

# Electronic Invoicing in SMEs

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**Abstract.** E-invoicing has benefits that are quite valuable to any enterprise, for example, cost savings, automated accounting procedures and increased efficiency of the workforce. This paper reports the results of a study that focused on the ease of use, learnability and low usage of e-invoices in SMEs. The study was conducted with 12 Finnish small and medium enterprises (SME). The paper demonstrates use habits related to the e-invoicing systems and presents positive and negative comments from the users. According to the users, the benefits of e-invoicing are on a rudimentary level. On the negative side, the SMEs cannot realize all the benefits of e-invoicing.

**Keywords:** electronic invoicing, SME, usefulness, usability, Finvoice.

## 1 Introduction

The widespread use of e-invoicing has been touted to save 200 billion euros worth of costs, reduce CO2 emissions by 3 million tons per year and free resources for more productive work. Additionally, e-invoicing will also reduce fraudulent invoicing by improving VAT controls. The European Commission Expert Group on e-Invoicing [1, 2] highlights that SMEs need cheap and easy-to-use e-invoicing solutions and services that can be accessed and used without specific IT skills. The group also points out that the ease of use is an important business requirement exceeding simple cost savings. [1]

E-invoices are said to have many advantages over paper invoices as e-invoices can be forwarded via banks similarly to payment transactions. The Finnish e-invoice format, Finvoice, provides advantages for both the seller and the payer. Forwarding of e-invoices is reliable and secure, and the format of the invoice is generic enough to suit the requirements of any business sector. The process of handling incoming e-invoices can be fully automated to reduce handling times and the number of errors. Furthermore, forwarding an e-invoice through the bank network enables delivery notices to be sent to the sender, and the banks authenticate all e-invoice senders providing more security for the payers. The Finvoice format also works on multiple systems providing sellers and payers a variety of software options to handle e-invoices. [3]

The study was conducted in collaboration with three Finnish banks. Each bank provided four SME-sized customers for the study. We carried out expert evaluation as well as field studies to test the usability of sending e-invoices in the three Internet bank systems. In addition, we wanted to find out use habits related to the e-invoicing process.

## 1.1 Research Goals

In our research, we have noticed that the diffusion of e-invoicing has been low in SME-sized companies. The motivation for this study was to investigate the reasons for the low usage of e-invoices in Finnish SMEs and the low utilization rate of opened invoice services. We were particularly interested in creating and sending e-invoices, and therefore, receiving and paying e-invoices were excluded from the study. In the beginning, we contemplated that a troublesome adoption phase, bad usability of the banks' e-banking systems as well as a mismatch between e-invoicing and established ways of creating invoices could be the possible reasons for low usage and the low utilization rate.

## 1.2 Research Methods

The study was carried out in two phases, namely expert evaluation and field studies. The Internet banking systems and the e-invoicing services are usually put into use without any instructions. Therefore, we would need to carry out expert evaluations that analyze the ease of learning as well as the match between users' needs and the system's functionality. In addition, the expert evaluation method should bring supplementary data, as only a limited set of users participated in the study. Cognitive walkthrough, which was chosen as the expert evaluation method, focuses on ease of learning but also addresses functionality and ease of use as they contribute to the ease of learning [4]. In our reasoning, the cognitive walkthrough method seemed to fit the criteria very well.

As the expert evaluations had provided us some findings about the ease of use of the Internet banking systems, it seemed logical to combine an interview and contextual inquiry to further look into our findings and to understand how the users create and send e-invoices and if they had formed any use habits. The field studies also highlighted problems that the SMEs had come across while using the systems. These two methods were chosen not only to highlight possible usability problems in the services but also to analyze how e-invoicing merged with the traditional way of sending invoices.

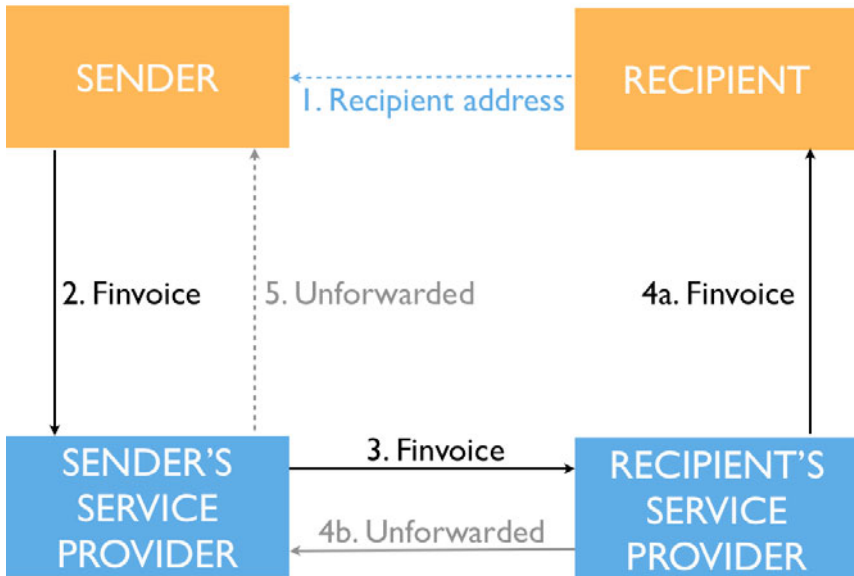
# 2 Electronic Invoicing

In Europe, e-invoicing has a good starting point as the European Union (EU) has been developing the Single European Payment Area (SEPA). SEPA is said to make cross-national electronic payments as easy as current domestic payments [5]. It can also help provide value-added services, such as e-invoicing [6]. The European Council wants e-invoicing to be the primary method for invoicing in Europe by 2020 [7].

## 2.1 Invoice Forwarding Service

In Finland, e-invoices are forwarded with the Finvoice forwarding service, which is presented in Figure 1. The four-corner model consists of the sender, the sender's service provider, the recipient and the recipient's service provider. The invoice is

forwarded from the sender to the recipient via their service providers. Any material not forwarded to the recipient is returned to the sender. Only a bank or a credit institution can act as a service provider in the forwarding service.



**Fig. 1.** Finvoice forwarding service [8]

## 2.2 SMEs and E-Invoicing

For SMEs e-invoicing is problematic as they do not have the skills and infrastructure to implement e-invoicing [9, 10]. Also, the SMEs' attitude can have a negative effect on the adoption of e-invoicing [10]. This is supported by the fact that SMEs' have only a short-term view on IT acceptance and implementation [11].

According to Brun and Lannig, SMEs rely on invoice portals and scanning agencies, which means that these companies do not get the full benefit from e-invoicing. The authors also state that the borders of digitalization should be lowered to provide the full savings benefits for SMEs. The gains for SMEs consist of time and cost savings from the process. The more they send and receive e-invoices, the more benefits the SMEs get. [9]

## 3 Case: Creating E-Invoices

In this chapter, we present the users, the e-invoice creation workflow and the results of the study.

### 3.1 Users

A total of 12 users participated in our study. All participants were middle-aged (30-50 years old) people who worked for an SME. They were all in charge of invoicing in their companies. The participants were distributed evenly between genders. Half had used the system for less than six months.

The SMEs were from various industries, such as marketing and communications, web design, floral services, chemical production, knitting machine distribution, graphic design, measurement devices, freelance writing, language services, marine maintenance services and archeology. The monthly number of e-invoices sent varied from one to fifteen. Furthermore, in every SME the number of e-invoices sent was less than half of all sent invoices.

### 3.2 The Process of Creating an E-Invoice

As the systems follow the Finvoice format, the user interfaces will not be presented individually, but a general description of what information can be included in an e-invoice will be given. The creation of an e-invoice consists of five phases: seller information, payer information, products sold, invoice information and additional information. Moreover, there is always a summary page to scan through the e-invoice before sending it. There is also the possibility of looking at the PDF version of the e-invoice that conforms to the Finvoice format. The process is presented in Figure 2.

**Seller Information.** The seller information contains a business ID, company name, seller organization unit number, e-invoice address, street address, postal number, place, phone number, bank account number, VAT identifier, contact person, contact person phone number, contact e-mail address and web page. Of this information, the business ID, company name, e-invoice address and contact information are mandatory in the e-invoice.

**Payer Information.** The payer information contains the e-invoice address, e-invoice operator, VAT identifier, payer name, payer organization unit number, street address, postal number, place, phone number, contact person, contact person phone number and contact e-mail. Of this information, the e-invoice address, e-invoice operator, and contact information are mandatory in the e-invoice. Furthermore, the payers' contact information can be saved in a repository for later use.

**Sold Products.** The sold products information contains a product name, product code, quantity, unit, unit price, date or time period of delivery and VAT percent. Of this information, only the product code is optional in the e-invoice. Furthermore, the product information could be saved in a repository for use in other e-invoices.

**Invoice Information.** The invoice information contains the invoice number, invoice date, due date, terms of payment, reference number and order reference number. Of this information, the terms of payment and order reference number are optional in the e-invoice.

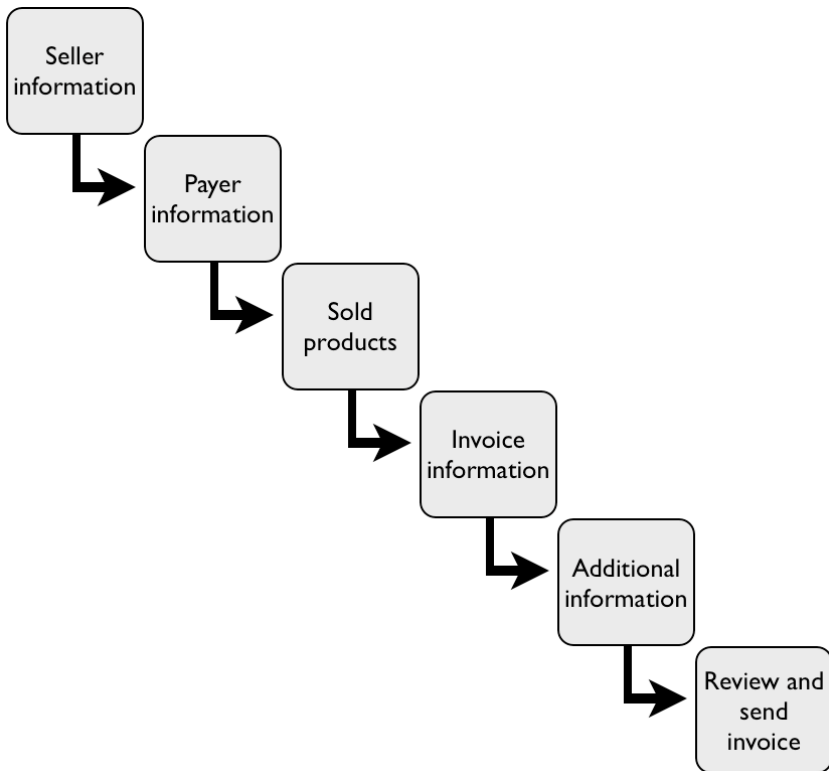


Fig. 2. E-invoice creation workflow

**Additional Information.** The additional information contains the cash discount percent, cash discount sum, complaint time, penalty interest, additional message, breakdown of costs (URL and text; only one bank had this) and posting information (one bank did not have this). None of the additional information is mandatory in the e-invoice.

**Review and Send E-Invoice.** The final step for creating an e-invoice consisted of reviewing the invoice and possibly printing out the PDF version of the e-invoice before sending it.

### 3.3 Results

The following results originate from the expert evaluations and field studies.

**Usage of E-Invoices.** Eleven of the 12 SMEs had made the transition to e-invoicing because of customer demand. The customer requiring e-invoicing was usually a large company, a Finnish municipality or the Finnish state. In one exception, the entrepreneur running the company knew that he would need to start sending e-invoices soon and therefore had moved his outgoing invoices to the e-invoicing system early on to make the transition smooth.

When asked about the pricing of e-invoices, the SMEs stated that the prices are at an acceptable level. Sending an e-invoice costs €0.25 at two of the banks and €0.85 at one bank. There is also a monthly fixed fee for the service, which for two banks is €5 and for one bank €25.

Although the e-invoicing process needs no paper, often the invoices were still printed out for accounting, which was usually handled in the paper format. One of the interviewees said that e-invoicing does not save paper since he still prints out the invoices for accounting. Nevertheless, for e-invoices his paper usage was half of what paper invoices needed; e-invoices need paper only for accounting purposes.

The Finvoice format has a feature called posting, which means recording a transaction or adjustment to the correct accounts. Using posting helps the e-invoice receiver in its accounting as the transaction is automatically recorded to the correct account. Moreover, posting can be seen as a sign of integrating processes. However, the possibility of adding information for posting was not used by any of the SMEs in the study.

The possibility of saving payer and product information in the e-invoicing system was used in every SME except two: one had only one customer receiving e-invoices, and the other had no fixed product names as the company manufactured only customized products. One of the e-invoicing systems did not have payer and product repositories, but the SMEs used previously sent e-invoices as templates, where they had to change only the sold products, invoice information and additional information fields.

As for sending invoices, the SMEs always sent their invoices after the project had ended. The largest SME with roughly 30 employees sent invoices only twice a month. The others were small enterprises so they could not afford to wait long for the money, but needed it as quickly as possible.

The Finvoice format does not support sending attachments; they have to be delivered by other means. However, the SMEs stated that they need to send attachments.

In the end, the operations method defines if attachments are needed or not. For example, a company selling tangible products can send the needed attachments with the shipped products, whereas a maintenance services company sends the maintenance report after their visit to the customer.

According to our interviews, the SMEs that participated in our study do not need mobile e-invoicing. Usually sending an e-invoice was not so time critical that it could always be done from the office. One company made an exception as their business was running archeological excavations. They did not have an office at the excavation site but sent e-invoices with a smart phone.

**Pros.** Most important, sending e-invoices is easy. In a normal case, the SMEs can just click through most phases, add a few products and billing information to the invoice and then send it. From a financial point of view, there is no need to buy stamps and letters, which saves money. In addition, there is less need to take letters to the post office anymore, which saves the SMEs some time. For example, one entrepreneur saved a considerable amount of time, as he did not have to drive to the nearest post office, which was 30 kilometers away from his excavation.

The e-invoice was considered quick and reliable. Usually, the e-invoice reaches the payer the next day. According to the SMEs, the e-invoice never gets lost in Finvoice the forwarding service as letters sometimes disappear in the mail system, and as e-invoices are stored in an electronic system, the possibility of a human error in the payer's handling process was less likely. In addition, re-sending the invoice after a problematic situation was a quick process, as the re-sent e-invoice would reach the payer the next day. From the accounting perspective, combining e-invoicing and paper invoicing is effortless as the e-invoice is simply printed out and added to the accounting data.

**Cons.** In the interviews, the SMEs pointed out also some downsides to the e-invoicing system. The first e-invoice was often sent without any help from the bank, which forced the users outside their comfort zone. They had to learn the process of creating an e-invoice and the system terminology by themselves. The adoption phase was often described as troublesome. For example, the first e-invoice of one SME had a tiny but crucial error, and the company had to cancel the first e-invoice and then send a new one. Some companies also had trouble with payer e-invoice address formats. In the end, the SMEs stated that they were comfortable with creating e-invoices, but the adoption phase and learning to use the system are just something that one has to go through.

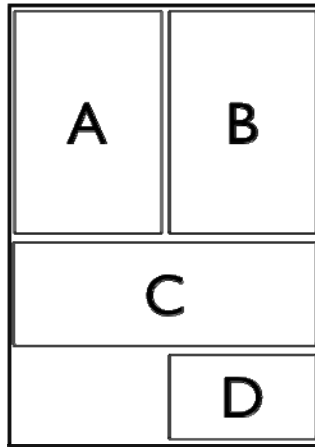
The SMEs also stated that understanding and correcting errors is difficult. For example, one of the biggest e-invoicing operators in Finland removes the frame of the e-invoice, which means that some of the routing information is removed from the message.

In this case, the payer e-invoice address was removed, and if additional routing information was not provided, the e-invoice got lost in the system.

As only a minor share of invoices is e-invoices, the SMEs had to also use a paper-based invoicing system. Only one sent paper invoices through banks' mailing services although it was available to everyone. The separate systems introduced problems as the SMEs had to manage two invoicing processes. The SMEs stated that managing two separate systems is burdensome.

The e-invoice is not flexible enough to meet every organization's needs for creating an e-invoice. For example, giving additional information for one product is not possible on the e-invoice. Furthermore, adding a breakdown of costs is not possible in an e-invoice. According to the interviews, the e-invoice is much worse in flexibility when compared to a paper invoice created with a text editor.

In the PDF version of an e-invoice the seller and payer information (A) were in the top-left part, the invoice and additional information (B) in the top-right part, the products (C) in the middle part of the e-invoice and the sum (D) in the lowest. The users stated in the interviews that they did not know where some information would be located in the PDF version, as the process of creating an e-invoice did not match the PDF version's structure. This lack of comprehension caused users not to include some of their information in the outgoing e-invoices. The PDF version of Finvoice is presented in Figure 3.



**Fig. 3.** The PDF version of Finvoice

The fixed costs of e-invoicing services increase the price per e-invoice. Therefore, the SMEs are not able to fully utilize the lower costs of e-invoices, as only a minority of sent invoices are, in fact, e-invoices.

Regarding the terminology, the payer organization unit number caused confusion. The SMEs stated that they do not know what it means or why it is used. Often, it was needed along with the e-invoice address to ensure that the e-invoice reached its destination.

The process of creating an e-invoice was considered to contain needless steps and information. The seller information is the same aside from address or contact person changes. The SMEs pointed out that checking the seller information for every outgoing e-invoice feels unnecessary. Additionally, posting and cash discounts seemed to be unnecessary information that could be hidden from the user interface by choice.

## 4 Discussion

The emphasis in the research was on the usability and ease of use of e-invoicing. According to the users, creating e-invoices is easy. However, the majority of the users were not technically oriented people. Thus, the low IT skills of the users brought challenges to the process of creating an e-invoice.

All the users who participated this study live in the capitol region. Thus, the sample presents only a tiny fraction of the plethora of Finnish SMEs regionally and lines of business. In our study, only two SMEs conducted their daily work outside their offices. We were not able to interview mobile workers as they were only seldom at their offices. Interviewing mobile workers could have provided valuable information about the benefits of mobile e-invoicing technologies.



Despite our attempts, we were able to interview only people who had already used the e-invoicing system. Interviewing and observing people using the e-invoicing system for the first time could have revealed a more realistic picture of the initial experiences.

## 5 Conclusions

Against our initial contemplations in the beginning, the study with 12 SMEs suggests that the low adoption of e-invoices in Finnish SMEs and the low utilization rate of opened invoice services are not consequences of low ease of use, a troublesome adoption phase or a mismatch between e-invoicing and established ways of creating invoices. However, the removal of the e-invoice frame by one company lowers the usability of e-invoicing. Overall, the differences between paper and e-invoicing do not explain why the usage is low. Nonetheless, the difference causes extra work for users.

For SMEs, the advantages of e-invoicing are not high enough that they would adopt e-invoicing voluntarily. The more large corporations a company has as its clients, the more it is likely to benefit from e-invoicing. Large corporations get great benefits from e-invoicing, and they are pushing it hard. Consequently, SMEs cannot discard these demands. SMEs cannot get the benefits of e-invoicing due to the low number of companies using e-invoicing. In addition, SMEs have small clients that the companies cannot push into e-invoicing. Although the EU has been promoting the special needs of SMEs, in the current situation they are slipping through the net. To drive the diffusion of e-invoicing in SMEs, the service ecosystem should provide more flexible tools that SMEs can utilize for creating e-invoices suited to their needs.

As our empirical study has provided initial results of the problems that SME face with e-invoicing, a continuation study with a larger sample will be carried out to obtain more concrete results regarding the situation of e-invoicing in Finnish SMEs.

## References

1. European Commission Expert Group on e-Invoicing. Mid-Term Report (2009), [http://ec.europa.eu/internal\\_market/payments/docs/einvoicing/report-2009\\_01\\_27\\_en.pdf](http://ec.europa.eu/internal_market/payments/docs/einvoicing/report-2009_01_27_en.pdf) (referenced January 24, 2011)
2. European Commission Expert Group on e-Invoicing. Summary of Responses (2010), [http://ec.europa.eu/internal\\_market/payments/docs/einvoicing/summary\\_report\\_en.pdf](http://ec.europa.eu/internal_market/payments/docs/einvoicing/summary_report_en.pdf) (referenced January 24, 2011)
3. Federation of Finnish Financial Services. Finvoice product information, [http://www.fkl.fi/verkkolasku/english/electronic\\_invoice\\_for\\_companies/finvoice\\_product\\_information.htm](http://www.fkl.fi/verkkolasku/english/electronic_invoice_for_companies/finvoice_product_information.htm) (referenced December 22, 2011)
4. Wharton, et al.: The Cognitive Walkthrough Method: A Practitioner's Guide. Technical Report, <http://ics.colorado.edu/techpubs/pdf/93-07.pdf>
5. European commission. Web page, [http://ec.europa.eu/internal\\_market/payments/sepa/index\\_en.htm](http://ec.europa.eu/internal_market/payments/sepa/index_en.htm) (referenced January 26, 2011)

6. European commission. The single European payment Area – What It Means for Small and Medium Sized Businesses,  
[http://ec.europa.eu/internal\\_market/payments/docs/sepa/sme/sme\\_en.pdf](http://ec.europa.eu/internal_market/payments/docs/sepa/sme/sme_en.pdf) (referenced January 26, 2011)
7. European commission. Reaping the benefits of electronic invoicing for Europe (2010),  
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0712:FIN:EN:HTML>  
(referenced January 26, 2011)
8. Federation of Finnish Financial Services. Finvoice forwarding service (2010),  
[http://www.fkl.fi/verkkolasku/english/ladattavat/forwarding\\_description.pdf](http://www.fkl.fi/verkkolasku/english/ladattavat/forwarding_description.pdf) (referenced January 26, 2011)
9. Brun, M.H., Lannig, C.: Reducing barriers for e-business in SME's through an open service oriented infrastructure. In: Proceedings of the 8th international conference on Electronic commerce: The new e-commerce: innovations for conquering current barriers, obstacles and limitations to conducting successful business on the internet (ICEC 2006), pp. 403–410. ACM, New York (2006),  
<http://doi.acm.org/10.1145/1151454.1151519>,  
doi:10.1145/1151454.1151519
10. Penttinen, E., Hallikainen, P., Salomaki, T.: Impacts of the Implementation of Electronic Invoicing on Buyer-Seller Relationships. In: 42nd Hawaii International Conference on System Sciences, HICSS 2009, January 5–8, pp. 1–10 (2009), doi:10.1109/HICSS.2009.248
11. Sandberg, K.W., Wahlberg, O., Pan, Y.: Acceptance of E-Invoicing in SMEs. In: Proceedings of the 8th International Conference on Engineering Psychology and Cognitive Ergonomics: Held as Part of HCI International 2009 (EPCE 2009), pp. 289–296. Springer-Verlag, Heidelberg (2009),  
[http://dx.doi.org/10.1007/978-3-642-02728-4\\_31](http://dx.doi.org/10.1007/978-3-642-02728-4_31),  
doi:10.1007/978-3-642-02728-4\_31