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Fredric Skargren

Looking Under the Hood of Digital Government

A Digital Index Framework for Assessing Digitalisation of Core Processes in Government Agencies

Author: Fredric Skargren
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Abstract

This thesis addresses the question: How can a Digital Index Framework (DIF) provide an assessment of digitalisation of core processes in government agencies? It aims to understand how digitalisation can be assessed in the context of public administration and core processes. The research is grounded in the multi-disciplinary field of digital government and applies mixed methods: literature review, design science and case studies. The thesis finds that benchmarking digital government faces recurring criticism regarding how assessments are conducted and what they measure. By examining the design of a DIF, the thesis proposes design principles for assessing digitalisation, focusing on how digital technologies support administrative processes. This includes a process view highlighting interaction with society, internal case handling and data exchange. Examining digitalisation through a DIF highlights core processes and contributes to scholarly discussions on linking public administration with digitalisation. Focusing on core processes, the thesis presents a classification of eight types, which can support both assessing digitalisation and studying phenomena such as artificial intelligence and digital services. The thesis also contains results concerning the influences from the practical implementation of the DIF among practitioners in government agencies. The engagement with the DIF fostered skill development, deeper reflections on cross-government processes and led to policy learning and change.

Keywords: Digital government, public administration, benchmarks, maturity models, design science, core processes, classification.

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And of course, to my wonderful wife, Sofia and our three little rascals — thank you for enduring the late-night work, squeezed in between dinners and during the holidays I never quite took. I love you.

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List of papers

This thesis is based on the following studies, referred to in the text by their Roman numerals.

I. Skargren, Fredric, 2020. “What is the point of benchmarking e-government? An integrative and critical literature review on the phenomenon of benchmarking e-government”. *Information Polity*, 25:1, 67-89.

II. Skargren, Fredric, and Garcia Ambrosiani, Karin, 2022. “The practitioners guide to a digital index: Unearthing design-principles of an abstract artefact”. *Information Polity*, 27:1, 21-41.

III. Skargren, Fredric, Olofsson, Niclas, and Garcia Ambrosiani, Karin, 2025. “A Classification of Core Processes for Digital Government”. Submitted to *Government Information Quarterly*.

IV. Skargren, Fredric, Lagsten, Jenny, Hatakka, Mathias, and Garcia Ambrosiani, Karin, 2025. “Learning by Assessing Digital Government: A Case Study of the Digital Index Framework”. Submitted to *Transforming Government: People, Process and Policy*.

1 Introduction

This thesis is about the development and application of a Digital Index Framework (DIF) for assessing the digitalisation of core processes in public administration. The DIF is designed and applied in the context of government agencies in Sweden. The background for this research is based on my work as a civil servant at a digitalisation unit at the Swedish Transport Agency (STA), starting in 2015. I was part of an organisational unit identified by Clarke (2020) as a Digital Government Unit (DGU). Clarke identifies DGUs as being placed in countries' central governments and having a shared set of "orthodoxy" on the promises of digital government, such as data-driven decision-making, use-centric design and horizontal platform-based solutions. The focus in this thesis relates to one of my first tasks at the STA, which was to lead work on designing and implementing what my former manager explained as: some way of "gauging digitalisation" at the STA. My instruction was to create an index that can tell us how far we have progressed as a "digital agency".

As I conducted this work in collaboration with several colleagues, the DIF was designed and implemented during 2015 and 2019 at the STA. I later became employed as an analyst for the Swedish Agency for Digital Government (Digg) in 2021, with the opportunity to further develop and apply the DIF on a national level.

After its inception in 2015, the DIF was tested as a pilot-study and implemented at the STA and used to assess the digitalisation of over 340 sub-processes in the areas of issuing permits and conducting supervision and control at the STA in 2016–17, and again in 2019. I presented the work related to the DIF for experts and senior leaders in public administration, at conferences for practitioners and for researchers at the informatics department at Örebro University. The latter contact in 2017 became a research collaboration with Örebro University. This gave me the opportunity to pursue and view the work on developing the DIF from a research perspective as an industry-employed doctoral student in informatics at Örebro University School of Business as of January 2018. The work on the

DIF enabled an exploration of types of frameworks for assessing digital government via the world of maturity models and benchmarks in research on digital government (Bannister, 2007; Iannacci et al., 2025; Okan, 2024).

1.1 Frameworks for assessing digital government

This thesis focuses on an area of digital government concerning the phenomenon of *digitalisation* of *core processes* in the public administration of Swedish government agencies. The digitalisation of core processes allows for a discussion on the role of digital technology in what is the *practice* of public administration. This focuses on the purpose and context of digital technology in public administration. These points are not novel, and research has shown how digital technologies are integral to the exercise of public administration, requiring thorough attention to the purpose and circumstance of the tools and practices of government in analysing digital government (Fountain, 2001; Gil-Garcia, Dawes, & Pardo, 2018; Hood & Margetts, 2007; Lenk, 2007, 2012; Lindgren, Melin, & Sæbø, 2021). From a broader view on how to study digital government, this perspective on stressing the nature and context of government – an institutional perspective – can be seen as one out of nine major perspectives on analysing digital government (Lips, 2020). Lips (2020) characterises this perspective in terms of stressing the importance of the "institutional nature of government" for understanding digital technologies in the public sector. The institutional aspect is in this thesis operationalised via the role of digitalisation in public administration and core processes, defined in section 2.1. This perspective is not new, and already in the early 1970s Laudon (1974) looked at how expected purposes stemming from a political environment such as government affected the implementation of automated information systems, as well as asking "whose goals the technology serves" (Dutton, 1975, p. 10). In the mid-1980s Bozeman and Bretschneider (1986) drew attention to two major concerns, namely, on the one hand, how new management information systems (MIS) are changing public administration, and on the other hand, the lack of attention from scholars in MIS to understanding the environment of public organisations. This challenge of combining

the purpose of public administration with digital technology seems to prevail, and Lindgren et al. (2021, p. 509) highlight that understanding digital governments properties "[…] must rest on knowledge about governments (public administrations) as a particular study domain".

While the previous discussion presents the basic perspective in this thesis, the study of the DIF can be situated in two areas of research within the field of digital government: 1) benchmarking and maturity models and 2) how to understand digitalisation within a public administration context. The thesis is therefore concerned with the usefulness of frameworks for assessing digital government in general, and in particular the design, use and further application of a DIF in assessing digitalisation of core processes. Using primarily case studies and empirical material in the context of government agencies based on the work on the DIF, the aim is to understand how digitalisation can be assessed in the context of public administration and core processes.

As previously mentioned, the thesis can be situated in relationship to research within digital government pertaining to maturity models and benchmarks (Andersen, Lee, Mettler, & Moon, 2020; Iannacci et al., 2025; Okan, 2024; Skargren, 2020), and with an interest in research on the influences and effects of applying these types of theoretical frameworks for assessing digital government (Batlle-Montserrat, Blat, & Abadal, 2016; Kromidha, 2012; Maheshwari & Janssen, 2013). The instrumental and practical value of applying, for example, benchmarks for digital government, is one of three possible perspectives on the purpose of benchmarks according to Heeks (2008). One of these purposes is a prospective way of using them for supporting decision-making, establishing priorities and creating a forum for learning and best practices (ibid.). However, these types of frameworks for assessing digital government have been subject to much criticism, as well as misunderstandings according to some research (Andersen et al., 2020). One major concern of these types of frameworks for assessing digital government relates to a broader criticism regarding how digital government in general has at times become conceptualised mainly as the use of front-office services

(Bannister & Connolly, 2015). This has also to a certain degree been cemented in the practice of international organisations such as the United Nations (UN) and the European Union (EU) that have – and continue – to use benchmarks on how well countries perform in different areas of digital government. Other critical remarks concern their lack of context and thereby relevance for assessing digital government, that they only focus on front-end digital services while major parts of digitalisation take part in back-end process, how they risk distorting government strategies and resources and the lack of any real instrumental value for practitioners (Andersen et al., 2020; Bannister, 2007; Skargren, 2020; Vintar & Nograšek, 2010). Past research has therefore argued for a need to move beyond measurement as an endpoint, and to use these types of frameworks and their results in more depth in a certain domain and as support for questions surrounding development of digital government (Maheshwari & Janssen, 2013). Others have advocated for more studies on the resources used to implement them, how these frameworks are implemented and the efficiency of their evaluation results (Okan, 2024). This thesis contributes to this area of research within digital government in looking at the design and application of a DIF.

1.2 Digitalisation of core processes in public administration

As mentioned above, the DIF has a particular focus on digitalisation of core processes in the setting of public administration. This focus on digital government relates to studies highlighting certain prerequisites of public administration for understanding digitalisation (Gil-Garcia et al., 2018; Lenk, 2012; Lenk, Traunmüller, & Wimmer, 2002; Lindgren et al., 2021). Bozeman and Bretschneider (1986) highlighted how MIS reshapes public administration and noted MIS scholars' neglect of its public context. As Lindgren et al. (2021, p. 509) put it, understanding digital government "[…] must rest on knowledge about governments (public administrations) as a particular study domain". In this sense I concur with Lindgren et al. (2021), who explain the specificities of a public ethos as distinguishable characteristics of public administration, including, inter alia, the rule of law and accountability.

My understanding is that this discussion on how to study digitalisation in the environment of public administration has continued into the present day, and scholars have, for example, advocated that digital government needs to be better grounded in public administration to tackle the "Big" research questions of the day (Yıldız, 2012), while others argue more broadly that scholars "[…] still do not give ICTs a prominent position in their research into modern developments in public administration" (Meijer, 2007, p. 233); both of these points has been brought up by other researchers in the field of digital government (see Lips, 2007; Margetts, 2014). Nonetheless there are several important studies of digital government examining digital technologies in terms of what can be broadly termed the "nuts and bolts of public administration" (Lenk, 2012; Lenk et al., 2002), "e-bureaucracy" (Cordella, 2007; Cordella & Tempini, 2015) or the role of digital technologies in what Hood and Margetts (2007) call the instruments of government. There are thus ample signs within the digital government community of calling for more studies on the relationship between technology and public administration and for "greater attention" to the practical aspects of how ICT impacts the public sector (Gil-Garcia et al., 2018, p. 641; Lenk, 2007, 2012).

Taking these points together, the DIF can be situated among researchers in the field of digital government calling for better contextualisation of digital technologies in public administration, and scholars studying an "information polity" have pointed towards the importance of analysing how ICT supports information processes within a judicial framework (Bellamy & Taylor, 1992). Digital government in this thesis is therefore used in a broad sense of the use of digital technologies in both government and public administration (F. Bannister & Connolly, 2012; Scholl, 2022), and I acknowledge how this in turn can be divided into many different and significant areas of study, such as digital strategies and maturity, the use of AI, digital participation, open data and digital services (Hofmann, Madsen, & Distel, 2020; Lips, 2020; Madsen, Lindgren, & Melin, 2022; Sun & Medaglia, 2019; Twizeyimana & Andersson, 2019). In a more specific sense, this thesis is therefore delimited in its perspective on digital government as the presence of digital technologies in

public administration for the execution of core processes (Lenk, 2012; Schedler & Helmuth, 2024; Skargren & Garcia Ambrosiani, 2022).

1.3 Aim and research questions

The aim with this thesis is to understand how digitalisation can be assessed in the context of public administration and core processes. The question pursued in thesis is: *How can a Digital Index Framework provide an assessment of digitalisation of core processes in government agencies?* This question is addressed from four main directions. Firstly, as a critical examination of the purpose, more generally, of benchmarks for digital government and via a literature review on what research has had to say on this area. Secondly, a closer study on the design of a framework – the DIF – for assessing digital government based on a case study of a government agency in Sweden. Thirdly, a study on the development, validation and results of a classification of core processes for digital government. This ramification and definition of core processes is used in the DIF and an argumentation is provided for how this classification can contribute to research on digital government for purposes of analysis and description Fourthly, the main question is approached by examining the results and influences from the application of the DIF in practice. A summary of the questions in their respective studies can be seen in Figure 1.

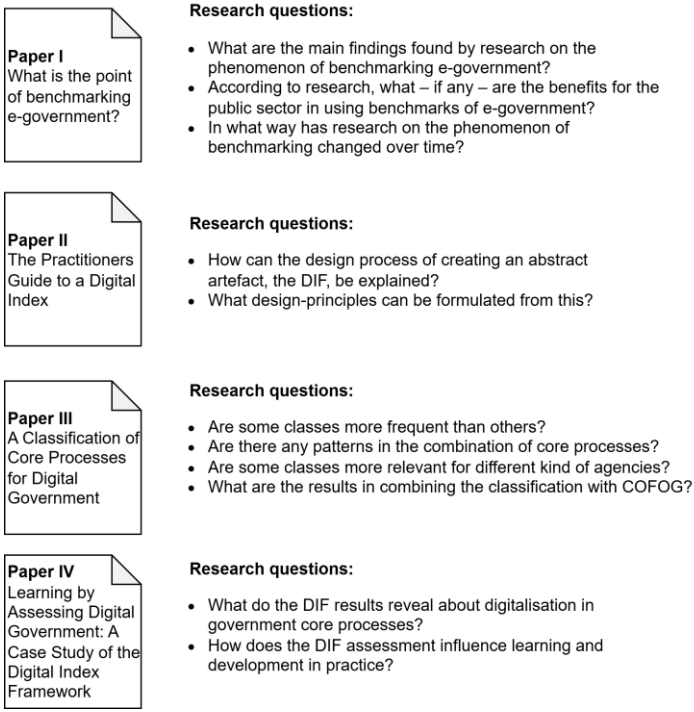

Figure 1. Overview of research papers and their respective research questions and focus.

The main question can be studied from many angles, and this thesis explores some of these. Paper I is motivated by wanting to understand, more generally, what research has had to say on benchmarks for assessing digital government. A further motivation for this is in part how international expectations on digital government is used in key policy papers to evaluate Sweden's progress in this area, and these evaluations seem to play a key role in how policy and politics are developed with regards to digital government in Sweden (see e.g. chapter 9 and 5.1 respectively in E-delegationen, 2015; Statskontoret, 2014) and a more recent example in (Digg, 2024a). These types of assessments, and their use in motivating policy and politics, encourages my interest to study the phenomenon of international "benchmarks for e-government", and I address this phenomenon from the perspective of what research has had to say

about these benchmarks and how this research had developed over time (see Skargren, 2020). With my background in public administration and experiences in working with a DIF as a model for practical application and development of digital technology at a government agency, I was curious to see how these benchmarks could be of benefit for the public sector. I wanted to know: What is the point of benchmarking digital government? And a part of this was also to try and understand my own role and purpose in creating these types of models, and to apply a critical view on what I was doing in practice.

From the study on benchmarks for digital government, paper II moves on to study the model of the DIF at the STA. This is an analysis of the creation of a single framework – the DIF – in a single case study that included a period of about six months (see Skargren & Garcia Ambrosiani, 2022). The motivation here is to explore the process of designing the DIF and looking specifically at how it was designed and for what purposes. In contrast to studying different frameworks producing relatively abstract outcomes about e-government and based on highly aggregated data about many underlying actors and variables at an international level, paper II is about the details of a single model at a micro level. The DIF assesses digital government much closer "to the ground" in terms of what the public sector is doing in practice.

Paper III investigates a classification of core processes for digital government. Core processes is the focus of the DIF, as shown in the study of its design in paper II, however the original design of the DIF was geared towards two classes of core processes: granting permits and conducting supervision and control. Government agencies do more than these two types of core processes. Paper III is a case study of Digg regarding the development, validation and results of a classification of core processes in government agencies in Sweden. Here, a set of research questions was asked to see how the proposed classification can contribute to research in digital government using different types of classifications. These questions concerned, among others, whether some classes are more frequent than others, their distribution among government agencies and the results of

combining the classification with the Classification of the Functions of Government (COFOG).

As noted above, the DIF has also been applied in practice on several occasions. Paper IV moves beyond the design and development of the DIF, towards analysing the application of the DIF and its influences on the participants subject to working with it. The level of analysis here moves from a case study of the development of the DIF at a single government agency, to a case study of a project using the DIF and involving two government agencies in Sweden. This analysis was directed to interpretating the quantitative results from the DIF and using a so-called schematic theory of evaluation influence to study qualitative data on how the DIF assessment process influences the participants of the project. This paper therefore addresses the following two research questions: What do the DIF results reveal about digitalisation in government core processes? How does the DIF assessment influence learning and development in practice?

1.4 Disposition

Having introduced a general perspective on the background and basis of this thesis in research on digital government, as well as the research topic and questions, this thesis will proceed in the following manner.

Chapter 2 provides an overview of the type of research from the field of digital government relevant for this thesis, as well as definitions and discussion of key concepts and analytical vantage points applied in this study.

Chapter 3 proceeds by delving deeper into the question of method. This includes descriptions and purposes of the chosen methods, as well as a general characterisation of the choice of methods applied in relationship to the idea of pragmatism and arguments concerning the dual role as a practitioner and researcher. This leads to a discussion of the ethical consideration relevant for this thesis and of course the limitations of this study based on the chosen methods.

Chapter 4 presents the results from four main perspectives based on the respective papers. Namely, a description and motivation for the

study; a discussion on how the studies was selected in relation to research and practice; how the studies answer their respective research questions; and a closer look at the results and their wider implications in terms of future research and practice. This is then followed by an answer to the main question posed in this thesis.

Chapter 5 presents the main contributions from this thesis in terms of both theoretical as well as practical contributions and includes a final subsection suggesting future research.

2 Related research and definitions

This thesis concerns the subject of informatics. According to the Swedish Academy for Information Systems (SISA)[1] informatics is a "scientific discipline for developing knowledge about digitalisation and its prerequisites, meanings, values and consequences in individual, organisational and societal contexts".[2] SISA defines the subject further to involve the study and development of systems, artefacts and resources as well as "digital practices". The latter includes the implementation and use of systems, artefacts and resources as well as the governance and design of these aspects. Research on these aspects in the context of the public sector have been studied extensively since at least the mid twentieth century and developed into the multidisciplinary field of, among others, digital government. This thesis contributes to the field of digital government, which is a discipline entailing the study of the "use of modern information and communication technologies (ICTs) in the business of government along with its evolutionary change-driving consequences" (Scholl, 2022, pp. 68-70). The discipline of digital government is multidisciplinary in the sense of using theories and empirical studies from scholars in the field of information systems (IS), as well as law, political science and public administration (F. Bannister & Grönlund, 2017; Hirschheim & Klein, 2012; Scholl, 2022)

Research on digital government gained a lot of attention with the advent of the public use of the internet in the 1990s. It is during this decade that the notion of "e-government" was launched as a vision of the "transformation" of government by the Bill Clinton and Al Gore administration in the US government (Lips, 2007, 2020). This meant more focus from digital government research on studying e-services for citizens, in contrast to past research concerned with the "internal" use of digital technology in government operations (Grönlund &

[1] Authors translation of "Svenska informationssystemakademin", https://sisa-org.se/ (visited 2025-05-20).

[2] Ibid. Author's translation.

Horan, 2005). Both Scholl (2007) and Andersen and Henriksen (2005) show, however, that research on digital government is very broad and diverse going forward from the mid 1990s. This thesis can be positioned in terms of one of the six aspects that Scholl (2007) presents as "major concepts", based on the Digital Government Society of North America, in research on digital government, namely that of *government operations*. While Scholl does not define this term, I understand it here as how digital technologies are implemented and used to support core processes in public administration, as discussed earlier. This area of research can also be connected to the results from an extensive analysis of digital government research conducted by Andersen and Henriksen (2005). They identify six "key dimensions" in digital government research, and this thesis can be connected to the research area they describe as "labor intensive" and "where case handling plays a central role in areas such as social welfare and application processing"(Andersen & Henriksen, 2005, p. 35).

More precisely, the latter aspects are related to the focus of this thesis, namely the design and application of a DIF in how to assess and understand the results of a framework for assessing digitalisation in core processes in digital government. This includes a broad understanding of the phenomenon of frameworks for assessing digital government, and suggestions of how to classify core processes for analysing digital government. This thesis therefore relates to past research in two aspects. Firstly, it is delimited to a function and area of responsibility in the public sector which is the digitalisation of core processes in the public administration of government agencies. This limits the thesis in its scope but also asserts an important theoretical principle expressed by Lindgren et al. (2021, p. 509). that understanding the characteristics of digital government "must rest on knowledge about governments (public administrations) as a particular study domain". This is motivated both by how the DIF is in this thesis designed, and applied, to assess digitalisation in a public administration context, including how it can be used to study eight identified classes of core processes in public administration relevant for digital government. From a broad perspective, this relates to researchers in digital government making the case for the importance of studying digitalisation in the context of public administration

(Lenk et al., 2002; Lips, 2007, 2020; Margetts, 2014). More specifically, the thesis relates to research in digital government using theoretical frameworks for assessing digital government addressing closely related aspects of core processes (Chen, Hu, Tseng, Juang, & Chang, 2019; González & Delgado, 2021; Hooda & Singla, 2020), and research on digital government using or designing concepts and classes relating to the tasks or tools of government (Engstrom, Ho, Sharkey, & Cuéllar, 2020; Hood & Margetts, 2007; Maragno, Gastaldi, Tangi, & Benedetti, 2021; Maragno, Tangi, Gastaldi, & Benedetti, 2021).

Secondly, the DIF in this thesis can be situated as a phenomenon described as frameworks for assessing digital government, and there are plenty of studies in digital government looking at such frameworks in terms of benchmarks and maturity models (Bannister, 2007; Iannacci et al., 2025; Okan, 2024; Skargren, 2020). This thesis contributes to this research within digital government, and related researchers mentioned in the previous paragraph focusing on core processes and assessing digital government as well as indexes for assessing digital government (Batista, Carreiras, & Ramos, 2022; Benaddi, Hannad, Kettani, & Askour, 2023).

This chapter will proceed by defining key concepts in this thesis, including public administration, core processes and digitalisation. The chapter then goes on to remark on the thesis' relationship to theory, whereafter follows an account of how to situate the research in this thesis in relation to past research in digital government in general and delimiting it to the area of core processes in government agencies. The area of research in digital government concerning core processes is then expanded further, both in terms of a classification for analysing digital government and the relation between the DIF and past research in digital government. The concepts of framework, assessing and index will be defined in the section detailing the DIF (see section 2.5).

2.1 Definitions

2.1.1 Public Administration

> Legislation and administration are two sides of a coin. Legislation creates rules, while administration applies them. (Lehdonvirta, 2022, p. 153)

Public administration is a particular context in which digital technologies are implemented and put to practical use. Indeed, a characteristic that the two fields of the study of public administration and digital government respectively share is a deep concern with questions of practice: how technology can be used in practice and how to carry out the theory of administrative procedures in practice such as undertaking taxation or government supervision of permits for doctors (see e.g. L. Karlsson, 2014; Scholl, 2022). Public means how the administering of politics is an extension of our representative form of democracy: being open to public scrutiny; being legitimate by upholding current legislation; and placing a central role in maintaining "[…] the democratic welfare state as we have come to understand it" (T. Karlsson, 2014, p. 16). This is in turn also connected to why the public sector is characterised by a unique public ethos to maintain core democratic values (Lundquist, 1998) and part of a set of features that are crucial to understand when defining digital government (Lindgren et al., 2021).

Two classical accounts of how to define public administration that are relevant this thesis are Woodrow Wilsons *The Study of Administration* (1887) and Herbert Simon's *Administrative Behavior* (1997). Wilson sets out two purposes for the study of public administration, both of which are highly actual still today in discussions on digital government, namely a normative question on what government "can properly and successfully do" and how to do this as efficiently as possible (Wilson, 1887, p. 197). The definition of public administration is here the organised and transparent act of administering and implementing laws and regulations in practice and thus in extension the exercise of political power (see Peters & Pierre, 2012; Wilson, 1887). This area, sometimes labelled under the notion of bureaucracy in research on digital government (see F. Bannister,

2017), demands for example the processing and handling of various types of information, commanding legal legitimacy in the eyers of citizens and the resources and ability to use different types of analogue and digital technologies, with far reaching effects on the lives and business of people and companies (F. Bannister, 2017; Hood & Margetts, 2007; Lenk, 2012). Not least the latter type of question has been subject to many treatises in the field of digital government concerning questions such as digital transformation and the potential of reform in public administration using digital technologies (see Clarke, 2020; Danielsen, Flak, & Sæbø, 2022; Mergel, Edelmann, & Haug, 2019), and via concepts such as government as a platform (O'Reilly, 2011), advocated by the intergovernmental Organization for Economic Co-operation and Development (OECD) for reforming public administration in its member states (OECD, 2020).

More importantly for the definition of public administration in this thesis, Wilson (1887, p. 212) explains how it is about the "[…] detailed and systematic execution of law. Every particular application of general law is an act of administration". This excludes from our study, for example, the political sphere of bargaining and deciding on whether to amend or create laws in a parliamentary setting. Or as Wilson (1887, p. 212) puts it, "[t]he broad plans of governmental action are not administrative; the detailed execution of such plans is administrative". In line with Wilson, Simon (1997) also highlights the actual, practical and contextual dimensions of administration. "Administration", writes Simon (1997, p. 1), "is the art of getting things done". More in detail this means that we are interested in what he describes as "[…] the processes and methods for insuring incisive action" (ibid.); indeed, this relates to the tools of government in the digital age (Hood & Margetts, 2007). These points and definitions are important because they exclude digital government in terms of the politics or policy inputs of digital *governance* or effects on civil society. Based on Molin et al. (1975), Grönlund and Horan (2005) present a simple overview in their discussion on digital government research which illustrates my point in Figure 2. For our purposes here, this figure is interesting primarily to give an example of how to situate the research in this thesis as being in the area of public administration

highlighted in Figure 2, distinguishing public administration from the area of "formal politics" and "civil society". The two latter areas are of course not irrelevant or unimportant in any way, and they intersect with public administration in important ways, but they are not the focus of this thesis. As we shall see in the definition of core processes shortly, formal politics play a crucial role, and core processes relate to civil society in terms of the dimension of interacting with society in the DIF (section 2.5)

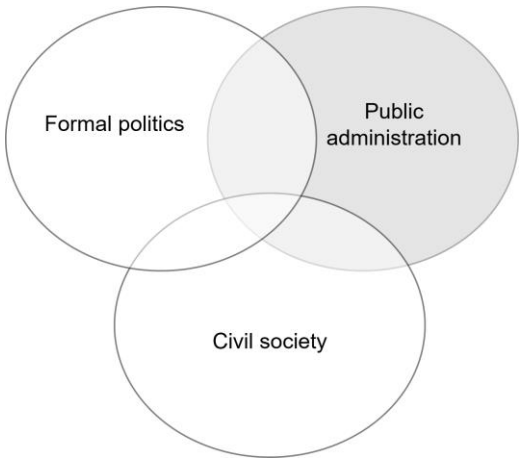

Figure 2. "Basic Spheres and Relations in a Democratic Government System" adapted and modified from Grönlund and Horan (2005), based on original by Molin, Månsson, and Strömberg (1975). Area of "Public Administration" is modified and highlighted by the author.

Having placed the thesis in relation to a definition of public administration, the latter area is detailed further via the concept of core processes.

2.1.2 Core process

Within the practice and area of public administration, this thesis deals with government agencies and how they carry out so-called core processes. Firstly, the Swedish Agency for Public Management (SAPM) defines a government agency as an "enduring organisational entity with its operating instructions laid down in an ordinance or in law" (Statskontoret, 2024, p. 11, author's translation). The purpose

and goals of government agencies in Sweden are to implement ordinances and laws from the Swedish government and parliament (Norén Bretzer, 2021). As of January 2025, there are 367 government agencies under the central government and 290 (79%) of them have an annual workforce of more than 10 persons (Statskontoret, 2025). The main tasks of government agencies are to carry out core processes, which are laid out in legal instruments used by the central government to govern state agencies called the Government Agency Ordinance (Norén Bretzer, 2021). Government Agency Ordinances are structured according to a certain logic, adhering to judicial codes and norms, and are legally binding instructions for every state agency. The notion of "core" relates to the tasks of a government agency, in contrast to, for example, support processes such as managing the budget and personnel issues, and is carried out to make sure laws and regulations are upheld in society (see Digg, 2021a). An example of these ordinances stipulating, among others, the core processes of a government agency can be seen (in Swedish) in Figure 3.

Similar to the definition of business process provided by Schedler and Helmuth (2024, p. 167), process, as in core process, means to proceed "chronologically from input to output, i.e. from the supply of resources to the delivery of the service". These are triggered by different types of events, such as the application of a permit (in the core process of granting permits) or an external report (in the core process of supervision and control). In the case of public administration these processes are guided by law or legal norms (Bovens & Zouridis, 2002; Schedler & Helmuth, 2024; Skargren & Garcia Ambrosiani, 2022). Lenk (2012, p. 226) describes this as a field of "operative administrative action" and explains how administrative processes can come in a huge variety. In public administration this means that a process is heavily imbued by, and made up of, a plethora of various administrative activities based on law and, for example, the classification of information. The input and output of "resources" is the creation, combination and preparation of different types of information gathered from citizens and businesses or from other public sector actors. These activities are carried out in practice according to what what has been decided by law via politics, in accordance with the

definition of public administration provided earlier. These aspects are incorporated in the DIF presented in section 2.5.

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Uppgifter

1 § Myndigheten för digital förvaltning ska samordna och stödja den förvaltningsgemensamma digitaliseringen i syfte att göra den offentliga förvaltningen mer effektiv och ändamålsenlig.

Med den offentliga förvaltningen avses i denna förordning kommuner, regioner och statliga myndigheter, med undantag för Regeringskansliet, Säkerhetspolisen, Fortifikationsverket, Försvarshögskolan samt myndigheter som hör till Försvarsdepartementet.

Myndigheten ska ansvara för den förvaltningsgemensamma digitala infrastrukturen enligt 3-5 §§. Förordning (2019:1131).

1 a § Myndigheten för digital förvaltning är beredskapsmyndighet enligt förordningen (2022:524) om statliga myndigheters beredskap. Förordning (2022:571).

1 b § Myndigheten är nationell samordnare enligt Europaparlamentets och rådets förordning (EU) 2018/1724 av den 2 oktober 2018 om inrättande av en gemensam digital ingång för tillhandahållande av information, förfaranden samt hjälp- och problemlösningstjänster och om ändring av förordning (EU) nr 1024/2012. Förordning (2022:821).

Figure 3. Example of an excerpt from the Government Agency Ordinance for the Swedish Agency of Digital Government (Ministry of Finance, 2018).

A core process in public administration is thus the administering of legal action based on demands founded on law as well as information requirements and the purpose of the specific core processes at hand. Two critical aspects can be added to core processes here: they vary in complexity and come in different classes. Concerning the former

aspect, Lenk (2012, p. 226) writes that these types of processes come in a "huge variety" and distinguishes them on three different levels:

A. Recurrent and well-structured processes;

B. Processing of cases: individualised decision-making;

C. Negotiation processes.

Core processes in category A consist of standardised decisions, with binary – or highly limited – sets of decision options, based on set and clear judicial criteria (see ibid.). These can further be characterised as being large in terms of volume of cases and subject to automatisation. Cases in category B require different communication and levels of interaction with citizens and companies, and the outcomes are not possible to predict beforehand, thus requiring various levels of personal contact, while the judicial options are broader and not as clear cut. Regarding category C, Lenk (2012) describes how there is a complex process of negotiation where there are perhaps no determining laws and regulations, and room for adaptation and negotiation are important.

Core processes can also be divided as consisting of at least eight different classes in the area of digital government (Digg, 2021a; Skargren, Olofsson, et al., 2025). Each class has a different purpose and is specified in the ordinances explained earlier (see Figure 3). The classes of core processes can be granting permits, conducting supervision and control or to conduct public transferring, which is to collect, distribute and/or redistribute capital in different ways (see section 2.4). A core processes such as supervision and control can be carried out in such diverse areas in society as forestry, real estate agents and agencies or airports. Granting a particular type of permit can be done in areas as different as transportation, operating a specific type of company or for medical professions. Core processes in this sense therefore primarily highlight the *purpose* of public administration in terms of what they are to achieve across different policy areas such as education, crime, energy and water management – rather than *how* this is done (see Gulick, 1937; Hammond, 1990). In addition, a core process can be further detailed, and is made up of a

number of different sub-processes or case types. Case types is part of a hierarchical structure – a classification structure – with the purpose of identifying and numbering all types of information processes in accordance with the different areas of core processes that take place at government agencies in Sweden. This is a legal requirement by the Swedish National Archives (Riksarkivet, 2008, 2012). A case type or a sub-process, is then a further level of detail within a class of core processes that specifies an added detail of purpose. For instance, in the area of transportation, the core processes of granting permits can be done for either objects such as to build a specific bridge or to run a company, or for individuals to drive a taxi or a train. Depending on the level of judicial demands there can be x amount of specific sub-processes within a main class of core process. Case types are significantly more detailed and can be divided into several hundred different types depending on aspects such as legal framing, how a process is delimited and how information is structured (Skargren & Garcia Ambrosiani, 2022).

As will be explained further in section 2.5, core processes in terms of the DIF presented in this thesis are therefore a judicially bound and highly structured processes carried out by public servants – or a machine – to achieve specific legal effects, and which can have a high degree of practical impact on the lives and businesses of citizens and companies.

2.1.3 Digitalisation

As noted above, this thesis is positioned in the field of digital government and studies the area of digitalisation in public administration and core processes of government agencies. The concept of digitalisation is in this thesis defined as it is used in the DIF. Digitalisation means the degree of presence of different types of digital technologies in activities carried out in an ideal type of a case handling process. Digitalisation as the presence of digital technologies can vary depending on where they are used in carrying out a core processes. They can be, for example, digital services for facilitating the communication, which is the dimension of “interacting with society” in the DIF, or the “front-end” – such as web-services – between an

individual and their dealing with a government agency in receiving financial aid or being in the process of having their driving licence revoked. Digitalisation here relates to the notion of "e-bureaucracy" as introduced by Cordella (2007); (see also Cordella & Tempini, 2015). The notion of e-bureaucracy stresses how digital technologies are

> […] used to facilitate and support the fundamental organisational functions of coordination and control that are defined in the legal-normative set of rules that prescribe how to coordinate the activities of the organisation and how to deliver the services. (Cordella, 2007, p. 272).

Digital technologies in core processes can also include the existence of automated decision-making mechanisms in the dimension of internal case handling in the DIF, or the existence of application programming interfaces (APIs) for the sharing of data as in the dimension of exchange of data in the DIF (see also Cordella & Tempini, 2015, p. 280). The DIF has been designed to identify these technologies in the sense of quite simply describing their existence in relation to the mandatory steps in terms of different administrative activities required to carry out core process.

From a theoretical perspective, the concept of digitalisation in this thesis therefore serves a primarily descriptive and analytical function (Gregor, 2006). Normative questions regarding whether digitalisation has led to improvement, to what extent digital technologies are used, whether they transform government agencies in anyway or other types of effects are largely left outside of this thesis. In defining the concept of digital transformation, Mergel et al. (2019), for example, makes a distinction between digitisation and digitalisation, clarifying that digitisation underlines "the transition from analog to digital services with a 1:1 change" in the offering of services and addition of technologies (ibid. p. 12), while digitalisation underlines "potential changes in the processes" beyond digitisation, and digital transformation is a further and deeper change in areas involving organisation and culture (ibid.). However, one can argue that the question of how to distinguish between digitisation and digitalisation is still not clear here in terms of, for example, how to distinguish in practice what is really a "1:1" change, and how to distinguish between

the two notions when different types of analogue and digital services, as well as changes in some processes but not others, co-exist. Indeed the distinction previously made by Mergel et al. (2019) can be problematised further from a number of perspectives, not least using technology enactment theory developed by Fountain (2001) and applied by Cordella and Iannacci (2010) and Gong, Yang, and Shi (2020). However, it is not the purpose here to resolve this distinction. Digitalisation is used in this thesis as a combination of digitisation and digitalisation. It involves the presence of digital technologies for carrying out an administrative activity. The point in this thesis is how digitalisation is present in core processes and are imperative for carrying out "e-bureaucracies" consisting of "the activities of the organisation" mentioned in the above definition. It is acknowledged that digital technologies not only support these processes, but they are also in turn inherited with the different ideas and political bargains and hopes of different policy effects developed in the process of policymaking in the sphere of formal politics in Figure 2 (see also F. Bannister & Connolly, 2014; Cordella & Tempini, 2015). These aspects of values in digital government are left out of this thesis.

2.2 Theory and digital government

The application of theory and concepts in this thesis has been primarily in terms of tools to analyse material and answer research questions, rather than applying or departing from *one* theory to explain or predict phenomena in digital government. In this sense, this thesis has used different types of theories that can mainly be placed in types of theory described by Gregor (2006) as descriptive and analysing and for design and action. This division is useful because it offers clear definitions of theory for the discipline of IS and of which digital government is a sub-discipline (Bannister & Connolly, 2015). A further explanation in terms of how to frame the results as theoretical contributions of each paper is presented in chapter 4. A brief remark here instead concerns, for example, how a literature review such as the one conducted in paper I can be viewed as theory, and to note a theory which is in proximity to the DIF, namely the e-government work systems framework (eGovWSF) (Lindgren et al., 2021).

The literature review in paper I was done to integrate past research into a coherent analysis of the phenomenon of benchmarking digital government and to identify themes and research problems. The purpose of the literature review was also to probe the usefulness of these benchmarks for public administration. The theoretical contribution of conducting a literature review is in this sense to be able to accumulate knowledge as a means for gaining insights into a topic, being able to show what "research knows", create theory and concepts with the goal of advancing knowledge further (Hart., 1998; Paré, Trudel, Jaana, & Kitsiou, 2015; Webster & Watson, 2002). A literature review can then be categorised as a theory type belonging to what Gregor (2006, p. 619) calls analysis and description. In short, the purpose is to "say what is" (Gregor, 2006, p. 620), based on the articles being reviewed. By reporting and synthesising what other scholars have noted, it also contributes to theory in the sense of being critical. An additional theoretical contribution to a seemingly descriptive and integrative literature review is to highlight the meaning and importance of benchmarks outside their immediate use and interest for scholars, but how they affect practice and decision-making (Andersen et al., 2020; Bannister, 2007). Another possible theoretical contribution from such a critical literature review is to connect to relevance and avoid the criticism of instrumentalism, and lack of engagement with questions with a social meaning and usefulness to practitioners, as argued by Alvesson, Gabriel, and Paulsen (2017).

Another aspect of the use of theory in this thesis is how the DIF is closely related to the eGovWSF. There are plenty of relationships to explore here, yet only three of these will be noted sketchily in relation to the notion of core processes and the analytical focus of the DIF. Section 2.5 connects and motivate the parts of the DIF to the parts they relate to in the eGovWSF. First, this thesis and the DIF share an important principle with Lindgren et al. (2021, p. 509) concerning the study on digital government, namely, how

> Understanding e-government's characteristics must rest on knowledge about governments (public administrations) as a particular study domain. First and foremost, when we use

> European welfare democracies as the analytical starting point, the public ethos constitutes public administrations' most distinguishable feature, which means that they should operate in a way that serves all citizens. (Lindgren et al., 2021, p. 509)

The previous quote goes back to the definition of public administration earlier as a core feature of the study of digital government in this thesis. Besides the points about the importance of recognising the social, economic and political environment of government agencies, at least three elements in the DIF and the eGovWSF can be commented on (see Lindgren et al., 2021 p. 511 ff).

- Law and regulation. This element was added by Lindgren et al. (2021) ex post to Alter's (2013) original Work Systems Theory and for very good reasons. Government agencies are heavily regulated, from high service standards of transparency in the Public Access and Confidentiality Act (in Swedish: *Offentlighets- och sekretesslagen*) and high service standards and mandates to always respond to citizens in services with citizens and companies in the Administrative Procedure Act (in Swedish: *Förvaltningslag*). Judicial standards are basic and crucial elements impacting the design and prerequisites for all types of digital government (see also e.g. Bovens & Zouridis, 2002), and not least the ability to, for example, formalise law for automated decision making (Parycek, Schmid, & Novak, 2024).

- Processes and activities. This relates to what is discussed above as the process-oriented nature of core processes, and defined by Lindgren et al. in the eGovWSF context as "processes (clearly defined steps) and activities (discretion and improvisations) that provide public e-services to external stakeholders" (p. 513), taking place at both the front- and back-end of public services and case handling.

- Information. This is crucial to the understanding of digitalisation of core processes, mainly because this is about the actual and practical elements for the purpose and effects that core processes are administering in relation to citizens and companies such as

statistics, financial information or personal data. This makes up the actual digital building blocks with which the digital technologies are integrating to "use, create, capture, transmit, store, retrieve, manipulate, update, display, and/or delete" (ibid).

2.3 Digital government and public administration

This research can be explained in more detail by situating it in relation to the organisational parts that constitute a public organisation (see Figure 4). According to Mintzberg (1980), and based on his classic synthesis of organisational research, there are five basic parts to organisations: operating core; middle line; support staff; technostructure; and strategic apex.

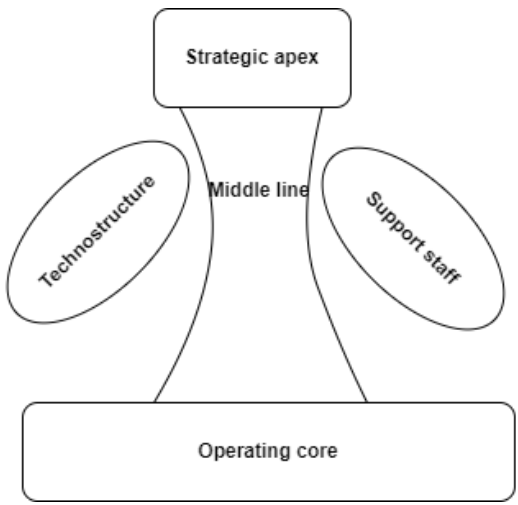

Figure 4. Based on Mintzberg's "Five basic parts of an organisation", adapted and slightly modified from the original (Mintzberg, 1980, p. 324).

Mintzberg theorises the basic roles and functions of the staff for each of these parts. In a nutshell, the **technostructure** contains the staff responsible for maintaining the direction and the correct purpose of the whole organisation and consists, according to Mintzberg, of analysts and accountants. While on the other side, the **support staff** entails, for example, human resources and legal support. While the **operating core** is where the actual service or products are being created, the **strategic apex** is the top management team and directors, who are in turn supported by the **middle line** of managers connecting them indirectly to the operating core (Mintzberg, 1980). Core processes, as defined in this thesis, can be placed in what is called operating core in Figure 4.

With Mintzberg's organisational schema in mind, the area of digital government research dealt with in this thesis can be highlighted further by differentiating it from research relating more to other parts identified in Figure 4. In summary, relevance from a digital government perspective can be to look at, for example:

- governance and culture;
- core processes;
- citizen and companies perspectives;
- the IT-infrastructure;
- digital services;
- and the sharing of open data for public re-use.

This overview is not meant to be exhaustive in any way, but rather to illustrate some possible parts researched from a digital government perspective and to help explain and situate the area studied in this thesis and its relationship to research. The purpose here is to situate and delimit the area of study presented in this thesis, located in the area of "core processes".

Research in terms of **governance and culture** – relating to what Mintzberg calls the s*trategic apex* – can be addressed in terms of "softer values" under the umbrella notion of "digital maturity". This

area can include different types of digital competencies, from the presence of a digital agenda, instituting different leadership roles such a Chief Information Officer, to the need to implement different models for facilitating innovation and change management with the help of digital technologies or information security policies. This way of addressing digitalisation in the public sector can come in different variations and can be found in, for example, Magnusson, Kizito and Nilsson (2019, p. 3), who define digital maturity as an "organizations ability to gain benefits from digitalization", and Digg looks at similar organisational parameters surveying the presence of, for example, competency in leading digital development (Digg, 2024b); and the OECD (2024), in its digital government index, based on its six dimensions of the OECD Digital Government Policy Framework, has similar elements pertaining to governance of digital government. D**igital services**, on the other hand, is a classic area for studies in digital government overall and can also come in a wide range of perspectives (see e.g. Tremblay-Cantin, Mellouli, Cheikh-Ammar, & Khechine, 2023), and can be studied, for example, in how a combination of digital and analogue channels might be required depending on the intricacy and nature of the citizen-related inquiry and indeed how self-service via digital means might entail more, rather than less, of an administrative burden for citizens (Madsen, Hofmann, & Pieterson, 2019; Madsen et al., 2022). The part on **citizen and companies perspectives** can be exemplified by research on "e-participation" and "e-democracy" and how digital technology effects citizens' participation on issues and policy proposals from the public sector (Fung, Gilman, & Shkabatur, 2013; Macintosh, 2004; Twizeyimana & Andersson, 2019); and on the question of **open data,** how this might foster participation in different ways (Ruijer, Grimmelikhuijsen, & Meijer, 2017) or the barriers for public administration to publish open data against the background of the positive expectations of its economic and political effects (Barry & Bannister, 2014).

Further, the **IT infrastructure** can be studied more closely by looking at the systems, databases and software that enable digital government and can include looking at the issue of technology debt (Magnusson & Bygstad, 2014), to the use of digital government infrastructure such

as “dedicated information exchanges networks”, information registries and operating systems granting the basis for applications to function (M. Janssen, Chun, & Gil-Garcia, 2009).

The final area of **core processes** is the area studied in this thesis. This research area will be described and motivated in two aspects. Firstly, in terms of how to conceptually and analytically divide this area in terms of a classification. Secondly, how to assess and analyse digitalisation via the DIF.

2.4 Classification of core processes

To get an overview and understanding of this research domain, a classification can be created to identify its components. Classification is about “the ordering of entities into groups or classes on the basis of their similarity” as well as “the general process of grouping entities by similarity” (Bailey, 1994 p. 1, 4). A classification “categorizes phenomena into mutually exclusive and exhaustive sets with a series of discrete decision rules” (Doty & Glick, 1994, p. 232). Classifications help researchers analyse complex domains (Nickerson, Varshney, & Muntermann, 2013), and classifications can be used for descriptive and analytic purposes (Gregor, 2006). The development of a classification of core processes is based on the context of public administration for digital government. In line with the definition of core processes presebted earlier, a classification for this research area can focus on what Hood and Margetts (2007, p. 2) call the “tools of government” use when “it comes into contact with ‘us’ the world outside”. While Hood and Margetts (2007) go on to address this in terms of their “NATO scheme” for government resources, this classification focuses on the types of tasks with which government agencies are assigned. This can be motivated by how core processes and their digitalisation are parts of the description and operationalisation of a work system framework for digital government (eGovWSF) presented by Lindgren et al. (2021). Viewed from the perspective of the eGovWSF, the concept of core processes addresses the specific purpose, idea and values of public administration and government agencies with digital technologies.

This highlights critical aspects such as law and regulations, processes and activities and information.

Due to the horizontal capability of digital technology (see Dunleavy & Margetts, 2023; Scholl & Klischewski, 2007), the question of how public administration is carried out in combination with its purpose is central in digital government. A classification can therefore address the need for what Lenk (2012, pp. 229-230) describes as "reference models of administrative production", and which can be created in order to discern the purpose of, and relationship between, digital technology and administrative actions. A central question here is the difference between horizontal and vertical classifications of government (Roness, 2007). A horizontal perspective on government sheds light on "how tasks and authorities are distributed among different organizations at the same hierarchical level" (Roness, 2007 p. 65). This perspective on horizontal integration views an organisation based on purpose and process as provided in the classic discussion by Gulick (1937) of his theory of organisation. A purpose is related to a particular area granting services to citizens, such as education, or in this thesis as granting permits or conducting a supervision, and the process of doing so relates to how these tasks are carried out, such as clerical or financial tasks (see Gulick, 1937, pp. 15-20).

The perhaps most prevalent application of a single and internationally recognised classification in digital government research is the Classification of the Functions of Government, abbreviated as COFOG (United Nations Statistics Division, 1999). This is a relatively static, vertical and hierarchical classification of the government sector according to its activities (defence, health care, the environment, etc). Alshahrani, Griva, Dennehy, and Mäntymäki (2024, p. 680) note that the COFOG "[…] serves as a comprehensive tool to categorise and organise the diverse functions undertaken by governments in various countries. Its primary objective is to ensure a consistent and uniform approach for grouping government expenditures and activities into broader functional categories". Researchers in digital government have applied this classification in particular and are in general no strangers to creating and employing

classifications for studying different phenomena. These range from applying a classification inspired by the COFOG concerning challenges of integration and interoperability by assessing organisation interoperability and public services (Vicky Margariti, Anagnostopoulos, Papastilianou, Stamati, & Angeli, 2020; Vasiliki Margariti, Stamati, Anagnostopoulos, & Nikolaidou, 2024; Vasiliki Margariti, Stamati, Anagnostopoulos, Nikolaidou, & Papastilianou, 2022), to different taxonomies and "patterns" for analysing various aspects of digital public services (European Commission, 2021; Pawlowski & Scholta, 2023; Wouters, Janssen, & Crompvoets, 2021). Other examples of types of classifications that are closer to the research area of core processes are those researchers using classifications of government tasks. In a study mapping the spread of artificial intelligence (AI) in the public sector, Maragno, Tangi, et al. (2021) situate the government processes being affect by AI using, among others, a "macro-category of public processes", including, for example, internal operations and public service delivery (ibid. p. 4.). This study uses and develops a classification of "use types" according to different types of tasks in government, applied by legal scholars in an extensive report analysing the use of AI in Federal Administrative Agencies in the US (Engstrom et al., 2020). These include adjudication concerning benefits and rights or public services and engagement, including "the direct provision of services" in terms of communicating information or for other regulatory purposes (ibid., p. 10). In another study focusing on blockchain technology, Maragno, Gastaldi, et al. (2021, p. 481) use a taxonomy of eight different processes of "government operations" to situate where blockchain is being implemented in practice. The classes of processes include, for example, procurement, property management, or payments and tributes (ibid., p. 481). All of these papers also combine the classification of government tasks and processes with the COFOG.

The COFOG creates different policy areas for government such as economic affairs, housing and health, yet lacks a classification based on the purpose of what governments do in practice. It here argued that research using the classification of tasks, mentioned above, is not systematically defined because it varies in scope and purpose. Another set of classifications of core processes can be suggested, based on a

case study from this thesis on the creation of a classification of core processes for digital government. These are presented in Table 1, and are based on a translation from work of Digg (Digg, 2021a, pp. 12-15) as well as presented in the aforementioned case study (Skargren, Olofsson, et al., 2025).

Table 1. Classification of core processes for digital government.

Classification	Description	Example
1. Granting permits	This class includes the issuing of different types of permits for various types of objects (individuals, companies, vehicles, infrastructure). This type of public activity judges whether the object lives up to certain standards derived from law and decides on granting a permit granting the rights to conduct a certain type of action or business or to possess a certain type of object.	The Swedish Transport Agency grants driving licenses and other permits for different types of vehicles; the Swedish Gambling Authority issues permits for companies to conduct lotteries and own slot machines. Other examples are granting licenses to practice medicine (the National Board of Health and Welfare) or to own firearms (the police).
2. Supervision and control (including test and approval)	This category includes a general definition of supervision as defined in a Swedish public commission(SOU, 2004 pp. 13, 37): an actor investigates in order to assess whether or not another actor/object operates in accordance with, or is designed to operate in accordance with, laws and regulations.	The Swedish National Audit office performs supervision of other public agencies; the police perform controls vis-à-vis individuals, as does Swedish Customs, who also control the import and export of goods. Supervision pertaining to the area of environmental questions is performed by, among others, county administrative boards; and the Swedish Medical Products Agency tests and approves medical products.
3. Public transferring	Transferring is defined as when it is the task of a public agency to collect, distribute and/or redistribute capital in different ways. This includes collecting and administrating	The Swedish Tax Agency and the Swedish Transport Agency both collect taxes from citizens and companies; the Swedish Social Insurance Agency redistributes

	debts and taxes or distributing subsidies and/or other types of benefits.	subsidies to citizens; and the Swedish Board of Student Finance pays out student loans/allowances.
4. Counselling and mediation	This includes agencies dealing with disputes, charges and appeals between two parties. The responsible agency can decide on an outcome and provide specific counsel. This definition demands that there are at least two actors involved and that it is not about directing specific information towards one actor. Another aspect not included here is appeals and disputes regarding individual cases done within the exercise of authority pertaining to granting permits, supervision and transferring.	The Parliamentary Ombudsmen; the Swedish Consumer Agency; and the National Board of Appeal for Student Aid.
5. Providing data from registers and statistics	This classification entails the responsibility to provide data from registries, statistics, and other types of data for reuse by third parties.	The most obvious is Statistics Sweden (SCB); but also the 28 authorities who are officially responsible for statistics in different areas; and the various agencies making data available for reuse to various extents.
6. Regulation and standards	This category entails public authorities with the right to implement regulations and rules of various kinds. Standards can be seen as a kind of rule, albeit with a lower degree of mandatory power than a regulation. The imposition of regulations and standards for internal purposes are not included.	Many authorities are granted the right to implement regulations within their respective areas of responsibility, for example the Swedish Environmental Protection Agency has the right to set regulations with regard to hunting and wildlife. The Swedish Institute for Standards creates and issues standards for many different types of public operations.

7.	**Production of services and goods** (**infrastructure, maintenance, care, education, contracts**)	Here is included the type of operations overseeing or producing different types of services, for example education, care and culture. This also includes the setting up of requirements and obligations for procurement of goods and services for public and private actors.	The Swedish Defence Material Administration is tasked with supplying the Swedish Armed Forces with materials, although the production per se is done by private actors nationally as well as internationally. The Legal, Financial and Administrative Services Agency set in place the preconditions for procurements in Swedish government (framework agreements) and the Swedish Transport Administration does the same for the physical infrastructure. Public museums are classified as the production of culture, as is education to a certain degree (in this case education is seen as the transfer of existing knowledge, in contrast to producing new knowledge; see below).
8.	**Knowledge production** (**research, analysis, public inquiries**)	Knowledge production includes the creation of new knowledge (in contrast to education above) and which is conducted as part of basic and problem-oriented research. Different types of structured investigations and analyses with a broader and evaluative purpose than just improving one's internal operations can also be regarded as knowledge production. The latter is perhaps more of a compilation or analysis of existing knowledge, but with the purpose of drawing new conclusions within a specific area and thereby contributing to new knowledge.	Universities; the Swedish National Financial Management Authority; the Swedish Agency for Public Management; and the Swedish Agency for Transport Analysis.

This classification was designed with some criteria in mind, and among them was that it has a horizontal in contrast to a vertical perspective. Indeed, there are at least two major forms of how to classify public administration: vertically or horizontally (Roness, 2007). A vertical classification is understood here as focusing on the distinguishing features separating different areas or themes from each other and doing so in a hierarchical manner. This can be done by, for example, dividing government agencies in terms of number of employees, the COFOG, their governance structure or according to which ministry they belong, such as the ministry of finance, or agriculture or justice (see Figure 5).

In contrast to a vertical form of classification, a horizontal classification on government looks at how tasks are distributed between government actors that are positioned equally in a hierarchical level (Roness, 2007). The example of core processes mentioned above are tasks and purposes that are carried out irrespective of which area a government actor belongs too: agencies in agriculture, the area of justice or the energy sector will carry out core processes such as issuing permits or conducting supervision (see Figure 6). Digital technologies carry a horizontal capability (Dunleavy & Margetts, 2023; Scholl & Klischewski, 2007) since they can – in theory – be applied in similar ways across different government actors for the purposes of upholding common features of core processes.

The classification of eight types of horizontal core processes presented above is a way of classifying the practice of public administration for the purpose of digital government. Other examples of horizontal classifications of core processes in public administration have been undertaken by Bouckaert and Peters (2003) and Premfors, Ehn, Haldén, and Sundström (2009).

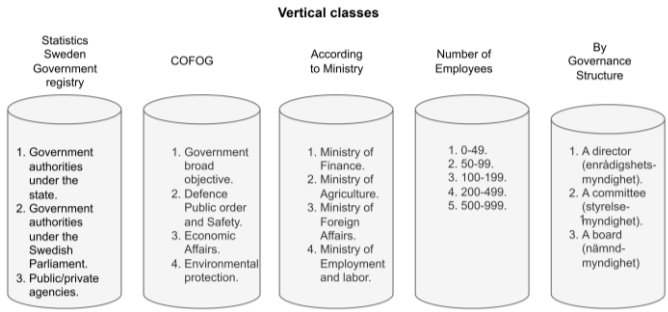

Figure 5. Examples of vertical classifications of government (based on Statskontoret, 2024).

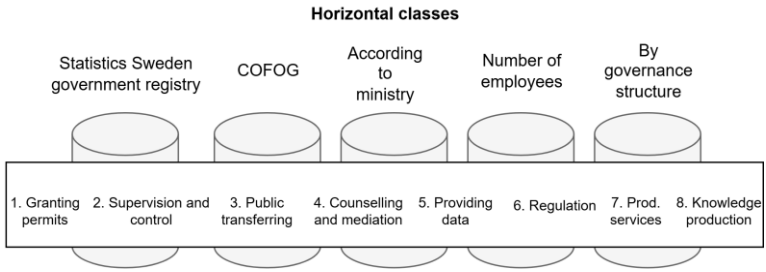

Figure 6. A horizontal classification of core processes for digital government (based on Digg, 2021a; Skargren, Olofsson, & Garcia Ambrosiani, 2025).

In this thesis the core processes granting permits and supervision have been studied from various aspects in papers II, III and IV (number 1 and 2 in Fig. 6). These two classes of core processes were systematised as part of other classes of core processes in paper III, presented as classifications of core processes for digital government. Granting permits and supervision and control were also the two "original" core processes for design of the DIF studied in paper II. The core process of supervision and control was studied in article IV, looking at the results of applying the DIF and the influence of the assessment on the participants (Skargren, Lagsten, et al., 2025).

2.5 The Digital Index Framework

The research area in digital government called core processes can be studied from many different aspects. In this thesis it is explained as a matter of focusing on the digitalisation of core processes taking place in public administration, and which in turn can be classified into eight different classes.

A DIF was designed during the fall and winter of 2015/16 for the purpose of, among others, assessing digitalisation in core processes (Skargren & Garcia Ambrosiani, 2022). The DIF was originally designed to address digitalisation in the core processes of supervision and control and granting permits.

One purpose of the DIF is to assess – and assess here simply means evaluate by way of judging or gauging (Dictionary, 2024) – the presence of digitalisation. The latter is given in numerical values in terms of an index. An index is understood as a sign or *indication* (Dictionary, 2025) of digitalisation in the case of the DIF. The DIF assessment results in a composite indicator: a digital index representing the presence of digital technology in three analytical dimensions of a process. The dimensions reflect key operating parts for understanding and measuring levels of digitalisation in public administration: 1) interaction with society: the extent of services offered via digital channels; 2) internal case handling: the extent to which required steps in the administration of a case are carried out automatically; and 3) data exchange: the means by which data are collected and shared internally in the organisation, updated and shared with external actors (see the appendix for the entire list of items operationalising each dimension in terms of administrative activities). Each of these dimensions consists of certain activities representing an ideal type of case handling process (see Figure 7). These activities will slightly differ depending on which core process is investigated, and they are built on established definitions in public agencies, as well as Swedish laws and regulations. For example, the process of internal case handling is based on a standardised manner according to which the registration of information is enabled, how it is collected, prepared and judged and which is used by the Swedish Agency for Public Management (Statskontoret, 2004). The focus on

assessing and identifying sub-processes is built on legal requirements and guidelines for how to document and classify information by the Swedish National Archives (Riksarkivet, 2008, 2012).

The aim with the DIF is to establish a joint understanding of the presence and extent of digitalisation in core processes and to support further learning and development. The DIF was originally designed and developed at the STA (Skargren & Garcia Ambrosiani, 2022) and is now managed by Digg. The DIF has thus far been applied at the STA from 2016 to 2019 and again in 2022 under the auspices of Digg, and involving two other government agencies (see Skargren, Lagsten, et al., 2025).

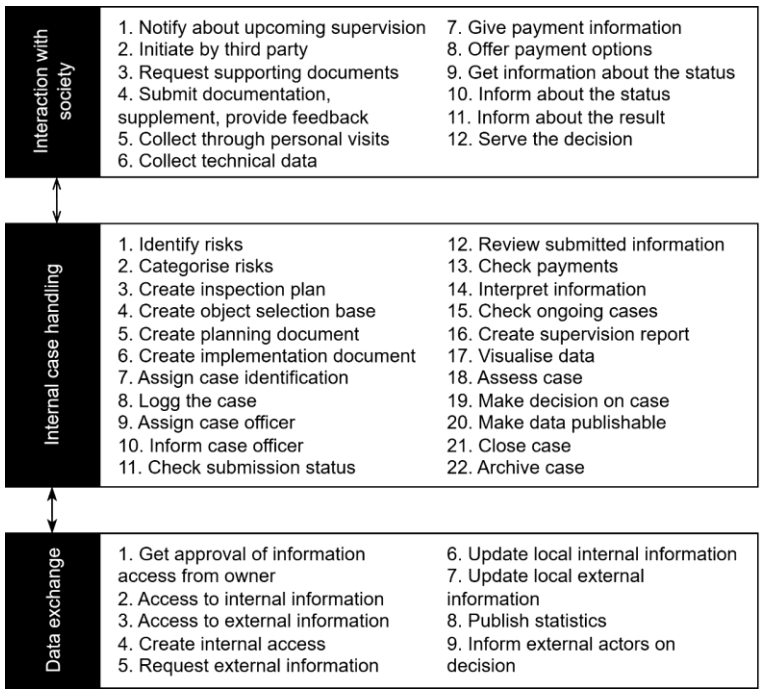

Figure 7. The Digital Index Framework (DIF) for assessing digital government for activities in the area of supervision and control (Skargren, Lagsten, Hatakka, & Garcia Ambrosiani, 2025).

In the application of the DIF at these instances, the assessment of a core process is typically done in the following manner: the responsible civil servant for a core process is contacted in collaboration with the organisation in question and the process, and accompanying sub-processes, for assessment are identified (see Table 2).

Table 2. Description of the components of the DIF.

Conceptualisation of the phenomenon as interpreted through the DIF	The phenomenon under investigation is the level of digitalisation in core processes.	Levels of digitalisation are operationalised as the presence of digital technologies within each administrative activity in each of the three dimensions.
Dimensions	The presence of digital technologies in administrative processes is analysed across three dimensions: • Interacting with society • Internal case handling • Data exchange.	Each dimension is represented as an ideal type, defined by a set of distinct administrative activities. Each activity is measured using an ordinal variable, with discrete values assigned to represent different types of technologies used to carry it out.
Examples of questionnaire items	Each item in the questionnaire presents a set of response alternatives reflecting different digital and analogue technologies, designed to capture levels of digitalisation in administrative activities.	Examples of such technologies include: My pages (digital); digital post; digital service; chatbot; API for sharing data; automatic case handling.
Value per variable	0, 1, 2, 3, 4, 5, 6. 0 indicates no use of digital technology, and 6 represents full digitalisation or automation of the process.	The differences between the values assigned to the variables are not necessarily equidistant; for example, a value of 6 does not imply that the phenomenon is twice as present as a value of 3.

Data collection tool	Questionnaires are distributed to public servants knowledgeable about how the processes in question are carried out.	Respondents are selected in collaboration with the targeted organisation, based on their having a relatively high level of knowledge of the full process involved in handling the relevant case type.
Composite index	The composite index is constructed by aggregating all items within one or all three dimensions, based on the arithmetic mean of the assigned values.	The values are weighted differently for each dimension to support a nuanced understanding of digitalisation. The weighting is motivated by the relative ease of digitalising certain activities – such as standardised tasks in internal case handling, including the automation of binary decisions.

In principle, the main basis for selection of respondent is that they are highly knowledgeable of how the whole process is carried out, and the questionnaire can therefore be answered by one or several persons. The people responsible for answering a questionnaire identifies, on a detailed level, how information and data are processed during the life cycle of a case in the process under investigation. The questionnaire contains questions relating to the three dimensions regarding the use of technologies in the process (see the appendix for the questionnaire). When finished, each item is scored on a predefined scale (see the appendix) and the index is calculated as an arithmetic mean. Note that the values indicate relative levels of digitalisation and should not be interpreted as having equal intervals. The aggregate results from the DIF comprise three ordinal and discrete variables that reflect the presence of digitalisation for the respective dimension. Results can also be viewed across different stages in each dimension.

2.5.1 Relating the DIF to past research and theory in digital government

This index has a process view on public administration and shares many characteristics with similar analytical perspectives offered by Schedler and Helmuth (2024), Lenk (2012) and Lenk et al. (2002). The DIF assessment can also be related to similar frameworks for evaluating digital government in terms of benchmarks and maturity models (Bannister, 2007; Iannacci et al., 2025; Okan, 2024). Heeks (2008, p. 12) presents an "architecture of eGovernment" including similar aspects as entailed in the dimensions of the DIF. In Heeks' model, what is called "data exchange" in the DIF is labelled as "source", the internal case handling in DIF resembles "processing" and channel and recipient are similarly entailed in the dimension interacting with society in the DIF. While these two frameworks are compatible, they also focus on different aspects and Heeks' model entails no aspects of how core processes are carried out, instead focusing mainly on technology and systems.

The DIF also shares important traits from contemporary studies of public administration in terms of governance and the functions that make public administration work and the provision of public services (see e.g. Bovaird & Loeffler, 2024). The DIF has a perspective on public administration as being carried out as a process, and in contrast to this thesis, Schedler and Helmuth (2024, p. 171) use such a view to normatively assess, for example, the quality and efficiency of what they call "public processes". Their view of a "public process" is illustrated via a process map for the application for a Swiss ID based on three divisions, as in the DIF. Schedler and Helmuth (2024, p. 170) in this sense identify the importance of the interaction with what they call the "customer" (interacting with society in the DIF in Figure 7), and what they refer to more generally as "public administration" is called internal case handling processes in the DIF. Both models have in common that they identify similar points of interactions between citizens and the public sector, and how there is an internal process of dealing with information based on several key administrative steps.

Another group of researchers with close proximity to the view advocated by the DIF, but instead directing a stronger focus to the role of law and knowledge on digital technology in administrative processes, is provided by Lenk et al. (2002). This research shares the view of the DIF on the importance of law in executing core processes in public administration and has similarly identified the importance of understanding how digital technology interacts with the decision-making processes in public administration (what is called internal case handling in the DIF). Lenk et al. (2002) highlights digital government in terms of the framing of the relationship between technology, administrative processes, the purpose of public administration and the complexity of these processes in terms of their different types. This research differs from this thesis and the DIF, however, regarding how it does not take into account what Lenk et al. (2002) studies in terms of the *knowledge* required by public servants to carry out case types and which is in turn important, according to them, for the design of information systems. This relates to the ability and design – and indeed the challenges – of the formalisation of law in, for example, using AI or automatisation for administrative procedures (see Parycek et al., 2024).

As mentioned above, the DIF can also be related to streams of research in digital government related to the design and applications of maturity models and benchmarks. As discussed in paper IV, there are several examples of these types of frameworks for assessing digital government. There are, for example, models and structured taxonomies for developing digital government in terms of the maturity of public digital services (Panayiotou & Stavrou, 2019), and decision support models based on organisational maturity for co-creation (Jukić, Pluchinotta, Hržica, & Vrbek, 2022). Close to the study of core processes, Chen et al. (2019) produce a framework including "institutional and interorganizational factors" looking at quality and accountability in "administrative procedures" and "administrative processes", while González and Delgado's (2021) focus on how core processes – using the example of passport applications – are executed in digital government according to law is in line with the design principles of the DIF. A passport application

in the context of the DIF could be viewed as a core process classified as granting permits (see Table 1).

As in the case of the DIF, there are also theoretical models with quantitative measures in the form of an index for different areas in digital government (see e.g. Batista et al., 2022; Benaddi et al., 2023). Hooda and Singla (2020) present a theoretical model concentrating on *business process reengineering* for empirically assessing strategic effects in this area. Their model addresses "business processes", and although the concept is not defined with regards to what it means in a public administration context, it is interpreted here as close to this thesis' definition of core processes. And unlike the DIF, Hooda and Singla (2020) address the critical aspect of competencies in how to execute and "reengineer" business processes.

As a final note here, the area of core processes and the DIF – as well as the research mentioned previously – can be subsumed and related to the eGovWSF mentioned earlier. This relates to especially the elements identified in this framework identified as "completely in the system" by Lindgren et al. (2021, pp. 42-43), such as processes and activities, information and digital technologies. The DIF systematises, for example, the aspects or processes and activities identified in the eGovWSF relating to routines and case handling processes (see ibid). There are also close connections between the two frameworks' operationalisation of digital technologies and the purpose of the handling of information concerning taxation data and information about different types of records. In this sense the DIF could be fused with the eGovWSF to further detail key elements of this framework, and this is most likely an avenue for future research.

3 Method

> Practice is not the enemy of theoretical knowledge but the most valuable incentive to it. (Popper, 1963, p. 222)

This chapter consists of four main sections, presented in the following order.

- The first section includes an overall picture of the research conducted in this thesis (3.1.1), followed by a characterisation of the research approach (3.1.2) and a discussion on my role as a researchers and practitioner (3.1.3).
- The second section consists of explaining the selection of cases and the premisses of the analysis by motivating the chosen methods, explaining how the analysis has been done and looking at my role in each case.
- The third and fourth sections consist of a discussion on ethical considerations and, respectively, on the limitations of this thesis based on the chosen methods.

3.1 The bigger picture

This section provides a bird's-eye view of the data collection by looking at aspects such the context and timeframe – an example of how theory and practice has informed the purpose of the data.

3.1.1 Timeframe, context and data

The empirical data included and related to the DIF in this thesis stems from the period of 2015 until 2023. This includes data on how the DIF was designed at the STA during 2015/16 (paper II), data from the design of the suggested classification of core processes in the spring of 2021 (paper III) and data based on the DIF assessment project in 2022 and 2023 (paper IV) – both of which are based on work from Digg (see Figure 8). Data for three-quarters of the studies in this thesis are based on the two cases of the STA and Digg. The data for paper I undertaken in 2019/2020, was collected using the databases of Scopus and Web of Science.

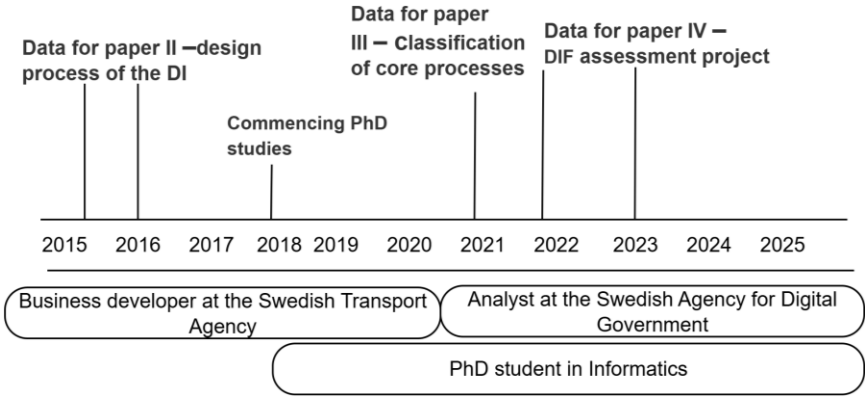

Figure 8. Timeline detailing areas of employment and points of primary data collection.

The primary data used in this thesis stems from three different time-periods – 2015–2016, 2021 and 2022–23 – and were collected and analysed using certain methods and asking specific questions. Throughout the whole research period, the author has been both a practitioner working in the government sector and a PhD student learning the practice of research (see section 3.1.3). There is therefore a practice and research knowledge connection in the primary data collected during all the time periods in question. This characterises all three cases studied in this thesis: the design process of the DIF at the STA, the development of the classification at Digg and the study of the application of the DIF assessment. My ambition and will from the start of my PhD studies was to examine the work I had been a part of in practice via the lens of science. However, none of the cases were planned from the start, and it is only ex post that I realised that they might be relevant and can contribute to research. I will further discuss this relationship of being a practitioner and a PhD student in the next section.

As I progressed in my PhD studies, starting in 2018, I slowly realised that the work I had been involved in could not only be studied using concepts and methods from science, but that it could also possibly contribute to research on digital government. By this I mean that in presenting and analysing the results from the mentioned time periods, they could be structured using scientific methods and not

only contribute to past knowledge, but also made "engageable" for research to, for example, test or develop further, as seen for example in the design principles presented in paper II, the classification for digital government in paper III and the DIF project in paper IV. Making these transitions between practice to research, and indeed how to study practice using research, are quite challenging in many ways, as I will discuss more below and in the chapter on results.

Research and practice have informed each other in different ways. The relationship is not as straight forward as where practice directly or solely influences research, and vice versa. The initial cue for writing paper I, for example, comes from frustration and challenges in not being able to use international benchmarks more precisely for the context of practice. The problem derives from practice and not research. And yet, it then turned out that research had identified the same problems! Practice can inform research as I believe it does in paper II, then again concepts and theories from research refines and enhances practice significantly and makes practice clearer and more relevant. The latter is done via the concept of design principles and theory of design science. From a general perspective, the data for this thesis is collected from three different cases, close to practice, and analysed ex post using methods, results and concepts from the scientific community. The methods used have varied from a literature review to design science, and using both qualitative and quantitative data to build on each other as in papers III and IV. This whole study can thus be characterised as employing a mixed methods approach.

3.1.2 Research approach

Taken as a whole, the research approach in this thesis can be situated in the IS research tradition of pragmatism (Goldkuhl, 2012; Goles & Hirschheim, 2000). This does not mean a conscious decision to apply the principles of pragmatism from the start of this thesis, but rather that the principles of pragmatic research can be applied to how the research has been conducted. There are two general premises for the pragmatic research approach in this thesis:

- the application of mixed methods;

- the presence of central knowledge characteristics derived from pragmatism to understand, describe, prescribe and prospect (see Goldkuhl, 2012, p. 140).

3.1.2.1 Mixed methods

The choice of methods is based on using a broad array of research tools stemming from different domains of knowledge characteristics. This means, for example, that I am interested in different types of methods for the purpose of generating a wide array of knowledge outputs, such as in both describing and analysing phenomena, but also to understand the meaning and purpose thereof. In this thesis, papers I and II look at how the research on digital government has been conducted to ask normative questions regarding the purpose of assessing digital government, and to explore alternate ways of understanding and defining digital government based both on case studies of practical examples in combination with past debates from the research community. The importance here is not primarily that this thesis sticks to a certain method, but rather how to combine and use methods to answer questions relevant for research and practice. The research approach in this thesis can in this sense be an example of what Goles and Hirschheim (2000, p. 263) characterise as "paradigmatic pluralism", and a strength of this is "its recognition of the intrinsic diversity of problem formulations faced by the community of IS research". Taking these points together make up a core idea on what constitutes the purpose and creation of knowledge as defined as a form of pragmatism. In this sense I agree with the summary of pragmatism offered by Creswell and Creswell (2018, p. 11), explaining that from this world-view methods are chosen and designed for the purpose at hand and can be both quantitative and/or qualitative depending on the problem, and how research becomes open for "[…] different assumptions, as well as different forms of data collection and analysis". Indeed, the famous sociologist Howard Becker (1998, p. 5) has in this sense a pragmatic view on research in his application of the concept of "tricks" to the research process as "[…] ways of thinking about what we know or want to know that help us make sense of data and formulate new questions based on what we've found".

By applying a mixed methods approach, this thesis has both quantitative as well as qualitative research characteristics. In this sense I agree with Myers and Avison (2002) that different types of epistemologies such as interpretive, critical or positivist assumptions can all be done under the auspices of qualitative research. A mixed methods approach in this thesis means that I have been mainly interested in qualitative analysis, by studying both "numbers" and "words" as well as employing qualitative and quantitative methods concurrently *and* sequentially (see Recker, 2021, p. 48). Creswell (2014, pp. 219–227) provides an account of three types of mixed methods. In a nutshell, one of these is called the explanatory sequential mixed methods design, which lets quantitative and qualitative methods build upon each other. This means conducting, for example, a survey or an experiment, analyse the data and then in a second phase use qualitative methods to follow up on the results and "[…] help explain the survey responses" (ibid., p. 224). In this thesis there is a similar sequencing of data and methods from practice and research, and vice versa, that is, how qualitative and quantitative data from practice and existing research has been mixed in order to create additional knowledge. Paper III concerns, for example, a classification applied to a relatively large set of government agencies, and which in turn is built on a qualitative coding of the classification of legal documents, and how the classification from a theoretical perspective is argued to be useful for both qualitative as well as quantitative research in digital government. A similar mix of quantitative and qualitative work is done in paper IV. The data here is both quantitative in terms of the index generated by the application of the DIF assessment, and qualitative in terms of interpreting the influence of the DIF on the participants of the assessment. The method of a case study applied in this study involves both types of data, the qualitative interpretation of the influences is done via theory from evaluation research and the quantitative approach is in describing and analysing the numerical results from the DIF. In contrast, paper II is more of a purely qualitative study, in understanding how an artefact was designed in a particular context of public administration, analysing qualitative data such as documents and memos. A literature review, as in paper I, is quantitative in the sense that the method requires using

Boolean logic to delimit the number of relevant scientific sources in database queries for a given period of time in order to be able to have found research that might be relevant, and thereby to claim some sort of generalisability and validity in the identified gaps. The literature review is also qualitative in the sense of *integrating past research* into a meaningful whole – which requires careful attention to reasoning, arguments and results from existing research, and then synthesising this into larger arguments and themes and how they vary across time, as in the identified three periods signifying research on benchmarks of digital government (see Skargren, 2020).

3.1.2.2 Pragmatism

> Rather, researchers should ensure that they adopt a perspective that is compatible with their own research interests and predispositions, while remaining open to the possibility of other assumptions and interests. They should understand and acknowledge the extent to which the perspective they adopt will focus their attention on some things and not others, and bias their views of the phenomena they study. (Orlikowski & Baroudi, 2002, p. 24)

I am sympathetic to the above conclusion because it highlights not only how all approaches to research have their strengths and weaknesses, but it also reminds one to be conscious of these pros and cons and, more importantly, to be open to different perspectives. The strength of one's own research is determined not only by the stringency of the applied method, but by the ability to engage with practice, an openness to other perspectives and the ability to pursue one's curiosity and willingness to learn. These are important aspects of the notion of pragmatism, and I wish to add two broad characteristics to this notion for the purpose of this thesis.

Firstly, the wide application of methods in this dissertation means that it has generated different types of knowledge and for different purposes. While the fundamental question has been to look at how the DIF can provide an assessment of digitalisation of core processes in government agencies, this question can in theory be pursued in many ways and from many angles. As argued in the results section

(see chapter 4), the results of this thesis can mainly be characterised as descriptive, exploratory and prescriptive (see Gregor, 2006). That is: asking questions relating to describing phenomena and prescribing via suggesting how they can be understood and studied further (papers I, II, III and IV), to exploring the process of designing something (paper II) or suggesting how to analyse and understand digital government and frameworks for assessing digital government (papers III and IV). These knowledge characteristics, and how they are combined and pursued using mixed methods in this thesis, is close to how Goldkuhl (2012, p. 140) describes the "knowledge character within pragmatism" in IS research. Essential for pragmatism, according to Goldkuhl, is the trio in which knowledge demonstrates values (normative), proposing possibilities (prospective) and offering guidelines (prescriptive) (ibid.). The different methods applied in this thesis are all applied in conjunction with the practical questions and purposes at hand, and have produced knowledge critical of current benchmarks for digital government (paper I), in terms of arguments for how to design an artefact for assessing and learning from digital government (paper II), showing how a classification of core processes developed in practice can contribute to research on digital government (paper III) and a discussion of how frameworks for assessing digital government can influence practice (paper IV).

In combination, these aspects point towards the importance of a key element of pragmatism, namely the relationship between research and practice, not least in how research can bring value to practice (Goles & Hirschheim, 2000), and the relationship between knowledge and action (Goldkuhl, 2012). Together these constitute how the research approach in this thesis can be seen as providing a meaningful relationship between research and practice. Knowledge can be meaningful, as argued by Alvesson et al. (2017, p. 18), when it "[…] addresses the political, economic, or existential realities that face it and affect the lives of the public." While I am not claiming that the work in this thesis has any grander impact on the existential realities of society, it has practical relevance for institutions that have a relatively large impact on people's lives and one of the perhaps most pressing issues facing our societies; the development and reactions to

digital technology. These aspects are recurring in this thesis, as to the practical relevance argued for each of the four papers.

Table 3. Overview of studies in this thesis and how they can be characterised in terms of types of knowledge from pragmatism.

Categories	Case	Method	Type of source/data	Characteristics from pragmatism
Paper I, qualitative and quantitative	N/A	Literature review.	27 research articles/papers.	Prospective and normative.
Paper II, qualitative	STA	Design science, case study.	37 written materials/documents, categories as 6 different types.	Prospective, normative and prescriptive.
Paper III, qualitative and quantiative	Digg	Design science, case study, interpretative and descriptive.	Case study on Digg, including 159 legal documents, data from the application of the classification regarding 159 Swedish government agencies.	Prescriptive and prospective.
Paper IV, qualitative and quantiative	Digg	Design science, case study, interpretative and descriptive.	Case study on the DIF assessment, involving two government agencies, results from 7 sub-processes.	Prospective and normative.

3.1.3 The practitioner and the researcher

The research in this thesis has been conducted while I have been employed as an *industridoktorand* since 2018. The standard definition of an "industridoktorand" in Sweden is simply someone who is admitted as a PhD student and financed via another employer outside

of the university (Högskoleverket, 2006). Some universities in turn demand that the PhD education be conducted at a minimum of 50% of full-time (KTH, 2022). This is also the study-rate at which this research has been conducted, and in this case the employer and the university together with the author, have entered into an agreement on the premises of the collaboration in order to guarantee that the research is fully financed, that the involved parties are informed of the study that this project remains within the legal responsibilities of the university concerning PhD education.

As noted in the previous sections, the cases studied in this thesis are impacted by, among others, my dual role as a practitioner and PhD student. This requires particular attention to aspects such as the integrity and degree of independence of the research, and to provide a reader with disclosure and transparency for judging the scientific soundness of this thesis via disclosure and transparency. These are also some ethical considerations and reflections in this thesis (see section 3.3). A transparent process is perhaps one of the most important paths to knowledge in the context of research. Providing transparency means not only explaining how one went about acquiring the knowledge in question, but also being open to questions on how the data and cases were selected. The ability to reflect how the research context and method is considered by some research as key ingredients in sound research (Alvesson & Sköldberg, 2018).

Concerning the context for this thesis, research has framed the type of collaborations in which it has been undertaken as University-Industry Collaboration (UIC) (Schubert, Kilian, & Bjørn-Andersen, 2014). This means that the UIC's are studied as a type of "joint work" carried out between a university and practitioners in government agencies or companies. The formulation of the research problem(s) and the broader area of study in UICs, as described by Schubert et al. (2014), concern how the degree of engagement can vary "from the definition of the research question and the development of the research design, to the actual research work and the interpretation of the findings" (ibid.). Relating to this, there have been debates on the integrity and usefulness thereof and also other types of practice and action-oriented research – via the pros and cons of, for example, "engaged

scholarship" or the dilemma of "serving two masters" (McKay & Marshall, 2007; McKelvey, 2006; Van De Ven & Johnson, 2006). A similar discussion has also been conducted with regards to the method of action research under the notion of "serving two masters" on how to maintain rigour and relevance in research with meaning and usefulness in practice (McKay & Marshall, 2007). A broader take on this debate has been promoted by Alvesson et al. (2017), criticising research for being far too narrow and disinterested in society, and their call is that social science focus on meaningful and important social questions.

Albeit that this research has not been done as action research, the description of Kock and Lau (2001) expressing the potential dilemma of serving "two masters" is still illustrative as a discussion and basis for disclosure on how this thesis has been carried out:

> Whatever the case, the IS action researcher serves two different "masters", namely the research client and the research community as a whole. The needs of these two masters are usually entirely different, and sometimes conflict with each other. Fulfilling them is rarely easy, and certainly the main challenge that all IS action researchers have to face.

The question of "serving two masters" is about judging the degree of independence and integrity of the research, which can be done by looking at the degree of engagement. Overall, three main areas can be of interest to judge the integrity and soundness of research in terms of my role as practitioner and researcher:

- **Context** – working in the public government sector;
- **Independence** – degree of independence in research;
- **Role** – moving between practice and research.

The importance of the context as an "industridoktorand" can be motivated by the concept of reflexive methodology as it is presented by the two business administration scholars, Alvesson and Sköldberg (2018, p. 11), who hold as important criteria of research quality one's ability to present "[…] careful interpretation and reflection". The

former, according to Alvesson and Sköldberg, means that irrespective of how data are generated and collected –interviews, surveys, observations etc. – it should always be open to scrutiny, one should remain aware of how it can be flawed and/or subject to various biases, thus the relationship between data and reality is never one to one. Reflection is the ability to think of one's role as a researcher as part of a larger historical and social context (ibid.). In this case, the context is not on a grand historical or social scale, but rather to show that this research is done in the context of a UIC – in this case between two types of government authorities in Sweden; a university and a government agency.

On the question of context, the following aspects are important to mention from a general perspective. Firstly, the non-profit nature of the public sector. Public servants work primarily for upholding the purpose and laws governing the government sector in general, and the respective agencies in particular. I will go into the details of my relationship with each case in the next section; here it is important to note that in contrast to the private sector, where the main motive is profit and time and efficiency might be valued over quality, the value-system in the public sector is fundamentally different. The ramification of a public servant are set down in four Swedish constitutional laws, along with other types of legislations and guidelines (Statskontoret, 2019). The SAPM identifies six basic principles which together make up the value system for public officials in Sweden, namely (ibid., p. 6): democracy, legality, objectivity, freedom of opinion, respect, and finally, efficiency and service. In practice these perspectives set the motivation for the relationship between the object of study – the DIF – and the context in which I have been situated as a practitioner and PhD student. This makes for a context that is open and not preclusive of any particular views or results, other than the sense of how I have been able to explore what I have found to be interesting, meaningful and relevant for research.

The next aspect concerns the integrity and degree of independence of the research. As mentioned above, according to researchers there is a degree to which the research design and formulation of research

questions and perspectives are formulated in UICs. If the non-academic organisation financing the research, such as a government agency or a private company, interferes in the research projects in terms of research priorities or quality standards of the research, this might be considered infringements on academic freedom (Spannagel, Kinzelbach, & Saliba, 2020). This is the first of five indicators in the Academic Freedom Index assessing academic freedom across the world (Spannagel & Kinzelbach, 2023). There are two further indicators from this index on academic freedom relevant for this discussion, namely the freedom to discuss and disseminate research findings among academic and non-academic audiences and the "extent to which universities exercise institutional autonomy in practice" (ibid., pp. 8-9).

Concerning the ability to freely discuss and disseminate the work, I have been able to present various aspects of the research in both seminars within the research field for colleagues at the informatics department at Örebro University, as well as for academics in other disciplines within the university, and in academic conferences in Sweden and abroad. I have similarly, without any infringement whatsoever, been able to design and present my work for non-academic audiences at government agencies, and as part of training programmes for public servants from other countries. I have also written a critical essay, based on my experiences as a PhD student and practitioner, deeming the governance of digital government in Sweden a wicked problem (Skargren, 2022). None of these presentations have caused any negative repercussions that I am aware of.

In terms of the question of institutional autonomy, my experience is that decisions on administration, internal governance of how the PhD education has been conducted, and more importantly, the research choices have been made entirely at the discrepancy of the university and academic tutelage. If we judge the question of the independence of the research and the dilemma of "serving two masters", the research can be seen as having been undertaken with freedom of expression, under institutional autonomy of the university and without any external interference in the design of the research.

My priority has been located in the context of serving the thesis and research standards, but also to infuse research with what "is going on in practice". The main challenge here has perhaps not been the lack of understanding for institutional autonomy, but rather how to develop a self-reflective practice of what is both effective and meaningful in terms of formulating relevant research when working within this institutional relationship as both researcher and practitioner. This is both a delicate and complex question, since there are many tools available to guide one regarding how to go about doing this as well as many potential benefits.

Figure 9 illustrates how the relationship and benefit between practice and research can take place. The academic autonomy under the notion of degree of independence is illustrated by the dotted line, the arrows highlight the dialogue and exchange of knowledge between the relevance and rigour of research, and the meaning and purpose of practical application. The basis for this interaction is the practical experience in designing and using the model of the DIF for assessing digital government, which entered into a wider dialogue with a motivation for studying how research views these types of frameworks in terms of benchmarks for digital government. This highlights and specifies points where "two masters" meet and which can be discussed in terms of upholding the three principles of academic freedom mentioned above.

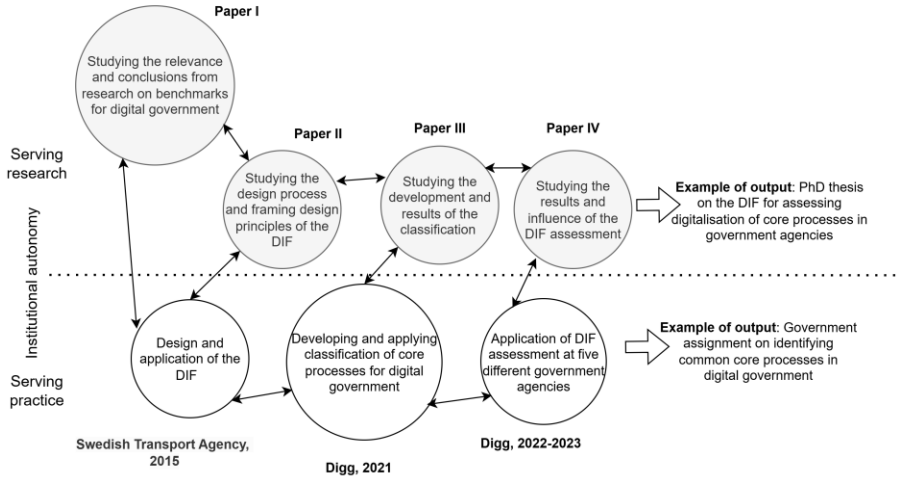

Figure 9. Illustrating the relationship between serving "two masters" in the context of the research and practice of this thesis.

Looking at Figure 9, and in the discussion of the integrity of the research, it might be relevant to separate the freedom of the research in one instance, and the practical work and applicability in serving practice in the other. This distinction is perhaps easier to uphold in this case, due to the context of a non-profit public sector and the topic – digital government and public administration – which can be seen as a relatively non-contentious area. This means that albeit that the effects of public administration are potentially serious for people and businesses, the area can be seen as relatively abstract and not an area of any "heated" disputes in public opinion.

As for the third dimension, this regards the dual role as a practitioner and researcher and the aspect of acting as a participant observer (Walsham, 2002). Walsham (2002, p. 107) describes how a researcher can have two different roles: the outside observer and the involved researcher. Walsham presents this discussion as an aspect of the paradigm of interpretive research, and the questions he raises are general and can apply to other research paradigms as well. Walsham's division can be used to characterise my role as an observer and practitioner in the organisations in which the data for this thesis have

been collected, namely the STA and Digg (papers II, III and IV). The involved researcher has both pros and cons according to Walsham (2002), as summarised in

Table 4. Potential merits and disadvantages of the researchers as participant observer, based on Walsham (2002).

Merits	**Disadvantages**
Access to information	Barred from information due to personal state
Sense of the field and organisation	Risk of overmodesty
Inside understanding	Risk of self-aggrandisement

My role in each case in terms of this thesis has first and foremost been as a PhD student looking into aspects of digital government. This means access to knowledge about work being done in each case. Via practical experiences, I have through institutional autonomy and access to research via the university searched for answers regarding the work I have been involved in. In neither case did I know beforehand that I was going to study them ex post. These ideas came afterwards, in realising that the work might have relevance to the research community and seeing the potential of using scientific methods and past findings to analyse, collect and structure certain types of data to create rigour and relevance for research. As mentioned in the previous section, my role in the case studies has been as an employee at the three case studies in this thesis. The study of inanimate objects means little or no influence on any potential respondents in the data collection phase, such as could be the risk in, for example, a purely qualitative study relying on interviews. All the data collected in turn relates to various degrees of abstract information pertaining to working processes, and the accuracy of which it is possible to corroborate ex post in terms of the existence or not of different types of digital technologies and communication channels as assessed by the DIF.

In my case, the merits of being a participant observer can be described as in Walsham's perspective. This is also related to the previous figures illustrating the dialogue between serving the two masters or practice and research. A positive aspect in this thesis is the access to information and experience and knowledge of the data and information underpinning the studies I have conducted. A major challenge, however, has been to understand how to study something in which I have been a part as a practitioner. While the merits are perhaps clear, there is the challenge of how to transpose these advantages into scientific rigour and relevance. This is apparent not least in the cognitive hurdle of formulating and understanding something one has been working with daily into abstract and scientific terms. This can be, for example, as simple as asking oneself: What is relevant here for a research audience? A challenge has been, not least, how to frame problems and findings from a practitioner's point of view in a research context. This has, I found, required many hours of reading and studying research on digital government in identifying exactly where practical experiences meet abstract thinking. Even this is not enough, and sometimes the answers to some questions have come many years later when stumbling across a reference or book that discusses a problem found in practice. Looking at the disadvantages in the previous figure, each of these can be acknowledge in this thesis. Not least the case of "self-aggrandisement" is apparent in exaggerating one's "practical insights" and knowledge in contrast to the lack of these from researchers. I can only hope that the risks of over-modesty and self-aggrandisement remain at a level so as not to risk the integrity and results of this thesis – which is for others with less stake and a more objective view to judge.

3.2 The case studies

> Digital government is both a research domain and a field of practice. As such, it needs both new knowledge and research-based problem solving and innovation. To achieve both ends, researchers need to bring their full array of theories, standards and methodologies to the actual needs of government, while practitioners' deep knowledge of policy domains, and organizational and political environments can

> challenge and enrich how researchers frame questions, explore explanations, and convey results. (Dawes, 2013, p. 50)

In this section I will discuss and explain the cases involved in this thesis in terms of how the chronology of the data collection stems from 2015, 2021 and 2022– 2023 and includes three cases, the STA and Digg (see Figure 8 for a timeline regarding the context and points of primary data collection).

3.2.1 Context

The context of the cases is that of the Swedish government sector. The first case is that of the STA – a government agency with about 2000 employees and which has a broad administrative and legal responsibility for transportation systems operating in the areas of air, sea, land and railway. The agency was formed in 2009 and constituted a major reform of public administration by merging several different agencies and consolidating core processes in the areas of supervision, granting permits and managing registries, etc, into the STA (Statskontoret, 2015). My responsibility at the STA was as a business developer, which meant that I worked for a small unit responsible for coordinating and implementing agency-wide projects using digital technologies. The unit I worked for was tasked with and responsible for issues relating to the whole agency and divided amongst what was deemed as strategic areas, such as open data, catering for citizens' needs and digital services. This included a broad experience ranging from working with open data, data and information management pertaining to legal information and being involved in designing and creating an index for assessing digitalisation at the STA. The case is of the STA, in which I was stationed in the city of Örebro, and is signified by having a long tradition of managing enormous databases, not least for the area of cars and different types of permits for owning and driving vehicles, dating back to the 1970s.

At the second case, Digg, I work as an analyst. This agency is significantly smaller in terms of employees and today has around 170 people. Digg's main task is to coordinate and support a common digital infrastructure – such as digital post, data infrastructure and e-

invoicing– for the Swedish public sector (Ministry of Finance, 2018). Digg is also tasked with assisting the government in collecting and analysing the development of digital government and on digitalization of society in general. My responsibilities at Digg range from writing reports in small teams on topics such as the progress of digitalisation in the Swedish government sector and society at large and representing Sweden in international working groups on monitoring and policy on digital government, to helping in the preparation and answering of international monitoring reports on the progress of digitalisation and digital government from the EU and the OECD.

Table 5. Overview of government agencies where cases in the thesis are based.

Categories	Cases	
Name of agency	The Swedish Transport Agency	The Swedish Agency for Digital Government
Responsible ministry	The Ministry of Rural Affairs and Infrastructure	Ministry of Finance
Area of responsibility	Transportation, infrastructure for air, sea, land and railway	Digitalisation, digital government, common digital infrastructure
Number of employees	2000	170
Core processes	Granting permits; Supervision and control; Public transferring; Production of services and goods; Regulation and standards	Production of services and goods; Regulation and standards
Author's Role	Business developer	Analyst

3.2.2 Selection of cases and data collection

The selection of cases is both opportunistic and driven by personal interest. It is opportunistic in the sense that I am studying the

environment I am a part of and to which I have access to information. In terms of personal interest, I am intrigued and fascinated by trying to understand how practice can be understood scientifically, and how it can be of benefit for the scientific community. In the former sense I was influenced by experiences of the means and resources to study the design and application of the DIF at the STA. Similarly at the work for Digg, experiences from working with the longitudinal survey on digital government in Sweden was the basis for the study and presentation for the research community on how to develop and, apply, and also the results of, a classification of public administration for digital government.

Doing research, irrespective of whether it is in a UIC setting or not, is always about access, time and available resources. The strategic choices are dependent on relationships and access to the studied cases. At the same time, the work I have been doing is very close to the topic of this thesis, therefore the mutual benefit and closeness of the research and practice have been positive in this sense.

The cases are pivotal to the form and collection of the data. The application of methods is based on mixed methods and can be described as pragmatic, which means that they were selected as tools to engage with the types of questions asked, the phenomenon under study and the type of data available.

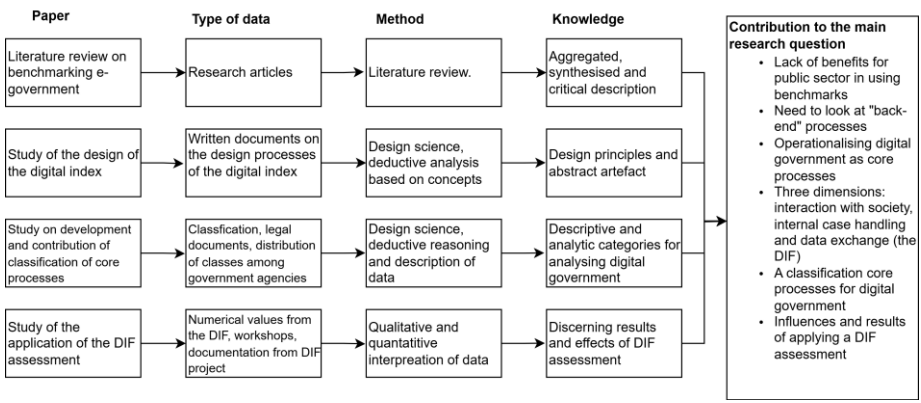

Figure 10. Relationship between studied cases, data, method and knowledge and their contribution to main research question.

All the respective studies mentioned to the far left in the figure above have used different types of data and methods. If we look at the column for "type of data", the literature review uses data in the form of research articles. These have been studied via the method of a literature review – as stated in the following column on method. This then generates new knowledge in the form of aggregated and synthesised descriptions of the data – the research articles – by combining the contents of these as answers to the research questions posed in that study. The knowledge types mentioned in the column for concerning knowledge for the literature review study is to create new knowledge based on past knowledge. The former surfaces when aggregating and synthesising the "old knowledge", using the method of a literature review, and asking fresh questions, integrating concepts and theories to present new perspectives (Callahan, 2010; Torraco, 2005; Webster & Watson, 2002). The final column presents the first part of the answer to the main research question in this thesis in terms of the purpose and eventual use of frameworks for assessing digital government. Some important contributions to the main research questions here are the lack of benefits for the public sector in using the studied types of benchmarks for e-government, and how a need to study "back-end" processes was voiced, among others.

3.2.2.1 Data collection for the literature review

Data was collected in the literature review using large databases of IS research: Scopus and Web of Science. This data was collected in a series of five steps, entailing a structured search for key terms, filtering and processing articles in search of whether they included a study on the phenomenon of benchmarking e-government and an in-depth reading of the final 27 articles (Skargren, 2020). In order to gain relevant research items, three central terms were singled out – e-government, electronic government and e-governance – and then combining these with six terms found the most relevant for the phenomenon studied: benchmark, ranking, index, indicator, performance and assessment. Each step of the data collection was documented and presented in an appendix, including notes concerning the major findings, benefits for the public sector and a description of how the issue had changed over time.

3.2.2.2 Data collection for the design science study of the DIF

In paper II data was collected from the fall of 2015 with the purpose of clarifying the design process of an abstract artefact – the DIF. The data for this paper consisted of six major types, and they were all different kinds of written documents: minutes from meetings, field-notes, structured PMs, reports and drafts of reports from the STA pertaining to the design process, presentations and official reports (see Skargren & Garcia Ambrosiani, 2022, pp. 28-29). The data of relevance here are all types of material produced in conjunction with the creation of the DIF from its initial inception in 2015 until it was presented and approved in early 2016. First hand experiences from - the case as a practitioner with knowledge of the work, provided entry and understanding of the information and data pertaining to the process of designing the DIF.

3.2.2.3 Data collection for the study on the classification of core processes in digital government

The data for paper III consists of three parts. First, on the work pertaining to the development of the classification and its validation using legal documents of government agencies in Sweden. This involved a step-by-step description of how the classification was developed in terms of the decisions made and purposes considered when including and excluding various classes of core processes, both in terms of criteria that were decided upon from the start and with influence from a report by the EU, as well as past research on horizontal classifications of core processes. Secondly, the data consists of the described process of validating the classification on official legal documents called government ordinances by coding 159 of these documents according to the proposed classification. Thirdly, the data for this study are collected by looking at the distribution of classes among the 159 agencies and highlighting patterns in combinations of classes as well as how they are distributed among certain agencies. This also includes looking at the data in terms of the results of the classification in combination with how agencies are divided according to the COFOG.

3.2.2.4 Data collection for the study on the application of the DIF assessment

In paper IV the data were collected from a project implementing the DIF in practice during 2022 and 2023. The data consists of the results from the DIF assessment presented as a numerical value from 0 to 100 for each of the identified administrative activities identified in the framework. This is collected from the results of the DIF assessment project deriving from the scores obtained from a questionnaire assessing the levels of digitalisation for the two government agencies included in the study. Secondly, data were collected from various parts of the DIF assessment project. This includes observations by the authors participating in the project on behalf of Digg from the various meetings taking place in the project. There is also collected e-mail correspondence from the participatory agencies and Digg, when answering questions about which sub-processes to include in the DIF assessment and sharing information on the volume of cases for these processes. Data were also collected from the workshops, which played a critical role in the project, and here minutes documented by Digg were included as well as presentations. Various official reports – three in total – were also included as part of the data for the study, including a report about the results of the project, an official assignment from the Ministry of Finance and a final report from Digg in 2025 (Digg, 2023, 2025a; Ministry of Finance, 2024).

3.2.3 Data analysis

The data have been analysed using different types of methods and research questions. The analysis is qualitative in the sense that the analysis in all the papers focuses on meaning and being sensitive to context (Creswell, 2007, 2014). Looking for meaning in the data analysis concerns studying key concepts such as benchmarking, core processes, evaluation theory, classification or how to understand public administration in digital government. At the same time, the qualitative data interpretation using different types of concepts has also been coupled with a quantitative analysis. The word quantitative derives from the Latin word quantus meaning “of what size?” or “how much?”, and this has been key in, for example, analysing the

frequency and combination of classes of core processes in paper III or describing the results from the DIF assessment in paper IV on an aggregated and detailed level. Quantitative research can be associated with the idea that the world is perceived as behaving in a more or less logical and rational manner and being governed by relationships and laws discernible by our senses (see e.g. chapter 2 in Godfrey-Smith, 2021). In this thesis, both from a qualitative and quantitative perspective, it has been important for the understanding of the results to study and observe occurrences of social and technical phenomena in quantified terms, albeit that they are also equally analysed and understood via concepts and theories in a more interpretive and qualitative sense. Data can be used to generate and test theories as well as to make generalisable assumptions. This can be done for example by studying the world as concepts, which can be defined as "[…] elements of the social world that seems to have common features and that strike us as significant" (Bryman, 2008, p. 143). With the different interpretations and tentative generalisations of the data noted, I am of course open to other suggestions on how the interpretation and analysis of all the data in the papers can be viewed, and to other propositions and positions deriving from the analysis, and for others to test the applicability of the results in other instances.

3.2.3.1 Data analysis in the literature review

The data analysed in the literature review was done on the 27 research articles that remained after they had been screened in the data base searches. This means that the articles were read chronologically and analysed according to the following parameters: major findings and benefits for the public sector, and then comparing the changes over time to see if any patterns emerged. The content of the papers was in this sense able to be grouped into three major categories. The analysis consisted of putting the contents of the articles into new categories as they emerged, and in terms of development and changes in how the research community addresses the topic of benchmarking e-government and clustering the papers into three main periods (see Skargren, 2020).

3.2.3.2 Data analysis in the design science study of the DIF

In paper II the data was analysed in the form of records pertaining to statements and the documentation of the reasoning and purposes surrounding the design process of the DIF. In a similar fashion as in paper II, the data were grouped according to how it was coded in terms of belonging to the three different phases of the theory on how designers design solutions to problems (Takeda, Veerkamp, & Yoshikawa, 1990). The six major types of records were thus categorised according to how they fit with awareness of the problem, suggestions and development. To create a rigorous approach to the later analysis of the data, all the data were sorted into the six different categories according to how they were defined initially by their authors, then manually tagged as to their data of origin and again categorised according to one of the three stages of the design process. Examples of how the content of the records were coded is also given, as in an explanation as to why this gave the particular record in question a fit with a particular phase in the design process (see Skargren & Garcia Ambrosiani, 2022, pp. 29-30).

3.2.3.3 Data analysis for the study on the classification of core processes in digital government

The aim of this study was to present how a classification of core processes developed in practice can contribute to research in digital government. The data here were analysed on two levels. First, in terms of a case study and motivated by design science to describe how practitioners worked in developing and validating the classification. This means focusing on analysing the steps for how the classification was created and deeming it deductive reasoning. It also included presenting and analysing how the classification was validated by explaining how the practitioners addressed certain challenges in applying the classification. This included the following challenges: a) to provide a reasonable sample of agencies to apply the classification; b) to find data to classify; c) devising a way to collect this data; d) creating instructions for how to code the data; and e) finding a way of assessing how well the data were coded. Finally, analysing the results from the application of the classification was motivated by asking research questions that can show how the classification might

contribute to research on digital government. This was described and analysed in terms of whether some classes are more frequent than others, the combination of classes as well as whether some classes are more relevant for different kind of agencies and how the classification can be used with the COFOG. The analysis was done by compiling the aggregate number per class and the frequency of their unique combinations, along with a presentation of the ten agencies with the most types of assigned classes and dividing the combination of classes into three groups. Finally, the data was analysed in terms of the results from the combination of the classification with the COFOG.

3.2.3.4 Data analysis for the study on the application of the DIF assessment

The data for this case study also consisted of both quantitative and qualitative types. The quantitative data consists of the numerical values generated from the two government agencies' answers to the DIF questionnaire and in which the items were scored from 0 (low levels of digitalisation) to 6 (high levels of digitalisation). The scores were first analysed at the highest level of aggregation for each of the three dimensions comparing the two agencies. The results were then analysed at a more detailed level for each of the three dimensions in the DIF. This includes analysing the results for each of the identified steps for each of the dimensions: interaction with society includes 12 possible points of interaction; administrative processes have 22 possible administrative actions; and data exchange consists of 9 possible steps.

The qualitative data were in chronological order from the project start in February 2022 until its end in February 2023. These data were analysed according to a division of the early phase, the mid phase and the late and ex post phase. The focus of the analysis was on the influence on the participants during the project, based on the how the DIF and evaluation process influenced the actions and attitudes of the participants (Henry & Mark, 2003). The point was to analyse the types of stimuli from the DIF in terms of its results and concepts on the actors affected and in which parts of the programme these influences take place and for what purpose (Alkin & King, 2017). The

data were viewed as an instance of *process use*: "the ways that activities through which an evaluation was conducted, rather than its findings, affected individuals and the organization" (Alkin & King, 2016 p. 575). Analysing the data meant reading and understanding all the data collected from workshops, questionnaires and official reports, and matching the interpretation of the data filtered through the types of influences and actions stipulated by the schematic theory of evaluation influence (Henry & Mark, 2003; King & Alkin, 2019).

3.3 Ethical considerations

Ethics is important and there are many straightforward and obvious reasons therefor, Resnik (1998, pp. 53-68) mentions many of them, including freedom, carefulness, openness and social responsibility. In this sense ethics is crucial for research because it is bound with the essence and purpose of creating knowledge in an open and free society. Ethics provides the much needed transparency that allows for fresh and different perspective on data and knowledge, and by doing so enhances quality: researchers must be open both for scrutiny and be able to explain and justify their research processes. These have been, for example, guiding principles in explaining the method(s) used for conducing the research presented in this thesis. Besides safeguarding the people and institutions providing the material as participants in research, ethics sets a framework creating an interplay between scrutiny and discussion that guarantees a mode of inquiry that advances and develops knowledge. I hope to have contributed to this process by being open in how the data collection and analysis of data has been done along with my calls for research to use and apply the results from this thesis in other contexts to test the propositions for design principles and the classification of public administration for digital government (see papers II and IV).

The Swedish Research Council (SRC), a government agency, presents for a Swedish context newly revised and updated guidelines for research ethics called "God forskningssed" (Vetenskapsrådet, 2024). The SRC bases its view on research ethics according to the European Code of Conduct for Research Integrity (ALLEA, 2023), and has transposed its core values for an ethical mindset to a Swedish context

(Vetenskapsrådet, 2024, pp. 10-11). These are reliability (*tillförlitlighet*), honesty (*ärlighet*), respect (*respekt*) and accountability (*ansvar*).

Some of these ethical aspects are relevant to mention in particular for this thesis. In terms of reliability and honesty, to the question of my responsibility as a researcher to address ethical issues when designing a research study, I believe it covers the whole research endeavour and all decisions I make in designing the study. The SRC mentions with regards to reliability the importance that the research is free from any undue external influences, that the method and research questions are based on up-to-date research and good management of research data and that the research is presented in a transparent manner and that choices are motivated appropriately (ibid., p. 12). All names of persons and sub-processes have been anonymised in papers II and IV. In the latter case, I have asked for permission – which has been granted – to use the results and experiences documented from the participants, and they remain anonymous. Honesty is the ability to report on the conduct of the research in "a transparent, fair, full, and unbiased way" (ALLEA, 2023, p. 5). In my case, there are two main ethical aspects and challenges that I need to be aware of and deal with, which are presented in section 3.1.3. This regards the balancing act of serving two masters. This means that I am in theory susceptible to a bias in how I present and interpret my data due to the source of my funding (see e.g. Krimsky, 2013); I discuss this in terms of institutional autonomy and academic freedom above (see Spannagel & Kinzelbach, 2023; Spannagel et al., 2020). The ethical question here is then my level of intellectual freedom (Resnik, 1998, p. 169) in designing, interpreting and formulating the knowledge from the studies in this thesis. To comment on this, I would like to note firstly my experience, which is that I have not experienced any undue influence or attempts to influence these results either in my practice or research. This means that my challenge is not that of a particular bias of funding giving impetus to having "positive results", but rather how I must try to communicate and pragmatically implement the results of the data vis-à-vis a complex environment with many vested interests. The latter aspect is not only with regards to the institutions which I am studying, but also a challenge in how the research

community accepts and understands the results. I have tried to be careful in my claims here since the model might have flaws I have not considered and the results might not be possible to extrapolate further to other cases.

Another ethical aspect – that of honesty – is the ability to switch between different roles as a civil servant at my employer and when I am a PhD student at the university. In this sense different contexts require different ways of communicating and adhering to what my role and purpose is. I am therefore forced to have a constant meta-perspective on the work I am doing in terms of reflecting on how research can be interpreted in various contexts, as well as the basis for why I am interested in certain knowledge aspects and not others, or explaining to my audience when I am in the role of a PhD student or working as a practitioner. This reflexive movement which has been enabled via my place in academia has also opened for more critical stances both vis-à-vis my topic as well as how other researchers have treated and dealt with my area of study. This is indeed a balancing act which is very often the practical case when considering ethical aspects in relationship to the benefits of the research project (see Johannesson & Perjons, 2014, p. 181)

However, when ethics tends to be put forth as a set of static principles, as I partly interpret it to be the case in Creswell and Creswell (2018) and Johannesson and Perjons (2014), I believe there is a risk of ethics becoming only a "normative checklist" or being seen as an administrative hurdle ("check these boxes for good ethics"). In this sense I argue that Resnik (1998, pp. 1-6) perhaps misses an important point in his list of possible objections to the purpose of ethics when he does not mention how one objection to ethics is when it becomes disconnected from the practical reality and balancing act characterising real and difficult ethical situations. It is therefore easy to look at ethical failures in hindsight, and with calmness point out the mistakes, and it is far harder to expound an ethical phronesis for research that can help us make the right decisions when we are in the centre of an ethical dilemma.

3.4 Limitations

> Every man takes the limits of his own field of vision for the limits of the world. (Arthur Schopenhauer *The New Yale Book of Quotations* 2021, p. 722)

There are different types of limitations in this thesis. The limits of the literature review are how it derives its conclusions from a study of the available research on benchmarks for digital government, and not, for example, an empirical study of the benchmarks themselves, or a study on how policymakers, politicians or practitioners in the public sector perceive or engage with these benchmarks. In this sense, the perspective on how useful these benchmarks are, and their potential benefits, can potentially differ from how they are analysed and interpreted from research perspectives.

Regarding the study based on the design of the DIF in paper II, the main limitations can be summarised in two aspects. Firstly, this is a single case study – and albeit that it can be argued that this is an important case, the findings are limited to the context of the STA. It is therefore highly interesting for future reference to understand, study and compare the results from the DIF based on its application in other government agencies and organisations both in Sweden and in other countries. The second aspects regards the design and focus of the DIF itself. This has primarily to do with the fact that the DIF directs its attention to core processes in the public sector, and as noted in the introduction on past research, this is one of many potential areas in which to study digital government. The DIF does not give the full picture of digital government.

There are also limitations to the study on classification of core processes in paper III. This includes discrepancies on the application of the classes to the ordinances. There are differences in interpretations in coding the legal documents and how some of the ordinances lack a full exposé of government responsibilities. There is also a limitation of applying these classes across various types of public administration in different countries. Another limitation concerns the accuracy of the classification: Are they all to be

considered as types of core processes? Is the classification too broad? All attempts to apply and enhance these classes further are welcomed.

Paper IV is also limited by how the DIF is a particular framework and project for assessing digital government, and the Swedish system of public administration, which restricts is generalisability considerably.

4 Results from the individual papers

This chapter presents the results from this thesis based on the four papers. The combined results from the papers in turn provide an answer to the question in this thesis regarding how can the DIF provide an assessment of digitalisation of core processes in government agencies.

In general, the results can be characterised as moving from normatively questioning and evaluating the basis and purpose of benchmarking e-government across the world, based on an analysis and synthesis of past research of the phenomenon of benchmarking e-government in paper I, towards paper II that studies a suggestion for how to assess digital government, via a case study of the design process and practice of developing a digital index at the STA. This paper results in suggesting a set of design principles on how to assess digital government, with the purpose of learning, evaluating, understanding and developing digital government. Paper III studies the development of a classification of core processes for digital government and looks at suggestions and results in the application of this classification for 159 Swedish government agencies. After these two case studies, the research turns to a third case study looking at the results and influences of the application of the DIF assessment involving two government agencies.

4.1 Different divisions for explaining the results

The results are characterised and presented using four main divisions. These are:

- **What and why** – explains the topic under study and the incentive for choosing this topic.
- **Motivating the study** – discussing how the study was selected in relationship to research and practice.
- **Describing the study** – explaining how the study helped to answer the question(s).

- **The outcome** – explains the results and the wider implications and queries that they might raise for future research and practice.

For each of the main papers, I present a table that highlights the title of the paper, the research questions asked and the theme of the study, and also add what is called the knowledge characteristics of the research results. These components are obtained from Gregor's (2006) taxonomy of different types of theories and their respective knowledge contributions in information systems research. While Gregor focuses on classifying different theory types, the focus here is instead on characterising the results of each paper in terms of its type of knowledge contribution. Gregor identifies at least five different theory types, and each of these have their own features and knowledge characteristics (ibid., p. 620) (see Table 6).

Table 6. Created and adapted based on Grego's "Table 2. A Taxonomy of Theory Types in Information Systems Research".

Types of theories in information systems research	
Theory type	Distinguishing characteristics
1. Analysis (descriptive)	Provides an account of a phenomenon based on analysing data and information and does not provide any prediction.
2. Explanation	Can combine various types of questions in terms of their relationship to each other with the aim of explaining why something happened, without going into predicting what will happen next. Examples of types of questions to combine are the classic "Serving Men" founded on the author Rudyard Kiplings poem "I Keep Six Honest Serving Men", namely: why, what, when, how, who and where.
3. Prediction	Starts from what is the case and then goes on to claim from this for what can be. This means giving qualified projections and added to this are suggestions for that can be tested for verification or falsification.
4. Explanation and prediction	Combines 2 and 3 above to have both suggestions that can be tested as well as causal explanations based on explicating answers to the Serving Men above.

5. Design and action (prescriptive)	This type is different from 1-4 above in that it explains how to do something. In abstract terms, it means to give prescriptions in terms of, for example, "methods, techniques, principles of form and function for constructing an artifact" (Gregor, 2006, p. 620).

4.2 Paper I: A foray into the world of benchmarking digital government

The first paper was published in 2020 in the journal *Information Polity* and is a literature review on the research on the phenomenon of benchmarking digital government. The main characteristics of this article can be seen in Table 7 below.

Table 7. Description of paper I.

Categories	Description
Title	What is the point of benchmarking e-government? An integrative and critical literature review on the phenomenon of benchmarking e-government.
Research questions	What are the main findings found by research on the phenomenon of benchmarking e-government? According research, what – if any – are the benefits for the public sector in using benchmarks of e-government? In what way has research on the phenomenon of benchmarking e-government changed over time?
Theme	Analysing how digital government is assessed.
Knowledge characteristics	Analytic / descriptive: Offers a systematic categorisation of the main tenants relevant for the phenomenon of benchmarking and identifying gaps and potential in research on benchmarking. Brings forth and synthesises the most important factors in research and describes their relationship across time to identified themes and/or topics. Prescriptive: Questions the practice of benchmarking, offers constructive suggestions for form and content of benchmarks, and addresses challenges on how research has been developed over time.

4.2.1 What and why

The motivation for this topic was twofold. Firstly, to pursue critical questions and answer these questions via research in order to analyse the world of benchmarking digital government. Secondly, the motivation was to understand the context of assessing digital government that I am a part of. In this sense the motivation was not purely critical, but also to be constructive and pragmatic in order to contribute to discussions on how to provide a basis for thinking about the opportunities and challenges of digital government. The background for this was that I was aware of the many practical issues and lack of relevance of benchmarks for the context of where I was working as a civil servant in public administration. I therefore saw an opportunity here to provide further systematic and grounded knowledge to the area of benchmarking digital government.

4.2.2 Motivating the study

The purpose was to attain a critical overview and understanding of what research has had to say about the phenomenon of benchmarking e-government. The focus was to understand the context and purpose of benchmarking digital government from the perspective of research, and the method of a literature review seemed apt for this. As noted in the paper (Skargren, 2020, p. 70), the primary point was not to test, expose or develop a particular theory or concept, as Webster and Watson (2002) suggest as purposes for conducting a literature review. The study was instead based on a strand of research on literature review that argues for its purpose as creating a *synthesis* of past research on a particular topic and to analyse this research in order to compile new angles and ideas (Torraco, 2005). This means that there are at least three major motivations for this study in line with a broader background to the DIF as a framework for assessing digital government:

- Cumulative knowledge – compiling and building past research into potentially sharper insights and/or new questions;
- Integrating different strands of knowledge on a particular topic to systematise it into a meaningful discourse;

- Critically assessing the phenomenon itself by looking for how it can benefit the public sector.

These three knowledge components are extensive, and when viewed in combination they provide two additional analytical perspectives. This has to do, firstly, with making a value judgement based on similar criticism on existing research in digital government, and which regards the lack of cumulative interaction and discussion amongst researchers on common research topics (Heeks & Bailur, 2007). Secondly, the synthesis of earlier knowledge opened up for further suggestions on research methods that provide other types of knowledge inputs on how to measure and assess digital government than the ones studied in the paper, such as action research (Skargren, 2020, pp. 80-83).

4.2.3 Describing the study

As noted in section 4.2.1, an incentive for this study was to understand and critically examine the context I had been involved in as a practitioner. In this sense, the method and the focus of the questions helped to produce new knowledge by asking fresh questions and combining old knowledge in new ways. For the purposes of this thesis, this was the initial foray into searching and understanding how to assess digital government and using research as a means towards "evaluating the evaluators", as one of the sections in the paper is called.

The three relatively clear though also broad questions, meant that the examination of the articles was time consuming, and at the same time straight-forward. In other words: finding the results was simple but took some time to gather and put together into a meaningful whole. The 27 articles finally included in chronological order in the paper were read by focusing on extracting three types of results from the articles which were based on the corresponding questions. While the results in turn materialised by reading each of the articles from the perspective of the questions, these were then compiled as results for each question in a table – a column for each question, and one for the time period and source of the results (see the appendix in paper I). Going through past results like this, and asking specific questions,

eventually starts to yield a deeper understanding of the topics and questions in how they change and can be grouped into different periods as they appear across time. The results were grouped into three different time periods based on what is called their main characteristics. As argued in the paper, these periods contain both differences and similarities in how the same types of questions and results from research occurred across time. The point of the periods is not to argue that they are entirely different from each other, but to highlight how the topic evolves and new research questions around the phenomenon of benchmarking e-government comes forth. One point of conducting a literature review is, after all, to show how something evolves and changes across time and characterising the material can help to see this development.

4.2.4 The outcome

The outcome from this study can be summarised into five main aspects.

- **Main findings**
  - Criticism of benchmarks – relating to their design and potential for misleading public policy, having a too narrow scope and potentially hindering innovation.
  - Problems and improvements of methodology – how to operationalise key terms, keeping the measurements up to date with technology.
- **Benefits for the public sector**
  - Few examples of benefits, and the claimed benefits are based on arguments that benchmarking are a positive means for public governance.
  - No empirical findings at all of benefits for the public sector.
  - Caveat: positive effects might exist outside the scope of the studied research.
- **Change over time**
  - Initial research focused on creating taxonomies and scrutinising and critically commenting on the methodology of benchmarks.

    - The following period, called "the long middle period 2007 to 2012", had some constructive responses to earlier criticisms, but also deepens the criticisms in important ways.
    - The last period identified – "the late period 2015 to 2016" – offers more systematic criticism of the effects of benchmarks and the lack of conceptual clarity.
    - A finding based on looking at the research in its entirety is to conclude how the same criticism occurred constantly, and this was interpreted partly as a lack of engagement between researchers and a disregard for producing cumulative knowledge.
- **Characterising research on benchmarks**
    - Limited adherence and knowledge accumulation between researchers (for connecting this to other findings commenting on research in digital government generally, see Heeks & Bailur, 2007).
- **Thoughts for further discussion**
    - The lack of understanding of the use and purpose of technology in a public sector context; more accurate measurements of back-office processes.
    - Too heavy emphasis on "the best way" of doing something and instead acknowledging complexity and challenges.
    - Suggesting other methods and means of assessing digital government found in the philosophy of pragmatism and action research (Baskerville & Pries-Heje, 1999) and canonical action research (Davison, Martinsons, & Kock, 2004).

4.3 Paper II: Studying the design of a Digital Index Framework

The second paper was published in 2022 in the journal *Information Polity* and is a study of the design process in constructing a digital index and extracting the design knowledge from this process as design principles. The main characteristics of this article can be seen in Table 8 below.

Table 8. Description of paper II.

Categories	Description
Title	The practitioners guide to a digital index: Unearthing design-principles of an abstract artefact
Research questions	How can the design-process of creating an abstract artefact, the DIF, be explained? What design principles can be formulated from this?
Theme	Presenting design principles for how to assess digital government.
Knowledge characteristics	Descriptive and exploratory: Using design science to highlight the process of designing an abstract artefact, by looking at when and how it was created, as well as why it was designed in a particular way. Prescriptive: Presenting design principles for how a particular abstract artefact ought to be designed when creating an abstract artefact for, e.g., assessing and developing digital government.

4.3.1 What and why

After the previous study on what research concluded regarding the phenomenon of benchmarking digital government, the focus of the research shifted towards looking more closely at how a particular instrument for assessing digital government was developed. Together with my co-author, we chose to study our past experiences of designing the DIF at the STA during the fall and winter of 2015/16.

Besides having extensive practical experiences of such work for a government agency, this study also builds on the questions and issues derived from paper I. This had to do not least with the main findings of the gap between the design of benchmarks and their usefulness for policy and practice, as well as the need for clearer benefits for the public sector and citizens in using such models for measuring digital government. As it turned out, there had also been an ongoing debate, as we show in the section of past research in paper II, about how public administration seems to be missing in research on digital

government (Bannister & Connolly, 2015; Gil-Garcia et al., 2018; Lips & Schuppan, 2009).

4.3.2 Motivating the study

While motivating the study in terms of addressing current problems and topics in research on digital government, benchmarks and public administration was straight-forward, there was an extensive struggle with finding a relevant entry point and motivation for *how to carry out the study*. These challenges can concern, for example, how to study something you have been a part of creating several years earlier, or to think about how to structure and capture, in a systematic and transparent manner, the possible knowledge contribution of this case to the research community. Another challenge is thinking about how practical work can relate to, perhaps complement and even help past research go further.

A further challenge was the initial lack of awareness in what the process of creating the index looked like in detail. How did this work progress across time? When did what happen during the process, and what were the motivations for various design choices? As a practitioner, my experience is that even though there was no hurry to finish the project in this case, the focus is still on getting results and getting "the job done", and there is thus no space to reflect from a meta-perspective on what we are doing while we are doing it. The key focus is instead to deliver by upholding public sector values such as efficiency, objectivity and legality. This study, however, gave us the opportunity to study the work from new perspectives.

The initial focus was to structure thoughts and ideas on how to study the process of creating the DIF and we discussed this dilemma with my supervisors at the department of informatics at Örebro University. Here it slowly emerged that we ought to study the work in terms of being a part of creating *something*, an artefact, and how this could be seen as the process of designing *something* to solve one or a set of problems.

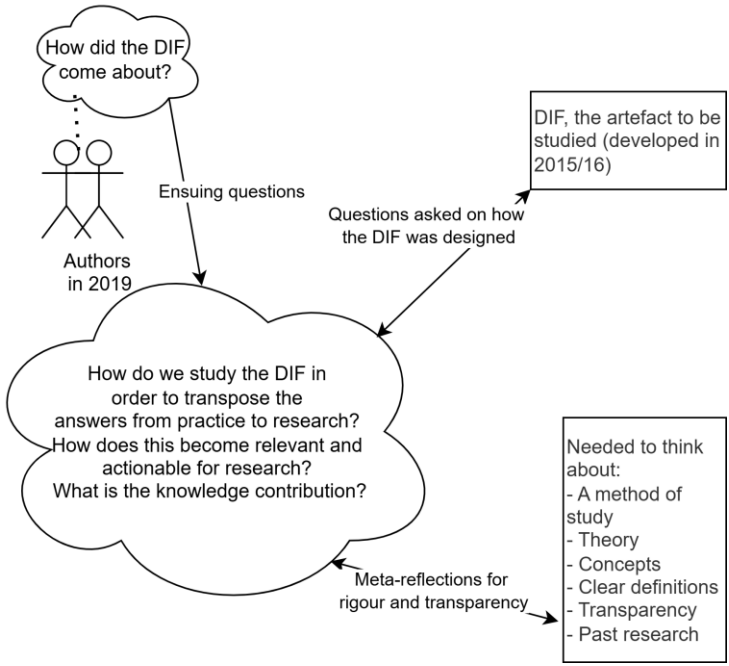

Figure 11. Overview of challenges and questions to be asked on how to study the DIF.

The questions and problems asked as practitioners when designing the index were: How to measure digitalisation at the STA? What purpose should it serve? How can this potential measurement be used to promote and discuss current ambitions and strategies for digital government? By applying a design perspective on studying this work, we were able to use design science theory and flip the perspective to use it *not as a theory of how to design something*, but a theory of *what practitioners do when they try to design something to solve a problem*. Which is the type of knowledge that the study was looking for in understanding and explaining how the DIF came about? We used this theory on how designers design solutions to problems to find – excavate – the *design-knowledge* and which in this case came to be presented as design principles for how to develop such an artefact in order to assess and learn from digital government.

4.3.3 Describing the study

Studying the process of designing the DIF required documentation and data on how the design process had developed. The development of the DIF was based on experiences from the people involved in the process, and information on how the work on creating the DIF had proceeded. The latter information on how to study the design process, included memos, field-notes and notes from meetings and drafts from the period of creating and designing the DIF. There were six different types of sources in total, classified in accordance with their purpose, and that made up the bulk of our empirical material to analyse (see Skargren & Garcia Ambrosiani, 2022, p. 29). These sources constituted the main data for studying the design process of the digital index.

We used the theory of how designers design solutions to problems based on an adaption from Takeda et al. (1990) and Vaishnavi and Kuechler (2004/21), by coding and designating the data according to when they "were produced in time, their purpose and how they fitted the definitions of awareness of problem, suggestion and development" (Skargren & Garcia Ambrosiani, 2022, p. 29), by illustrating the design process in a timeline, highlighting how the various phases overlapped as well as relapsed across time into previous stages as the design-process progressed. This gave an overview for the first time for understanding how the DIF was created across time, and which allowed for a more in-depth analysis of the process by writing up a synthesis of the data clustered around the three design phases' awareness of the problem, suggestions and development. Based on this analysis and the compiling of all the data for how to design the DIF, the argument for how the DFI can be based on three design principles was developed, and is one of the two main outcomes of the paper.

4.3.4 The outcome

The outcomes from this paper can be divided into two parts. Regarding the first part, the outcome consists of the presented design principles and presenting an abstract artefact that is a manifestation of how these principles can be enacted in practice, in this case of the

DIF. The principles are three in total and as principles they express general ideas that are argued to be desirable to follow when designing the DIF.

- Design principle I: *e-government must be contextualised with the nature of public administration – which means to relate digital technologies vis-à-vis core processes of a public authority*. This is about putting the focus on "the relevance and purpose of digital technologies in a public organisation" (ibid., p. 32). The latter can be, for example, to understand the purpose of a particular process in relationship to its effect on citizens and companies and what role digital technologies can play in this.
- Design principle II: *digital technologies support administrative processes and must be premised on the classification of information and law*. If the first principle demands the adherence to the context of public administration, the second principle details what this means in practice. Three aspects are highlighted in this regard: start with the content of public administration, not from technology; look at the relationship between information and law; and thirdly the importance of understanding how these processes and their purposes effect people's lives.
- Design principle III: *apply a process view of e-government that highlights the relationship between internal administrative procedures, the interaction with citizens/companies and the sharing of government data*. The third and last principle suggests a three-layered perspective on how to understand the relationship between digital technology and public administration. This highlights both the nature of administrative actions of public servants when assessing and formulating decisions, the different points of interactions and effects for citizens when they are dealing with a public agency, and the pre-requisite for many of these processes in how data are updated, shared, and exchanged within the agency and with other third parties.

A figure showing how these principles can be manifest is also presented in the paper using concepts and symbols consisting of three dimensions, including the perspective from citizens, the internal case

handling, and data exchange. While the DIF was the result of the work in the present case, the design principles, as argued in the paper, when applied or interpreted in other ways, can in theory produce other types of artefacts with the purpose of assessing, understanding, learning from and developing digital government.

The second part of the outcome from this paper consists of the three main arguments advocated in the discussion. These can be formulated as three theses on digital government and gives further meaning to why the design principles might be important.

I) **Technology must have a practical purpose grounded in public administration**

   a) The purpose of public administration relates to the effects of the administrative action situated within specific core processes (supervision and control and granting permits are used in the paper) and to see the social consequences of these actions for citizens and companies.

   b) Digital technology serves a key role in maintaining, developing and executing the administrative actions and it is thus imperative that it serves the purpose of public administration.

II) **Digital technologies can be implemented on several levels**

   a) This argues for the relevance of how law, information and administrative processes are key parameters in viewing the role of digital technology with regards do what public administration *does*.

   b) This allows for a further operationalisation of exactly where and how digital technology is and can be put to use within a public authority and why.

III) **Learning for change and innovation**

   a) A central tenet of this argument is to address how an operationalisation and contextualisation of digital technology in a public authority can have a "sobering effect" and allow

for a balancing of hype and reality when it comes to questions on how to develop and change public administration.

b) An off shoot of the design principles and the proposed DIF is data that can enable the formulation of strategic questions in digital government; being able to narrow down questions and singling out where and how digital technologies can support administrative processes.

c) The purpose of the DIF is also to enable learning in the sense of having a conceptual and symbolic representation that enables an understanding of how digital technology and public administration interacts. The hope here is for this to enable rational thinking and creative thoughts about how to innovate and change public administration with the help of digital technologies.

4.4 Paper III: A classification of core processes for digital government

The third paper in this thesis was submitted to the journal *Government Information Quarterly* in July 2025. As in the previous paper, the aim of this study is to present how experiences and knowledge from practice can contribute to research in digital government. In this case, the study looked at the development and design of a classification of core processes done for Digg. In terms of existing research in digital government, the paper is positioned in terms of the question of using classifications of government and tasks for analysing digital government. The motivation for the study is to present a classification of core processes that has rigour and can capture the connection between the practice of public administration in government authorities with digitalisation.

Table 9. Description of paper III.

Categories	Description
Title	A Classification of Core Processes for Digital Government
Research question	Are some classes more frequent than others? Are there any patterns in the combination of core processes? Are some classes more relevant for different kinds of agencies? What are the results in combining the classification with the COFOG?
Theme	How the practice of public administration can be classified for digital government.
Knowledge characteristics	Descriptive / Analytical: Suggests eight classes of core processes for digital government, and how these can be used for descriptive and analytical purposes in research on digital government. Studies on, for example, AI, digital services and interoperability can be categorised using different classes of core processes in terms of, for example, motivating or delimiting a study, or to study technology in a particular context. The classification enables an understanding of the purpose of digital technologies supporting government practice in terms of core processes.

4.4.1 What and why

Having previously gone deeper into a case by studying the design in practice of the DIF in paper II, I had the opportunity via my work for Digg to step back and look at the wider picture – beyond supervision and control and granting permits – of core processes for digital government. Based on the theses from the previous study, I was motivated to look further at tools for analysing – and assessing – digitalisation in terms of the practice and context of public administration. In work for analysing and designing a national survey for digital government in Sweden, similar questions had come up

when elaborating on different ways to present and analyse the material from this survey. The aim of paper III was to present how a classification of core processes developed in practice can contribute to research in digital government. A classification is a tool for ordering objects by similarity and can help to analyse complex domains (Bailey, 1994; Nickerson et al., 2013). I argue in the paper that one way of systematically addressing the challenge of combining the analysis of digital government with specificities of the context of public administration is to establish classifications.

4.4.2 Motivating the study

The motivation for paper III is twofold. First, to contribute to existing research on digital government that has developed and applied various classifications to analyse phenomena such as AI, digital services and interoperability. Past research had utilised both the classical way of dividing government according to the COFOG (Alshahrani et al., 2024) as well as drawn more directly on what is referred to as tasks in government (Maragno, Gastaldi, et al., 2021; Maragno, Tangi, et al., 2021). In paper III the argument is that there is a lack of a rigorous classification for capturing the area referred to as tasks or government operations, that is between the practice of public administration in government authorities with digitalisation. The motivation here is also on how the well-established and used COFOG can be used in combination with the proposed classification of core processes.

The second motivation is broader and has to do with a long-running debate and discussion on how to combine the values and context of public administration with research on digitalisation. The argument in the paper is that the classification based on core processes in public administration, developed for analysing digital government, can help bridge this division.

4.4.3 Describing the study

The study contains two main parts. The first entails the case description and analysis of the development of the classification as it then took place. This entails a detailed case description of the

justification and design of the suggested classification of core processes as it took place at Digg during Spring 2021. The development of the classification was based on both criteria from the authors in using the classification as meta-data for analysing and understanding the national survey on digital government. This way in combination with inspiration both from existing research in the field of public administration creating so-called horizontal classification of core processes in government, as well as a report from the EU on "patterns" for European public services (European Commission, 2021). The case description also entails a description of the application of the proposed classification using 159 different legal documents instructing government agencies in Sweden of their areas of responsibility. This descriptrion focuses on how the following challenges were addressed in the process of applying the classification: a) providing a reasonable sample of agencies to apply the classification; b) finding data to classify; c) collecting this data d) drafting instructions for how to code the data; and e) devising a way of assessing how well the data was coded.

By way of showing how the proposed classification can contribute to research, the study presents the results for a set of research questions. These are as follows: Are some classes more frequent than others? Are there any patterns in the combination of core processes? Are some classes more relevant for different kinds of agencies? What are the results in combining the classification with the COFOG? The answers to these questions in turn show how the classification can contribute to existing research in digital government using classifications for the analysis of phenomena in this area.

4.4.4 The outcome

First of all, the results from the development, application and analysis of the distribution of classes among the sample of government agencies show that the classes are relevant in all agencies under study. The results show further that the classes are clearly varied by order of frequency, where supervision and control is he most prevalent of the eight classes, and counselling and mediation is the least prevalent. The outcome also shows that supervision and control in combination

with knowledge production occurs 38 times, and this makes them the most frequent combination of core processes. By looking at the results in terms of the patterns of combinations of classes of core processes, the agencies can be divided into three groups: multi-core processes (4–6 classes), agencies specialising in one singular type of core process and a third group with 2–3 types of core processes. Agencies with multiple types of core processes make up about 17% of the total amount of agencies. Combining the classification with the COFOG shows how the three areas of economic affairs, education and general public services contain the majority of occurrence of types of core processes.

In terms of theoretical implications, there are three general outcomes worth noting here. These are how the proposed classification yields the ability to:

- Divide and categorise – the public sector according to the suggested classes, providing a descriptive and analytical capability to group and compare government organizations based on their shared properties of core processes.
- Analyse digital government regarding the potential for horizontal integration of systems and services. This can highlight question of interoperability and the "horizontal capability" of digital technologies where, for example, many agencies can use similar standards of technologies or data for related purposes and aims.
- Analyse digital government from normative characteristics, providing a starting point for a discussion on how and why the design and implementation of digital government must differ in, for example, scope, aim and depth depending on the class of core process.

The proposed classification and the results contribute to existing research in four main perspectives. In terms of being able to study various area of digital government the classification helps to structure empirical results from phenomena in digital government such as digital services. In the paper, an argument is also provided for how

the classification can contribute to research in integration and interoperability and can offer more rigour and logic to past classifications on tasks in the public sector for studying digital technologies. Another important theoretical implication is how the classification can be combined with the COFOG, and this is an important outcome both in terms of being able to analyse digital government looking at a division according to area and core processes, and to confirm that an established classification used in digital government can be further combined with the classification of core processes.

4.5 Paper IV: Learning by assessing digital government

The fourth paper in this thesis is submitted to the journal *Transforming Government: People, Process and Policy* in June 2025. This is a case study of the application of the DIF assessment in the project "Digitalisation for Cross-Government Public Value" undertaken by Digg (Digg, 2023). The aim of the study is to examine the results and influences of the practical implementation of the DIF assessment for analysing the digitalisation of core processes of two government agencies. The main characteristics of this article can be seen in Table 10.

Table 10. Description of paper IV.

Categories	Description
Title	Learning by Assessing Digital Government: A Case Study of the Digital Index Framework
Research question	What are the results from the application of the DIF concerning digitalisation in government core processes? What are the influences of the DIF assessment process concerning learning and development in practice?
Theme	The results and influences from the DIF assessment of digitalisation of core processes.
Knowledge characteristics	Descriptive / Analytical: The quantitative results from the DIF assessment show the multifaceted spread of digitalisation among activities for carrying out core processes in government agencies,

	revealing differences in automatisation, levels of digital service and the exchange of data. The qualitative analysis reveals influences from the DIF in how the participants acquire skills to learn about the development of digitalisation and are primed towards certain cross-government challenges and opportunities of digital government. Prescriptive: The DIF assessments can support in decision-making, selecting priorities and creating a forum for learning and best practices. Results from the influence of the framework show how an engagement with the DIF can provide mutual understanding among participants on key areas of concern for common developments of digital technologies in core processes, to being able to elaborate on challenges for cross-government digitalisation.

4.5.1 What and why

Having looked at the broader picture of the purpose and usefulness of benchmarks for digital government in paper I, the design of the DIF framework for assessing digital government in paper II and a proposed classification of core processes for analysing digital government in paper III, paper IV studies the results and the influence of the DIF assessment. This study looks at not only the results from the DIF but also analyses the results as different types of influences on the participants, using evaluation theory (Henry & Mark, 2003; Mark & Henry, 2004).

4.5.2 Motivating the study

The study is motivated against the background of the criticism in past research concerning different types of frameworks for assessing digital government, namely maturity models and benchmarks for digital government and calls for case studies on their application and use in practice (Andersen et al., 2020; Bannister, 2007; Skargren, 2020). Research has also advanced a need for further studies investigating the effects of these types of frameworks in practice in order to view them not as endpoints but in terms of critical prerequisites for learning and understanding the context of their application (Kromidha, 2012;

Maheshwari & Janssen, 2013; Okan, 2024). The application of the DIF assessment is therefore an apt case to study, especially in the context of Sweden where agencies have a relatively high degree of independence and where development of digital government is reliant on the ability of government agencies to cooperate and coordinate their efforts around common goals and purposes. The motivation for using a framework such as the DIF among practitioners, that assesses digitalisation of core processes, is therefore potentially high both in terms of a means of governance and in terms of being close to the practice of public administration.

4.5.3 Describing the study

The research questions were answered using a mixed methods approach in a case study on the application of the DIF during 2022 and 2023. Data was collected in terms of the results from the application of the DIF, consisting of the numerical values generated by the answers to the questionnaire from the two respective government agencies. This is the data from the questionnaire showing the results from the application of the DIF in terms of the levels of digitalisation for the respective three dimensions of the DIF: interaction with society; internal case handling; and data exchange (see Figure 7). Compiling this data enabled an analysis to the first research questions on the results from the application of the DIF. The results were analysed at two levels: as a total for each of the three dimensions and at a finer level looking at the results per each dimension and their respective points of interaction. This contrast shows how digitalisation is spread and varies considerably depending on which dimension is studied and which points of interactions are included.

The second research question, concerning the influences of the DIF assessment process regarding learning and development in practice, was answered by applying the schematic theory of evaluation influence (Henry & Mark, 2003; King & Alkin, 2019). This means unpacking the effects of the DIF as an evaluation process by looking at how it influences the actions and attitudes of the participants (Henry & Mark, 2003). The data are viewed as an instance of *process*

use: "the ways that activities through which an evaluation was conducted, rather than its findings, affected individuals and the organization"(Alkin & King, 2016 p. 575). The analysis was done by reading and understanding all the data collected from workshops, questionnaires and official reports, and matching the interpretation of the data filtered through the types of influences and actions stipulated from the schematic theory of evaluation influence (Henry & Mark, 2003; King & Alkin, 2019). The analysis is therefore driven by bringing forth the type of stimulus applied in the project. Stimulus can be written and/or oral information presented as parts of the project or the results from the evaluation process in the project (ibid.).

4.5.4 The outcome

The discussion highlights the outcome of the study: how it contributes to past research in three main perspectives. This is, firstly, how the micro level of assessment of digital government in the DIF can be combined with more macro level-oriented frameworks; using results from each level of the framework to test hypotheses or complement analyses in order to explain or describe certain outcomes. In this category the outcome also contributes to past research asking for more case studies on the use of maturity models for digital government. Secondly, the DIF is an example of a framework for assessing digital government that can enable a prospective direction in terms of creating a forum for learning or making priorities (Heeks, 2008). This is shown by how the study identified several positive effects on the influence and actions at both individual and interpersonal levels in terms of elaborating and acquiring skills to ask questions and develop thinking about digital government in core processes from participants in government agencies. Thirdly, the DIF, its results and most importantly its focus on core processes and administrative action contributes to several studies having a similar process perspective on core processes in digital government, and promotes a focus on, for example, finding cross-boundary systems in administrative procedures (Chen et al., 2019) and legal requirements for carrying out core processes via digital technologies (González & Delgado, 2021).

4.6 Conclusion: Looking under the hood of digital government

The final section of this chapter suggests an answer – based on the aggregated results of the individual papers – to the main question of this thesis. The main question is how a DIF can provide an assessment of digitalisation of core processes in government agencies.

4.6.1 The many ways of assessing digital government

The answer to the main question can be answered by giving the following propositions, based on the respective studies compiled in this thesis. In paper I the study of the phenomenon of benchmarking digital government showed that there is a plethora of different ways in which to assess digital government in countries and governments and that there is a lack of context in these benchmarks and a need for being more attuned to context and assess other dimensions than digital services. Seen from these results, the DIF can provide an assessment of digitalisation as it is close to the context and purpose of how core processes are carried out. As argued in paper IV, this type of micro level assessment of digital government does not need to exclude macro level assessments of digital government provided by benchmarks or maturity models. They can complement each other constructively by simply highlighting different aspects, but can also build on each other by testing various propositions based on the outcomes of the assessments.

In paper II the research detailed the principles for how to design a framework for assessing digital government. However, while these principles set out certain premises important for the context of digital technology in public administration, they do not stipulate the design of *a particular framework*. Indeed, while the DIF was designed in this way in the present case, applying these principles can also lead to potentially different outcomes in terms of other types of frameworks for how to assess digital government. There is not only one way to assess digitalisation of core processes. Indeed, remaining close to context in assessing digital government can mean many different things. The DIF offers one aspect of this in terms of the presence of digital technology, but digitalisation can be measured from many other aspects, such as how they are perceived or how they are used.

There is also a myriad of other aspects to study, ranging from the ability to strategically reason and re-engineer core processes (Hooda & Singla, 2020) or to situate the assessment of core processes in a far wider and complex work systems framework (Alter, 2003; Lindgren et al., 2021), or indeed to study core processes in terms of the level and depth of the *type of knowledge* required to process and make decisions in different types of processes and their judicial ramifications (Lenk et al., 2002). From the perspective of the study in paper III, the DIF can provide an assessment of core processes by being attuned to *different classes* of core process. The study in this thesis has looked at two out of eight possible different classes of core processes – granting permits and supervision and control. This means that the DIF was designed in terms of the ideal types of administrative activities for each of the three dimensions that might occur in conducting these respective core processes. Paper IV studied the results and influence from assessing the core process of supervision and control. With this in mind, there are six other classes of core processes with potential variations of ideal types of administrative actions that might need to be accounted for if applying the DIF under these circumstances. Furthermore, the way in which engagement and use of a framework for assessing digitalisation of core processes is structured and implemented also matters. Viewed from the perspective of benchmarks for digital government, for example, Heeks (2008) notes at least three main purposes for conducting these: evaluating what has happened (retrospective achievement); establishing priorities and "thinking ahead" (prospective direction); and scrutinising and holding people responsible for investments made (accountability). Each of these main purposes for assessing digitalisation can in theory imply a plethora of different ways of working with the results and the purpose of the assessment. Setting up the *purpose* of an assessment impacts the way it is used in practice. With paper IV in mind, the answer to the main question is presented in how the DIF provides an assessment under the auspices of a structured and controlled project. This project ran for almost an entire year and included several occasions of instruction, discussion and particular engagements via workshops with the results from the application of the DIF using a questionnaire. It also included a mix of inputs from researchers on

the area of supervision and control, to discussions on international expectations from the EU and OECD on digital government (Digg, 2023). Using evaluation theory, this way of engaging with the DIF assessment in practice proved to have certain types of influences. Yet the influences might have been considerably different if, for example, there was only the assessment via the questionnaire and then a report or a brief seminar on the results, or indeed if the project ran longer and more extensively. It can further be hypothesised that the influences from the DIF assessment might have been different depending on the framing and communication of the purposes both before and during the project.

Depending on how digital government is defined, the answer to the main question in this thesis may vary. The main point here is, however, that to understand in a meaningful way how digitalisation can be assessed in core processes in government agencies, a suggestion is to look under the hood of digital government. Do so leads to discerning not only the existence of digital technologies, but more importantly to the purpose upheld by digitalisation in supporting the execution of core processes.

4.6.2 Digitalisation of core processes

The review on research on the phenomenon of benchmarking digital government revealed, among others, two important aspects, namely that there is a lack of benefits for the public sector in using these benchmarks and secondly that these common and widespread benchmarks lack measurements of "back-end" processes and have too much focus on narrow aspects such as front-end services. These findings can tell us something about the importance of looking for other aspects in how to assess digital government.

Going to the case study from the STA in paper II shows an alternative way of assessing digital government that has a wider purpose than to just compare progress (which is a main point of a benchmark). The DIF was designed around identifying two types of core processes in public administration, granting permits and conducting supervision and control. Digitalisation is operationalised by presenting a three-

layered view of core processes: interacting with society; the internal case handling; and the exchange of data.

Core processes are identified by looking at what a government agency *does* in terms of its legal mandate and effects on society. Core processes are identified via Government Agency Ordinances. Viewed from the DIF assessment of core processes, digital government is identified in how these processes are carried out using different types of digital and analogue technologies, services and administrative activities across three dimensions.

Digital government at a more detailed level can be assessed via different administrative activities in each of the three dimensions. In the case of interacting with society, these are operationalised with the idea of capturing common points of interactions between the agency and a citizen and/or company. Each point of interaction – which may vary slightly depending on the class of core process – such as notifying about an upcoming supervision or offering payment options, requires some form of communication such as telephone, postal mail or digital self-service, or through digital means of payments. The internal case handling takes place in how different types of information are being exchanged and demanded from citizens and companies, as well as from other public authorities, and then processed for various legal purposes. Examples of the latter includes how information is processed in order to identify and categorise risks, register information, reviewing the submitted information to determine the legal effects in the form of a decision concerning the granting of a permit or in terms of a supervision, then again administering the final information and data for sharing, filing and archiving. Here digitalisation is assessed by which of the necessary stages for administering information – such as registering information, collecting information and reviewing the information – is done automatically or requires human intervention. The third dimension of the DIF is data exchange. This layer looks at "the means by which data is collected and shared internally in the organisation, updated and shared with external actors" (Skargren, Lagsten, et al., 2025, p. 7). Here digitalisation plays a central role in the exchange and collecting of data both inside an agency as well as with other

agencies, and the sharing of data to third parties, all for the purposes of carrying out sub-processes within a core process.

Looking at the main question from a wider perspective, there are several other classes of core processes than supervision and granting permits, as identified in paper III about classification of core processes for digital government. These are suggested to be eight in total (Skargren, Olofsson, et al., 2025). While not included in this thesis, it is argued here that with the design principles from paper II, the DIF can be modified to cater for other possible different administrative actions based on how other classes of core processes are carried out, for example public transferring or counselling and mediation. This broadens the answer to the main question in this thesis on how the DIF provides an assessment of digitalisation of core processes in government agencies. Such a modification does not change the three dimensions or the sequence of the processes, but rather the different individual points of administrative actions which will in turn will give further knowledge on the digitalisation of core processes from several other areas of public responsibility (such as collecting taxes, issuing payments for child-care or settling disputes between a citizen and the state).

In summary, the answer to the main question of this thesis regarding how the DIF can provide an assessment of digitalisation of core processes in government agencies is as follows:

- There is not "one" way of assessing digitalisation in core processes in government agencies.
- Looking under the hood of digital government means in this thesis to assess how digitalisation supports the purpose of core processes in government agencies. This means to focus on the presence of digital technologies in various administrative activities taking place at three different levels: interacting with society, internal case handling and exchange of data.
- Core processes can be classified as eight in total and detailed in terms of various sub-processes taking place in each of these, which are mandated by law, requiring the structured processing of data

and information, which in turn are all supported by various means of digital technologies. The eight classes of core processes are granting permits; supervision and control; public transferring; counselling and mediation; providing data from registers and statistics; regulation and standards; production of services and goods; and knowledge production.

- Digitalisation is assessed in the case of the DIF by how technology supports how core processes are executed at different points of interaction and administrative actions. In the dimension interacting with society in the core processes of supervision and control this includes 12 possible steps; in the dimension internal case handling there are 22 identified possible administrative actions; and in data exchange there are nine. The combined view of the presence of digital technologies at various administrative actions and points of interactions in each of the three dimensions can be assigned a numeric value. This can in turn be aggregated, for example, as a total average in each of the three dimensions, or on a more detailed level for each of the identified interactions and actions. Depending on how the data are aggregated and analysed can in turn provide a holistic perspective on the spread and thus variety of digitalisation in the core process of a government agency.
- Besides having different purposes, being attuned to context and assessing different classes of core processes, an assessment of digitalisation in the case of the DIF can also influence the participants and policy making of digital government in different ways. These influences can be seen on different levels, such as learning, asking questions and the formulation of assignments for policy making. All these aspects in turn depend on the purpose of the assessment and how the work and engagement with the results are done in practice. An assessment of digitalisation of core processes does not stop at churning out the results, it begins with how to understand and learn from the outcomes and the purpose of digital technology in the context of public administration.

5 Contribution

The main contribution of this research is to show how digitalisation can be assessed in government agencies in a meaningful way. Meaningful here means that the assessment takes place close to the context and practice of public administration in terms of the digitalisation of core processes. A tangible contribution of this thesis is in this sense the proposed DIF that has been grounded in both research and practice.

5.1 Theoretical contribution

The theoretical contribution of this thesis can be presented as follows. Firstly, new knowledge on the phenomenon of benchmarking digital government has been presented by integrating past studies on this phenomenon in new ways via asking novel questions. This continues a line of research in this area that has been ongoing since 2003, and synthesises the findings based on how research has progressed across time (see Skargren, 2020).

The contributions in synthesising and critically investigating the phenomena, based on past research, are as follows. Criticism of benchmarks range from how they can mislead policy to how they fail to account for potentially transformative effects (Bannister, 2007; D. Janssen, 2003). There are also relatively few examples in research of any benefits of using benchmarks from the empirical studies and positive remarks are provided based on how benchmarks as a method is positive. Another contribution here is to show how this research has changed over time, divided into three periods, starting with initial criticism and examining benchmarks, to a middle period examining the background of these benchmarks and offering constructive suggestions on how to improve them, while the latest period is signified by, among others, further criticism of benchmarks grounded in theory.

Building on the synthesis of past research, another contribution concerns how research in this area shares important characterisations with how Heeks and Bailur (2007) have criticised the discipline of

digital government in general. That is, among others, as fragmented and lacking in attempts to build coherent and cumulative knowledge. The findings from the literature review, as well as thinking about how to characterise this research in terms of the lack of coherence, inspired two further points for discussion which can be raised as contributions. The first is the suggestion to develop new and/or other methods for developing digital government. This includes improving current benchmarks, but also to adhere to principles of pragmatism and to conduct both action research and employ the principles of canonical action research (Baskerville, 1999; Davison et al., 2004). A contribution here is thus to show the motivation to at least explore other types of methods and purposes for assessing digital government.

Other contributions are based on combining research and practice, and relate to the significance of the design principles for the DIF. These are based on a relatively unique case study of a design process in a government agency with the purpose of developing a framework for, among other things, assessing digital government. The design principles are open and can be further enhanced and used to motivate and create other types of frameworks looking at other aspects of digitalisation. A contribution is also to contribute to the discussion on how to combine the study of digital technology into the context of public administration. The design principles help to avoid seeing digital technology as a means to its own end, but rather in terms of being imbued with the purpose of core processes. The study here also contributes with suggestions for how to study well known aspects of information, law and processes – areas where digital technologies play critical roles. A final contribution regards the argument that the design principles bring "technology down to earth" and can mitigate the often-associated hype that comes with "promises" of digitalisation (see e.g. Gauld, Dale, & Goldfinch, 2006). Being forced to see the purpose and role of digital technology in terms of what it is supposed to serve regarding core processes can contribute to afterthought and better decisions.

A further contribution for the research community, enabled by excavating experiences and knowledge from practice via a case study, is the development and validation of a classification consisting of

eight different core processes in government agencies. This consists of a transparent and open description of eight classes of core processes relevant for digital government as well as a detailed account of its positive validation in categorising government agencies according to these classes, using official legal documents. Another contribution concerns the analysis of the results from the application, made in order to clarify and suggest how it can provide input to past research using classifications for analysing digital government. More in detail, it is argued that there are three main contributions to past research here. First, how the classification itself constitutes a theoretical tool for describing and analysing digital government. An important contribution at this stage is how the classification provides meaning in terms of why a certain core process is carried out, allowing for questions to be asked regarding the purpose and explanation of the prevalence of digital technologies. A second contribution here regards how the classification offers a more systematic and consistently horizontal classification of what governments do *in practice* than past suggestions of classifications on the level of administrative tasks. Thirdly, the proposed classification is shown to be combined with another well-known and used classification of government, the COFOG. This contributes to researchers being able to sort and present their findings both in terms of areas of government and to purposes in terms of what government does in practice concerning core processes.

Another main and important contribution is the analysis of how a framework for assessing digital government influences the processes of engaging and using the results. This of course concerns the DIF, which along with the questionnaire provides a ready and tested way of assessing digitalisation at a micro level and with high relevance for practice. Here the study contributes to the area of research on benchmarks and maturity models by showing how such an assessment can be used for learning and engaging with complex questions for developing digital government. This contributes with a micro level assessment that can work in conjuncture with macro-oriented frameworks for assessing digital government, and together these can form a pivotal tool for analysis and assessing progress. The study contributed to previous calls for more case studies on the use of

maturity models, as well as for better context and purpose in applying these types of frameworks. More in detail, the study contributes to a type of benchmark that Heeks (2008) identifies as prospective, as well as past studies assessing digitalisation in similar terms as processes of administrative procedures, paying close attention to legal ramifications and how these processes take place in the public sector.

5.2 Practical contribution

This thesis is based on important aspects on work from practice, and I hope that it can contribute to practical work in the public sector. A major contribution to practice is the proposed classification of core processes for analysing digital government – the DIF – and how it can be used as well as how it has already contributed to policy development.

Two contributions (mainly discussed in paper III) can already be visible in practice. One of these is the use of the proposed classification of core processes for analysing digital government based on quantitative data from the longitudinal survey on the progress of digital government in Sweden (see e.g. Digg, 2021b). In this classification, government agencies can be divided according to which core processes they are responsible for and practitioners responsible for follow-up and analysis can examine this division based on data from Digg's survey on digital government. The latest survey in this area applies, for example, the classification for distributing and analysing the results from government agencies in terms of their progress in terms of being data-driven and their ability to use AI (Digg, 2025b). A second identifiable practical implication is the use of the classification in a recent report analysing the potential impact of AI in the Swedish public sector relating to productivity and labour demand by a group of researchers in economics (Lodefalk, Engberg, & Tang, 2025). The classification of core processes is here combined with an index of how exposed different occupational groups are to AI in a scenario analysis divided according to the different classes of core processes presented in this thesis.

Another apparent practical contribution of this thesis is how practice has benefited from the process of using the DIF assessment, in terms

of being influenced by the results and participating in a project using the DIF (see paper IV). The DIF has also contributed to policy development and further suggestions for national digital infrastructure in Sweden. An additional contribution concerns how the DIF can be viewed as an alternative, or complimentary, way of assessing digitalisation on a different level and purpose than the prevalent benchmarks and maturity models. As argued above, an important contribution here is how these different types of frameworks can work to complement each other.

Important practical lessons can also be learned from the literature overview on benchmarking (paper I) which found a lack of clear benefits for public administration in using these types of benchmarks. While I know there are examples of their potential benefits, there were few to be found in research on the phenomenon of benchmarks. This is of course about perspective views and which questions are found relevant to address. Nevertheless, an important practical contribution here is to provide "the bigger picture" of the purpose and criticism of benchmarks, which can be valuable for policy developers and decision makers in the public sector, who to a certain degree face many of these types of frameworks on a relatively frequent basis, not least from organisations such as the OECD and the EU.

Practical contributions are also a clear support and enjoy a high relevance in how to understand and view digitalisation in terms of the execution of core processes in the context of public administration (as mainly discussed in paper II). The suggested three dimensions of interacting with society, internal case handling and exchange of data, offers a clear and easily identifiable area for discussions and suggestions on how to develop digital government in their day-to-day operations. The combination of these dimensions in terms of the DIF, may support the ability to think and reason about digitalisation of core processes in a more strategic manner. This means, for example, interacting with the DIF and its results to set goals based on a numerical progress in the index value over time, and the accompanied ability for managers to follow up at a relatively high level of detail the progress of digitalisation in any of the three

suggested dimensions. All in all, this contributes to practice by offering a holistic framework for strategic discussions and decisions on how to monitor and ask informed questions about digital government at a single government agency.

5.3 Future research

In this final section I would like to make some suggestions on future research, based on the results of this thesis.

- Benchmarking, evaluating and following-up digital government is still alive and prevalent, as can be seen in the latest policy programme in the EU called the Digital Decade (European Union, 2022), as well as in the case of the OECD's digital government index (OECD, 2024). There is therefore a continued need to further study the usefulness, impact and design of these types of benchmarking procedures. In contrast to the literature review presented in this thesis, future studies can have a more empirical approach by studying how they are received and used in several countries and what type of benefits they might have, or by, for example, scrutinizing the relevance of the methodology and indicators of the benchmarks based on current research. Some of these benchmarks may also need updating as technology develops, and future practice-oriented research might be one avenue for support.
- Regarding the design principles of the DIF, and the model itself, here are a few suggestions for future research. The first is to think about how the principles can be applied in building another type of model, and by doing so, improving the quality and relevance of the principles. Secondly, to test the DIF in different traditions of public administration in other countries, or other government agencies in Sweden and to do so by exploring both the applicability and relevance of the DIF, as well as to study the potential trends and differences in outcome. The latter can be used to study more cases as well as core processes, and discuss the results from different debates, problems or theories, such as the progress of, for example, digital transformation or the purpose and value of implementing various types of digital technologies.

- As suggested more specifically in the study of the design of the DIF, there are at least two theoretical viewpoints that are close relatives to the design principles of the DIF, namely the work of Lenk (2012), (Lenk et al., 2002), Alter (2003) and not least the eGovWSF by Lindgren et al. (2021). Perhaps both the model and the design principles can be improved significantly in a theoretical sense by combining these theories or by studying parts of the suggested theories in more detail using the DIF.
- With regards to the proposed classification of core processes, the wish here is of course for future research to use it as a tool for analysing various phenomena in digital government. An important first step is to examine and validate the classes in other countries. Is the suggestion valid for other countries with different political cultures and administrative practices? If so, the classes can be used for cross-country comparisons of core processes and various phenomena in digital government. The proposed classification can be combined with the COFOG, but also other types of classifications, such as in terms of size (number of employees) or how many people and companies are affected by a certain type of core process (volume of cases), or other relevant classifications of government.
- Regarding the DIF in general and research on frameworks for assessing digital government, paper IV is but one case study of how this type of framework is applied and used in practice. It would therefore be highly interesting and beneficial for our understanding to see more cases of how practitioners have engaged with the results and frameworks for assessing digital government, using research from evaluation research. Secondly, a previous point in this section suggested that the DIF be applied and used in other contexts and modes of public administration. An addition to this point is that this type of research assesses and validated whether this way of working with the DIF and its results are relevant and useful in other contexts, or indeed if there are other ways of engaging with the DIF and its results that are perhaps more effective and meaningful. Thirdly, the DIF has been designed to address two main types of core processes: supervision

and control and the granting of permits. There are more types of core processes and future research and design work can focus on how to enhance, develop or adapt the DIF to other classes of core processes.

Appendix

Questionnaire for the DIF

English translation of DIF questionnaire

Numbers in parentheses are the value assigned to the answer given to the respective alternatives in each item.

1. Respondent:
    - Name:
    - E-mail:
2. Which government agency do you represent:
    - X
    - Y
3. Which sub-process or processes are included in your answer?
    - Sub-process A
    - Sub-process B
    - Sub-process C

    Etc.
4. Please state the number of case processes for each sub-process per annum:

Part One: Interaction with society

Part 1 focuses on the contact between the agency and the object (or its representative) under supervision. What does the interface look like? Are they analogue or digital or both?

Initiating a case

1. How is a supervision process initiated? (This item gives no value)
    a. Report from third party
    b. Risk assessment

c. Information from media
d. Control of database information
e. Thematic study
f. Periodical/reoccurring supervision (initiated by the agency)
g. Other:

2. In what way does the agency notify about a coming supervision?
    a. Digital post/my messages (6)
    b. E-mail (1)
    c. My pages (or corresponding function) (6)
    d. Letter (0)
    e. SMS/text message (6)
    f. Telephone (0)
    g. Publication on webpage (1)
    h. Not relevant

3. In what way can a supervision be initiated by a third party (for example a complaint or report)?
    a. E-mail (1)
    b. Digital service (6)
    c. Letter (0)
    d. SMS/text message (6)
    e. Telephone (0)
    f. Touch-tone menu (1)
    g. Chatbot (5)
    h. Electronic form (non-responsive) (3)
    i. Other:
    j. Not relevant

During a case

4. How does the agency request information from the object under supervision?
    a. Digital post/my messages (6)
    b. E-mail (1)
    c. My pages (or corresponding function) (6)
    d. Letter (0)
    e. SMS/text message (6)
    f. Telephone (0)
    g. Not relevant

5. In which manner can an object under supervision submit information and/or supplement their case or respond to the agency?
    a. E-mail (1)
    b. Digital service (6)
    c. Letter (0)
    d. SMS/text message (6)
    e. Telephone (0)
    f. Touch-tone menu (1)
    g. Chatbot (5)
    h. Electronic form (non-responsive) (3)
    i. Not relevant

6. How does the agency representative collect information when conducting supervisions on site at the object?
    a. Digital service (6)
    b. Paper (0)
    c. Digital photo/film (6)
    d. Analogue photo/film (0)

e. Electronic form (non-responsive) (3)
f. Digital document (3)
g. Sound files (6)
h. Other:
i. Not relevant

7. How is data collected via technical tools relating to the object under supervision?
    a. Autonomous drones/robots (air, land, sea) (6)
    b. Sensors connected and fixed (photo, film, sound or other types of sensor data) (6)
    c. Analogue sensors (manual reading), mobile or fixed (0)
    d. Manual testing via sampling equipment (0)
    e. Event or time-triggered data collection (photo, film, sound, etc, with, e.g., satellite or aerial photo) (3)
    f. Other:
    g. Not relevant

8. How does the agency provide payment information?
    a. Digital post/my messages (6)
    b. E-mail (1)
    c. My pages (or corresponding function) (6)
    d. Letter (0)
    e. SMS/text message (6)
    f. Telephone (0)
    g. Publication on webpage (1)
    h. Not relevant

9. Which payment options do the agency offer?

a. Direct debit (6)
b. E-invoice (5)
c. Paper invoice (0)
d. Swish (Swedish mobile payment system) (6)
e. My messages (e.g. Kivra) (6)
f. Bank transfer (6)
g. Card payment (3)
h. Periodic fee (3)
i. Not relevant

10. In what way can the object under supervision come into contact with the agency to receive information about the status of their case?
    a. E-mail (1)
    b. Digital service (6)
    c. Letter (0)
    d. SMS/text message (6)
    e. Telephone (0)
    f. Touch-tone menu (1)
    g. Chatbot (6)
    h. Electronic form (non-responsive) (3)
    i. Not relevant

11. How does the agency inform about the status of the case/provide feedback?
    a. Digital post/my messages (6)
    b. E-mail (1)
    c. My pages (or corresponding function) (6)
    d. Letter (0)
    e. SMS/text message (6)

f. Telephone (0)
g. Publication on webpage (1)
h. Not relevant

Ending a case

12. How does the agency inform about the results/consequences of a supervision?
    a. Digital post/my messages (6)
    b. E-mail (1)
    c. My pages (or corresponding function) (6)
    d. Letter (0)
    e. SMS/text message (6)
    f. Telephone (0)
    g. Publication on webpage (1)
    h. Not relevant

13. How does the agency serve its decisions?
    a. Digital service of process (6)
    b. Letter (0)
    c. Personal visit (service by process server) (0)
    d. Not relevant

Part Two: Internal case handling

Part two is about the agency's internal case handling for its back-office process of supervision. Are there activities in this process that are done automatically or is the case processing done manually? Is there automatic support in the stages of identifying and planning of a supervision (e.g. AI solutions)?

Planning of the supervision

1. How are risks identified?
    a. AI-based risk identification (e.g. via patterns) (6)
    b. Automatic risk identification (e.g. with set parameters) (3)
    c. Manual risk identification (0)
    d. Not relevant

2. How are risks and effects categorised?
    a. Automatically (6)
    b. Manually (0)
    c. Not relevant

3. How are plans for supervision created?
    a. Automatically (6)
    b. Manually (0)
    c. Not relevant

4. How is the basis for selecting an object to supervise created?
    a. Automatically (6)
    b. Manually (0)
    c. Not relevant

5. How is the basis for planning one or several supervisions created?
    a. Automatically (6)
    b. Manually (0)
    c. Not relevant

6. How is the basis for conducting one or several supervisions created?
    a. Automatically (6)
    b. Manually (0)
    c. Not relevant

Registering and control of case and information

7. How is case identification assigned?
    a. Automatically (6)
    b. Manually (0)

8. How is the case logged in the record system?
    a. Automatically (6)
    b. Manually (0)

9. How is the case assigned to a case officer?
    a. Automatically (6)
    b. Manually (0)

10. How is the case officer informed?
    a. Automatically (6)
    b. Manually (0)

11. How is the submission status of all documents, including any supplementary ones, checked?
    a. Automatically (6)
    b. Manually (0)

12. How is the content of incoming information reviewed (includes all forms of collected information and data)?

a. Automatically (6)
b. Manually (0)

13. How is the payment status checked?
    a. Automatically (6)
    b. Manually (0)

Review, assessment and decision in the case

14. How is the interpretation of received information (including supplements) done against relevant laws and regulations?
    a. Automatically (6)
    b. Manually (0)

15. How do you check for the presence of one or several cases concerning the same object?
    a. Automatically (6)
    b. Manually (0)
    c. Not relevant

16. How do you create a report concerning the supervision?
    a. Automatically (6)
    b. Manually (0)

17. How is information/data visualised?
    a. Table (0)
    b. Static graphics (e.g. image, diagram) (0)
    c. Interactive graphics (6)
    d. Film/video (3)
    e. Not relevant

18. How is the case assessed?
    a. Automatically (6)
    b. Manually (0)

19. How do you make the final decision?
    a. Automatically (6)
    b. Manually (0)

Finalisation and archiving of the case

20. How is data from the case made ready for publication (e.g. removing sensitive personal information)?
    a. Automatically (6)
    b. Manually (0)
    c. Not relevant

21. How is the case closed?
    a. Automatically (6)
    b. Manually (0)

22. How is the case archived?
    a. Automatically (6)
    b. Manually (0)

Part Three: Data exchange

Part three is about the flow of information within the agency and between different public and private actors. How does the agency get access to required information (without asking the object of supervision)? How do you ensure that the information is up to date? And finally, how are other actors (which in some cases are guided by

law) informed about the results of the supervision? Does the agency publish statistics regarding the number of conducted supervisions?

Gathering of information from registries and external agencies and actors

1. How does the owner of the information approve access to requests for information from the agency?
    a. Given login (3)
    b. Single sign-on (6)
    c. Open access (6)
    d. Not relevant
    e. Other:

2. How does the owner of the information grant access to requests for information from within the agency?
    a. Open API (6)
    b. Digital service (6)
    c. Shared systems (3)
    d. Manual file transfer (1)
    e. As attachment in e-mail (1)
    f. Website for information sharing (1)
    g. Other:

3. How does the owner of the information grant access to requests for information from external actors?
    a. Open API (6)
    b. Digital service (6)
    c. Shared systems (3)
    d. Manual file transfer (1)
    e. Attachment in e-mail (1)

f. Website for information sharing (1)
g. Other:

4. How, if applicable, how do you actively create access to information that is stored internally within the agency?
    a. Request per e-mail (1)
    b. Requests via telephone (0)
    c. Digital service (6)
    d. Electronic form (non-responsive) (3)
    e. SMS/text message (6)
    f. Other:
    g. Not relevant

5. How, if applicable, do you request information from another actor and/or agency?
    a. Request per e-mail (1)
    b. Requests via telephone (0)
    c. Digital service (6)
    d. Electronic form (non-responsive) (3)
    e. SMS/text message (6)
    f. Other:
    g. Not relevant

Update of locally stored information

6. How is information from the agency that is stored locally on your computer updated?
    a. Periodic file transfers (3)
    b. Manual update (0)
    c. Not relevant (direct access to data within the agency) (6)
    d. Not relevant (we do not use data from the agency)

7. How is locally stored information that is originally derived from another actor updated?
    a. Periodic file transfers (3)
    b. Manual update (0)
    c. Not relevant (direct access to external data) (6)
    d. Not relevant (we do not use external data)

Making results available

8. How does the agency publish aggregated results and/or statistics from supervisions?
    a. Open data (6)
    b. Share/conditional data (3)
    c. Information sharing via website (Word/PDF/text) (1)
    d. Upon request (0)
    e. Not relevant

9. How do other agencies and/or actors become informed about decisions of supervisions?
    a. Open API (6)
    b. Digital service (6)
    c. Shared systems (3)
    d. Manual file transfer (1)
    e. E-mail (1)
    f. Information sharing via website (1)
    g. Official notice (0)
    h. Other:
    i. Not relevant

Is there anything else you want to share? (Free text)

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