

Electronic invoicing information system

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Abstract. Implementation of Electronic invoicing via the Electronic invoicing information system is one of the first steps in the digitization of business. The process of accepting electronic invoicing in the European Union is based on Directive 2014/55/EU which has the goal of decreasing the barriers to cross-border procurement activities, ensuring an interoperable standard/norm for electronic invoicing in public procurement within the boundaries of European Union, and ensuring more straightforward and business-to-business transactions. The transition to this form of invoicing should save a significant part of the costs related to invoicing and significantly speed up and simplify the whole process. Despite the fact that this is a technology that is many years old, state institutions in the Slovak Republic are just beginning to work with this technology. The state's approach also has an impact on the willingness and motivation of private companies to implement it. Different lawful and technical prerequisites of electronic invoices create barriers to access the free market in cross-border public procurement and barriers to trade as they deter economic operators from engaging in cross-border public procurement activities. The aim of the article is to point out the requirements and technical standards, advantages, and disadvantages of the implementation of electronic invoicing information system accent with an emphasis on the current situation in the Slovak Republic. Due to the fulfillment of the main aim, analysis, synthesis, comparison, induction and deduction are used in the article.

Keywords: Electronic invoicing, Electronic invoicing information system, Directive 2014/55/EU

JEL classification: G28, H25, L86

1 Digital technologies

The rise of digital technologies, for example, the Internet of Things, or artificial intelligence used in the area of machine learning, robotization, automation, which

immensely affect today's businesses, are present in every area of our lives. Customer expectations in the digital age are rising, forcing businesses to improve and present new business models that take advantage of digital technological advances. The results of zero action can prompt the loss of Generation Y customers due to insufficient technological progress in a competitive digital market. In order for traditional businesses to remain competitive, they must stop avoiding the process of moving towards digital technologies, on the contrary, they must seize opportunities, which must lead to the beginning of the transition to adopting a model that meets the expectations of the digital economy. The introduction of electronic invoicing is one of the first steps in the digitization of business. An invoice is a legal accounting document in paper or electronic form that must reflect the actual supply of products or services and should be linked to a specific taxable transaction, whether the supply of goods or services.

1.1 Digital transformation

Newly emerged digital communication channels, like the use of the World Wide Web to search for information, online communication, mobile applications, different types of digital media, are challenging to understand for the rather traditional banking industry. That is particularly true for the traditional banking models which don't live up to the assumptions of Generation Y.

New financial market participants, such as start-up digital banks and fintech companies, influence and dictate emerging trends in the banking industry, which radically deploy technologies and draw in clients with creative digital banking services and products.

It is therefore essential that organizations in the financial business but also companies providing accounting, auditing, investment services, etc., swap radically from creation and management of financial, accounting, and similar products and services to the area of provision of modern monetary instruments that are required by clients and adapting offers to their necessities [16].

The need for the digital transformation of business entities is an outcome of advances in computerized technologies, advanced digital competition, and the subsequent way of behaving of "computerized" clients.

Verhoef et al [15] identified three stages of digital transformation:

- a) digitization -the activity of converting analog information to digital information,
- b) digitalization - the process of introducing information or digital technologies for efficient use in business in order to change existing business processes and
- c) digital transformation.

Advancements in technology are the basis for an organization to contend in a digital environment, for example by making digital business models that further increment the upper hand of the company over the competition. Based on this context, we can characterize competitive advantage as the process of creating value and the ability to deliver newly created value to customers, followed by the conversion of received payments into profits.

A new business model is presented through the digital transformation by carrying out a new business rationale in order to make and capture value. In the environment of a digitized economy, business entities communicate with clients through a wide range of online interfaces and web applications, often called digital platforms [5].

In order to achieve digital transformation, every one of its stages needs digital resources, which can result in a transformation of a classic enterprise into a digital enterprise. The impact of digital transformation on the structure of the organization is huge, as changes in the structure of an organization should uphold the introduction and reception of digital change.

However, digital technologies alone don't ensure a positive outcome unless the strategy of digital growth is implemented. The success of the implementation process and the results of the implementation are estimated utilizing metrics, which also need to be adjusted by incorporating digital aspects.

An updated business strategy associated with the transition to the digital environment, building and maintaining a market position, and the constant development of the capacity of human capital are the basic factors related to the success of a financial institution. The accentuation on transforming distribution models, further developing worth designs, and developing the impact of a digitized process will increase development and consumer loyalty and provide a solid ground on which financial organizations can grow and innovate [13].

2 Research on electronic invoicing

Tofan [14] studied the issue of preventing the danger of hacker attacks in electronic invoicing systems, researching the technology of detecting attacks on electronic invoicing systems, which is based on machine learning techniques and allows the completion of two goals of research.

The principal goal was to propose a method based on machine learning with the purpose to detect anomalies in electronic invoices and identify anomalies occurring in electronic invoice systems. The subsequent goal was to perform a profound combination examination of abnormal mining ways of behaving to distinguish likely threats in electronic invoice systems and to design and implement an in-depth analysis method based on the collection of these electronic invoice characteristics based on the "median k" and Skip-gram. Trial results suggest that the technique proposed by the [12] can really recognize pernicious assaults yet in addition possible dangers in electronic invoicing frameworks.

Zhou, Che [19] emphasized the existence of tax problems, such as difficulties with invoice management and accounting. They recommend for the market to support electronic invoicing, which the government could support by providing appropriate subsidies, and to motivate companies to prepare optimal tax plans.

In the study Kotyla [10] identifies the principles of the eIDAS Regulation (electronic identification and trust services). Results also emphasized the need for changes in connection with the regulation requiring changes in the current teaching of accounting.

The above-mentioned changes mainly concern the new standards of electronic documents creation, electronic signature, and electronic distribution of bookkeeping documents. In addition, in Poland and the other EU Member States, corrections must be introduced in the study programs of students specializing in accounting, as similar arrangements apply to electronic accounting records, electronic signatures, and electronic supplies throughout the EU [2]. The results of this research also present the opinion of accountants on the eIDAS Regulation and its implications for their practice.

Chang et al [9] found that electronic invoicing has a bright future in the area of payment security. It can be used not only for item traceability as well as to prevent illegal practices from manufacturers suspected of money laundering. Required utilization of e-invoices can improve the accuracy of this alert system.

Hagsten, Falk [6] examined empirically the extent to which a set of basic business characteristics (size of the company, industry, form, and structure of the invoice, and capacity of production), external factors, type of clients, the possibility of access to the advanced information and communication technologies (ICT infrastructure) are connected to the likelihood of sending electronic invoices and the frequency of their use, based on the results of a representative survey of 1,500 Swedish companies. Analyzed were companies with one or more employees in all industry sectors except agriculture, fishery, forestry, public administration, and defense. The results of the descriptive statistics show that 42% of companies used some kind of electronic invoices in 2016. The results of the research show that both internal and external factors have an impact on the use of electronic invoices.

The likelihood of acceptance of electronic invoices is reasonably higher for companies with clients from the government sector and a higher number of invoices. Another variable significant for the scope of electronic invoices is the level of labor productivity. Companies operating in the construction sector are most likely to accept electronic invoices and manufacturing companies will increase their use. In addition, neither industry membership nor enterprise size class is decisive. Assuming the size class of the enterprise is assessed independently, apparently medium and large enterprises associate the invoices with the type of client, while the scope of activity is connected only to internal factors. On the other side in the case of micro and small businesses, the type of client seems to be the most important aspect.

Horák, Bokšová, Strouhal [7] examined approaches to electronic invoicing in the public procurement process in the European Union. They analyzed the process of receiving electronic invoicing within different EU member states, with the orientation to business-to-government (B2G) contracts. Directive of the European Parliament and of the Council of the EU no. 2014/55 emphasizes the existence and use of several global, national, regional, and corporate standards in the field of electronic invoicing in the EU Member States. None of these standards are prevalent and the majority of these standards are not compatible with another. The acceptance of electronic invoices depends on Directive 2014/55 with a definitive goal to reduce boundaries to cross-border procurement activities, ensuring an interoperable norm/standard for electronic invoicing in public procurement in the EU, and guaranteeing more straightforward B2B transactions.

Without a unified standard for electronic invoicing, the states of the EU can freely decide on the use and improvement of their existing systems based on the different national guidelines and standards while promoting the utilization of systems of electronic invoicing in public procurement. The number of simultaneously existing various norms in the Member States is subsequently expanding and is probably going to increment further in the future [1].

The diversity of non-compatible standards brings disproportionate complexity, legal uncertainty, and extra operational expenses for financial operators involving electronic invoices in the different Member States. Companies wishing to do cross-border public procurement activities are expected to agree with a new standard on electronic invoicing whenever they enter market of another state. Different legal and technical necessities for electronic invoices establishes barriers to free market access in cross-border public procurement and barriers to exchange as they deter companies from engaging in cross-border public procurement activities. They constitute obstacles to fundamental freedoms and therefore straightforwardly impact on the functioning of the internal market [1].

In addition to the transposition of the Directive and its subsequent notification, Member States are required to guarantee that contracting sides or entities get and handle electronic invoices that follow the European standards for electronic invoicing in public procurement.

Subsequently, the directive regulates the requirements of an electronic invoice and the method of adoption and publication of a European standard.

The relevant European standards are technical standards, transferred to the national STN system under the designation:

- STN EN 16931-1 + A1: 2020 Electronic invoicing. Part 1: Semantic model of basic elements of an electronic invoice (36 9640)
- STN EN 16931-1 + A1: 2020 / AC: 2020 Electronic invoicing. Part 1: Semantic model of basic elements of an electronic invoice. AC repair
- STN P CEN / TS 16931-2: 2017 Electronic invoicing. Part 2: List of syntaxes complying with EN 16931-1 (36 9640)

From the point of view of the scope of the directive, this does not apply to the so-called defense contracts if they relate to classified information or are accompanied by other security measures.

Member States had the obligation to implement the Directive by 18 April 2019 at the latest for central government and by 18 April 2020 at the latest for all VO / O. This obligation was not fulfilled by the Slovak Republic.

The main aim of the research [7] was to find out which EU Member States followed this directive and afterward to look at the rules on electronic invoicing that can be valid in all EU Member States. The methodology of research was a comparative analysis of data transfer by electronic invoicing between the provider and the client from the point of view of B2G. The research team sought to address the accompanying research questions: Which EU Member States or European Economic Area (EEA) nations have

rules for B2G electronic invoicing? Is it required to utilize B2G electronic invoicing during the obtainment cycle or is electronic invoicing just a deliberate choice of the organization or state establishment in the chosen country? What platform is utilized for the data transfer of electronic invoices? Is the invoicing platform provided by a state establishment or a private company? This research analyzed data from 28 EU Member States and 3 EEA countries. Data from the Member States on electronic invoicing distributed by the European Commission and all Member States were analyzed.

Even though the main objective of Directive 2014/55/EU is to guarantee the interoperability of electronic invoicing standards, numerous Member States actually have their own, specific way to deal with electronic invoicing. The three primary options to access the electronic invoicing platforms are those provided only by government providers, second are invoicing platforms provided by a private enterprise, and third are invoicing platforms that provide a choice between a government or a private supplier for electronic invoicing processing. More than 10 states that were included in the research actually don't have existing regulations on electronic invoicing. Besides, B2G electronic invoicing is on a voluntary basis in 12 countries according to the information from 28 EU Member States and 3 EEA countries. In a conclusion, these Member States don't comply with the above-mentioned EU directive.

The Slovak Republic, since 1 August 2019, has fulfilled the requirements of Directive 2014/55 / EU by adopting Act no. 215/2019 on guaranteed electronic invoicing and the central economic system and on the amendment of certain laws [12].

If we look at the way the electronic data is transferred only in Norway and Iceland they are provided exclusively by privately owned businesses. In Norway and Iceland authorities have passed the whole agenda of electronic information transmission to private enterprises. In Sweden and the Netherlands is available a possibility, that companies can choose between a private or public platform as a carrier of the electronic invoicing process. The authors of the study are persuaded that electronic invoicing, which is presently utilized in B2G contracts, will turn into the reason for the implementation of electronic invoicing in B2B contracts and guaranteeing compulsory use by law, as is now the case in Italy [7].

Vieira et al. [16] are examining the benefits of introducing an electronic invoice, which represents an increase in tax revenues in Brazil (Goiás). The results indicated that the average tax collection in the State of Goiás was statistically higher in the period after the introduction of the electronic invoice and also confirmed a higher increase in the collection of companies required to issue an electronic invoice compared to those not required during the research period. Thus, the main focus of electronic invoicing is not to increase tax collection, it can be observed that the institutionalization of the standardization program and the sharing of fiscal documents included improving tax administration control processes, increasing the collection of state taxes by reducing tax incapacity.

3 Requirements and Technical Standards for Implementation and Deployment of Electronic Invoicing Information System (IS EFA)

The CEN / TC 434 Electronic Invoicing technical group established by the European Committee for Standardization (CEN) has prepared a European standard (EN) for electronic invoicing in public procurement and a list of syntaxes that comply with the EN, and subsequent technical specifications and technical reports related to electronic invoicing. in public procurement. At the end of 2017, European standards and some technical specifications were transferred to the national STN system by an announcement in the ÚNMS SR Bulletin.

Binding technical standards for the implementation and deployment of IS EFA are:

- STN EN 16931-1 + A1: 2020 Electronic invoicing. Part 1: Semantic model of basic elements of electronic invoicing (36 9640)
- STN EN 16931-1 + A1: 2020 / AC: 2020 Electronic invoicing. Part 1: Semantic model of basic elements of an electronic invoice. Correction AC 25.
- STN P CEN / TS 16931-2: 2017 Electronic invoicing. Part 2: List of syntaxes conforming to EN 16931-1 (36 9640), the following two syntaxes:, the following two syntaxes:
 - UN / CEFACT Cross Industry Invoice XML report as defined in the XML Schem 16B document (SCRDM - CII),
 - Messages for UBL invoices and credits as defined in ISO / IEC 19845: 2015.

The recommended and supplementary technical standards in the implementation of the IS EFA are:

- STN P CEN / TS 16931-3-1 Electronic invoicing. Part 3-1: Methodology for linking syntaxes to the basic elements of an electronic invoice (CEN / TS 16931-3-1: 2017),
- STN P CEN / TS 16931-3-2 Electronic invoicing. Part 3-2: Syntax link for invoice and credit memo ISO / IEC 19845 (UBL 2.1) (CEN / TS 16931-3-2: 2020),
- STN P CEN / TS 16931-3-3 Electronic invoicing. Part 3-3: Syntax link for cross-sector invoice UN / CEFACT XML D16B (CEN / TS 16931-3-3: 2020),
- STN P CEN / TS 16931-3-4 Electronic invoicing. Part 3-4: Syntax link for UN / EDIFACT D16B invoice (CEN / TS 16931-3-4: 2020),
- TNI CEN / TR 16931-4 Electronic invoicing. Part 4: Handbook for interoperability of electronic invoices at the transmission path level (CEN / TR 16931-4: 2017),

- TNI CEN / TR 19931-5 Electronic invoicing. Part 5: Guide for the use of sectoral and national extensions in conjunction with EN 163931-1, method of use in the real environment (CEN / TR 16931-5: 2017),
- TNI CEN / TR 16931-6: 2017 Electronic Invoicing. Part 6: Results of testing EN 16931-1 with regard to its practical use by end users.

In addition to the above recommended and supplementary technical standards:

- in the CEN approval process, the technical specification FprCEN / TS 16931-7: Electronic Invoicing - Part 7: Methodology for the development and use of EN 16931-1 compliant structured Core Invoice Usage Specifications,
- and in the design process the technical specification prCEN / TS 16931-8: Electronic Invoicing - Part 8: Functional specification and guidance for registry services.

3.1 Electronic invoice

An electronic invoice means an invoice that contains data pursuant to Section 74 and is issued and received in any electronic format [18]. The choice of format is not determined by the Member State, but the use of the electronic format depends on the taxable person. These can be invoices as structured messages, such as XML, or other types of electronic format, such as PDF. The law makes the issuance of an electronic invoice conditional on the consent of the recipient of the goods or services. This consent can be expressed in writing, electronically - by email, orally, or by the processing of the invoice by the recipient or its payment. The recipient must be sure that he is technically able to accept the electronic invoice and ensure the authenticity of its origin, the integrity of the content, and its legibility[4].

In other words, e-invoicing or Electronic Invoicing is the electronic transfer of billing information. E-invoicing is an essential part of an efficient financial chain that connects the internal processes of accounting units to payment systems. In the process of e-invoicing, we must respect the procedure (billing), which is a process associated with the invoicing. The billing is followed by payment between business partners (customers and suppliers) [8].

In a simpler sense, e-invoicing can also be defined as a process that consists of sending invoices, making them available, and then saving them. It is a process related to the activities related to the invoicing itself but by the use of electronic means. E-invoicing consists of all steps from purchase to payment and from order to delivery.

3.2 Integration of e-invoicing and advantages and disadvantages of using e-invoicing

Electronic invoicing via Internet banking was first used in practice in 2003. As part of this process, an invoice can be loaded and downloaded in the same way as normal payment transactions in a payment system. The supplier prepares an invoice in its internal information system on the basis of the specification and sends it directly to the

customer or to his bank via the application of internet banking. The bank will use the identification data (IČO, IBAN) to send the invoice either directly to the customer or to another monetary institution. The customer then uses the Internet banking application to download the invoice and into his internal information system. The great advantage of such cooperation between electronic invoicing and electronic banking is that clients use a familiar environment, i.e. the internet bank environment [14]

Electronic invoicing is provided by electronic means and special information channels. A predefined procedure using detailed invoicing is used for electronic invoicing. The first step comes from the supplier. The electronic invoice must be processed in the internal information system of the accounting unit. After recording the e-invoice in the system, the e-invoice is sent to the customer. The e-invoice is considered to be accepted in the moment when the so-called electronic announcement resp. notification is sent. We consider this notification to be a one-time delivery of the invoice by the supplier [11].

For many entities, e-invoicing is a step forward, as many benefits come. One of the most important is automation and integration in payment transactions, from the order itself to payment between customers and suppliers. Another advantage is the increase of transparency in business relations. This increase means that trading parties are able to obtain information faster and more efficiently, for example about the creditworthiness of the counterparty. This type of invoicing also streamlines the control of internal systems, which are aimed at combating unfair practices of employees working in the financial department of the accounting unit. If we look at domestic business relations, here we will include the registration of value-added tax electronically among the beneficial effects of e-invoicing [14].

However, one of the most obvious benefits of using e-invoicing is the faster transfer of money from customers to suppliers reducing the cost of printing, postage, or archiving invoices. Like any system, e-invoicing faces various obstacles. E-invoices can be prepared in various formats and according to many standards, which prevents the smooth transfer of the invoice from a supplier to customer and reduces all savings and costs associated with e-invoicing. Different e-invoice formats slow down interstate communication in the field of e-invoicing. Many potential users have concerns about the security of e-invoicing systems as well as the possibility of distorting the data contained in e-invoices. [5]

Slowly, most accounting invoices are moving from paper invoicing to electronic invoicing, mainly due to the greater accuracy and the speed of creating accounting documents.

4 Conclusion

The aim of the article was to point out the requirements and technical standards, advantages, and disadvantages of the implementation of electronic invoicing information system accent with an emphasis on the current situation in the Slovak Republic. In the Slovak Republic, electronic invoicing is increasingly used as an

opportunity for savings for companies, a reduction in the burden on the environment, but also a way to collect taxes more efficiently.

If we should answer the question of whether the brake in the implementation of electronic invoicing in the Slovak Republic is too demanding or vague legislation, then we can refute it. Technical requirements are also not a significant problem, although the acquisition costs for its implementation are high for many companies. From the experience, it can be seen that this investment will return to companies within a time horizon of up to 1 year.

The state of use of electronic invoicing is then rather below the EU28 average (EU 27 from 31 January 2020.).

The main trend is to move from sending paper invoices to sending invoices that do not allow automated processing via e-mail. In this type of invoices, the Slovak Republic is one of the countries with the highest share of invoices sent in this way. Companies in the Slovak Republic are therefore interested in cost savings, but the low level of implementation is a hindrance, especially for small companies that do not have the bargaining power to convince their suppliers and customers to switch to electronic invoicing.

Based on the processed information in the article presented above, we can state that the objective has been met.

<https://news.cgtn.com/news/2022-03-30/Foreign-minister-of-China-Russia-meet-in-Anhui-18OTL2V0Lny/index.html>

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