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A Unified View of Electronic Invoicing Adoption: Developing a Meta-Model on the Governmental Level

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Abstract

The digitalization of invoices and their processing is a key factor for the improvement of process efficiency on the G2B (government-to-business) and G2G (government-to-government) level. Some European countries like Denmark or Spain already started to mandate electronic invoicing, but most other countries in the European Union are still in the planning phase for implementation. This weak adoption rate hinders governments to generate benefits of electronic invoicing, so an understanding of this fact from a public sector perspective is crucial. Still, the majority of preceding studies investigated electronic invoicing from a private sector perspective. In addition to that, an overarching model explaining electronic invoicing adoption is still missing. This paper develops a unifying meta-model of influencing factors of electronic invoicing adoption on governmental level by analyzing relevant literature and by conducting expert interviews. The paper then discusses implications for future research with a focus on the public sector.

1. Introduction

Electronic government (e-government) is the public sector's use of information technology to support government operations, engage citizens, and provide government services [39]. The main goals of e-government are to improve efficiency, effectiveness, transparency, and responsibility of government [42]. An important part of e-government to achieve these main goals is the digitalization of documents and the processing of these documents through electronic channels. A critical document in business process chains is the invoice. The European Union defines electronic invoicing as "the sending of invoices by electronic means", i.e. "transmission or making available to the receiver and storage using electronic equipment for processing (including digital compression) and storage" (EU Council Directive 2001/115/EC). The dematerialization of invoices has several advantages compared to the traditional paper-based exchange of invoices. By fostering electronic

invoicing technologies and processes, institutions of the public sector aim to achieve cuts in administrative costs, improve the efficiency of workflows, and obtain process transparency and traceability [1]. Beside these economically motivated advantages of electronic invoicing, the electronic exchange of invoices also has environmental benefits as the saving of natural resources and reducing carbon emissions [38,40].

Despite these benefits, especially in the public sector electronic invoicing is far from being an operational standard. Within the European Union (EU), there are some pioneering countries like Denmark or Norway, where electronic invoicing has become mandatory for suppliers of the public sector. However, most other countries do still discuss or already plan the implementation of electronic invoicing in their public sectors [16,23]. Despite several studies on the adoption of electronic invoicing in the private sector [2,11,20,32,48], research approaches particularly investigating this slow diffusion on governmental level or a comprehensive model of drivers and inhibitors influencing electronic invoicing adoption on a governmental level are still missing. To fully understand the adoption process on governmental level this paper draws on the research from studies in the private sector as well [11,20,32,33,48].

This paper first derives relevant factors affecting electronic invoicing adoption on the governmental level from an analysis of relevant literature. As the next step, expert interviews are conducted with electronic invoicing experts across different European countries to evaluate the derived meta-model. In a final step, conclusions for further research with a focus on the public sector are drawn.

The presented paper is structured as follows: In section 2 we provide an overview on electronic invoicing research as well as on e-government adoption research in general. In section 3 we present our research methodology for the literature review as well as the conducted interviews. In section 4, we develop a meta-model by deriving propositions from prior scientific literature and from major EU research studies on the status quo of electronic invoicing

adoption in EU countries. This model is then evaluated with the help of the conducted expert interviews with experts on electronic invoicing in section 5. The paper concludes with a summary of our findings and implications for further research in section 6 as well as limitations of this work in section 7.

2. Research Background

Before we develop the electronic invoicing adoption model and related propositions in section 3, we provide the research background for our studies within the next two subsections. First, we outline important outcomes and implications of prior electronic invoicing research. Second, we describe in detail the results of prior e-government research from the G2G, the G2B, and the G2C perspective.

2.1. Electronic Invoicing

The first attempts and concepts to transfer structured data in electronic form were already made in the 1970s, resulting in the formation of the EDI standard and especially the EDIFACT standard for administration, commerce and transport, which in turn was also used to transfer invoicing data in electronic form. In recent years, more and more initiatives have been started concerning the advance of electronic invoicing due to its numerous benefits. Known benefits from studies in the private sector include administrative cost cutting, improved efficiency of workflows, as well as better process transparency and traceability [1]. On governmental level the European Union has recognized electronic invoicing applications as one of the most important sources of productivity increases in Europe [15]. According to the European Associations of Corporate Treasurers 243 billion EUR savings could be achieved across Europe by optimizing supply chains through electronic invoicing, with invoicing being one of the key processes between organizations that can be automated [12].

Current electronic invoicing research could be sectioned into several different streams. One stream of research focuses on the identification of drivers and inhibitors affecting the adoption of electronic invoicing predominately in organizations of the private sector [2,11,20,32,48]. Another research stream is dealing with the performance impact of electronic invoicing [26]. Inter-organizational impacts of electronic invoicing are examined by Penttinen and colleagues [30,31]. In addition, Tenhunen and Penttinen provide a different view on electronic invoicing by examining ecological impacts of the electronic invoicing process [40]. While a majority of these research approaches is conducted in the private sector, Agostini and Naggi as

well as Arendsen and van de Wijngaert analyze the role and impact of governmental intervention and participation in adopting electronic invoicing [1,2].

2.2. E-Government Adoption

A rich body of research is dealing with – mainly individual – IT adoption behavior in organizations. According to Williams et al., before 2009, more than 360 articles have been published in major journals within this field [47]. Similarly, the topic of e-government adoption on the individual level as well presents a rich body of research. However, studies on e-government adoption are less numerous in relation to studies of adoption in the private sector. According to Rana et al., a number of 112 articles were published in this field before 2012 [36].

The following section offers an overview of preceding approaches in this research area. In general, Caudle et al. argue that differences among private and public organizations are reflected in several information system issues that are unique to information systems in the public sector [7]. While private organizations often treat information systems as proprietary and use them as a competitive advantage, the public sector can use technology transfer strategies to increase sharing of applications and technical assistance among public organizations. Cats-Baril and Thompson find in their case study describing the implementation Human Resource Management System for the State of Vermont that a useful methodology for managing IT projects in the public sector needs to recognize the inherent differences between the public and the private sector [6]. The main differences are the greater interdependence and the turnover of top level administrators in private organizations, as well as the incremental nature of governmental decision making.

In the field of government-to-citizen (G2C) research, scholars typically focus on the adoption of websites by local governments. Norris et al. define e-government as the “*delivery of government services and information, electronically, to businesses and residents, 24 hours per day, seven days per week.*” [28]. This definition is adopted by Holden et al., who offer a G2C literature review on the topic of local-level e-government. In addition they discuss a survey of more than 3,700 local governments in the U.S. by Norris et al. on the local adoption of e-government in the U.S. They find that the emergence of e-government at the local level is still in its formative stages [18,28]. Norris and Moon conduct a – survey based – longitudinal G2C examination. They look at local e-government adoption in the U.S., mainly in terms of web-site sophistication and the impacts of e-government, including certain barriers to the adoption

and sophistication of e-government systems [27]. The authors use an exploratory framework, which is adopted from Laudon and Laudon, combining (1) organizational and environmental factors affecting IT adoption, (2) internal organizational processes and (3) organizational outputs and outcomes [24]. They name barriers to adoption, namely a lack of human expertise or (web-) technology, of financial resources as well as privacy and security concerns. Drivers for adoption are, according to the authors, mainly government size and - less consistently - the type and form of government, metropolitan status and region.

In a G2B context, Veit et al. conduct a multiple-case study and analyze determinants of e-procurement adoption of 13 German municipalities [46]. They find that perceived benefits and risks for the government organization, degree of e-procurement capabilities among local businesses and peer influence among government organizations are the strongest determinants. Using survey data from 128 companies in Singapore, Tung and Rieck examine factors influencing adoption of e-government services by organizations in Singapore [44]. In this government-to-business (G2B) context, they report that perceived benefits, management readiness, sensitivity to cost, external pressure, and social influences are positively related to the adoption decision. In the same institutional context, Vaidya et al. propose several success factors for the implementation of e-procurement initiatives [45]. Based on a literature review, they identify involvement of end-users and suppliers, process reengineering, and system integration as the most important success factors.

Observing the G2G context, Kamal proposes an eight-stage IT adoption process based on the result of a multiple case study [21]. He derives more than 40 critical success factors for IT adoption in government organizations and divides them into five categories: support, external forces as well as perceived technology, organizational and collaboration factors. Below these factors, he lists drivers such as organizational size, the level of support from administrative authorities, the level of financial support, the extent of managerial capabilities, support from within the organization, effective management style, technological and organizational compatibility and served community size, among others. In contrast, technical and organizational complexity can become an adoption inhibitor. Links between innovation characteristics and IT adoption are examined by Damanpour and Schneider [8]. Using survey data on the adoption of 25 innovations in more than 700 local governments in the U.S. and data from an expert panel, they state that properties of a specific innovation and – especially personal – qualities of the respective public

managers in charge of the project have a significant effect on IT adoption. According to the study, innovation complexity does not significantly affect IT adoption. The study claims an increase of IT adoption predictability depending on innovation characteristics. On the contrary, Prybutok et al. did not examine impacts on IT adoption but on information, system and service quality in an e-government environment [35]. The authors claim the MBNQA leadership triad (leadership, strategic planning, and customer/market focus) to have a significant impact on the information, system, and service quality in the G2G context.

3. Research Methodology

In this section we describe the two-fold research methodology applied for the development of the electronic invoicing adoption meta-model (EIAMM), as can be seen in Figure 1. Based on a review of

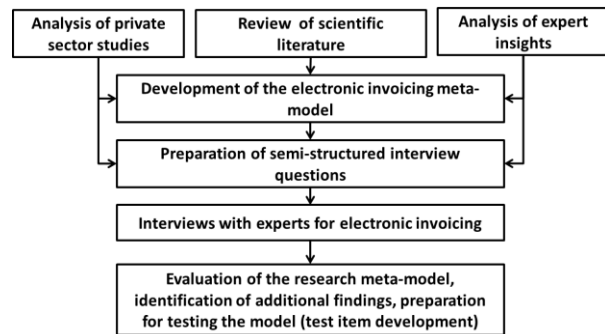


Figure 1: Research methodology of the EIAMM

scientific literature, private sector studies as well as expert insights, multiple adoption factors were deductively derived from these sources and combined to form the EIAMM. As a next step, semi-structured interview questions were developed, taking into account all prior information sources as well as the developed EIAMM. Results of the interviews were successfully analyzed and used to evaluate the EIAMM, as well as identified additional insights into the field of electronic invoicing for further research.

3.1. Review of Relevant Literature

In order to develop an overarching research model explaining the adoption of electronic invoicing on governmental level, we conducted a structured review of electronic invoicing and e-government adoption literature. Our four-headed research team searched through major online research databases as the AIS library and Business Source® Complete by EBSCOhost using the search term “electronic invoicing” and affiliated labels. In total, more than 4,000 articles were accessed.

To search through the respective databases, we applied the two main search techniques, “General Search and the “Advanced Search”, both including the Boolean operators (“AND”+“OR”) to facilitate the search with more than one search item. As with the procedures common to other literature research approaches (e.g. Williams et al. [47]), we mainly used the “General Search” allowing for a continuous procedure with consistent results and without any confusion. The 326 search results were then at first coded within an excel sheet outlining drivers and inhibitors of electronic invoicing implementation projects as well as study characteristics as the country of scope and governmental structures. In a second step all four researchers crosschecked the search results for the respective context of electronic invoicing adoption by governments. The resulting drivers and inhibitors of electronic invoicing adoption were then assigned to overarching categories by our research team forming the EIAMM as presented in Figure 2.

3.2. Expert Interviews

In this study, semi-structured interviews comprising open as well as Likert-type scale questions were developed and used to collect data. The content of the semi-structured interview protocol was designed by taking into account information from the prior conducted literature review of scientific literature on electronic invoicing and e-government adoption, as well as an analysis of major European electronic invoicing studies and insights from prior contacted electronic invoicing experts. The final version of the protocol can be downloaded from <http://www.e-docs-standards.de/cms/images/Publikationen/hicss2012/protocol.pdf>. The primary aim of the semi-structured interviews was to evaluate the deductively developed meta-model. However, the interviews identified additional insights into the matter.

Experts for electronic invoicing were identified through their membership in a European initiative supported by the Comité Européen de Normalisation (CEN) as part of a top-down research approach. All of the experts were designated information managers for electronic invoicing in their respective country also primarily encompassing governmental initiatives. This ensured a view from a state / country level for the conducted survey. The designated experts, being 35 in total, were first addressed by telephone and then sent a semi-structured interview questionnaire. The questionnaire consisted of closed as well as open-ended questions. Results of the literature review were used to guide the interviews. The interviewees were asked to describe the advantages and disadvantages of electronic invoicing in general, answer questions about

drivers and inhibitors to the acceptance of electronic invoices as well as to outline the role of the public sector in this context. An overall amount of 16 responses were received from March 2012 until the end of the data collection in June 2012, which results in a participation rate of more than 45%. The sample covered experts from twelve countries: Iceland, Sweden, Latvia, Lithuania, Croatia, Netherlands, Ireland, Norway, Switzerland, Estonia, Spain and Germany. In two countries (Sweden and Norway), we were able to talk to more than one expert, which explains the difference between the number of countries and experts interviewed. Beside their countries, we also asked for the vocational position of the experts. The interviews revealed important information about the landscape of the factors affecting the electronic invoicing adoption decision on a governmental level as well as their relevance for the adoption decision and their overall importance in the context of electronic invoicing.

4. Developing a Meta-Model of Electronic Invoicing Adoption

The following section describes the factors derived from the literature review, which are proposed to be relevant to electronic invoicing adoption on governmental level. In Figure 2, the final overarching EIAMM is presented.

4.1. Institutional Pressure

According to DiMaggio and Powell, change can be of coercive, mimetic, and normative type [10]. Mimetic change is the result of pressure expressed through the need to imitate actions of other eventually competing organizations or institutions. Formal or informal influence on an institution is dependent upon it is called coercive pressure and leads to coercive change, e.g. by sanctioning illegitimate or promoting legitimate actions. Normative change, described by DiMaggio and Powell as result of professionalization, is the need to be accepted by others of equal occupation and to act in a way that pleases those [41]. According to a survey conducted by Edelmann and Sintonen aiming at empirically examine the non-adoption of electronic invoicing as a technological innovation, the amount of market demand in the environment of an organization has a positive influence on its decision to adopt electronic invoicing, being a case of normative pressure [11]. Similar findings are presented by Penttinen and Tuunainen when exploring the effect of external pressure in inter-organizational IS adoption, arguing that external pressure and bandwagon effects influence the decision to adopt

electronic invoicing [33]. A lack of market demand or normative pressure has an opposite effect on the decision. Results of a survey by Legner and Wende investigating the status of European electronic invoicing implementations in a B2B environment show that more than 90% of companies argue that their business partners are not willing to use electronic invoicing or are not prepared to do so [25]. Analyzing the adoption intention of B2B and B2G businesses in the Netherlands, Arendsen and van de Wijngaert emphasize this by showing that social influence and adoption by others have an influence on the adoption of electronic invoicing [2]. In contrast to this, when promoting the adoption of electronic invoicing through an increase in communication and cooperation between organizations, forms of mimetic pressure can be observed. According to a case study presented by Penttinen et al. examining the effects of the implementation of electronic invoicing on buyer-seller relationships, both buyers and sellers have made adaptations in the process of electronic invoicing implementation leading to an increased communication, commitment and cooperation between the two parties [30]. A preceding case study by Penttinen and Hyytiäinen investigating factors affecting the rate of adoption of electronic invoicing in Finland, already identified that by increasing internal and external communication, a positive effect can be observed towards the adoption of electronic invoicing [32]. On the other hand, imposing coercive pressure on trading partners results in fewer advantages from inter-organizational EDI systems, as already stated by Raymond and Blili when investigating the potential for EDI in the context of a network enterprise [37]. Considering the process of electronic invoicing as an IT-enabled inter-organizational system, institutional pressures have an impact on the adoption of electronic invoicing on governmental level.

4.2. Ecological Pressure

According to research by Innopay, there are approximately 30 billion invoices sent in Europe per year [19]. Despite the fact that the concept of electronic invoicing is not new, invoicing in European countries is still predominantly based on paper. Up to 95% of all invoices in Europe are still paper invoices [38]. Though, the level of social responsiveness in European governments is rising. Environmental benefits and ecological concerns of electronic invoicing are part of the agenda of European governments, as these also form key concerns of the energy policy of the European Union as well as the international Kyoto Protocol agreement. Additionally, a positive effect on public image can be achieved [19].

1,000,000 paper invoices equal an approximate resource need of 400 trees [19]. Increasing the adoption of electronic invoicing in Europe by 1% can already reduce the resource need by an approximate number of 800,000 trees per year. In addition, looking at the life cycle of an invoice, Tenhunen and Penttinen identified that the carbon footprint of this life cycle can be reduced by an overall amount of up to 63% meaning that there is a high potential for environmental benefit in every single invoice [40]. These considerations, being constantly promoted through initiatives of the European Union, can affect governmental as well as organizational decisions.

4.3. Political Commitment

On the European and pan-European level, there have to date already been a couple of electronic invoicing initiatives of the European Commission and governments of European member states. The final report of the European Commission on European electronic invoicing presented the need for a policy level cross-European activity on electronic invoicing with the aims to inhibit current and further fragmentation and establish the basis for innovative future solution creation [12]. The Pan European Public Procurement On Line pilot project was conducted from May 2008 to October 2011 aiming at setting up a pan-European pilot solution to facilitate EU-wide interoperable public e-Procurement in conjunction with solutions of European member states [34]. The vision of the project was that any company in the EU, with special focus on SMEs, should be able to communicate electronically with any European governmental institution for the entire procurement process. Electronic invoicing was one of the key areas of focus for PEPPOL [19,34]. The Europe 2020 strategy, launched in March 2010, has the purpose to get Europe out of the crisis and prepare the EU economy for the next decade, reaping the full economic and social benefits of a digital society. The Commission expresses its vision for electronic invoicing to become the predominant method of invoicing by 2020 in Europe [15]. One of the seven flagship initiatives of the Europe 2020 strategy is the Digital Agenda, aiming to maximize the social and economic potential of ICT and to achieve a single digital market. The agenda aims at removing regulatory and technical barriers that prevent mass adoption of electronic invoicing [14].

4.4. Technological Readiness

The current state of the electronic invoicing solution market in Europe shows many different and partly specialized technical solutions for electronic

invoicing and features a high fragmentation [38]. Over the past years, many big organizations have assimilated electronic invoicing by implementing a technological solution with the highest internal compatibility, as well as the highest external compatibility to systems of their clients and suppliers. A lack of interoperability between solutions leads to numerous conversion issues and presents organizations with relations to partners having different solutions for electronic invoicing with a substantial problem and hinders the adoption of electronic invoicing. Selfsame was identified by Legner and Wende or Penttinen and Hyytiäinen [25,32]. Similarly, according to the findings of the European Commission, the strongest perceived obstacles of electronic invoicing usage are customer compatibility or readiness, readiness or compatibility of internal systems and complexity of the solution [13].

4.5. Economic Benefits

Since the beginning of the EURO crisis in the EU in 2011 and the ongoing need of countries as Greece, Portugal or Ireland for external financial support, all EU governments are forced to tighten belts concerning their state household budgets. The aggravated financial situation in the EU has led to a more cost efficient way of thinking in the individual countries, including restricted disbursements and the trimming of all public authorities and institutions. As electronic invoicing provides the automation of in-efficient and time-consuming administrative processes, countries as Denmark or Norway started to implement electronic invoicing technologies helping to fulfill tasks, which were conducted by state officials beforehand. According to the European Associations of Corporate Treasurers 243 billion EUR of supply chain costs can be saved across Europe by adopting electronic invoicing [12]. Penttinen and Hyytiäinen further identified that in moving from paper based to electronic invoicing, costs can be cut by up to 80% [32]. Bertelè and Rangone even consider cost savings to be the main benefit of electronic invoicing [4]. Electronic invoicing provides the benefit to streamline the inefficient administrative invoicing process, helping to save time and cost.

4.6. Educational Shortcomings

The component of training the users to correctly and efficiently make use of the respective solution remains one of the key factors to the adoption of the respective solution. Even though the process of invoicing remains the same, employees face new challenges in coping with the new technology of doing it electronically as well as succeeding potentially

altered process steps [30]. As a result, Penttinen and Hyytiäinen show that users have to be well trained and informed about the process of electronic invoicing and its correct handling [32]. They also identify a distinct need of an internal expert to assist them. Looking at the abundance of different electronic invoicing solutions, another issue emerges. Organizations lack awareness and understanding of the process of electronic invoicing and its benefits [4]. The lack of knowledge about electronic invoicing technologies as well as a lack of information about practical implications, strengths, and benefits leads to a relatively high uncertainty concerning the adoption [11].

4.7. Legal Uncertainties

National regulatory requirements are different across different countries, even EU member states. Requirements for electronic invoicing in terms of proving the authenticity, integrity and availability of electronic invoices differ greatly across different legislation areas [1,43]. Scandinavian countries like Denmark and Finland, but also Germany for example accept all types of electronic invoices. France and the Netherlands on the other hand require electronic signatures [16,43]. According to Legner and Wende, this particular legal uncertainty is mainly responsible for inhibiting the adoption of electronic invoicing [25]. Especially organizations having business relations across different legislation areas are presented with the problem of choosing interoperable electronic invoicing solutions. The lack of knowledge, the fear of nonexistent interoperability as well as a lack of awareness of legal norms have an impact on the adoption of electronic invoicing [4]. This is further confirmed by research conducted by Deutsche Bank Research equally stating that the legal situation and the lack of interoperability are holding back the rollout of electronic invoicing [38].

4.8. Social Affordances

The interaction through the means of electronic invoicing is rendered with a set of new features as opposed to the traditional way of invoicing. These new features originate from the inherent uncertainty and openness of the internet [29]. E-services such as electronic invoicing, which are conducted in this uncertain environment, require an element of trust [3,17]. According to Belanger et al., the concept of trust can be divided into institution-based trust as well as characteristic-based trust [3,5]. While institution-based trust is associated with an individual's perceptions of the structures, regulations and legislations making the environment of the individual

feel safe and trustworthy, characteristic-based trust is described as the confidence in the benevolence, integrity, and competence of the agencies providing the service in question [3]. Additionally, information

as an important factor for the adoption of electronic invoicing, also in the public sector: *“Cooperation between market players and public sector is very important. There is no need for regulation if players*

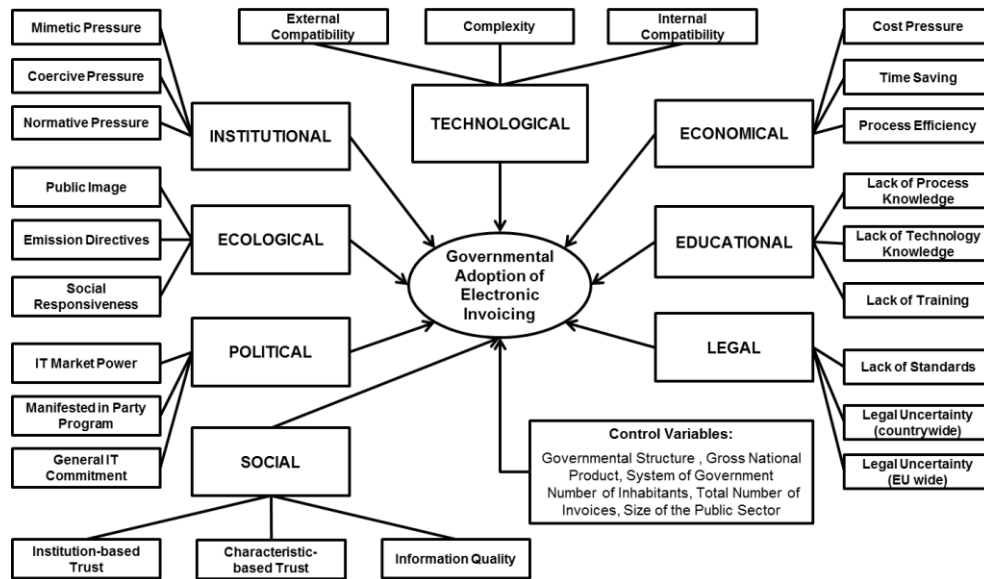


Figure 2: The complete electronic invoicing adoption model on governmental level

quality can have a positive effect on e-government adoption by increasing trust in the technology to adopt [22]. A more general study of IS success by DeLone and McLean also stated information quality as an important factor able to produce a positive organizational impact [9].

4.9. Country-level Factors

In order to account for differences among countries and their impact on the adoption process of electronic invoicing, a set of control variables is proposed to affect the adoption of electronic invoicing on governmental level. The following country-specific variables have been considered: governmental structure, gross national product, system of government, population size, total number of invoices, and size of the public sector. Measuring these variables is conducted through statistical authorities for numeric variables. The variables governmental structure (e.g. federal government) and system of government (e.g. democracy) are captured in respective categories through references in the corresponding literature.

5. Discussion of the Interview Findings

Cooperation between business partners was stated to be one of the different forms of institutional pressure. This kind of institutional pressure is, according to one of the interviewed experts, regarded

can agree about standards and other aspects of delivering invoices”. In addition, it is regarded as a more capable factor than governmental regulation efforts. Finally, institutional pressures are ranked as a highly important aspect of electronic invoicing, but only a medium relevant factor in affecting governmental adoption decision by the respondents.

According to the expert interviews, ecological concerns are regarded as an important aspect of electronic invoicing by 8 of 16 respondents. However, it is ranked as one of the least relevant factors in affecting the adoption decision of electronic invoicing.

Political commitment seems to play a role in the adoption of electronic invoicing, as stated by a German expert: *“There is a general strategy missing regarding the adoption of electronic invoices... The procurement sector ... has concentrated much on electronic tendering (pre-award phase) but they have not taken into account the less complex post award processes like electronic invoicing and electronic ordering. There seems to be a very low interest to participate in European initiatives regarding electronic invoicing. There is a high risk for uncontrolled growth of electronic invoicing...”* Another expert stated, that: *“A lack of government innovativeness and initiative, as well as lack of affordable acceptable technical standards impacts the adoption of electronic invoicing”*. Political commitment is seen as an important aspect in the context of electronic invoicing

by 9 of the 16 respondents, as well as rather relevant in affecting the governmental adoption decision.

Technological readiness is regarded as the most important factor in the context of electronic invoicing, as well as one of the most relevant factors in affecting the adoption of electronic invoicing. Respondents state technological complexity, missing technological standards, interoperability issues as well as transition complexity as main reasons for this instance.

Economic benefits are likewise on the agenda of private organizations as well as public institutions. As one respondent state: *“Main driver that impact the adoption of electronic invoicing ... is a potential for cost savings”*. Furthermore, this factor is ranked as one of the most relevant in affecting the governmental adoption decision.

Educational shortcomings are regarded as the most relevant factor in affecting the governmental adoption decision. Furthermore, they form the most important factors in the context of electronic invoicing.

Legal uncertainties are addressed by several respondents. The following was stated by one of them: *“As long as legal requirements and interpretations thereof, and practice won't be harmonized, as well as private and governmental sector will have different opinion regarding these issues there will be practical difficulties to apply and rely on electronic invoicing”*. Furthermore, legal uncertainties are considered an important factor by 7 of the respondents. However, only 3 respondents state that legal factors hinder the adoption of electronic invoicing.

In the case of social affordances, answers from the respondents also presented resonance. One of the respondents stated, that security risks are the most important disadvantages of electronic invoicing. Several other respondents stated that *“a lack of trust in government and a lack of trust in the tax collection service”* are among the main inhibitors for electronic invoicing adoption.

6. Conclusion and Further Research

This paper presents a meta-model of electronic invoicing adoption on a governmental level. As a first attempt to structurally explain the adoption of electronic invoicing in the public sector, the resulting model indicates that the adoption process has multiple – and partially opposing – underlying influences. Eight main factors have been outlined in the process, being proposed to affect the adoption of electronic invoicing by the government: institutional pressure, ecological pressure, political commitment, technological readiness, economic benefits, educational shortcomings, legal uncertainties and social affordances. All eight predictors are being proposed to

have an impact on countries' electronic invoicing adoption decision.

This research aims to increase the awareness of policymakers of the different factors that have to be taken into account in the context of electronic invoicing. However, the eight identified factors are not equally influenceable by governmental policymakers. On the one hand, there are the ecological and economical drivers that especially play an important role with regard to clarification of the benefits of electronic invoicing. On the other hand, institutional and political pressures rather have to be seen as framework conditions that may not be adjustable in the short term (or at all). The remaining factors, each proposed to have a negative relation to governmental adoption of electronic invoicing, are the ones that most likely could be influenced. First, technological readiness could be improved through adequate investments in infrastructure, e.g. concerning interfaces for receiving invoicing data from customers and suppliers of the private sector. Second, as in enterprises, those persons responsible for invoicing processes have to be trained and sensitized within change management processes. Third, legal certainty has to be created with the aims to enable as well as foster a change towards electronic invoicing. Fourth, trust in the reliability and security of the electronic invoicing process has to be built, as well as trust into the capability of the public sector itself. In this context, it has for instance to be evaluated, if and how the Danish approach of making electronic invoices mandatory, is applicable to other countries [1]. As stated above, the underlying topology of the public sector differs from country to country, making the aim of a broad and simultaneous adoption of electronic invoicing across Europe even more ambitious.

A further focus of future research should be the examination of related effects among the generic meta-factors and their combined resulting impact on the adoption process. As the interviewed experts themselves were situated in the private sector and were not employed in a governmental institution, further investigation could focus on the collection of interview data from employees of governmental institutions to complement the findings of this investigation. An empirical validation of the model with implementation data of several EU countries would be beneficial in this context, in order to ensure model stability, as well as to outline the differences within the control variables.

7. Limitations

This study is limited due to the number of only 16 semi structured expert interviews with interviewees being situated in different countries. Further research

should focus on public institutions of one country, as well as conduct more thorough interviews to confirm and extend the presented research findings. Similarly, further limitations arise from the sample profile. The interviews were conducted on a state / country level as part of a top-down approach. However, a more detailed analysis on each of the underlying levels based on these research findings should be considered in future research. This study is furthermore limited by the explanatory power of the meta-model, which is emphasizing the areas for further research rather than explicitly describing and analyzing relationships between concepts. However, further research on the analysis of the concepts and their relations according to the presented meta-model is necessary.

8. Acknowledgements

This research is supported by the German Federal Ministry of Economics and Technology (BMWi) as well as the research institute ISPRAT. We gratefully acknowledge the financial support. Any opinions, findings, conclusions, or recommendations expressed in this paper are those of the authors and do not necessarily reflect the views of ISPRAT or BMWi.

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