STATUS QUO OF ELECTRONIC INVOICE PROCESSING AT MUNICIPALITIES IN THE FEDERAL STATE OF BADEN-WÜRTTEMBERG

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Abstract

On 16 April 2014, the European Parliament and the Council of the European Union adopted the Directive on electronic invoicing for public contracts (2014/55/EU) in order to establish electronic invoicing as the predominant method by 2020. The e-invoicing directive requires all contracting authorities to be able to receive and process electronic invoices (ABI L133/1). The European legislator defines e-bill as "an invoice issued, transmitted and received in a structured electronic format that enables its automatic and electronic processing" (ABI L133/7).

This raises the question of (a) the status quo of electronic invoicing in Baden-Württemberg's municipalities, (b) their implementation barriers and drivers, and (c) the status quo in Baden-Württemberg compared to all other German states. This paper answers these questions and points out interesting aspects that raise new research questions.

1. Introduction

The economically strong state of Baden-Württemberg wants to take a leading role in digitalization. In a state comparison by the Association of the Internet Industry, Baden-Württemberg is currently in second place behind Hesse (72 points) and ahead of North Rhine-Westphalia (53 points) with 58 of 108 possible points [1]. The assessment is based on the political declarations of intent, not on their actual implementation. With the digitalization strategy "digital@bw" Baden-Württemberg wants to establish itself as a leading region for digital change in Germany [2]. One of the main topics of the strategy paper agreed upon in 2017 is Administration 4.0. An important component of Administration 4.0 is e-government, by which the state understands "the use of modern technologies to simplify and increase the efficiency of administrative processes". Particularly great potential is offered here by the application field of e-workflow, which aims at the electronic representation of conventional business processes without media breaks [3].

The European Union also wants to push the digitisation of its member states. With the adoption of the European Directive 2014-55-EU in 2014, the EU therefore pursued the goal of establishing electronic invoicing as the predominant invoicing method in its member states by April this year [4]. With an estimated 32 billion invoices per year in Germany alone, the invoice is the central document in business relations [5].

The aim of this paper is to determine the status of digitisation of local government in Baden-Württemberg using the example of electronic invoice processing. To enable a comparison of the

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actual state between Baden-Württemberg and Germany as a whole, a Germany-wide online survey was replicated. Two research questions are central to this:

RQ 1: What is the current status of the transition to an electronic invoicing workflow in the municipal administrations of Baden-Württemberg compared to the whole of Germany?

RQ 2: Which factors act as implementation barriers before or during the transition to electronic invoice processing?

In addition to the online questionnaire, guideline interviews were conducted with administrations that are in the process of converting to electronic invoicing or have already completed the conversion.

2. Background

Before discussing the results of the survey, a brief overview of the legal development of e-invoicing will be given and the benefits of e-invoicing processing will be highlighted.

2.1. European Directive 2014/55/EU and the definition of e-invoices

In order to establish electronic invoicing as the predominant method by April 2020, the European Parliament and the Council of the European Union adopted the Directive on electronic invoicing for public contracts (2014/55/EU) on 16 April 2014. The Directive on electronic invoicing obliges all contracting authorities to be able to receive and process electronic invoices. According to EU law, this obligation applies to so-called cap procedures. These are contracts which, due to their volume, require public EU-wide tendering. The national legislators are free to decide whether to comply with these ceilings or to introduce the obligation to award contracts below the thresholds. The threshold value for supplies and services is currently 214,000 euros net, for construction services 5,350,000 euros net [6].

The European Law defines e-invoice as "an invoice that is issued, transmitted and received in a structured electronic format that allows its automatic and electronic processing" [4]. A structured format is an invoice format consisting of symbolic data, which can be read and processed directly electronically [7]. Such an invoice cannot easily be read by humans. It is typically received by the recipient as an XML (Extensible Markup Language) file. The scope of the information depends on the processing depth. Either only the header data (for example, invoicing party, number, date, amount, bank details) or additionally the item data (price, article, quantity) can be transmitted. An example of a structured data format is the standard "XRechnung", which was developed by the IT Planning Council of Germany specifically for the requirements of public administration in Germany [8].

A distinction must be made between this and the iconic format in which the invoice data is available in a purely visual form [7]. Typical for this format are PDF files or image file types such as JPEG and TIFF. Since no invoice data is embedded in the invoice, the invoice data must either be typed or read with OCR (Optical Character Recognition) software. Invoices in this format are not electronic invoices as defined by the EU. However, there is an exception in the case that an iconic invoice contains an identical element with symbolic data in addition to the picture element. This combination of iconic and structured format is called a hybrid format. An example of such a hybrid format is ZUGFeRD (abbreviation for "Zentrales Benutzerhandbuch des Forums elektronische Rechnung Deutschland"), the current version of which meets the requirements of European Law.

2.2. Implementation of the EU Directive in federal and state law In order to implement the EU

Directive into national law, the German Parliament passed the law on December 1, 2016, implementing Directive 2014/55/EU on electronic invoicing in public procurement (E-Invoicing Act) [9]. The law forms the legal basis for customers of the federal public sector. The corresponding e-invoicing ordinance was published on 18 October 2017 [10]. From 27 November 2020 it obliges federal suppliers to issue and transmit invoices in electronic form. The data exchange standard to be used is usually the XRechnung.

The individual federal states are responsible for the implementation of the Federal Directive at state level. On 7 November 2018, the state parliament of Baden-Württemberg passed the law amending the eGovernment Act, which extended the existing eGovernment Act to include the regulations for implementing the eInvoicing Directive [11]. In principle, it obliges contracting authorities to receive and process electronic invoices regardless of their value. However, an exception applies to municipalities and associations of municipalities. Here the regulation only applies above the EU procurement thresholds. The corresponding e-invoice regulation is currently only available in the draft version of 29.10.2019 [12]. According to this draft, the data exchange standard XRechnung should be used. For the transmission of electronic invoices to state authorities, billers must use the state's service portal. Otherwise, they must use a transmission path specified by the invoice recipient.

2.3. Definition and advantages of electronic invoice processing

In the following, electronic invoice workflow means the electronic representation of the work steps of invoice processing, from the input and validation of invoice data, the checking of the factual and arithmetical correctness, the ordering, the accounting entry, the payment, and the archiving. The electronic processing is carried out independently of the form of invoice receipt (paper or electronic) without media discontinuity. In the case of paper invoices, this requires scanning, reading and checking the invoice data. It is irrelevant in which format (structured, iconic, hybrid) electronic invoices are received.

The changeover to electronic invoice processing has several advantages [7]. Since waiting and transport times are eliminated, the processing times for invoices are shortened. The digitalization of the process achieves a high degree of transparency, since all those with access rights can view the invoices in the system at any time and thus monitor the process. This also makes it easier to meet payment targets. In addition, the automation eliminates manual entries, which reduces the error rate. Cost and time savings can also be realized in archiving, as no additional space is required and retrieval of invoices is much easier.

If, in future, only electronic invoices within the meaning of the EU definition are fed into the electronic invoice workflow, there will be a high potential for increasing efficiency and saving costs. The processing time could be reduced from just under half an hour for the paper-based invoicing process to an estimated two minutes for the digital processing of e-invoices [13, p. 22 fig.8]. A prerequisite for this is that the invoice contains both the header data and the item data in a structured form. On the cost side, an estimated 15 to 20 euros can be saved per e-bill [14, p. 38]. At municipal level, there is a savings potential of at least 88,000 euros per authority [14]. E-bill is also desirable from an ecological point of view. According to calculations, CO_2 emissions from digital invoice processing can be reduced by almost 50 percent [14, p. 40f.].

3. Methodology

The study "E-Government in the municipal sector" by the research institute ibi at the University of Regensburg from 2018, in which, among other things, the electronic invoice processing of municipal administrations was examined, will be replicated in Baden-Württemberg [16]. To ensure the comparability of the results of both samples, a state-wide survey was conducted. The data collection was carried out with the help of the standardised questionnaire developed by ibi, which was extended by further questions. An online survey was conducted. The following variables from the ibi-study were used to answer the first research question: *accepted and preferred receiving channels*, *current processing of invoices* (procedures for invoice receipt, data capture) and *status of the changeover*. In addition, the questionnaire was supplemented by the variables *archiving* and *proportion of the different invoice formats*. In order to answer the second research question, the variable *challenges during the changeover* was adopted. In addition, the questionnaire was extended to include the reasons that prevented the administrations from making the changeover (*reasons for the delay*). Therefore, 13 administrations were contacted in advance by e-mail, 9 of which replied to the questionnaire. The response characteristics were derived from the feedback.

The statistical population of the study are the municipalities in Baden-Württemberg. There are a total of 1,136 municipalities in Baden-Württemberg. These can be divided into 35 administrative districts, 313 cities and 788 municipalities [17]. The participants were actively recruited for the survey. For this purpose, the survey link was forwarded to its members via the municipal council of Baden-Württemberg (Gemeindetag), the largest regional association of municipalities. The city and district administrations were each contacted personally by e-mail and asked to participate. In the field phase from 25 July to 16 August 2019, a total of 341 administrations took part in the survey. After data cleansing, 326 cases were included in the evaluation. This represents a response rate of 29%. A comparison with municipal population figures of Baden-Württemberg showed that local administrations with small populations are underrepresented in the sample.

To answer the second research question, guideline interviews were conducted with the aim of obtaining more detailed information about the challenges of electronic invoice processing. A total of five project managers from administrations that are currently in the changeover phase or have already completed it were interviewed. The interviews lasted between 25 and 60 minutes. Contact with these administrations was established via the local council. The transcribed interviews were evaluated by a content analysis.

4. Results

4.1. Status Quo in digital invoice processing

For RQ1 on the current status of electronic invoice processing in Baden-Württemberg compared to Germany, the evaluation produced the following results, see table 1.

Status quo of digital invoice processing		Baden-Württemberg		Germany	
Variables	*Reply options*	*percent*	*n*	*percent*	*n*
Accepted forms of invoice receipt*	E-Mail	91%	326	85%	205
	DE-Mail, E-Postbrief	1%		3%	
	Download	27%		31%	
	EDI	2%		11%	
Preferred form of invoice receipt	Paper form	82%	325	52%	196
	E-Mail	14%		32%	
	DE-Mail, E-Postbrief	1%		3%	
	Download	0%		3%	
	EDI	1%		9%	
	Other	2%		2%	
Proportions of the invoice formats (estimated values)	Paper form	92%	322	No data available	
	Iconic format	8%			
	Structured format	0,5%			
	Hybrid format	0,2%			
Invoice receipt* (paper invoice)	paper-based further processing	95%	326	64%	204
	digitisation of the invoice	21%		50%	
Invoice receipt* (electronic invoice)	further processing on paper after printout	97%	298	68%	197
	digital further processing	5%		34%	
Data acquisition* (paper invoice)	manual entry in it-system	90%	326	73%	204
	automatic acquisition in it-system after scan and ocr	7%		27%	
Data acquisition* (electronic invoice)	manual entry in it-system	89%	295	68%	197
	automatic acquisition of iconic invoice data (ocr)	4%		23%	
	automatic acquisition of structured invoice data	3%		14%	
Archiving (electronic invoice)**	Only paper form (printout)	28%	296	No data available	
	Only electronic form	14%			
	Both	58%			

Table 1: Overview of the results of the online survey

* Multiple selection possible
** Due to the high level of conformity in the archiving of paper (only paper: 27%, only electronic: 16%, both: 56%, n = 326) and electronic invoices, no separate presentation was made.

Form of invoice receipt: The majority of the administrations surveyed in Baden-Württemberg (n = 326) and Germany as a whole (n = 205) accept electronic forms of receipt. The acceptance of invoices via e-mail attachments is the most widespread so far (Baden-Württemberg: 91%, Germany: 85%). Invoices via download (Baden-Württemberg: 27%, Germany: 31%) or electronic data interchange (Baden-Württemberg: 2%, Germany: 11%) were accepted comparatively rarely.

Preferred form of invoice receipt: There is a large discrepancy between the samples of Baden-Württemberg and Germany as a whole with regard to the preferred form of reception. While in Baden-Württemberg only 16% of the administrations surveyed (n = 325) prefer an electronic form of invoice transmission, this figure is already 47% in the German sample (n = 196).

Invoice format: It is currently estimated that 92% of invoices in Baden-Württemberg are received in paper form. Almost every tenth invoice is received in an iconic format (8%). A tiny proportion consists of invoice formats that can be read directly by machine (structured invoice format: 0.5%, hybrid invoice format: 0.2%).

Invoice receipt: In principle, invoices in paper form (95%) are further processed in paper-based form by the administrations in Baden-Württemberg (n = 326) after receipt. In the nationwide sample (n = 204) only two thirds (64%) of the administrations do this. Instead, half of the respondents (50%) digitise the invoices as soon as they are received. In the Baden-Württemberg sample, one-fifth (21%) of the administrations proceed in this way. When electronic invoices are received, 97% of the administrations surveyed in Baden-Württemberg (n = 298) print them out and then process them in paper form. In the German sample (n = 197), only 67% of the administrations proceed in this way. Instead, 33 % of those surveyed stated that they process the invoice digitally. In Baden-Württemberg this proportion is currently only 5 %.

Data acquisition: In the Baden-Württemberg sample (n = 326), 90% of the municipalities manually enter the invoice data from paper invoices into an IT system. Only 7% of the respondents enter the data automatically. Nationwide (n = 204), the number of manual data entry is 73%, while the remaining 27% enter the invoice data automatically.

Furthermore, 9 out of 10 (89%) of the surveyed municipalities in Baden-Württemberg (n = 295) still enter the data for electronic invoices manually into the IT system. In the case of iconic invoice data, the invoice information is automatically captured by 4% of the administrations, and by 3% for structured invoice data. In the Germany-wide sample (n = 197), 7 out of 10 administrations (68%) enter the data manually into the IT system. The invoice data is automatically captured by iconic invoice data (23%) and structured invoice data (14%).

Archiving: During archiving, it is apparent that almost three quarters of the administrations (72%) in Baden-Württemberg already archive paper invoices electronically (n = 326). However, 56% of the respondents archive both in electronic and paper form, while only 16% are restricted to purely electronic archiving. A quarter of the respondents (27%) archive exclusively in paper form. Similar results are shown for the archiving of electronic invoices. However, the procedure of exclusively paper-based archiving of electronically received invoices is actually not permitted.. According to the GoBD (principles for the proper management and storage of books, records and documents in electronic form and for data access), electronically received invoices must also be kept in this form. No comparative data is available for the nationwide survey of local authorities.

Status of the conversion: When asked about the status of the conversion to electronic invoice processing in their state, one in five administrations (19%) in the Germany-wide survey (n = 167) replied with "We can receive and process electronic invoices", see Figure 1. 4 out of 10 administrations (43%) stated that they would be able to do so by the legal conversion date. Another 4% have started implementation but will not complete it by 18 April 2020. 3 out of 10 administrations (28%) have already informed themselves about the issue but have not yet taken any concrete implementation steps. The remaining 7% had not yet addressed the topic in autumn 2018, the survey period of the ibi research study.

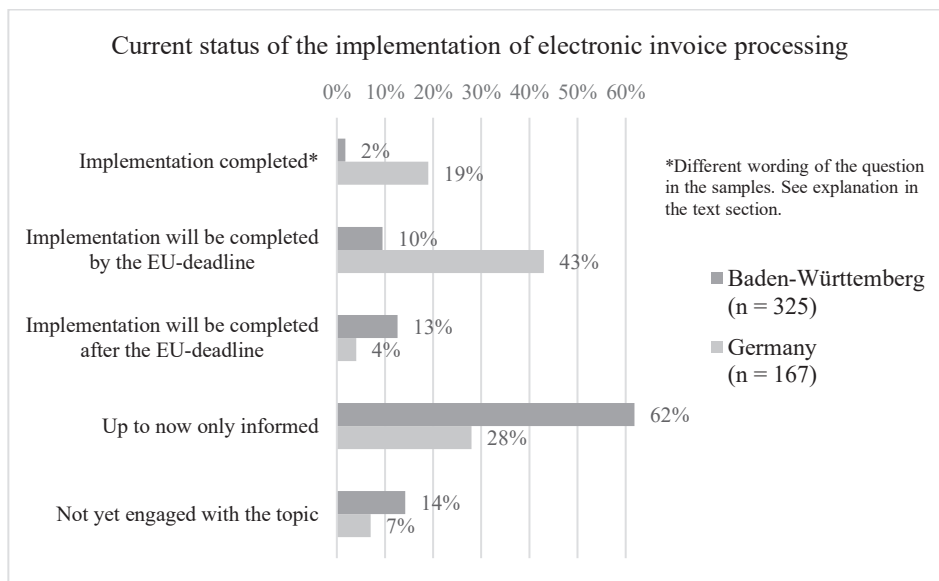Current status of the implementation of electronic invoice processing

Figure 1: Status Quo of the implementation of electronic invoice processing

In the Baden-Württemberg sample, 2 % chose the first response option - which differs from the original form[3] - "We have completed the switch to electronic invoicing". By the EU deadline, 10% of administrations will have completed the changeover to e-invoicing. Another 13% will complete the changeover after the EU deadline. 6 out of 10 administrations (62%) have so far only informed themselves about the issue but have not yet taken any concrete steps to implement it. 14 percent have not yet addressed the topic.

All in all, it can be stated that digitalization with regard to invoice processing in the Baden-Württemberg administrations surveyed is not yet as advanced as in the nationwide sample. In the following chapter the reasons for this become apparent.

4.2. Implementation barriers and challenges[4]

The barriers and challenges raised by the municipalities are described in the following paragraphs.

4.2.1. Results of the online survey

Barriers: Local authorities that have not yet taken concrete steps to introduce an e-invoicing workflow were asked in the online survey about the reasons that have prevented them from making the changeover so far ($233 \leq n \leq 241$), see figure 2.

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[3] For the survey of local authorities in Baden-Württemberg in summer 2019, the first response option deviated from the formulation of the replicated study. The reason for this is that the original formulation merely asks whether the legal minimum requirements applicable from April 2020 have already been met. However, administrations can also meet these requirements without having introduced a complete electronic invoicing process. The implementation of this "small solution" continues to cause a media disruption. Although the invoice is received electronically, it must be printed out, signed by hand and finally scanned in again for further processing. With this interim solution, the advantages of an electronic invoice process cannot be realized.

[4] For reasons of clarity, in the presentation of the results for the obstacles in the text part, the percentages for the response values "applies/ rather applies" (approval) and the values "does not apply/ rather does not apply" (rejection) have been combined.
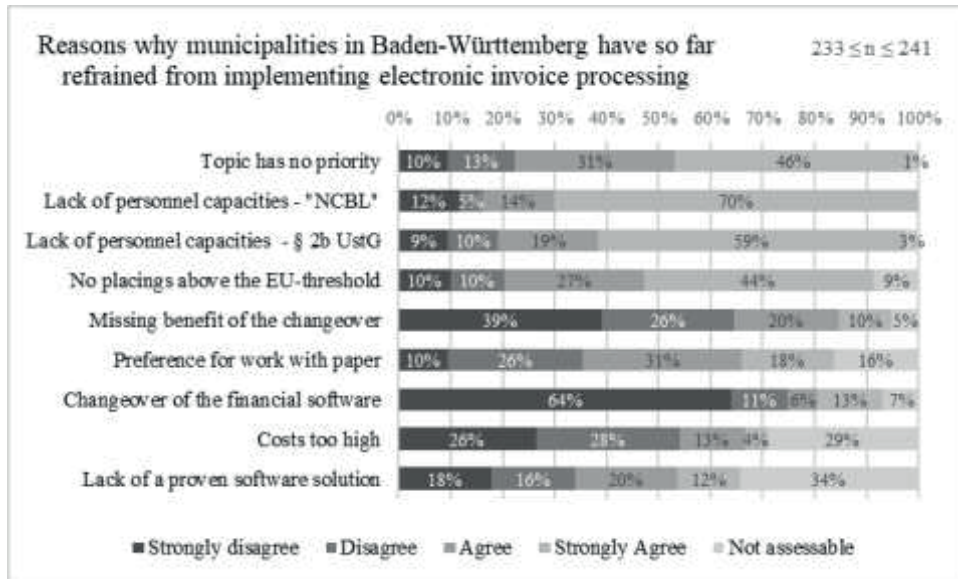
Figure 2: Implementation barriers before the changeover

For 77% of the respondents, e-invoicing is simply not yet a priority. The reason for this could be that administrations currently consider it more urgent to adapt to other legal regulations. For example, 84% of respondents said that they lacked capacity due to the changeover to the new communal budget law ("ncbl"). The new introduction of § 2b UStG (value added tax act) also has a negative impact on 8 out of 10 administrations (78%). By contrast, the EU e-invoicing directive is of little significance for a large number of municipalities: 7 out of 10 administrations (71%) state that they practically never place orders above the EU thresholds. The fact that a changeover does not bring sufficient added value, e.g. in terms of potential savings and efficiency gains, due to a comparatively low invoice volume, is not seen by the administrations. Two thirds of the respondents (65%) rejected this statement. A rather split picture emerges when asked whether the majority of employees prefer to work with paper instead of electronic documents. Half agreed with the statement, 36% disagreed with it. The remaining 16% could not evaluate the statement. Nearly one-fifth of administrations are still waiting for the changeover because they are currently converting their financial software or will be doing so in the near future. This reason seems to be particularly relevant for the cities, where a quarter of the administrations agreed with the statement. Whether the costs associated with the changeover are too high, 29% of respondents were unable to judge. However, more than half of the respondents (54%) did not see this as an obstacle and rejected the statement. Even a third of the administrations surveyed (34%) could not judge whether there is a lack of a proven product solution. Otherwise, opinions were divided here. Approx. one third (32%) agreed with the statement, the other approx. one third (34%) rejected it.

Main challenges of the changeover: Administrations currently in the process of changeover or having already completed it were asked about their main challenges during the changeover. In both the sample for Germany (n = 152) and the sample for Baden-Württemberg (n = 78), the adaptation of processes is seen as one of the greatest challenges in the introduction of electronic invoice processing. In each case 7 out of 10 municipalities chose this answer (Germany: 71%, Baden-Württemberg: 70%). In second place in each case is the creation of acceptance within the organisation, even if there is a discrepancy of 20% (Germany: 69%, Baden-Württemberg: 49%). The determination of legal requirements is perceived as a challenge by about one third of the municipalities (Germany: 36%, Baden-Württemberg 31%). In the Germany-wide survey, half of the respondents (48%) see integration into the existing IT landscape and the IT implementation of existing processes as a major challenge. In the Baden-Württemberg sample, this was only the case for one third of the respondents

(36% and 33% respectively). In both samples, 3 out of 10 administrations considered the development of expertise to be one of the greatest challenges (Germany: 31%, Baden-Württemberg: 30%). One feature that was only asked about in the present study was the delay caused by the high workload of the selected service provider. This circumstance was chosen by a quarter of the administrations surveyed (26%). The fact that this provider-side problem could be important for Baden-Württemberg was shown by the preliminary survey, which was used to determine the response characteristics for the additional variable "barriers".

4.2.2. Results of the guideline interviews

Challenges from the point of view of the project managers: Table 2 summarizes which factors hinder the changeover from the point of view of the project managers.

	Selected answers
Legislation **unclear legal situation**	*Interview 1* "Many also waited because the whole legislation was still in force. And in Baden-Württemberg we still have the problem that the legal standard was not yet pronounced until recently. So there is still no regulation on this §4a eGovernment law. I saw the draft for the first time last week, about three quarters of a year too late. It was not clear at that time either, what do you have to consider? Do you have to accept with portal, you may accept by e-mail, all the questions were not clarified. Or are still unsettled. You can only really get started when you know what the legal situation is.."
Legislation **too little pressure for invoice recipients**	*Interview 3* „It is the fault of the legislator who did not make the whole thing mandatory. Not like the SEPA changeover, which was mandatory for all municipalities in the country on the key date X [...] Now the EU is coming with its directive, the municipalities or public authorities are to accept and process electronic invoices. Then again the small print [...], which invoices are meant? It is about the threshold value for the award of contracts: Construction works over 5 million and services are 120,000 ungrades net. At least 90 percent of the municipalities in Baden-Württemberg sit back and say that this doesn't concern me at all. [...] So I can well understand why so few local authorities - I don't mean to say are not thinking about it – but shy away from the implementation."
Legislation **Too little pressure for billers**	*Interview 5* „And then there is the acceptance by the suppliers. The question is how many real e-bills will actually be received over time. Whether it is even worth it. Or will the majority of invoices, and I suspect that, continue to be received in paper form and must be scanned. There is no real pressure, because very few bills are above the threshold above which we have to accept e-bills."
Municipal IT-Provider **Time frame**	*Interview 5* "We have requested an offer from our municipal data network Iteos. It took a relatively long time until we received an offer. We are scheduled to start the project in December 2021, the pilot phase will run until August 2022. So it's a very long time horizon to introduce the whole thing. [...] The biggest problem is the time frame. As far as I've heard, the data network is completely booked out to implement this. And that's why it simply takes a long time. They don't have enough staff because of a lack of specialists to implement the whole thing and get the project off the ground."
Municipal IT-Provider **Dependency**	*Interview 5* "…At the same time, we are still looking for alternative possibilities outside the Iteos solution. I personally am not enthusiastic about this. It's about an interface solution that maps the invoicing process outside the system and then transfers it to SAP via interfaces. We are users of SAP KommunalMaster Doppik and that's where the consideration comes in. I don't think much of it, because I don't think it will work. In my view, we need an SAP-integrated solution. …"

Municipal IT-Provider **Finances / Costs**	*Interview 5* „The question of costs is also problematic. We have now at least received the offer from the data center. The introduction costs for us are about 50.000€, so I say okay, these are one-time introduction costs. The problem is the running costs. Because you would have to pay per invoice transaction processed. We have about 65,000 payout receipts per year and they charge a certain amount per item. And that brings us to a running cost of 83,000 euro per year, which is currently not being incurred. In other words, the advantages that e-bill certainly offers - shorter processing times, etc. - must of course first pay off before they can be introduced. This is an issue on which we are still struggling and thinking, does it make sense, does it not make sense." *Interview 3* „Then there is the fact that here in Baden-Württemberg we are linked to the ITEOS data network, our service provider. And of course, they try to market the product, and for a small community like my home municipality with 2,200 inhabitants, the switch is not financially worthwhile. [...] And of course not only the follow-up costs but also the installation costs that ITEOS demands are not exactly cheap. Of course, a municipality must first be aware of that. Am I taking the path of digitization, no matter the costs, or do I say it's not worth it for us, we stick to paper bills".
Municipality **Shortage of employees**	*Interview 3* „And in retrospect, I would say that I would only take over the project again when it is clear that I have the appropriate personnel here. As it is so often the case in the combing department, we managed the projects, be it the SAP conversion or the conversion to double-entry bookkeeping, with the existing personnel. And that is not feasible. Everyone has their day-to-day business, and I maintain that everyone, including the working group here, is busy with their day-to-day business, and then there is the project, without additional personnel, which is of course an additional burden. And especially in cases of holiday or illness, the project has to be put on hold. We were euphoric back in 2013, after WMD had given us the order to rebuild the entire city by 2018 at the latest. Then we set it for the first quarter of 2019, and now we have no final date at all."

Table 2: Barriers out of the perspective of the project managers

From the point of view of the project managers, the responsibility for the slow progress in the conversion to electronic invoice processing lies with the legislator. This is because administrations that show the will to introduce electronic invoice processing are slowed down by the lengthy legislation. For example, the e-invoice regulation has yet to be adopted, and the draft has only been available since autumn 2019. However, the regulation is important for the implementation of electronic invoice processing, as it regulates the invoice format to be accepted and the receipt of invoices.

Due to the implementation of the EU directive into the national law of the federal states, which only requires the receipt and processing of e-bills for contracts above the threshold values, a large number of administrations do not feel compelled to change over. The lack of an obligation for the entire public sector to accept e-bills reduces the attractiveness for companies to issue electronic invoices. However, the low level of acceptance by suppliers means that most invoices are still received in paper form. As a result, administrations with e-invoicing workflows cannot take full advantage of the benefits of digital invoicing and instead face additional scanning and validation costs. To achieve this, not only must the personnel capacities be kept ready, but above all the technical prerequisites must be created. Another factor that has a negative impact on the cost issue is the level of running costs. For each invoice that is fed into the workflow, a certain amount must be paid to the service provider. This leads to additional costs that are not incurred with paper-based processing and reduces the potential for savings. If a local authority decides to introduce electronic invoice processing despite the associated costs, it encounters another problem.

The municipal IT service provider Iteos is the first choice for most administrations in Baden-Württemberg. Due to staff shortages, however, this provider is experiencing massive time delays. It is not only the preparation of offers that is protracted. In particular, the project start itself can only be realised at a much later point in time than the administrations are aiming for. However, switching to other providers can lead to interface problems, as their products are not designed for municipal financial software. Another reason for the displeasure is that the administrations themselves are affected by a lack of personnel. Since no one is usually released exclusively for the project, the introduction of electronic invoice processing must be handled alongside day-to-day business. Due to holiday periods and cases of illness it can happen so easily that the schedule cannot be kept.

5. Summary

The aim of the present study was to survey the current status of electronic invoice processing in the municipalities of Baden-Württemberg. The results of the online survey conducted for this purpose show that three quarters of the administrations surveyed (n = 325) have not yet taken any concrete steps towards implementing an electronic invoicing workflow. Irrespective of whether the invoices arrive in paper or electronic form, the majority of them have so far been processed manually. However, currently 9 out of 10 invoices are still received in paper form, which is the preferred format of the administrations in Baden-Württemberg. However, the majority of administrations also accept invoices by e-mail. Digital archiving is carried out by 3 out of 4 municipalities. Compared to a nationwide survey, Baden-Württemberg is lagging behind in terms of digitisation overall.

The administrations justify the fact that no conversion has taken place so far, in particular by the lack of staff. The changeover to double-entry bookkeeping is particularly important here. The adaptation to the new budget law should also explain why the administrations in Baden-Württemberg are performing worse overall than in Germany as a whole. The conversion, which was approved by the Baden-Württemberg state parliament in 2009, was originally planned to last until 2016. However, this already long period was later extended to 01.01.2020. This makes Baden-Württemberg the only state where the new budget law will only become binding this year. In the other federal states, the changeover was either completed several years ago or the implementation is optional [17].

Nor is the EU directive, which was actually intended to promote electronic invoice processing, proving to be a driving force. In Baden-Württemberg, the directive has been transposed into state law in such a way that it only applies to local authorities in the case of award procedures above the thresholds. The majority of respondents generally do not reach these thresholds. The e-bill law is therefore not relevant for the majority of municipalities. In other federal states, the obligation also applies in the lower threshold range, which is why administrations there are under greater pressure to act [8]. Another problem is the unclear legal situation for billers and recipients, as the e-invoice regulation has not yet been adopted. Only since the end of October 2019 has the draft been available on the state's participation portal. Without concrete legal requirements, it is difficult for both business and administration to tackle the technical implementation. Although the digitisation strategy of the state of Baden-Württemberg is an attempt to advance the field of e-government, the legislation acts more as a brake than as a motor of change. How the actions of the state legislator affect the digitisation of other strategic areas is an interesting starting point for future research.

Especially for the administrations in Baden-Württemberg there is also a problem on the provider side. The municipal IT service provider Iteos, which is favoured by the majority of administrations, does not have the necessary personnel capacities to introduce the workflow of electronic invoicing for administrations willing to change over to the new system in a timely manner. For a quarter of the

administrations, this is the reason for delays. Since many administrations have so far only informed themselves about the subject of electronic invoice processing but have probably not yet received a concrete offer, this problem is likely to become even more acute in the near future. These administrations will probably have to wait several years before starting the project. In addition to the time frame, the high implementation costs and running costs also act as a deterrent. Especially for small administrations, this is unlikely to lead to savings. At this point it would be interesting to examine to what extent the high savings potential predicted in the studies can actually be realised by the municipalities. In this context, it also seems worthwhile to take a closer look at the implementation status of purchase-to-pay processes at municipalities in future scientific studies. The purchase-to-pay process goes beyond digital invoice processing, as the steps from procurement to payment of the invoice are digitised. This could result in a significantly greater efficiency potential, especially for larger municipalities.

6. References

[1]   GEYWITZ, H., Bundesländer Digital: Hessen, BaWü und NRW sind Vorreiter, Basecamp, Public-Affairs-Blog von Telefónica Deutschland, 2019 - download from https://www.basecamp.digital/bundeslaender-digital-hessen-bawue-und-nrw-sind-vorreiter/

[2]   Landesregierung Baden-Württemberg, Digitalisierungsstrategie der Landesregierung Baden-Württemberg, Ministerium für Inneres, Digitalisierung und Migration, 2017, download from https://www.baden-wuerttemberg.de/fileadmin/redaktion/dateien/PDF/Digitalisierungsstrateg ie-BW.pdf

[3]   REINERMANN, H., VON LUCKE, J., Speyerer Definition von Electronic Governance: Ergebnisse des Forschungsprojektes "Regieren und Verwalten im Informationszeitalter", Forschungsinstitut für öffentliche Verwaltung, Speyer, 2002, download from http://www.joernvonlucke.de/ruvii/Sp-EGov.pdf

[4]   ABl L133/1, Richtlinie 2014/55/EU des Europäischen Parlaments und des Rates vom 16. April 2014 über die elektronische Rechnungsstellung bei öffentlichen Aufträgen, Amtsblatt der Europäischen Union, 2014, download from https://www.bmi.bund.de/SharedDocs/downloads /DE/gesetztestexte/richtlinie/e-rechnung-richtlinie.pdf?__blob=publicationFile&v=5

[5]   BT-Drs.18/9945, Entwurf eines Gesetzes zur Umsetzung der Richtlinie 2014/55/EU über die elektronische Rechnungsstellung im öffentlichen Auftragswesen, Bundestag-Drucksache 18/9945, 2016, download from http://dip21.bundestag.de/dip21/btd/18/099/1809945.pdf

[6]   European Commission, Thresholds according to type of procurement under the 2014 directives on concessions, general procurement and utilities, 2020, download from https://ec.europa.eu/ growth/single-market/public-procurement/rules-implementation/threshold s_en

[7]   PUHL, A., Einsparpotenziale für die öffentliche Verwaltung durch die elektronische Rechnung: Grundlagen, Handlungsempfehlung und Wirtschaftlichkeit, Diplomica-Verlag, Hamburg, 2014.

[8]   GROSS, S., LINDGENS, B., BURGHARDT, P. and HAMBURG, J., Die elektronische Rechnung in der öffentlichen Verwaltung – Ein Leitfaden für die praktische Umsetzung, Peters,

Schönberger & Partner mbB, München, 2020, download from https://www.psp.eu/media/allgemein/leitfaden_die_elektronische_rechnung_in_der_oeffentlichen_verwaltung.pdf

[9]   BGBl. I S. 770, Gesetz zur Umsetzung der Richtlinie 2014/55/EU über die elektronische Rechnungsstellung im öffentlichen Auftragswesen, Bundesgesetzblatt, 2017, download from http://www.verwaltung-innovativ.de/SharedDocs/Publikationen/Organisation/e_rechnung_BGB_e-Rechnung.pdf?__blob=publicationFile&v=2

[10]   BGBl I S. 3555, Verordnung über die elektronische Rechnungsstellung im öffentlichen Auftragswesen des Bundes (E-Rechnungsverordnung - E-RechV), Bundesgesetzblatt, 2017, download from https://www.bmi.bund.de/SharedDocs/downloads/DE/gesetztestexte/e-rechnungsverordnung.pdf?__blob=publicationFile&v=3

[11]   LT-Drs. 16/5105, Gesetz zur Änderung des E-Government-Gesetzes Baden-Württemberg, Drucksachen Landtag Baden-Württemberg, 2018, download from https://www.landtag-bw.de/files/live/sites/LTBW/files/dokumente/WP16/Drucksachen/5000/16_5105_D.pdf

[12]   Landesregierung Baden-Württemberg, Entwurf - Verordnung der Landesregierung über die elektronische Rechnungsstellung im öffentlichen Auftragswesen in Baden-Württemberg (E-Rechnungsverordnung Baden-Württemberg – ERechVOBW), 2019, download from https://beteiligungsportal.baden-wuerttemberg.de/fileadmin/redaktion/beteiligungsportal/gesetzentwuerfe/191114_Entwurf_der_ERechnungsverordnung_BW_mit_Begründung.pdf

[13]   BERNIUS, S., PFAFF, D., WERRES, S. and KÖNIG, W., eRechnung - Handlungsempfehlungen zur Umsetzung des elektronischen Rechnungsaustauschs mit der öffentlichen Verwaltung: Abschlussbericht des Projekts eRechnung, Goethe-Universität, Frankfurt am Main; Bundesministerium des Inneren, Frankfurt, Bonn, 2013, download from https://www.ferd-net.de/upload/Handlungsempfehlungen-Rechnungsaustausch.pdf

[14]   BERNIUS, S. and KREUZER, S., Warum eRechnung? Ökonomische und ökologische Einsparpotenziale in der öffentlichen Verwaltung. In: Rogall-Grothe, C., Leitfaden Elektronische Rechnung in der öffentlichen Verwaltung. Grundlagen, Umsetzungsempfehlungen, Best Practices, Goethe-Universität, Frankfurt am Main, 2014, Chapter 3, 33–42, download from https://www.verwaltung-innovativ.de/SharedDocs/Publikationen/Organisation/e_rechnung_leitfaden_online.pdf?__blob=publicationFile&v=3

[15]   SEIDENSCHWARZ, H., E-Government im kommunalen Bereich: Ergebnisse einer Umfrage zu Payment- und Rechnungsprozessen in der kommunalen Verwaltung, ibi research an der Universität Regensburg, Regensburg, 2018, download from https://www.ecommerce-leitfaden.de/studien/item/e-government-im-kommunalen-bereich

[16]   Ministerium für Inneres, Digitalisierung und Migration Baden-Württemberg, Zahlen, Daten, Fakten: Kommunale Strukturen in Baden-Württemberg, download from https://im.baden-wuerttemberg.de/de/land-kommunen/starke-kommunen/zahlen-daten-fakten/

[17]   KommunalWiki, Doppik, Heinrich-Böll-Stiftung e.V, Berlin, download from http://kommunalwiki.boell.de/index.php/Doppik