THEORETICAL AND PRACTICAL IMPLICATIONS FROM THE USE OF STRUCTURATION THEORY IN PUBLIC SECTOR INFORMATION SYSTEMS RESEARCH

Complete Research

Veenstra, Anne Fleur van, TNO, Van Mourik Broekmanweg 6, 2628 XE Delft, the Netherlands, annefleur.vanveenstra@tno.nl

Melin, Ulf, Linköping University, Department of Management and Engineering, Information Systems, SE-581 83 Linköping, Sweden, ulf.melin@liu.se

Axelsson, Karin, Linköping University, Department of Management and Engineering, Information Systems, SE-581 83 Linköping, Sweden, karin.axelsson@liu.se

Abstract

To gain better understanding of the development, implementation and use of information technology (IT), many scholars in the field of information systems (IS) use structuration theory (ST). However, ST is, so far, more seldom applied to, and reflected upon, in studies of public sector IS to account for (unexpected) outcomes of IT development and implementation. This paper creates an overview of the use of ST in studies on public sector IT in order to identify theoretical and practical implications for the digital public sector. Most (ten out of twelve) papers in this field apply ST to empirical studies, while three papers were found to adapt ST to fit public sector settings, and none were found to critically address ST. While ST as a lens for studying public sector IT was thus seen to have practical usefulness, theoretical usefulness is still underdeveloped regarding theory adaption and contextualization. Based on this study we argue that there is a need to further investigate the risks associated with the transfer to the public sector as it is important to achieve conscious adaptation and use of ST in public sector IS in order to progress with using ST in that context.

Keywords: Structuration Theory, Public Sector, Digital Government, Information Systems.

1 Introduction

Structuration theory (ST) in different versions is widely used within information systems (IS) research to investigate the development, implementation, and use of information technology (IT) in organizations (Jones and Karsten, 2008). ST holds that human actions as well as the social structure shape social phenomena (Giddens, 1979; 1984). Since it originates from the field of sociology, many have later adapted ST to fit the purpose of studies in the field of IS (see, for example, Orlikowski, 1992; and Poole and DeSanctis, 2004). Recently, authors have also started to apply the theory to the field of public sector IS research, to study its implementation to account for intended and unintended outcomes related to electronic government (Basettihalli, Kim, Lee and Noh, 2010; Gil-Garcia et al., 2008; Meneklis and Douligeris, 2010; Puron-Cid, 2013; Veenstra, Janssen and Tan, 2010).

While these studies have generally considered using ST in studies of public sector IT to be insightful and useful, little is known about how ST can further develop research of and insights on the development, implementation, and use of IT in the public sector. We argue that such understanding is important when theories are transferred from one field or application area to another, as well as from general IS to public sector IS studies. There is also a general underestimation of the public sector specificity (in terms of e.g. democracy, governance, citizen relations etc.) (Rosacker & Olson, 2008) and a lack of theoretical foundations (Grönlund & Horan, 2005; Heeks & Bailur, 2007; Yildiz, 2007) within the research field. Therefore, this paper explores the use of ST in studies of public sector IT by analyzing what we have found to be the comprehensive part of publications of this kind. Firstly, we aim to create an overview of how and for which purposes ST has been used in public sector IS research. Secondly, we aim to derive findings from the application of ST to studies of public sector IT to explore the benefits of using this theory within this research field. And thirdly, we aim to identify and formulate implications for the use of ST within this field of research. Altogether this implies that the purpose of this paper is to *analyze and discuss previous work on ST in order to learn for future ST applications in the still emerging public sector IS research field.*

These questions are investigated using a snowballing technique to identify relevant publications. By categorizing the existing studies in the field of public sector IT and subsequently analyzing them, we identify a number of specificities for the use of ST in studies of public sector IT. This may help researchers in this field to decide whether ST is useful for them to deploy in their studies and to develop theoretical foundations for the research field. To allow for deriving implications from the use of ST in studying public sector IT, this paper takes four steps. Firstly, this paper presents the theoretical background of this study: the use of ST in IS research. Secondly, this paper presents the methodology of the analysis of the use of ST in public sector research. Thirdly, it derives and discusses implications and particulars of the use of ST in studies of public sector IT. Finally, conclusions and recommendations for further research are presented.

2 Structuration Theory in IS Research

ST originates from sociology and aims to explain the emergence of social phenomena. Three concepts are central to Giddens' work: *duality of structure*, *actor's knowledgeability*, and *time-space relations* (Hond et al., 2012). The duality of structure refers to structure and agency being mutually constitutive. This means that social structure is reproduced by ongoing human action, while, at the same time, structure enables and constrains human action (Giddens, 1979; 1984). Actors, in Giddens' view, shape phenomena voluntarily, which means that they are knowledgeable about their actions, which they execute according to goals of which they are aware (Giddens, 1984). Time-space relations refer to the notion that social activities are situated in a specific time and space and they cannot be easily disconnected from their context and placed into another situation (Hond et al., 2012).

For analytical purposes, Giddens distinguishes three dimensions of structuration: signification, domination, and legitimation, with corresponding dimensions of interaction: communication, power, and sanctions, which are linked through modalities of, respectively, interpretative schemes, facilities, and norms (Jones & Karsten, 2008). "*Interpretative schemes* are standardized, shared stocks of knowledge that humans draw on to interpret behavior and events, hence achieving meaningful interaction. *Facilities* are the means through which intentions are realized, goals are accomplished, and power is exercised. *Norms* are the rules governing sanctioned or appropriated conduct, and they define the legitimacy of interaction with a setting's moral order." (Orlikowski & Robey, 1991, p. 148, emphasis in original). See Figure 1 for a graphical overview of these concepts.

Even though Giddens hardly refers to technology in his work, ST has become widely used in IS research, with over 300 papers having cited his work (Jones & Karsten, 2008). ST is considered especially useful for explaining *un*expected outcomes of IT implementation (Poole & DeSanctis, 2004; Pozzebon & Pinsonneault, 2005; Meneklis & Douligeris, 2010). Orlikowski (1992), for example, shows how ST can account for differences between the outcomes of an implementation process of IT and the intentions during the design of the technology. Heinze & Hu (2005) even identified a full list of examples of unintended consequences of the development and implementation of different technologies and services within government. Since these unintended consequences can occur both in the existing structure and agency (as a result of public sector IS) as well as in the outcomes of the development and implementation of public sector IT (as a result of structure and agency), ST can be used to investigate either phenomenon.

Besides being used for exploring the influence of ST on IS research, authors have sought to extend the theory to fit studies of technology. Arguably the best known and most widely used adaptations of ST to the field of IS are the *duality of technology* (Orlikowski, 1992) and *Adaptive Structuration Theory* (DeSanctis & Poole, 1994) (AST). Many studies in the field of IS that use ST follow either of those adaptations (Pozzebon & Pinsonneault, 2005).

The duality of technology is conceptualized as follows: "[T]echnology is physically constructed by actors working in a given social context, and technology is socially constructed by actors through the different meanings they attach to it and the various features they emphasize and use. However, it is also the case that once developed and deployed, technology tends to become reified and institutionalized, losing its connection with the human agents that constructed it or gave it meaning, and it appears to be part of the objective, structural properties of the organizations" (Orlikowski, 1992, p. 406). Orlikowski (ibid.) thus sees a time-space discontinuity: "many of the actions that *constitute* the technology are often separated in time and space from the actions that are *constituted by* the technology" (ibid., p. 407, emphasis in original).

AST describes the interplay between IT, social structures, and human interaction (DeSanctis & Poole, 1994, p. 125). AST proposes "a framework for studying variations in organization change that occur as advanced technologies are used" (DeSanctis & Poole, 1994, p. 125). AST investigates the development and implementation of IT through the dimensions of structuration and appropriation of technology. While structuration refers to the process of structure being (re)produced, appropriation refers to faithful or unfaithful use. While both adaptations of ST focus on explaining unintended outcomes, Orlikowski's (1992) work focuses on the difference between design and implementation, while AST (DeSanctis & Poole, 1994) tries to explain differences in between implementations across social structures.

Although many studies within the field of IS apply ST, others have addressed the limitations (cf. Gregson, 1989; Gregory, 1989; Greenhalgh & Stones, 2010; Thompson, 2012). Critique is aimed both at its fundamental concepts and at its empirical use. Based on the use of ST within IS research, discussion is still ongoing on all three central concepts defined by Giddens (duality of structure, actor's knowledgeability, and time-space relations remains). Regarding structure, discussion is on whether there is a possibility for structure to take on any other form (such as a technology) than in

being a trace in the human mind (Poole, 2009; Jones and Karsten, 2009), which would, for instance, imply that technology cannot be seen as structure. Regarding actor's knowledgeability, Thompson (2012) argues that ST downplays more deeply rooted psychological dimensions of the human condition and portrays too voluntaristic a picture of agency. The third concept, time-space, is quite extensively criticized for being underdeveloped in Giddens' work (cf. Gregory, 1989) as, according to these authors, he does not seem to be sensitive enough to the notion that social activities are always routed in a specific context in time and space.

3 Methodology

In this paper we present an overview of studies on public sector IT that use ST in the analysis of studied issues. The first step was to search for studies on public sector IT that use structuration theory. This search was undertaken in three steps. Firstly, a Scopus search was undertaken to identify all papers in the field of IS that use ST. Then, a closer look was given to these papers to see whether they are applied in the public sector or whether they regard public sector IT. Thirdly, using snowballing technique, as mentioned earlier, we again looked at the references of these papers to see whether they can lead us to any other publications, until the set of papers under study was saturated. This way of action has similarities with the literature review process suggested by Webster & Watson (2002); implying search in leading journals as a complement to keyword search in databases, followed by backward reviewing of citations, and then forward search in Web of Science to find other articles citing the already found articles (ibid.).

The second step was to categorize the papers that we identified. Papers within the tradition of ST can be placed into three groups: (1) papers that explore how ST may influence IS and related phenomena; (2) papers that develop IS specific versions of ST, and (3) a group of papers critically addressing the limitations of the theory (Jones & Karsten, 2008). Furthermore, we did not only look at whether a paper would fall into one of these categories, but also what the main influence of ST on IT and related phenomena is (which 'type of issue' is studied, and what are the 'key findings' from the study), how the theory is extended ('extension of theory'), and which limitations to the use of the theory ('limitations of theory') that are identified, if any.

The third step of this study was to carry out analyses on the set of studies that was identified. In this analysis we first followed an author-centric approach (Webster & Watson, 2002), reading each paper thoroughly. We then continued to a concept-centric analysis (ibid.) in order to find interesting patterns of how ST was used in previous studies. This phase can be compared to a conceptual analysis and was inspired by Pollitt (2011, p. 378), who argues that "[e]ven before we use theories to explain things we use concepts and taxonomies to think about them. Our conceptual schemes enable us to describe, sort and classify: in short, to see certain aspects and dimensions as important (and, equally, not to see other aspects)." This is an important methodological statement that has guided the research method and process in this paper.

4 Structuration Theory in Public Sector IS Research

More recently, ST has also been used to study the implementation of public sector IT to account for outcomes of governmental IT projects (see, for example, Gil-Garcia et al., 2008; Basettihalli et al., 2010; Meneklis & Douligeris, 2010). Furthermore, some extensions of ST have been developed to fit the topic under study: public sector IT (see, for example, Senyucel, 2007; Puron-Cid, 2013). Where others (see, for example, Rose, 1998; Jones and Karsten, 2008) aim for a comprehensive overview of papers using ST within IS research, in this section we have tried to look into as many research papers on the use of structuration theory for public sector IT as we could find and categorize them according to Jones and Karsten's (2008) categories.

The first category encompasses studies exploring the influence of ST on the development, implementation, and use of IS and related phenomena in the public sector. We found ten papers that have this objective: Devadoss, Pan & Huang, (2002); Senyucel (2002); Heinze & Hu (2005); Parvez (2006a; 2006b); Gil-Garcia et al. (2008); Basettihalli et al. (2010); Meneklis & Douligeris (2010); Veenstra, Janssen & Tan (2010); and Hossain et al. (2011). Although some of these papers develop a framework for empirical reasons (cf. Devadoss, Pan & Huang, 2002; Heinze & Hu, 2005) their central objective is to investigate outcomes of development or implementation of public sector IT, rather than extend ST by developing an adaptation of the theory (which is the central objective of Jones & Karsten's (2008) second category). The second category of papers (Jones & Karsten, 2008) aims to extend ST to fit the topic of study: public sector information systems. Two papers were found that have this objective: Senyucel, 2007; and Puron-Cid (2013). An overview of the main findings, aspects and characteristics of the use of ST in these papers is presented in Tables 1 and 2, in the next section.

While we found examples of the first two categories, our search did not identify any papers that primarily address the limitations of ST based on public sector IS research – Jones & Karsten's (2008) third category of papers on ST. Still in some papers some critical views are presented on the use of ST. Among those papers, is Devadoss et al. (2002), who conclude that ST should not be treated as a rigid methodology, but as a "sophisticated approach with which to explore the rich diversity of the development and use of information systems in organizations" (ibid, p. 268).

5 Analysis, Findings and Discussion

From the overview in the previous section it appeared that papers were identified for two out of three of Jones & Karsten's (2008) categories. This section proceeds beyond categorization of the papers to an analysis of the implications from the use of ST in public sector IS, identifying key findings from these studies, to the implications on ST based on studies carried out in the field of public sector IS, and to a discussion of the findings.

5.1 Key Findings Based on the Use of ST

The first part of the analysis is concerned with the benefits of using ST to studies of public sector IT and related phenomena. To identify those benefits, we looked at all papers to identify the type of issue under study, the extension of ST they use in their studies, as well as the key findings (see Table 1).

	Topic under study	Extension of ST used	Key findings on the topic under study
Devadoss et al. (2002)	Implementation of an e-procurement system in Singapore to identify factors determining e-government development.	Giddens (1982); Orlikowski & Robey (1991)	Cooperation between different actors and organizations is important for the transition to e-government; three layers influencing e-government initiatives are identified: e-government structure, developer knowledge and user participation.
Senyucel (2002)	The influence of the IS function on the organisational change taking place in a public organisation in connection with the drive for modernising government through the adoption of e-government services.	Giddens (1984); Duality of structure (Orlikowksi, 1992)	Increased customer/citizen demands for faster and more effective public services will realize e-government; e-government is expected to change many traditional structures of local authorities.

Heinze & Hu (2005)	An identification of unintended consequences as a result of developments in public sector IS.	Giddens (1984); Duality of structure (Orlikowksi, 1992)	The relationship between government and citizens is shaped and mediated by IT, altering the structural properties of the relationship; unintended consequences of e-government for citizens are related to privacy and security and an enlarged a 'digital divide'.
Parvez (2006a)	Study of e-democracy in local government.	Giddens (1984); Duality of structure (Orlikowksi, 1992)	IS supported the reproduction of established governance practices in a gradual way.
Parvez (2006b)	Developing a framework for examining e-democracy, tying together the technology-shaping and the technology-use process, that both shape the emergent role of e-democracy.	Giddens (1984); Orlikowski (1992; 2000)	Eleven key social structures and agency issues need to be explored by research for a deeper understanding of how the role of e-democracy is enacted and its impacts moderated in the democratic process.
Gil-Garcia et al. (2008)	The role of comprehensive prototyping in IT development and implementation.	Giddens (1984)	Comprehensive prototyping can produce knowledge and shared understandings among participants during the development phase.
Basettihalli et al. (2010)	Factors that emerge out of the interplay of structure and human interactions responsible for successful implementation of e-government projects.	Giddens (1984)	Critical learning in interactions between institutional elements and human actors facilitate or impede e-government implementation.
Meneklis & Douligeris (2010)	Identification of architectural principles for the design of public sector IS.	Giddens (1984)	Include more than the organizational aspects of the environment of the system, also other aspects influence the architectural choices made by the implementers.
Veenstra et al. (2010)	Factors influencing transformational government.	Giddens (1984); AST (DeSanctis & Poole, 1994)	
Hossain et al. (2011)	Impact of organizational assimilation of e-government IS.	Giddens (1984); Duality of structure (Orlikowksi, 1992)	The assimilation of e-government IS has a clear impact on value creation.
Senyucel (2007)	Application of the "active agents" framework, which builds on ST to understand mutual relationships between the IS function providers and users in a public sector case.	Giddens (1984)	A changing relationship between users and providers of information services in delivering e-government.
Puron-Cid (2013)	Uneven adoption of technology by different agencies demands the incorporation of multidisciplinary aspects into the ST framework.	Giddens (1979)	Only a subset of formal practices prescribed for systems and policy was effectively adopted while new informal practices were enacted. Among all, practices of collaboration, knowledge and trust were the most critical practices in the case.

Table 1. Type of issues under study, extensions of ST used, and key findings in papers on public sector IS.

The generic topic under study in all papers identified use ST to investigate the influence of public sector IS on organizational change and transformation. Since ST can be used to study both the forces (such as existing structure and agency) shaping the (un)intended outcomes of public sector IT implementation and the effects the implementation of IT on existing public institutions and agency, we investigated which of the two processes of structuration they address. We found that five papers (Devadoss et al., 2002; Parvez, 2006b; Senyucel, 2007; Gil-Garcia et al., 2008; Basettihalli et al., 2010) study the impact of existing structure and agency on public sector IT projects. Three papers (Senyucel, 2002; Heinze & Hu, 2005; Hossain et al., 2011) investigate the impact of public sector IT on existing structure and agency. Four papers (Parvez, 2006a; Meneklis & Douligeris, 2010; Veenstra et al., 2010; Puron-Cid, 2013) investigate both processes of structuration. Furthermore, a number of studies use ST to study specific phenomena within the research field, such as e-democracy (Parvez, 2006a; 2006b), prototyping (Gil-Garcia et al., 2008), and architectural principles (Meneklis & Douligeris, 2010). This implies that the theory can be applied to a range of topics in the research field.

All of these papers find ST to be a useful lens for studying the topic of the development and implementation of public sector IS. Furthermore, all papers refer to and build on the concepts of Giddens (1979, 1982; 1984). Some studies also use a specific extension of ST. While in the field of IS two extensions of ST (duality of technology and AST) were found to be widely used (Pozzebon & Pinsonneault, 2005), studies public sector IT more often build on the duality of technology. Five papers (Senyucel, 2007; Gil-Garcia et al., 2008; Meneklis & Douligeris, 2010; Basettihalli et al., 2010; Puron-Cid, 2013) were found to only use Giddens' work, five papers (Senyucel, 2002; Heinze & Hu, 2005; Parvez, 2006a; 2006b; Hossain et al., 2011) also use Orlikowski's work on the duality of technology (Orlikowski, 1992), and two papers were found to another extension of ST. Devadoss et al. use Orlikowski & Robey (1991) and Veenstra et al. (2010) was the only paper found that uses AST. One reason may be that studies in public sector IT often involve single case studies rather than comparative studies, while AST is especially useful to study varying outcomes IT implementations.

The findings from the studies suggest five general directions. The first direction suggests that ST is useful for explaining the need for gaining shared understandings in collaborations of different actors and organizations, for example for the transition to e-government (Devadoss et al., 2002; Senyucel, 2007) and in gaining shared understandings for the implementation of new technology (Gil-Garcia et al., 2008). The second direction suggests the changing nature of the relationship between government and citizens as a result of the implementation of technology (Senyucel, 2002; Heinze & Hu, 2005; Basettihalli et al., 2010). The third direction identifies unintended consequences from the development and implementation of IS in the public sector (Heinze & Hu, 2005; Veenstra et al., 2010). The fourth direction suggests the reinforcement of existing institutions (Parvez, 2006a; Veenstra et al., 2010). The fifth direction suggests that ST is used for identification of a wider range of factors that influence the outcomes of change as a result of development and implementation of public sector IT (Devadoss et al., 2002; Meneklis & Douligeris, 2010; Hossain et al. 2011; Puron-Cid, 2007).

5.2 Implications for the Use of ST within the Public Sector IT

The second part of the analysis concerns the conclusions that can be drawn for the use of ST in the field of public sector IS. For this, we identified the key findings from the use of ST in a specific study, and we looked at whether the papers in our overview created a specific extension of ST adapted to public sector IS. Furthermore, even though no papers were found that primarily have the purpose of critically addressing ST, we did look at which limitations the papers we found suggest. An overview of these findings is presented in Table 2.

	Key findings on the use of ST	Adaptation of ST	Limitations of theory
Devadoss et al.(2002)	The use of ST has made it easy to identify factors influencing the transition to e-government.	The need for adaptations is discussed (as ST should not be treated as a rigid methodology).	ST is not a rigid methodology, but an approach for exploring different outcomes of development and use of IS in organizations. Therefore, caution in using ST is argued for.
Senyucel (2002)	ST makes it a feasible task to investigate how patterns of interaction lead to emergence of a new organization by focusing on the dynamics by which organisations are changed and reproduced.	No adaptation of ST mentioned.	Not discussed
Heinze & Hu (2005)	ST offers an exploration of the complex interactions between the elements that shape the relations between government, citizens and information technology;	No adaptation of ST mentioned.	Not discussed
Parvez (2006a)	Demonstrates the utilization of ST for of categorising social structures into institutional and IT mediation structures that influence how actors appropriate e-democracy.	No adaptation of ST mentioned.	Not discussed
Parvez (2006b)	Identifies key social structures and agency issues that enact e-democracy.	No adaptation of ST mentioned.	Not discussed
Gil-Garcia et al. (2008)	Use of ST to better understand the process of consensus building.	No adaptation of ST mentioned.	Not discussed
Basettihalli et al. (2010)	ST is useful to recognize the association of reciprocal interrelationships among several factors in the implementation process.	No adaptation of ST mentioned.	Not discussed
Meneklis & Dougleris (2010)	ST allows for explaining the undercurrent processes of the evolution concerning e-government initiatives and their environment.	No adaptation of ST mentioned.	ST can be even further extended with insights from the works of other structurationists such as Pierre Bourdieu, whose work on a theory of practice (Bourdieu, 1977) is considerably under-referenced in similar studies.
Veenstra et al. (2010)	ST allows insight into (un)intended outcomes of transformational government development and implementation; domination is a main process of structuration.	No adaptation of ST mentioned.	Limitations of ST to use in empirical research.
Hossain et al. (2011)	Conceptualizes the different notions of IS in organizations using ST and assimilation literature.	No adaptation of ST mentioned.	Not discussed
Senyucel (2007)	Deeper understanding of the individual actors (users and providers) and structural dimensions of the phenomena is needed in local e-government.	Introduces the "active agents" framework as a tool to operationalize ST.	"Active agents" framework stems from ST and it helps to sensitise and map the roles of agents (users and providers) and their interactions.

Puron-Cid (2013)	Informal structuring strongly determines success; domination is a main process of structuration.	Interdisciplinary structuration theory (IST) includes social structures from other domains to gain a better understanding of the interacting disciplines.	Lack of interdisciplinarity in traditional ST and extensions of ST may not account for failure of e-government projects.

Table 2. Key findings on the use of ST in, adaptations of ST for, and limitations of ST in papers on public sector IS.

All papers included in our analysis that ST is a useful lens to study public sector IT development and implementation, for identifying and categorizing forces, based on structure and agency, that influence the development and implementation of public sector IT. Furthermore, some studies (cf. Heinze & Hu, 2005; Veenstra et al., 2010) also point at its use for identification of unintended outcomes or consequences. While no study claims to focus exclusively on either aspect (structure or agency) of the process of structuration, some papers were found to either emphasize the influence of agency (cf. Devadoss et al., 2002; Senyucel, 2007) or social structure (cf. Hossain et al., 2011, Puron-Cid, 2013). While many studies in the field of IS focus on agency as a strong mode of structuration (cf. Orlikowski, 1992), specifically for the public sector, Veenstra et al. (2010) and Puron-Cid (2013) point out that domination appears to be a stronger mode of structuration. This appears in line with the findings from Parvez (2006a) and Veenstra et al. (2010) who argue that ST often reinforces the current institutions and structure.

Except for Devadoss et al. (2002) who argue the need for an adaptation of ST, no mention of an adaptation is made in the papers that were categorized as using ST to study influences on public sector IT. In the category of papers adapting ST, Senyucel (2007) points at the need for including other mechanisms of agency to operationalize ST, while Puron-Cid (2013) argues for the need to include social structures from other domains and creating an interdisciplinary extension of ST. While no papers were identified that primarily aim to critically address ST, some papers discuss limitations of the theory. Devadoss et al. (2002) call for caution in using ST, without pointing at how it should be used, Meneklis & Douligeris (2010) argue for including aspects of ST based on the work of other structurationalists than Giddens, and Veenstra et al. (2010) mention the empirical limitations of using ST. Furthermore, both papers proposing an adaptation of ST point at limitations of ST, that they propose to overcome: Senyucel (2007) by including 'active agents' as a means to sensitize and operationalize ST, and Puron-Cid (2013) by extending ST with social structures from other domains, presenting an interdisciplinary view of ST.

5.3 Discussion

An overview of the findings from the analysis is presented in Table 3.

Findings	Categorization of studies	Key findings from the use of ST	Implications for the use of ST in public sector IT
Theoretical	Most studies apply ST rather than extend the theory to fit the domain under study; no studies were found that primarily critically address ST. While all studies refer to	Five general directions identified for the use of ST in public sector research: the need for gaining shared understandings between different actors, the changing nature between government	Some papers study the impact of existing structure and agency on outcomes of public sector IT, others the impact of public sector IT implementation on the existing structure and agency and also a few investigate both.

	Giddens (1979; 1982; 1984) and five studies use the work of Orlikowski (1992; 2000), only one study was found to use AST (DeSanctis & Poole, 1994).	and citizens, identification of unintended consequences, the reinforcement of current structures, and the identification of a wider range of influences on studies of public sector IS.	Most studies tend to focus more on social structure influencing outcomes of public sector IT, pointing at the strength of domination as a force of structuration, although some also focus on the influence of agency.
Practical	The practical application of ST is often proven to be useful for gaining insights from the development and implementation of public sector IT.	ST is often proven to be useful for identifying factors influencing outcomes, or for explaining (unintended) outcomes.	Within the public sector, structure is often found to be a very strong force determining outcomes of public sector IT. Studies using ST seem to confirm this.

Table 3. Practical and theoretical findings from the analysis.

Most studies seem to take ST for granted. As in general IS research, the practical usefulness of ST is that most studies adopt ST concepts in order to structure and discuss empirical findings for public sector IS. Furthermore, no papers were found that critically address the use of ST in the field of public sector IT. Based on our study it seems that most authors are satisfied with using the IS adaptions of ST without questioning the need for further adaptions for public sector. This suggests that as the theory is proven to fit into the general IS field the authors seem to make the transfer to the public sector context without any explicit reflections considering risks associated with the transfer and the public sector characteristics. The theoretical dimension thus seems to be underdeveloped so far regarding theory adaption to fit public sector settings. This may partly be explained by a general underestimation of the public sector specificity (Rosacker & Olson, 2008) and by the fact that the field still lacks theoretical foundations (Grönlund & Horan, 2005; Heeks & Bailur, 2007; Yildiz, 2007), compared to for example studies and reflections of ST in general IS research and publication.

While on the one hand, many of the papers we include in our study point at the inclusion of a wider range of aspects to account for the outcomes of public sector IS development and implementation, either by adapting the theory (cf. Puron-Cid, 2013), or by including other factors in the study (cf. Hossain et al., 2011), some studies on the field of public sector IT imply that domination is the stronger force of structuration and stress the reinforcement of current organizational and institutional structures, which is also in line with studies that do not use the lens of structuration theory (cf. Fountain, 2001; Cordella & Iannacci, 2010). As this would have implications both for theory and practice, further research should look into which forces have a stronger effect on the development and implementation of IT. In line with this, as it is difficult to use ST to make generalizable statement, a third recommendation for further research is to pursue could be to combine the application and use of ST with other theories, as Meneklis & Douligeris (2010), Veenstra et al. (2010) and Puron-Cid (2013) suggest to be able to create an in-depth view on the topic of study.

6 Conclusion

While ST is widely used in general IS research, few papers on public sector IS have so far made use of ST to account for (un)intended consequences of the development and implementation of IT. This paper creates an overview of such studies and analyses the findings for the research field based on the use of ST, as well as the findings for the use of ST in the research field of public sector IS. From this overview we conclude that most studies use *ST as a lens to describe and explain (unintended) outcomes* of the implementation of public sector IS for organizational change and transformation. Two *adaptations of ST* specifically address the research field of public sector IS. No papers were found based on the research field of public sector IS that primarily *critically address the limitations of ST*. ST

was thus primarily found to have practical usefulness for the research field of public sector IT. The theoretical usefulness seems to be underdeveloped so far regarding theory adaption to fit public sector settings. Furthermore, we found that a number of studies on public sector IT focus on the influence of social structure rather than on agency stressing the reinforcement of current practices within government through the implementation of IS. Based on this study we argue that there is a need to further investigate the risks associated with the transfer and the public sector characteristics as it is important to achieve conscious adaptation and use of ST in public sector IS in order to progress with using ST in that context. Therefore, we recommend that further research is done to critically address the transferral of ST from IS to public sector IS, to identify the relative strength of factors influencing the development and implementation of public sector IS, and to combine the use of ST with other theoretical lenses to allow for generalization of findings. This recommendation is based also on the limitations identifying the lack of papers covering the area of concern, and starting to suggest a route forward.

References

Basettihalli, R., Kim, H.-W., Lee, H.-L., & Noh, S.-E. (2010). Structural Analysis of e-Government in India. Asia Pacific Journal of Information Systems, 20 (2), 1-21.

Cordella, A. & Iannacci, F. (2010). Information systems in the public sector: The e-Government enactment framework. Journal of Strategic Information Systems, 19, 52-66.

DeSanctis, G., & Poole, M.S. (1994) Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory. Organization Science, 5 (2), 121-147.

Devadoss, P.R., Pan, S.L., & Huang (2005). Structurational analysis of e-government initiatives: a case study of SCO. Decision Support Systems 34, 253– 269.

Fountain, J.E. (2001). Building the Virtual State: Information Technology and Institutional Change. Brookings Institution Press, Washington, D.C.

Giddens, A. (1979). Central Problems in Social Theory: Action, Structure and Contradiction in Social Analysis. University of California Press, Berkeley and Los Angeles.

Giddens, A. (1982). Profiles and Critiques in Social Theory. Macmillan, London.

Giddens, A. (1984). The constitution of society: Outline of the theory of structuration. Polity, Cambridge.

Gil-Garcia, J.R., Canestraro, D., Costello, J., Baker, A., & Werthmuller, D. (2008). Structuration Theory and the Use of XML for Web Site Content Management in Government: Comprehensive Prototyping as an Induced Change Episode. In Proceedings of the American Society for Information Science and Technology.

Greenhalgh, T., & Stones, R. (2010). Theorising big IT programmes in healthcare: Strong structuration theory meets actor-network theory. Social Science & Medicine, 70, 1285-1294.

Gregory, D. (1989). Presences and absences: time-space relations and structuration. In: D. Held & J.B. Thompson (Eds.). Social theory of modern societies: Anthony Giddens and his critics. Cambridge University Press, 185-214.

Gregson, N. (1989). On the (ir)relevance of Structuration Theory to empirical research. In: D. Held & J.B. Thompson (Eds.). Social theory of modern societies: Anthony Giddens and his critics. Cambridge University Press, 235-248.

Grönlund, A., & Horan, T. A. (2005) Introducing e-Gov: History, Definition, and Issues. Communications of the Association for Information Systems, 15 (39), 713-729.

Heinze, N. & Hu, Q. (2005) E-Government Research: A Review via the Lens of Structuration Theory. Proceedings of the Ninth Pacific Asia Conference on Information Systems (PACS2005), Bangkok, Thailand, July 7-10, 891-904.

Heeks, R. & Bailur, S. (2007). Analyzing e-government research: Perspectives, philosophies, theories, methods, and practice. Government Information Quarterly, 24, 243-265.

Hond, F. den, Boersma, F.K., Heres, L., Kroes, E.H.J., & Oirschot, E. van (2012). Giddens à la Carte? Appraising empirical applications of Structuration Theory in management and organization studies. Journal of Political Power, 5 (2), 239-264.

Hossain, M.D., Moon, J., Kim, J.K., & Choe, Y.C. (2011). Impacts of organizational assimilation of e-government systems on business value creation: A structuration theory approach. Electronic Commerce Research and Applications 10, 576-594.

Jones, M.R., & Karsten, H. (2008). Giddens's Structuration Theory and Information Systems Research. MIS Quarterly, 32 (1), 127-157.

Jones, M.R., & Karsten, H. (2009). Divided by a Common Language? A Response to Marshall Scott Poole. MIS Quarterly, 33 (3), 589-595.

Meneklis, V., & Douligeris, C. (2010). Bridging theory and practice in e-government: A set of guidelines for architectural design. Government Information Quarterly, 27, 70-81.

Orlikowski, W.J. (1992). The Duality of Technology: Rethinking the Concept of Technology in Organizations. Organization Science, 3 (3), 398-427.

Orlikowski, W.J. (2000). Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations. Organization Science, 11 (4), 404-428.

Orlikowski, W.J. & Robey, D. (1991) Information Technology and the Structuring of Organizations. Information Systems Research, 2 (2), 143-169.

Parvez, Z. (2006a). Informatization of local democracy: A structuration perspective. Information Polity 11, 67–83.

Parvez, Z. (2006b). Examining e-democracy through a double structuration loop. Electronic Government, 3 (3), 329-346.

Pollitt, C. (2011). Mainstreaming Technological Change in the Study of Public Management. Public Policy and Administration, 26 (4), 377-397.

Poole, M.S., & DeSanctis, G. (2004). Structuration Theory in Information Systems Research: Methods and Controversies. In Handbook for Information Systems Research (Whitman, M.E. and Woszczynski, A.B. Eds.), 206-249, Idea Group Publishing: Hershey, US.

Poole, M.S. (2009). Response to Jones and Karsten, "Giddens's Structuration Theory and Information Systems Research". MIS Quarterly, 33 (3), 583-587.

Pozzebon, M., & Pinsonneault, A. (2005). Challenges in Conducting Empirical Work Using Structuration Theory: Learning from IT Research. Organization Studies, 26 (9), 1353-1376.

Puron-Cid, G. (2013). Interdisciplinary application of structuration theory for e-government: A case study of an IT-enabled budget reform. Government Information Quarterly, 30, S46-S58.Rosacker, K.M. & Olson, D.L. (2008), Public sector information system critical success factors. Transforming Government: People, Process and Policy, 2(1), 60-70.

Rose, J. (1998) Evaluating the Contribution of Structuration Theory to the Information Systems Development. Proceedings of the 6th European Conference on Information Systems.

Senyucel, Z. (2007). Assessing the impact of e-government on providers and users of the IS function – A structuration perspective. Transforming Government: People, Process and Policy, 1(2), 131-144.

Senyucel, Z. (2002). The Impact of the IS Function on the Transition of e-Government Services in Welsh Unitary Councils. WPS 039, Manchester Metropolitan University Business School Working Paper Series (Online).

Thompson, M. (2012). People, practice, and technology: Restoring Giddens' broader philosophy to the study of information systems. Information and Organization (22), 188–207.

Veenstra, A.F. van, Janssen, M., & Tan, Y.-H. (2010). Towards an understanding of E-government induced change – Drawing on organization and structuration theories. In Wimmer, M.A., et al., LNCS 6228, Proceedings of EGOV 2010, Springer, Heidelberg, 1-12.

Webster, J. & Watson, R.T. (2002). Analyzing the past to prepare for the future: Writing a literature review. MIS Quarterly, 26(2), xiii-xxiii.

Yildiz, M. (2007). E-government research: Reviewing the literature. Limitations, and ways forward. Government Information Quarterly, 24, 646-665.