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Information (Re)Use: Navigating Changing Needs for Information

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Information (Re)Use: Navigating Changing Needs for Information

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To Åsa, Valborg, and Agda

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Abstract

Understanding the concept of use within Information Systems (IS) has remained challenging, marked by the challenge of comprehending and anticipating its complexities. In this digital era, where contemporary organizations generate vast amounts of information, it could constitute valuable organizational assets over time. However, for information to constitute organizational value requires that it can be accessed, used, and reused in relation to changing information needs. With a focus on information within systems in contemporary organizational settings, this thesis aims to enhance the understanding of information use. Previous research on use within the IS research field has primarily concerned the technical artifact, the system itself, with less focus on the use and reuse of the information that systems contain. By examining the multidimensional nature of information use and its interplay with system use, this thesis seeks to contribute to an information-oriented perspective on the IS research field. Drawing from both IS and archival research, the thesis elucidates how information use and reuse can be understood in relation to organizational practices and changing information needs. Data has been gathered from three studies, using qualitative and quantitative methods, resulting in five papers presented in this thesis. The main findings suggest that information use is shaped by dynamic and situated information needs that are influenced by societal, organizational, and individual factors. The findings further suggest that information systems are primarily designed to support initial or intended uses, while over time, users develop information needs that extend beyond these purposes. By identifying changing information needs can support reuse over time by shifting the focus from an immediate use perspective to the underlying purposes that motivate

use. This highlights information reuse as a key factor in achieving long-term organizational value. It also demonstrates the value of understanding daily practices and viewing information in terms of its potential and secondary uses.

Keywords: Information use, information reuse, information needs, information systems, organizational context

Summary in Swedish

Att förstå konceptet användning inom informationssystem (IS) har fortsatt varit utmanande och präglats av utmaningen av att förstå och kunna förutse dess komplexitet. I en digital tid där samtida organisationer genererar stora mängder information, kan informationen utgöra värdefulla tillgångar över tid. För att information ska kunna utgöra organisatoriskt värde kräver dock att den kan vara tillgänglig, kunna användas, och återanvändas i relation till förändrade informationsbehov. Med fokus på informationen inom system i samtida organisatoriska miljöer syftar denna avhandling till att öka kunskapen om informationsanvändning. Tidigare forskning om användning inom IS-forskningsfältet har fokuserat på den tekniska artefakten, själva systemet, med mindre fokus på användning och återanvändning av den information som systemen innehåller. Genom att undersöka informationsanvändningens flerdimensionella natur och dess samspel med systemanvändning, syftar denna avhandling till att bidra till ett informationsorienterat perspektiv på IS-forskningsfältet. Med utgångspunkt i både IS och arkivvetenskaplig forskning belyser avhandlingen hur informationsanvändning såväl som återanvändning kan förstås över tid i relation till organisatoriska praktiker och förändrade informationsbehov. Empirin i avhandlingen har samlats in genom tre studier med kvalitativa och kvantitativa metoder och omfattar fem artiklar. De primära resultaten tyder på att informationsanvändning formas av dynamiska och situerade informationsbehov som påverkas av samhälleliga, organisatoriska, och individuella faktorer. Resultaten tyder vidare på att informationssystem primärt är utformade för att stödja initiala eller avsedda användningsområden, medan användare med tiden utvecklar informationsbehov som sträcker sig bortom

dessa syften. Att identifiera förändrade informationsbehov kan stödja återanvändning över tid genom att flytta fokus från informationens omedelbara användning till de underliggande syften som motiverar användning. Detta belyser återanvändning av information som en nyckelfaktor för att uppnå långsiktigt organisatoriskt värde. Det visar också på värdet av att förstå dagliga arbetsrutiner och se informationen i termer av dess potentiella och sekundära användningsområden.

Nyckelord: Informationsanvändning, återanvändning av information, informationsbehov, informationssystem, organisatorisk kontext.

List of Papers

I. **Hellmer, E**. (2023). Standing on the Outside Looking in: Testing the Concept of Societal Embeddedness from a User and Pluralising Perspective. In: Sserwanga, I., *et al.* Information for a Better World: Normality, Virtuality, Physicality, Inclusivity. iConference 2023. Lecture Notes in Computer Science, vol 13971. Springer, Cham. (*Published*)

II. **Hellmer, E**., Hasselblad, A., & Sundqvist, A. (2024). Considering Information Re-use in Public Sector Information Systems: A Factor of Success? In the *CEUR Workshop*. CEUR-WS. (*Published*)

III. **Hellmer, E**., & Sundqvist, A., & Frings-Hessami, V. (2026). From Storage to (Re)use: Factors Affecting the (Re)use of Organizational Information. In *Information Research* (*Accepted for publication*)

IV. **Hellmer, E**., & Hellmer, K. (2026). Testing DeLone and McLean's Information Systems Success Model: Measuring Mandatory Use of an IT System in a Public Organization. (*Submitted*)

V. **Hellmer, E**., & Sundqvist, A. (2025). 'Information in all its Different Guises': Exploring the Elusive Concept of Information. In the *International Conference on Electronic Government*. (pp. 85-100). Cham: Springer Nature Switzerland. (*Published*)

Additional scientific work not included in the thesis

Hellmer, E. (2023). Att bevara för att använda?: Om användares och användningens betydelse i arkivet [Preserving for Use?: On the Significance of Users and Use in the Archive] (Licentiate thesis, Mittuniversitetet)

Hellmer, E. (2023). It is a Matter of Perspectives: A Literature Review of Users and Use in an Archival Context. *Nordic Journal of Library and Information Studies*, 4(2), 19-34.

Hellmer, E. (2017). Chain of Archival Requirements: Usability of Digital Records in the Context of e-Services in Sweden. *INTEGRATING ICT IN SOCIETY*, 121.

Engvall, T., & **Hellmer, E**. (2017). As Money Turns Digital and Trust Turns Algorithmic: What Ought to be Considered? In Maintaining the Facts Infrastructure in the Era of Post-Truth Politics, 19-20 September 2017, National Swedish Heritage Board, Storgatan 41, Stockholm.

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Abbreviations

D&M Model	DeLone & McLean Information Systems Success Model
E-government	Electronic government
ICT	Information Communication Technology
IS	Information Systems
IT	Information Technology
RCM	Records Continuum Model
SE	Societal Embeddedness
STA	Swedish Transport Administration

Preface

Reflecting on one's doctoral journey is something that can be seen as a privilege. When I was about to begin writing this thesis, I was told that it would likely be one of the few times in my career when I would have the opportunity to truly reflect on my own work and the choices I have made over the years. In retrospect, I can say that the process of writing this thesis has been challenging, but it has been truly formative, allowing me to take a step back and gain perspective on the studies and articles in which I have been deeply engaged.

This thesis examines the use of information within systems in contemporary Swedish organizational settings. It is situated within the global digitalization landscape, characterized by incentives for efficiency and innovation, where organizational information is recognized as an asset and a resource for driving organizational growth and prosperity. To serve as a valuable resource, information generated within systems must be usable. How we use information and systems can create the opportunity to achieve and enable the realization of digitalization goals of efficiency and innovation. The focus of this thesis is the use and value of the information that systems contain, thus the interplay of information use and system use.

The purpose of this preface is to introduce the reader to the starting point of this thesis. I have often been asked a question along the lines of: "You didn't just wake up one day and decide on a specific topic or question to explore, what influenced your choices?" The answer is that our paths are shaped by experiences and moments of curiosity that guide our choices. For me, having a background and experience in archives and information science, as well as history, has influenced the questions I have formulated and explored. This background

motivates me to understand events and their underlying causes. It also includes a long-term perspective on records and information, on how they can remain understandable, accessible, and usable over time, regardless of when and who needs to use them. As a PhD student in information systems (IS) and as a lecturer in archives and information science, I enter the landscape of digitalization with its incentives for increasing efficiency, improving digital public administration, and creating streamlined and effective business processes for information management. To this, I bring with me a perspective influenced by archival thinking, one that highlights the importance of understanding how information is used today and how it can continue to be used within systems to continue to create value as a resource.

Next, I wish to share a brief introduction on the point of departure for this thesis, to outline the perspectives and experiences I bring to the field of information systems research. It is not a story of moving from one discipline to another but of standing in the space between and traversing disciplinary boundaries.

Point of departure

> I don't drink coffee, I take tea, my dear
>
> I like my toast done on one side
>
> And you can hear it in my accent when I talk
>
> I'm an Englishman in New York (Sting, 1987)

As Sting strolls down the streets of New York, he describes details that illustrate a cultural identity distinct from American culture. The lyrics underscore traditional British values, with the polite and calm

contrasted with the harsher and more intense American city. This signifies his background, but also what he brings and contributes to a different context and culture. In the lyrics, Sting describes that he has a walking cane by his side, which he brings everywhere he goes, symbolizing his English identity and British culture. The accent is different, but it is intelligible. The lyrics also convey a sense of alienation; even though he is a legal alien with a legitimate place in American society, they reveal a deeper feeling of not belonging. Standing in the space between the disciplines of information systems and archives and information science may create a sense of not fully fitting into either one. However, through one's background, one inevitably brings additional perspectives and forms of collaborations, consciously or unconsciously, into new contexts.

As a lecturer in archives and information science, one of the first questions I encourage students to reflect on is not how to arrange or classify information, but *why*. Embedded in the question of why is, in this context, a perspective of *time* and *use*. In the Swedish Archival Act, archives of public authorities "must be preserved, arranged, and maintained to meet

1. the right of access to public records,
2. the need for information for justice and public administration, and
3. the needs of research" (SFS 1990:782, §3)

The above suggests that the archives and their contents should be preserved, arranged, and maintained so that they can be used if the purpose of use based on these three points arises. The concept of use has historically been linked to the activity of appraisal of records, and in 1956, the American archivist and archival theorist Theodore Schellenberg introduced the concepts of *primary* and *secondary value*

of records. The primary value referred to the value that records hold for the originating organization and where the records should be preserved as long as there was a need, for example, to support contemporary business activities. Records of secondary values were values ”that will exist long after they cease to be of current use, and because their values will be for others than the current users” (Schellenberg, 1956, p. 238). The distinction between primary and secondary value marks a temporal separation between now and then, yet the “then” value is meant for others that we cannot yet know, whose purposes and moment of engagement remain uncertain. Secondary use was, at this time, linked primarily to users such as researchers in disciplines like history and other social science subjects. Meaning, that “modern archives are kept for the use of others than those that created them, and that conscious decisions must be made as to their value for such use” (Schellenberg, 1956, p. 14).

In today's digital era, where large amounts of organizational information are created across different systems, secondary values can be recontextualized to exist within one's own organization. And where "the others" can be within that organization itself, as information needs constantly evolve, and the concept of “then” may even relate to the near future. As I bring the idea of secondary value, a value for others, into contemporary organizations, where information is regarded as a resource, it also suggests that information should not only be usable but also *reusable*. The accent that archival science has, or the tone it strikes, primarily concerns, in this thesis, a time perspective, but also a tone of reuse and the notion of continuing value. When discussing incentives for efficiency and innovation in the context of digitalization of societies, organizations,

and processes, the time perspective for secondary uses and purposes of use must be included in that discussion.

The concept of use in the research field of IS is linked to the use of information systems and is a central concept in the field. It "refers to an actor's employment of an information system to perform an activity, where an actor refers to the individual, group, organization, or other collective using the system" (Burton-Jones, Stein, & Mishra, 2017). The use of information contained in systems usually involves an actor or, as it is referred to in this thesis, a user. In this thesis, the user is a user of both the system and the information the user needs.

This interplay of information use and system use invites interdisciplinary approaches. The research field of IS is of interest to many different disciplines (e.g., computer science, engineering, social science, psychology, et cetera). Concurrently, archives and archival practice have interested disciplines such as sociology, psychology, and philosophy. Through the Archival turn, researchers in other disciplines have influenced new perspectives on archival theory, methodology, and practices (Ketelaar, 2017).

Information systems research is wide and involves:

> "[…] a variety of information technologies (IT) such as computers, software, databases, communication systems, the Internet, mobile devices, and much more, to perform specific tasks, interact with and inform various actors in different organizational or social contexts" (Boell & Cecez-Kecmanovic, 2015, p. 4959)

Examining the interplay between information use and the system that contains information means finding influences or ideas from other disciplines. In the studies presented in this thesis, I have navigated between the two disciplines of IS and archives and information

science. The studies that have examined users' information needs, variations in use, and how systems are used to search and find information that users need have all been shaped by the theories and methods of both fields.

When I first began this doctoral journey, I felt alienated and metaphorically like an Englishman in New York with a different accent and slightly out of place. Although I have not significantly changed my accent, I have embraced the opportunity to learn about another culture and, along the way, have come to enjoy both coffee and tea. Building on this point of departure, the following chapter outlines the scope and objective of this thesis.

1 Introduction

In this digital era, where vast amounts of information are continuously created, effective management can transform information into valuable assets. Organizations face growing challenges in designing systems and functions that enable different users to access and understand the information they contain. This, as information has become increasingly integral to business processes and provides advantages to organizational employees in their work tasks (Byström, Heinström, & Ruthven, 2019). Organizational information has been described not only as an asset and resource, but also as the organizational glue, fuel, and currency (Svärd, 2014), emphasizing the need for well-structured information management to support organizational effectiveness (Sundqvist & Svärd, 2016).

As the name of the discipline of information systems (IS) implies, it includes the concept of *information*, and there has recently been a pronounced need to clarify the concept and its meaning further (see Carter, Petter, & Randolph, 2015; McKinney & Yoos, 2010; Mingers & Standing, 2018; Petter et al., 2018). Additionally, this clarification can be important for enhancing understanding of how information, or the 'assets' of organizations, can be used to support organizational development and fulfill electronic government (e-government) visions.

Use is a central construct in IS research, often focusing on how users apply IS artefacts. However, much of the existing literature conceptualizes use in relation to the use of the artefact itself (e.g., Baird & Maruping, 2021; Burton-Jones & Gallivan, 2007; Mingers & Standing), while less attention is placed on the use of the information the systems contain. Earlier research, for example, in the work of

Langefors (1977; 1980), illustrates a greater emphasis on information in an information-oriented perspective.

The use of the information within a system is closely tied to the system's design. In this sense, information and systems are intertwined. However, failing to consider how a system facilitates access to the information it holds can result in limited or even impossible use of the information it contains. As Díez and McIntosh (2009) have dictated:

> "Arguing for a better understanding of use and usefulness is equivalent to arguing for a better understanding of the ways in which information is acquired, manipulated, and used by individuals and groups within organizations, and should be a fundamental influence on the process of developing IS" (Díez & McIntosh, 2009, p. 589)

Linked to the concept of use is reuse which has, in recent times, come to be associated with contexts such as open data, (e.g., Attard, et al, 2015; Gao & Janssen, 2022), reuse of research data or Open Science (e.g., Hafner et al, 2025; Pasquetto, Borgman, & Wofford, 2019; Tenopir et al, 2020), and in IS development and software engineering (e.g., Vial, 2023). In 2019, the Directive (EU) 2019/1024 on open data and the reuse of public sector information was published. The legal framework aimed to encourage the use of open data and consisted of a set of minimum rules to enable public and publicly funded data "to be reusable for commercial or non-commercial purposes" (European Union, 2019). The concept of reuse within these contexts is defined as a beneficial process that yields benefits such as increased efficiency and production, improved quality, reduced costs, time, and workloads, and more. Reuse in these contexts concerns using something already existing for similar or other purposes based on the

"well worn adage, to avoid reinventing the wheel" (Brash, 2001). However, despite its explicit benefits, research on the reuse of organizational information in contemporary organizations is scarce.

One of the goals of effective information management is to transform organizational information into knowledge; thus, information is considered a strategic resource and asset for organizations (Choo, 2002). Streamlining information management in organizations is strongly linked to digitalization and e-government initiatives. Beyond emphasized goals of enhancing public service delivery and fostering inclusivity, e-government also aims to develop internal organizational processes (Setyarto et al., 2025). While the implementation of e-government aimed to fundamentally reshape governmental structures, the digital transformation within public administration has had varying degrees of success (Kempeneer & Heylen, 2023). Even though digital transformation in the IS research field is increasing, its success does not just lie in the implementation and use of new technology; it is considered a broader phenomenon and also involves the transformation and change of organizational structures, strategies, processes, management concepts, and culture (Kutzner, Schoormann, & Knackstedt, 2018; Mahraz, Benabbou, & Berrado, 2019). Previous research in information management has emphasized, from the perspective of e-government development, the importance of a holistic environment where the information structure integrates information systems, routines, legal requirements, and defined management roles. This approach promotes collaboration, system integration, staff training, and emphasizes process engineering and the reuse of information (Svärd & Zimic, 2021).

While extensive research has been conducted on the evaluation of the implementation of systems, such evaluation should extend beyond the technical artifact. Evaluations should also encompass the

content, the output of the system, and thus the data or information that users interact with or require through the system. The effective use of this content is, in that sense, essential for realizing the goals of streamlining administrative processes. As previous research outlines, to increase the quality of an information system, different usages and current, potential, and even future users need to be considered (Borglund, 2008). This challenges both the use and design of information systems, influencing how information is stored, organized, and accessed.

1.1 Problem Formulation

As outlined above, information has been described as a central asset (Svärd, 2014) for organizational effectiveness (Sundqvist & Svärd, 2016). When information has become integral to business processes and provides advantages to organizational employees (Byström, Heinström, & Ruthven, 2019), there are growing challenges in understanding how organizational information is actually used and how information use evolves. Additionally, what needs drive information use and how these needs can be made visible and supported in information management and system improvement.

When information needs evolve and "secondary" purposes emerge within an organization, systems risk failing to support assessment of information and informed decision-making.

Reuse is a concept that has been in focus in different contexts (e.g., Hafner et al., 2025; Vial, 2023) and is attributed to the value of being able to increase efficiency, improve quality, and reduce costs and workloads, but within the context of organizational information, it is underexplored. More emphasis on the possibility of reusing organizational information can increase organizations' ability to

improve or design information systems and information management practices to support effective use. It can minimize organizational information from becoming underutilized, lost, or needing to be recreated, rather than being used as a strategic and reusable asset.

The subject of this thesis is information use in contemporary organizational settings, in the context of and in the footsteps of digitalization and e-government development, where systems are designed to streamline organizational workflows and enhance decision-making. Against this background, this thesis explores the importance of information use and reuse perspectives in contributing to organizational efficiency. Further, it explores how insights into information use and the need to use can inform information management in contemporary organizational systems. By combining insights from the information systems research field with an archival theoretical perspective, the thesis places particular emphasis on information needs and variations in information use. This combined perspective highlights information reuse as a critical, yet often unexplored, opportunity for ensuring effective information use in contemporary organizations.

1.2 Research Questions and Thesis Aim

The overarching aim of this thesis is to enhance knowledge of information use and reuse in contemporary organizational settings by examining the need to use information and variations of use.

Two research questions are formulated to address the research objectives:

> RQ 1: What affects and influences the need to use information?

RQ 2: How can making diverse information needs visible support information reuse over time?

1.3 Outline of the Thesis

To address the research questions of this thesis, Chapter 2 first presents related research on the development of e-government, the value and role information plays, and how previous studies have examined information users, use, and reuse in different contexts. Chapter 3 introduces the theoretical and analytical frameworks that underpin this thesis and guide the analysis of the empirical material. It presents and clarifies the theoretical perspectives of the empirical findings, which are discussed in Chapter 6. This is followed by Chapter 4, which presents the methodological choices made. This includes the research context in which studies have been conducted, a presentation of the research process, as well as methodological and ethical reflections. Primarily, qualitative methods have been used through interviews and document studies, but quantitative method in the form of a survey has also been applied. Chapter 5 is the summary of the five papers included in the thesis. Chapter 6 presents and discusses the main results of the thesis in relation to the theoretical and analytical frameworks. Finally, Chapter 7 presents the conclusions of the thesis, suggestions for future research, and the main contributions.

1.4 Key Concepts

The core concepts of the thesis are presented below. The aim is to describe how these concepts are understood in the context of the studies and papers presented in the thesis.

Information: The concept of information is often linked and interrelated to data and knowledge. In this thesis, the concept is understood as "[…] the meaning produced from data based on a knowledge framework that is associated with the selection of the state of conditional readiness for goal-directed activities" (Kettinger & Li, 2010, p. 415). In this thesis, the concept of information is both treated as something that is contained within systems, and additionally, not regarded as a static entity but rather something that is given meaning in relation to its use.

Records: Even though records have not been the research concept of the thesis, the concept is, in organizational contexts, closely linked to and often synonymous with information. Archival theory positions records as its central concept and as the focus of recordkeeping practices (Sundqvist, 2009). Records serve as evidence of business activity, and "any set of information, regardless of structure or form, can be managed as a record" (ISO 15489-1:2016); thus, records contain information.

Information Systems: In this thesis, information systems are understood as involving both a technical (e.g., IT systems) and social (e.g., users and organizational contexts) dimension of IS.

Use: Use refers to both system use and information use, where the concept is understood as situated and as a purpose-driven human activity.

Users: There are different viewpoints on what constitutes a user depending on the context and discipline. In this thesis, the user is someone who engages with a system to access and use or reuse the information it contains based on a specific need for information. A common term in the IS research field is the *actor*, often to emphasize agent and context; however, the term user is here chosen to target

individuals who engage with information systems and information in organizational settings.

Reuse: In general terms, reuse is described as "further, different, or repeated use" (merriam-webster.com). Other related concepts are recycling, upcycling, or repurposing. The prefix *re* refers to *again, anew, back,* or *backward* (merriam-webster.com), suggesting that the core of the concept is the use of something already existing. In this thesis, the concept is understood as the secondary and situated use of existing information or data for similar or new purposes or needs.

2 Related Research

Contemporary organizational systems have their roots in early e-government initiatives, aimed at improving the efficiency and service orientation of public administration. With information playing a critical role in business processes and supporting employees in their work, modern organizations need to address the challenge of creating systems that enable different users to access, interpret, and use the information they provide. The related research presented below is situated in the context of this thesis, which is divided into three interrelated areas: the development of e-government, perspectives on the role and value of information, and related research on users, use, and reuse of information.

2.1 The Effective Government

The global landscape of digitalization has been described in terms of grand narratives of societal rebirth and large-scale changes, permeating national government policies (Gidlund & Sundberg, 2022). The phenomenon, or the expectations, of digitalization often highlights the increasing efficiency improvements of new organizational solutions, leading to enhanced economic growth and benefits for society (Nyhlén & Gidlund, 2022). In 2018, the Agency of Digital Government was established in Sweden to coordinate and support the making of a more efficient and effective digital public administration (SFS 2018:1486). This was part of Sweden's political digitalization strategy, aimed at leveraging technology to improve public services, accessibility, and organizational tools while streamlining business processes for information management. This included the effective implementation of internal development within public sector organizations (Swedish Government, 2017/18:47). Stemming from the internet boom in the 1990s, e-government

emerged as a means of making public administration more citizen- and business-oriented (Ilshammar, Bjurström, & Grönlund, 2005).

The term "e-government" has commonly been used to describe the use of information and communication technology (ICT) by governments and public administrations (Bannister & Connolly, 2012) to enhance administrative efficiency, promote democratic values, and encourage citizen inclusion (Bernhard et al., 2018). Over the years, e-government research has focused on the role of technology in enhancing the productivity of government employees and improving electronic services for citizens, including e-democracy, e-participation, and e-transactions, et cetera (Manoharan & Ingrams, 2018). Although e-government has led to the development of many successful systems and electronic services, previous research has highlighted its shortcomings in fully realizing the initial visions of e-government. One of the reasons for this has been described as the gap between the expectations of internal and external stakeholders, such as governments, businesses, managers, and citizens, and the actual outcomes of e-government projects (Rose, Flak, & Sæbø, 2018). According to Bannister and Connolly (2012), there has been a rush to adopt new technologies, leaving older technologies and ideas downgraded or implemented less effectively than intended. The authors argue that the continuous, rapid pace of technological development presents both opportunities and challenges, emphasizing the importance of continually evaluating what works, what does not, and why. New technologies often introduce complexity and overdesign, which can aggravate use and demand significant time and resources. Fully adopting e-government, they argue, requires long-term planning, a holistic approach, and tenacity (Bannister & Connolly, 2012).

One key factor in e-government development is effective information management in organizations (Sundqvist & Svärd, 2016). By using ICT, governments have sought to streamline and enhance public services and administration. The introduction of e-government has led organizations to implement digital systems to achieve national e-government efficiency goals. These efforts are intended to streamline operations and modernize organizations, with the promise of delivering both internal and external benefits. The implementation of e-government is, however, associated with various challenges (Ashaye & Irani, 2019). According to previous research, these challenges have been explored as external and internal factors that affect the success of e-government implementation. Ashaye and Irani (2019) divide the external factors into organizational, political, economic, legal, and critical mass. The internal factors relate to leadership, financial matters, goals and objectives, attitudes, and network infrastructure. In order to achieve successful e-government implementation, there is a need to strategize the relationship between public organizations and their stakeholders (Ashaye & Irani, 2019).

The implementation of e-government has been examined from various perspectives, such as concerning the concept of value or public value of e-government implementations (e.g., Bannister & Connolly, 2014; Pang, Lee, & DeLone, 2014; Sundberg, 2019; Twizeyimana & Andersson, 2019). Weerakkody et al. (2015) conducted a systematic literature review on the cost, opportunity, benefit, and risk analysis of e-government implementations, drawing on 132 research articles. The authors argue that e-government is often linked to efficiency and characterized by attributes like better, cheaper, faster, more cost-effective, transparent, and accurate, reflecting the expectations or aspirations surrounding the e-government phenomenon. According to the authors, successful

implementation is based on factors of cost-effectiveness throughout the entire implementation process, from initial planning to adoption, but it also needs to deliver clear benefits to its intended users or recipients (Weerakkody et al, 2015).

2.2 The Value of Information

The modern world has been described as an age of information, or that society of today is an information society. The concept of *information* has achieved a special relevance affecting social, political, and economic relations (Webster, 2014). In a time where vast amounts of information are constantly being created, organizational information has been described as an asset, a resource, as well as the glue, fuel, and currency in organizations (Svärd, 2014). As digital information becomes increasingly embedded in business processes and enhances employees' ability to perform their tasks, it also poses challenges for organizations (Byström et al, 2019). One of these challenges is designing systems that allow diverse users to access and interpret the information effectively (Sundqvist & Svärd, 2016)

Information systems (IS), information technology (IT), and information communication technology (ICT) all revolve around the concept of information, indicating that it has relevance and meaning. For almost three decades, there have been debates on what the core of information systems research is and should be. Previous discussions have revolved around standpoints that the core is the IT artifact itself (e.g., Benbasat & Zmud, 2003) or the systems in organizations (Alter, 2003). Myers (2003) has argued that the IT artifact is considered one part of a system and, thus, not the core of the IS research field. Myers emphasized that there is no consensus on the definitions of information systems and information technology, nor on the concept

of information itself. According to Myers (2003), information is defined and described in various ways, being considered a resource in one context and a product in another. More recent research has emphasized that technical artifacts function as mechanisms for storing, transmitting, and providing access to information (Mingers & Standing, 2018).

In organizational management, information is described as a key factor for the growth and prosperity of the organization (Durugbo, Tiwari, & Alcock, 2013), and when well managed, it may promote organizational effectiveness (Sundqvist & Svärd, 2016). The impact of strong information governance within organizations is described as effectively creating value and reducing costs and risks (Lian, Wang, & Oliver, 2022). In addition to the descriptive value of information, information research has addressed conceptual analysis.

Previous conceptual research has linked and interrelated the concept of information to data and knowledge (e.g., Langefors, 1980; Martz & Shepherd, 2003; Tuomi, 1999). Or in the DIKW hierarchy or the "Information Hierarchy" where the four components, data, information, knowledge, and wisdom are presented in a causal relationship, information represents meaning that is generated through data processing, leading to knowledge and wisdom (Mingers & Standing, 2018; Rowley, 2007). Tuomi (1999) turned this around by arguing that information "can be created only after there is knowledge" Tuomi, 1999, p 118). In the literature, information is highly related to data and can also be used interchangeably (Lee, 2004), and Boell (2017) argues that information is processed data.

Byström et al (2019), referring to workplace information, relate the concept of information to its potential and describe that "information is a resource to be cultivated, organized and harvested through different systems" (Byström et al, 2019, p. 11).

The words attributed to the concept of information reveal something about its meaning and that it has some sort of value for someone. Still, as Yeo (2018) has argued:

> "We live in an information culture, in which we hear information mentioned so frequently that most of us feel no need to ask what kind of phenomenon it is" (Yeo, 2018, p. 86)

When interpreting Yeo, information is something that is taken for granted, with the assumption that everyone is familiar with its meaning. The concept of information, according to the literature, may refer to fuel, resources, documents, data, or records, depending on the context in which it is discussed and by whom.

2.3 Users, Use, and Reuse

> When individuals have an information need or find a gap between their existing knowledge and a new situation, they select an information system and use it in order to find that which seems needed to fulfill the information need or fill in the perceived gap (Palmqvist & Kim, 1998, p. 4)

Previous research on users, use, and reuse spans a wide range of different perspectives and levels of analysis. Much of this research has sought to understand how systems are used, who the users are, what prior knowledge users possess, what the users are searching for, and how they search for and use information in systems.

Previous research has identified different approaches to user studies, such as system-oriented, user-oriented, and holistic user-oriented studies. In the system-oriented approach, the user is viewed as a passive receiver of information. In contrast, the user-oriented approach views the user as an active and constructive user of

information. In the latter, the focus is on the user's subjective and perceived values of information, and the user is recognized as part of a dynamic and changing context. The holistic user-oriented approach concerns both the internal variables of the user, including the cognitive and affective aspects, as well as external variables related to social and cultural contexts (Palmqvist & Kim, 1998).

Orlikowski (2000) has described that users are shaped by and shape technology through organizational practices. Based on the idea of technology-in-practice, that is, the specific interaction structure that occurs when people use technology, Orlikowski argues that the use of technology is temporary, thus that it is an open-endedness to use where there is a possibility for users to do differently in the context they find themselves in. According to Orlikowski (2000), use is different for different individuals, and it can be different for the same individual depending on time and circumstances. Use is in this sense, changeable and can be influenced by different things, such as an example where "[…] a company's new policy for the use of safety features is likely to alter people's view and understandings of the appropriate ways of using the technology in this company" (Orlikowski, 2000, p. 272). Users also draw on their own technical skills, prior knowledge, experiences, assumptions, expectations, and understanding of functions. According to Orlikowski (2000), technology use is always situated and emergent. It is based on the structure and design on which the technical artifact is built, but users can always redefine and modify their use after design and implementation (Orlikowski, 2000).

User studies may also focus on the expertise of users (e.g., Sedera & Dey, 2013), perceptions of users, and how users impact systems or systems' impact on users in decision-making (O'Donnell & David, 2000).

The archival science discipline has a long tradition of studying users to enhance access to archival material and systems. Since the 1980s, there have been various user studies with the endeavour to increase the understanding of who the archive user is and how users search for and use information that they need in a variety of contexts (e.g., Conway, 1986; Maher, 1986; Turnbaugh). Freeman (1984) argued for a systematic approach to make the users' needs visible and to understand how they perceive the archival material. User studies have been conducted with known users (Duff & Johnson, 2002; 2003), with experienced and less experienced users (Prom, 2004), or examining users within specific archival practices (e.g., Rhee, 2017).

Segmentation models have been used to categorize users and their use of information and records (e.g., Sexton, Yeo, Turner, & Hockey, 2004; Yeo, 2005). What variables to select is dependent on the particular context and can consist of geographic location or demographic variables (e.g., sex, age, and social class), or sociological variables (e.g., level of education, computer competence, levels of literacy, et cetera), to enhance user understanding and streamline use and search processes. Archival researchers have focused on the creation of archival systems design, the use of finding aids, and system interfaces, as well as on user behaviour, user cognition, user orientation, and the perception of users. As a concept, a user can be described as a heterogeneous and context-bound concept (Hellmer, 2023a). Users and their use of information have also been examined through various models and theories of information-seeking and behaviour (e.g., Ellis, 1989; Kulthau, 2007; Wilson, 1999). Others have highlighted the significance of context, the social environments within organizations in which the user as the social actor is affected (e.g., Kling & Lamb, 2003).

System usage has long been considered a key variable in IS research and has been studied in various organizational contexts (Burton-Jones & Gallivan, 2007). With the growing development of various information systems, there is a rising interest in evaluating the outcomes of an invested IS and, consequently, the success of the IS.

Use, as a concept within the field of IS, has concerned studies of the relationships between user participation and system use (e.g., Hartwick & Barki, 1994; Lin & Shao, 2000). Through time, the measurement of success has shifted the focus of measuring speed and accuracy toward subjective measurements of the strategic and social impact of the system (Petter, Delone, & McLean, 2012). In the last two decades, several different IS models have been developed to measure and understand which variables influence what makes an IS successful, such as the Delone and McLean Information Systems success model (Delone & McLean, 1992; 2003), the Technology Acceptance Model, TAM (Davis, 1989), and the Unified Theory of Acceptance and Use of Technology, UTAUT (Venkatesh et al, 2003). The Technology Acceptance Model focuses on the acceptance and use of certain technologies and is a commonly used theory within e-government research, evaluating users' acceptance of certain technologies (Bélanger & Carter, 2012). However, Petter, DeLone, and McLean (2008) have argued that users' acceptance of technology is rather a necessary prerequisite than equivalent to success.

In the archival field, the concept of use has historically been connected to the appraisal and primary and secondary value of records. Schellenberg (1956) described the primary value of records as the value of the organization that created the record and should therefore be preserved as long as there is a need for the record (e.g., to support business needs). The secondary value was described as values “that will exist long after they cease to be of current use, and

because their values will be for other than the current users" (Schellenberg, 1956, p. 238). However, this distinction of values creates a clear divide, forming dichotomies of "now and then" and "the creators and the others". More recent research, however, differentiates between primary and secondary *purposes*, where the primary purpose refers to why records are created, while the secondary purpose focuses on their use, regardless of when and by whom (Menne-Haritz, 1998). Standford and Meyer (2011) have argued that judging the value of records is based on their potential use.

With the prefix "re", reuse is assumed to have a different meaning than the concept of use, in the sense that the difference lies in a first and a second use (Van de Sandt et al., 2019). The concept of reuse has been explored in several different research contexts and in different disciplines. In the context of the reuse of open data, the concept of reuse is a key concept. In 2019, the European Parliament published a recast of the Directive on open data and the reuse of public sector information to increase the supply of valuable public data. In this, public sector bodies are encouraged to promote and administrate the ability to reuse "any documents held by them" for the potential re-users. Reuse in that context is referred to as "the use by persons or legal entities of documents […] for commercial or non-commercial purposes other than the initial purpose […] for which the documents were produced" (European Union, 2019). Opening up public data and information has been described as an enabler of all different benefits, as well as an economic asset and a driving force for transparency (Attard et al., 2015; Gao & Janssen, 2022; Hellberg & Hedström, 2015). According to Lassinantti (2019), the reuse of open public data addresses "new purposes" and can be linked to different reuse activities. These activities involve getting access to the data,

usually through a technological interface, the ability to understand and interpret the data, the handling of the data based on a user's own purpose, or repurposing the data to fit a specific need, and contextualizing the data in a broader frame linked to a new purpose (Lassinantti, 2019).

Similar activities and the meaning of the concept can be seen in the context of the reuse of scientific research data or open science. Here, reuse simply refers to the reuse of data that scientists did not collect themselves. The concept of reuse is a key concept in the FAIR principles, a framework for management of scientific data to make them Findable, Accessible, Interoperable, and Reusable. The central thought of these principles is to facilitate knowledge discovery and innovation, thus to make previously created data and metadata usable for others (Wilkinson et al., 2016). Although the benefit of the framework is clear, the realization of the framework is highly based on individual technical skills and research culture, making it a time-consuming and resource-intensive process (Fraga-González et al., 2025). In this context, data reuse is "usage of a dataset by someone other than the originator", thus, reuse is not limited to time (Pasquetto, Borgman, & Wofford, 2019). Previously created data is reused across different disciplines, for example, in the context of the reuse of ecological data, Zimmerman defines reuse as "the use of data collected for one purpose to study a new problem" (Zimmerman, 2008, p. 634). In the specific context of ecologists' reuse of data, the author highlights the importance of purpose, specifically the primary purpose for which the data was created. According to Zimmerman (2008), reuse or secondary data use is guided by the experiences and tacit or information knowledge of scientists.

In the context of research in the field of information systems development (ISD), reuse typically concerns issues such as economic,

performance, and technology, where the notion of reuse is linked to increased efficiency, productivity, and reliability of information systems. Reuse in the ISD regards the reusability of previously used functions and artifacts originating in the software engineering community (Brash, 2001). In the context of the reuse of software, it is described as leading to shorter coding time and a reduction of cost and time in a development process (e.g., Ahmad, Hashim, & Asmai, 2020; Beydoun et al., 2020; Vial, 2023). Research regarding reuse covers a wide scope that explores, in addition to what has been mentioned, also the reuse of IS services (e.g., Kettinger, Park, & Smith, 2009), previous engineering, design patterns, and best practices with described benefits such as reduced workloads, improved quality, and more time for creation and innovation (Liu, Kittur, & Myers, 2021). In addition to research on the reuse of already existing artifacts, the research on reuse also concerns the reuse of knowledge and lessons learned (e.g., Markus, 2001). In a study focusing on information reuse in the context of large aerospace and manufacturing companies, Mey Goh and McMahon (2009) argue that a limitation of information reuse lies in the lack of strategies for capturing information. Additionally, there is a lack of understanding of the purpose of reuse and its benefits. According to the authors, "information reuse occurs when information is assimilated and used in a new application and also, subject to some processing, yields useful new insights and knowledge" (Mey Goh & McMahon, p. 631, 2009). Being able to learn from previous use is considered beneficial; however, the authors highlight a knowledge gap that needs to be addressed further. To solve this, reuse should be considered early with strategies and methods concerning structure, information classification, adoption of taxonomies, and the capture and reuse of information should be embedded in work processes. Additionally,

the authors argue, information retrieval needs to be improved "to ensure information is available to the right people at the right time" (Mey Goh & McMahon, p. 637, 2009).

Previous research shows differences in users' needs and expectations depending on what is searched for. Different user groups have different expectations, and there is a challenge in clarifying these (Adams, 2007). Shepherd and Yeo (2003) categorized the motivations for use into business, accountability, and cultural purposes. This was further developed by Sundqvist (2015) who identified several purposes for use: "[…] *material purposes* to ascertain the users' benefits and rights; for *operational purposes*, to provide input in practical activity either personal or business related; for *accountability purposes*, to maintain control and finally, for *knowledge-enhancing or self realisation*" (Sundqvist, 2015, p. 12).

Sundqvist (2015) has argued that "the ultimate reason for creating and keeping records is that they are of use for someone for some purpose" (Sundqvist, 2015, p. 3). The use, in itself, has according to Sundqvist, not any value of its own. The use of records or information occurs when they are needed, and as Sundqvist adds, the need to use is determined or influenced by something outside the record itself (Sundqvist, 2015). However, finding the motivation or purpose of use is not a straightforward process. When discussing uses, Yeo (2005) bases it on the values of records as evidence, as sources of information, and as artifacts or objects. Why records are being used, or the values sought, may differ, being difficult to distinguish between evidential or informational values, "users seeking evidence may want not only proof that something was done, but confirmation of what was done, who did it or when it occurred" (Yeo, 2005, p. 34).

2.4 Summary

Previous research has highlighted challenges in implementing e-government visions, which entail challenges in meeting organizational efficiency demands both internally and externally. Although citizen adoption of technology has been a central theme, growing attention is directed towards the complex digital infrastructure needed to realize these visions, particularly the efficient use of organizational assets such as information. As e-government research often highlights efficiency from different perspectives, it rarely addresses how this efficiency could be translated into users' concrete information needs.

Studies on use focus on both the interaction between systems and their users, as well as how effectively these systems meet user needs. They also explore how information or records within these systems are used. Despite differing approaches, the common goal across studies is to enhance understanding of users and use patterns, ultimately driving improvements. As this related research highlights, there remains a significant need to continue adapting systems to their intended users, where governmental organizations must address the challenge of creating systems that enable different users to access and effectively interpret the information they provide.

Information is a central concept, however differently defined, which challenges its use and reuse in organizational systems. Based on this related research, reuse as a concept concerns using something already existing for similar or other purposes with described benefits such as increased efficiency, productivity, time and cost reduction, reduced workloads, improved quality, shorter coding time, et cetera. Sometimes based on the "well worn adage, to avoid reinventing the wheel" (Brash, 2001), but also on the ascribed value of being able to access something for further use. Although there are described

benefits of reuse, research on the reuse of organizational information and its benefits is scarce.

In summary, this review points to a need to further examine how organizational information is used and reused by different users, and how variations in use can be understood in contemporary organizational settings.

3 Overview of Theoretical Frameworks

This section introduces the theoretical frameworks that underpin this thesis. The aim of this section is not to develop a theory, but to present the analytical lenses through which the research questions and the results of the thesis are discussed in Chapter 6. Rather than being a theory-driven thesis, it is a data-driven thesis that uses theoretical tools.

In the thesis, the records continuum thinking and the concept of societal embeddedness (SE) are used analytically to identify and discuss the factors that affect and influence users' need to use information, as well as to explain how these needs relate to the organization of information in systems. More specifically, at a meta-level, continuum thinking is used to analyze how information is created, captured, organized, and potentially reused, while SE enables an identification of how broader societal factors (such as laws, regulations, expectations, and norms) affect these processes (RQ 1).

As technical solutions are implemented to improve efficiency within organizations, the information systems success research emphasizes the importance of evaluating the "effective creation, distribution, and use of information via technology" (Petter, DeLone, & McLean, 2012, p. 342). An invested IS within an organization is considered a long-term investment (Gable, Sedera, & Chan, 2008), and the ability to access information within the system is vital for organizational progress. While several information systems success models exist, the DeLone & McLean Information Systems Success Model (D&M model) stands out for incorporating not only a system perspective but also a focus on information. Since this thesis focuses

on information use within systems, the D&M Model as an analytical lens contributes to the analysis by enabling an examination of how the different dimensions of the model relate to users' ability to meet their need to use information and thereby to support use and reuse (RQ 2).

Even though these frameworks have been applied in the individual studies presented in this thesis, they are also used at a meta-level in the thesis as a whole. Together, these frameworks contribute to the analytical discussion in Chapter 6 by linking the emergence of the need to use information to the practical realization of use in systems. As societal embeddedness explains why the need to use information emerges, the D&M model is used to analyze whether these needs are supported through system use.

A short introduction to the frameworks is presented next.

3.1 Societal Embeddedness

Records continuum thinking addresses recordkeeping across five key areas: the role of records in governance; the connection between recordkeeping and accountability; its function in shaping corporate and collective memory; its role in providing evidence; and the value of records as value-added information where records may function as a resource and "[…] can be exploited as assets, with new records being created in the process" (McKemmish, 1997, p. 2). As the Records Continuum Model (RCM) is related to recordkeeping, its holistic perspective on records makes it applicable in broader contexts. Visualizing its dimensions can be effectively used to engage other stakeholders involved in activities across the dimensions of the model. In 2021, Frings-Hessami introduced the concept of societal embeddedness (SE), building on the RCM. The concept of societal

embeddedness was presented to serve as a framework for interpreting and analyzing pluralization processes of the use of records. The concept extends Hans Hofman's Dutch translation of the fourth dimension, *maatschappelijk inbedden*, which is translated to "embedded in society" in English. Societal embeddedness is presented as a means to illustrate and explain pluralization, emphasizing that it involves not only future sharing but also societal expectations in both records and recordkeeping (Frings-Hessami, 2021).

Based on a continuum perspective on records, Cumming (2010) has described that it "operates through time, not in time" (Cumming, 2010, p. 42); thus, records may have multiple purposes depending on their use. In different times, contexts, and organizations, different mandates dictate the creation, capture, organizing, and pluralization of records, creating different recordkeeping stories (Reed, 2005b). The use of the SE as a tool in contemporary organizations may enhance the understanding of the impact of societal contexts on all dimensions of the RCM.

The RCM is a conceptual and analytical tool that emphasizes the continuum of recordkeeping and archiving. Reed (2005b) has argued that "recordkeeping does not occur in a social, cultural or political void", meaning that what is valued as something to be preserved or created is affected and regulated by social and cultural aspects, as a conscious or unconscious act (Ketelaar, 2001). It was first created in the middle of the 1990s by the archival scholar Upward and can be used to analyze different perspectives of recordkeeping through spacetime and outside of records' original context (Upward, 1996; 1997), and can "[…] open up new threads of action, involving re-shaping and renewing the cycles of creation and disposition" (Upward, 2000, p. 120). The RCM can be used across different

recordkeeping contexts, including contemporary, regulatory, and historical settings (Upward, 1997). With a continuum approach, "records are 'fixed' in time and space from the moment of their creation, but recordkeeping regimes carry them forward and enable their use for multiple purposes by delivering them to people living in different times and spaces" (McKemmish, 1997, p. 2)

As Figure 1 shows, the RCM consists of four axes (evidentiality, transactionality, recordkeeping containers, and identity) and four dimensions (create, capture, organize, and pluralize).

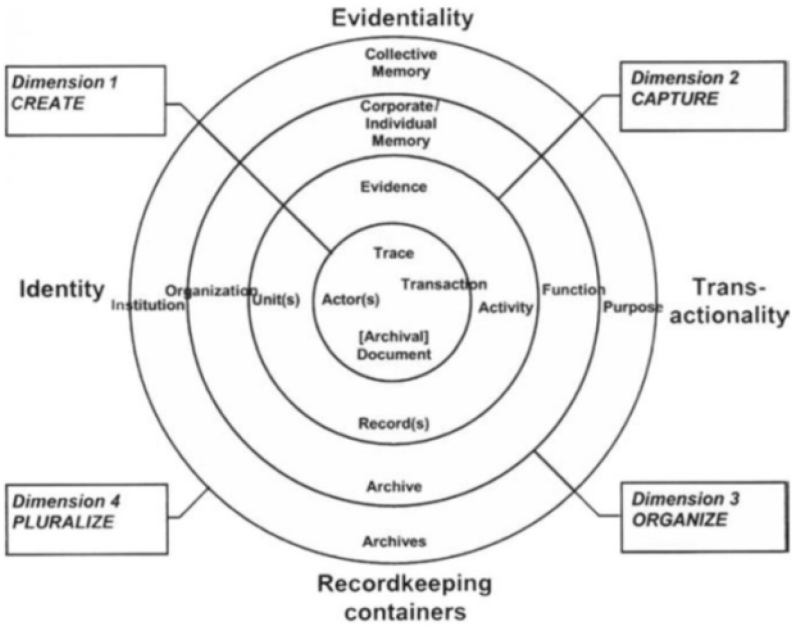

Figure 1. The Records Continuum Model © Frank Upward

Depending on the context and based on what purposes, the model can be read to analyze different recordkeeping stories (e.g., Frings-Hessami, 2017; 2021; Karabinos, 2018; Reed, 2005b). The first dimension, create, is "the locus of all action" and is where a

document is created. This trace of an activity, embedded with metadata, is captured in the personal and organizational recordkeeping system, which takes place in the second dimension, capture. When organized and aggregated with other information and records, as corporate and individual memory, it moves to the third dimension, organize (Reed, 2005b). The fourth dimension, pluralize, illustrates interpretations and usage beyond the boundaries of the original context where records function as a collective memory (McKemmish, 2001). From a pluralized perspective, a record can be interpreted across spacetime, beyond its original context, whereas a record "[…] is always in a process of becoming" (McKemmish, 2016).

In an era where vast amounts of information and records are generated across diverse technological solutions, it is critical to organize and make sense of the ability to access and to carry their use forward for multiple purposes and people.

3.2 Information Systems Success Model

The first D&M model (see DeLone & McLean, 1992) was primarily based on three levels of information presented by Shannon and Weaver in 1949 and the effectiveness or influence level presented by Mason in 1978 (DeLone & McLean, 2003). The three levels: technical, semantic, and effectiveness, were adopted to be represented in the model as the system quality that measures the technical success, the information quality that measures the semantic success, and the use, user satisfaction, and the individual and organizational impact that measures effectiveness success (DeLone & McLean, 2003). Driven by a call from DeLone and McLean's first article on their model, many researchers tested, validated, criticized, and made suggestions for changes to the model's structure. This resulted in an updated model

(see Figure 2) with six interrelated and interdependent dimensions: Information Quality, System Quality, Service Quality, Use/Intention to Use, User Satisfaction, and Net Benefits (DeLone & McLean, 2003). These serve as key factors in assessing the success of an information system. When evaluating the success of information systems, it is essential to assess or control the quality dimensions as they directly affect the 'use,' 'intention to use,' and 'user satisfaction.' The dimensions are interrelated and create a causal relationship where high user satisfaction leads to increased use and intention to use, ultimately generating 'net benefits' depending on the context. However, negative outcomes may also arise, potentially reducing use (Petter, DeLone, & McLean, 2008).

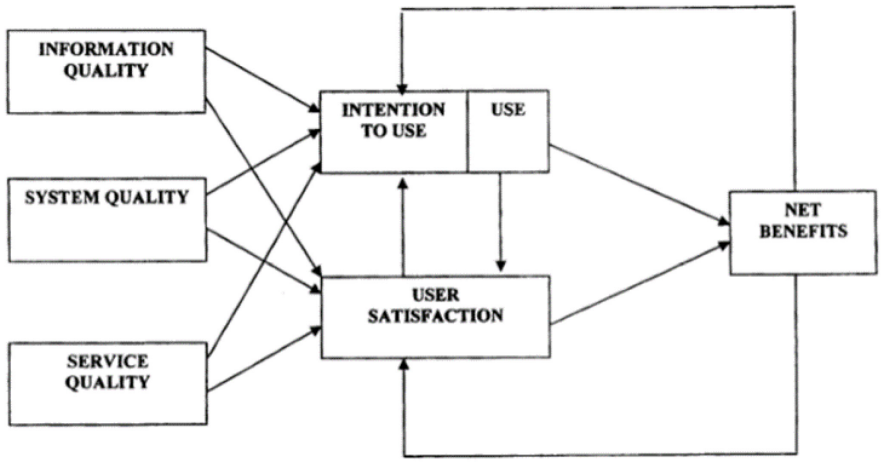

Figure 2. D & M IS Success Model (2003, p. 24)

The information quality dimension, which refers to the desirable attributes of an information system's output, has been regarded as a key antecedent influencing user satisfaction. This dimension encompasses measures that assess the quality and usefulness of the information provided by the system. The system quality dimension

refers to the desirable characteristics of an IS itself, and the measurement often relates to systems' usability, such as system flexibility, ease of use, and learning, and is often combined with measurements related to the Technology Acceptance Model (see Davis, 1989). The third quality dimension, service quality, reflects the level of support users receive from the IS department and IT support staff. Intention to use/use commonly measures the amount of use, purposes of use, and appropriateness of use (Urbach & Müller, 2011). The intention to use is typically viewed as an attitude, while use is considered a behavior. As DeLone and McLean (2003) point out, use can vary significantly and range from mandatory to voluntary, informed and uninformed, and effective to ineffective, and is considered challenging to measure. User satisfaction reflects the degree to which users are satisfied when using an IS. Measurements often involve the attitudes, beliefs, and feelings of using an IS, and this dimension is considered one of the most critical factors of IS success. Lastly, net benefits, which previously consisted of 'individual' and 'organizational' impacts, were combined into one single variable. DeLone & McLean (2003) argued that the impact of an IS can occur at various levels (individual, group, organizational, and societal), depending on the context and the specific system being evaluated. As such, researchers must critically consider questions such as, "What qualifies as a benefit? For whom? And at what level of analysis?" (DeLone & McLean, 2003, p. 22).

The D&M model has been used to measure system success in various contexts of systems use, such as e-commerce systems (e.g., Wang, 2008), healthcare systems (e.g., Ojo, 2017), and financial and accounting systems (e.g., Iivari, 2005). When evaluating an IS, it is important to define the specific context in which the system operates. Previous research also indicates that an individual's role and position

within an organization can influence several dimensions of IS success. Moreover, organizational characteristics such as size, available competencies, management support, and IT infrastructure all play a role in shaping the outcomes of IS success (Petter, DeLone & McLean, 2013). An invested IS within an organization is considered a long-term investment (Gable, Sedera, & Chan, 2008), and the ability to access information within the system is vital for the development of an organization.

The D&M Model evaluates a single point in time, giving a snapshot of its here-and-now. Although this does not capture long-term development, it can provide valuable insights into the current state of a system.

4 Methodology

In this chapter, I present the methodological choices made for this thesis. The methodological approach is grounded in the interpretive research paradigm, which has guided the research process. In general, interpretative studies seek to understand phenomena by exploring the meanings people are assigning to them (Myers, 1997). Interpretivism focuses on subjectivity, emphasizing an understanding of how individuals, as conscious actors, interpret, create, and modify the world they inhabit (Rohde et al., 2017). Studies based on an interpretive approach assume that people interact with the world both subjectively and intersubjectively. The primary goal for an interpretive researcher is to understand and assess the meanings that participants attribute to the phenomena being studied.

The studies presented in this thesis have employed a qualitative research design, primarily using qualitative methods. These methods have been employed through observations, interviews, and document studies; additionally, a quantitative approach has also been utilized in the form of a survey. A qualitative research approach involves examining people's experiences and perspectives in order to understand meanings and interpretations shaped by the context in which they find themselves (Hennink, Hutter, & Bailey, 2020). It is often based on interpretive characteristics and seeks to "study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meaning people bring to them" (Denzin & Lincoln, 2011, p. 3).

The thesis revolves around three studies, where the second study consists of several sub-studies, resulting in five papers presented in this thesis. In two of the three studies, the focus has been on examining and interpreting participants' perceptions of the specific

contexts in which they are situated. Their information use and information needs are, in that sense, understood and interpreted in relation to their own conceptual world.

This chapter opens with section *4.1, Research Studies and Design,* which presents the studies and the motivations for the chosen research design. Section *4.2, Methodological Motivations*, presents insights into the various methods used, reflecting how they have enhanced the understanding of different methodological research approaches. Section *4.3, Research Process*, details the research process and presents the context in which the research studies were carried out. This is structured in distinct chronological steps. Finally, in section *4.4, Ethical Reflections*, the ethical considerations adopted in the research studies are presented.

4.1 Research Studies and Design

This research was undertaken during two projects, *Digikon* and *VDN-INFO*. Both research projects share a common focus with this thesis: the use of information from a user perspective. This has been explored through different studies and research methods, which are further detailed in the following section.

The performance of the studies is summarized in Table 1 below.

Study	Research Method	Data Collection	Analytical Tool	Paper
1	Action case study	4 interviews 1 group interview, participation observation	Records Continuum Model (RCM) and the concept of Societal Embeddedness as a guiding tool	I
2	Case study	15 interviews Internal documents A total of 111 survey answers	DeLone & McLean Information Systems Success Model, Archival taxonomy of primary and secondary values/purposes, Thematic analysis, Information use environment (IUE), Content analysis	II, III, IV
3	Literature study	Seminal work in the IS and archival research fields	Concept analysis Boundary object	V

Table 1. Overview of research studies and design

4.1.1 Action Case Study

The first study was performed as an abductive action case study in the context of the first project. The purpose of the project was to develop a digital service based on the work processes of official receivers. The creation of a digital service aimed to streamline work processes by simplifying the aggregation, analysis, and evaluation of digital information, while also enabling the discovery of new values in that information. Stemming from information systems research, the action case study combines elements of both case study methodology and action research, incorporating both an interpretative and an interventive perspective (Halecker, 2015). The choice of an action case study was based on the nature of the project, where my role involved knowledge contribution when participating in the project. The interventive approach involves a degree of involvement and can have varying degrees of impact and potential influence on the researched phenomena (Halecker, 2015). As a member of a project where I participated in the development of a specific service, I was part of the environment that was studied. I recognized and was aware that the questions I posed in interviews and in discussions may influence the creators during their design process, even though that was not the purpose of the interviews. This study aimed to examine the information process of the intended users of the service and what affects the need to use information. To examine the perspectives and experiences of the intended users, interviews were considered a suitable method. Semi-structured interviews, rather than structured, were used since these are based on an incomplete script where some questions are prepared but with a degree of improvisation (Myers & Newman, 2007). The empirical data consisted of semi-structured interviews with creators and users of the service, as well as one group interview where both creators and

users participated. The interview questions were formulated based on participation in project meetings and an analytical framework. The study had an abductive approach, meaning that the researcher moves, in a non-linear process, back and forth between theory and practice, intending to combine the empirical data with insights from theory (Halecker, 2015).

The interviews were transcribed verbatim and analyzed based on readings of the Records Continuum Model (RCM) and the concept of Societal Embeddedness (SE) (presented in Chapter 3). This was motivated by the model's holistic perspective on records. Examining the information process and information needs of the service's intended users was interpreted as a pluralized perspective; thus, these users were not the creators of the information and records they needed.

4.1.2 Case Study

The second study used a case study approach and was conducted within the second project at the Swedish Transport Administration (STA). The overarching aim of the project was to explore how existing organizational records and information are created in different construction projects and how earlier or current documentation can be used or reused for other purposes. This was examined iteratively, leading to the case study being broken down into three sub-studies, as the results of the first sub-study motivated a second and a third.

Case studies, as such, are variously described and defined as a method, a methodology, or a research design (VanWynsberghe & Kahn, 2007). Despite the various definitions, case studies are described as a suitable strategy when seeking an understanding of a specific context (Ragin, 1999). In the IS research community, case studies are described and accepted as a valid research strategy (Klein

& Myers, 1999). Even though VanWynsberghe and Kahn (2007) reflect on, as they describe it, the conundrum of the case study, Ragin (1999) argues that the starting point for a researcher is to thoroughly consider *what* is to be understood. To be able to explore the research questions and to create a rich data collection, interviews with different actors and documentation studies can be conducted (Goldkuhl, 2019).

The first two sub-studies were qualitative inductive case studies, meaning that analysis, themes, codes, and theory were based on the observations of the empirical data (Creswell & Creswell, 2017). The empirical data, in these two sub-studies, consisted of document studies of internal documents such as road plans, consultation documents, and organizational guidelines and strategies. In total, 15 semi-structured interviews with project managers in different geographical areas in Sweden were conducted and transcribed verbatim. In the first sub-study, the D&M Success model (DeLone &McLean, 2003) was used as an analytical lens in combination with temporal aspects of information use with the archival taxonomy of primary and secondary values/purposes of use (Schellenberg, 1956; Menne-Haritz, 1998). The archival taxonomy was used to examine the primary and secondary purposes underlying users' information needs, essentially, what motivates their use of information.

Combining this with the D&M model was motivated by the model's focus on use, considering not only the technical aspects of the system but also the information it contains. An approach suitable to examine the relationship between users' information needs and the systems that store and provide access to that information.

In the second sub-study, the interviews were analyzed using a thematic analysis framework described by Braun and Clarke (2012). The framework is applicable in qualitative research because of its

focus on meaning and identifying how respondents talk about a specific topic. The systematic six-phase approach involves identifying specific themes into a coherent narrative by coding and analyzing texts and interviews (Braun & Clarke, 2012). The information use environment (IUE) was used as an analytical lens. The IUE framework, as it is presented by Taylor (1991), can be used to examine how individuals interact with their environment and the factors that influence the information behaviour of users. Previous research suggests that an information need leads to an information-seeking behaviour; in other words, the information-seeking behaviour is a consequence of an information need (Wilson, 1999).

The third sub-study used a deductive quantitative survey methodology. In contrast to an inductive approach, the deductive approach often tests or verifies a theory rather than develops it, and a theory is often placed at the beginning of the proposed study (Creswell & Creswell, 2017). This study applied the D&M model (DeLone & McLean, 2003) to examine the use of a specific IT system based on specific users' work processes and information needs.

Although the D&M model can be used to qualitatively investigate what constitutes information system success, a quantitative survey can reach a larger sample of respondents than conducting interviews. By examining a larger sample, a researcher can minimize the possibility of chance influencing the research problem within a limited group (Hellmer, 2022). As part of the iterative process in this case study, the results of 15 interviews suggested that one specific system was mandatory to use and that it was experienced as difficult to use based on the needs of these specific system users. Through a survey based on the quality dimensions for system success, I was able to reach a larger sample of respondents and to examine which quality dimensions influence use and ultimately system success.

The survey was based on a questionnaire influenced by the desirable characteristics outlined by Petter, DeLone, and McLean (2013), as is presented in Table 2. The questionnaire consisted of 44 statements based on the six dimensions of the D&M model and on the specific context of project managers and project engineers, and their ability to find comparable project information, thus their ability to search and find information based on their needs. Additionally, an open-ended response was provided. The motivation for adding project engineers to the survey was grounded in their close collaboration with project managers in projects and on their mandatory use of the specific system in question.

Dimensions	Measurements
Information Quality	Relevance, understandability, usability, availability, searchability
System Quality	Ease of use, ease of learning, system reliability, system flexibility
Service Quality	Competence, technical competence, empathy of staff
Use/ Intention to Use	Amount of use, nature of use, purpose of use
User Satisfaction	Likeability, expectations
Net Benefits	Improved decision-making, improved efficiency, cost reductions, time reduction

Table 2. Measurement characteristics

The questionnaire was structured using a seven-point Likert scale with the range from '1 = no agreement' to '7= full agreement'. The survey was designed using Google Forms, and a link was distributed via email, resulting in a total of 111 respondents to the survey. The analysis was done using Jamovi software (The Jamovi Project, 2022). Based on the D&M success model, ten hypotheses were developed (see Paper IV).

In the analysis, the validity of the data was examined. Different types of validity refer to various qualities of data, and their taxonomy and classification vary across research fields and study types (e.g., Taherdoost, 2016). To test the reliability of the data, the internal consistency of each construct was measured using alpha coefficients (α). The hypotheses were tested using three linear multiple regression models (Howitt & Cramer, 2008). To analyze the open-ended responses, a qualitative content analysis approach was employed (Graneheim & Lundman, 2003). In this analysis, the manifest content of the open-ended responses, thus the words and sentences the respondents used to describe the system use, was abstracted, condensed, and coded into different categories and themes (Graneheim & Lundman, 2003). Since out of 111 respondents, 54 chose to add a comment in the open-ended item, the purpose of the content analysis was to further contribute to the understanding of these users' use of the system.

4.1.3 Literature Study

The third and final study was a literature study inspired by the results of the previous studies. In these previous studies, I had been examining what kind of information users need in different contexts. Sometimes it had been specific documents, sometimes referred to as data, information, or records. This made me question what the systems should make accessible. What is information? Through the previous studies, I have used analytical frameworks and concepts from both the IS and the archival research fields. In this study, I decided to examine how the different disciplines have explored and identified the concept and to examine if it could function as a boundary object (Star, 1988; Star & Griesemer, 1989) that can bridge the two disciplines. Rather than applying a systematic literature

review, the data collection approach attempted to identify key sources through backward citation of seminal work in both the IS and archival research fields (Denscombe, 2017). Additionally, Google Scholar was used for relevant literature.

4.2 Methodological Motivations

The majority of the studies of this thesis utilized qualitative approaches, but I also used a quantitative approach in one of the studies. My choice of using a quantitative method allowed me to explore use with a larger sample of users and also allowed me to develop my understanding of research methodologies further. Quantitative research often starts from a theoretical framework, from which the researcher formulates hypotheses that the collected data may or may not support (Pickard, 2013). In my case, the quantitative study was designed based on DeLone and McLean's model, and specifically, the mandatory system use context in which the research was conducted. By utilizing quantitative methods and larger sample sizes, researchers can generate generalizable insights about the subject under investigation (Pickard, 2013). This allowed me to test a different perspective on the research problem and to verify the respondents' viewpoints in a larger sample. In an exploratory sequential mixed method, Creswell and Creswell (2017) describe that a qualitative research phase, where the view of the participants is explored and analyzed, may be used to identify a quantitative phase. In this case, the survey study was based on the findings from the former interviews conducted, which revealed challenges with the mandatory use of the specific IT system and motivated a broader examination involving more users.

In summary, the methodological choices I made enabled exploration of what affects and influences information needs (RQ1) and how making these needs visible may support reuse over time (RQ2).

4.3 Research Process

This thesis is built on prior work in the licentiate thesis (Hellmer, 2023b), which focused on understanding users and the use of records within an archival context. It contributed to the conceptual foundation and shaped the initial research interest, which is here further developed by expanding the focus of use in the context of contemporary organizations.

The following sections aim to present the chronological steps in the research process that resulted in the five papers included in this thesis. It presents the iterative research process and the motivations behind each step taken in this journey. The section concludes by presenting a chronological visualization of the research process and how it relates to the research questions of the thesis and the five papers (see Figure 3).

4.3.1 Step 1

The setting of the first project was the Swedish private sector and a Swedish information company specializing in creating digital solutions for long-term information management. The purpose of the project was to develop a digital service that supports official receivers by streamlining their work process by simplifying the aggregation, analysis, and evaluation of digital information, while also enabling the discovery of new values in that information. In the project, my role was to observe and take part in the development of the service

from a user and usage perspective. This led me to reflect more on the users' information process, how it operates, and what factors shape and affect their information needs. In other words, what influences the type of information required to effectively carry out their work as official receivers? This motivated exploration of the users' information process as a 'recordkeeping story', through the different dimensions of the Records Continuum Model (RCM). As presented in Chapter 3, the model can be used to analyze different perspectives of recordkeeping through spacetime and outside of the records' original context (Upward 1996; 1997). While searching for literature that applied the RCM in practical examples, I discovered Frings-Hessami's article, *The Societal Embeddedness of Records: Teaching the Meaning of the Fourth Dimension of the Records Continuum Model in Different Cultural Contexts* (2021). In the article, Frings-Hessami presents the concept of Societal Embeddedness (SE), proposing that this concept can be used to analyze and interpret the perspective of pluralization. According to Frings-Hessami, the fourth dimension, pluralization, of the RCM is often misunderstood, and argues that the meaning of it extends beyond future sharing; it also encompasses societal expectations. Mandates or laws, regulations, and expectations vary across contexts and societies, shaping the creation and use of records. The concept is presented to allow reflection on the societal context for information and records across all dimensions of the RCM. According to Frings-Hessami, the concept can contribute to a deeper understanding of the fourth dimension's influencing factors on the creation, use, and reuse of records in different contexts (Frings-Hessami, 2021). As I initially sought to explore the factors that influence information needs, the concept of SE emerged as an area of interest. If it is possible to clarify what shapes or affects information needs, it may also be possible to enhance information use, making

user needs more visible. The study aimed to examine what affects the need and use of information in the creation of a digital service by using the RCM and the concept of SE as analytical tools.

The findings of this study raised additional questions about the use of information. It is suggested that the reasons for using or reusing information come from the needs present at the time of use; therefore, those needs exist independently of the context in which the information was originally created. These insights were carried over into the second step of the research process. This first step resulted in Paper I.

4.3.2 Step 2

The setting of the second project was the Swedish public sector, specifically in the Swedish Transport Administration (STA). The STA initiates and manages various projects across Sweden, ranging from large-scale to smaller projects in railways, roads, and shipping. My role in the project was to conduct case studies of existing information management practices to map and analyze how information was used and reused in different contexts. In collaboration with STA contacts, I chose to focus on smaller projects, specifically pedestrian and bicycle lane projects, assuming they would be easier to oversee and that it would likely be more feasible to reach relevant respondents for the study. Additionally, focusing on a single project type would enhance the ability to compare projects across different regions and identify variations in the information process and purposes of use. Based on this, I decided to conduct a first case study that aimed to map the information process and information needs of project managers of these smaller projects. Based on the notes from initial conversations with project managers and internal document studies, it became clear that the project managers had an overarching

role and responsibility for the information creation as well as responsibilities toward various specialists, contractors, and consultants. When searching for ongoing, planned, or finished pedestrian and bicycle lane projects on the STA website, several hundred projects were listed. This sheds light on the amount of existing project information and the question of *whether* and *how* this information was being used when creating new projects. The selection of respondents was based on geographical counties. The reason for this was to examine whether the work process and information needs differed depending on where in the country the project managers operate.

In the previous study, I had focused on users' specific information needs and processes, and not explicitly on the system use. In addition to this, I needed to broaden my perspective on how information use and needs are related to the use of systems in which the information is located. This led me to examine different IS models with a clear connection to system use (e.g., Technology Acceptance Model, TAM, and Unified Theory of Acceptance and Use of Technology, UTAUT). The search primarily aimed for a perspective or model that can be used to examine and understand what affects the use of information within a system, that is, where the use of the system is combined with the need to use the information in a system. During this search, I found the highly cited D&M model that, in many different contexts, had been used to measure and analyze system use connected to its intended success. The clear focus on not just the technical aspect of the systems but also on the information within the systems motivated me to use it as an analytical lens. Initially, in the interview process, the respondents outlined their typical work process from project initiation to completion, and additionally, what systems they used to access the necessary information. Early in the interview process, it

became clear that there was one specific IT system that project managers were required to use, involving mandatory tasks to ensure a time- and cost-effective planning as possible. After conducting nine interviews with project managers in nine different counties, tentative results showed a variation in information needs. This resulted in Paper II.

4.3.3 Step 3

According to organizational guidelines and strategies, the STA aims to run an effective "asset administration", striving to utilize the organization's resources to generate the necessary value and benefits required to achieve the organizational objectives (STA, 2017). The "asset administration" aims to promote the provision of sufficient and efficient information based on users' information needs. The assets, defined as information and data, are described as essential for planning, designing, constructing, operating, managing, maintaining, and dismantling constructions throughout their entire life cycle. The enhancement of the digital management of constructions is expected to improve information quality, expand access to reusable data and information, and increase the availability of accurate and structured information for decision-making and oversight (STA, 2019).

Since organizational information is regarded as a valuable resource, the workplace could be regarded as an arena for information behaviour. As the previous study had shown a variation in information needs, this motivated me to examine the factors that shape or influence employees' behaviours and decisions in their pursuit of information, and ultimately, to achieve the goals of the organization. In the third step, the number of respondents was increased to examine how individuals interact with their information environment and the factors that influence their information

behaviour when navigating the challenges to satisfy their need for information. This resulted in Paper III.

4.3.4 Step 4

Previous research has highlighted the challenges in understanding and measuring use (e.g., DeLone & McLean, 1992; 2003). When the D&M model was used as an analytical lens in the previous study, the findings suggested that an actual need and benefit for these users was based on their mandatory work processes. This made me want to quantitatively test the model in this setting. By reaching out to more respondents, I wanted to examine the use of a specific IT system based on specific users' work processes and information needs, and to see which quality dimensions influence the use and ultimately contribute to the system's overall success. Statements based on the project manager's mandatory work tasks were created, reflecting the ability to use and reuse existing information in the system as a net benefit. This resulted in Paper IV.

4.3.5 Step 5

Through my studies, the interviews conducted, document analysis, and article readings, I had observed that the concept of information was frequently used. Even in cases where what I perceived as being about records, the concept of information was used. However, the previous studies on information use that I had conducted had revealed a conceptual gap around the concept, pointing to a need for further exploration. Within the context of e-government development, marked by increasing implementation and use of digital technologies and information, this gap became a potential intersection between information systems and archival research

fields. This raised questions about the meaning of the concept in both fields, whether there are any similarities and differences between how the concept is described, and if it can be identified as a boundary object to bridge disciplines, facilitate communication, and foster mutual understanding. The purpose of exploring the concept of information is to contribute to the overall purpose and research questions of the thesis, as understanding what information is and how we view information may help us clarify its meaning related to its use. Instead of conducting a systematic literature review, the focus was on seminal work within both research fields. This resulted in Paper V.

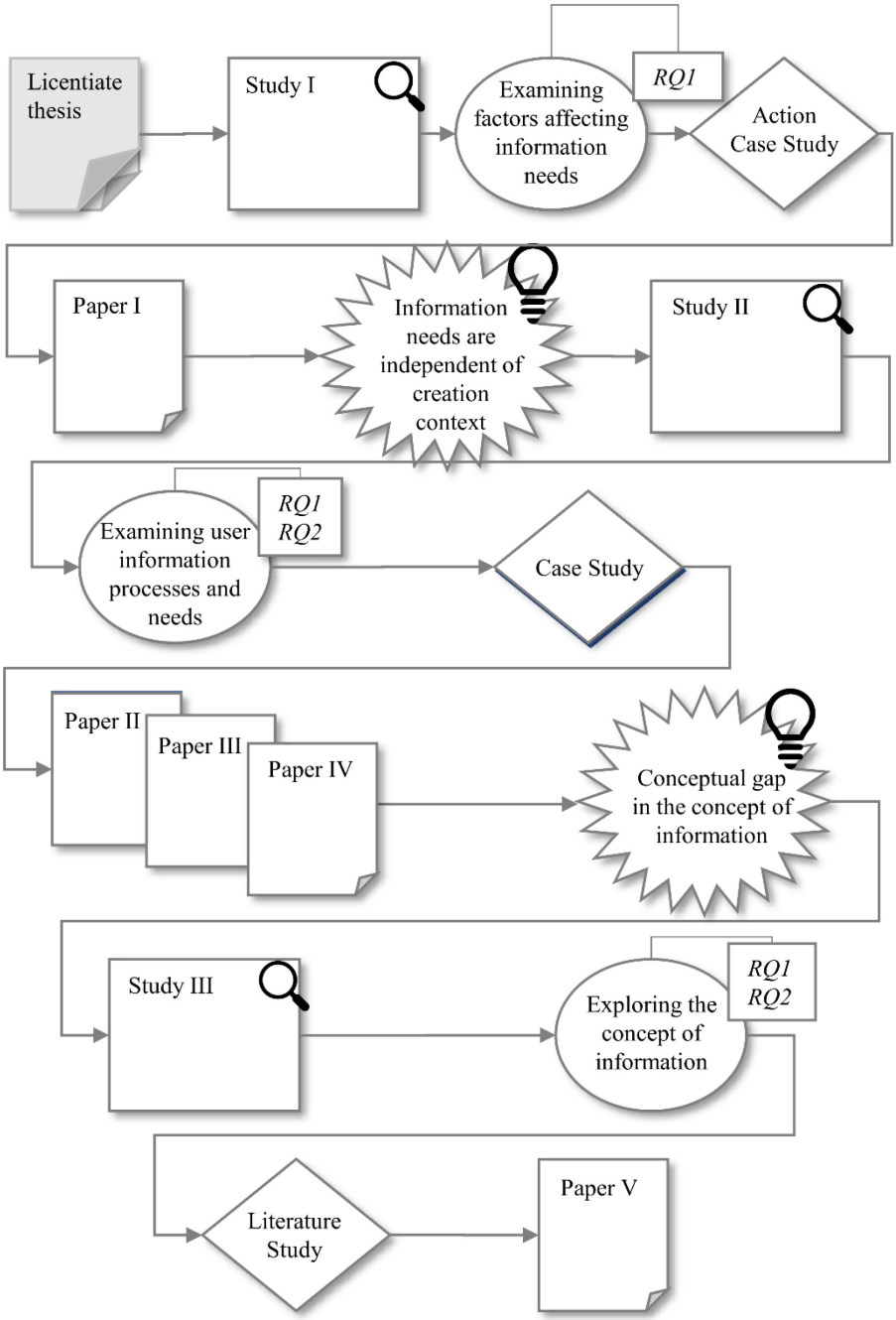

Figure 3. Research Process

4.4 Ethical Reflections

Ethical principles were relevant in two out of the three studies of this thesis, as they involved interactions with people. The Swedish Research Council (2017) has detailed guidelines on how studies should be designed to ensure the anonymity of participants and the handling of data collection of personal data from respondents. These guidelines have been consistently followed to maintain the integrity of the research.

In the two studies, all interviews were conducted and recorded with informed consent. Before each interview, an information letter was sent outlining the types of questions to be asked, requesting consent for recording, and informing participants of their right to withdraw or skip any questions they did not wish to answer. An information letter was also sent regarding the quantitative study, which described the anonymity of their participation. In addition, the introductory text to the survey stated that participation was confidential and anonymous. The survey included demographic variables such as the participant's occupation (project manager or project engineer), gender, and years of service with the public authority. The open-ended responses were analyzed at group level. All participants involved in the two studies participated based on their professional position.

5 Summary of Included Papers

This chapter presents the summaries of the five papers included in the thesis.

5.1 Paper I:

Paper I, *Standing on the Outside Looking in: Testing the Concept of Societal Embeddedness from a User and Pluralising Perspective*, revolved around the context of the transition towards digital management and specifically the development of a digital service to aggregate information and records to increase the capacity to manage these to support business and preservation needs. The paper aimed to test the concept of Societal Embeddedness (SE) as an analytical tool and to reflect on how societal contexts enhance sustainable recordkeeping of digital information and the reuse of information and records.

The findings suggest that societal embedded factors, such as contemporary laws, regulations, and expectations, dictate users' needs to create and use records and information. The specific users in this paper described three societal factors that dictate their need to create and use specific information and records, thus the fourth dimension affecting the value of information and records. The findings also suggest that records and information are not created in isolation, but rather created and used based on external societal factors that support an organized and democratic society. The fourth dimension of the RCM influences and dictates, in that sense, why records and information are created, how they are captured, how they are organized, and preserved, thus affecting all dimensions of the RCM.

The paper concludes with suggestions for the applicability of testing the concept of societal embeddedness since it introduces a specific way of thinking that can function as a methodological tool for

both practitioners and researchers. Further, this approach may aid in deepening the understanding of the underlying reasons for the creation of records and information, the factors affecting their use, why it is organized in a particular way, et cetera, ultimately making visible the societal embedded factors that shape recordkeeping and information management within organizations.

5.2 Paper II:

The second paper, *Considering Information Re-use in Public Sector Information Systems: A Factor of Success?*, aimed to explore the use of an IT system in a large public sector authority in Sweden in relation to the use of information stored in the system.

The archival taxonomy of primary and secondary values/purposes of use, along with the DeLone and McLean Information Systems Success Model, served as analytical lenses. The users of the IT system, project managers of pedestrian and bicycle lane projects, use the system in their daily work. The system's primary purpose is to streamline project work for its users. During this process, project managers are required to complete certain mandatory tasks, including identifying comparable projects to enable the most cost- and time-effective planning possible. As the system contains over six thousand ongoing and finished projects, finding similar and comparable projects should be a straightforward task. However, the findings showed that the users' intentions to use have evolved from primarily storing information to retrieving and reusing it for learning and other purposes. As the system is mainly designed to streamline the work process and support information storage rather than retrieval and reuse, it struggles to meet these changing needs. As a result, the system's ability to support users effectively diminishes,

impacting users' intention to use, user satisfaction, and the overall success of the system.

The paper concludes with suggestions for explorations of how the utilization and functionality of IT systems unfold over time by emphasizing variations in the use and purposes of use of information. The paper further concludes with suggestions for applying archival perspectives of secondary purposes of use, which may enhance the current net benefits of the system, thus satisfying different interests and intentions to use.

5.3 Paper III:

The third paper, *From Storage to (Re)use: Factors Affecting the (Re)use of Organizational Information*, was to build on previous findings by further exploring what affects the information-seeking behaviour of project managers when navigating challenges to satisfy their need for information to perform work tasks, solve problems, and achieve organizational goals. The information use environment (IUE) was used as an analytical framework.

The findings suggest that this relatively homogeneous group of users, project managers, who follow the same mandatory pre-defined work process and use the same systems, have different information needs due to geographical factors (e.g., various mud soil, ground frost, surrounding streams, marshlands, arable lands, mountains, et cetera) that they need to consider to avoid delay and cost increases. In the mandatory task of finding comparable projects, the users primarily emphasize human contact as an information resource. The reasons for this are: 1) the specific IT system is primarily designed for project management, and human contact is a faster and more convenient approach rather than searching the system on your own,

and 2) human contact information, such as shared experiences, is provided. The information search in the system is made more difficult by the lack of a shared nomenclature and the use of individual folder structures. The findings also suggest that despite the implementation of metadata structures, it has not contributed to increased searchability due to the individual understanding of metadata tagging. In addition, the folder structure is still used to some extent, resulting in individual structures with reduced usability and transparency in a long-term perspective.

The organization's digitalization goal of using its assets (i.e., data and information) and running an effective digital management is not consistent with the way these specific users perform their work processes. The lack of access to information and the lack of knowledge about users' actual information needs in relation to systems not being adapted based on these needs are, according to this paper, contributing factors to not reaching digital organizational goals. The paper suggests the need to recognize the daily practices of users to be able to create information strategies. A well-defined work process does not mean that it also enables the ability to use and reuse information within systems.

5.4 Paper IV:

The purpose of the fourth paper, *Testing DeLone and McLean's Information Systems Success Model: Measuring Mandatory Use of an IT System in a Public Organization*, was built on and inspired by previous findings. The paper aimed to examine system usage based on specific users' unique work processes and information needs. The theoretical framework consisted of the DeLone & McLean Information Systems Success Model (D&M model) and was quantitively tested in the

mandatory system use of a specific IT system presented in Papers II and III.

Based on a total of 111 survey answers, the findings suggest that among the three quality dimensions (information quality, system quality, and service quality), it is only service quality that is statistically significant with use/ intention to use. However, the findings also suggest that User Satisfaction is predicted by all three quality dimensions. Respondents' use and intention to use the system likely reflect their mandatory requirement to use the system and are not affected by lower ratings of information quality and system quality as such. However, service quality affects use and intention to use based on whether the users receive necessary technical support to perform their work tasks or not. The open-ended responses showed that the respondents perceived system complexity due to the many different functions of the systems. The respondents described a difficulty in integrating the different functions and a lack of knowledge of how all of these functions simplify their work tasks.

The findings support the applicability of the DeLone & McLean Information Systems Success Model in a mandatory setting of system-use context. However, the descriptive analysis suggests that there are low mean scores (*M*), suggesting that these system users are generally dissatisfied with the system. Information quality is the lowest quality variable, user satisfaction is lower than use/ intention to use, and the highest is use/intention to use, which is probably related to the mandatory use setting rather than voluntary engagement, where users are not obliged to use the system. The open-ended responses support these low mean scores and reveal descriptive terms of "not user-friendly", "complicated", and "frustrating". Due to the poor search function combined with incorrect and inconsistent metadata tagging, trying to find

information about other projects in the system is described as time-consuming and takes away time from other commitments.

The paper concludes by proposing suggestions to consider the importance of a deeper understanding of information needs, which system functions are necessary for each user group, and to strengthen the service support.

5.5 Paper V:

Paper V, *'Information in all its Different Guises': Exploring the Elusive Concept of Information*, was inspired by the results of the previous papers and explored the concept of information from the perspectives of the IS and the archival research fields. The inspiration was an accumulating effect of the ever-increasing use of the concept due to the increasing e-government and technological development. The purpose of the paper was to examine how the concept is explored and identified in the two disciplines and whether it can be identified as a boundary object bridging the disciplines.

The findings suggest that there is no consensus on what information is in the two disciplines. While the IS research field tends to theorize and elaborate more on the concept, the archival field takes a more pragmatic approach with less focus on its essence. The concept is inconsistently defined and used not only between the disciplines but also within them, limiting its ability to be identified as a boundary object. The findings also suggest that although most people have a general idea of what information is, general definitions may limit our understanding of it. In certain contexts, defining the concept is necessary, but it can also be viewed as an epistemic object; thus, as a dynamic and evolving concept. In a constantly shifting world, our understandings and interpretations are continually

influenced and transformed. The paper suggests that, although the concept's widespread use and presumed clarity, it is crucial to acknowledge its nuanced and context-dependent nature.

6 Discussion of the Results

In this section, the findings of the papers included will be discussed in relation to the formulated research questions and the theoretical lenses presented in Chapter 3. The formulated research questions are:

RQ 1: What affects and influences the need to use information?

RQ 2: How can making diverse information needs visible support information reuse over time?

The two research questions are sequentially linked, with the second building on the findings and insights of the first.

6.1 Factors Influencing the Need to Use Information

Although information plays an important role in organizations and society, its use is constrained by challenges such as accessibility, varying user needs, and contextual complexity. The findings of the studies presented in this thesis suggest that the need to use information does not arise in a vacuum. Instead, information needs are situational and shaped by broader societal drivers, as well as organizational and contextual elements that influence what information different users need and why.

Using the concept of Societal Embeddedness (SE) as an analytical lens, as examined in Paper I, enables interpretation of the findings in terms of what shapes and motivates the need to use information. From the perspective of SE, the need to use information is not isolated organizational practices but rather influenced by societal embedded factors such as laws, regulations, norms, and expectations. Using the continuum perspective, based on the concept of SE and the fourth dimension perspective (Frings-Hessami, 2021; Upward, 1996;

1997), societal mandates, such as e-governmental efficiency goals and technological development, affect and influence system design that is expected to be used, the information anticipated to be created, what information is captured in the systems, and how it is intended to be used. Simultaneously, from the opposite end of the continuum, the information created is explained by factors identified in the fourth dimension, including the systems used and how information is organized and structured. This interplay, illustrated in Figure 4, aligns with Reed's (2005b) argument in the recordkeeping context that such practices do "[…] not occur in a social, cultural, or political void" (Reed, 2005b, p. 2). Similarly, the creation and use of systems, or the creation and use of information, are also shaped by these broader contexts.

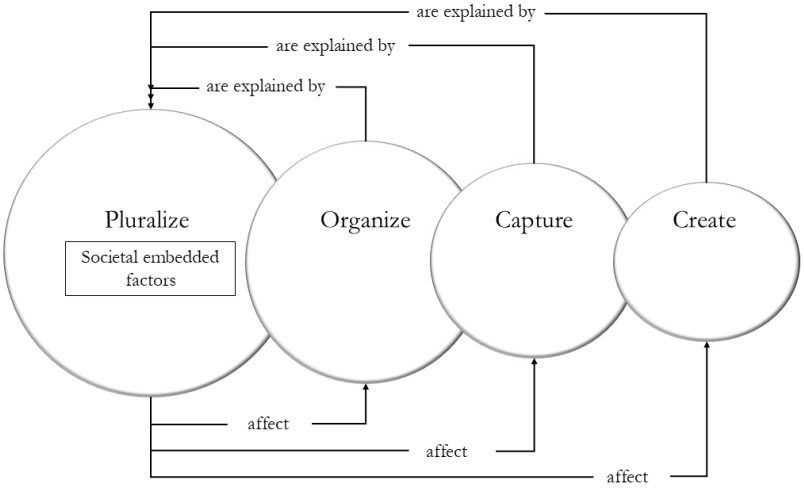

Figure 4. Societal embedded factors from a fourth-dimension perspective affect dimensions of organize, capture, and create, and simultaneously, these are further explained by factors identified in the fourth dimension

This relationship between societal mandates and organizational practices becomes visible in Paper III. Here, organizational goals

depict a vision of asset management and strategies for effectively managing information assets, which are similarly shaped by societal expectations. These are strategies aimed at improving information quality, expanding access to reusable data and information, and increasing the availability of accurate and structured information for decision-making and oversight (STA, 2017; 2019). Strategies of this kind can be seen as an effect of global digitalization, where digitalization is often described to highlight increasing efficiency improvements (Nylén & Gidlund, 2020), which in turn affect and influence organizational goals and needs.

Organizational strategies and guidelines can function as goals for an organization's path forward and to describe how an organization should be run in relation to political and societal goals. In Papers II and III, the respondents described a robust work process aiming to streamline the daily work for project managers. As these users were a rather homogeneous group of users, working in the same organization, with similar educational backgrounds, building similar constructions, dealing with similar problems, and using the same IT system, it could be assumed that their information needs and behaviour would be quite similar. However, this assumption proved not to be the case. Based on the findings, several mandatory and cultural elements affected information needs and behaviour in this organizational setting. The mandatory step in the work process involved finding similar projects to compare with to create as effective cost- and time-planning as possible. However, as each project was considered unique based on geographical aspects in the environment, such as various mud soil, marshlands, arable lands, surrounding streams, ground frost, et cetera, thus, identifying previous knowledge and experiences of a specific geographical area played an important role in the planning of constructions.

These different geographical factors and the mandatory task of finding comparable projects to avoid delays and cost increases are factors that influence the information needs of these specific users. However, an important question is then how these factors align with system use. Even though the system contained over six thousand finished and ongoing projects, finding similar and comparable projects is not a straightforward process. According to the interviewees, the search function of the system was poor, and it was easier to ask colleagues for advice on finding projects in the system (e.g., asking for the project number or the name of the project manager). In addition, this way of searching and finding similar projects through social networks was transferred to new project managers, arguing the importance of a network to be able to carry out their tasks rather than searching through the system. The colleagues are, in that sense, the primary sources of experience and knowledge transfer. This suggests a work culture that shows an established way of working that emphasizes the importance of actual dialogue when information needs are not aligned with system use.

In this particular case, these results indicate a lack of interplay between information use and system use. Previous research has argued that there has been a strong research focus on the artifact itself (e.g., Baird & Maruping, 2021). However, since information use in modern organizations involves the use of systems that contain that information, system use and information use need to be seen as intertwined rather than as two separate phenomena. This is also supported by prior research that, in the context of IS development, highlighted the importance of including an information perspective by trying to understand how information is used and requested by different users (Díez & McIntosh, 2009).

The use of the specific IT system was further examined in Paper IV. Using the D&M model as an analytical lens enables an analysis of how different system quality dimensions relate to users' ability to meet their information needs. In Paper IV, system use was examined in relation to specific users' work processes and information needs, thus finding similar projects and information that the system contains. Based on the findings, the only quality dimension that was statistically significant with use/ intention to use was service quality, while all three quality dimensions affected user satisfaction. This result aligns with previous research in the context of mandatory use, and it is suggested to further improve services and to allocate more time for user training (Mkinga & Mandari, 2020). As service quality had a clear connection to use/intention to use can be described by the interviews presented in Papers II, III, and in the open-ended responses in Paper IV. In these, it was described that the search function was poor and that the functions in the system were too many, which gave a feeling of complexity. This makes technical support important for users to be able to perform their work tasks.

The lack of significant linkages between both the information quality and system quality to use/intention to use was presumably due to the mandatory context. It is argued that, in previous research, when the use is mandatory, that is, where the users are required to use the system, it can distort the results and weaken the observed relationships (Iivari, 2005). However, as was presented in the open-ended responses in Paper IV and by the interviews in Papers II and III, the lack of significant linkages can also be explained by the poor information structure due to the lack of a shared nomenclature, an unstructured use of metadata tagging, together with low system searchability as well as system complexity. The specific information needs that project managers describe influence the intention to use

the system. These needs function as goals and motivators for system use, but primarily, the intention to use its content, its output, thus the user's intention to use *the information*, which is perceived as less visible in the D&M model. Even though the information quality dimension is described as an antecedent of user satisfaction (Petter, DeLone, & McLean, 2013) and as the usefulness of the information to the user (Urbach & Müller, 2011), in this particular context, it is important to consider the entirety of the use of both the system and its content on a more holistic level. As one respondent described in Paper III: "If people are careless with the information in, the information out will also be of poor quality" (respondent 12).

From the perspective of Figure 4, the system was primarily designed to streamline the work process. The specific information to be captured in this system, as well as how it was planned to be organized, is, from this perspective, based on and explained by the fourth dimension in the RCM. Examples of societal embedded factors that affect what systems to use, how information should be organized, and which information to create can, in this example, be organizational visions and strategies for effectively managing information assets. When the need for information changes, since we live in a dynamic world, political, cultural, or social regulations or expectations will alter what information is created, how it is captured, organized, and how it is pluralized to enable multiple use situations. Ultimately, *if* it can be used and reused as an asset, a resource, or as the currency for an organization.

In summary, what affects and influences the need to use information is based on factors at multiple levels, including societal mandates such as laws, regulations, digitalization goals, and expectations. These influence organizational strategies and goals, which in turn affect organizational cultures and everyday practices.

Thus, the findings suggest that information needs are dynamic and contextually embedded rather than static. Although contemporary digitalization strategies and organizational goals aim for improved efficiency, the findings of this thesis suggest that systems are designed based on an assumption of efficiency. This assumed notion of efficiency is not realized as the systems are not designed to enable information reuse, even when there is such a need in practice. The understanding of what efficiency is and what it can enable differs depending on organizational levels. While efficiency at a practical level heavily relies on the ability to reuse information, this perspective is not reflected in the goals and strategies that guide investment decision efficiency improvements.

6.2 Identification of Information Needs to Support Reuse

Based on the findings of the studies presented in the thesis, broader societal, organizational, and contextual drivers affect and influence the need to use information. Still, how can the identification of information need support for reuse?

There are societal incentives around the concept of reuse through the Directive on open data, open science, and in the context of the FAIR principles, which show an explicit ambition to recycle and reuse something already existing for new purposes. One might even say that the concept of reuse is trendy; however, rarely explicit in the context of contemporary organizations and as internal secondary use. In the studies presented in this thesis, the concept of reuse is implicit in the purpose of the mandatory task of finding similar and comparable projects to create a new project, and it is implicit in the goal of creating a digital service to collect and aggregate data and information for new purposes. It is implicit as an invisible but central

phenomenon. Its pros and the value ascribed to the concept are explicitly embedded in these organizational goals of asset administration. Still, according to the findings of this thesis, it is not the act of use or reuse that determines what is valuable or not. Rather, what is valuable is shaped by the needs or purposes that motivate use. As previous research emphasises, use has no value of its own; the use occurs when there is a need to use (Sundqvist, 2015). The findings in Paper I suggest that the reasons for using or reusing information come from the needs present at the time of use, meaning that those needs may exist independently of the context in which the information was originally created. This implies that to better support reuse, is to identify and understand the underlying needs that shape and motivate perceptions of value. Consequently, what is considered valuable information is not fixed, but is shaped by societal and organizational factors (e.g., expectations, legal frameworks), and may shift over time and differ depending on the needs of those who engage with it.

In the interplay between system use and information use, access is a prerequisite. In an ideal scenario, if users' ability to search a system is aligned with their specific information needs, supported by an information structure with a shared nomenclature that facilitates searchability, this may improve the likelihood of meeting the organization's goals. However, as the findings of Papers II, III, and IV suggest, the system is not designed for other purposes. In this specific research context, this results in workarounds, where users develop their own solutions to perform their work tasks. Consequently, organizational goals of digital information management and, from a broader societal perspective, e-government efficiency and digital transformation goals may not be achieved.

Project managers used the specific IT system on a daily basis because they were obligated to. However, as the findings suggest, these users were dissatisfied with it. Previous research has argued that measuring actual usage in a mandatory use environment is pointless because of that very requirement (e.g., Ojo, 2017). Still, the frequency of use and actual use were measured, which revealed an important point. Although frequency of use is not a success factor per se, Paper IV shows the system's importance in users' daily routines and their dissatisfaction with it. As a result, employees find alternative ways to perform work tasks without relying on the systems they are expected to use. Findings on frequency of use and actual use, combined with dissatisfaction with the system, can serve as a strong basis for highlighting improvements, as they signal a need for management or other stakeholders to take action. The rapid pace of technological development has, according to Bannister and Connolly (2012), made it important to continually evaluate what works, what does not, and why. Identifying what works, what does not, and why may, based on the findings of this thesis, support continuing value and reuse over time. To fully adopt e-government, a holistic approach and long-term planning are required (Bannister & Connolly, 2012).

In a constantly changing world where new systems are created, updated, and implemented, where vast amounts of information are generated, and work processes are changed to meet the efficiency needs of organizations, what constitutes a successful system? What qualifies as a net benefit? In a modern organizational perspective where internal efficiency is sought, and the goal is to be an asset administration, a possible antecedent to system success would be the net benefit of the ability to reuse information. In the research setting of Papers II, III, and IV, the understanding of what role information

should play in an organization could support the relationship between information systems and the information the system contains for how information can be used over time. Based on the findings, the quality of the information, the output of the system, needs to have a clear structure and nomenclature based on the information needs of the intended users. However, to understand information needs, one inevitably needs to address what is meant when we talk about information. As previously presented, the commonly used concept of information may be a result of the concept's strong place in an ongoing information society, but the common use was also present in my own empirical observations. In my studies, what I perceived as documents, records, or even data were labelled as information.

Paper V revealed that the field of records management and recordkeeping has witnessed a change in the definition of records, where records are understood in terms of information. In the international standard Records Management (ISO 15489-1:2016), a record is "information created, received and maintained as evidence and as an asset by an organization or person, in pursuit of legal obligations or in the transaction of business". Information connected to assets or resources is something that has emerged and can be linked to the economic value of information and the improvement of organizational effectiveness and efficiency. The adoption of the term information can also be connected to enhanced transparency and accountability in public administration, where laws such as the "freedom of information" and "access to information" have been established. As Yeo (2018) points out, even though it is not information that the citizens normally get access to, but rather records, it is the term "information" that is being used.

As the findings in Paper V suggest, there is no consensus on what information is in the IS or the archival research field. Many varying definitions exist and are often connected to data and knowledge. What information is or what can be informative is context-bound, and it largely concerns what the user or interpreter needs, understands, and perceives. As Langefors (1977) has argued, data (e.g., signals, tokens, symbols, et cetera) are not information per se. To be information, it needs to be processed or interpreted to represent information, which can lead to knowledge; it needs to be given meaning. Thus, what is perceived as information is dependent on the user's cognitive background (e.g., preunderstanding, experiences, expectations, et cetera) regarding the object. The way information is stored, organized, classified, and made accessible affects how it is (and *if* it is) perceived and used as a valuable resource and asset.

Identifying information needs makes users an important part of the process. In this thesis, users were known, and the information needs they express in Papers II and III are based on their ability to perform their work tasks in their specific context. The creation of the digital service, presented in Paper I, is based on these users' explicit work processes together with their data and information needs. It may seem obvious to create a service or system based on the users who will utilize it to streamline work tasks. Still, in contemporary public organizations, a variety of users exist. Studies focusing on known users have highlighted the importance of contextual preexisting knowledge in locating and understanding the information they require. However, even if you can map users' prior knowledge and technical skills through user studies in an organization, the challenge also lies in the changing nature of information needs. New directives on the creation of new information can lead to new needs for information regardless of the users' background. Users' prior

knowledge matters, but it is limited to also cover the changing nature. Previous research has highlighted the need to find appropriate strategies to encourage people to capture relevant information. To increase information retrieval and opportunities for reuse, regard the opportunity "to ensure information is available to the right people at the right time (Goh & McMahon, 2009, p. 637). But who are "the right people" and when is "the right time"? The right time is presumably linked to the information needed at that specific point in time.

Additionally, there are many mandatory systems in the public sector where different users have different information needs to solve different problems. Mapping the information needs of each user may induce a feeling of exhaustion; however, valuing information based on current needs may deepen the understanding of how data and information can be structured to serve as reusable resources within an organization.

While users may solve problems by consulting coworkers, as in this specific research context, this type of solution is effective in addressing a problem in the short term. Over time, as more unstructured information is added and new information needs emerge, the system and its content risk becoming unusable and insufficient. In the long run, this can create gaps in the organization's memory, where valuable assets are lost, and new projects must be initiated without the ability to build on existing knowledge stored in the system.

In summary, the findings of this thesis demonstrate that making diverse information needs visible supports information reuse over time when shifting focus from immediate use to the underlying purposes motivating use. When identifying and articulating information needs, rather than needs being implicitly embedded in

individual work practices, these needs can be translated into shared information structures and nomenclature. This enables information to be organized in ways not tied to specific tasks, contexts, or specific users, and further enables secondary and future use. As information needs may vary across users and evolve due to changing organizational goals, legal frameworks, norms, or expectations, the visibility of these needs allows information to become retrievable and meaningful beyond its original context of creation. Without such visibility and awareness, systems risk supporting only immediate tasks, which can lead to workarounds and, in the long run, loss of organizational memory. Identifying needs, therefore, constitutes a key condition for reuse and for sustaining information as a valuable organizational asset over time.

7 Conclusions

The overarching aim of this thesis was to enhance knowledge of information use and reuse in contemporary organizational settings by examining information needs and variations of use.

The Papers included in this thesis have highlighted the complexity of understanding use, suggesting that the use of information and the use of systems are intertwined. It is an interdependent relationship, meaning that the use of information presupposes the use of systems that store, structure, and make information accessible.

Based on the findings, system success is related to whether information needs are met or not. The ability to use and reuse information within systems, for secondary and multiple purposes, can therefore be understood as a net benefit that contributes to the organizational effectiveness over time. In that sense, systems would function as enablers rather than limiters to information use.

What affects and influences the use of information is fundamentally based on the need to use it. These needs may be shaped by societal, organizational, and individual embedded factors such as laws, regulations, norms, digitalization goals, and expectations. As information needs change over time, existing information structures are challenged, meaning that the value of information is not fixed, but evolves depending on how and why it is needed. The identification of different needs to use information supports the reuse of information over time when the focus shifts from immediate use to the underlying purposes that motivate its use. Based on the results of this thesis, the need to use information is often embedded in work practices and therefore implicit. By identifying and articulating these needs, they can be translated into organized and shared information structures, enabling support for secondary and future use.

By conceptualizing reuse as a temporal dimension of information use, this thesis suggests that the identification of information needs is central to enabling information to remain usable and valuable beyond its original context of creation. In this specific research context, when systems do not align with users' information needs, or when the search function of a system is limited due to an unclear information structure, workarounds emerge in which users rely on colleagues rather than on the systems intended to support information use and reuse.

7.1 Future Research

The results of this thesis have raised interesting new questions for further research. One interesting area regards the connection between information quality and information reuse over time. As existing organizational information and data are used for purposes extended beyond human information use, such as the development of data-driven language models, an interesting area to explore is what requirements information must meet to remain meaningful and reliable. This form of reuse raises questions about what constitutes sufficient information quality and contextualization when information is reused without direct human interpretation at the time of use. Such research would expand the temporal and reuse-oriented perspective on information use and contribute to ongoing discussions about data-driven development and digital transformation.

Another interesting suggestion for future research would be to further focus on information reuse as a temporal construct and what system qualities in different organizations support or hinder the temporal extension of use.

7.2 Contributions

This thesis makes several contributions to information systems research. These can be summarized as theoretical, empirical, methodological, and practical contributions.

Theoretical contributions: This thesis theoretically contributes to information systems research by introducing reuse as an analytical perspective to understand information use over time. As information systems are often created to support primary use, such as work processes and storage, the results suggest that users develop needs for secondary uses of information that extend beyond the original purpose of a system. By drawing on archival science concepts of primary and secondary value and purposes of use, the thesis argues that these perspectives may enrich existing IS models and provide a temporal lens to systems success. The results indicate that the long-term success of information systems does not only depend on the immediate usability or adoption, but also on their ability to support information reuse as needs evolve. In addition, this thesis contributes to the ongoing theoretical discussions of the concept of information by demonstrating that it is a context-bound and often ambiguous concept in practice.

Empirical contributions: Empirically, this thesis contributes to a deeper understanding of why the reuse of information is difficult to achieve in modern organizational environments. The results suggest that information systems are often created for specific purposes, while the users' actual work processes demand access to information for secondary purposes, such as comparison or lessons learned. The studies presented in this thesis identify several factors that affect the search for and the reuse of information, such as societal and organizational contexts, and insufficient metadata structures. In addition, the results show a misalignment between organizational

ambitions related to digitalization and the information needs that emerge in everyday work practices. The empirical material suggests that reuse is hindered when systems, organizational processes, and user needs are not aligned. This can lead to users developing workarounds and relying on colleagues rather than on the system that is intended to support their work.

Practical contributions: From a practical perspective, this thesis contributes with insights relevant for public organizations working with digital transformation and information management. The results emphasize the value of understanding the users' information needs and daily routines when designing and evaluating information systems. Specifically, in relation to the ability of long-term information reuse. Additionally, the results argue that technological implementation alone is insufficient to reach organizational goals related to digitalization and efficiency, as unclear information structures and limited search functionality encourage the development of solutions. By emphasizing the ability to reuse as a measurement for system value over time, practitioners and policymakers may adapt system design and information governance to support sustainable information use.

Methodological contributions: The thesis contributes with methodological insights by testing the applicability of the DeLone & McLean Information Systems Model in a mandatory use environment. The thesis also contributes with a practical example of how the Records Continuum Model, together with the concept of societal embeddedness, can effectively be applied as an analytical tool in various contexts.

7.3 Limitations

The discussions and conclusions of Papers II, III, and IV are based on examinations of the use of a single system within a Swedish authority. Even though it is a large system that all project managers and project engineers within the authority are obliged to use, it cannot provide a picture of general system use. In addition, despite attempts, I was not given access to actively use the system myself, thus the examinations are based on the users' perceptions of the system.

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