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# Electronic Invoicing Initiatives in Finland and in the European Union

– Taking the Steps towards the  
Real-Time Economy

HELSINGIN KAUPPAKORKEAKOULU  
HELSINKI SCHOOL OF ECONOMICS

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FullSEPA White paper

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## Executive summary

June 3, 2008

Electronic invoicing is currently being adopted in Finnish companies and in the public sector. In this white paper, we report the results from the FullSEPA project which concentrates on promoting and researching electronic payments and electronic invoicing. FullSEPA is the first phase in the Real-Time Economy (RTE) program. The RTE program is a four-year program focusing on real-time technologies and business transactions. It is conducted in collaboration between the Helsinki School of Economics and TietoEnator, and it is funded by TEKES.

This paper looks at electronic invoicing and reports the latest developments in the EU-arena related to electronic invoicing. In addition, the study reports the findings from the case studies conducted during autumn 2007. These case studies focused on the implementation processes of electronic invoicing in Finnish companies and the public sector.

This document is useful for practitioners as it portrays the current state of electronic invoicing in Finland; it highlights, e.g., the objectives, benefits, and challenges that Finnish companies are experiencing with regard to electronic invoicing. In addition to the practitioners operating in the field of electronic invoicing, this white paper can also be used by researchers to pinpoint new interesting avenues for research initiatives.

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## 1. Introduction and background, e-payments and e-invoicing

This white paper reports the findings from the first phase of the Real-Time Economy (RTE) program which is a TEKES-funded joint collaboration between the Helsinki School of Economics (HSE) and TietoEnator (TE). By Real-Time Economy, we essentially mean an environment where all business transactions are conducted in real-time, without any store and forward procedures. Although there are many other aspects of real-time economy, in our project, we focus on the financial value chain transactions (payments, invoices, ordering, and accounting). The first phase of the program is named FullSEPA, and it concentrates on electronic payment systems and electronic invoicing systems. In FullSEPA, our focus is mainly on business-to-business (B2B) electronic invoicing.

This document is useful for practitioners as it portrays the current state of electronic invoicing in Finland; e.g., the objectives, benefits, and challenges that Finnish companies are experiencing with electronic invoicing. In addition to practitioners, this white paper can be used by researchers to pinpoint new interesting avenues for research initiatives.

Electronic invoicing has been recognized as one of the most important sources of productivity increases in Europe (EEI 2007). Some European countries have been more active than others in enforcing the transition to electronic invoicing. As an example, since 2005, Denmark's public authorities primarily receive invoices in electronic format, and this practice has been stipulated by law (Brun 2007). The benefits of moving from paper invoices to electronic invoicing are clear. The Finnish State Treasury and some Finnish companies have estimated that an incoming paper invoice incurs costs amounting to 30-50 Euros to the receiver company. By moving to electronic invoicing, these costs can be lowered to 10 Euros by semi-automating the invoice process and to 1 euro by fully automating the process. According to the European Associations of Corporate Treasurers (EACT), the resulting cost reductions in the supply chain expenditures total 243 billion Euros across Europe (EEI 2007). The European Union

estimate is 238 billion Euros. In addition to the monetary savings, there are considerable environmental effects as the transition from paper bills to electronic invoicing would save over 14 million trees in the EU alone (estimates of, e.g., Pagero and PayItGreen).

Electronic invoicing is not something totally new. Invoices have been transmitted in electronic format for decades. Already in the 1970s, EDIFACT was used by large companies as a means to exchange invoice data. These systems were point-to-point systems, and required rather heavy investments in establishing the connection between the two companies or organizations. In this white paper, however, we leave these legacy systems out of our scope and define electronic invoices as invoices transmitted through XML-based open standards, e.g., Finvoice or the TEAPSSXML standard in the Finnish context. Our focus is on the automation of invoicing processes, and this in turn requires that the invoice data is sent in structured formats. Therefore, according to our definition, invoices that are transmitted as attachments in e-mails are not considered electronic invoices. This is because e-mail attachments do not allow for the invoice data to be automatically processed in the payment system.

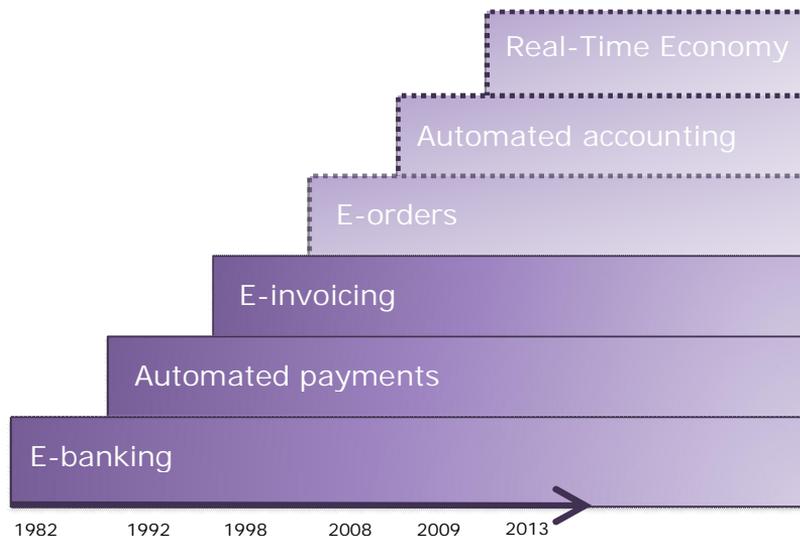
The report consists of three parts. In the first section, we examine the initiatives taken in the European Union concerning SEPA (Single Euro Payments Area) and electronic invoicing. In the second section, we describe the industry and process views in Finland. We depict the key players in the field of electronic invoicing and examine the electronic invoicing standards currently in practice in Finland. In the third section, we report the findings of the interviews conducted in Finnish companies and organizations related to the implementation and adoption of electronic invoicing. We describe the current status of electronic invoicing and illustrate the main advantages and difficulties in the adoption of the electronic invoicing systems. In addition, we provide a list of references to the managerial documents on electronic payments and electronic invoicing as well as some research papers currently under construction in the field of electronic invoicing.

In addition to this current document, we refer the reader to join and promote the RTE idea by taking an active part in the RTE community, which is an interactive website using the means of the social media. The RTE community is at [www.realtimeeconomy.net](http://www.realtimeeconomy.net). Besides the RTE community, another more permanent outcome of the project is the RTE Competence Center, which has been established at the Helsinki School of Economics. The aim of the Center is to promote the research and education initiatives on technologies (e-payments, e-invoicing, RFID, machine monitoring from a distance systems etc.) enabling the transition to a more real-time economy. The Center is headed by Professor Virpi Tuunainen and coordinated by PhD Esko Penttinen.

### *1.1 The Real-Time Economy program*

The Real-Time Economy program aims at promoting new technologies that enable a more real-time economy. The first phase of the RTE program is FullSEPA, concentrating on electronic payments and electronic invoicing. The next step on the real-time economy ladder is Full Value Chain (FVC). FVC aims at extending the electronic payment and invoicing technologies to other messages that are transmitted between the buyer and the seller in a commercial transaction. These include, e.g., the invitation to tender, the offer, the order, the payment and delivery guarantees, and other messages.

In the upcoming projects, we will extend our views to electronic archiving, electronic tax systems, electronic auditing, and electronic accounting. These steps on the digitalization ladder make it possible to develop tools and techniques to decrease the risks (e.g. currency and interest risks) involved in business transactions. The following figure illustrates the steps toward the Real-Time Economy.



**Figure 1. Steps on the way to the Real-Time Economy**

## 2. Electronic payments and electronic invoicing in the EU

In this section, we provide a brief introduction to the initiatives on the EU level on SEPA and electronic invoicing. We begin with a short description of SEPA and then move on to the EU work which is being done to promote and facilitate the transition to electronic invoicing. Finally, we go through the standardization practices related to electronic invoicing.

### *2.1 SEPA and electronic invoicing*

The Single Euro Payments Area (SEPA) project represents the next major step towards closer European integration. SEPA will allow for customers to make non-cash euro payments to any beneficiary located anywhere in the euro area using a single bank account and a single set of payment instruments. All retail payments in euro will thereby become “domestic”. There will no longer be any differentiation between national and cross-border payments within the euro area. (ECB 2008)

The SEPA in its core version is not a good business case – certainly not for banks and thus not for their customers and thus not for Europe. Cross-border payments have already been speeded up and prices regulated to domestic levels. The rest of the improvements in productivity will have to come from higher degrees of automation in the corporate reconciliation processes, more competition from standardized corporate-to-bank interfaces and consolidation of clearing systems – this will be a slow process. FullSEPA – using this unique integration opportunity to also include e-invoicing as a first step – would make the needed difference. The European Association for Corporate Treasurers, for example, states that yearly corporate savings in process costs reach 243 billion Euros.

The conclusion is that the core SEPA can drive e-invoicing forward in many ways. The first reason is that it improves the overall business case. In addition, there is now a focus on standardizing interfaces between enterprises and banks to save cost and enhance competition – in e-invoicing it was the case from the beginning and ISO20022 for credit transfers is aiming at the same. Payment standardization presents considerable potential for EU-productivity improvements. The e-invoicing ISO process will in the best case act as a shoehorn to get fast alignment between the UBL and the UNCEFACT.

But there is one problem left. The billions of savings are so widely distributed and the daily business so hectic that it will take far too long for enterprises to migrate to e-invoicing without some strong incentives. The example from Denmark where the law permits only e-invoices to the public sector is probably the best way forward – especially if banks and other service providers get the signal that this will happen in time to establish convenient, integrated, and economical solutions. To solve this problem, the EU has taken the initiative and has set up an expert group to speed up the progress. EU also supports the identification of needs for changes in taxation and legislation.

## *2.2 Electronic invoicing on the EU agenda*

Rather early in the SEPA preparations, there was a clear change in the message from both the EU-commission and the European Central Bank: e-invoicing should be implemented as soon as possible and as a part of SEPA. The work at the European Payments Council (EPC) had, however, started already, and banks did not see that it could be possible to work on pan-European e-invoicing at the same time. National banking community efforts did start to show up and by now it has become evident in many more countries that both consumers and SMEs expect their banks to provide e-invoicing both in their e-banking service and as file transfer. Banks – both in Europe and USA - also started to see that the value created is a base for income that can make more customers in the SME segment become profitable.

The EEI report (EEI 2007) concluded that a policy level cross-European activity on e-invoicing is needed to help counteract current fragmentation, to tackle barriers to electronic invoicing, and to establish the basis for innovative market-driven solutions. Finland was in turn to run the EU presidency in the latter half of 2006 and the prime minister's office organized a high-level conference titled "Something Real for Lisbon". Speakers were asked to list three concrete measures that would have a considerable impact on productivity in EU and be easy to implement. The audience then voted on the proposals, and e-invoicing came out – to no surprise – at the top. This was documented in the Helsinki Manifesto which was handed over to Germany – the next presidency country. The Manifesto [Finland'sEUPresidency (2006)] has been considered an important tool when moving from producing only strategy papers and studies to real implementation of digital services which aim both at large scale productivity improvements and better services.

Much as a result of this, the EU commission established an expert group to discuss, promote, and facilitate the transition to electronic invoicing. The group is composed of stakeholders from the public sector, private sector enterprises, large and small, as well

as financial services providers and standardization organizations. The objective of the group is to design a 'European Electronic Invoicing Framework' (EEIF) by 2009. This framework should promote the emergence and the development of open and interoperable e-invoicing services across Europe, bringing huge benefits to citizens and business, including SMEs, throughout the Internal Market.

The EU-commission is trying to do its best to improve European competitiveness in many fields. An important contribution from EU is the support promised to the expert group and EU's fast action in the field of harmonization of legislation and taxation. But especially in the area of improving productivity and lowering the public sector costs – all benefitting businesses directly – the Commission has the right to expect that top management in banks, enterprises, enterprise organizations and the public sector do everything they can to contribute with services and policies that achieve critical mass of usage in the shortest possible time.

Establishing this shared sense of urgency and good-for-society-at-large mindset comes first - and is crucial to success. To ensure board level support, it is suggested that the EU-commission and the corporations ask a simple question: "We have e-invoicing at the top of the Lisbon productivity agenda. Is your organization prepared to support our efforts in concrete ways?"

### *2.3 Standardization initiatives on electronic invoicing*

As enterprises already drive standardization of payments, it is only logical to do the same also for e-invoicing and other business documents. There are many reasons why a common standard for electronic invoicing should be created and why we should work for its earliest possible and widest possible usage. These reasons include:

- more direct interoperability leading to lower reformatting costs

- easier change of service provider leading to increased competition and thus lower costs
- easier standardization and automating of also other business documents
- cheaper software as all support common standards and competition increases
- easier integration to back-end systems
- easier solutions and more choices for presentment and storage, compliance management and roaming
- better harmonization of tax and legal compliance requirements in different countries
- less technically demanding requirements to secure the origin and integrity of e-invoices

It should be made clear that the coming ISO-standard will not change the present fragmented format landscape overnight. Today, there are many standards that need to be converged into one to achieve automated end-to-end processes. Several banks are already offering an “any-format-in & any-format-out-service” with the help of service providers such as TietoEnator. These services will be needed also after the new global e-invoice standard is established. However, the number of standards and the cost of reformatting and the lack of interoperability will start to improve. Above all, the bank sector which provides services for the SME sector will start using the same standard initially in the interbank space but soon also in the customer interface.

Rule-based online translations between different e-invoicing formats can be done fairly easily if all the necessary information content is available. Therefore, the first step in standardization is to agree upon the common set of mandatory and industry-specific data elements needed in all e-invoices. After that a gradual migration is possible, when national and other widely available formats can be enhanced to include all the necessary information.

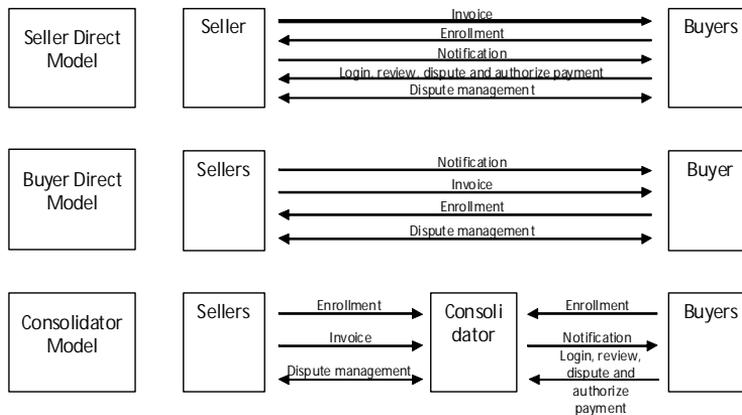
Still, the biggest challenge is the large variety of tax and other legal requirements in different countries. That has resulted in incompatible country-specific practices, even when referring to the same e-invoicing EU directive from 2001. Companies which have international business and cross-border invoicing are struggling with different demands in each country, e.g., for electronic signatures and tax-compliant archiving.

In many cases, the standardization initiatives have failed in deploying standardization results. The current electronic invoicing standardization is tightly integrated with the overall development in the EU. All the stakeholders share the view that the standardization objectives should be in global standards to be able to provide adequate support for corporations. The current roadmap in standardization is to create a base electronic invoicing standard in the UN/CEFACT to meet the Global Corporate requirements. Practical experience of electronic invoicing in the Nordic countries points out the necessity of having banks involved in the electronic invoicing service. This has been the key factor to tie the SMEs and consumers in electronic invoicing. From the perspective of standardization, this situation means that it is most important to have UN/CEFACT results accepted also in the ISO20022 which is the global forum for Financial Industry standardization.

### 3. Industry structure and process view

According to COBP (2001) and PricewaterhouseCoopers (2006), there are three generic electronic invoicing models: the seller-direct model, the buyer-direct model, and the consolidator model. In the seller-direct model, the seller installs the electronic invoice presentment and payment (EIPP) solution to send invoices electronically to her customers. In the buyer-direct model, it is the buyer who implements the EIPP solution to receive invoices electronically from her customers. The main disadvantage of these two models is the need for multiple integration projects. The third alternative, the consolidator model provides an interface between multiple sellers and buyers. If this

model is well configured, the seller or the buyer only has to set up an integration project with the consolidator platform once, and she is able to communicate with all the other trading partners that are connected to it. The following figure, adopted from PricewaterhouseCoopers (2006), depicts the different models in greater detail. [COBP (2001); PricewaterhouseCoopers (2006)]



**Figure 2. Electronic Invoicing Presentment and Payment Models**

The number of participants in the electronic invoicing scene has increased considerably during the last few years. According to Koch (2007), the number of corporations using electronic invoicing in Europe is estimated to reach 630,000 in 2007. Similarly, the number of consumers using electronic invoicing is estimated to grow from 14.8 million (2006) to 18.6 million in 2007. The number of service providers is increasing as well (from 160 in 2006 to 260 in 2007). (Koch 2007)

Concerning the third EIPP model, the many-to-many model, in Finland, a number of active consolidators co-exist with a growing bank scheme all well supported by the government. In the former space there are companies such as Itella, Basware, Logica, Anilinker, and TietoEnator. These firms have expanded outside Finland as their experience has developed, especially into Germany. The collective bank model is based on Finvoice which is an e-invoice for electronic/online presentment by the invoice issuer

to the receiver. Finnish banks originally designed it as invoice in a machine readable form (XML) enclosed in an electronic envelope to replace the traditional paper invoice. Finvoice can be sent to the receivers through the banks' online invoice transmission services or by using another invoice service provider. It is a solution suitable for invoicing between businesses of any size, also for invoicing consumer customers<sup>1</sup>. In June 2007 about 70,000 companies used Finvoice in Finland. The Finvoice format is also used in Belgium and Italy and it provides solutions for invoice financing as well. (EBA 2008) According to the Federation of Finnish Financial Services, the amount of transactions handled through the Finvoice system has grown from 260,000 in 2005 to 2,720,000 in 2007. During the same period, the amount of Finvoice contracts has grown from 61,308 to 97,437.

According to our estimates, in Finland, the yearly volume of invoices is about 450 million of which 250 million to consumers and 200 among businesses. Roughly 20-30% of the B2B invoices are electronic invoices. The market share information in Finland shows that each of the different players has their share of the market. It is estimated that operator-to-operator electronic invoices represent 44 percent of the market. Twenty-eight percent of the electronic invoices in Finland are from bank-to-operator invoices. Operator-to-bank invoices have a 17-percent market share, while bank-to-bank invoices represent 11 percent of the market in Finland. (Koch 2007)

### *3.1 Business case: electronic invoicing in one micro company*

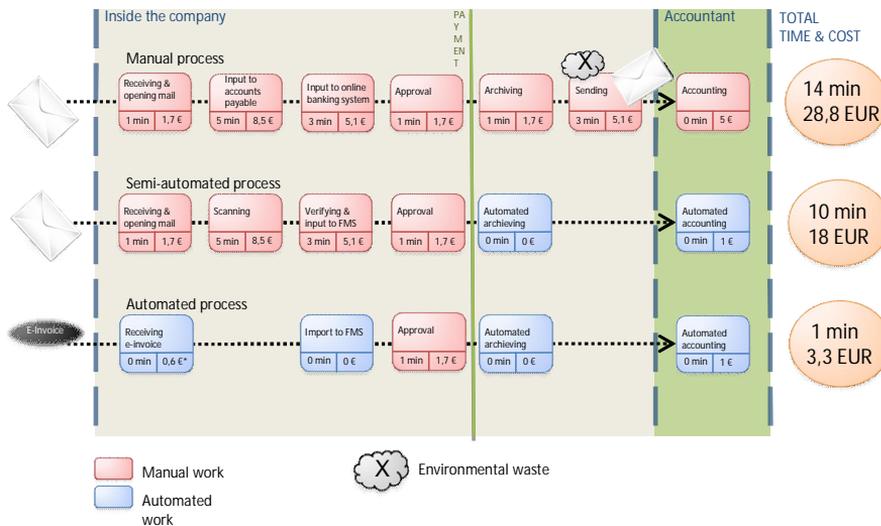
In the context of a small company, we studied the process of receiving and sending invoices in paper format vs. in electronic format. We were able to draw these processes and estimate roughly how much time and money is spent by the entrepreneur in handling paper invoices vs. electronic invoices. The case company had recently

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<sup>1</sup> In the case of electronic invoicing to consumers, the invoice arrives in the consumer's electronic banking system and needs only to be confirmed by the consumer, thus avoiding the retyping of invoice data such as the sum and the receiver's bank account information.

implemented electronic invoicing and thus presents an interesting opportunity to examine the effects of electronic invoicing.

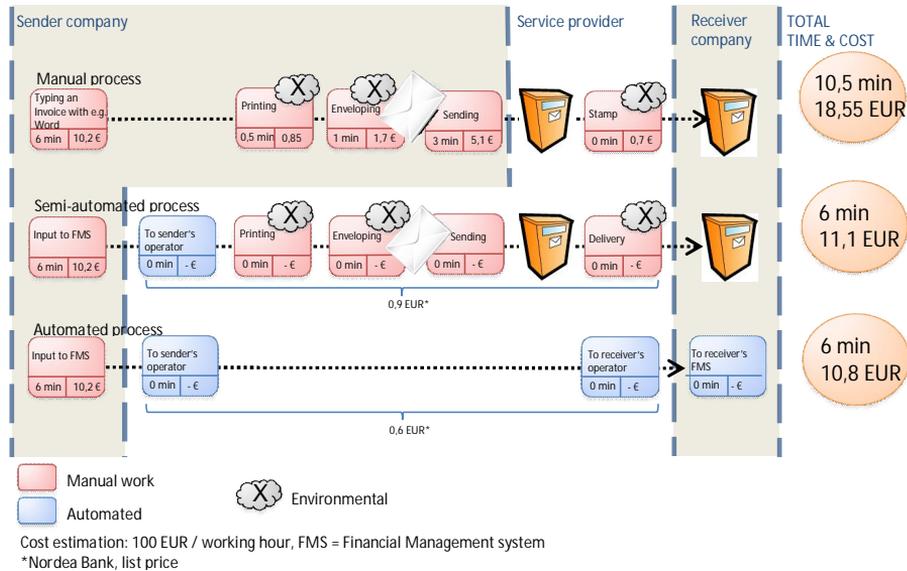
In the case of receiving invoices, much of the invoice handling process can be automated. Here, the savings from the implementation of electronic invoicing stem from the fact that the invoice data comes directly to the electronic system. Hence, the manual processes of opening the envelopes and typing the invoice data manually to the electronic system can be avoided. The following figure illustrates the process of receiving invoices (manual process, semi-automated process, and fully automated process). The minutes indicate the processing time of the activity in question and the monetary amounts indicate the cost of the activity.



**Figure 3. Receiving Invoices in a Micro Company**

In the case of sending invoices, the potential cost savings are less impressive. Here, the savings are generated through the elimination of the manual mailing process. The

following figure illustrates the invoice sending process (manual process, semi-automated process, and automated process).



**Figure 4. Sending Invoices in a Micro Company**

We were able to arrive at an estimate of the potential cost savings resulting from the transition to electronic invoicing. This small case example shows that by implementing electronic invoicing, the company can make considerable savings. The entrepreneur can free working time from handling invoices to other more productive tasks. According to our estimates, the time freed by electronic invoicing corresponds to one week's working time per year.

#### 4. Implementation and adoption of electronic invoicing in Finnish companies and public organizations

One of the main objectives of the FullSEPA project was to examine how electronic invoicing is being implemented and adopted in Finland. In this section, we report the

findings of the case studies conducted during autumn 2007. The interviewed companies and public organizations were Lindström, Novart, Kuusakoski, Finnair, Oriola-KD Corporation, TietoEnator, City of Helsinki and City of Tampere. The following table provides a brief description of each of these organizations.

**Table 1. Case organizations**

| Organization     | Description  |
|------------------|--|
| Finnair          | Finnair is one of the world's oldest airlines (est. 1923) and its operations cover scheduled passenger traffic and leisure traffic, technical and ground handling operations, catering, travel agencies as well as travel information and reservation services. Personnel 9,700, turnover 2,180 million Euros.   |
| Kuusakoski       | Kuusakoski is an international recycling services company. In addition to being the leading recycler of metal-based products in the Northern Europe, Kuusakoski is also recognised as one of the largest suppliers and refiners of recycled metals in the world. Personnel 2,000, turnover 832 million Euros.  |
| Lindström        | Lindström is a Finnish textile and cleanliness services company founded in 1848. Lindström's range of services consists of workwear, mat, protective equipment, hygiene, restaurant textile, and shop towel services. Lindström has operations in 18 countries. Personnel 2,300, turnover 227 million Euros.   |
| Novart           | Novart is the largest kitchen and bathroom fixture manufacturer in Finland. The company is part of the Nobia group which is the leading kitchen and fixture company in Europe. Novart has 60 years of expertise in kitchen fixture manufacturing and has four brands: Petra, A la carte, Netto, and Parma kitchen. Personnel 500, turnover of 90 million Euros.  |
| Oriola-KD        | Oriola-KD Corporation is a leading company in pharmaceutical trade and in healthcare trade. The company operates via its subsidiaries Oriola Oy and Kronans Droghandel AB in Finland, Sweden, Denmark, and the Baltic Countries. Personnel 1,300, invoicing 2.5 billion Euros, net sales 1.4 billion Euros.  |
| TietoEnator      | TietoEnator is one of the largest information technology (IT) service providers in Europe and specializes in consulting, developing, and hosting its customers' digital businesses. TietoEnator is organized into six business areas: banking & insurance, telecom & media, healthcare & welfare, government, manufacturing & retail, forest & energy, and processing & network. Personnel 16,000, turnover 1.7 billion Euros. |
| City of Helsinki | Helsinki was founded in 1550 and it is the capital of Finland situated in the south of Finland. Helsinki is the largest city in Finland with a population of 570,000.  |
| City of Tampere  | Tampere was founded in 1779 and is the third largest city in Finland. It is also the largest inland centre in the Nordic countries. Currently, there are little over 200,000 inhabitants in Tampere, and almost 300,000 inhabitants in the Tampere region, which comprises Tampere and its neighboring municipalities.   |

We asked the companies and public organizations questions about the current state of electronic invoicing in their respective organizations: the invoicing volumes, the operators they use etc. Then, we proceeded to the objectives of and already realized impacts of electronic invoicing on profitability and on buyer-seller relationships. We also asked the respondents to cite success factors influencing the rate of adoption of electronic invoicing. Finally, we asked them to describe their future steps of

digitalization. Most of the respondents were specialists in financial management. The interviews were semi-structured and lasted approximately 1.5 hours. All of them were tape-recorded and transcribed.

#### *4.1 Objectives and current state of electronic invoicing*

The objectives of the transition to electronic invoicing were related to financial objectives, to improvements in customer service, and to the image of the organization. The interviewed organizations seek financial gains by making their processes more efficient by automating the invoice processes. Transferring personnel from manual invoice processing to more productive work was given as the main argument for electronic invoicing. The organizations also stated that electronic invoicing is a means to improve customer service. In addition, the organizations wanted to present a modern image by transitioning to electronic invoicing. This was especially important for public organizations as they wanted to portray an image of an efficient public service organization, which does not throw away the taxes paid by their citizens to inefficient routines.

##### 4.1.1 Volumes and means of promotion

Regarding the current state of electronic invoicing in the interviewed organizations, all of the organizations can receive electronic invoices. The penetration of electronic invoicing in these incoming invoices ranges from 10% to 53%, meaning that 10%-53% of invoices are received in electronic format. The remaining paper invoices are scanned into the electronic system by the company itself or by a service provider.

In the case of outgoing invoices, most of the organizations have adopted electronic invoicing. The penetration here ranges from 1-2% to 36%, meaning that 1-2%-36% of the invoices go through in electronic format, the remaining invoices are printed as paper

invoices and mailed to the client. The following table depicts the volumes of invoices in the case companies.

**Table 2. Volumes of invoices in case organizations (yearly volumes)**

| Organization         | Year of initiation of electronic invoicing                                  |   | Volumes of Incoming invoices |                  | Volumes of Outgoing invoices  |                 |
|----------------------|---|---|------------------------------|------------------|---|-----------------|
|                      | Incoming  | Outgoing  | Total                        | Electronic       | Total   | Electronic      |
| Finnair <sup>2</sup> | Gradually one business unit at a time, starting in 2000 for travel agencies | Gradually one business unit at a time, starting in 2002 for travel agencies | 323,000                      | 5%,<br>17,000    | 986,000   | 32%,<br>315,000 |
| Kuusakoski           | 2006  | 2006  | 45,000                       | 25%,<br>11,250   | 30,000  | 2-3%, 400       |
| Lindström            | 2003  | 2003  | 28,800                       | 25%,<br>7,200    | 540,000   | 33%,<br>194,400 |
| Novart               | 2006  | n/a   | 33,475                       | 28%,<br>9,526    | To be implemented in 2008   |                 |
| Oriola-KD            | 2004  | 2004  | 10,000                       | 10-15%,<br>1,000 | 350,000   | 18%,<br>63,000  |
| TietoEnator          | 2005  | 2005  | 93,000                       | 53%,<br>49,500   | 101,300   | 34%,<br>34,000  |
| City of Helsinki     | 2002  | 2006 (2007 to consumers)  | 560,000                      | 42%,<br>240,000  | 50,000 <sup>3</sup>   | 25%,<br>12,500  |
| City of Tampere      | 2005  | 2008  | 250,000                      | 34%,<br>85,000   | To be implemented in 2008, 1.4 million invoices to consumers and businesses |                 |

We were also interested in finding out whether there were differences in customer/supplier segments in adopting the electronic invoicing practices. Our initial hypothesis that large organizations tend to move first received mixed results. According to our interviews, when implementing electronic invoicing, the companies target their promotion measures to large companies with large volumes of invoices. This is quite natural because when a company initiates electronic invoicing, it wants to have the suppliers and customers that send large amounts of invoices turned to electronic format. Large organizations usually have larger volumes of invoices and the larger the

<sup>2</sup> The Finnair figures include all invoices both domestic and international.

<sup>3</sup> In addition to these 50,000 invoices from businesses, the city of Helsinki sends out 1.2 million invoices to consumers. A pilot project has been launched to transfer these consumer invoices into electronic format.

volumes the larger the estimated benefits and savings from electronic invoicing. However, the respondents could not say that the larger companies had adopted electronic invoicing earlier than smaller companies.

Other than size, it was very difficult to find demographical factors explaining the timing of the implementation of electronic invoicing. Other than demographical factors, we found that positive attitude towards new technologies and technological readiness contributed to the early adoption of electronic invoicing.

All of the organizations stated that they wanted to increase the penetration of electronic invoicing. To this end, the organizations promoted the use of electronic invoicing in many ways. The most cited means of promotion was the sending of an information letter. The interviewees found that the best way of promoting electronic invoicing was at the time of signing the contract. The organizations were also asked whether they were planning to take more aggressive steps in the electronic invoicing promotion, e.g., paper fees. Most of the organizations did not feel comfortable of adding a processing fee on incoming paper invoices. However, they were ready to adopt the paper invoice fee if it became the industry standard.

#### 4.1.2 Archiving, scanning, and costs related to paper invoices

Archiving of the invoices is handled in electronic format. Two of the organizations were currently implementing the electronic archiving of invoices; the remaining organizations had already started to use the electronic archiving.

Each organization has to decide whether to scan the incoming paper invoices into electronic format themselves or outsource this activity outside the organization. Within our case organizations, the results were mixed. Half of the organizations had decided to

scan the incoming paper invoices themselves, while half of the organizations had outsourced this activity to, e.g., Xerox.

The processing cost of an incoming paper invoice was estimated at about 30-40 euros by the interviewed organizations. This is in line with the Finnish State Treasury estimate of 30 euros. We also gathered information on the cost differences of paper invoices and electronic invoices. These estimates varied from paper invoices being twice to ten times as expensive as electronic invoices.

#### *4.2 Perceived diffusion factors, benefits, and problem areas*

Here, we will (1) present the diffusion factors that emerged from the interview data, (2) go through the perceived benefits of electronic invoicing to the interviewed organizations, and (3) discuss the problem areas stemming out from the interviews.

##### 4.2.1 Perceived diffusion factors

One of the main objectives of the interviews was to explore the perceived success factors related to the diffusion of electronic invoicing. We asked the interviewees to cite the most important factors that they perceive as success factors in the transition from paper invoices to electronic invoicing. These factors can be categorized into management support, communication factors, and technological readiness.

##### *Management support*

Management support was mentioned as an essential factor in the transition to electronic invoicing. In some cases, the interviewed organizations stated that the management had merely given orders to the “grass-root level” to implement electronic invoicing. The managing director had not taken into consideration that this would be a rather challenging task due to the fact that there were separate billing systems (e.g. more than 10) in that specific organization. Therefore, we interpret that management

really needs to take a more holistic view to electronic invoicing and support the electronic invoicing initiatives for it to succeed.

In addition to the management support, many organizations stated that one active project owner is required to promote and implement electronic invoicing in a very concrete way. According to our interviews, this person can be located at any level in the organization.

#### *Internal and external communication*

The most cited factor affecting the diffusion of electronic invoicing was internal and external communication. The respondents felt that the activity towards clients and suppliers had a positive effect on the adoption of electronic invoicing. Help and support should be given to the clients and suppliers that are new in the field of electronic invoicing. In addition, the availability of the electronic invoicing option should be made clear to clients and suppliers. This should be stipulated in the contract. Some advanced companies have found it useful to make a statement not to accept paper invoices (Nordea, city of Tampere 1.1.2007, TietoEnator 1.11.2007, Lindström 1.8.2008, and the Finnish government at the end of 2009).

Also, we learned that there were inactive links, meaning that the buyer and the seller might already be using electronic invoicing between some business units, while some other business units (in these same respective companies) had not initiated electronic invoicing. By enhancing the communication concerning electronic invoicing, these missing, already established links can be activated with very little effort.

In addition to this active external communication, the interviewees pointed out that the electronic invoicing project has to be well communicated within the company. The personnel must be given the necessary training and information concerning the implementation of electronic invoicing. In the implantation phase, the employees often

need assistance in processing the electronic invoices. Therefore, the need for an internal contact person specializing in electronic invoicing emerged from the interviews. The key target group for the internal communication is the purchasing department as it has the most leverage in negotiating new contracts. Another key target group is the sales department that can actively promote electronic invoicing towards the clients.

In addition to external and internal communication, the interviewees saw that the different operators should collaborate and communicate seamlessly to tackle any problems in the transmission of electronic invoices.

#### *Technological readiness*

In all the interviews, the respondents stated that technology should be mature. In the Finnish context, the respondents appreciated the fact that there were established standards such as the Finvoice and the TEAPPSXML standards. In addition to the maturity of technology, the respondents saw that centralizing the billing systems acts as an important enabler in the transition to electronic invoicing.

#### 4.2.2 Benefits realized so far

The interviewed organizations have implemented electronic invoicing during 2000-2007. Today, in these organizations, just over 30% of invoices are received in electronic format. The remaining paper invoices are scanned into electronic format. What kinds of benefits have these organizations been able to achieve so far?

#### *Cutting costs*

The organizations have already been able to extract considerable monetary gains by implementing electronic invoicing. One company reported their current work load savings at 1,300 hours per year. Another organization had set up an objective of 88% cost decreases in the invoice handling department and stated that they are well on their way to attaining this objective. Yet, another company reported having saved 0.8% of

their turnover directly from the implementation of electronic invoicing. The interviews support our hypothesis that the monetary gains are greater in the case of incoming invoices than in the case of outgoing invoices.

#### *Elimination of manual errors and improvements in customer service*

The case organizations reported far less manual errors in the case of electronic invoices compared to paper invoices. The companies had been able to eliminate the errors emerging from the interpretation of handwritten data. This has resulted in a considerable decrease in settlement times. Partly as a by-product of the elimination of manual errors, the interviewed organizations reported improvements in customer service. As an example, when sending out invoices, the company can monitor more efficiently the status of the invoice and can respond to their customers' enquiries.

#### *Decreasing circulation time*

By implementing electronic invoicing and by scanning the (still) incoming paper invoices into electronic format, the organizations have been able to decrease the circulation time of the incoming invoices in their respective organizations. Circulation time is the time it takes for an invoice to be processed within the organization. In addition to removing the mail delivery time, the actual circulation times have seen a decrease of approximately two days. However, now that invoices are in electronic format, some acceptors need to be reminded to go to the electronic system and accept the invoices. Before, this was done manually by the assistant coming to get the signature to the invoice to be accepted and paid. The organizations reported that the payment of electronic invoices takes place more often on time than the payment of traditional paper invoices.

#### *Other benefits*

The organizations also stated that electronic invoicing has increased the transparency and enabled real-time reporting. One interviewee appreciated the "online touch" to the suppliers' invoices even before posting the information to accounting. Some

organizations stated that the digitalization of business processes has had a positive effect on their image and that recruiting, for example, has become easier.

#### 4.2.3 Problem areas

As all disruptive technologies<sup>4</sup>, electronic invoicing has problem areas which may lower its performance, at least in the short term. In the case of electronic invoicing, there are some technology issues that still need to be solved. These include, for example, conversion issues between operators. The interviewed organizations reported that some of their invoices had gone missing and that they had told that this was due to conversion failure between the different operators. The respondents saw that the transmission of electronic invoices from one standard to another was not yet completely smoothly done. The interviewees saw that in this respect the technology was not mature enough.

Adding attachments to the electronic invoice presents problems to the organizations interviewed. Finvoice, for example, does not allow for attachments to be included in the invoice. Some organizations have solved this problem by adding a link to a webpage containing the information or the image of the actual invoice. Some organizations have had to go back to sending or receiving paper invoices for the clients or suppliers that require attachments.

One considerable problem area that emerged from the interviews was the step towards internationalization. None of the organizations had really initiated electronic invoicing internationally. The interviewees attributed this to their international invoicing connections, mainly customized EDI solutions which do not allow for open architectures. In addition, the local legislation requirements such as electronic signatures make it

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<sup>4</sup> Disruptive technologies bring to a market a very different value proposition than had been available previously. Generally, disruptive technologies underperform established products in mainstream markets. But they have other features that a few fringe customers value. Products based on disruptive technologies are typically cheaper, simpler, smaller, and frequently, more convenient to use. (Christensen 1997)

difficult to extend the Finnish electronic invoicing practices to international connections. The EU work described in the second section of this white paper aims at creating a unified, common rulebook to tackle this problem.

The respondents also criticized the cost structures in the Finnish electronic invoicing scene. As an example, one organization used two operators for their electronic invoicing. The organization did not find it acceptable that when their counterpart used Finvoice, they would have to pay the bank for receiving and sending invoices as they already paid to their operators.

While all of the interviewees recognized the shortcomings of the electronic invoicing systems, some invoices gone missing etc, all of them were unanimous in stating that they never want to consider returning to paper invoices. This feature is very common in disruptive technologies (Christensen 1997).

#### *4.3 Impacts on personnel and future steps of digitalization*

First, our results show that the implementation of electronic invoicing services creates new requirements to the personnel. Instead of merely opening the paper envelopes, circulating them to the acceptors in the organization, and, finally, inserting the invoice data into different (payment, ERP etc.) systems, the employee must be able to handle invoice data streams electronically and do follow-ups in the electronic system. The employees must be able to understand new technologies, processes, and systems.

Second, we found that, contrary to expectations, the level of interaction between the buyer and the seller did not decrease very much. Many of the companies actually reported that they now communicate more with their customers and suppliers on issues concerning invoicing. When asked about this, they stated that the companies share more information with their customers and suppliers making the billing processes more

transparent. In addition, by implementing electronic invoicing services, the companies have been able to raise the frequency of invoices.

Third, our results show that the employees considered the electronic handling of invoices mentally much more rewarding than handling paper bills. The interviewees appreciated, e.g., the automated accounting procedures and the increased transparency of internal financial management. On the other hand, they stated that, in physical terms, the change is for the worse as “most of the work is done at the desk on the computer and you lose the daily exercise”.

Fourth, in the beginning, the employees were somewhat anxious of losing the concreteness of invoicing. In the past, the employee could put the paper invoice in an envelope and physically take it to the post office. Now, with electronic invoicing, the employee just sends the invoice through the system and some employees found this new way of sending invoices ambiguous.

At the end of each interview, we asked the interviewees to cite future projects related to the digitalization of their businesses. The results show that the organizations plan to extend the electronic invoicing routines to ordering processes and eventually link the ordering processes directly to the customer’s systems.

## 5. Discussion

Electronic invoicing is being adopted in Finnish companies and public organizations at an increasingly fast rate. In this white paper, we have reported the results from the FullSEPA project which is the first phase of the Real-Time Economy program.

The project has produced many good results:

- increased the awareness of the benefits in Finland and EU generally
- pinpointed areas which need improvement
- enabled considerable contribution to EU Task Force in 2007 and Expert Group in 2008

The development work, research and market analysis also displays differences in mentalities between countries. Denmark, Sweden, and Italy have legislated or declared e-invoicing as mandatory at the latest this year in the public sector. Finland with the best starting point from the service angle was the slowest to come to a decision and also the latest to set a deadline – end of 2009. Now there are some 15 nations with plans to make electronic invoicing mandatory for the companies operating with the public sector.

Finland has a long tradition and relatively high volumes in EDI traffic between the business partners. The challenge in EDI has been the high cost for the SME sector and the fact that the entry barriers were lowered with the XML-based e-invoicing. Large enterprises had a need to digitize connections with all their business partners. Therefore, the local value added network service providers in Finland had an interest in complementing their services with e-invoicing consolidator services. When the service providers had also capabilities to bridge EDI and XML-based invoices, it was very natural at the Finnish market to start with B2B invoicing.

Finland did move ahead with B2B invoicing first as the savings for enterprises are so large (2,8bn). Traditional consumer invoicing is costing some 400m€ per year. In other Nordic countries it was not possible to get the banks to agree on B2B invoicing so Nordea Bank drove the initiative towards B2C e-invoicing instead. Due to active pricing 1,5-10€ additional charges for paper invoices a very rapid migration has been achieved. Consumers always pay all the costs for service providers and a transparent and even

aggressive pricing is very much in their interest. With lower costs and functioning competition the benefits come back to the customers through lower prices and improved services. This has been demonstrated in many fields. Positive incentives have in most cases failed to achieve any notable migration.

It has been difficult to get this normal EU best practice established in Finland. Consumer organizations do not see the full picture and even the financial press seems to believe that driving down cost with functioning incentives somehow is against consumer interest. If this attitude prevails Finland will not be able to catch up with neighboring countries in the B2C field. A failure to move fast ahead in the domestic market will also affect negatively the credibility of the export efforts conducted by the service operators and the consulting firms.

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