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Stowarzyszenie Księgowych w Polsce

W KIERUNKU UMIĘDZYNARODOWIENIA / TOWARDS INTERNATIONALIZATION

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Electronic Document Management Systems as an IT tool for processing accounting e-documents in Polish local government

System Elektronicznego Zarządzania Dokumentacją jako narzędzie informatyczne do przetwarzania elektronicznych dokumentów księgowych w jednostkach samorządu terytorialnego w Polsce

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Abstract

Purpose: This paper explores the level of use of Electronic Document Management Systems (EDMSs) to process electronic accounting documents in local government in Poland, as well as the kind of basic activities related to electronic accounting documents that are supported in EDMSs. Registering electronic accounting documents in an EDMS is a vital step towards e-accounting because the automation of the processes related to registering accounting documents in accounting software is possible only when the accounting documents are electronic, i.e. in the form of a structured XML file.

Methodology/approach: Survey research was conducted among local government units (LGUs) in Poland to examine whether they use EDMSs to support accounting work related to the handling of electronic accounting documents. One thousand, five hundred and forty-nine units were examined, which is approx. 57% of the total population. The study is qualitative in nature.

Findings: The results showed that the Polish local government is poorly prepared to register electronic accounting documents in EDMSs. Of the 1,594 units examined, 1,058 use an EDMS and 536 have not yet implemented one, which means that these LGUs are not at all prepared for electronic communication, including registration of electronic accounting documents. Of those units already using an EDMS (1058), 685 use it to register electronic accounting documents, while 373 do not use it for this purpose.

Research limitations/implications: The limitation of the study is that despite the relatively large number of LGUs surveyed, the qualitative study does not allow for the generalisation of the results for the entire population.

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Practical implications: The study will be of interest to all those who plan to automate accounting processes based on loading metadata to the accounting software directly from electronic accounting documents in the form of XML files. Even though the empirical study covered only Polish LGUs, the issues related to IT applications used to develop e-accounting documents will also be of interest to local governments of other EU Member States, as the regulations and principles mentioned in the study have entered into force in all Member States.
Originality/value: The originality of the study lies in the fact that e-accounting, e-documents, and e-signature are relatively young phenomena, so this study may be one of the voices in the future discussion on this topic. The originality and value of the study lie in the attempt to approximate the degree of current EDMS use to process electronic accounting documents in local governments and the plans for implementing an EDMS in those local governments that do not yet use one in their activities. This will allow us to predict and assess the state of development of Accounting Information Systems (AIS).
Keywords: e-accounting, e-invoice, e-signature, e-document, eIDAS, Electronic Document Management System (EDMS).

Streszczenie

Cel: W artykule omówiono stopień wykorzystania systemów EZD do przetwarzania elektronicznych dokumentów księgowych w jednostkach samorządu terytorialnego w Polsce oraz rodzaje podstawowych czynności związanych z e-dokumentami księgowymi obsługiwanymi w EZD. Rejestracja e-dokumentów księgowych w EZD jest bardzo ważnym krokiem w kierunku e-księgowości, ponieważ automatyzacja rejestracji e-dokumentów w systemach księgowych jest możliwa tylko wtedy, gdy dokumenty księgowe są elektroniczne, tj. w formie ustrukturyzowanej Plik XML.
Metodyka/podejście: W celu zbadania, czy systemy EZD są wykorzystywane przez jednostki samorządu terytorialnego (JST) do wspomagania pracy księgowej związanej z obsługą elektronicznych dokumentów księgowych, przeprowadzono badanie ankietowe wśród JST w Polsce. Przebadano 1594 jednostki, czyli ok. 57% całej populacji. Badanie miało charakter jakościowy.
Wyniki: Wyniki pokazały, że JST są słabo przygotowane do rejestracji elektronicznych dokumentów księgowych w systemach EZD. Spośród 1594 zbadanych jednostek 1058 korzysta z EZD, a 536 nie wdrożyło jeszcze EZD, co oznacza, że te JST nie są przygotowane do komunikacji elektronicznej, w tym do rejestracji elektronicznych dokumentów księgowych. Spośród tych jednostek, które już korzystają z EZD (1058), 685 używa EZD do rejestracji elektronicznych dokumentów księgowych, a 373 nie używa EZD do tego celu.
Ograniczenia badania/implikacje: Ograniczeniem jest fakt, że pomimo relatywnie dużej liczby zbadanych JST, badanie jakościowe nie pozwala na uogólnienie wyników na całą populację, wskazuje natomiast na kilka kierunków przyszłych badań, z których najważniejszym jest, czy i jaki wpływ będzie miała zmiana formy dokumentu księgowego z papierowego na elektroniczny na dotychczasową praktykę księgową i sprawozdawczą oraz na rozliczenia podatkowe.
Praktyczne implikacje: Artykuł może zainteresować wszystkich, którzy planują zautomatyzować procesy księgowe przez automatyczne wprowadzanie metadanych do oprogramowania księgowego bezpośrednio z elektronicznych dokumentów księgowych w postaci plików XML. Pomimo tego, że badaniem objęto tylko polskie jednostki samorządu terytorialnego, to kwestie związane z aplikacjami informatycznymi służącymi do opracowywania e-dokumentów księgowych mogą zainteresować również samorządy innych krajów UE, gdyż wspomniane w opracowaniu regulacje prawne i zasady weszły w życie we wszystkich państwach członkowskich.
Oryginalność/wartość: E-księgowość, e-dokumenty, e-podpis to stosunkowo nowe zagadnienia, toteż artykuł może być jednym z głosów w przyszłej dyskusji na ten temat. Oryginalność i wartość opracowania polegają na próbie przybliżenia stopnia obecnego wykorzystania systemów EZD do przetwarzania e-dokumentów księgowych w JST oraz planów wdrożenia EZD w tych samorządach, które jeszcze nie wykorzystują EZD w swojej działalności. Pozwoli to przewidzieć i ocenić stan rozwoju informatycznych systemów księgowych.
Keywords: e-księgowość, e-faktura, e-podpis, e-dokument, eIDAS, EZD.

Introduction

In all EU countries in recent years, there has been very intensive digitisation of local government units (LGU), known as e-government. E-government is a concept that defines the use of IT&C in conjunction with organisational measures to improve specific structures, processes, and functions of public government (Gherasim, Ionescu, 2019). As a result, in the process of everyday business activities, as well as in communication with the public administration, documents are increasingly being signed and stamped digitally (Bralic et al., 2020), including accounting documents. In the first stage, the digitisation of LGUs covered their main activities, i.e. the implementation of electronic communication between the office and the applicant in connection with official matters. Currently, it also covers LGU support activities (back office), including accounting. Thus, from an accounting perspective, one aspect of the electronicisation of LGUs is that more and more electronic documents also appear in the accounting area in what can be called the advent of the e-accounting era. E-accounting refers to electronic accounting, a term used to describe an accounting system that relies on computer technology to capture and process financial data (Soudani, 2013; Mohammad, 2020). Information technology helps to improve the functions of accounting systems in organisations (Kloviene, Gimzaiskiene, 2015), and thanks to developing technologies, it is possible to record, transfer, and store books and accounting documents electronically (Guney, 2014).

The appearance of electronic documents in local governments has forced the implementation of a new IT tool for their processing, the Electronic Database Management System (EDMS). Registering an electronic accounting document in an EDMS is the first step and, at the same time, a necessary condition for its subsequent automatic processing by accounting software.

An electronic accounting document should be in the form of a structured XML file, as this is the only form that enables the automatic transfer of metadata about the transaction documented by this document to the accounting software. As defined in the Directive regulating electronic invoicing in public procurement, "'electronic invoice' means an invoice that has been issued, transmitted and received in a structured electronic format which allows for its automatic and electronic processing" (2014/55/EU, Article 2, point 1). Indeed, the maximum benefits of electronic invoicing appear when the processes of generating, sending, receiving and processing an invoice can be fully automated (2014/55/EU, preamble point 7). For this reason, "only machine-readable invoices that can be processed automatically and digitally by the recipient should be considered to comply with the European standard on electronic invoicing. A plain image file should not be considered an electronic invoice" (ibidem). Thus, an accounting document can only be said to be entered electronically if the information is written and read in binary (one-zero) form, and the interpretation and display/printing in a human-readable (text) form is carried out using the appropriate software. Currently, the XML format best meets these criteria; it is therefore widely used and is replacing other formats.

This study explores the use of EDMSs to process electronic accounting documents in Polish local government. The study also aims to explain what kind of basic activities related to electronic accounting documents are supported in EDMSs. The key research questions which this paper aims to answer are:

RQ1. Do LGUs use EDMSs to handle electronic documents and accounting processes?

RQ2. What types of LGU accounting processes and accounting documents are supported in EDMSs?

To empirically verify the research questions, a questionnaire survey was conducted among selected LGUs in Poland. To assess the degree of e-accounting implemented in LGUs, I also analysed other aspects related to the use of EDMSs to process accounting documents, such as the types of accounting documents and accounting processes already supported and planned to be supported by EDMSs.

The present study contributes to the Polish literature in accounting in the following ways. First, it fills a gap in the literature on the degree of advancement of electronic accounting implementation in local government units. The results of the use of EDMSs to process electronic accounting documents were examined and presented. Secondly, the study also enriches the literature on the subject by presenting the types of accounting documents and accounting processes whose electronic processing is currently supported or planned by LGUs.

The structure of this paper is as follows. The first part (Section 2) presents the most important premises of public policy that initiated the emergence of e-accounting, such as the activities of the European Parliament and the Council, concerning legal regulations regarding e-documents, e-signatures, e-delivery, and e-invoicing. The second part (Section 3 and 4) presents the assumptions of research conducted among Polish local governments to determine whether and to what extent EDMSs are used to process electronic accounting documents. Section 5 presents the discussion of the findings. Finally, Section 6 presents the conclusion of the study, outlines its limitations, and points out some directions for future research and practice.

1. Background and legal regulations

The main purpose of the EDMS implementation was to support the basic processes related to the services provided by LGUs. The advantage of the electronic document flow is that it allows for the optimisation of the technological processes of governmental bodies (Kussainova et al., 2020). The system enables the implementation of basic processes related to handling electronic documents, which mainly include registering e-document impact, electronic e-document workflow within the office, preparing a response to requests in the form of an e-document, e-signing e-documents, and e-delivering e-documents to recipients' electronic addresses. As Guney notes (2014), electronic document management is gaining importance in conjunction with the use of modern technologies. One of the main

goals of e-administration implementation is the transformation of paper processes carried out in a traditional office into electronic processes, which in turn should bring "measurable financial benefits for public administration" (Kotyla, 2020a, p.145). As Bralic, Stancic, and Stengard write (2020), the benefits should result in savings measured in tens of billions of euros.

Changes related to eIDAS and e-invoicing will soon change a lot in accounting because there is likely to be a second digital revolution in accounting, which will lead to the elimination of paper accounting documents and the emergence of electronic documents instead. Therefore, research should be conducted into how electronic accounting documents are processed and the directions of EDMS and AIS development.

1.1. eIDAS

Electronic communication has created a need for reliable online identity authentication. Most online service providers use registrations and then simple username/password systems for their identity management. The most widely deployed authentication method, a username plus a password, increasingly seems unfit-for-purpose (Kennedy, Millard, 2016). To ensure an adequate level of security of online transactions, this had to change. Personalised electronic services, e.g. from the e-government domain, had to reliably identify and authenticate users (Filho et al., 2019; Lentner, Parycek, 2016). An observable trend in e-government initiatives throughout Europe in recent years has been the emergence and roll-out of electronic identity (eID) schemes, which allow individuals to manage and authenticate their identities in conjunction with the use of online public services (Bourdillon-Stall et al., 2018). Electronic identities (eIDs), therefore, are an essential element of a comprehensive e-government solution (Lentner, Parycek, 2016; Melin et al., 2016).

The direct response to this expectation in the EU is the eIDAS Regulation (910/2014/EC), adopted in 2014. eIDAS stands for Electronic Identification (eID) Authentication and trust Services (AS), which already gives an idea of what eIDAS is about. These rules simplify and standardise the digital identifier and signature system across Europe, contributing to a European single digital market and providing a single legal structure for electronic identities and signatures. Importantly, the European legislation chose a regulation (not a directive), meaning that it is directly applicable in all EU member states. As a result of such a legal structure, the existence of a single set of rules throughout the EU was guaranteed, significantly reducing the risk of interpretation problems in individual member states. The changes introduced by eIDAS will soon make traditional paper documents, signed by hand and sent to the recipient by the traditional postal service, a thing of the past. Instead, an electronic document will appear in XML format that is electronically signed and delivered to the addressee via the e-delivery service; this will also apply to accounting documents.

From the point of view of the future development of e-accounting, a very important concept introduced by eIDAS is the legal definition of e-document, e-signature, and e-delivery. The e-document is defined as any content stored in electronic form, in particular, text or sound, visual or audiovisual recording (eIDAS, Article 3, point 35). Of fundamental importance is the provision relating to the legal effects of an e-document, which states that an e-document shall not be denied legal effect and admissibility as evidence in legal proceedings solely on the grounds that it is in electronic form. Thus, the e-document was legally equated with a traditional paper document (eIDAS, Article 46).

However, for a document to constitute evidence in a case, there must be one very important element, i.e. a signature on the document that confirms the will of the parties and the intention to conclude the transaction. With paper documents, this signature is handwritten on paper. A handwritten signature is impossible to submit in the case of the electronic form of a document. Digital signatures can be viewed as a digital solution to the problem of identity confirmation and data integrity using cryptographic algorithms (Bralic et al., 2020). This is where the second important definition introduced by eIDAS appears, i.e. an e-signature understood as data in electronic form that is attached to or logically associated with other data in electronic form and which is used by the signatory to sign (Article 3, point 10). As with the e-document, eIDAS introduced a very important rule regarding its legal effects concerning electronic signatures. An electronic signature cannot be denied legal effect and admissibility as evidence in proceedings solely on the grounds that it is in an electronic form (eIDAS, Article 25, point 1). Thus, legislation was developed at the EU level to equate electronic signatures with wet ink signatures (Graaf, 2019; Kotyla, 2020a). In addition to the e-signature itself, eIDAS also provides the equivalent of a traditional seal, i.e. an electronic seal, defined as data in electronic form that is attached to or logically associated with other data in electronic form to ensure the latter's origin and integrity (Article 3, point 25).

Finally, an electronic document requires a special delivery method, a registered e-delivery service, that makes it possible to transmit data between third parties by electronic means and provides evidence relating to the handling of the transmitted data, including proof of sending and receiving the data, and that protects transmitted data against the risk of loss, theft, damage or unauthorised alterations (eIDAS, Article 3, point 36).

1.2. E-invoicing

The first clear, practical step towards e-accounting is electronic invoicing in public procurement. The invoice is a critical document in business process chains; in the public sectors especially, the invoicing process is considered to be one of the processes with the greatest potential for improvement, resulting in increased productivity (Haag et al., 2013). As for its form, the invoice is associated primarily with a paper printout. The electronic invoicing concept emerged as a modern, reliable,

and efficient method for handling and processing invoices without the need for paper (Cedillo et al., 2018). It was made possible by technological development, which changed how tasks are performed in accounting, and transactions related to accounting began to be carried out through electronic media (Guney, 2014; Doshi et al., 2020; Kapkama 2020). The definition and rules for issuing and storing e-invoices in European Union Member States are regulated by Council Directive 2006/112/EC on the common system of Value-Added Tax. For VAT settlements, an e-invoice has been defined as an invoice that contains the information required in this Directive and which has been issued and received in any electronic format (2006/112/CE, Article 217).

The process of e-invoicing has long promised cost savings and efficiency gains (Fernandes, Longbottom, 2011; Kumar, Ganguly, 2020). The main benefits of the evolution of the invoicing system from the traditional (paper) form to the electronic form are:

- lower costs of handling the invoicing process – the introduction of automating the process of issuing, delivering, and settling invoices as well as archiving and cataloguing e-invoices allows for savings of financial resources,
- facilitating the transfer of invoices between the seller and buyer – an e-invoice allows for its e-delivery, which speeds up the transfer of the invoice from the seller to the buyer, thus improving business processes,
- protection of the natural environment – minimising the use of paper means less felling of trees, thus reducing the risk of extinction of certain animals and plants species and limiting other negative changes in the ecosystem.

The tangible benefits of e-invoicing have also been noticed by the public sector, which is the largest recipient of goods and services in all EU countries. According to the European Commission, around 250,000 public authorities across the EU spend ca. 14-15 per cent of GDP for purchases annually, playing a central role in many sectors of the economy (Bobowski, Gola, 2017). Therefore, lowering the costs of public supplies leads to an increase in the economic efficiency of procurement processes carried out by public entities, which contributes to an increase in competitiveness and innovation in the entire economy.[1] In addition to the financial aspect, the introduction of e-procurement reduces the discretionary power of public officials, fosters public sector accountability, removes unreasonably long tendering procedures, improves transparency, and leads to a higher quality of public goods (Melon, Spruk, 2020).

To reduce the costs of public deliveries in the Member States, in 2014, the European Commission adopted Directive 2014/55/EU of the European Parliament

[1] However, a study by McCue and Roman (2012) of procurement specialists showed that digitised public procurement has not yet led to significant transformative changes. The mismatch of software platforms, organisational resistance, lack of strategic systems integration and the lack of involvement of procurement professionals in the design of e-procurement systems, were identified as major obstacles to the successful implementation of digital procurement.

and of the Council of 16 April 2014 on electronic invoicing in public procurement. The e-invoice was defined for public procurement, which was slightly different than the previously mentioned definition that existed in the VAT Directive. The e-invoice is defined as a document that has been issued, sent, and received in a structured electronic format that allows its automatic and electronic processing (2014/55/EU, Article 2). In practice, it is an XML file that must contain metadata that is recognisable by the accounting software of both the invoice sender and its recipient. Importantly, 'images' of invoices, i.e. .jpg, .png, .gif, .tif, or .pdf files, do not meet the criteria of this definition because they cannot be automatically transferred and processed between the systems of the sender and recipient of the document. Directive 2014/55/EU obliges public administration at all levels to accept e-invoices from entities implementing public procurement contracts, and it provides for the unification of the e-invoice system within all member states.

The method of delivering and storing e-invoices is particularly important in the e-invoicing process. Electronic invoices should be stored in the same form in which they were sent or issued, and the authenticity of their origin and all content, important for commercial, accounting, and tax purposes, must be guaranteed. This means that e-invoicing compels the implementation of IT systems that enable the processing and archiving of e-invoices.

1.3. E-accounting

The literature review conducted by Kloviene and Gimyaiskiene showed (2015) that information technology influences the accounting process. As Amiri and Amiri (2014) add, some of these technologies, especially the Internet, have significantly changed accounting procedures. Specifically, technology enables the unprecedented sharing of data, access to cutting-edge hardware and software, and tools that can complement and enhance management accounting, financial accounting, and auditing tasks (Moll, Yigitbasioglu, 2019). So far, there is no standard definition of e-accounting; it only refers to changes in accounting caused by computer and network technologies. Therefore, for this study, e-accounting has been given a much broader meaning, i.e., it is computerised accounting based on electronic, not paper, source accounting documents (e.g. e-invoices and other e-documents).

The enactment of the legal framework related to e-documents, e-signatures, and e-delivery (eIDAS Regulation), along with the dissemination of e-invoices in public procurement (Directive on e-invoicing in public procurement), is an important signal that indicates the irreversible evolution of traditional paper accounting towards e-accounting, an attribute of which is the electronic accounting document. The legal status that exists under eIDAS equates the legal effects of an e-document signed with an e-signature with a traditional document signed with a handwritten signature (ink signature). Most electronic signatures are regarded as being capable of verifying both the signatory and the signatory's intent to sign (Kim, 2019).

This makes the e-document in the form of a structured XML file the same as a paper document with a handwritten signature that has been utilised for many decades; however, the use of e-documents creates new challenges. As with any new technological development, several legal questions arise (de Graaf, 2019). The questions mainly concern the processing and archiving of e-documents. An electronic document is an XML file that contains data on the concluded transactions and should be received in electronic form and then processed and archived in electronic form. Thus, the XML file must be:

- electronically decreed according to the rules adopted in the office – the electronic decree must be included in the XML file of the e-document,
- electronically accepted – the electronic signature of the supervisor accepting the given expenditure must be included in the XML file of the e-document.

Then, after electronic assignment and approval, the e-document must be electronically submitted to the accounting department of the LGU for inclusion in the accounting book of the office. The accountant of the LGU must therefore be able to visualise the XML file data in an appropriate IT system (metadata, e-signatures, e-assignment, e-acceptance, etc.) to verify the correctness of the required elements and signatures necessary before the e-document is included in the accounting books. Finally, since the original form of an e-document is electronic, this has consequences, as it requires all activities related to the procedure and archiving of e-documents to be electronic. In the event of any litigation – for procedural purposes – it will be necessary to provide the original document. This original is an electronic form, i.e. an e-document XML file, which contains all the elements required by external and internal regulations.

An e-document makes it possible to load the metadata describing the e-document to the accounting software of both the recipients and exhibitors based on the changing role of accountants, where advances in technology relegate the mechanical aspects of accounting to computer networks (Mohammad, 2020). As a consequence, it enables the automation of data processing processes, i.e. the automation of entries in the general ledger, the automation of tax settlements, and finally, the automatic preparation of the e-financial statement, reducing information asymmetry on the European market by providing all interested parties with faster and easier access to corporate information and documents (Judkowiak, 2019). The availability of abundant digital data also opens up new ways of improving financial audits (Werner, 2017).

2. Methodology

The study allows us to assess the analysed phenomenon, and it involved considering an individual case, which may be both a single institution and a specific larger group of units of the same type (e.g. local government units). The focus was on identifying the problem to assess the current state of affairs, the concept of improvements, and to predict how the phenomenon will develop.

2.1. Sample selection

The selection of the research sample was purposeful (non-probabilistic) and proceeded as follows. Data on the surveyed LGUs came from the internet database gminy.pl kept by the Ministry of Interior and Administration in Poland (as of June 15, 2020). The population of all local governments in Poland consists of 2,825 units. In the first step, from the theoretical population:

- Marshal's Offices (16) were excluded – due to the small number of these units and the different nature of their activities, and
- municipalities (238), cities with district rights (66), and Warsaw city districts (18) were merged into one type because all these types of units are classified as urban units, and they represent the same nature of business.

After these changes, a sample consisting of 2,809 firms was obtained. In the second step, more units were removed, namely those that did not disclose their email contact details in the gminy.pl database or whose email address was incorrect, as the email with the survey form could not be successfully sent from the outgoing mail server.

The final result of the sample selection is presented in Table 1.

Table 1. The result of the selection of the research sample

Type of LGU	Population	Research sample	%
Rural communes	1,545	1,350	87
Urban-rural communes	628	527	84
Municipal communes (incl. cities with district rights and Warsaw city districts)	322	264	82
Districts	314	271	86
Marshal Offices	16	---	---
Total	**2,825**	**2,412**	**86**

Source: own study (applies to all tables and figures).

2.2. Data collection method

The research was conducted using the survey questionnaire technique from June 23 to September 30, 2020. Questionnaires were distributed among LGUs through email with a request to fill them in and send them back to the same email address from which they were sent. Due to the nature of the questions asked, which related to the open activities of public entities, the questionnaire was attached to a special application, called an application for the disclosure of public information, which is regulated in Polish law by art. 2 clause 1 of the Act of September 6, 2001, on Access to Public Information. It obliges public authorities, in this case,

local government authorities, to answer the questions contained in the questionnaire within 14 days, increasing the effectiveness of the survey. Only some questions regarded the use of an EDMS for accounting purposes (appendices 1-2); the remainder concerned other substantive issues related to the LGUs' use of EDMS.

The following variable qualitative characteristics were examined:

- Does the LGU have an EDMS and use it to handle electronic documents and accounting processes?
- If not:
  - is it planning to implement it, and if so, when?
  - is it planning to use it to handle electronic documents and accounting processes?
- The kind of accounting processes already supported or planned to be handled in the EDMS:
  - the creation, approval, and settlement of the commitment of financial resources,
  - the registration of incoming invoices/bills,
  - substantive and accounting acceptance as well as assigning invoices/bills,
  - handling HR and payroll matters.

About 66% of the research sample was successfully researched, i.e. a correctly completed questionnaire was returned.

Such a high response rate is undoubtedly the effect of the legal nature of the survey, i.e. the request for disclosure of public information. The number of individual types of LGUs that returned the questionnaire are presented in Table 2.

Table 2. Number of surveys returned and the response rate

Type of LGU	Research sample	Researched LGUs	Response rate (%)
Rural communes	1,350	878	65
Urban-rural communes	527	345	65
Municipal communes	264	189	72
Districts	271	182	67
Total	**2,412**	**1,594**	**66**

3. Results

Each returned questionnaire was verified for correctness, and the collected data were subjected to detailed analysis. The results of this analysis are presented in Table 3–5.

Table 4 shows how many LGUs have already implemented an EDMS and use it in their operations, and how many still do not have such a system.

Table 3. EDMSs in LGUs

Type of LGU	Researched LGUs	LGUs with an EDMS	%	LGUs without an EDMS	%
Rural communes	878	541	62	337	38
Urban-rural communes	345	242	70	103	30
Municipal communes	189	143	76	46	24
Districts	182	132	73	50	27
Total	**1,594**	**1,058**	**66**	**536**	**34**

The use of an EDMS for accounting purposes by LGUs that already have an EDMS is shown in Table 4.

Table 4. Use of EDMS by LGUs that already have the system

Panel A: Use for accounting purposes

Type of LGU	LGUs that have an EDMS	The EDMS is used for accounting purposes	%	The EDMS is not used for accounting purposes	%
Rural communes	541	335	62	206	38
Urban-rural communes	242	164	68	78	32
Municipal communes	143	104	73	39	27
Districts	132	82	62	50	38
Total	**1,058**	**685**	**65**	**373**	**35**

Panel B: Types of accounting documents and accounting processes supported by EDMS

Type of LGU	EDMS is used for accounting purposes	Creation, approval, and settlement of the commitment of financial resources	Registration of incoming electronic invoices/bills	Substantive and accounting acceptance, as well as assigning invoices/bills	Handling HR and payroll matters
Rural communes	335	23	322	80	31
Urban-rural communes	164	16	159	51	21
Municipal communes	104	15	101	21	12
Districts	82	7	79	20	8
Total	**685**	**61** 9%	**661** 96%	**172** 25%	**72** 11%

Table 5 shows planned implementations and future uses of EDMSs for accounting purposes by LGUs that do not yet have an EDMS.

Table 5. EDMS implementations by LGUs that do not yet have a system

Panel A: Planned implementations of EDMS

Type of LGU	LGUs do not have an EDMS	LGUs do not plan to implement an EDMS	LGUs plan to implement EDMS		LGUs did not answer this question
			but not use it for accounting purposes	and use it for accounting purposes	
Rural communes	337	146	148	37	6
Urban-rural communes	103	40	44	16	3
Municipal communes	46	14	21	10	1
Districts	50	13	28	7	2
Total	**536**	**213** 40%	**241** 45%	**70** 13%	**12** 2%

Panel B: Types of accounting documents and accounting processes planned to be supported by EDMS

Type of LGU	LGUs plan to implement an EDMS and use it for accounting purposes	Creation, approval, and settlement of the commitment of financial resources	Registration of incoming invoices/bills	Substantive and accounting acceptance, as well as assigning invoices/bills	Handling HR and payroll matters
Rural communes	37	20	36	21	15
Urban-rural communes	16	5	16	11	5
Municipal communes	10	4	9	6	7
Districts	7	5	7	3	5
Total	**70**	**34** 49%	**68** 97%	**41** 59%	**73** 46%

Panel C: The planned date of EDMS implementation

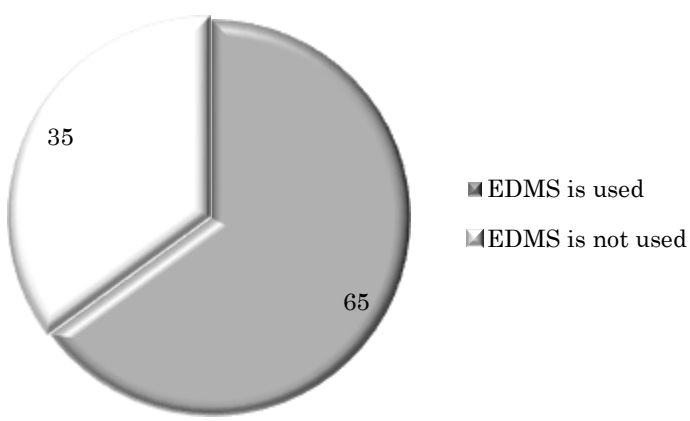
Type of LGU	LGUs plan to implement EDMS	By the end of 2020	By the end of 2021	No deadline has been set	No declaration as to the date
Rural communes	185	24	14	142	5
Urban-rural communes	60	12	4	43	1
Municipal communes	31	3	2	25	1
Districts	35	6	1	28	0
Total	**311**	**45** 14%	**21** 7%	**238** 77%	**7** 2%

4. Discussion

The registration of electronic accounting documents in an EDMS is a vital step towards e-accounting because the automation of the processes related to the registration of accounting documents in the accounting software is possible only when these documents are in the form of a structured XML file. XML files, which contain data about transactions (e-documents) registered in the EDMS, will enable the automatic loading of metadata that describe these transactions to accounting software, eliminating the manual work related to document registration currently performed by accountants. Of course, for this to be possible, it is also necessary to synchronise the accounting software with the EDMS, but this is another issue. Once again, the first step is to register the electronic accounting documents in the EDMS.

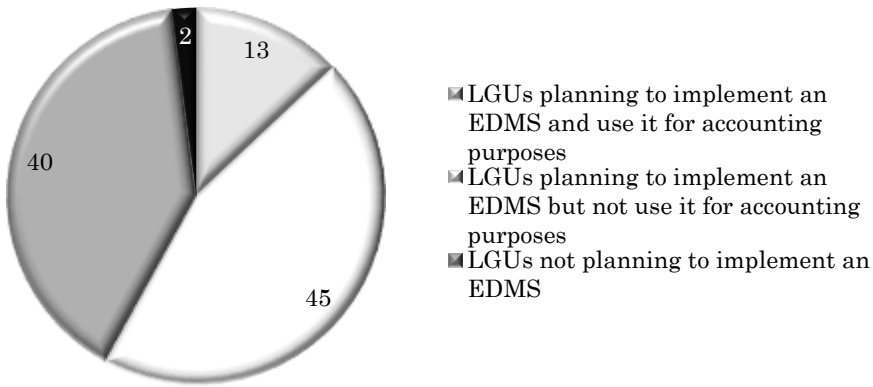
The results of the study show that 1,058 of the 1,594 surveyed LGUs already have an EDMS system. Most of them—as many as 685 units (65%)—use an EDMS to process accounting documents, while 373 units (35%) do not, as depicted in Fig. 1. Unfortunately, about 536 surveyed LGUs in Poland, which is quite a large percentage (34%) of all the researched LGUs, have not implemented an EDMS. This means that approx. 1/3 of LGUs are not yet prepared for electronic communication of A2C, A2B, or A2A, including the processing of electronic accounting documents.

Figure 1. Use of an EDMS for accounting purposes (in %)



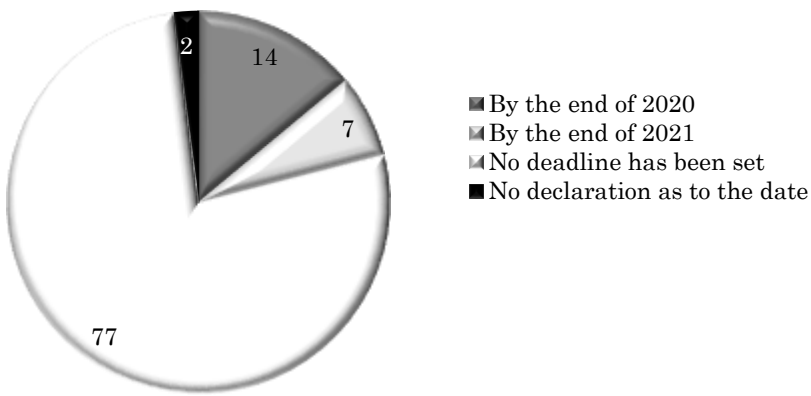
The LGUs declaration regarding the planned implementation of an EDMS is presented in Fig.2. As can be seen, almost 60% of the LGUs that do not yet have an EDMS plan to implement it. The use of an EDMS for accounting purposes is, however, declared by only 13% of LGUs that currently do not have one.

Figure 2. Planned implementations of an EDMS (in %)



As for the date of the planned implementation of the EDMS system, in the case of most LGUs (77%), it is not yet specified. In this context, declarations regarding the planned implementation lose their credibility. Detailed data on the planned implementation dates are presented in Fig. 3.

Figure 3. The planned date of EDMS implementation (in %)



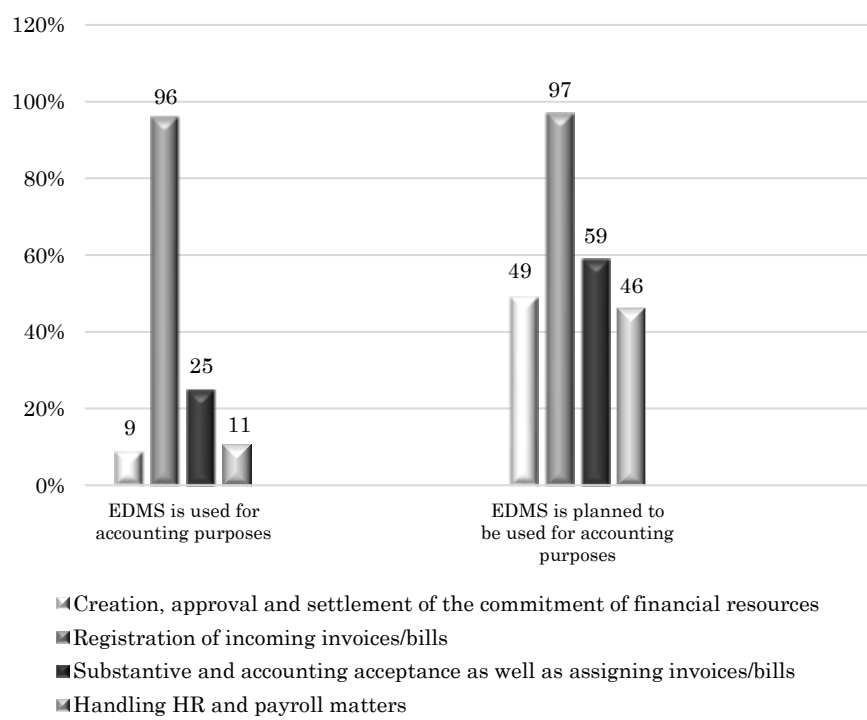
The scope of support for accounting activities and processes in an EDMS is presented in Fig. 4, and it should be considered in two sections, i.e.

- LGUs that already use EDMS for accounting purposes and
- LGUs that are planning to implement the EDMS and its use for accounting purposes.

As for LGUs that already use an EDMS to support accounting processes, most use it to register incoming electronic invoices and bills (96%). Activities related to the approval and assignment of accounting documents (25%) took second place. The remaining activities, i.e. the creation, approval, and processing of funds, and the handling of HR and payroll matters, are supported by EDMS to a much lesser extent. Among the LGUs planning to implement EDMS and use it to support accounting processes, the registration of incoming electronic invoices and bills has also been recognised as the most important process that requires EDMS support, with as many as 97% of LGUs concurring.

The need for a tool to register electronic invoices and bills is the result of the introduction of electronic invoicing in public procurement in Poland, starting from April 2019. This obligation is a consequence of Directive 2014/55/EU and is part of the government program "from paper to digital Poland".

Figure 4. Types of accounting documents and accounting processes supported by EDMS



When analysing the processing of electronic accounting documents in Polish local governments, it is worth recalling the results of a study conducted in Poland by the Ministry of Entrepreneurship and Technology in partnership with the Institute of Logistics and Warehousing from February 14 to March 18, 2018. The

research group was a representative sample of public entities obliged to receive electronic invoices in connection with public contracts awarded by them, and one of the two research goals was to answer the question: What is the organisational and technical level of preparation enabling the implementation of the receipt and processing of e-invoices in public administration? As a result of the research, it was found that (Dobiecka, 2018):

- the use of information systems by contracting authorities in public supply is relatively low (26%),
- integration between internal IT systems for collecting and processing electronic invoices occurs only in 13% of the surveyed units.

Consequently, only 2% of the public procurement sector entities surveyed declared that they received electronic structured invoices, i.e. invoices in XML format.

Conclusions

Electronic accounting documents provide a chance to automatically enter transaction metadata into the accounting software, but only if it is registered and stored electronically as a structured XML file in the EDMS. The empirical findings, based on a survey conducted among 1,594 LGUs in Poland (over 60% of Polish LGUs), indicate that Polish local government is poorly prepared to register electronic accounting documents in an EDMS, even though there are relevant legal regulations (eIDAS and the Directive on electronic invoicing in public procurement). There are also tools that enable in practice the registration of electronic accounting documents, i.e. the EDMS, which would eliminate some of the manual work currently performed by accountants. Currently, only 685 Polish LGUs use an EDMS to register electronic accounting documents. The vast majority register only incoming invoices/bills; no other accounting documents are registered in an EDMS. As for the types of activities performed in an EDMS, they are most often used to receive and process electronic invoices, which is related to the obligation to receive e-invoices in public procurement. Such poor preparation of Polish self-government to process electronic documents with so much pressure, among others the digitisation of local government, and funds provided by the EU, raises the question of why it looks like this. However, answering this question requires separate empirical research in this area.

Even though the empirical study covered only Polish LGUs, the issues related to IT applications used to develop e-accounting documents will also be of interest to local governments of other EU Member States, as the regulations and principles mentioned in the study have entered into force in all Member States. Moreover, it is expected that similar problems and solutions will soon appear in the private sector, as the development of e-solutions is a key factor driving both business and public administration (Berenyi, Sasvari, 2018).

The study presents the possible development of accounting in the 21st century and thus accounting without paper accounting documents. This has some implications for researchers and practitioners, the most important of which are:

- the second digital revolution in accounting should be expected in the coming years, namely the abandonment of traditional paper accounting documents in accounting in favour of electronic accounting documents.[2] This process has already started at the level of public administration, and soon – following public administration – it will also take place in the private business sector;
- the change of accounting documents from paper to electronic form forces changes to the accounting regulations of individual member states, in the part concerning accounting documents. An electronic accounting document requires completely different procedures than a paper version, and "their effective implementation requires changes to the provisions regarding source documents" (Kotyla, 2020b, p.107) in the accounting regulations and internal regulations of the units.

The research has its limitations. In qualitative research, the selection of the research sample is non-probabilistic; thus, there are limitations when generalising the results for the entire population, and the presented assessment of the results is often considered a subjective judgment of the researcher. Another limitation was the sample selection method, which may be biased with a self-selection bias.[3] The questionnaire was sent to the email address in the gminy.pl database, from which the data of the surveyed units came. Unfortunately, not all units had entered their email address in that database, and not all addresses listed there were correct. The lack of an email address, or an invalid email address, made it impossible to investigate such units. It would be worth considering whether the fact that the survey was conducted jointly with a commercial company is also a limitation or not. In my opinion, it is not, although I understand that some doubts may arise here.

Similar doubts may arise concerning the form of the research, i.e. requesting the disclosure of public information. Even though public entities are legally obliged to provide such an answer, doubts may arise whether their answers are credible, due to the large number of requests they receive. In my opinion, they are credible because the act obliges them to provide reliable public information on the functioning of offices, and I do not think that this form translates into unreliable answers. The fact that the term EDMS was not defined in the questionnaire may also be considered a limitation, although I believe that after so many years of electronicisation of LGUs, local governments know very well what an EDMS is.

Despite these limitations, I hope that the study is a step towards understanding the pending changes in accounting that are related to the change in the form

[2] The first digital revolution in accounting could be called the transition from paper books of accounts to electronic books of accounts.

[3] More on self-selection bias see Strawiński (2007, pp. 46–61).

of documenting business operations. I believe that the findings will be useful to a variety of local government unit stakeholders, regulators, as well as local government unit researchers. In particular, the results of the research may translate into decisions regarding the development of EDMS and AIS, future legal regulations regarding the organisation and documentation of the course of public procurement, as well as the necessary changes in the organisation of accounting in the local government. Apart from the practical implications, the research also has theoretical implications. An electronic document in accounting that will replace a paper document forces certain changes in legal regulations and applicable accounting principles, e.g. in the field of documenting business operations, and this is one of the many areas that should be carefully examined.

The originality of the study lies in the fact that e-accounting, e-documents, and e-signatures are relatively young phenomena, so this study may be one of the voices in the future discussion on this topic. The originality and value of the study come from the attempt to approximate the degree of current use of EDMSs to process electronic accounting documents in local governments and the plans for implementing an EDMS in those local governments that do not yet use one. This will make it possible to predict and assess the state of development of Accounting Information Systems.

The findings point at several avenues for future research. Researchers could:

- study whether and what impact the change in the form of electronic accounting document will have on the current accounting and reporting practice, as well as on tax settlements;
- establish a catalogue of current and future needs related to the processing of electronic accounting documents. Currently, only e-invoices are processed. Therefore, it is important to consider what the needs will be with the advent of electronic accounting documents other than electronic invoices;
- examine to what extent the accounting regulations and internal regulations of units regarding the handling of accounting documents should change due to the advent of electronic accounting documents;
- examine whether, in the event of a full transition to electronic accounting documents, they should still be processed in the EDMS used for substantive work, as is the case today in most offices.

It would also be worth considering extending the accounting software with a new module to handle electronic accounting documents.

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Appendices

Appendix 1. Part of the survey form on the processing of electronic accounting documents in those LGUs that already use EDMS

LGUs with EDMS	Yes / No
1. What is the scope of using an EDMS in your office in the field of accounting matters?	----------
• Creation, approval, and settlement of the commitment of financial resources	
• Registration of incoming electronic invoices/bills	
• Substantive and accounting acceptance, as well as assigning invoices/bills	
• Handling HR and payroll matters	

Appendix 2. Part of the survey form on the processing of electronic accounting documents in those LGUs that do not yet use an EDMS

LGUs without an EDMS			Yes / No
1. Do you plan to implement EDMS, and if so, when?			
By the end of 2020	By the end of 2021	No deadline has been set	
2. What is the planned scope of using EDMS in your office in the field of accounting matters?			
• Creation, approval, and settlement of the commitment of financial resources			
• Registration of incoming electronic invoices/bills			
• Substantive and accounting acceptance, as well as assigning invoices/bills			
• Handling HR and payroll matters			
• We are not yet planning the scope of using EDMS in the field of accounting			