Value types in e-government: The digital artifact as value carrier and value contributor

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Abstract

This paper addresses values in public sector digitalization (e-government). It develops, through several case studies and a literature review, a value conceptualization on e-government values. A differentiation is made between public administration values and societal values. Public administration values are divided into five value types: Efficacious public administration, informed and transparent public administration, safe public administration, efficient public administration, and trusted public administration. Societal values are divided into four value types: Citizens' capacity for action, citizens' knowledgeability, simplicity for citizens, and overall societal values. The paper makes also a differentiation into digital artifact values, use values, and consequential values. Two value roles of digital artifacts are identified: The digital artifact as a value contributor and as a value carrier. The value conceptualization is illustrated through examples from a case study on digitalization of medical certificates.

Keywords: e-government, value, digital artifact, policy, public administration, medical certificate

1   Introduction

1.1   Background and context

The use of digital technology in public administration (e-government) has evolved historically from limited intra-organizational applications (such as case handling systems) to much broader applications involving digital interaction between several public organizations and with citizens (Grönlund & Horan, 2004; Heeks & Bailur, 2007; Belanger & Carter, 2012). There has been a rapid growth of e-services designed for citizens' interaction with public agencies (e.g. Layne & Lee, 2001; Jansen & Ølnes, 2016). Many broad websites ("one-stop government") have been introduced to meet demands from citizens' complex life-situations (Wimmer, 2002; Vintar et al., 2002). Such digital artifacts put demands on effective coordination and collaboration between different public agencies. Many public tasks involve an interaction between such public agencies and there has been a growth in digital interoperation between different agencies (Klischewski & Scholl, 2008). Interoperability between digital artifacts has been high on the agenda for a long time in egov development (Guijarro, 2006; Pardo et al., 2012). Such complex multi-organizational digital landscapes with many stakeholders put high demand on the governance of digital resources. Development of e-government is considered as one important reform agenda in the progress

of public administration. Appurtenant, the development of national egov policies and frameworks has attracted much interest and effort in many countries (Ray et al., 2011).

Such egov policies contain descriptions of values and goals of how to direct egov development. There may be descriptions of desirable properties of digital artifacts and the use of such artifacts. There is an apparent normative orientation in such policy declarations. This normative orientation has, of course, a role on the political scene; to enounce political ambitions by the regime to the public. Egov policies have also an instrumental function. *Policy declarations should be used as governance instruments for e-government*. National egov policies should guide strategic decisions on the introduction, development, and change of digital artifacts in different sectors of public administration. However, there are many circumstances and considerations in concrete situations of digital governance that may not be addressed or covered by national egov policies. Such national policies may be influenced by topical discussions and governance boards for digital resources in different sectors may have other long-term goals that are not addressed in the national egov policies.

There exist thus values for egov in national policies and often in governance plans for some specific digital artifacts. However, the values that are efficacious in the actual digital practices may differ from those declared in policies and plans (Goldkuhl, 2012a). We can look upon *the designed egov artifacts as value manifestations*. There may be differences and tensions between policy declarations (as enounced values) and the actual egov design (as manifested and efficacious values). This paper's main interest is *values in e-government*. The research interest is based on the identification of such differences between policy level and artifact level concerning values. The knowledge development is pursued through several case studies on e-government in multi-organizational settings. The research was initiated together with a cabinet office in Sweden that worked with national egov policy development. At that point of time, the national egov policy was stated in three salient goals: Swedish e-government should contribute to 1) simpler everyday life for individuals and companies, 2) a smarter and more transparent administration that supports innovation and participation, 3) higher quality and efficiency in the public administration (eGovernment Delegation, 2011). In the general discourse, these enounced values in the national digital agenda were often condensed to the value terms of *simplicity*, *transparency*, and *efficiency*.

The general focus in the research work was on multi-organizational governance of complex (groups of) digital artifacts. We investigated polices and plans (on different levels), IT governance activities and the involvement of different stakeholders, and the digital artifacts and their uses. This means an interest in egov values; as:

- enounced in policies and plans,

- considered in IT governance activities,

- manifested in digital artifacts and their use.

The three digital goals in the national digital agenda (mentioned above) were expected to govern the development of egov in Sweden, especially those digital artifacts that were considered to be of strategic importance. However, the national policy statements covered only a limited spectrum of possible values in public administration and e-government. There can exist other types of values, which can be consid-

ered important for strategic egov development. The formulations of the three goals were more slogan-like than useful for governance and evaluation. There were different forms of expression for these goals. Goals 2 and 3 contain several goals which can be seen as confusing. Especially goal 2 has a problematic formulation since it is expressed as containing means-to-ends relations. "Smarter and more transparent administration" are considered as egov goals, but also as means to other goals such as "innovation and participation". This is not the place to go into detailed critique of these policy statements. However, several reflections can be formulated based on these examples: The policy statements represent only a limited set of possible egov values. What about other values that are not explicitly stated? What kind of governance will these stated egov values imply in relation to other possible values? How do unclear formulations in policy declarations impact governance of digital artifacts? Do differences exist between digital policy and digital reality? And if so, how does this impact future governance and policy planning?

1.2   Inquiry purpose and structure of paper

Background, context and main research interest have been presented above. Based on these, the guiding inquiry purpose of this paper can be stated: *How to conceptualize values in e-government?* The observations and reflections stated above are considered as motivations for this study. A need for more research on values in e-government has been argued by Bannister & Connolly (2014, p 125): "Examination of the critical transformational impact of ICT, namely its effect on public sector values, has been neglected", "There is scope for extensive research into this subject"; and by Flak et al. (2009, p 223): "A structured way of defining public sector values will make it easier to design eGovernment projects in a way that makes the value of them easier to assess".

This paper represents a "sliced" sub-study of several pursued case studies on multi-organizational e-government. The research approach will be described in the next section (2). The inquiry purpose will be further elaborated in that section. In section 3, previous value conceptualizations in public administration and e-government are reviewed. In Sections 4 and 5, proposals are given of different types of values related to e-government. The paper is ended in section 6 with a concluding discussion.

2   Research approach

2.1   Pragmatist foundation

This research has been conducted following ideals of the philosophy of pragmatism (e.g. Dewey, 1938; Wicks & Freeman, 1998; Shields, 2003; Friedrichs & Kratochvil, 2009; Goldkuhl, 2012b). This means a close linkage between empirical work and conceptual development and an emphasis on the practical application of knowledge. Developed knowledge is considered in the context of action and practice. The knowledge development is framed as an inquiry process (Dewey, 1938; Cronen, 2001). This means a movement from a problematic situation to a settled situation. The inquiry purpose and focus are founded in the formulation of what is considered as problematic in a situation. In this case, this has been articulated through background description (in Section 1.1) and the purpose formulation (in Section 1.2). This inquiry is driven by a quest for a suitable conceptualization of different value types in e-

government. The validity claim of a contributed conceptualization like this is not a truth claim. A clarification and a differentiation of value types are *not* a matter of *truth*. However, issues of *descriptive adequacy* and *correspondence* need to be addressed. Not every conceptualization will work. From a pragmatist stance, validity claims of *applicability* and *usefulness* can be raised concerning a conceptualization like the one presented. This means questions like: Can different values be identified following a proposed value conceptualization? Is the value conceptualization possible to apply when studying egov values? Can different values be characterized in a meaningful way following the value conceptualization? Is a resulting value classification useful for reasoning and resolution?

2.2 Research process

The proposed value conceptualization has emerged through a series of research endeavors. It is also an integrated part of larger research accomplishments (see Figure 1 for an overview). During several years, the governance and use of multi-organizational digital artifacts in the public sector have been studied. There has been a continual alternation between empirical studies and theorizing. A research team has conducted several case studies on such multi-organizational egov artifacts. In the first stage, eight parallel qualitative case studies were conducted. We studied the following digital artifacts: a national health portal, a national business link portal, digital post from public agencies to citizens, e-prescription (information exchange from medical prescribers to pharmacies), information exchange for social welfare allowances, a common system for study results within higher education, platforms for municipal e-services (for applications from citizens), joint system for admission to upper secondary schools in one county. See Goldkuhl et al. (2014) and Goldkuhl & Röstlinger (2015) for research results and more details of the research approach.
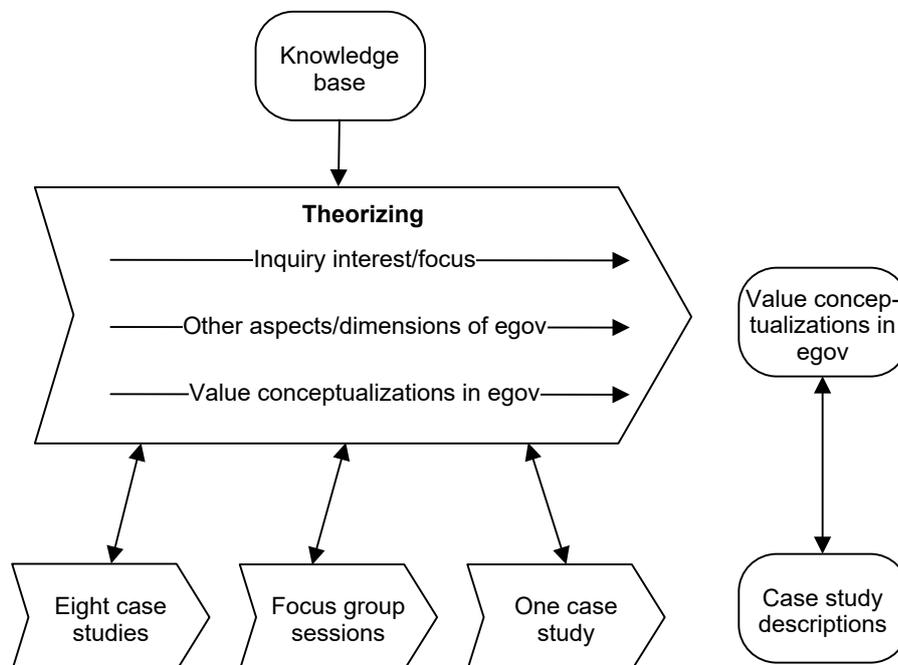

Figure 1: Research approach

As said, a study of normative matters (values and goals) was one sub-study among several other studied aspects. Such other studied aspects of multi-organizational e-government include laws and regulations, digital work processes, digital services, stakeholder roles, information resources and workpractice language, digital interactivity, and digital interoperability. The research focus in this paper is on value types in e-government but, as said, there exists a much broader set of aspects empirically and conceptually explored.

After and based on these eight case studies, parts of the research team started to develop a prescriptive guide for evaluation and governance of multi-organizational egov artifacts. In this second stage of the research, the conceptual and prescriptive development was supported by close interaction with qualified practitioners. This included persons working on a national policy level and persons working with digital governance in specific areas of the public sector. The proposed guide for evaluation and governance (including different conceptualizations) was assessed in focus group sessions with these practitioners. This included discussions on value types.

In the third stage of research, the proposed guide was applied in a diagnostic case study on the digitalization of medical certificates. This implied a thorough test of the conceptual and methodological aspects of the proposed guide. This included application and continual appropriation of concepts and description tools.

Conceptualizations of value types have emerged continually through these different research stages in an inductive manner. The conceptual development has been empirically grounded (Corbin & Strauss, 2008). There have existed several versions of value conceptualizations that have been continually refined through conceptual reflection and empirical application. In this paper, the latest version is presented.

In the theorizing part of the research, we have of course studied and reviewed existing literature on focused topics. The emergent value conceptualizations have been assessed in relation to extant literature and modified as a result of this theoretical matching (Goldkuhl & Cronholm, 2010). The empirical parts (case studies) have employed the following methods for collection/generation of data: interviewing/workshop sessions, document studies and digital artifact studies (Goldkuhl, 2019a). A qualitative research approach has been chosen following our pragmatist research stance. This means that knowledge has been developed through a continual alternation between closeness to empirical situations and abstracted theorizing with analyses and reflections on data, extant theory and contributed knowledge in progress. As said, this has included a continual refinement of inquiry purpose and focus and a situational application and appropriation of suggested conceptualizations. Our research aims and the complex character of the studied multi-organizational egov settings necessitated a deep and close investigation of these phenomena; i.e. a qualitative research approach has been preferred.

2.3   Case study: digitalization of medical certificates

The last conducted case study comprised an empirical study and evaluation of the digitalization of medical certificates. We studied digital artifacts related to doctors' issuing of medical certificates and the transfer of those certificates to patients, their employers and the Social Insurance Agency (SIA), that manages sickness benefit cases. A medical certificate, issued by a doctor, is needed by citizens/employees to prove a legitimate sickness leave to the employer and SIA. There exist several related digital artifacts in this digital landscape of medical certificates and sickness manage-

ment. DigCert is a digital support for issuing, storage and transfer of certificates. MyCert is a module in the national health portal where each citizen/patient can manage his/her medical certificates. There exist several artifacts at SIA; one e-service for patients' submission of sickness benefit applications and an internal case handling system for sickness benefits. Examples from this case study are given in Sections 4 and 5 below in order to illustrate the proposed value conceptualizations. The case study has also been used for other research/publication purposes (Goldkuhl, 2019b).

3   Value frameworks in e-government – related work

There exist different views of how to conceive of values in public administration. Bannister & Connolly (2014, p 120) define a value to be explicitly linked to acting: "a value will be defined as a mode of behaviour, either a way of doing things or an attribute of a way of doing things, that is held to be right". Rose et al. (2015 p 532) adopt a broader view: "Value represents the 'worth, utility, or importance of an entity … that which is 'considered a good (worthy of striving after) without further justification'", with references to Esteves & Joseph (2008) and Sikula (1973). They further state: "Values refer to desirable goals, which people strive to attain" (ibid). Values will, in the following, not be limited to acting as proposed by Bannister & Connolly (2014). The notion of value is here defined as *something considered as valuable* (cf. Alford & Hughes, 2008). This "something" can be any entity or process (*value object*) that is found desirable in some specific state (*value attribute*); (cf. Henkel et al., 2007). This means that it must be *someone* (a stakeholder) who judges something as valuable and thus also an *act of judgment*. This means also that when someone states that "this is a value", such a statement is an abbreviation of "this is considered as valuable by someone".

Rose et al. (2015) have presented a value framework for e-government. They have summarized and synthesized previous research on values in public administration and e-government as e.g. Jørgensen & Bozeman (2007) and Persson & Goldkuhl (2010). Their synthesis, which seems to be a further development of a previously presented framework (Rose & Persson, 2012), encompasses four areas of ideals and values; what they call "value positions". These four value positions/ideals are:

- Professionalism ideal, covering key representative values such as durability, equity, legality, and accountability.

- Efficiency ideal, covering key representative values such as cost reduction, productivity, and performance.

- Service ideal covering key representative values such as public service, citizen orientation, and service level and quality.

- Engagement ideal, covering key representative values such as public service, citizen orientation, and service level and quality.

Rose et al. (2015) position these four value positions in relation to different public administration paradigms. Professionalism ideal is related to bureaucracy and efficiency ideal is related to New Public Management; see Persson & Goldkuhl (2010) for a comparison of these administrative paradigms in relation to e-government. Service ideal is related to Public Value Management (Moore, 1994; Alford & Hughes,

2008). Engagement ideal is related to New Public Service (Denhardt & Denhardt, 2011).

Bannister & Connolly (2014) have investigated different literature sources in order to reconstruct and clarify the concept of public value in relation to e-government. One result from their literature investigation is a conceptualization of public values adapted to e-government. This typology with three main value types is a modification of a value taxonomy developed by Hood (1991). The three value types are:

- Duty oriented values (e.g. accountability to government, compliance with the law)

- Service oriented values (e.g. service to the citizen, efficiency, transparency

- Socially oriented values (e.g. equality of treatment, protecting citizen privacy)

Twizeyimana & Andersson (2019) have conducted a literature review on values in e-government. As a result of this investigation, they have created a value conceptualization consisting of three main value groups and some sub-groups of these:

- Improved Public Services

- Improved Administration (with the sub-groups: improved administrative efficiency; open government capabilities; improved ethical behavior and professionalism)

- Improved Social Value (with the sub-groups: improved trust and confidence in government; social value and well-being)

Three value conceptualizations have briefly been described above. Many others exist. These three value conceptualizations differ in certain respects. They cover, of course, similar sets of values but the clustering of different values into main value types differs. There is not one right value conceptualization since we cannot talk about the truth of such a value conceptualization. All three value conceptualizations originate from the study of literature in public administration and e-government. Rose et al. (2015) have, however, applied it in empirical studies of e-government and the application of values. Their developed value conceptualization has obviously been considered useful as a basis for their empirical inquiry.

In the next two sections, value conceptualizations will be presented that have emerged through the empirical studies as described in Section 2. There are resemblances with and differences to the three value conceptualizations presented just above in this Section. In Section 6, resemblances and differences will be discussed.

4   Two main types of public values and nine sub-types

In order to situate values of egov artifacts, we need to clarify the value landscape of public administration. Digital artifacts within public administration should contribute to the achievement of different public values. A value conceptualization of public administration emerged through the different case studies conducted (Section 2). This was not restricted to values directly related to the digitalization of the public sector. We adopted a broader view; *public values* generally speaking but considered as relevant in the context of digitalization. In the different case studies, we made characterizations of the values that were identified through data collection. Gradually, a useful value conceptualization was developed. Initially, there was one group of four value

types related to public administration. Later this single group of values was divided into two main types of public values. A differentiation was made into:

- Public administration values

- Societal values

This differentiation was based on a clear means-to-end logic. Considered value properties of public administration should contribute to broader societal values, i.e. values related to citizens and other societal desires. The different public administration value types and their meanings are described in table 1. The different societal value types and their meanings are described in table 2.

Table 1: Public administration values

Value type	Explanation
Efficacious public administration	The public administration should perform and deliver what it is set up and intended to do. Its practices should be legally compliant and fulfilling various governmental tasks (authority exercise, production of public resources and services to collectives and individuals) in a spirit of impartiality and adaptive responsiveness.
Informed and transparent public administration	The public administration should develop and sustain a competency that is well-informed based on external and internal knowledge sources. It should be open and receptive to influences from citizens and other sources. The public administration and its information and procedures should, in reasonable ways, be open and accessible to citizens as well as to other stakeholders. An ideal is a free flow of information based on proper documentation and preservation throughout history. This comprises requirements that information should be complete/comprehensive, accurate, clear/understandable, easily accessible and concerted/coherent.
Safe public administration	The public administration should be safe and secure. The administration's operations must be robust and resilient to inaccuracies and shortcomings. This includes, among other things, quality assurance of information (i.e. that information should withstand distortions) and protection of information (i.e. information should not be disclosed to unauthorized persons).
Efficient public administration	The public administration should apply efficient work processes (i.e. with the efficiency of cost, time and other resources). There exists an appropriate distribution of tasks between different public organizations. Basically, it is a matter of good housekeeping of the resources of the public.
Trusted public administration	The public administration needs to be trustworthy, which means that the citizens have confidence in the administration. It is important for the public administration that it is perceived as legitimate and reliable in the eyes of citizens. It is also important for society as a whole that there exists such a trust base for citizens to act from.

The five public administration value types can be considered as *foundational* for the exercise of public power. Each of the five public administration value types repre-

sents some specific *aspect* of the administration. The first one (efficaciousness) is often taken for granted in policy descriptions; that the public administration does what it is intended to do. However, this needs to be stated explicitly together with the other basic values. The four first in table 1 represent the creation of properties that the administration may have some direct control of. The fifth (trust) is rather something that the public administration deserve dependent on the realization of other stated values; i.e. when public administration appears as efficacious, competent and transparent, safe and efficient, it is considered as trustworthy and legitimate in the eyes of the citizens (Twizeyimana & Andersson, 2019). All value types can be related to digitalization. Two of them are explicitly related to information resources. These are the two, often contrary values of free flow of information (as part of competency/transparency) and information protection (as part of safety); see Hellberg & Grönlund (2013).

Table 2: Societal values

Value type	Explanation
Citizens' capacity for action	Citizens must be able to exercise their rights and obligations and other desires. Citizens need to be provided with the necessary public permits for their desired activities. It is desirable to facilitate for citizens to exercise their legal obligations.
Citizens' knowledgeability	A well-informed and knowledgeable citizen is an important societal goal.
Simplicity for citizens	Citizens' interaction with the public administration should be performed in a simplified, flexible and effective manner. Simplicity in the everyday life of the citizen is an important goal.
Overall societal values	Desirable conditions and characteristics of society at large (the population as a whole, infrastructure, environment etc.).

The societal values are divided into four value types (Table 2). The three first are directly related to the citizens. The fourth covers overall values that go beyond individual citizens.

As an empirical illustration, Tables 3 and 4 contain values identified in the case study on digitalization of medical certificates; introduced in Section 2.3 above. Table 3 contains public administration values and Table 4 contains societal values. The identification of these values in the case study was done mainly through interviewing and document studies. First, values were identified through an open and inductive process. In a later stage, different value types of the value conceptualization were used as a "deductive" check list to search for further values. All these identified values in the case study were easily classifiable following the value conceptualization. The identified values give a rich picture of the value landscape of medical certificates.

Table 3: Public administration values: Case study on digital medical certificates

Value type	Explanation
Efficacious public administration	1. Effective care and rehabilitation of persons on sick leave 2. Good ability of doctors to issue quality assured and uniform medical certificates 3. Accurate and uniform medical assessment of patients through medical certificates 4. Correct and uniform sickness benefit case handling
Informed and transparent public administration	5. Free flow of certified medical information to adequate target groups 6. Clarity of information for each target group and use situation
Safe public administration	7. High security in medical assessment 8. High security in care/rehabilitation 9. High security in handling medical information 10. High security in sickness benefit case handling 11. Maintained patient privacy
Efficient public administration	12. Low/adequate costs for sick leave 13. Efficient sick leave processes 14. Efficient management of medical assessments (medical certificates) 15. Efficient handling of sickness benefit cases
Trusted public administration	16. High level of trust among citizens for medical assessments 17. High level of trust among citizens for health care/rehabilitation 18.High level of trust among citizens for the management of medical certificates 19. High level of confidence among citizens for sickness benefit case handling

Table 4: Societal values: Case study on digital medical certificates

Value type	Explanation
Citizens' capacity for action	20. Good management of own health situation at the individual level
Citizens' knowledgeability	21. The individual is knowledgeable about his/her illness (causes, progression), treatment and sick leave
Simplicity for citizens	22. Easy for patients to manage medical certificates
Overall societal values	23. Early return to work after sick leave 24. Good health of the population

5 Value roles of the digital artifact

All public values of the case study (Table 3 and 4) can be generally related to the digitalization of medical certificates. They can be used for value-directed governance of digital artifacts. Different digital artifacts and their uses should support the achievement of stated values. However, how this is done cannot be seen simply from the listing of these different values above. A means-to-end logic between the digital artifacts and the different values concerning sickness leave and medical certificates needs to be clarified.

I need to discuss the value roles of digital artifacts in a general way before examples can be given from the case study. It is natural to see a digital artifact as an instrument (a means) for the achievement of desired values. This is the role of the digital artifact as a *value contributor*. However, the conducted case studies revealed that it is a too restricted view of digital artifacts to see them as only value contributors. In many situations, digital artifacts enact different values. They are *value carriers*. Different values are inscribed in the artifacts through the design of them. This can be done through the designed digital functionality or the types of digital information that they contain. This discussion will be furthered below at the end of this section

The performed knowledge development has led to the articulation of a fundamental and simple means-to-end logic of digitalization values with a differentiation into three value types:

- Artifact values

- Use values

- Consequential values

These value types are explained and related in Figure 2, which is a principal value diagram. This principal value model can function as a template for analysis and clarification of different digitalization values. An arrow in such a value diagram depict a means-to-end relationship.

A simple example from the medical certificate case showing such means-to-end logic can be found in Figure 3. Most of the identified values from the initial analysis of public administration values (Table 2) and societal values (Table 3) are not directly related to digital artifacts and digital use. Most of them can be seen as overall values and as such "consequential values" when using the terminology introduced in Figure 2. There exist, however, examples of use values. One such example is "The individual is knowledgeable about his/her illness (causes, progression), treatment and sick leave" (21). This use value of knowledgeability is depicted in Figure 3 as a link between the artifact value of showing certificates (29) and the consequential value of good management of own health (2).
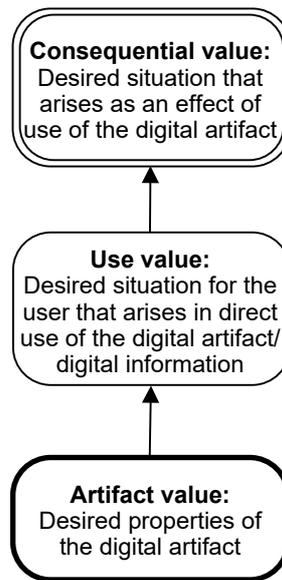
Figure 2: Different value types related to the digital artifact and its use in a means-to-end logic
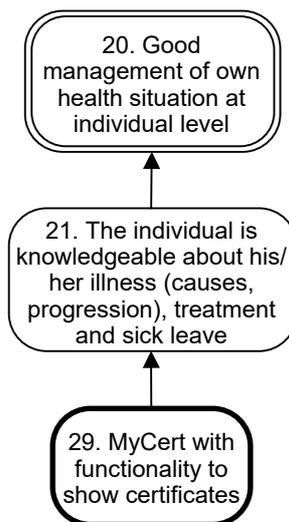

Figure 3: Value diagram on the patient's knowledge about the illness, treatment and sick leave

Based on the value conceptualization (with these three value types in a means-to-end logic), further values (such as use values and artifact values) can be detected. In the case study, an investigation was performed on the different digital artifacts. Use values (Table 5) and artifact values were identified (Table 6). The way to detect such use values and artifact values was through a close investigation of artifact properties. This was mainly performed through inspection and exploration of the studied digital artifacts DigCert and MyCert (Nielsen, 1993; Goldkuhl, 2019a). This was empirically complemented by interviews and document studies. The lists of public administration values (Table 2) and societal values (Table 3) were important drivers in this investiga-

tion giving focus on what values to search for. The general questions driving this inquiry were: *How are the digital artifacts and their uses contributing to these overall values? What digital properties and use situations contribute to these overall values?* It should, however, be noted that the close investigation of the digital artifacts was not only conducted with such a positive value focus. We also applied a critical eye looking for any deficiencies in the digital artifacts that might obstruct value fulfillment (Goldkuhl, 2019b).

Table 5: Use values: Case study on digital medical certificates

Use values
37. Doctors can issue certificates in a safe manner
38. Doctors can set the appropriate period of sick leave
39. The patient can adapt medical certificates to employers
40. Employers can obtain medical certificates with proven sick leave
41. Doctors can submit medical certificates to the Social Insurance Agency
42. The patient can submit medical certificates to the Social Insurance Agency

Table 6: Values of digital artifact properties: Case study on digital medical certificates

Values of digital artifact properties
25. DigCert with support for completion of medical certificates
26. Digital medical certificates carefully and fully completed
27. DigCert capable of informing/suggesting adequate sick leave periods for selected diagnoses
28. Digital medical certificates with adequate and uniform sick leave periods
29. MyCert with functionality to show certificates
30. MyCert with provided filtering functionality for medical certificates
31. DigCert can register consent for distribution of certificates
32. DigCert provides dispatch functionality for issued certificates
33. MyCert provides dispatch functionality for issued certificates
34. SIA e-service for sickness benefits provides retrieval functionality for issued certificates
35. Efficient digital transfer of medical certificates to the Social Insurance Agency
36. Medical certificates in digital format at the Social Insurance Agency

A more complex value diagram from the case study is shown in figure 4. This diagram depicts values related to the doctors' issuing of medical certificates. The diagram shows two aspects of certificate issuing: a) a general quality assurance of medi-

cal certificates and b) medical certificates with adequate and uniform sick leave periods. Both these aspects are described as means-to-ends in a series of stages. From 1) *digital functionality* as a support to 2) *user action* leading to 3) *quality in digital information* that contributes to 4) *desired overall consequential states*. This follows a human-artifact interaction logic that also comprises an interactive value logic.
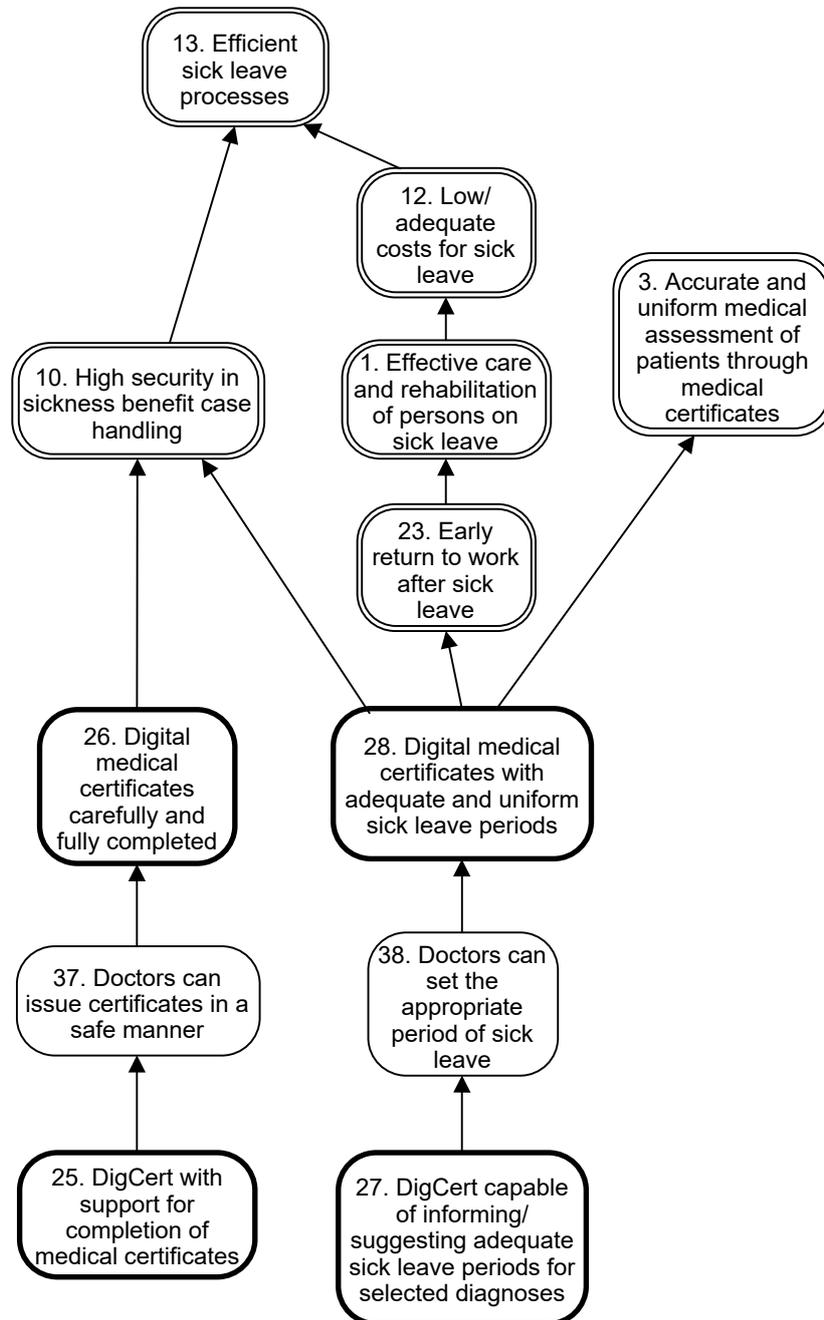

Figure 4: Value diagram on the doctor's issuing of a medical certificate

All stated artifact values (Table 6) should be seen as value contributors. As such, they contribute to desired digital use situations and to broader administration and societal value states. However, some desired digital properties should also be seen as value carriers. Important public values are expressed directly in the inscribed behavior of the digital artifacts. Two such examples can be seen in the list of digital property values (Table 6): The development of the different digital artifacts was governed by an important political goal of being restrictive concerning sick leave periods. The sick leave benefits were considered a great economic burden to society and it was also questioned if long sick leave periods were beneficial for rehabilitation. A digital decision support was developed by the National Board of Health and Welfare which consisted of proposed standardized sick leave periods for different medical diagnoses. This digital decision support became an integrated part of DigCert (see value 27 in Table 6 and Figure 4). This digital support should be seen as a carrier of these enounced political values (see values 23, 1, and 12 in Figure 4).

Another example of the digital artifact as a value carrier is the value "MyCert with provided filtering functionality for medical certificates" (30); see Table 6. In the law, it is stated that a patient/employee does not need to reveal the kind of illness when proving sick leave to the employer. The idea is to protect citizen privacy. This value is legally codified in a special law on sick pay. The digital artifact MyCert is provided with functionality to give the patient opportunities to manage his/her medical certificates. The provided digital functionality contains an option to filter diagnosis information in the certificate in order to sustain the patient's privacy in relation to the employer. MyCert is thus a carrier of the value of sustained personal privacy.

6 Discussion and conclusions

The development of the presented value conceptualizations started from a critical analysis of existing egov values in national digital policies (eGovernment Delegation, 2011); see section 1.1. The three values of simplicity, transparency, and efficiency were questioned to be far too narrow in relation to the active governance and development of e-government in Sweden. These three value types can be found in our value conceptualization in Section 4. Transparency corresponds to "informed and transparent public administration" (Table 1), which thus is broader than the original policy statement. Efficiency corresponds to "efficient public administration" (Table 1). Simplicity is not considered as a public administration value as those to other values. It corresponds to the societal value "simplicity for citizens" (Table 2). As can be seen from Section 4 and Tables 1 and 2, several other value types have been distinguished through this inquiry besides the three enounced values in the national digital policy. These additional value types are efficaciousness, safety, and trust in public administration and citizen knowledgeability and action capacity, and also overall societal values.

The value types in Section 4 were initially developed as part of empirical inquiries. As described in Section 2.2, they were results from an inductive-pragmatic approach. The category generation was of course influenced by the general pre-understanding in the research team of e-government and digital policies. However, these value types have later in the process also been confronted, through a theoretical matching (Goldkuhl & Cronholm, 2010), with value conceptualizations in extant literature. This theoretical matching resulted in some modifications of the value types.

We had initially formulated a value type as "transparent public administration". After reading and reflecting this was broadened to "informed and transparent public administration". We realized that the previous formulation and explanation were too narrow. In the explanation part, we added aspects of competency building and being receptive to citizens and other stakeholders. The need to be competent is considered as one key element in the professional ideal as stated by Rose et al. (2015). The need to be receptive is considered as vital in the engagement ideal (ibid) and it corresponds also well to citizen-centricity in the service ideal (ibid). We also made some addition to the explanation of value type "efficacious public administration". We discovered that some parts that had been implicit should rather be formulated explicitly. These are aspects of legality, impartiality, and responsiveness. The aspects of legality and impartiality can be found in the professionalism ideal and in the service ideal (ibid). Responsiveness corresponds to citizen-centric values in the service ideal and the engagement ideal (ibid).

In the following discussion, further links will be explicated between the presented value conceptualization in Section 4 and the three reviewed value conceptualizations in Section 3. When comparing these different value typologies, it becomes very clear that different principles have been applied for the clustering of basic value types into the larger value groups. "Efficacious public administration" corresponds to duty oriented values in Bannister & Connolly (2014); as "legality" and "accountability to government". It also corresponds to service oriented values; as "service to the citizen" and "responsiveness"; and also to socially oriented values; as "impartiality". "Transparency" is mentioned as a value in the service oriented group, which thus corresponds to one part of our "informed and transparent public administration". Efficiency is mentioned in both duty oriented values and service oriented values. In socially oriented values, one can find "protecting citizens", which is one aspect of "safe public administration". Aspects of trust are not mentioned in the value types of Bannister & Connolly (2014).

A comparison with value groups in Twizeyimana & Andersson (2019) reveals the following: "Efficacious public administration" corresponds to their value groups of "public service" and "ethical behavior and professionalism". "Informed and transparent public administration" corresponds to their value group "open government capabilities". "Efficient public administration" corresponds to their group "administrative efficiency". "Trusted public administration" corresponds to their group "trust and confidence in government". Aspects of "safe public administration" can be found in their groups "ethical behavior and professionalism" and "administrative efficiency". Besides these value groups, they mention also a value group of "social value and well-being". However, there seem to be unclear overlaps between this group and some of their other value groups.

In our value conceptualization, we have two groups of value types, public administration values, and societal values. Between these two groups there exist a clear means-to-end logic. The other value conceptualizations do not make any such differentiation and there does not exist any means-to-end relations. Rose et al. (2015) discuss different types of relationships between value states, as causality (i.e. means-to-end), synergy and competition. However, no such links are generally made between their value groups. The other value conceptualizations have a direct focus on public administration values. Citizen values and other societal values are kept implicit. One

exception is "citizens' well-informedness" (in value group "trust and confidence in government") as stated by Twizeyimana & Andersson (2019, p 176).

As mentioned in Section 3, the development of value conceptualizations differs in relation to applied research approaches. The three other value conceptualizations originate from literature reviews. The value conceptualization of Rose et al. (2015) has later been empirically used. Our value conceptualization emerged initially from empirical studies with an inductively conducted generation and analysis of data (Section 2). Later in the process, the emergent value categories were confronted with extant literature as described above. There is a need in future research to analyze and compare, in more detail, the different categories and their different clustering principles in the different value conceptualizations. The validity of our value conceptualization relies on the described combination of 1) inductive empirical generation, 2) empirical application with continual modification and refinement, and 3) matching with other theoretical sources.

In Section 5, three values types were presented with a direct relation to digital artifacts: The three value types of artifact values, use values, and consequential values together with an explicit means-to-end logic between them. The two value roles of the digital artifact (value contributor vs. value carrier) were articulated. The view that digital artifacts are value carriers is harmonious to the structurational model of information technology as expressed by Orlikowski (1992) and Orlikowski & Iacono (2001), and which is inspired by Giddens (1984). In this model, IT artifacts are considered to *embody* institutional elements. One kind of such structurational/institutional element is norms; the others are interpretive schemes and power. The concept of norms, in this model, seems to be mainly equated with rules for directing, legitimizing and sanctioning some organizational conduct. Values are not explicitly theorized in this model but may be included in a broad interpretation of this concept of norms. There are other scholars who are more explicit concerning digital artifacts as value carriers: Friedman & Kahn (2002) talk about "embedded values". So does Weigand (2019) who also uses the phrase "value expression". Cordella & Iannaci (2010) emphasize egov artifacts as carriers of policy values and that this embeddedness of values will have long-lasting effects on organizational practice. They ask for more research based on this value carrier perspective. In Goldkuhl (2016) a digital artifact within egov is considered to be a policy-ingrained IT artifact, which means that it should ideally be a result of thorough analysis of values and regulations in the public administration practice. Empirical examples of such digitally ingrained policy elements are demonstrated. In section 5 above, I have presented some examples from the medical certificate case. I would like to emphasize the importance of more empirical studies with investigations of what value elements are inscribed into digital artifacts in e-government. Such empirical research should have the potential of bringing more nuances to this notion of value embeddedness.

Value conceptualizations, like the ones presented in this paper, may have a potential for detecting and articulating values in evaluation, governance, and design of digital artifacts and digital work in the public sector. As already quoted above in Section 1.2, Flak et al. (2009, p 223) emphasize that "a structured way of defining public sector values will make it easier to design eGovernment projects in a way that makes the value of them easier to assess". Even with a value conceptualization framework like this one, it is important to balance the use of such pre-conceived value categories

with an open and inductive way of inquiring artifacts and practice concerning value realization and impact.

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