

**A Comparison of Electronic Invoicing Solutions in the EU
and the Effects of the EU Directives**

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Abstract of the Master's Thesis

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<p>Objectives</p> <p>Electronic invoicing is a relatively new field, and it is growing very rapidly. Many of the companies that provide electronic invoicing solutions do not fully understand the European Union's Invoicing Directive. Furthermore, in many cases it is not clear whom the companies are competing against or what electronic invoicing providers exist in Europe. Previously there have not been studies done on this topic, therefore this study aimed at developing a greater scientific knowledge in this area. The research objective can be divided into five parts, which are the following:</p> <ol style="list-style-type: none"> 1. Give an overview on electronic invoicing. 2. Describe the legislation regarding electronic invoicing in the EU. 3. Identify companies that provide electronic invoicing solutions in the EU and Norway. 4. Compare the electronic invoicing solutions. 5. Discuss the future of electronic invoicing as well as the possible effects of the Invoicing Directive. 	
<p>Data and Methodology</p> <p>The theory part of the thesis (chapters 1-3) was conducted in order to reach the first two parts of the research objective. Since electronic invoicing is relatively new field there are not yet books written on this topic. The data sources for this thesis were press releases, articles, company homepages and presentations, brochures, demos, and other publicly available information. Interviews with the electronic invoicing experts as well as the EU legislative personnel were used to gain a greater understanding of the whole. A survey was used as a research tool. Chapter 4 acts as a bridge between the theory part and the empirical part of the thesis. The empirical part (chapters 5-6) was done to reach the third and fourth parts of the research objective. The fifth part of the research objective was reached by analysing the theory part and the empirical part in chapter 7.</p>	
<p>Results</p> <p>The main results of the thesis were the findings on various electronic invoicing providers in the EU and Norway, and the comparisons made based on the survey results. Fourteen companies took part on the survey and based on their answers, the electronic invoicing solutions were compared. The research discussed EU's new Invoicing Directive and the level of harmonising effect it will have. Based on the interviews and the responses of the surveys, the majority believes that in the future the electronic invoicing market experiences rapid growth, and that an electronic invoice will become a common tool for businesses. The great challenge will be to have the various electronic invoicing solutions interacting with one and other across the borders.</p>	
<p>Key words: electronic invoicing, electronic storage, EU, Invoicing Directive, Sixth VAT Directive, XML, EDI, ebXML, advanced electronic signature</p>	

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ABBREVIATIONS

ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange
ASP	Application Service Provider
B2A	Business to Authorities
B2B	Business to Business
B2C	Business to Consumers
B2G	Business to Government
CPP	Collaboration Protocol Profile
DTD	Document Type Definition
e-	Electronic-
ebXML	Electronic Business eXtensible Markup Language
e-invoice	Electronic Invoice
EIPP	Electronic Invoice Presentment and Payment
EBPP	Electronic Bill Payment and Presentment
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange for Administration, Commerce, and Transport
ERP	Enterprise Resource Planning
EU	European Union
HTML	HyperText Markup Language
IT	Information Technology
MIME	Multipurpose Internet Mail Extensions
pdf	Portable Data Format
PIP	Partner Interface Process
SGML	Standardized General Markup Language
SOHO	Small Office Home Office
VAN	Value Added Network
VAT	Value Added Tax
XML	eXtensible Markup Language
XSL	eXtensible Stylesheet Language

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1. Introduction

This chapter provides the reader information regarding what this thesis consists of, and why the subject of the thesis is considered relevant.

1.1 Plan of this Chapter

This chapter is structured in the following manner: section 1.2 describes the background on electronic invoicing. The research objective of the thesis is defined in section 1.3, and the structure of the thesis is provided in section 1.4.

1.2 Background on Electronic Invoicing

This section contains information on electronic invoicing in general as well as it explains the background of the EU legislation on electronic invoicing.

Electronic invoicing is today's hot topic across the nations. In the business world electronic invoicing shapes accounting and financial systems. Companies save time and money when changing the traditional paper invoicing to an electronic form. When changing to electronic invoicing from the paper invoices, the savings can be up to 80-90% (Vahtera, 2002a). Also electronic invoicing results in space savings because of the electronic archiving used in applications. Electronic invoicing automates the invoicing process. In electronic invoicing the data has to be entered fewer times than in the traditional invoicing resulting in fewer typing errors.

One major problem with electronic invoicing is that currently there is no international standard. A multinational company issuing invoices in all EU Member States needs to understand fifteen different invoicing regulations. European Union's Sixth Directive concerning value added taxation written in 1977 did not mention electronic invoicing. In November 2000, the European Commission made a proposal for an Invoicing Directive amending the Sixth Council Directive. European Parliament did not approve

the proposal and changed the wordings. A final Directive was published in January 2002, and the Member States must implement this Directive by 2004. (European Union, 2002a) E-business VAT leader for PricewaterhouseCoopers, Christine Sanderson, states “Electronic invoicing is one of the building blocks of e-Europe and the invoice is probably the most important document in commercial trade. Complying with fifteen different invoicing procedures across the EU causes industry a colossal administrative burden and the Directive is definitely a move towards the simple, consistent rules European businesses have been asking for.” (Sanderson, 2000)

Electronic invoicing is still living its early stages, and yet there are no books written on electronic invoicing. Even the people in the electronic invoicing industry do not seem to have a clear picture of who they are competing against, and very often they do not know about the market situations outside their country. There has also been confusion with the new Invoicing Directive. The text and wordings of the Directive are in a quite complicated format, and even the electronic invoicing personnel have misinterpreted the text. (Salmi, 2002a) Consumers and personnel in other companies (outside of the electronic invoicing industry) often seem to have a hard time understanding simply what is an electronic invoice. This thesis is written to explain what is electronic invoicing, describe the legislation on electronic invoicing in the EU, identify companies that provide electronic invoicing solutions in the EU and Norway, compare the electronic invoicing solutions, and finally discuss the future of electronic invoicing and possible effects the new Invoicing Directive.

1.3 Research Objective of the Thesis

The research objective of this thesis is to explore what electronic invoicing solutions exist in the EU and Norway, compare them in a structured manner and find out what effects might the EU's new Invoicing Directive have on the future of electronic invoicing.

1.4 Structure of the Thesis

After describing the background on electronic invoicing and the research objective in chapter 1, the remainder of the thesis is structured as follows: in chapter 2 electronic invoicing is defined and described. Chapter 2 also explains the technology used with electronic invoicing solutions as well as discusses about the storage of invoices. The chapter describes the various players of the electronic invoicing market. The first part of the research objective, which was to give an overview on electronic invoicing, is reached in chapters 1 and 2.

Chapter 3 explains the European Union Council Directive 2001/115/EC amending the Directive 77/388/EEC with the view to simplifying, modernising and harmonising the conditions laid down for invoicing in respect of value added tax (VAT). A new Invoicing Directive was needed since the EU's Sixth VAT Directive written in 1977 did not mention electronic invoicing. The chapter describes the main characteristics of an electronic invoice as well as the advanced electronic signature. Chapter 3 describes the background and the decision-making process that finally led to the current Invoicing Directive. The chapter describes the different institutions of the EU that took part in the decision-making process regarding the Invoicing Directive. The second part of the research objective; describing the EU legislation on electronic invoicing, is reached in chapter 3. Also this chapter aims to clear out the confusion related to the Invoicing Directive that exists in the electronic invoicing field.

Chapter 4 describes the factors affecting the demand of electronic invoicing as well as the concerns of electronic invoicing. The chapter also summarizes the issues that should be taken into account when comparing the electronic invoicing solutions. Chapter 4 is a bridge between the theory part and the empirical part of the thesis.

Data sources and the research design are explained in chapter 5. This chapter also explains the research tool, a survey, which was used to compare the electronic invoicing solutions. In chapter 5, the companies that were offered to participate in this study are listed. The survey participants are also briefly identified. The third part of the research objective; identifying the companies that provide electronic invoicing solutions in the EU and Norway, is reached.

Chapter 6 consists of the empirical results of the thesis. The chapter explains the findings on current electronic invoicing solutions in the EU and Norway or, in some cases, the lack of solutions in certain of the EU Member States. The third part of the research objective is explored more thoroughly in this chapter. The comparison of the electronic invoicing solutions is made in this chapter, and therefore the fourth part of the research objective is reached.

The final chapter reaches the fifth part of the research objective by discussing the future of electronic invoicing in the EU and Norway and describing the possible effects of the new Invoicing Directive. Chapter 7 states the reliability and validity of this research. The chapter gives recommendations for further research as well as concludes the thesis.

2. Electronic Invoicing

Chapter 2 defines the term “electronic invoicing”. Also the chapter describes the electronic invoicing technologies as well as the storage of invoices and the players in the electronic invoicing market.

2.1 Structure and Objective of this Chapter

This chapter is structured in the following manner: section 2.2 explains the reader what is electronic invoicing. The electronic invoicing technologies, frameworks and protocols; EDIFACT/X12, XML, RosettaNet, Biztalk and ebXML, are introduced in section 2.3. The storage of electronic invoices is explained in section 2.4. The various players of the electronic invoicing market are described in section 2.5. This chapter is summarized and conclusions are drawn in section 2.6. The objective of this chapter is to give an overview on electronic invoicing so that the first part of the research objective of the thesis is achieved.

2.2 Definition of Electronic Invoicing

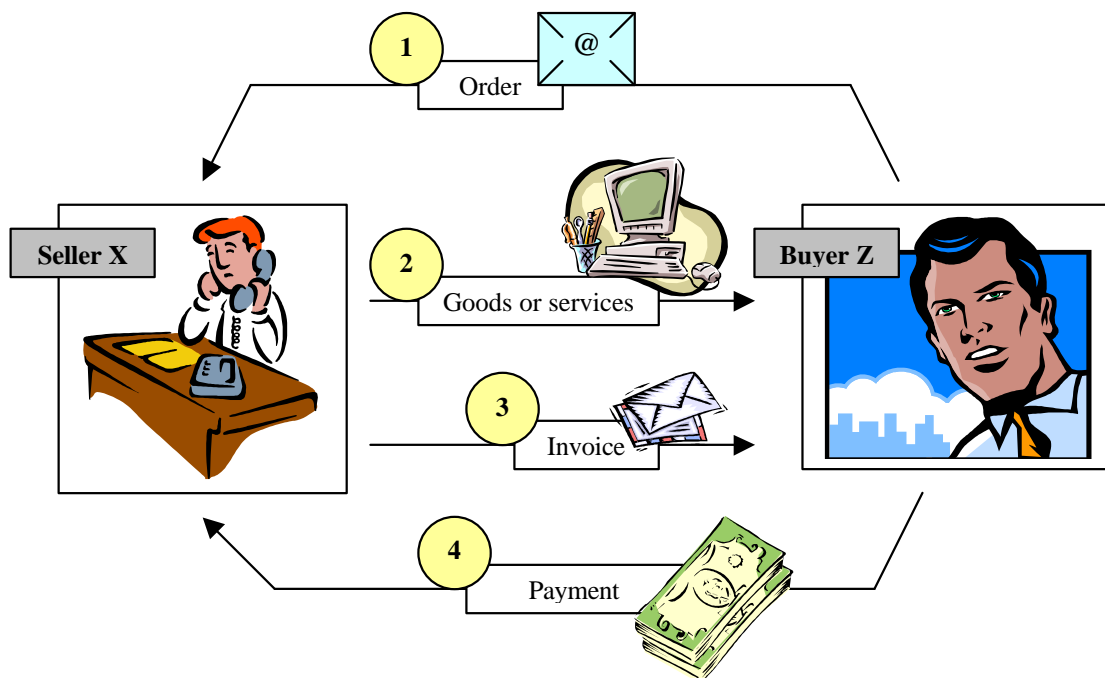
First it is necessary to define what is an invoice, where is it used, and how does it look like. After defining a traditional invoice, an electronic invoice is discussed.

An invoice can be described as the proof of payment in a transaction involving the sale of goods, provision of labour service, or other business activities. (TDC Trade, 2002)

An invoice is also a document supporting that a payment and receipt has taken place, an official document for financial management and accounting, and important tool in auditing for taxation purpose (TDC Trade, 2002).

Figure 1 illustrates the interfaces between a buyer and a seller when goods or services are ordered, delivered, invoiced and paid.

Figure 1. Basic Interfaces in an Ordinary Purchase Situation



I created this basic figure to illustrate why an invoice is created. In this example, there is Buyer Z who wants to buy goods or services from Seller X. First, the Buyer Z orders the goods or services by contacting the Seller X. Buyer Z and Seller X agree on the quantities of goods or services, the price, shipment, delivery schedule and so on. Secondly, Seller X delivers the goods or services to Buyer Z as agreed. Thirdly, the Seller X sends Buyer Z the invoice. The invoice states the description and the quantity of the goods or services delivered, the amount owed, the payment method, an account number, the taxes, and the contact information for both the buyer and the seller, date, due date, invoice number and possibly other information. Buyer Z checks that the invoice matches with the goods and services ordered as well as what was received. Lastly, after the Buyer Z agrees that the invoice is correct, he or she makes the payment for the goods or services. This was an example of how a traditional invoice is created. In addition to the traditional invoice, an invoice is also used in self-invoicing, direct invoicing and correcting earlier invoices. The invoicing operations can also be outsourced.

The most obvious way an electronic invoice differs from the traditional invoice is that it has an electronic form. Another difference is the technology used with electronic invoicing. The integrity of data and authenticity of the origin are main security issues related to electronic invoicing. The content of an electronic invoice has various message formats. The storage of an electronic invoice is different than the storage of a paper invoice, and this is explained in section 2.4. Whereas the traditional paper invoicing has a buyer and a seller, the role of a third party (consolidator) is important in electronic invoicing. This is explained in more detail in section 2.5.

Electronic invoice is often referred to as an e-invoice. The term “e-invoice” is widely used in the Nordic countries whereas the rest of the Europe often talks about “Electronic Bill Presentment and Payment (EBPP)” and “Electronic Invoice Presentment and Payment (EIPP)”. Also “netinvoice” is used in some companies to describe an electronic invoice. Electronic invoicing and e-invoicing has the same meaning and I will use both of the terms in this thesis. Electronic invoicing does not have the same meaning as electronic payment, electronic order nor electronic commerce. When describing the solutions companies offer, I will use the term they have defined for their solution, whether it is e-invoice, EBPP or something else. In general, companies that offer electronic invoicing solutions enable businesses to exchange invoices electronically with other business, consumers or authorities.

The Nordic eInvoice Consortium defines electronic invoice as a modern, reliable, cost-efficient and practically paperless method of handling and processing invoicing for goods, services, and other expenses. Both large and small companies as well as private consumers can receive invoices in electronic format. In electronic invoicing between businesses, the invoice data is transferred from the issuer’s invoicing system directly to the recipient’s financial system. According to the Nordic eInvoice Consortium, an electronic invoice is graphically presented on a computer with similar appearance to a traditional paper invoice. (eInvoice Consortium, 2002)

Laurent Strepenne from PricewaterhouseCoopers states that electronic invoicing is one specific aspect of the transmission of electronic data. According to Strepenne, based on an order received from a customer and on logistic information an electronic invoice is created. Electronic invoicing involves at least two parties, one company is sending the electronic invoice and another company is receiving it. The buyer’s financial system

recognises the electronic invoice and automatically books it into the relevant accounts without any human intervention. Strepenne notes that electronic invoicing is not the same as e-mailing an invoice as an attachment. (Strepenne, 2000)

According to Senior Research Analyst Esa Peltonen from IDC, electronic billing and payment refers to the electronic presentation of financial statements, bills, invoices and related information sent by a company to its customers or a third-party, and corresponding payment for goods or services. Peltonen states that “the information in the bill or monthly financial statement can also be located from the biller's own or a third-party organisation 's web site and thus end users can view and pay the bill over the Internet”. (Peltonen, IDC, 2002)

In this thesis I will assume that an electronic invoice is a presentation of an invoice in an electronic form sent by the seller of the goods or services to its customers either directly or through a third-party.

2.3 Electronic Invoicing Technologies

In this section I will go briefly over the five electronic invoicing technologies that are used or will be used in electronic invoicing. First, in subsection 2.3.1 the development of EDIFACT / X12 is discussed. Subsection 2.3.2 deals with eXtensive Mark-up Language (XML). Subsection 2.3.3 goes over RosettaNet framework whereas subsection 2.3.4 discusses Biztalk. Lastly, subsection 2.3.5 goes through Electronic Business eXtensible Markup Language (ebXML).

2.3.1 EDIFACT / X12

In the past, large companies have connected their major supplier through private networks often referred to as electronic data interchanges resulting in time and costs savings. (Kalakota, 2001, 310) In the 1970's work began for EDI standards. Both users and vendors had requirements for creating a set of standard data formats that were the following:

- hardware independent,

- unambiguous so that all trading partners could use them,
- reduced the labour-intensive tasks of exchanging data (e.g., data re-entry), and
- allowed the sender of the data to control the exchange, including the knowledge whether the recipient did receive the transaction. (NIST, 1996)

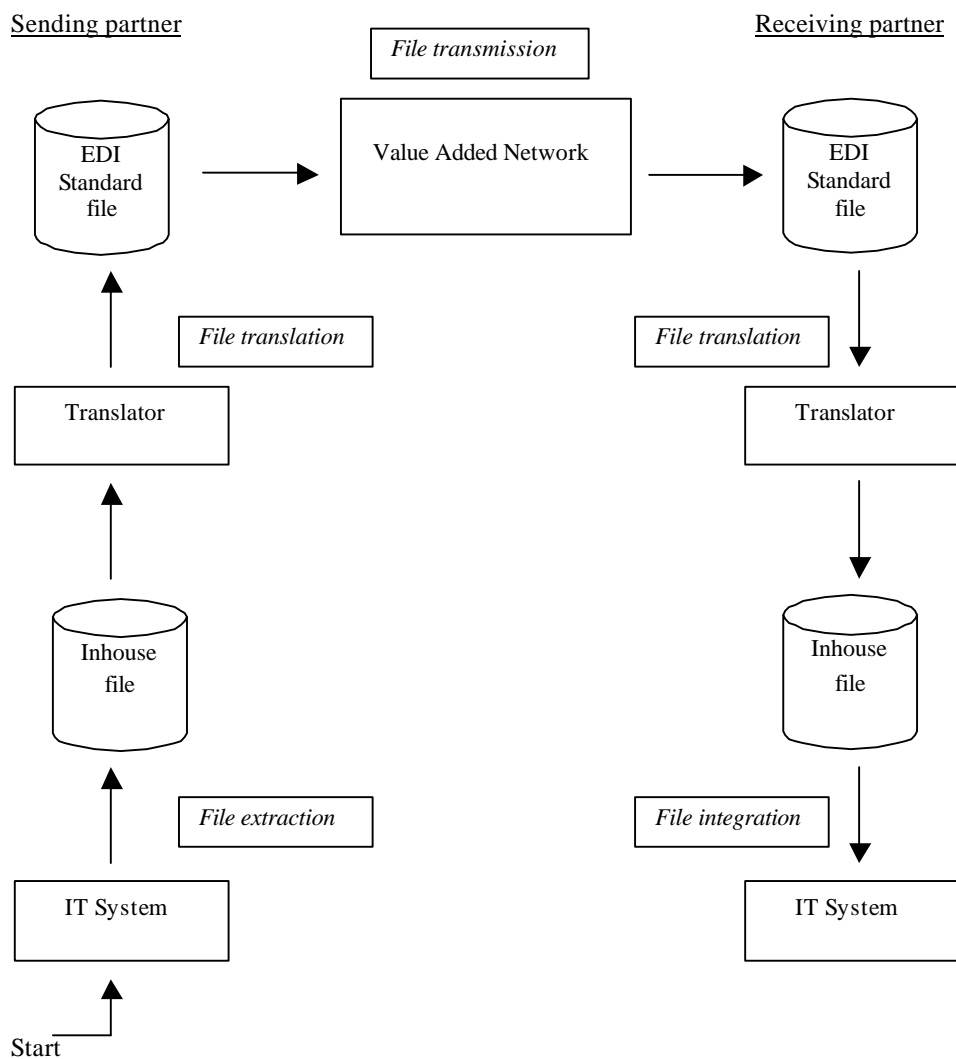
EDI was widely spread in the late 1970s to mid-1980s (Anderson, 2001, 392). EDI is an electronic transmission of documents between businesses. EDI uses a set of standard forms, messages, and data elements, and it is based on pre-existing contractual relations. With EDI the documents are exchanged through point-to-point connections, private networks, value-added networks, and the Internet. (PwC, 1999a)

An EDI message contains data elements, which can include for example a price or a product model number. The entire string is called a data segment. A header and a trailer that frame the data segments form an EDI unit of transmission. This unit often contains the content of a business document. (SearchEBusiness.com, 2001)

EDI is a format for exchanging business data, and it was especially used prior to the pre-XML era. The two main EDI standards have been ANSI X12 and UN/EDIFACT. (SearchEBusiness.com, 2001) ANSI (American National Standards Institute) is a private, non-profit organisation that administers and coordinates the U.S. voluntary standardization and conformity assessment system. ANSI is the U.S. representative to the International Accreditation Forum (IAF), the International Organisation for Standardization (ISO), and the International Electrotechnical Commission (IEC). (ANSI, 2002) UN/EDIFACT stands for United Nations rules for Electronic Data Interchange For Administration, Commerce And Transport. They comprise a set of internationally agreed standards, directories and guidelines for the electronic interchange of structured data related to trade in goods and services between independent, computerised information systems (UNICE, 2002).

Figure 3 illustrates the traditional EDI communication process between two partners.

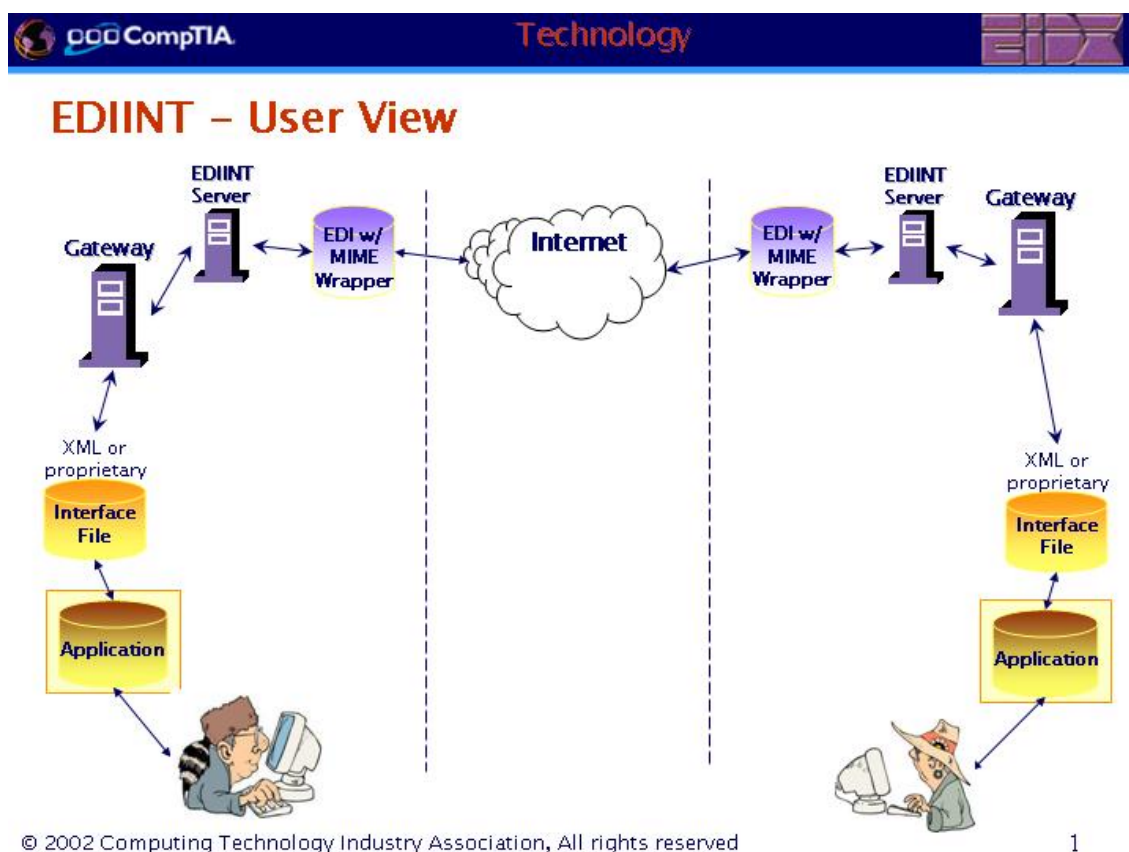
Figure 3. EDI Communication Process



Source: CompTIA, 2001

Expensive and complex interfaces to applications are required for the traditional EDI. The new Internet technologies have influenced EDI information transport technology and applications. In the web-based EDI a company needs only a PC, an Internet connection and a standard browser to participate in an existing EDI infrastructure. (PwC, 1999a) Figure 4 shows how the EDI data is sent over the Internet.

Figure 4. EDI Over the Internet (EDIINT)



Source: EIDX. 2002

EDIINT is an Internet specification for exchanging messages over the Internet and it is often used as an extension of traditional EDI. EDIINT uses the existing back-end application and gateway processes. Instead of sending the data to a traditional VAN, the data is sent over the Internet as an e-mail attachment. With EDIINT the communications with the trading partners are point-to-point. (EIDX, 2002)

2.3.2 XML

The development of eXtensible Markup Language (XML) began in 1996 and in 1998 it became a World Wide Web Consortium (W3C) recommendation. (Fitzgerald, 2001, 19) XML is designed to be served, received, and processed on the web in the way that is currently possible with Hypertext Markup Language (HTML). XML differs from both Standardized General Markup Language (SGML) and HTML in that easy to implementation and compatibility. (Ray, 2001, 313)

XML is not itself a markup language rather it provides a set of rules for building markup languages. A markup is a set of symbols that can be placed in the text of the document to demarcate and label the parts of that document (Ray, 2001, 2). A list of XML features below explains why it has become so popular in such a short period of time:

- XML is free
- XML is structured
- XML is the basis for a file format
- XML is open
- XML is non-proprietary
- XML is platform independent
- XML supports Unicode

(Fitzgerald, 2001, 19-20, 29)

Figure 5 is a basic example of an XML document designed for use with a B2B application.

Figure 5. The Anatomy of an XML Document

```
<?xml version="1.0" encoding="iso-8859-1" ?>
<Order partner="03-657-3748"2>
  <Date>2002-07-03</Date>
  <Item type="ISBN">0452840337</Item>
  <Comments>10% Discount</Comments>
  <ShippingMethod class="5th">FedEx</ShippingMethod>
</Order>
```

Source: Fitzgerald, 2001, 22

The first line of the XML document is an XML declaration:

```
<?xml version="1.0" encoding="iso-8859-1" ?>
```

In XML the document data is between the tags `<>` and `</>`. Unlike HTML, XML does not have predefined elements. The tags in XML are describing the content of the data, which makes it easy to understand and change the data. The style of the XML document is defined with stylesheets, and therefore the concept of the document and presentation are kept separate. With this feature it is easier to reuse and refit the content for various needs. (Fitzgerald, 2001, 37) When using XML you must define the elements yourself

of use someone else's vocabulary such as RosettaNet or ebXML. These XML vocabularies are discussed later in this chapter.

Figure 6 illustrates how the invoice data is formed using XML. The tags that are in the example such as <BANK_NAME></BANK_NAME> are used in TietoEnator's real XML invoices. The content inside of the tags such as **NORDEA** is not from an actual invoice, since this example is used only for demonstration purposes.

Figure 6. An Example of an XML Invoice Data

```

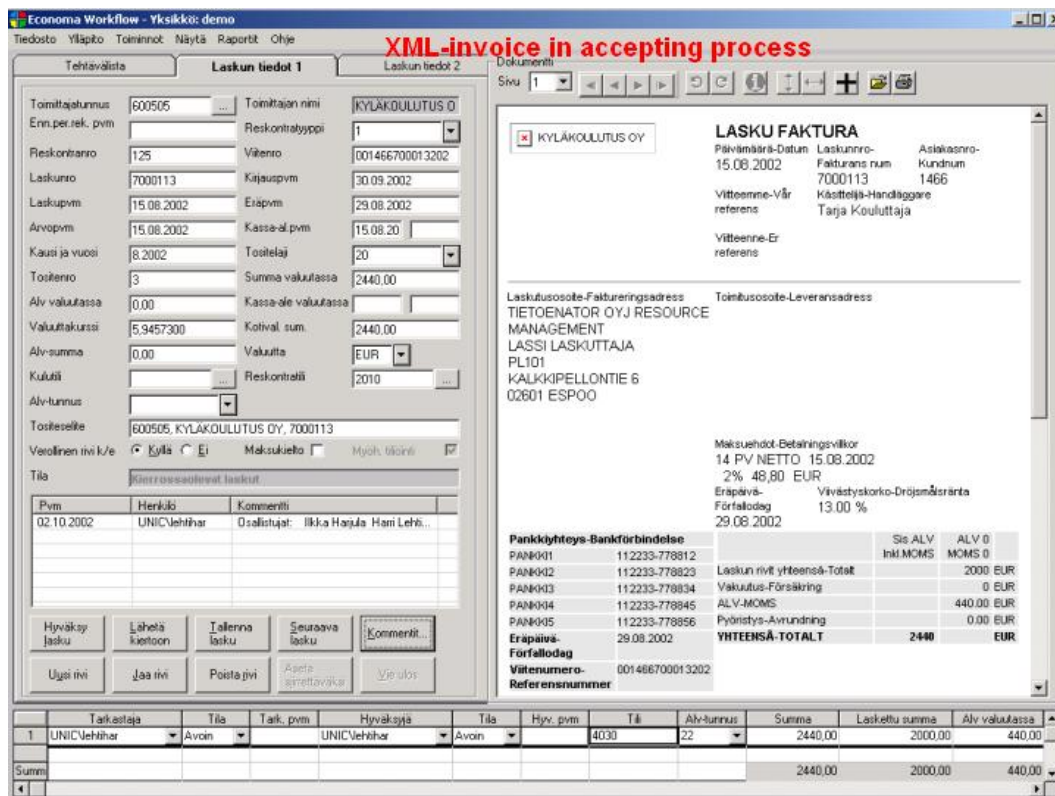
<VAT_NUMBER>FI010111385</VAT_NUMBER>
<ORGANIZATION_NUMBER>01011138-5</ORGANIZATION_NUMBER>
<TRADE_REGISTRY_NUMBER>191.751</TRADE_REGISTRY_NUMBER>
<CONTACT_INFORMATION>
  <TELEPHONE_NUMBER>09-3290 7000</TELEPHONE_NUMBER>
  <TELEFAX_NUMBER />
</CONTACT_INFORMATION>
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  <EU_COUNTRY_NAME />
  <EU_COUNTRY_CODE>FI</EU_COUNTRY_CODE>
</EU_COUNTRY>
<E-MAIL_ADDRESS>johnny.branders@tietoenator.com</E-MAIL_ADDRESS>
<CUSTOMER_INFORMATION>
<BANKS>
  <BANK_CODE>1</BANK_CODE>
  <BANK_NAME>NORDEA</BANK_NAME>
  <BANK_ACCOUNT_NUMBER>221188-12345</BANK_ACCOUNT_NUMBER>
</BANKS>
<NET_SERVICE_ID>TE0037001011385</NET_SERVICE_ID>
<DETAILS_OF_PAYMENT>
  <FI_PAYMENT_REFERENCE>000249700008202</FI_PAYMENT_REFERENCE>
</DETAILS_OF_PAYMENT>
<BANK_BARCODE>
  <FI_BANK_BARCODE>1228110006821900439200000000024970000820201012900000<FI
_BANK_BARCODE>
</BANK_BARCODE>
<PAYEE>
<RECEIVER>
  <CUSTOMER_INFORMATION>
    <CUSTOMER_NAME>DATAVOIMA OY</CUSTOMER_NAME>
    <ADDRESS>
      <STREET_ADDRESS1>DATATIE 7</STREET_ADDRESS1>
      <STREET_ADDRESS2 />
      <POSTAL_CODE>01300</POSTAL_CODE>
      <POST_OFFICE>VANTAA</POST_OFFICE>
      <COUNTRY />
      <COUNTRY_CODE />
    </ADDRESS>
    <VAT_NUMBER />
    <ORGANIZATION_NUMBER />
  </CUSTOMER_INFORMATION>
</RECEIVER>

```

Source: TietoEnator, 2002b

The following example illustrates how does an XML based invoice look like in the accepting process on the computer screen. Figure 7 is from TietoEnator's presentation slides.

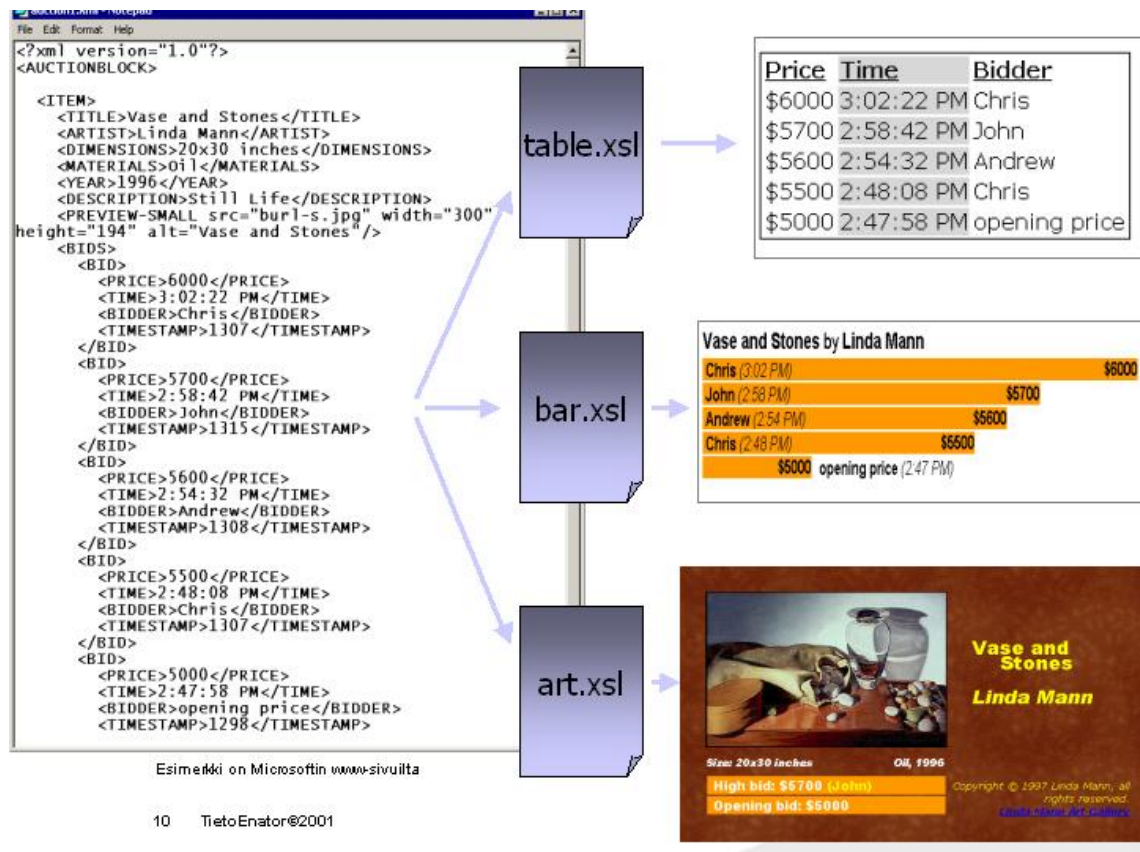
Figure 7. An Example of XML-invoice in the Accepting Process



Source: TietoEnator, 2002b

As mentioned earlier, XML language is designed so that it focuses on the content of the data alone. A language called Extensible Stylesheet Language (XSL) converts the original XML data into different output. Figure 8 is from TietoEnator's presentation slides and originally taken from Microsoft web pages. The example illustrates well how different parts of the business data that is stored in XML, can be converted by using XSL into three totally different outputs of data.

Figure 8. XML and Stylesheets



Source: TietoEnator, 2002b

2.3.2.1 How do EDI and XML compare?

This subsection compares EDI and XML. The comparisons are made of their definition, readability, transmission, customised mapping, costs, transaction values, user limitations and development. The comparison is made by Remarkable eBusiness, and Table 1 summarizes the differences between EDI and XML.

Table 1. EDI Compared with XML

EDI versus XML	
Definition	EDI is a technology for automating order processing and document interchange between computer applications. XML is an emerging standard designed to simplify Web-based e-commerce transactions between computer applications
Readability	EDI documents are typically in a compressed, machine-only readable form. XML is an open human-readable, text format
Transmission	EDI documents are typically sent via private and relatively expensive value-added networks (VANs). XML documents are typically sent via the Internet - i.e. a relatively low-cost public network.
Customised mapping	EDI traditionally requires customised mapping of each new trading partners document format. XML is designed to require one customised mapping per industry grouping, so most companies will be able to work to one format and use XML.
Cost	EDI typically requires dedicated servers that cost from US\$10,000 and up. EDI can involve high on-going transaction based costs keeping up the connection to the EDI network and keeping the servers up and running. XML requires a reliable PC with an Internet connection. XML in Internet-based has low ongoing flat-rate costs using existing Internet connections and relatively low-cost Web Servers.
Transaction values	EDI-based transactions account for the bulk of value of goods and services exchanged electronically. XML processes relatively low transaction values
User limitations	EDI is estimated to be limited to 300,000 companies worldwide and about 20% of their suppliers because of operational costs and complexity. XML appears to have no upper limit in terms of numbers of users
Development	EDI was traditionally built from the ground up in semi-isolation without being able to share resources with other programs. XML is being developed in a world of shared software development populated by many low-cost tools and open source projects.

Source: Remarkable eBusiness, 2002

XML is ideal for the structure when storing and sharing business and workflow information. For XML messages to be interpreted by other businesses, the companies have to agree on an XML-based B2B standard, which defines the document formats, allowable information and process descriptions. An XML-based standard such as RosettaNet, Biztalk, or ebXML, can increase the number of trading partners as well as it can help define the base process definitions that will be created between companies. (Skinstad, 2000) XML is will not replace EDI in the near future. In the past HTML made it possible for a small operator to get on the web, today B2B applications using

XML allow just about anyone to automate and quicken the pace of business transactions. (Fitzgerald, 2001, 6)

Next, I will briefly go over three important XML-based B2B standards or protocols that are RosettaNet, Biztalk and ebXML.

2.3.3 RosettaNet

RosettaNet is a non-profit consortium that has information technology, electronic components, and semiconductor manufacturing companies working to create, implement and promote open e-business process standards. (RosettaNet, 2002)

RosettaNet is a B2B process-oriented standard that defines high-level business process and breaks them up into process flows called PIP (Partner Interface Process), which are exchanged between the trading partners. (Skinstad, 2000)

Figure 9 demonstrates a part of RosettaNet's "Builder build sheet" that is used to start an XML template.

Figure 9. RosettaNet: XML Template for Build

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- (c) 2001, RosettaNet; portions hereof (c) 2001, SAIC. -->
<!--Description: Builder XML doc for %ROOTTAG% component, %MV1TEXT%

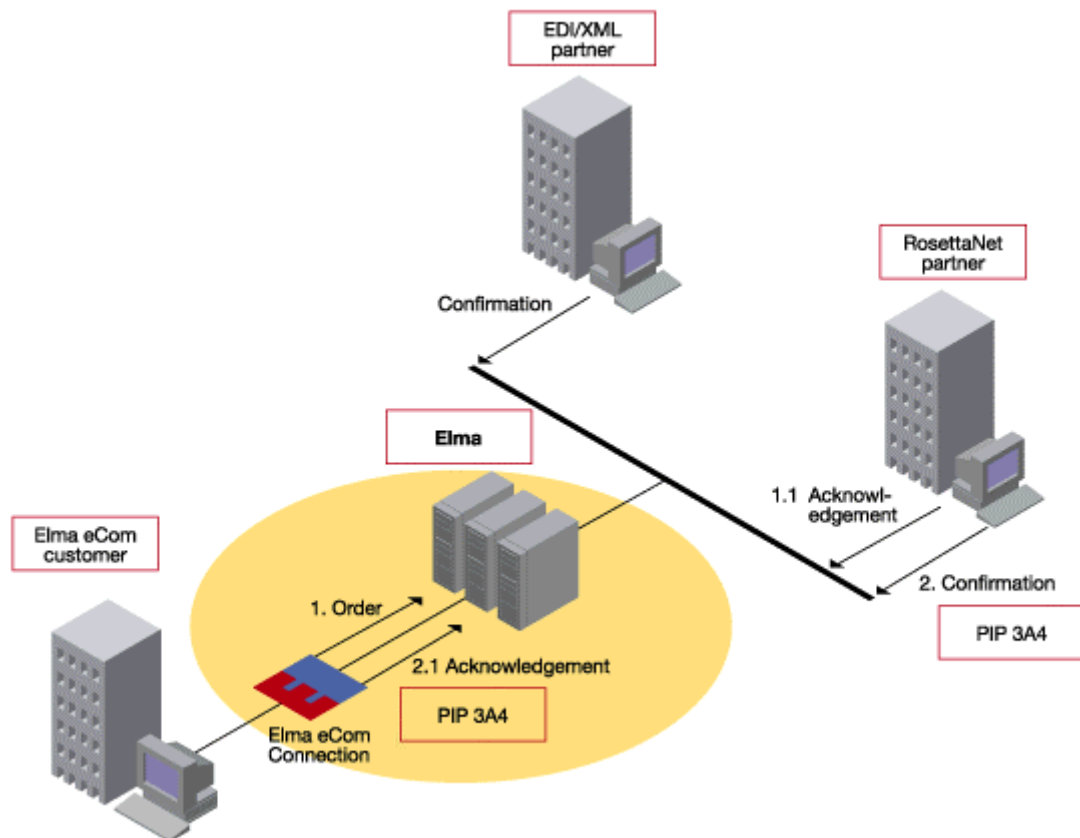
PIP: %PIPID%: %PIPTXT% - %ACTIVITYID% Dialog
Guideline: %MG_FILENAME%
% VERSIONTEXT%
Author: %AUTHOR%
-->
<!DOCTYPE Build SYSTEM "Build.dtd">
<Build name="%ROOTTAG%Build"
base="%PIPPATH%/MSGDIR%/MSGDIR%Base_%MVbase%.xml"componentType="%ROOTTAG%">
<Description>Build message XML structure for %ROOTTAG%, %MV1TEXT%</Description>
<Version>% VERSION%</Version>
%XMLvariant.0239%
</Build>
```

Source: RosettaNet, 2002

Elma Electronic Trading's ElmaXML for RosettaNet is an example of e-commerce solutions that comply with RosettaNet standards. ElmaXML for RosettaNet is based on a service provider model, and the connections enable the automation of application-to-application Supply Chain Management. The data is both sent and received

automatically between the software applications. The stream of data is entered directly to the trading partner's IT and ERP (Enterprise Resource Planning) systems. (Elma, 2002c) Figure 10 demonstrates how the ElmaXML for RosettaNet works.

Figure 10. ElmaXML for RosettaNet



Source: Elma, 2002c

2.3.4 Biztalk

Biztalk is an industry initiative supported by a wide range of organisations. Biztalk was started by Microsoft. Biztalk is not a standards body; it is an XML framework for electronic commerce and application integration. (Nickull, 2001) Biztalk is a community of standard users that have defined BizTalk Framework™. It consists of guidelines for publishing schemas in XML and for using XML messages to integrate software programs in order to build new solutions. (Skinstad, 2000)

Biztalk is suitable for many purposes including heavy-duty B2B operations (Fitzgerald, 2001, 275). Biztalk protocol relies on a Microsoft's BizTalk Server 2000, which costs \$5,000 for a single license and \$25,000 for an enterprise license. (Fitzgerald, 2001, 275)

Figure 11 shows a part of invoice data that is based on the Biztalk framework.

Figure 11. Biztalk Invoice

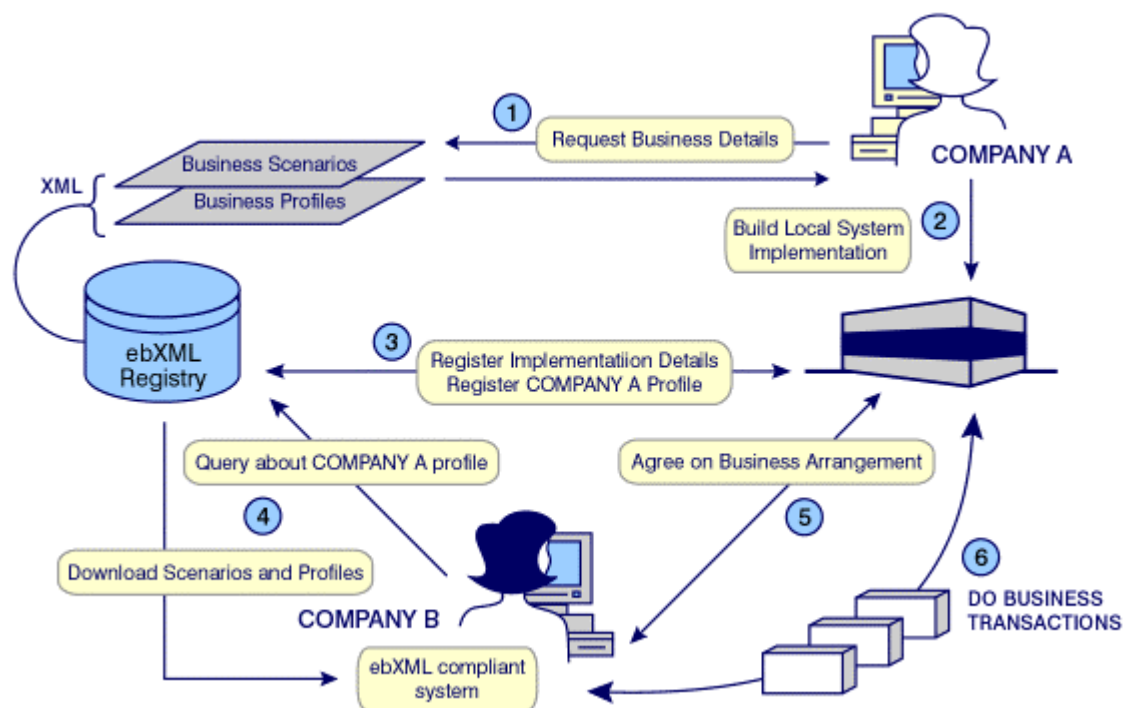
```
<ContosoInvoice>
<Header invoiceNumber="INV8279" referenceNumber="BL0211" PONumber="PO8579"
created="2001-04-02T16:13:31" invoiceTotal="790"></Header>
<BillTo name="Brian H. Valentine" address="1234 Main Street 2nd floor" city="Anytown" state="AB"
zip="12345" country="USA"/>
</ContosoInvoice>
```

Source: MSDN, 2002

2.3.5 ebXML

ebXML is a joint project of the United Nations body for Trade Facilitation and Electronic Business, and OASIS, the Organisation for the Advancement of Structured Information Standards to develop a framework for using XML to exchange business data (Skinstad, 2000). ebXML stands for Electronic Business eXtensible Markup Language. It is an open XML-based infrastructure enabling businesses to exchange messages, conduct trading relationships, communicate data in common terms and define and register business processes. (ebXML, 2002) Figure 12 gives a high-level overview of ebXML interaction between two companies.

Figure 12. Overview of ebXML Interaction Between Two Companies



Source: IBM, 2003

In Figure 12, Company A first reviews the contents of an ebXML Registry including the Core Library. The Core Library is a set of standard parts that may be used in larger ebXML elements; for example, Core Processes may be referred by Business Processes. The Core Library allows Company A to determine the requirements for their own implementation of ebXML. Company A can decide to buy or build an ebXML implementation that fits their transactions. Then Company A needs to create and register a Collaboration Protocol Profile (CPP) with the Registry. The CCP contains the necessary information for a potential partner to determine the business roles in which Company A is interested, and the type of protocols it is interested for these roles. The next step after Company A is registered is that Company B can look at Company A's CPP to determine that it is compatible with Company B's CCP and requirements. After this is done Company A and Company B can begin the actual business transactions. (IBM, 2003)

The Finnish Bankers' Association is developing an XML standard for electronic invoicing that is based on ebXML. Their standard is called Finvoice. This standard is still under development but I was able to get a draft version of it. Figure 13 shows a

partial example of the Fininvoice that is based on ebXML. (Finnish Bankers' Association, 2002)

Figure 13. Fininvoice (based on ebXML).

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<!-- edited with XML Spy v4.2 U (http://www.xmlspy.com) by Jussi Paasikallio (OKOBANK Group) -->
<!-- Sample XML file generated by XML Spy v4.2 U (http://www.xmlspy.com)-->
<!DOCTYPE Fininvoice SYSTEM "Fininvoice.dtd">
<?xml-stylesheet type="text/xsl" href="Fininvoice.xsl"?>
<Fininvoice Version="1.0">
  <SellerPartyDetails>
    <SellerPartyIdentifier>0123456-7</SellerPartyIdentifier>
    <SellerOrganisationName>Pullin Kala Oy</SellerOrganisationName>
    <SellerOrganisationTaxCode>0123456-7</SellerOrganisationTaxCode>
    <SellerPostalAddressDetails>
      <SellerStreetName>Haapatie 7</SellerStreetName>
      <SellerTownName>Helsinki</SellerTownName>
      <SellerPostCodeIdentifier>00100</SellerPostCodeIdentifier>
      <CountryCode>FI</CountryCode>
      <CountryName>FINLAND</CountryName>
      <SellerPostOfficeBoxIdentifier>PL 302</SellerPostOfficeBoxIdentifier>
    </SellerPostalAddressDetails>
  </SellerPartyDetails>
  <SellerOrganisationUnitNumber>00000</SellerOrganisationUnitNumber>
  <SellerContactPersonName>Hanna Paananen</SellerContactPersonName>
  <SellerCommunicationDetails>
    <SellerPhoneNumberIdentifier>050-5432659</SellerPhoneNumberIdentifier>
    <SellerEmailAddressIdentifier>hanna.paananen@pullinkala.fi</SellerEmailAddressIdentifier>
  </SellerCommunicationDetails>
  <SellerInformationDetails>
    <SellerHomeTownName>Helsinki</SellerHomeTownName>
    <SellerVatRegistrationText>Alv.Rek</SellerVatRegistrationText>
    <SellerVatRegistrationDate Format="CCYYMMDD">19990321</SellerVatRegistrationDate>
    <SellerPhoneNumber>(09) 542 1222</SellerPhoneNumber>
    <SellerFaxNumber>(09) 542 2221</SellerFaxNumber>

    <SellerCommonEmailAddressIdentifier>palaute@pullinkala.fi</SellerCommonEmailAddressIdentifier
  >
    <SellerWebaddressIdentifier>www.pullinkala.fi</SellerWebaddressIdentifier>
    <SellerFreeText>Tunnuslauseemme on Kalaa joka makuun!</SellerFreeText>
  </SellerInformationDetails>
  <RecipientPartyDetails>
    <RecipientPartyIdentifier/>

```

Source: The Finnish Bankers' Association, 2002

2.4 Storage of Invoices

Physically storing paper invoices for long periods of time is often problem due to the difficulty of maintaining readability of the invoice or having enough storage space.

With electronic storage of invoices some of the problems can be solved. The

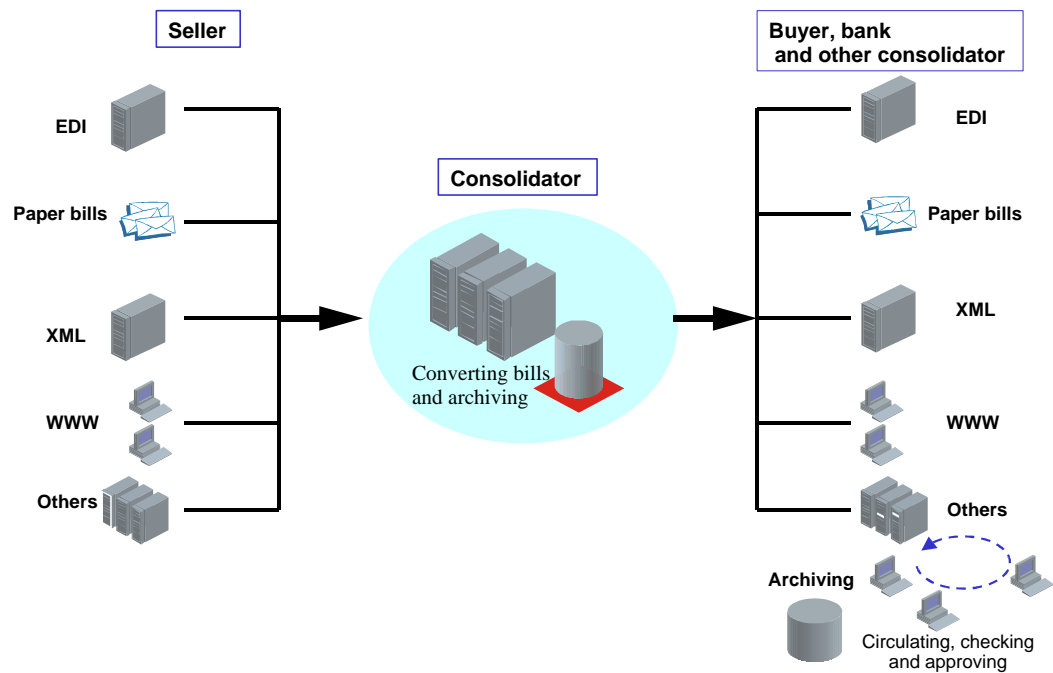
information can be kept on disks or tapes and on optical storage media. Optical storage allows for digitised recording of data in a non-renewable, non-erasable format that cannot be written over, which is often referred to as write-once, read-many, or WORM. Optical tape and CD-ROM are examples of optical storage technology. (PwC, 1999a)

2.5 Identifying the Players in the Electronic Invoicing Market

Electronic invoicing market is still at its early stages, but in general the future growth prospects are expected to be high. Various players of the electronic invoicing market have also noticed to new market opportunities. The market players vary by country, but in general the main players that offer electronic invoicing solutions include software vendors, telecommunications and IT service vendors, banks, operators, posts, consolidators and financial institutions.

An electronic invoicing operator connects the issuer of invoices to the system and changes the format of the invoice if needed. The electronic invoices use different distribution channels, such as the consolidators or ASP-operators, to get the recipient system. Also the invoice can be sent directly to the receiver, and this is done with receivers with large volumes of electronic invoices. The duty of an electronic invoice operator includes the actual connections between parties, maintenance, control and security. (Hällström, 2002) A consolidator consolidates invoices from organisations and other consolidators, and delivers them to consumers, businesses or authorities for invoice presentment. Also a consolidator converts the invoice data into various forms and archives it. (Peltonen, IDC, 2002) The application service providers deal with the enterprise resource planning (ERP) systems. An electronic invoicing service provider sends and receives of electronic invoices, recycles and checks the invoices, and stores the invoices electronically. (Hällström, 2002)

Figure 14 illustrates the role of a consolidator.

Figure 14. Consolidator's Operations

Source: Peltonen, IDC, 2002

2.6 Summary and Conclusion of this Chapter

An electronic invoice is a presentation of an invoice in an electronic form sent by the seller of the goods or services to its customers either directly or through a third-party. EDI is a format for electronic trade and commerce that has evolved standards such as UN/EDIFACT and ANSI X12. XML is a free markup language, and it is a basis for a file format where the style is kept separate from the content. The chapter explained three XML vocabularies and protocols for B2B applications that were RosettaNet, Biztalk and ebXML. Electronic invoices can be stored on disks, tapes or on CD-ROMs. The market players that offer electronic invoicing solutions include software vendors, telecommunication and IT service vendors, banks, operators, posts, consolidators and financial institutions. This chapter gave the reader a general overview on what is electronic invoicing, with what technology does it work with, who are the players in the electronic invoicing industry and how can electronic invoices be stored.

3. The EU Directives

Chapter 3 explains the European Union Council Directive 2001/115/EC amending the Directive 77/388/EEC with the view to simplifying, modernising and harmonising the conditions laid down for invoicing in respect of value added tax (VAT). This chapter explains the different requirements that currently exist in the various Member States. This chapter explains the background and the decision-making process that finally led to the new Invoicing Directive. It also describes the institutions of the EU that were involved in the Invoicing Directive process. This chapter also evaluates the new Invoicing Directive and discusses some views on effects of the Directive.

3.1 Structure and Objective of this Chapter

This chapter is structured in the following manner: section 3.2 describes the different requirements that currently exist in the Member States. The section also includes a subsection on characteristics of electronic invoicing as well as a subsection on the advanced electronic signature. Section 3.3 explains the EU Directive. This section includes subsections on the background and the decision-making process of the Invoicing Directive as well as it has a subsection on the institutions of the EU. The new Invoicing Directive is also discussed in this section. Section 3.4 evaluates the Invoicing Directive and views on this new Directive are presented in section 3.5. Conclusions of this chapter are drawn in section 3.6. The objective of this chapter is to describe the legislation regarding electronic invoicing in the EU. By doing this, the second part of the research objective is reached, and hopefully this chapter clears out some of the confusion related to the Invoicing Directive.

3.2 Different Requirements

Although electronic invoicing has numerous benefits, it also faces various problems. The main problem is that the rules governing invoicing vary widely from one Member

State to another. The rules vary from total ban to extreme flexibility. As an example of this diversity; in Greece electronic invoicing is not allowed in any form, in Finland even an SMS message is accepted as an invoice (PwC, 1999b)

PricewaterhouseCoopers found out the EU VAT legislation on electronic invoicing and electronic storage of invoices in all the fifteen Member States. Next, based on this study, I will describe the legislation of each Member State. The information in this section is based on the PricewaterhouseCoopers study (PwC, 1999b) unless stated otherwise.

In Sweden electronic invoicing is allowed and there is no specific regulation in the VAT law. There are no permissions needed or prescribed standards. Sending an invoice as an attachment to an e-mail is allowed. Electronic storage of invoices is possible and the storage period is ten years. Paper invoice must be stored in a paper form.

Finland has a very similar legislation on electronic invoicing as Sweden. Finnish law allows electronic invoicing and there are no prescribed standards. Electronic storage is allowed and the storage period is six years.

Denmark is following Finland and Sweden with its flexible legislation. In Denmark, electronic invoicing is allowed by law as well as electronic storage is allowed. Also there is no permission necessary and no prescribed standard for electronic invoicing.

In the United Kingdom, electronic invoicing is regulated by law and a notification to authorities is required. Also law regulates the electronic storage and a notification to authorities is required. The use of different standards is possible in the UK.

The Netherlands allows electronic invoicing and the authenticity of the origin and integrity of content of the invoices has to be guaranteed either by an advanced electronic signature, or by paper reconciliation overview (specific conditions), or by other methods such as pre-discussion with the authorities.

In Austria electronic invoicing is allowed by administrative practice. There are no prior permission necessary and no prescribed standards for electronic invoicing. Periodical

overview of electronic invoices must be issued. Similarly to Denmark, Austria also allows electronic storage.

Italy allows electronic invoicing by administrative practice. Prior authorisation is advisable but not required. Electronic storage is not allowed.

In Belgium electronic invoicing is allowed by administrative practice, similarly to Austria and Italy. The VAT authorities grant individual permissions and a supplier can obtain a license for its clients. Belgium uses EDI as a de facto standard. Electronic storage is allowed on microfilm or CD-WORM.

France requires prior notification to the authorities and EDIFACT is the only standard allowed. Electronic invoicing is allowed by law and only with the contract partner established in France. France is stricter than Belgium in having a different format, imposing six-year filing requirement and not accepting digital signatures (Isabel, 2002).

Permission is necessary for electronic invoicing in Ireland. Electronic invoicing is structured /EDI only. It is available only for domestic supplies within Ireland and only between taxable persons.

Spain allows electronic invoicing by law. Administrative authorisation is required both to issue and to receive electronic invoices. It is obligatory to use EDIFACT standards and data transfers go through authorized EDI invoicing operators. Electronic storage is allowed and the mandatory storage period is four years.

In Germany electronic invoicing is allowed, but an additional paper copy must be sent to ensure deduction of input VAT. Approval from the tax authorities is needed on use of electronic invoicing system if foreign entrepreneurs are involved. Electronic storage of invoices is possible and the storage period is six years.

Also Portugal does allow electronic invoicing. Electronic storage is allowed on microfilm and with previous authorisation.

Greece is one of the two Member States that do not allow electronic invoicing. Electronic storage is only allowed under strict conditions. Strict conditions means that

electronic storage is allowed for only certain companies, for only outgoing invoices, and the carrier should be authenticated.

Luxembourg is the other Member State that does not allow electronic invoicing. In Luxembourg the commercial code requires that written documents are sent or received prior to any electronic storage (Strepenne, 2000).

Please note that PricewaterhouseCoopers did this study in 1999, so some of the national regulations might have changed after the study was done.

Table 2 summarizes this subsection by listing each EU member state and their position in electronic invoicing and electronic storage. Also there is a field for other important information that is related to member states electronic invoicing regulations.

Table 2. Electronic Invoicing Requirements in EU Member States

EU Member State	Electronic invoicing	Electronic storage	Other
Sweden	Allowed	Allowed, storage period 10 years	Paper invoice must be stored in paper form
Finland	Allowed	Allowed, storage period 6 years	
Denmark	Allowed	Allowed	
The United Kingdom	Regulated by law, notification to authorities required	Regulated by law, notification to authorities required	
The Netherlands	Allowed		The authenticity of origin must be guaranteed by advanced electronic signature or paper reconciliation overview.
Austria	Allowed by administrative practice	Allowed	Periodical overview of electronic invoices must be issued.
Italy	Allowed by administrative practice	Not allowed	Prior authorisation advisable but not required.
Belgium	Allowed by administrative practice	Allowed on microfilm or CD-WORM	EDI as de facto standard
France	Allowed only with the contract partner established in France.		Requires prior notification to authorities, EDIFACT only standard allowed.
Ireland	Allowed only for domestic supplies within Ireland and permission is necessary.		
Spain	Allowed, administrative authorisation required	Allowed, mandatory storage 4 years	Use of EDIFACT standards obligatory
Germany	Allowed, but a paper copy must be sent	Allowed, storage period 6 years	If foreign entrepreneurs involved, approval of tax authorities is needed.
Portugal	Allowed	Allowed on microfilm and with previous authorisation	
Greece	Not allowed	Allowed under strict conditions	
Luxembourg	Not allowed		The position of VAT authorities is expected to change.

Source: PwC, 1999b

3.2.1 Characteristics of an Electronic Invoice

This section is based on the report dealing with electronic invoicing performed by PricewaterhouseCoopers for the European Commission in 1999 (PwC, 1999a). The report described the high-level characteristics that an electronic invoice should have.

The four characteristics are the following:

- authenticity of origin;
- non-repudiation of origin and of receipt;
- integrity of the invoices, and
- integrity of the sequence of invoices.

Authenticity of origin in electronic invoicing is necessary for the tax authorities to clearly identify the parties involved in the transaction. The authenticity of origin is guaranteed with using EDI, since the EDI infrastructure is based on contractual agreements. Also the use of cryptography and digital signatures improve user authentication guaranteeing the authenticity of origin.

Non-repudiation is the ability to prove origin from or receipt by a third party, and using cryptographic techniques can ensure this. Non-repudiation of origin means that the sender cannot later deny having sent the message. Non-repudiation of receipt means that the recipient cannot later deny having received the message.

The integrity of the invoice is an important characteristic should be ensured so that invoices cannot be altered intentionally or accidentally during the transmission. In archiving the integrity of electronic invoices can be guaranteed with hash algorithms.

The integrity of the sequence of electronic invoices avoids any gaps occurring in the outgoing invoices as well as it facilitates control. The integrity of the invoice content as well as the integrity of sequence of the invoices can be guaranteed with cryptographic hash functions. (PwC, 1999a)

3.2.2 Advanced Electronic Signature

Advanced electronic signature is one method of maintaining the integrity in electronic invoicing. According to legal expert Corinna Schulze, advanced electronic signature is a form of electronic signature based on public key cryptography. Electronic signature can be described as data in electronic form, which is attached to, or logically associated with, other electronic data. Electronic signatures serve as a method of authentication.

Advanced electronic signature is an electronic signature, which is:

- uniquely linked to the signatory,
- capable of identifying the signatory,
- created using means that the signatory can maintain under his sole control, and
- linked to the data to which it relates in such a manner that any subsequent change of the data is detectable. (European Union, 2001b)

The new Invoicing Directive on simplifying the invoicing legislation, states that an advanced electronic signature can be used as one of the options when guaranteeing the authenticity of origin and integrity of the data in electronic invoices. The other options to use are electronic data interchange, and any other means subject to approval by the Member States concerned. The process that led to these wordings is explained in the next section.

3.3 The EU Directives

Subsection 3.3.1 includes the background of the EU's Invoicing Directive amended the Sixth VAT Directive. Subsection 3.3.2 goes briefly over the institutions of the EU. In subsection 3.3.3 the EU's decision-making process that led to the Invoicing Directive is explained. Lastly, the subsection 3.3.4 explains the current EU Directive regarding electronic invoicing.

3.3.1 Background

Today, the legal rules governing invoicing vary considerably from one EU country to another as discussed in section 3.2. The amount of sales invoices is estimated to be 30

billion per year in the EU. (eInvoice Consortium, 2001) An invoice is probably the most important document in commercial trade. (Sanderson, 2000) Invoices are an important part of the value added tax (VAT) system. A purchaser can deduct VAT that has been charged from him by using the invoices as the evidence. (Foryszewski, 2002)

A multinational company issuing invoices in all EU Member States needs to understand fifteen different invoicing regulations. Businesses have been frustrated by the different invoicing terms applying in different EU countries, and by the uncertainty over the conditions imposed on electronic invoicing. In January 2002, the EU published an Invoicing Directive amended the Sixth VAT Directive ruling that all Member States must accept electronic invoicing and no preauthorisation can be required. (VM, 2001) The aim of this Directive is to introduce simplified, modernised and harmonised rules for invoicing. The EU Member States have until 2004 to implement the Invoicing Directive. In 2008 at the latest, the Commission will present a report on possible changes needed on the conditions on electronic invoicing. (European Union, 2002a)

The next subsection 3.3.2 will describe the Institutions of the European Union that were involved with the decision-making process of the Invoicing Directive.

3.3.2 Institutions of the European Union

This subsection briefly goes over the institutions of the European Union to clarify the decision-making process that is discussed in the next section. This subsection will define what are the European Parliament, the Council of the European Union, the European Commission, and The European Economic and Social Committee. These four institutions of the EU took part of the decision-making process of the Invoicing Directive.

The European Parliament is elected every five years directly by citizens, and it has three essential functions:

1. It shares with the Council the power to legislate, i.e. to adopt European laws (directives, regulations, decisions).
2. It shares budgetary authority with the Council.
3. It exercises democratic supervision over the Commission. (European Union, 2002b)

The Council of the European Union is the EU's main decision-making body. It has representatives of the Member States that meet regularly at ministerial level. The Council has the following key responsibilities:

1. It is the Union's legislative body; for a wide range of EU issues, it exercises that legislative power in co-decision with the European Parliament;
2. It coordinates the broad economic policies of the Member States;
3. It concludes, on behalf of the EU, international agreements with one or more States or international organisations;
4. It shares budgetary authority with the Parliament;
5. It takes the decisions necessary for framing and implementing the common foreign and security policy, on the basis of general guidelines established by the European Council;
6. It coordinates the activities of Member States and adopts measures in the field of police and judicial cooperation in criminal matters. (European Union, 2002b)

The European Commission is responsible for the general interest of the Union. After the President and Members of the Commission have been approved by the European Parliament, they are appointed by the Member States. The Commission has four main functions that are the following:

1. It initiates draft legislation and presents legislative proposals to Parliament and the Council;
2. It is responsible for implementing the European legislation (directives, regulations, decisions), budget and programmes adopted by Parliament and the Council;
3. It acts as guardian of the Treaties and, together with the Court of Justice, ensures that Community law is properly applied;
4. It represents the Union on the international stage and negotiates international agreements. (European Union, 2002b)

The European Economic and Social Committee represents the views and interests of organised civil society vis-à-vis the Commission, the Council and the European Parliament (European Union, 2002b).

The subsection, 3.3.3 Decision-Making Process, will discuss how and with what steps the EU came up with the new Council Directive 2001/115/EC on simpler invoicing conditions.

3.3.3 Decision-Making Process

The EU's attempt in simplifying, modernising, and harmonising invoicing regulations has and will be a long journey. In 1997, the EU Member States agreed to provide European businesses a harmonised framework for invoices across the EU. The Sixth Council Directive 77/388/EEC written in 1977 does not mention electronic invoicing. (European Union, 2002a) Presently the Member States can freely decide if they accept electronic invoices, and lay down preconditions and requirements for electronic invoicing. (Anttila, 2002)

In late 1998, the Commission launched a study regarding the conditions for invoicing for VAT purposes. (European Union, 2001a) In December 2001, the Council of the European Union having regard to the proposal from the Commission, the opinion of the European Parliament, and the opinion of the Economic and Social Committee adopted the Council Directive 2001/115/EC amending the Directive 77/388/EEC with a view to simplifying, modernising, and harmonising the conditions laid down for invoicing in respect of value added tax. In January 2002, this new Invoicing Directive was published. The EU Member States must implement this new Directive by 2004. Additionally, the Commission is due to report and make further proposals on electronic invoicing by 2008. (European Union, 2002a) This section will explain in more detail how the EU has moved towards more harmonised invoicing legislation and what is the current situation with the EU Directive on electronic invoicing.

The European Commission launched a study of the conditions laid down for electronic invoicing for the value added tax purposes in December 1998. The study had two goals. First was to describe the statements required on invoices in each Member State, together with the conditions under which electronic invoicing and self-billing were authorised. Second goal of this study was to examine the need to harmonise and modernise the legislation so that the use of new invoicing technologies possible. (European Union, 2001a)

The European Commission received the final report of the study made by PricewaterhouseCoopers in August 1999. The study concluded that electronic invoicing should be authorised by the Community legislation. Also it stated that electronic invoicing should be permitted between trading partners operating in different Member States. The report stated that no prior authorisation or notification should be required for electronic invoicing, and that storage of invoices electronically should be permitted. The report suggested that the work that has already been made for electronic signatures should be considered. The report also concluded that Community legislation should include harmonised mandatory list of items that must be included in every invoice. In addition, the report suggested using a flexible approach to currency and language questions. (European Union, 2001a)

The European Commission studied the report and discussed the suggestions both with traders and the various national administrators. Based on the suggestions of the report the Commission decided to propose an amendment to paragraph 3 of Article 22 of the Sixth VAT Directive, which deals with the obligation to issue invoices. The amendment had two aims: to harmonise the rules what information should be included on an electronic invoice and to establish a Community legal framework for electronic invoicing and self-billing. (European Union, 2001a)

In November 2000, the European Commission made a proposal for a Council Directive. The aim of this proposal was to harmonise the value added tax (VAT) rules for invoicing (both paper and by electronic means) and create a Community legal framework for electronic transmission and storage of invoices. The proposal stated that the authenticity of the origin and integrity of the contents of invoices sent by electronic means *must* be guaranteed with an advanced electronic signature. (European Union, 2001a)

The Directive proposal had many issues that were not very logical and reasonable. The Consortium developing Finnish Internet invoicing was not satisfied with the Directive proposal. Pauli Vahtera, Authorized Public Accountant, was one of the eight people who wrote a letter to the European Union to change the proposal.

According to this letter, the technical prerequisites of electronic invoicing presented in the proposal were alien. Implementation of the proposed suggestions would have caused

Finland to entirely redesign and rebuild electronic invoicing. The proposal would have resulted in a situation where the Internet can be used for paying invoices by for transferring invoices the same security methods would not be enough. And this really would not have made sense, because a payment is much more final than an invoice. Also the proposal demanded that invoices should be delivered for maximum of one-month period. With that regulation many information technology services would have faced difficulties since their monthly invoices can be very low. In summary, the letter stated three reasons why an advanced electronic signature should not be used in electronic invoicing, and the reasons were the following:

- Costs would amount to billions of euros
- The development of Information Society would slow down
- Technical requirements for digital signatures would be impossible to realise (eInvoice Consortium, 2001)

Ine Lejeune, a spokesperson for the European Tax Group (EeTG) had similar opinions about the proposal Directive. According to Lejeune, the current technology used in many EU countries would not have been enough to be able to bear an advance electronic signature. Lejeune also believed that a mandatory advanced electronic signature would have created burdens instead of simplifying the process. The argument was that since paper invoices do not have to be signed or certified, therefore there is no need to treat electronic invoices differently. If the proposal had gone through businesses would have had to introduce new software systems to comply, and this would had drastically reduced the originally predicted savings for the companies when transferring into the paperless invoicing. (Lejeune, 2001)

The European Parliament did not approve this proposal, and changed the wordings of the proposal. As an example of this is the change from “electronic invoices *must* bear an advanced electronic signature” to “electronic invoices *may* bear an advanced electronic signature”. The Council of the European Union consulted the Economic and Social Committee on the proposal. The European Parliament made amendments to the proposal, and in June 2001 approved the proposal. In December 2001, the Council adopted a new Directive based on the proposal from the Commission, the opinion of the European Parliament and the opinion of the Economic and Social Committee. This new

Directive was published in January 2002 and the Member States must implemented in national legislation by 1st of January 2004. (European Union, 2002a)

3.3.4 Invoicing Directive

The Council Directive 2001/115/EC (Invoicing Directive) that was published in January 2002 by the EU aims to harmonise the regulations surrounding invoicing, however, there are still many areas where individual Member States can set their own regulations. For example, the Member States may still decide some aspects of invoice data, invoice language, whether invoices are required for exempt or zero-rated supplies, time limits, and regulations surrounding summary invoices, and less detailed invoices. Different regulations can also be applied if the supplier is located outside the EU. According to Stefan Foryszewski, the main elements of this Directive are:

- Clarity over the obligation to issue an invoice,
- A standard set of data required on invoices,
- A legal basis for allowing invoices to be issued electronically, and
- Regulations surrounding the storage of invoices. (Foryszewski, 2002)

The Invoicing Directive states that electronic invoices shall be accepted by the Member States provided that the authenticity of the origin and integrity of the data are guaranteed by one of the following means: an advanced electronic signature, electronic data interchange (EDI), or any other means subject to approval by the Member States concerned. (European Union, 2002a)

The Invoicing Directive specifies ten mandatory items that must be included in every invoice as well as it lists additional items that may be required in specific circumstances. The mandatory items that the invoices must have are the following:

1. The date of issue
2. A sequential number that uniquely identifies the invoice
3. The VAT identification number of the supplier (if the customer is liable to pay VAT, the VAT identification number of the customer)
4. Where the customer is liable to pay tax on goods supplied, the VAT identification number of the customer
5. The full name and address of the taxable person and his customer

6. The quantity and nature of the goods and supplied or the extent and nature of the services rendered
 7. The date on which the supply of goods or services were supplied or the date on which the payment is made
 8. The net amount subject to VAT
 9. The VAT rate applied
 10. The VAT amount payable
- (European Union, 2002a)

Electronic invoices shall be accepted by the Member States provided that the authenticity of origin and integrity of the contents are guaranteed by:

- advanced electronic signature,
 - electronic data interchange (EDI), or
 - any other means subject to the approval by the Member States concern.
- (European Union, 2002a)

The Member States cannot require invoices to be signed. The amounts that appear on the invoice can be expressed in any currency. The Member States cannot impose restrictions on electronic invoicing nor to require preauthorisation. The Member States can determine the period for the storage of invoices as well as the form that invoices are stored. (European Union, 2002a)

This new Invoicing Directive amended the Sixth VAT Directive was published in January 2002 and the Member States must implemented in national legislation by 1st of January 2004. Also, the Commission is due to report and make further proposals on electronic invoicing by 2008. (European Union, 2002a)

3.4 Evaluation of the Invoicing Directive

The Invoicing Directive that must be implemented by 2004 includes three main points that are the following:

- Acceptance of electronic invoicing
- Minimum requirements for the invoice content

- Invoicing period is not regulated (VM, 2001)

In EU Sixth VAT Directive of 1977 did not mention anything about electronic invoicing. Previously, the Member States have been free to decide whether they accept electronic invoicing and if preauthorisation is required. According to the new Invoicing Directive, all Member States must accept electronic invoicing and no preauthorisation can be required. (VM, 2001) Advanced electronic signature was a big battle whether or not it should be mandatory for electronic invoicing. The Invoicing Directive does not require an advanced electronic signature to guarantee the authenticity of origin and integrity of data. Instead, the Member States are free to decide

The new Invoicing Directive states minimum requirements for the invoice content that each invoice must include. This means that if the Member States wish, they can extend the list of mandatory contents. (VM, 2001) The Invoicing Directive includes a list of ten mandatory items of information that must be included on every invoice

The proposal Directive suggested that there would be a maximum of one-month invoicing period. The Invoicing Directive does not have this requirement; instead it leaves the Member States to regulate the periods for invoicing. (VM, 2001)

The proposal Directive suggested the authenticity of origin and integrity of data must be guaranteed with an advanced electronic signature. The new Invoicing Directive gives three options to guarantee the authenticity of origin and integrity of data. The options are an advanced electronic signature, EDI, or by any other electronic means accepted by the Member State. (European Union, 2002a)

The Invoicing Directive does not regulate the format of electronic invoices nor the standards or technologies used with electronic invoicing. Also it does not regulate the storage period for invoices nor the form invoices are stored. (European Union, 2002a)

3.5 Views on the Invoicing Directive

I interviewed Heli Salmi from Elma Electronic Trading and she told me her views on the legislation regarding electronic invoicing. According to Heli Salmi, Finland worked very hard to change the wordings of the proposal Directive in so that an advanced electronic signature would not be a mandatory requirement for electronic invoicing. One of the reasons was that in Finland the paper based invoices are not required to be signed either. However, in the Southern Europe paper invoices are signed. The final Directive allows several ways for the Member States to guarantee the authenticity of the origin and integrity of the data as mentioned earlier in this chapter. Heli Salmi does not see this as truly harmonising since it leaves the Member States with so many options.

According to Salmi, it was extremely important for Finland to get the proposal of the Directive modified. If the proposal had gone through it would have created major restrictions on the development of electronic invoicing since a whole new infrastructure would have been necessary to develop. She does not see the new Invoicing Directive being very useful since it really is not really saying anything leaving the Member States with many options. (Salmi, 2002a)

I interviewed Erkki Liikanen, EU Commissioner for Enterprise and Information Society, as well as Suvi Anttila, Finland's Legislative Counsellor, regarding EU's efforts to harmonise regulations on electronic invoicing. Suvi Anttila represented Finland in the EU meetings in the decision-making process of the Invoicing Directive.

Anttila believes the Invoicing Directive amended the Sixth Directive is a big step forward in contributing to the development of electronic invoicing and e-commerce in the EU. She also states that the harmonised rules reduce the administrative costs of the European businesses and improve the functioning of the Internal Market. (Anttila, 2002) EU Commissioner Erkki Liikanen had similar opinions with Anttila, and he stated that the implementation of the Directive will help to secure an Internal Market for electronic commerce by providing business with legal security and predictability in the area of electronic invoicing (Liikanen, 2002).

According to Anttila, the framework gives the following advantages for businesses in the European Union:

- harmonised (=minimum and maximum) requirements for B2B invoice contents,
- maximum level of requirements for B2C invoice contents,
- acceptance of self-billing in all Member States,
- acceptance of e-invoicing and storage in all Member States,
- agreed maximum level of requirements for e-invoicing,
- prohibition for Member States to require prior authorisation or notification of e-invoicing,
- the option for Member States not to require the maximum requirements of e-invoicing,
- possibility to store e-invoices in any Member State if an on-line access is provided,
- the prohibition to require invoices to be legally signed, and
- acceptance of summary invoices in all Member States. (Anttila, 2002)

Commissioner Liikanen sees that the provisions of the Directive will lead to a substantial simplification of the obligations on traders, in particular those who conduct cross-border operations. In addition, the Directive should facilitate the development of an electronic invoicing system and thus of electronic commerce (Liikanen, 2002). Business will have to modify their systems in order to adapt to the new Invoicing Directive, and according to Commissioner Liikanen the companies should not face any major obstacles in putting the infrastructure in place considering the given time frame. (Liikanen, 2002) As a whole it is clear that the implementation of the Directive will accomplish a considerably high level of consistency between the Member States (Anttila, 2002).

To the question what countries benefit the most of the new Invoicing Directive, Anttila replied that it is difficult to say since it depends on the aspect you look at the matter but on the whole the countries that carry out to a larger degree cross-border transactions will benefit the most (Anttila, 2002). Commissioner Liikanen sees that all Member States will equally benefit from the implementation of the Directive. He also believes that the Invoicing Directive will also be of benefit for non-EU companies, which

have 'dependence' in the EU. (Liikanen, 2002) Anttila said that the adopted framework is likely to have an effect outside the EU. (Anttila, 2002)

3.6 Summary and Conclusion of this Chapter

For a long time businesses in the EU have been frustrated dealing with the fifteen different invoicing regulations. The chapter discussed the background and the decision-making process that led to the new Invoicing Directive. This Invoicing Directive was published in January of 2002 and all EU Member States must implement the Invoicing Directive by 2004. The Invoicing Directive sets minimum requirements for the invoice content, allows the Member States to decide on the invoicing period, and regulates that all Member States must accept electronic invoicing without requiring permissions or preauthorisation. (European Union, 2002a)

The second part of the research objective, which is to describe the EU legislation on electronic invoicing, is reached in this chapter. Also this chapter aimed to clear out the confusion related to the Invoicing Directive that exists in the electronic invoicing field.

4. How to Evaluate and Compare?

Chapter 4 describes various attributes of electronic invoicing such as factors affecting the demand and the concerns of electronic invoicing. This chapter summarizes the issues that should be taken into account when making the comparison of the electronic invoicing solutions. Chapter 4 unites the theory part with the empirical part of the thesis.

4.1 Structure and Objective of this Chapter

This chapter is structured in the following manner: section 4.2 describes various factors affecting the demand of electronic invoicing. The concerns of electronic invoicing are discussed in section 4.3. The issues that should be considered for the empirical part of the thesis are summarized in 4.4. Conclusions of this chapter are drawn in section 4.5. The objective of the chapter is to summarize what are the issues that should be taken into account when comparing the electronic invoicing solutions in the empirical part of the thesis. This chapter could be described as a bridge between the theory part and the empirical part of the thesis.

4.2 Factors Affecting the Demand of Electronic Invoicing

For years businesses have wanted to invoice electronically due to the time-consuming and costly process of handling paper invoices. This makes the time and money savings the most obvious benefit of the electronic invoicing for both the sender and the recipient. Those and other factors affecting the demand of electronic invoicing are examined in this chapter separately for the sender and the recipient.

For the sender there are several benefits from electronic invoicing. Electronic invoicing simplifies the invoicing process. Electronic invoicing reduces manual work such as entering data, printing, folding and envelope stuffing that is needed when handling paper invoices. Since the data does not have to be entered multiple times to the system,

there are fewer typing errors. From the archive, the sent electronic invoices can be viewed, printed or used as a template for new invoices.

Electronic invoicing also benefits the recipient. Similarly to the sender, the invoice recipient saves huge amounts of money on the handling costs. Electronic invoicing eliminates unnecessary tasks, since the invoices are automatically transferred into the accounting system. Electronic invoicing enables the fast and easy circulation of invoices for checking and approval in the company.

The Nordic eInvoice Consortium's estimates that processing a B2B invoice cost EUR 30, when the sender's and recipient's costs are summed up. The recipient pays approximately 80 percent of the total processing costs. With electronic invoicing the processing costs can be cut to half of what they are with paper invoices. (eInvoice Consortium, 2002) According to Elma, the recipient pays about EUR 25 for processing a single invoice. (Elma, 2002b) SAP estimates that invoices sent by mail can cost up to \$15 each and by using their product, mySAP Financials Electronic Bill Presentment and Payment (EBPP), the invoicing processing costs can be reduced as much as 70%. (mySAP Financials, 2002)

According to Elma Electronic Trading, companies usually do not calculate the time used for routine invoice processing. Table 3 shows the costs incurred by handling and processing invoices. The times are compared against the requirements for electronic invoicing. Elma Electronic Trading has calculated these invoice handling costs based on the book by Salmi-Vahtera, Internet and EDI in Effective Accounting

Table 3. Invoice Handling and Processing Costs

Company A			
Handling stage		Paper invoice Time (mins)	E-invoice Time (mins)
Opening the post		1	
Date-stamping the invoice		1	
Taking a copy of the original		1	
Alphabetical filing of the copy		1	
Checking and registering the invoice		2	
Entering in accounts payable		2	
Checking the contents of the invoice		1	1
Approving the invoice		2	1
Entering the invoice in the IT system		1.5	
Approving the payment of the invoice		0.5	
Filing the invoice (numerical order)		1	
In-house post (9 copies of invoice)		10	
Processing errors (10% of invoices)		2	1
TOTAL		26	3
Labour cost per hour	€34		
Labour cost per minute	€0.6		
Labour cost per invoice		€14.57	€1.68
Savings per invoice			€12.89
Savings, percentage			88.5%

Source: Elma, 2002b

Table 3 is interesting and gives a clear message that changing to an electronic invoicing solution will save the company time and money. However, there are a couple of points in this table that need to be noted. The table does not take into consideration the capital investments that the electronic invoicing solution might require. The time required to do each task with the paper invoice might be overestimated. Of course it is very hard to estimate the real figures for time and money savings of electronic invoicing. Although the table might have some estimation errors, it shows the main benefit of electronic invoicing – time and cost savings.

Electronic invoicing offers benefits such as overhead savings on paper production, faster collections, improved financing systems, and improved customer service. An important feature is the integration with the accounting system. (Prittie, 2001)

4.3 Concerns of Electronic Invoicing

Electronic invoicing standards that are secure and verifiable as well as able to carry out tax audits are important issues for tax authorities. A common fear concerning electronic invoices is that they do not provide as much security as paper invoices. (PwC, 1999)

The accounting and economics people have a history of being conservative and traditionally paper copies are very important. For a regular person to understand what is an electronic invoice is often a hard task, since the feelings vary from astonishment to horror and confusion. (Salmi, 2002a)

New technologies used with electronic invoices can guarantee integrity, authenticity, verifiability and auditability much better than paper invoices do. The preference that companies and tax authorities might still have for paper invoices can be explained with a psychological factor. Paper invoices are material objects, whereas electronic invoices are non-material requiring trust in software and hardware infrastructure. (PwC, 1999)

Other concerns of electronic invoicing are that the invoicing software system might not be accessible in the future. The reasons could be encryption key loss, outdated technology, viruses and other reasons. There are solutions for these problems such as key recovery, trusted third parties or other arrangements to guard against the loss of encryption keys. (PwC, 1999)

4.4 Issues to Consider

One main issue for the empirical part of the thesis is to identify electronic invoicing providers in the EU and Norway, which is the third part of the research objective. The various players of the electronic invoicing market were discussed in chapter 2. There are no previous studies done on the existence of electronic invoicing solution providers in the EU and Norway; therefore, the knowledge of what companies exist in the EU is important in order to make the comparison. Another main issue is to find out what solutions do the companies offer and to whom are the product offered for – whether they are targeted to B2B, B2C or both. It would be interesting to see how many customers do the electronic invoicing solutions serve and how many transaction

amounts there are monthly. It would be good to know if the companies have subsidiaries and strategic partners that relate to electronic invoicing operation. Other issues to find out are how widely companies geographically offer their electronic invoicing solutions, what is their market share, and who are their main competitors. It is important to find out whether the electronic invoicing solutions are the main strategy for the company or just a tiny strategic part of a large multinational corporation. In other words, to get the idea on what size of companies they are. For the thesis it is interesting to see how big is the electronic invoicing team versus the total amount of personnel.

As discussed earlier in this chapter, another big issue is the cost and time savings when the traditional paper invoicing is changed to electronic invoicing. To explore more on the cost issue, I will try find out the pricing level of the electronic invoicing solutions including the actual product, implementation and transaction costs. As it was mentioned in the theory part electronic invoicing saves time and money, but of course the savings relate directly to the capital investments required for an electronic invoicing solution. Although the electronic invoicing is still at its early stages it would be interesting to find out if companies have already made profits with their electronic invoicing solutions. Since there are various players in the electronic invoicing market offering various solutions, one issue to find out is the level of automation the companies offer in the process of receiving, handling, processing and archiving an electronic invoice. A higher level of automation means less manual work needed, and therefore larger time savings. Also higher level of automation might mean savings in costs due to the less labour hours needed. These cost savings depend on the costs associated with the electronic invoicing solution such as the initial capital investments and implementation costs.

Chapter 2 described five technologies that are used in electronic invoicing that were EDIFACT / X12, XML, RosettaNet, Biztalk, and ebXML. It will be interesting to find out what do the electronic invoicing solutions use as the basic file format. Invoices often have attachments, so the possibility for attachment in the electronic invoicing solutions is going to be explored. Another technical information that should be cleared out is whether there are any limits to the invoice size, for example, the larger message size causes the invoice price to go up. Also a technical issue to explore is whether the electronic invoicing solutions are able to convert data to other formats.

ebXML is a standard method to exchange business messages, conduct trading relationships, communicate data in common terms, and define and register business processes as described in chapter 2. (ebXML, 2002) According to Michael Fitzgerald, ebXML is still under development, but it is expected to win big (Fitzgerald, 2001). In the empirical part of the thesis I will ask the electronic invoicing experts whether they believe ebXML is going to have a major role in allowing electronic invoicing systems to accept invoices from other systems. Another big question will be whether the electronic invoicing solutions accept invoices from other electronic invoicing solutions.

As it was mentioned in chapter 3, in the report done by PricewaterhouseCoopers in 1999 electronic invoicing solutions should guarantee the following characteristics:

- authenticity of origin,
- non-reputation of origin and of receipt,
- integrity of the content of the invoice, not only during transmission but during the whole invoicing process up to the end of the legally required storage period, and
- integrity of the sequence of invoices. (PwC, 1999a)

In the empirical part I will ask the companies how do their electronic invoicing solutions guarantee these characteristics. Also the study stated the different requirements that exist in the Member States. I will ask questions on the permissions regarding electronic invoicing and electronic storage have changed in the Member States after the study was made in 1999.

Chapter 3 dealt with the EU Directives. EU Council Directive 2001/115/EU states that electronic invoices shall be accepted by the Member States provided that the authenticity of origin and integrity of the contents are guaranteed by:

- advanced electronic signature,
- electronic data interchange (EDI), or
- any other means subject to the approval by the Member States concern. (European Union, 2002a)

This statement leaves the Member State with various options on dealing with the authenticity of origin and integrity of the invoice contents. In the empirical part I will explore which of these methods do the companies use in their electronic invoicing solutions.

Chapter 3 described the various national legislations on the allowance of electronic invoicing and electronic storage. Invoicing Directive states the minimum requirements for the invoice content and the allowance of electronic invoicing in all Member States. The invoicing period is not regulated (VM, 2001) The Invoicing Directive allows the Member States to decide to quite large extent the legislation as noted in the previous paragraph. It will be interesting to find out whether the electronic invoice experts feel that the Invoicing Directive is truly harmonizing electronic invoicing in the EU or should there be stricter regulations.

Chapter 5 will explain how the empirical data was gathered and what was the research design used. It also explains the research tool in detail as well as discusses why each topics was important to find out. Chapter 6 consists of the empirical results of the thesis including the findings on the issues to consider that were discussed in this section. The electronic invoicing market is still very young and it will be interesting to see how the field will develop and at what pace. For estimating the future of electronic invoicing, one way is to ask the opinions of the experts that develop and market the electronic invoicing solutions. The future of the electronic invoicing in the EU and Norway will be discussed in the final chapter of the thesis.

4.5 Summary and Conclusion of this Chapter

Companies try to aim more and more towards a paperless environment of electronic invoicing because of the major benefits. For both the sender and the recipient, electronic invoicing enhances efficiency of the process cycle. Electronic invoicing offers numerous benefits such as speed, ease, integration of the accounting system, lower handling costs, and space savings due to electronic archiving. Concerns that electronic invoicing face is how to trust the security of electronic invoices. Overall it seems that the benefits of electronic invoicing outplay the concerns. Sooner rather than later businesses will step into the paperless era. Chapter 4 dealt with issues that should be considered when comparing the electronic invoicing solutions in the empirical part of the thesis.

5. Data and Methodology

This chapter describes how the data was gathered for the thesis. It also explains the research design of the thesis and the tool used for the research.

5.1 Structure and Objective of this Chapter

Chapter 5 is structured in the following matter: section 5.2 explains how the data was gathered. Section 5.3 describes the research design used. The section explains the instrument that was used to compare the electronic invoicing solutions in the EU as well as the participants of the study. And lastly, section 5.4 summarizes and concludes this chapter.

The objective of this chapter is to describe how data was gathered for the thesis as well as discuss the research design and why it was chosen. This chapter briefly identifies companies that provide electronic invoicing solutions in the EU and Norway, therefore the third part of the research objective is reached partly. Chapter 6 will go into more details with the identification of the companies providing electronic invoicing solutions.

5.2 Gathering Data

Electronic invoicing is still a relatively new field and there are yet books regarding electronic invoicing, therefore I tried to gather data for this thesis through other methods. The data was gathered through press releases, articles, company homepages and presentations, and other publicly available information. In addition, I got information to the theory part through the official EU Council Directives. Also brochures and demos that I received from the electronic invoicing providers have been of great value.

In the beginning Markku Helminen from Leonia (Sampo) helped me to get started by brainstorming possible topics for the thesis.

Senior Research Analyst Esa Peltonen from IDC gave me a great opportunity to explore their research “Nordic Electronic Billing and Payment Market, 2000-2005”. IDC is a provider of technology intelligence, industry analysis, market data, and strategic and tactical guidance to builders, providers, and users of information technology. The price of the research is EUR 3,000 and I was very lucky to have the chance to take a look at the research for free. The information I got from this research was very valuable for the thesis.

I got a lot of valuable information for the thesis through an interview with Heli Salmi from Elma Electronic Trading. Ilkka Harjula from TietoEnator gave a great presentation on electronic invoicing in general which has been very helpful. Matti Nieminen from TietoEnator helped me to spot a couple of companies for the thesis and he also gave me some valuable advice on how to make the comparison of the electronic invoicing solutions. Anneli Korpelainen from Statistics Finland gave me the *E-Commerce in Europe* publication that was used in chapter 6 to explain the possible reasons for not having electronic invoicing in some EU Member States.

For the empirical part of the thesis, I used a survey as the research tool. I explored who are the main players of electronic invoicing in the EU and Norway. Based on that knowledge, I decided to do the survey as a targeted electronic based interview. I contacted individually the potential survey participants via email. I chose to interview the businesses that offer various electronic invoicing solutions and I left the electronic invoicing users aside. I also interviewed EU Commissioner Erkki Liikanen and Finland’s Legislative Counsellor Suvi Anttila, who had been involved with the EU Directives harmonising electronic invoicing. The choice of methodology was a survey, since the empirical part of the thesis can be described as explorative and descriptive. The two objectives of the empirical part are the identification of the companies that provide electronic invoicing solutions in the EU and Norway and the comparison of the electronic invoicing solutions they offer.

The survey participants Joyce van Kasteren (Anachron/Netherlands), Jukka Muhonen (Analyste/Finland), Espen Hytta (BBS/Norway), Timo Heikkinen (Data Com/Finland), Heli Salmi (Elma/Finland), Marko Kolkka (Invoicia/Finland), Vincent Laroy (Isabel/Belgium), Raimo Näätäsaari (Nordea/Finland), Christopher Frey (PAYBILL AG/Germany), Kurt Gjesten (PBS/Denmark), Hans Erik Robbenstad (Posten Norge

AS/Norway) Pauli Vahtera (ProCountor.Com/Finland), Marcus Laube (Seals/Germany) and Marita Tolvanen (TietoEnator/Finland) gave me a lot of valuable information for the thesis. With the survey results I was able to compare the electronic invoicing solutions. More specific information about the research method is provided in the following section.

5.3 Research Design

I chose to use a survey as a tool for testing and comparing the electronic invoicing solutions in the EU and Norway. The survey consisted of four parts. The first part included general questions about the company. The second part dealt with more specific questions about the company's electronic invoicing solutions. The questions in the third part helped me to compare the characteristics, technologies and services of the electronic invoicing solutions. The third part of the survey was the main tool for acquiring information for the empirical part of the thesis. The final part of the survey included a few questions on EU Directives regarding electronic invoicing as well as questions on the future of electronic invoicing.

The first part of the survey had questions on general company background. This background data combined with the information found on company websites and press releases were used in chapter 6, where the different providers of electronic invoicing solutions in the EU and Norway are described. The questions on the general background data included the year the company was founded, the amount of employees in the company, the size of the electronic invoicing team, the financial data, and possible subsidiaries and strategic partners of the company. In addition, in the empirical part I will divide the survey participants by country and have the electronic invoicing experts who participated in the survey listed.

The second part of the survey had questions on the electronic invoicing solutions that the companies offer. The information asked in the first and second part of the survey was used in chapter 6 to describe current electronic invoicing solutions in the EU and Norway. The second part included questions on the services and options that the electronic invoicing solutions offer as well as the key financial data from the electronic

invoicing operations. It also had questions on market shares and customer types. I will divide the companies based on the customers (B2B or B2C) that use their electronic invoicing solutions. Also the pricing level of the electronic invoicing solution was asked. It is obvious that electronic invoice will save time and money, but the capital investments needed for electronic invoicing solutions are important to consider. The time and cost savings of an electronic invoice were briefly discussed in chapter 4, section 4.2 with Elma's example.

The third part of the survey was used to acquire information for the comparisons made in chapter 6. In this part the information on the characteristics, technologies and services of the electronic invoicing solutions was acquired. There was a question on the electronic invoicing technologies, that were defined earlier in thesis in chapter 2, section 2.3. The third part included a question on storage of electronic invoices that were discussed also in chapter 2, section 2.4. There were several questions on the technical side of electronic invoicing solution. Lastly, the security side of the electronic invoicing solution was asked. The results of the third part of the survey as well as the discussion and comparison of these results are included in chapter 6.

The electronic invoicing solutions will be compared by six features that are geographic coverage, interaction with other solutions, level of automation, ability to convert data to other formats, ability to send attachments, and invoice size limits. I will have the companies compared separately and also I will sum up the answers on these features. In chapter 6, I will illustrate the comparisons with scorecards, charts, and tables.

The last part of the survey dealt with the EU Council Directive 2001/115/EU amending the Directive 77/388/EEC with the view of simplifying, modernising and harmonising the conditions laid for invoicing in respect of value added tax (VAT). This was an important part to draw conclusions on the effects that the EU Directives will have on the electronic invoicing in the EU. The EU Directives were discussed in detail in chapter 3. Also the last part included questions on the future of electronic invoicing in general as well as the future goals of the electronic invoicing providers. This was done to get an overview on how does the future of electronic invoicing looks like in Europe, which will be discussed in chapter 7.

5.3.1 The Survey

Chapter 4, section 4.4 reviewed the main issues that should be considered when comparing the electronic invoicing solutions in the empirical part of the thesis. The data for the comparison is gathered through a survey sent via e-mail to providers of electronic invoicing solutions. Some of the main issues that will be asked in the survey were the following:

- Solutions for electronic invoicing
- Target customers
- Customer and transaction amounts
- Geographic coverage and market shares
- Expected growth
- Main competitors
- Subsidiaries and possible strategic partners
- Size of the company versus size of the electronic invoicing team
- Technical issues of the electronic invoicing solutions
- Pricing level of the solution
- Profits from electronic invoicing solutions
- Legislative issues of the EU
- ebXML
- Future of electronic invoicing

Now that the main issues to consider in the survey have been listed briefly, the rest of this section will explain in detail what were the questions in the survey and why they were they relevant for the thesis. Firstly, there will be the actual question how it was presented in the survey. Secondly, there will be the explanation of the relevance of the question.

The first part of the survey included questions number one through three. The questions were on general background data of the companies that offer electronic invoicing solutions in the EU and Norway.

Question 1: General information

- a) Please briefly describe the activities of your company.*

- b) *The year your company was founded.*
- c) *How many employees does you have in your company?*
- d) *How big is your electronic invoicing team?*
- e) *Your title.*

Questions 1 a) and 1 b) were asked to find out the general overview on what kind of companies offer electronic invoicing solutions and how long they have been around. Questions 1 c) and 1d) were asked to find out how many employees of the total human resource are developing, implementing and marketing the electronic invoicing solution. The title of the person answering the questionnaire was asked so that she or he can be referred to correctly when quoting in the thesis.

Question 2: General key data

- a) *What were the net sales in year 2001 (in euros)?*
- b) *What was the operating profit in year 2001 (in euros)?*

The financial data for last year was asked to so it could be stated in chapter 6 where the companies are briefly introduced.

Question 3: Subsidiaries and strategic partners.

- a) *Please name your domestic and foreign subsidiaries, if any.*
- b) *Please name (or describe the nature of) your domestic and foreign strategic partners related to electronic invoicing, if any.*

Question 3 a) was made to clarify if the company has subsidiaries that also have electronic invoicing solutions. Question 3 b) was asked to find out the co-operations and connections between the various electronic invoicing providers.

The second part of the survey consisted the questions four through seven. The second part had general questions on the companies' electronic invoicing solutions. The information asked in the second part was used in combination with the first part in chapter 6 where I briefly describe the companies and the electronic invoicing solutions that exist in the EU and Norway.

Question 4: *Please name and describe what your electronic invoicing solution consists of? What services and options does your electronic invoicing solution offer?*

Question 4 was asked to help me understand what is the electronic invoicing solution that the company offers and what it consists of.

Question 5: Customers

- a) *Is your electronic invoicing product/solution targeted for businesses or consumers?*
- b) *If your product is targeted for B2B, is it for small, medium or large enterprises and who are your main customers?*
- c) *Do you plan to include small companies (those for example who only have the basic MS software) as your customers? If so, how do you plan to do it?*
- d) *If your product is targeted for B2C, who are your main customers?*

If your company is serving directly the end-users, please answer the following two questions:

- a) *How many customers does your electronic invoicing solution serve?*
- b) *How many electronic invoice transactions do you have per month?*

Question 5 on customers is important to be able to see who competes against whom in the B2B and B2C electronic invoicing markets. This is interesting because the small companies are a big potential market for electronic invoicing. If they do not have the interest and money to invest in electronic invoicing solutions, how can they be included to the paperless environment? Also the question is to determine whether some of these surveyed companies are interested in this segment. The customer and transaction amounts of the electronic invoicing solutions would be interesting to see for understanding the actual scope of their product.

Question 6: Electronic Invoicing Key Data

- a) *What were the net sales in year 2001 (in euros) for electronic invoicing solutions?*
- b) *What was the operating profit in year 2001 (in euros) for electronic invoicing solutions?*

- c) *Please give an estimate of the pricing level of your electronic invoicing solution (the actual product + implementation + transaction costs)?*

This financial data on the electronic invoicing solutions was requested to find out how well the solutions have taken off since this is such a new market. The price of the electronic invoicing solution (including the implementation of the product as well as individual transaction costs per invoice) was asked so that a comparison could be made in chapter 6.

Question 7: Market share

- a) *In which countries do you offer your electronic invoicing product/solution?*
b) *What is your estimated (%) market share in each country?*
c) *Who are your main competitors?*
d) *What is your average annual growth estimate in the next three years (%)?*

Since yet there are no books on electronic invoicing and how the market has been divided, I asked question 7 to get some kind of an idea of the market shares. Also the short-term growth forecasts would be interesting to get an idea on the development of electronic invoicing.

The third part of the survey consisted the questions eight through eleven. The questions in the third part were used as the main empirical part of the thesis where I actually compared the characteristics, technologies and services of the electronic invoicing solutions that exist in the EU and Norway. The results and comparisons of this part of the survey are discussed in chapter 6.

Question 8: Can your electronic invoicing solution be used to totally automate the process of receiving, handling, processing, and archiving the invoices?

The level of automation of the electronic invoicing solution is relevant comparison to be made. If a physical person is need to manually feed in the data, it adds up the costs of handling and processing an electronic invoice, and this would not add value to electronic invoice when compared with a paper invoice as discussed in chapter 4.

Question 9: Technical information

- a) *What does your electronic invoicing solution use as the basic file format (some standard or an internal format)?*
- b) *Does your electronic invoicing solution convert the invoice data to other formats (independence of transportation)?*
- c) *Is it possible to send attachments with your electronic invoicing solution?*
- d) *Are there any limits to the message/invoice size (ex. larger message size → price goes up)?*

Question 9 included more detailed questions on the electronic invoicing solution. The different file formats of electronic invoice were described in chapter 2. The solution's ability to convert the invoice data is important for determining the independence of transportation level. If the solution can send attachments with the electronic invoice it is seen as an advantage in the field. Sending information has always a price. Question 9 d) is used to find out how does the price of an electronic invoice go up when the message gets larger.

Question 10: How does your electronic invoicing solution to guarantee the four basic characteristics:

- *authenticity of origin,*
- *non-repudiation of origin and of receipt,*
- *integrity of the content of the invoice, not only during transmission but during the whole invoicing process up to the end of the legally required storage period, and*
- *integrity of the sequence of invoices?*

Question 10 deals with the characteristics of electronic invoicing. This issue was discussed in chapter 3 with the PricewaterhouseCoopers study (PwC, 1999).

Question 11: Interaction with other electronic invoicing solutions

- a) *Does your electronic invoicing system accept invoices from other electronic invoicing systems?*
- b) *In your opinion is ebXML going to have major role in allowing electronic invoicing systems accepting invoices from other systems?*

Question 11 was made to find out how the electronic invoicing traffic actually works and will ebXML be a part of it in the future. Usually there are many players competing in the electronic invoicing market for the customers. How is a company able to send electronic invoices to its' various clients that each have contracts with various banks or consolidators that offer electronic invoicing solutions?

The fourth part of the survey consisted of questions twelve through sixteen. This last part included questions on the EU Council Directive 2001/115/EU amending the Directive 77/388/EEC with the view of simplifying, modernising and harmonising the conditions laid for invoicing in respect of value added tax (VAT). Also the fourth part had a few questions on the future of electronic invoicing.

Question 12: *EU Council Directive 2001/115/EU states that the Member States shall accept electronic invoicing provided that the authenticity of origin and integrity of the data are guaranteed by one of the following means:*

- a) Advanced electronic signature,*
- b) EDI, or*
- c) any other means subject to the approval by the Member States concern.*

Which of these three methods your electronic invoicing solution uses? If your answer is (c), please specify.

The national legislation varies a lot from country to country it is necessary to find out how the companies guarantee the authenticity of origin and the integrity of the data.

Question 13: *EU Member States have until 2004 to implement the Council Directive 2001/115/EU.*

- a) Do you feel the current EU Directive is truly harmonising the electronic invoicing in the EU or is it a step backward for businesses and will reduce the competitiveness of Europe's economy?*
- b) Should there be stricter regulations on electronic invoicing in the EU?*

It seems that the Invoicing Directive is not actually harmonising the electronic invoicing since it leaves the Member States with various options for the national legislation.

These questions will tell how the "insiders" see this issue.

Question 14: *Please describe the current legislation of electronic invoicing in your country. This question is used in section where I discuss the different requirements in each country.*

- a) For electronic invoicing are there permissions needed or prescribed standards?*
- b) Is electronic storage allowed?*
- c) How long is the storage period?*
- d) Please mention if you know an expert in this field or if you have a link to a website where is more information about this topic.*

PricewaterhouseCoopers study, which was discussed in chapter 3, was done in 1999. Question 14 helps to get more current information on the national legislation on permissions of electronic invoicing in general and the storage of electronic invoices.

Question 15: *Future of electronic invoicing*

- a) What are your goals in the near future with your electronic invoicing solutions?*
- b) How do you expect the electronic invoicing market to develop in the EU area in the next three years in general?*

Like I mentioned earlier, yet there has not been books about the current electronic invoicing solutions, so it makes it even harder to predict where the future is heading. With this question I hope to get the opinions of the electronic invoicing experts that operate in the electronic invoicing field.

Question 16: *Do you wish to add any additional comments?*

This final question was so that participants could add any information they feel I should know for my thesis.

Lastly, I requested for brochures and demos of their electronic invoicing solutions that could be used in this thesis.

5.3.2 Survey Participants

Finding out information with a survey sent via e-mail is not the most pleasurable task. It is very time-consuming and very often frustrating, especially after doing countless

hours of work without receiving any answers. After sending and receiving over 300 personalised e-mails, I finally was able to receive fourteen answers. I contacted dozens of companies in the EU and Norway via e-mail asking if they would like to participate in a survey. The following companies that are listed by the country were offered to participate in the survey:

- **Belgium:** Isabel
- **Denmark:** Dan Net, Danske Bank, Denmark Post, DMdata, eFaktura (Ementor, Eterra), Kommunedata, Maersk Data, PBS, WM Data
- **Finland:** Analyste, Basware, Data Com, Elma, Finland Post, Invoicia, Nordea, Novo Group, OKO Bank Group, Opus Capita, ProCountor.Com, Sampo, TietoEnator, WM Data
- **Germany:** Deutsche Bank, PAYBILL AG, Seals
- **Norway:** BBS, EDB Business Partner, Posten Norge AS, WM Data
- **Sweden:** Client Computing, e-giro (Handelsbanken, Skandinaviska Enskilda Banken, Östgöta Enskilda Bank, Skandia Banken, Bankgirocentralen), e-faktura (FöreningsSparBanken, Nordea), Postgirot Bank, Marakanda, SchlumbergerSema, Sweden Post, WM Data
- **The Netherlands:** Anachron
- **The United Kingdom:** Clear, Lloyds TSB, Microgen

I received positive feedback on the first query on requesting the participation of companies in the survey for this master thesis. The replies I got stated that this study is very interesting, and that they would definitely want to see the results. I sent another message to those companies that did not reply to the first query requesting to participate in the survey. In addition for some companies that I did not receive a reply I sent a general web message. Finally, I assumed that those who did not reply did to my survey request not want to take part on the survey.

The following companies did participate in the survey for this thesis:

1. Anachron/Netherlands
2. Analyste/Finland
3. BBS/Norway
4. Data Com/Finland
5. Elma Electronic Trading/Finland

6. Invoicia/Finland
7. Isabel/Belgium
8. Nordea/Finland
9. PAYBILL AG/Germany
10. PBS/Denmark
11. Posten Norge AS/Norway
12. ProCountor.Com/Finland
13. Seals/Germany
14. TietoEnator/Finland

In chapter 6 I will make the actual comparison of these fourteen companies that participated in the study. Also I will briefly go over other companies that offer electronic invoicing solutions Belgium, Denmark, Finland, Germany, Norway, Sweden, the Netherlands and the United Kingdom.

5.4 Summary and Conclusion of this Chapter

This chapter described how the data was gathered for the thesis. Chapter 6 also explained the research design of the thesis and what tool was used to do the research.

The data was gathered through press releases, articles, company homepages and presentations, and other publicly available information. Also brochures and demos have been useful. In addition to the data sources mentioned above, I received data through numerous of individuals who were mentioned in this chapter.

The research tool was a survey. This chapter reviewed the issues that should be considered when gathering the research data. Chapter 5 also explained in detail what were the questions in the survey and why they were they relevant to the thesis. The companies that were offered to participate in this study were listed in this chapter. The fourteen companies that took part on the survey were briefly mentioned.

6. Empirical Results

This chapter presents the empirical results of the thesis. It identifies the companies that provide electronic invoicing solutions in the EU and Norway as well as compares the electronic invoicing solutions.

6.1 Structure and Objective of this Chapter

The structure of this chapter is the following: section 6.2 describes the findings on electronic invoicing solutions. Section 6.3 does the actual comparison of electronic invoicing solutions based on the survey responses. Section 6.4 discusses the possible reasons for electronic invoicing not existing in some of the Member States. The chapter is summarized in section 6.5. The objective of this chapter is to show the empirical results that were found through the research. In this chapter the third and fourth parts of the research objective are achieved, which were to identify companies that provide electronic invoicing solutions in the EU and Norway and to compare the electronic invoicing solutions.

6.2 Findings

In this section I will describe what electronic invoicing solutions were found through the interviews, press releases, articles, and the Internet. Some of the information on the electronic invoicing providers has been taken from the surveys I received from the participants. I will describe the companies by the countries they are located at. The purpose of this section shows the findings on what electronic invoicing providers exist in Europe. This has been limited to the companies that I am aware of. For sure there are other companies that offer electronic invoicing solutions, but due to the limited time constraints, the following is what I was able to find out.

This section is divided into three subsections, 6.2.1 Electronic Invoicing Systems in the Nordic Countries, 6.2.2 Electronic Invoicing Systems in Other EU Countries, and 6.2.3

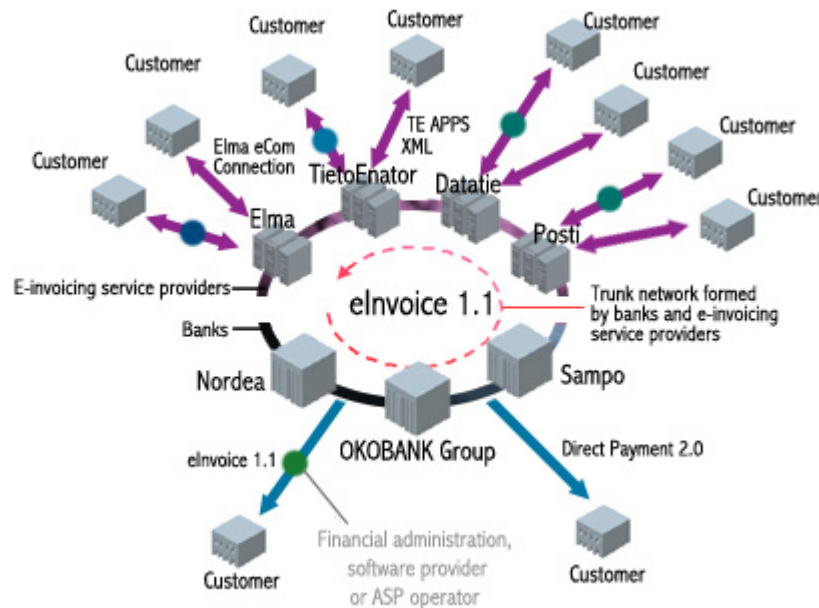
Other Electronic Invoicing Solutions. Subsection 6.2.1 takes a closer look at the electronic invoicing systems in Denmark, Finland, Norway and Sweden. Subsection 6.2.2 describes the electronic invoicing systems that are available in Belgium, Germany, the Netherlands, and the United Kingdom. Finally, subsection 6.2.3 briefly goes through the Microsoft's MS Invoice and SAP's EBPP solution.

Next to the company name is company's website. This way it is easier for the readers of the thesis to find out more information about the company if they are interested. The company is described with a few sentences. Information on the electronic invoicing solutions is introduced, if it has been available.

6.2.1 Electronic Invoicing Solutions in the Nordic Countries

The Nordic countries are the leading developers in electronic invoicing. Finland is one of the definite leaders in the world in electronic banking (TIEKE, 2003). Finnish electronic invoicing providers have developed a Nordic eInvoice Consortium. This Consortium promotes the widespread adoption of common standards and procedures for electronic invoicing in the Nordic countries and later throughout Europe. The aim of Consortium is to package communications components for providers of financial administration software, ASP operators and other parties involved in finance and accounting. (eInvoice Consortium, 2002) Figure 15 shows the interconnection traffic as an element in the Nordic eInvoice Consortium's co-operation.

Figure 15. Interconnection Traffic as an Element in the eInvoice Consortium's Co-Operation

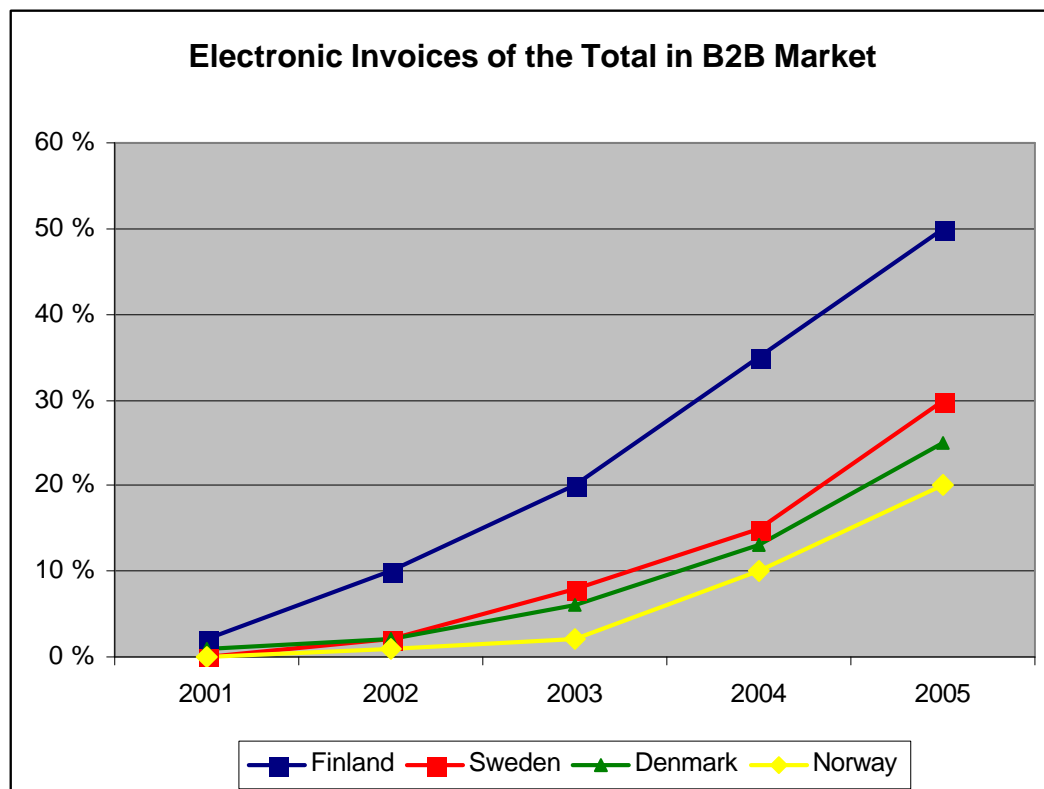


Source: eInvoice Consortium, 2002

The members of the Nordic eInvoice Consortium have a common standard that enables electronic invoices to be sent and received reliably in a common trunk network. One single line is used for transferring the electronic invoices even though the parties use different electronic invoicing providers. The electronic invoicing providers and banks can convert the invoice formats. (eInvoice Consortium, 2002)

The IDC's forecasts on B2B electronic invoicing amounting of the total B2B invoice market in Finland, Sweden, Norway and Denmark are illustrated in Figure 16. As it can be seen from the graph, the electronic invoicing market seems to be growing rapidly.

Figure 16. Electronic Invoices of the Total B2B Invoice Market in the Nordic Countries 2001-2005



Source: Hällström 2002 / IDC 2001

In the following subsections I will identify and briefly describe companies that provide electronic invoicing solutions in Denmark, Finland, Sweden and Norway.0

6.2.1.1 Denmark

Egiro and e-faktura are two competing Internet-based electronic billing and payment systems in Denmark. In both of these systems companies have to buy a license and install it on their own systems. A problem in the Danish electronic invoicing market is that there are no e-billing and payment systems accessible with a Web browser based on a third-party or application service provider (ASP) model, according to the IDC. If the Danish market is able to develop these systems, it could increase amount of the small and medium-sized companies using electronic invoicing. (IDC, 2001)

E-faktura (www.e-faktura.dk)

In Denmark the financial institutions supporting the e-faktura are Danske Bank, BG Bank, Nordea, Sydbank, Jyske Bank, Amagerbanken, Amtssparekassen Fyn, Spar Nord, Midtbank as well as 132 other banks and saving banks. These financial institutions have signed an agreement with the Merkantildata companies Ementor and Eterra. Ementor develops e-faktura's transport and security module, as well as the integration-modules whereas Eterra sells and distributes e-faktura via a net of distributors. According to Merkantildata, the e-faktura will be a new standard for electronic invoicing. E-faktura will be organised as a separate company jointly owned by the financial institutions. (Merkantildata, 2002)

Egiro

Egiro is a solution that integrates and simplifies the invoicing and payment with Concorde and Navision. It is functionality for exchanging electronic invoices and payment orders in Denmark. BG BANK, AMC-Consult, Dansk SystemCenter AS, Concorde and Navision develop Egiro. (Expandit, 2002)

Dan Net (www.dannet.dk)

Dan Net provides data clearing services for mobile roaming, mobile commerce, EDI, XML and e-business solutions. Dan Net's e-business solutions allow exchange of large quantities of business documents such as orders, invoices and transport instructions. Dan Net was founded in 1987 and it has 240 employees. (Dan Net, 2002)

Kommunedata (www.kmd.dk)

Kommunedata is a major IT-providers for the public sector in Denmark. It employs 2500 people. KMD owns 50% of e-Boks A/S. DMdata is the other owner of e-Boks. e-Boks is a mailbox on the Internet which provides a secure way of receiving and filing window envelopes they receive from public authorities or private enterprises. (KMD; 2002) KMD provides electronic billing and payment services and systems and it operates as consolidator supporting EDIFACT, E-giro and E-faktura systems. Also KMD can convert bills to different formats. (Peltonen, IDC, 2002)

Maersk Data AS (www.maerskdata.com)

Maersk Data AS is one of the leading IT suppliers with client/server, mainframe and network-based solutions in Denmark. Maersk Data provides solutions that are used with other vendors' billing systems. (Peltonen, IDC, 2002) The Maersk Data Group includes several companies, and one of the companies the Group owns jointly with Danske Bank is DMdata a/s. One of the DMdata's subsidiaries is e-Boks A/S, which markets the electronic version of window envelopes. (Maerskdata, 2002)

Post Denmark (www.postdanmark.dk)

In addition to the traditional postal services, Post Denmark offers businesses in the public and private sectors a digital signature to secure e-mail. Post Denmark is offering new services in electronic commerce such as Weblogistics and Global Merchant with Logistics. WebLogistics A/S is a joint venture of DanTransport Holding a/s and Post Denmark that offers logistics, distribution and warehousing solutions to businesses with virtual trading places. Post Denmark, DanTransport and IBM Denmark have developed Global Merchant with Logistics and it includes a fully integrated infrastructure of e-commerce. The solution includes the calculation of VAT, invoicing in different languages and trading in 27 currencies. In 2001, Post Denmark has nearly 12,000 employees. (Post Denmark, 2002)

PBS (www.pbs.dk)

PBS was found in 1968 and it employs 1,000 people. PBS is an IT-company specialising in electronic payment processing owned by Danish banks. PBS operates as a service provider to the banking industry in Denmark and it also operates as a sole company providing services to the Danish Society. PBS's four main areas are:

- Payroll- and HR Services,
- Billing Systems,
- Infrastructure for the banking industry, and
- Payment cards.

(PBS, 2002), (Gjesten, 2002)

6.2.1.2 Finland

In Finland the main electronic invoicing service providers are Datatie, Elma Electronic Trading, Suomen Posti, TietoEnator, Basware, Enfo Group and NovoGroup. The main banks that are involved with electronic invoicing as well as in the eInvoice Consortium are Sampo Bank, OKO Bank Group and Nordea Bank. Some of the providers of financial administration software are Affecto, Analyste, Basware, DL Software, EmCe Solutions Partner, Heeros Systems, Nisamest/Ventus Software, Nixu, NovoGroup, OpusCapita, Pupesoft.com, Solagem, TietoEnator, Tietosauma and OR-Softlane. (eInvoice Consortium, 2002) Finland has a long history of electronic payment transactions. According to Mika Hällström from Elma, in Finland 99% of B2B payment transactions are automated. The estimation done by IDC is that in 2005 half of the total invoices are sent electronically. (Hällström, 2002)

Analyste (www.analyste.fi)

Analyste a Finnish company that develops software for payment transfer between companies and banks, and for related financial administration, such as electronic handling of invoices, and for cash and financial planning. The company was founded in 1981 and has around 80 employees. The Analyste Cash Management product consists of cash management as well as training, consulting and publishing.

Analyste has three electronic invoicing products that are targeted for businesses:

- Analyste Banking (receives electronic invoices from electronic invoice operator),
- Analyste eOffice (processes and archives scanned and electronic invoices), and
- Analyste iBanking (sends, receives and archives electronic invoices).

(Analyste, 2002), (Muhonen, 2002)

BasWare (www.basware.com)

BasWare develops, markets and sells packaged software applications for e-business and financial management for large organisations. BasWare's software is used in private and public business sectors. The company was founded in 1985 and it has 168 employees. BasWare's net sales were EUR 12.4 million in 2001.

BasWare eBusiness product family include: BasWare Purchase Management, BasWare Invoice Processing, BasWare Document Archiving and Business Transactions. BasWare Financial Management product family consists of BasWare Business Planning, BasWare Group Consolidation, Management Consulting and Business Models. (BasWare, 2002)

Data Com Finland (www.datacom.fi)

Data Com Finland is a service centre that offers services in information and communication technology. Data Com Finland's services include various net communication and electronic invoice solutions, printing and mailing services, electronic filing, information management, and microfilming. Data Com Finland's products and services include: Print AXESS, Doc AXESS, Instant AXESS, Color AXESS, Card AXESS, Dpp AXESS, System AXESS, and Web AXESS. The Finnish company was founded in 1979 and it has 38 employees. The net sales for the year 2001 were approximately five million euros. Data Com Finland makes electronic visualisation of an invoice as pdf file and sends it as an email attachment to customer. Banking bar code is included in the message to be copy-pasted in to the Internet banks barcode field. (Data Com, 2002), (Heikkinen, 2002)

Elma Electronic Trading Corporation (www.elma.net)

Elma Electronic Trading is a service provider of electronic B2B commerce in the Nordic countries. Elma's products integrate electronic B2B commerce into companies' ERP and financial administration systems. Elma also provides maintenance services for these products and solutions to support the customer's electronic commerce. With the Elma products and services, companies are able to handle electronic B2A (Business to Authorities) transactions. Elma was founded in 1991 and currently it has 65 employees. Elma's net sales in the year 2001 were EUR 4 620 000.

Elma's electronic invoicing solutions include:

- Elma eInvoice (large- and medium size companies with wide-ranging and demanding invoicing needs)
- ElmaeInvoice.com (small companies with low volumes of invoices)

(Elma, 2002a), (Salmi, 2002b)

Invoicia (www.invoicia.fi)

Invoicia was founded in 1995 and is owned by ElisaCom and it has 136 employees. Invoicia provides invoicing and reporting services for businesses. For the contract partners Invoicia delivers the purchase invoices in an electronic form to the recipient's sales invoice system. As the basic solution Invoicia uses BasWare's Business Transactions –product, and the service provider (asp) is Elisa Solutions. Elisa Solutions is also the electronic invoicing operator for Invoicia. (Invoicia, 2002), (Kolkka, 2002)

Nordea (www.nordea.com)

Nordea is a full-scale financial institute providing services in the Nordic and Baltic countries. The Nordea Group was established in 2000 but derives its origin from banks and insurance companies from the Nordic region as far back as the early 19th century. The Group's business organisation includes three business areas: Retail Banking, Corporate and Institutional Banking, and Asset Management & Life. The Nordea Group has about 40,000 employees. Nordea has 1,245 bank branches in 22 countries.

Electronic invoicing is part of Nordea's electronic banking services. Main part of Nordea's offering is to act as the delivery channel linking the customers with one and other. Nordea does not provide any ERP or back-office systems. Nordea offers B2C electronic invoicing in Denmark, Finland, Norway and Sweden. B2B electronic invoicing is offered in Finland and Sweden. (Nordea, 2002), (Näätsaari, 2002)

Novo Group (www.novogroup.com)

Novo is a Nordic IT company employing about 2,300 professionals. Novo Group's net sales were EUR 295 million in 2001. Novo provides IT consulting services, software and operating services as well as infra solutions to the B2B market. Novo is a provider of solutions for the electronic management of archiving and purchase invoicing for Finnish organisations. The software Novo provides is called Rondo. In 2001, Novo and Elma Electronic Trading Corporation have agreed on extensive cooperation in electronic invoicing. (NovoGroup, 2002), (Elma, 2001)

OKO Bank Group (www.okobank.com)

OKO Osuuspankkien Keskuspankki Oyj (OKO Bank) is a commercial bank and the central bank of the OKO Bank Group. OKO Bank was founded in 1902 and currently

has around 8 800 employees. OKO Bank Consolidated's four business areas are Corporate Banking, Investment Banking, Retail Banking and Group Treasury. OKO Bank and Elma Electronic Trading are cooperating in electronic invoicing. (OKO Bank Group, 2002)

OpusCapita (www.opuscapita.fi)

OpusCapita is a supplier of software solutions for electronic banking and financial management. OpusCapita employs 76 persons. The turnover for the year 2001 was EUR 7,27 million. OpusCapita's main business areas are Treasury and Cash Management applications and electronic banking systems for companies and banks. The software products include OpusCapita® Finance, OpusCapita® Internet Corporate Banking and OpusCapita® Electronic Banking. OpusCapita® Electra is a product developed for managing electronic bill payment and presentment (EBPP). OpusCapita has signed a co-operation agreement with Basware and Finland Post. (OpusCapita, 2002)

ProCountor.com (www.procountor.com)

ProCountor.com is a Finnish Virtual Enterprise that offers accounting services on the web. The company was founded in 1999 and it has eight employees. Electronic invoicing is only a part of ProCountor.com's paperless web services. ProCountor.com's web services include invoicing, orders, accounting, salaries, purchases, purchase orders and agreements. Proha (www.proha.com) develops the services for ProCountor.com. (Vahtera, 2002b), (ProCountor.com, 2002)

Proha (www.proha.com)

Proha is a global software company founded in 1983. The Proha Group's net sales were EUR 82.8 million in 2001 and over 80 percent of the net sales came from outside Finland. The Proha Group employs 638 people. Proha's three main business areas are:

- Project Management (Artemis)
- Financial Management (Accountor)
- ASP services based on Internet Technologies (Intellisoft)

In the Financial Management business area, Accountor's Finance Department services are designed to support large companies in their financial management. Proha's ProCountor.com offers bookkeeping and invoicing for small and medium-sized companies. (Proha, 2002)

Sampo (www.sampo.fi)

Sampo is a full service financial group that offers retail, corporate and institutional customers all services relating to banking, insurance and investment banking operations. Sampo was founded in 1909. In 2001, Sampo (insurance group) and Leonia (banking group) merged. The new Sampo is a holding company with subsidiary companies such as Sampo Bank, Sampo Fund Management Company, Mandatum Omaisuu denhoito and Sampo Life Insurance Company. Through its electronic banking, Sampo offers an electronic invoicing product for businesses. Sampo and Elma Electronic Trading cooperate in the electronic invoicing field. (Sampo, 2002)

TietoEnator (www.tietoerator.com)

TietoEnator is a supplier of high value-added IT services in Europe with 12,000 employees in 21 countries. The annual net sales were EUR 1.1 billion. TietoEnator specializes in consulting, building and hosting its customers' core business systems. Most of the TietoEnator products and services are produced, distributed and consumed digitally via data networks. In electronic invoicing, TietoEnator offers the whole invoice management chain: billing, interchanging, accepting, posting, workflow functions, bookkeeping, payment and archiving. TietoEnator has developed an XML format (TEAPPSXML v2.3) that is used in electronic invoicing. (TietoEnator, 2002a), (Tolvanen, 2002)

Finland Post (www.posti.fi)

The Finland Post was established in 1638. The Finland Post Group conveys and delivers letters, newspapers and magazines, direct mail and parcels. In Finland, the Post has expanded into the electronic messaging and corporate logistics sectors. The Electronic Messaging Services business unit provides electronic messaging and e-business solutions for companies, organisations and consumers, and hybrid services that combine conventional and electronic messaging. The Finland Post's electronic invoicing solution is called "Laskunet". (Finland Post, 2002)

6.2.1.3 Norway

For Norway three electronic invoicing providers are introduced. The three companies are BBS, EDB Business Partner ASA and the Norway Post.

BBS (www.bbs.no)

BBS is a supplier of clearing services to Norwegian banks. BBS is also owned by the Norwegian banks. Bankenes BetalingsSentral (established in 1972), Bank –Axept (established in 1991) and BBS/Bank-Axept Holding (established in 1995) merged to one organisation in 1997 forming BBS. The companies were formally merged into one company in the beginning of 2001 for accounting purposes. Currently BBS employs 844 people. BBS has three product areas: card, giro and inter-bank systems. “eFaktura” is the Norwegian banks’ solution for electronic transfer and presentation of bills. eFaktura allows for electronic invoice transfer from companies to customers’ Internet banks, and it is targeted for B2C market. (BBS, 2002), (Hytta, 2002)

EDB Business Partner ASA (www.edb.com)

EDB Business Partner ASA is a Nordic IT group. EDB Business Partner ASA comprises eight companies and has more than 2 900 employees. EDB Business Partner operates as a total supplier, offering software systems, consultancy and computer operating services. NettBedrift is EDB Business Partner’s electronic invoicing solution for businesses. The NettBedrift gives companies access to payment services and to distribution and payment of electronic invoices. With this solution companies are able to manage their agreements with the bank, their account information as well as integrating own account receivable data, payroll and accounting systems. (EDB, 2002)

Norway Post (www.posten.no)

Norway Post (Posten Norge AS) is a 355 years old company employing 24,500 people. Postens eFaktura is a value proposition for suppliers, buyers and service suppliers (accounts, purchasing cars, credit information, factoring and other financial services) Norway post electronic invoicing products include: FMS (EDI central) with log, Print central, Scanning central, Archive, Payment delivery (eGiro), Delivery to Netbank Delivery by secure email (eKurer), and Workflow for internal acceptance of incoming invoice. (Norway Post, 2002), (Robbenstad, 2002)

6.2.1.4 Sweden

In Sweden there are two main electronic invoicing solutions, which are e-giro and e-faktura. In addition to e-giro and e-faktura, this subsection briefly introduces SchlumbergerSema and the Swedish Post.

e-giro (www.e-giro.se)

e-giro is an integrated electronic invoicing and payment service targeted for customers. e-giro is the result of a collaboration between Handelsbanken, Skandinaviska Enskilda Banken, Östgöta Enskilda Bank, Skandia Banken, and Bankgirocentralen. (e-giro, 2002) e-giro has a total of six companies that send these types of invoices. (Hällström, 2002)

e-faktura (www.e-faktura.com)

e-faktura is an electronic invoicing solution that is a collaboration between FöreningsSparBanken and Nordea Bank. E-faktura has over hundred companies that send out electronic invoices and half of these companies are Swedish counties. (Hällström, 2002)

SchlumbergerSema (www.slb.com)

SchlumbergerSema is one of two business segments of Schlumberger Limited, which is a global technology services company. SchlumbergerSema offers IT consulting, systems integration, managed services and related products to the oil and gas, telecommunications, energy and utilities, finance, transport and public sector markets. Their electronic invoicing solution interfaces with billing systems providing the telecom operators and service providers reporting and analysis, account fleet management and flexible reporting options. SchlumbergerSema has 30,000 employees. In 2001, the revenues were \$14.3 billion. (SchlumbergerSema, 2002), (Carter, 2002)

Swedish Post (www.posten.se)

In addition to the traditional postal services, the Swedish Post offers ePostbox service. ePostbox enables bills, pay-slips and other documents to be forwarded electronically

from corporations and the authorities to private individuals. ePostbox is free of charge for the recipient. (Swedish Post, 2002)

6.2.2 Electronic Invoicing Solutions in Other EU Countries

In this subsection is described the electronic invoicing solutions that are offered in other EU countries: Belgium (6.2.2.1), Germany (6.2.2.2), the Netherlands (6.2.2.3), and the United Kingdom (6.2.2.4). The rest of the EU countries are still taking small baby steps towards electronic invoicing, and due to time constraints I have decided to leave them aside. This is done so that I can better concentrate on comparing of those electronic invoicing solutions that clearly have done some significant progress. However, the section 3.2 Different Requirements did briefly describe EU Member States' various national legislative requirements for electronic invoicing. Also section 6.4 discusses the possible reasons for electronic invoicing not existing in some of the EU Member States.

6.2.2.1 Belgium

In Belgium there are several electronic invoicing software companies and just one electronic invoicing operator. There are no banks that support electronic invoicing. (Hällström, 2002) A major player in the electronic invoicing industry in Belgium is Isabel.

Isabel (www.isabel.be)

Isabel offers eBusiness and eBanking solutions for businesses from self-employed to multinationals. Isabel provides services for secure business transactions for companies (non-retail market or consumer market). Isabel offers solutions for electronic banking, electronic invoicing, e-commerce and e-Government (DIMONA, EDIVAT) for business of all sizes. As an electronic invoicing product Isabel offers "Isabel eInvoice", which has been granted accreditation by the Belgian Ministry of Finance. The shareholders are the four major Belgian Banks (i.e. Fortis Bank, BBL (ING Group), Dexia and KBC). Isabel was founded in 1995 and has approximately 100 employees. (Isabel, 2002), (Laroy, 2002)

6.2.2.2 Germany

This subsection introduces three German companies that provide electronic invoicing solutions. They are Deutsche Bank, PAYBILL AG and Seals.

Deutsche Bank (www.db.com)

Deutsche Bank is an international financial service provider and it has 82,000 employees. db-eBills is Deutsche Bank's Electronic Bill Presentment and Payment solution for the B2B market. Db-eBills is a multi-user system and it incorporates digital certificates and electronic identity verification mechanisms. (Deutsche Bank, 2002) In this solution the invoices are collected from the issuer of the invoice to an "invoice hotel". The process of receiving the invoices is done through a web-connection. (Hällström, 2002)

PAYBILL AG (www.paybillag.com)

PAYBILL AG is an EBPP consolidator as well as a service provider for the European market. It focuses on marketing, implementation, development and operation of system solutions for EBPP as well as on e-commerce. The German company was founded in 1997 and has over 300 employees. The main products include BILL2B (www.bill2b.com) and BILL2C (www.bill2c.com). As you can probably guess from the names, BILL2B is an EBPP service for the B2B market and BILL2C is for the B2C market. Both products are suitable for the completion of conventional business dealings and the integration of e-commerce. (Frey, 2002), (PAYBILL AG; 2002)

Seals (www.seals.net)

Seals was incorporated in 1999 out of the Lufthansa Group. Since February 2002 TietoEnator has been the major shareholder and in close co-operation with Seals. Seals is a B2B transaction service provider for electronic document exchange and business process management. Through the Sealsnet network companies are able to exchange invoices, orders and other commercial documents without system integration. Seals is independent of heterogeneous standards. (Seals, 2002), (Laube, 2002)

6.2.2.3 Netherlands

A major Dutch provider of electronic invoicing solutions is Anachron.

Anachron (www.anachron.com)

Anachron is a European provider of e-billing services, who will improve or enable a company's key business processes by bringing invoices and other structured data online through conversion of data from back office systems into a dynamic and interactive web-enabled presentation (Van Kasteren, 2002). Anachron was founded in 1999 and it is based in Netherlands. It employs 20 people. Anachron's solutions are targeted for both business and consumers. (Anachron, 2002)

6.2.2.4 The United Kingdom

In the United Kingdom examples of electronic invoicing providers are Microgen, and Open Business Exchange.

Microgen (www.mircogen.co.uk)

Microgen was founded in 1972 and is headquartered in the UK. The company has 350 employees and in 2001 the revenues were £21 million. Microgen provides software, consultancy and managed services enabling businesses to collate, process and distribute source data to enhance their business processes and information output (Microgen, 2002). Microgen consists three operating divisions: Microgen-Telesmart, Microgen-Kaisha and Microgen-OST. Microgen-Telesmart has a electronic billing solutions targeted for both B2B and B2C markets. (Microgen, 2002)

Open Business Exchange (www.obexchange.com)

Open Business Exchange is a service organisation that enables organisations to deliver and receive electronic invoices to and from their accounting systems through the OB¹⁰ network. The OB¹⁰ network connects multiple billing and accounting platforms enabling automation of back office invoice processing functions. OBE is a privately funded organisation, and it has offices in the UK and the USA. (Open Business Exchange, 2002)

6.2.3 Other Electronic Invoicing Solutions

In this section the electronic solutions of two multinational corporations are discussed. Subsection 6.2.3.1 describes Microsoft's MS Invoice, and the subsection 6.2.3.2 discusses SAP's EBPP solution.

6.2.3.1 Microsoft

Microsoft has developed MS Invoice, a web-based invoice-entry application, enabling suppliers and Microsoft employees to create an invoice or submit a file to the Microsoft Procurement Group online, through the company's intranet or the Internet. MS Invoice allows suppliers and independent contractors to submit invoices electronically and ensures expedient payments. MS Invoice interacts directly with SAP R/3, Microsoft's current enterprise resource planning system, in streamlining the invoicing process. MS Invoice incorporates business rules and validation routines that ensure a valid SAP R/3 purchase order (PO) number, supplier number, general-ledger code, and proper approver employee ID to route digital transactions or files for approval. Since its launch, MS Invoice has reduced internal processing costs from US\$30 per invoice to less than \$5 per invoice, saving Microsoft \$9.6 million per year. (Microsoft, 2002b)

6.2.3.2 SAP

According to SAP, most of the existing EBPP (Electronic Bill Presentment and Payment) solutions only show invoice data to customers. With the SAP solution the invoice recipients can view account balances and their overall position with the supplier. This way the customer can see possible credits, and they can offset these with receivables that are still open. The SAP solution handles all EBPP core processes, which include support for partial payments, the display of invoice detail data and payment history, as well as support for a variety of payment methods. EBPP is fully integrated in existing mySAP.com solutions and since it is using a flexible Java front end, it can easily be integrated with the existing web of mySAP.com solutions as well as marketplaces and portals. The mySAP Financials EBPP supports both B2C and B2B scenarios of the biller direct model, meaning the issuer of invoices sends them directly to the customers. In the future SAP's EBPP will also support the consolidator model in

which the issuer of the invoice sends invoices to an intermediary. (mySAP Financials, 2002)

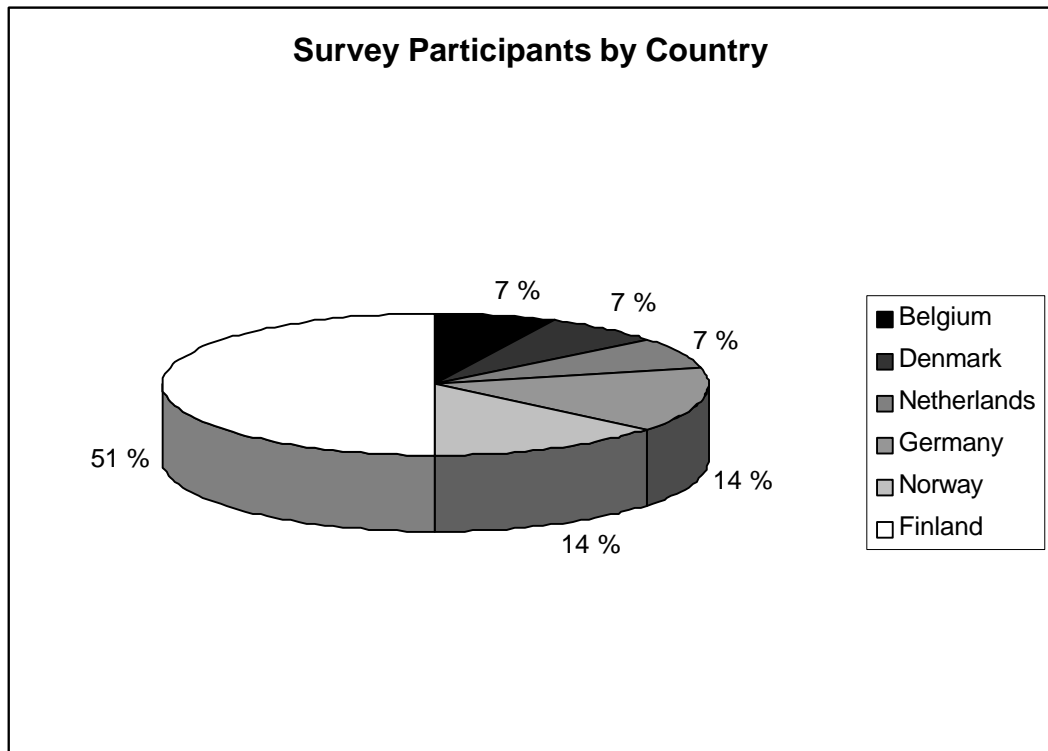
6.3 The Comparison

In this section I will compare the electronic invoicing solutions based on the answers received from the surveys. Section 5.3.2 listed all the companies that were offered to participate in this study as well as mentioned the fourteen companies that did participate in this study. I will use pie charts and tables to illustrate the general results of the surveys. Scorecards will be used when comparing the various electronic invoicing solutions.

I need to make a general note that is applicable to all of the information received from the surveys. The instructions in the survey said that “if there is confidential information that you do not wish to share, please do not answer that question.” So in the case the survey participant has left the question blank, I have assumed that the information is confidential.

The fourteen survey participants were from six different countries and Figure 17 shows how they were divided by country. Approximately half of the survey participants were Finnish companies.

Figure 17. Survey Participants by Country



The survey participants hold managerial positions in their companies.

Table 4 shows the fourteen companies that participated in the survey as well as states the personnel that replied for the company.

Table 4. Companies and Personnel that Participated in the Survey

Company	Country	Participant	Title
Anachron	Netherlands	Joyce Van Kasteren	Marketing Executive
Analyste	Finland	Jukka Muhonen	Product Manager
BBS	Norway	Espen Hytta	Product Manager
Data Com	Finland	Timo Heikkinen	Director, Information Systems
Elma	Finland	Heli Salmi	Coordinator, Expert Services
Invoicia	Finland	Marko Kolkka	Account Manager
Isabel	Belgium	Vincent Laroy	Marketing Analyst
Nordea	Finland	Raimo Näätsaari	Manager, R&D, e-business
PAYBILL AG	Germany	Christopher Frey	Board Director
PBS	Denmark	Kurt Gjesten	Product Manager (Payment cards)
Posten Norge AS	Norway	Hans Erik Robbenstad	Project Manager
ProCountor.Com	Finland	Pauli Vahtera	Virtual Evangelista, Guru
Seals	Germany	Marcus Laube	Managing Director
TietoEnator	Finland	Marita Tolvanen	Development Manager

The first part of the survey dealt with the general data of the companies. Table 5 states the year company was founded, the total amount of employees, and size their electronic invoicing team. Some the figures in the employee amount are estimated and some others are exact, but the main purpose of these numbers is to give some kind of idea of the size of the company, whether it is only a few dozen employees versus several thousands. A star (*) after the figure of the size of the electronic invoicing team means that

1. a specific electronic invoicing team has not been specified by the company,
2. there are no specific tasks related to electronic invoicing, or
3. something else.

Please, see the detailed information about the (*) cases below the Table 5.

Table 5. General Data

Company	Country	Founded	Employees	E-invoice team
Anachron	Netherlands	1999	20	10
Analyste	Finland	1981	80	N/A
BBS	Norway	1972	844	20-25
Data Com	Finland	1979	38	10
Elma	Finland	1991	65	20 *
Invoicia	Finland	1995	136	3 *
Isabel	Belgium	1995	100	N/A
Nordea	Finland	Early 19th century	40 000	4 prod. mngrs *
PAYBILL AG	Germany	1997	304	197
PBS	Denmark	1968	1000	N/A *
Posten Norge AS	Norway	1647	25 000	N/A
ProCountor.Com	Finland	1999	8	N/A *
Seals	Germany	1999	10	10
TietoEnator	Finland	1968	13 000	N/A *

In Elma's case, all of the 65 employees are related and working with their electronic invoicing solutions, but there are approximately 20 people working full-time in an electronic invoicing team. Invoicia has three employees working part-time in development of their electronic invoicing solutions, and the rest of the tasks are spread to the customer interface. In Nordea the electronic invoicing is a part of their electronic banking services, so they were not able to give exact numbers. However, Nordea stated that they have four product managers in the Nordic countries. PBS does not have a specific team dedicated for electronic invoicing. ProCountor.Com does not have a special team for electronic invoicing. TietoEnator has invoice management divided into different departments and exact numbers of persons cannot be given.

The financial data, net sales and operating profit were asked in the first part of the survey. These general key figures in the Table 6 give an idea of what size of a company is providing these electronic invoicing solutions.

Table 6. General Financial Data

Company	Net Sales (€)	Operating Profit (€)
Anachron	N/A	N/A
Analyste	7 075 000	1 181 000
BBS	1 507 861 000 (NOK)	86 987 000 (NOK)
Data Com	5 000 000	N/A
Elma	4 620 000	13 900
Invoicia	N/A	N/A
Isabel	N/A	N/A
Nordea	1 268 000 000	376 000 000
PAYBILL AG	7 400 000	2 100 000
PBS	2 100 000 000 (DKR)	300 000 (DKR)
Posten Norge AS	N/A	N/A
ProCountor.Com	N/A	N/A
Seals	N/A	N/A
TietoEnator	1 135 200 000	135 600 000

The survey also asked for the net sales and operating profit from the electronic invoicing operations. Most of the survey participants did not answer to this question often stating that information is confidential. Electronic invoicing is still at its early stages as mentioned earlier, and one can assume that some of the companies are not making profits yet with the electronic invoicing solutions.

Most of the survey participants did not answer to the question on the pricing level of their electronic invoicing solution. In general, the survey participants did not answer the question on the transaction and customer amounts. Also the companies did not answer to the question on the security (characteristics) issue. Since the majority did not reply to these questions, I will not present the answers of the few companies.

The companies were asked if they target their electronic invoicing solutions for businesses, consumers, or both.

Table 7. Customers

Company	Businesses	Consumers
Anachron	X	X
Analyste	X	
BBS		X
Data Com	X	X
Elma	X	X
Invoicia	X	X
Isabel	X	
Nordea	X	X
PAYBILL AG	X	X
PBS	X	X
Posten Norge AS	X	(X)
ProCountor	X	
Seals	X	
TietoEnator	X	(X)

Anachron offers electronic invoicing for both businesses and consumers. In the B2B market the products are targeted for small, medium and large enterprises. For *Analyste* the electronic invoicing products are targeted for businesses only, and the main customers are mostly medium and large companies. *Analyste* intends to reach small companies through application service providers and accounting firms. *BBS* targets its products to consumers only. The main customers sending invoices are public sector, telecom and energy market. For *BBS* the consumers that receive the electronic invoice are netbank users. Main customers for *DataCom* are consumers as well as small and medium size companies. *DataCom*'s main customers in the B2C market are oil companies, teleoperators and other companies that send large amounts of invoices to consumers. *Elma* targets for the B2B as well as the B2C market. In the B2C sector *Elma*'s main customers are telecommunication companies and the Finnish State. *Invoicia* delivers electronic invoices for both private customers as well as businesses. *Isabel* targets its products to businesses from SOHO (small office home office) market to large companies, non-profit organisations and government institutions. *Isabel*'s main customers are medium and large enterprises. *Nordea* acts as a delivery channel for both businesses and consumers. *PAYBILL AG* targets its electronic invoicing products to

business, consumers, banks, payment processors, telecommunication companies, insurance companies and so on. *PBS* targets its electronic invoicing solutions to both consumers and businesses of all sizes. *Posten Norge AS* offers their electronic invoicing solutions in the B2B, B2G and later in B2C market. The main customers in the B2B market are medium and large size enterprises. *Procountor.Com* target markets are small and medium size enterprises. Procountor.Com is able to also send invoices to consumers. *Seals* targets only businesses with their electronic invoicing solutions. The main customers are large enterprises. *TietoEnator* has customerships with organisations, and the consumers are supported indirectly.

For the comparison of the electronic invoicing solutions, I will use “scorecards” for each of the fourteen companies that participated to the survey. The scorecards will have scores on six features of the electronic invoicing solution. These features are geographic coverage, interaction, automation, data conversion, attachments, and size limits. The possible scores given are zero, five and ten.

The first feature is geographic coverage that the company offers their electronic invoicing solutions. If the electronic invoicing solution is still under development and not offered in any country the score is zero. If the product is offered in one or two countries the score is five. The score is ten if the company offers the electronic invoicing solution in more than three countries.

The second feature relates to the electronic invoicing solutions ability to interact with other electronic invoicing solutions. If the electronic invoicing solution is not capable of interacting with other electronic invoicing solutions the score is zero. The score ten is given when the electronic invoicing solution can accept invoices from other electronic invoicing solutions.

The third feature is automation. Automation meaning if the electronic invoicing solution can be used to totally automate the process of receiving, handling, processing and archiving the invoices. The score zero is given if the solution is not able to automate the process. If a partial automation is possible the score is five. The score ten is given if the electronic invoicing solution can totally automate the process.

The fourth feature is data conversion. Data conversion relates to the independence of transportation. If the electronic invoicing solution is not able to convert data into other formats the score zero is given. Score five is given in this feature when some specific format can be converted to some other specific format. If the solution can convert the all invoice data to other formats the score is ten.

The fifth feature is possibility to send attachments with the electronic invoicing solution. If the solution cannot send an attachment the score is zero. If the solution can partially make attachments on the invoices the score is five. An example of this is when an electronic invoicing solution cannot send invoices with attachments but attachments can be made on received invoices. Another example is when it is not possible to send attachments from the electronic invoicing software, but for the received invoices it is possible to attach comments and files. The score ten is given when attachments can be made on invoices.

The last feature is possible size limits to the message or invoice size. Size limit meaning that the price goes up with a larger message size. If the electronic invoicing solution has size limits the score is zero. The score five is given when there is a size limit but no price differentiation. The score is ten when the electronic invoicing solution does not have any limits on the invoice size.

Table 8 summarizes the features as well as the scoring of these features.

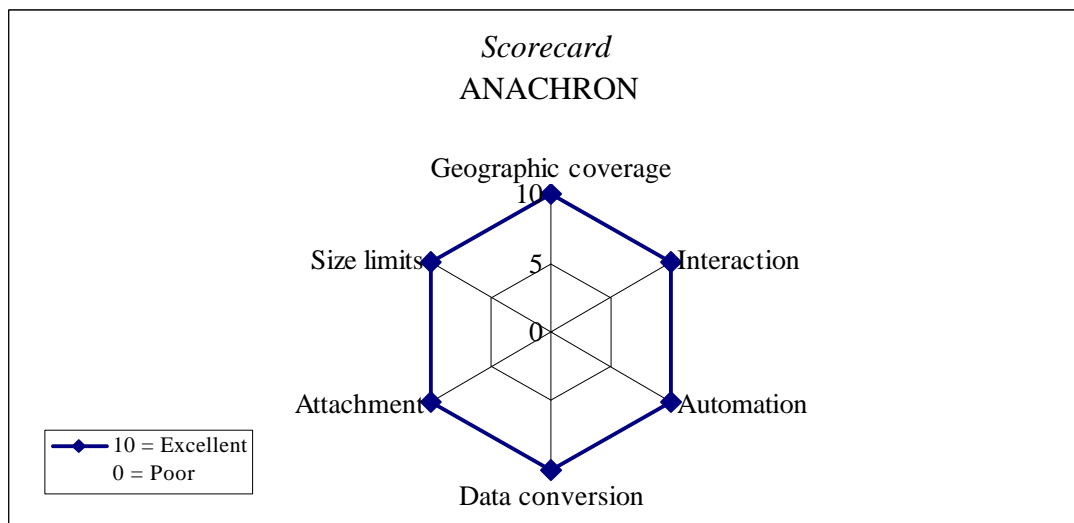
Table 8. Evaluation with Scorecards

<i>Evaluation with scorecards</i>		Scores		
		0	5	10
Features	Geographic coverage	No countries	1-2 countries	3 or more countries
	Interaction with others	No		Yes
	Automation	No	Partially	Yes
	Data conversion	No	Partially	Yes
	Attachment	No	Partially	Yes
	Size limits	Yes	Partial	No

For each of the fourteen survey participant there will be a scorecard. The company is described with a few sentences and the company's electronic invoicing solution is briefly introduced. The geographic coverage of the electronic invoicing solution, the

ability to interact with other solutions, the automation level, the ability to convert data, the attachment feature and the possible size limits are discussed. Lastly, the future goals of the company are discussed. The experts will also give their opinions on the future of electronic invoicing in general. The fourteen survey participants were Anachron, Analyste, BBS, Data Com, Elma, Invoicia, Isabel, Nordea, PAYBILL AG, PBS, Posten Norge AS, ProCountor.Com, Seals and TietoEnator.

Figure 18. Anachron



Anachron provides e-billing services, which will improve or enable a company's key business processes by bringing invoices and other structures data on-line, through conversion of data from back-office systems to an interactive web-enabled presentation. (Van Kasteren, 2002)

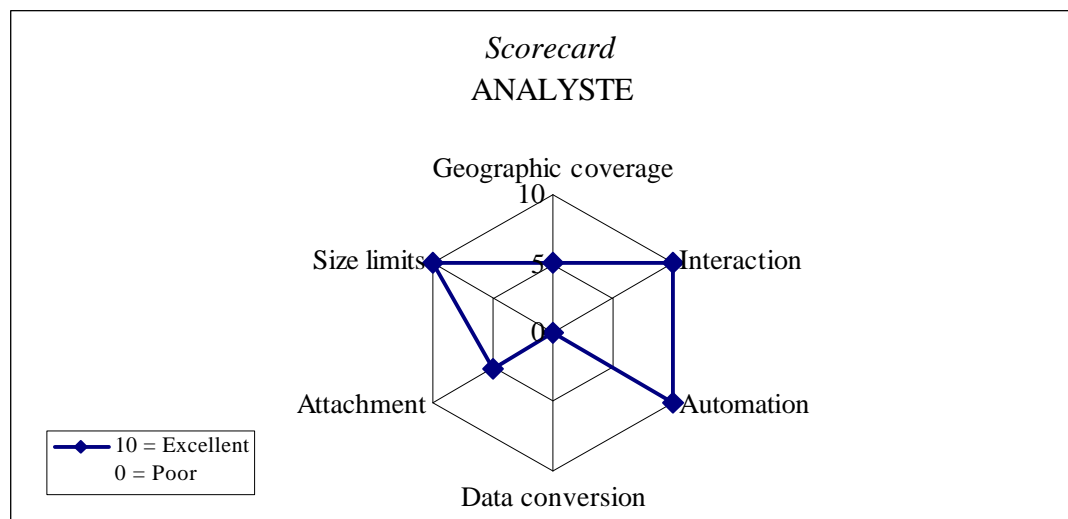
Anachron offers the electronic invoicing solutions for the European and North American markets (Anachron, 2002). Anachron's services in electronic invoicing can be divided into following areas:

- Presentment of the invoice
- Resolution of the invoice (through dispute handling)
- Payment of the invoice
- Overall control of the invoice
- Integration with ERP or Accounts Payable, Accounts Receivable software.

Anachron's electronic invoicing solution interacts with other electronic invoicing solutions and the solution can be used to totally automate the process of receiving, handling, processing, and archiving the invoices. As the basic file format Anachron uses XML, however their electronic invoicing solution is able to convert all formats received from the clients. Their electronic invoicing solution is able to send attachments with the invoices. Anachron's electronic invoicing solution handles every invoice size and this is included in the price. (Van Kasteren, 2002)

Anachron believes the electronic invoicing market in the EU will develop very well, since more and more companies and consumers want to receive their invoices online. When the regulation is clear in the EU, more companies will change to electronic invoicing, according to Marketing Executive Joyce Van Kasteren. In the near future with the electronic invoicing solutions Anachron hopes to create awareness of the new products and develop the products further. The goal is to implement as many EBPP solution as possible. (Van Kasteren, 2002)

Figure 19. Analyste

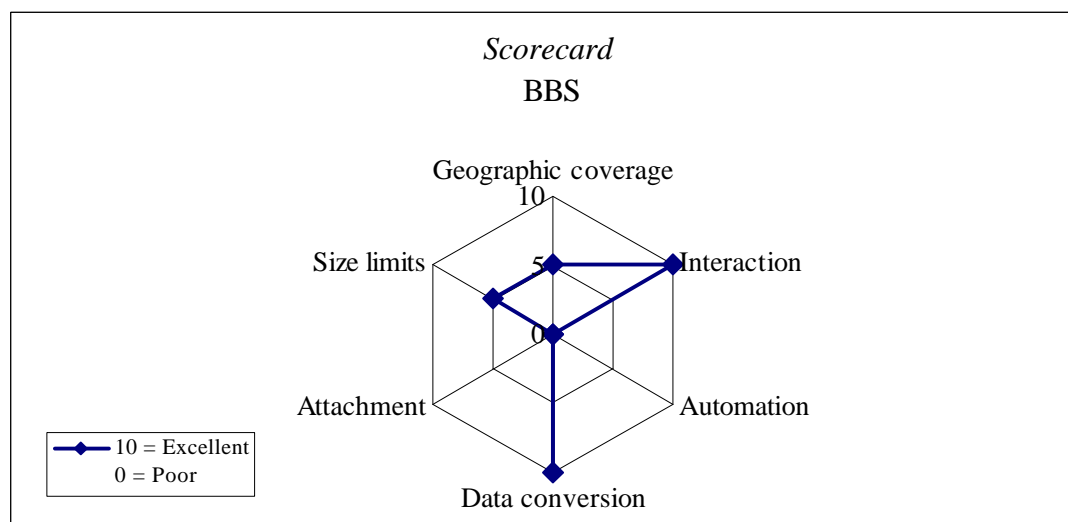


Analyste develops software for payment transfer between companies and banks, and for related financial administration such as electronic handling of invoices, and for cash and financial planning. The three products that handle electronic invoices are Analyste Banking (receives electronic invoices from electronic invoice operator), Analyste eOffice (processes and archives scanned and electronic invoices), and Analyste iBanking (sends, receives and archives electronic invoices). (Muhonen, 2002)

Analyste offers the electronic invoicing solutions in Finland only. Their systems are built on open interconnectivity. Analyste's software can automate the invoice process of receiving, handling, processing, and archiving. The basic file format for sending invoices is eInvoice format and the images of the file in stored in pdf. The software is not able convert data to other formats. It is not possible to send attachments from their invoicing software, however for received invoices it is possible to attach comments and files. Analyste does not have any size limits on the message size. (Muhonen, 2002)

Analyste believes the electronic invoicing market might move forward in the Nordic countries, Germany and Benelux countries, but is doubtful for the rest of the EU. In the future, Analyste will focus more on scanned invoice processing systems. According to Product Manager Jukka Muhonen, Analyste hopes that electronic invoicing will go forward as fast as possible, but has no interest in putting resources on making the wheel go faster. (Muhonen, 2002)

Figure 20. BBS

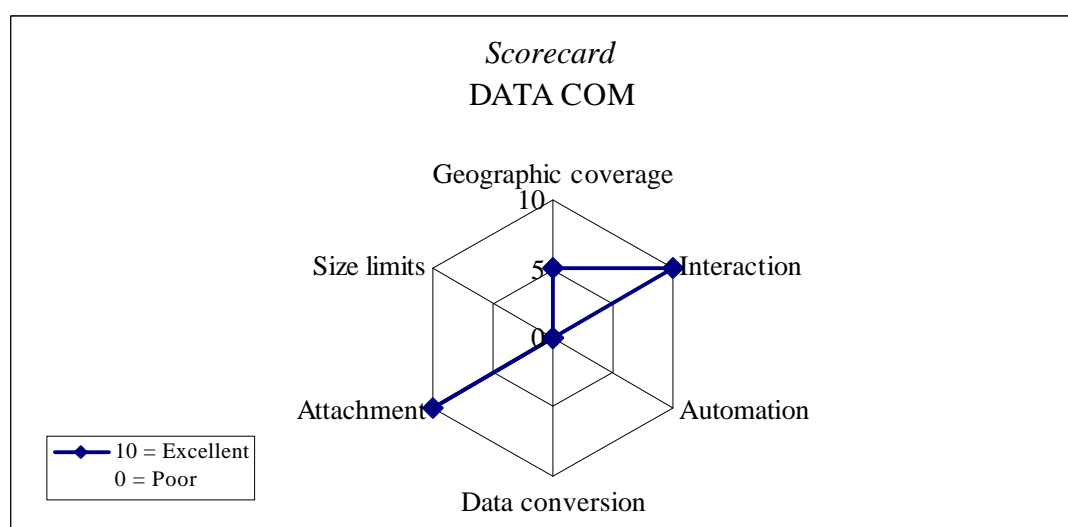


BBS is a supplier of clearing services to Norwegian banks and the three product areas are card, giro and inter-bank systems. (BBS, 2002) BBS's electronic invoicing solution consists of thick/thin consolidation, 16 months storage of electronic invoices, and Netbank API. (Hyttä, 2002)

BBS offers their electronic invoicing solutions in Norway only. The electronic invoicing solution interacts with other electronic invoicing systems. Total automation is not possible with their electronic invoicing solution. BBS uses XML or Internal BBS-

format in the summary data. The bill presentment can be done in variety of formats including EBCDIC, ASCII, BBS and so on. Data conversion can be made with the electronic invoicing solution. At the moment it is not possible to send attachments with invoices. There are limits to the invoice size but there is no price differentiation. According to Product Manager Espen Hytta, BBS hopes to increase the volume of their electronic invoicing solutions in the near future. (Hytta, 2002)

Figure 21. Data Com

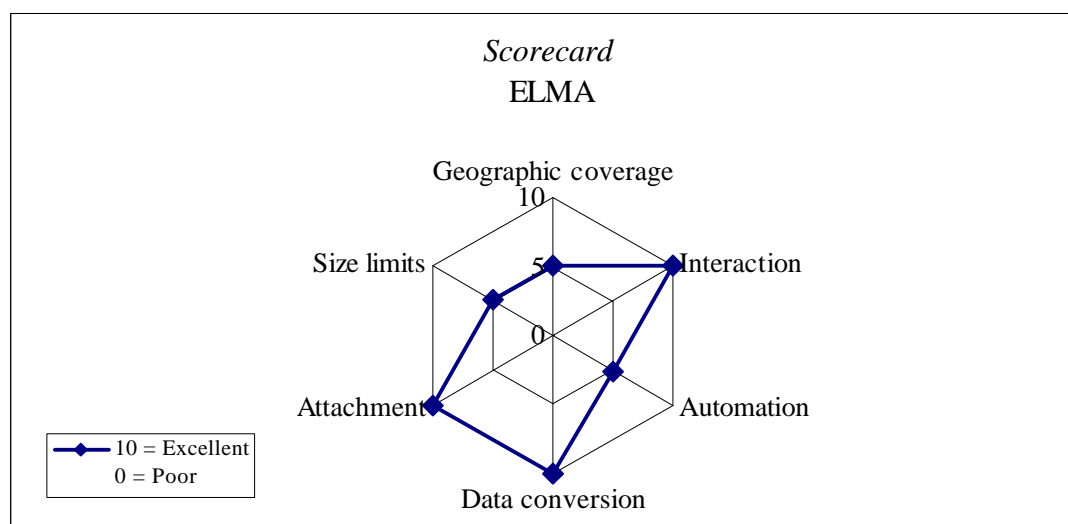


Data Com Finland Oy provides services on Information and Communication Technology. Services include various net communication and electronic invoice solutions, printing and mailing services, electronic filing and information management and microfilming (Data Com, 2002). Data Com Finland makes electronic visualisation of an invoice as a pdf file. The pdf is sent as an e-mail attachment to the customer. The banking bar code is included in the message to be copy-pasted into the Internet bank's barcode field. (Heikkinen, 2002)

The electronic invoicing solution is offered in Finland only. Data Com Finland's electronic invoicing solution accepts invoices from other systems. Total automation of the process of receiving, handling, processing, and archiving the invoices is not possible. Input can be in any format, but the output is always pdf. Data Com Finland's electronic invoicing solution is not able to convert the invoice data to other formats. It is possible to send attachments with the electronic invoicing solution. The pricing is based in sent messages and page count on pdf files. (Heikkinen, 2002)

In the next three years, Data Com Finland expects the electronic invoicing market in the EU area experience rapid growth. According to Director of Information Systems Timo Heikkinen, Data Com Finland’s goal with electronic invoicing solutions is to get them more common in the B2C environment. (Heikkinen, 2002)

Figure 22. Elma



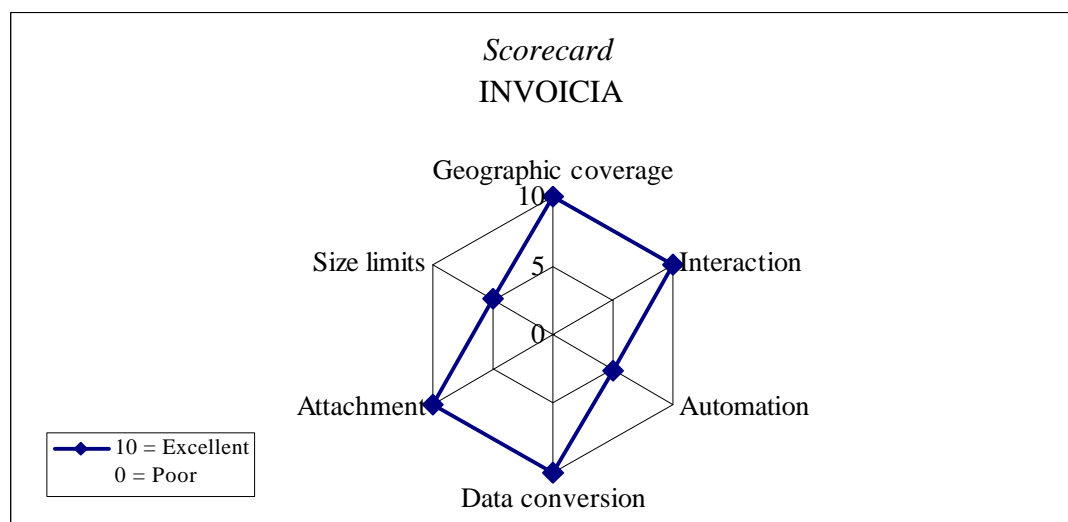
Elma Electronic Trading is a service provider of electronic B2B commerce in the Nordic countries. Products and services also make electronic transactions with public authorities possible. Elma’s solutions for e-commerce include the entire maintenance and the continuous monitoring of the systems. Elma transmits the invoices to the recipients in accordance with their e-commerce facilities. The invoices can be Elma eInvoices, as conventional EDI invoices, or as paper invoices printed by the ElmaInvoice service. (Elma, 2002a)

Elma offers in the electronic invoicing solutions in the Finland and Sweden. Elma’s electronic invoicing solutions interact with other electronic invoicing systems. The total automation of receiving, handling, processing, and archiving of invoices can be done through partners. Elma has many electronic invoice file formats including position based ASCII, XML, EDIFACT and Inhouse. The invoice data can be converted to other formats and it is possible to send attachments with the invoices. There can be size limits to the message size. (Salmi, 2002b)

Elma sees that Finland has a headstart in B2B electronic invoicing thanks to co-operation between operators, consolidators and software companies. Finland is one to

two years ahead of Sweden, two to three years ahead of Denmark and Norway, and three to four years ahead of Northern Europe. According to Coordinator of Expert Services Heli Salmi, Elma wants spread out the good news of electronic invoicing, find new customers, improve the products, and improve customers' efficiency. (Salmi, 2002b)

Figure 23. Invoicia



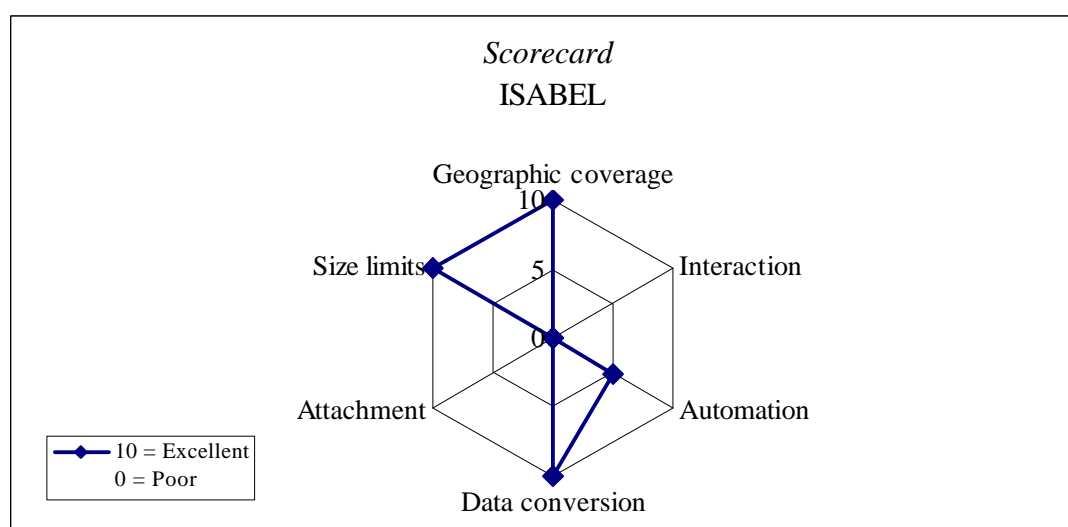
Invoicia is a part of Elisacom providing billing and reporting services. Invoicia delivers invoices in an electronic form to the recipient's accounts payable system. BasWare Oyj's Business Transaction product is used as the basic electronic invoicing solution. (Kolkka, 2002)

Invoicia offers its electronic invoicing solution in Finland and through service providers customers can be reached worldwide. The electronic invoicing solution accepts invoices from other systems. The total automation of receiving, handling, processing, and archiving of invoices is possible in cooperation with service providers. Invoicia's basic file format is TeApps-XML and data conversion can be made to EDIFACT, eInvoice and Inhouse formats. It is possible to send attachments with the invoices. Pricing is based on the amount of data transferred per invoice, but in normal invoicing situation the size limit is not reached. (Kolkka, 2002)

Invoicia believes in the future the ability to send and receive invoices will become a requirement instead of being an advantage. Invoicia sees the variety of electronic invoicing solution growing. For the small enterprises the electronic invoicing market

will offer “light” versions whereas the large enterprises will want to totally automate the process of ordering, delivering, invoicing and payments. According to Account Manager Marko Kolkka, in Europe electronic invoicing will spread with the international companies and especially with the Scandinavian companies. On the other hand, Invoicia believes that electronic invoicing will spread from the Nordic countries to the Southern Europe and estimates on this growth are hard to make. (Kolkka, 2002)

Figure 24. Isabel



Isabel provides services for secure business transactions for companies. Some of the solutions include electronic banking, electronic invoicing, e-commerce and e-Government. Isabel’s shareholders are four Belgian banks: Fortis, BBL (ING Group, Dexia, and KBC. Some of the Isabel solutions include:

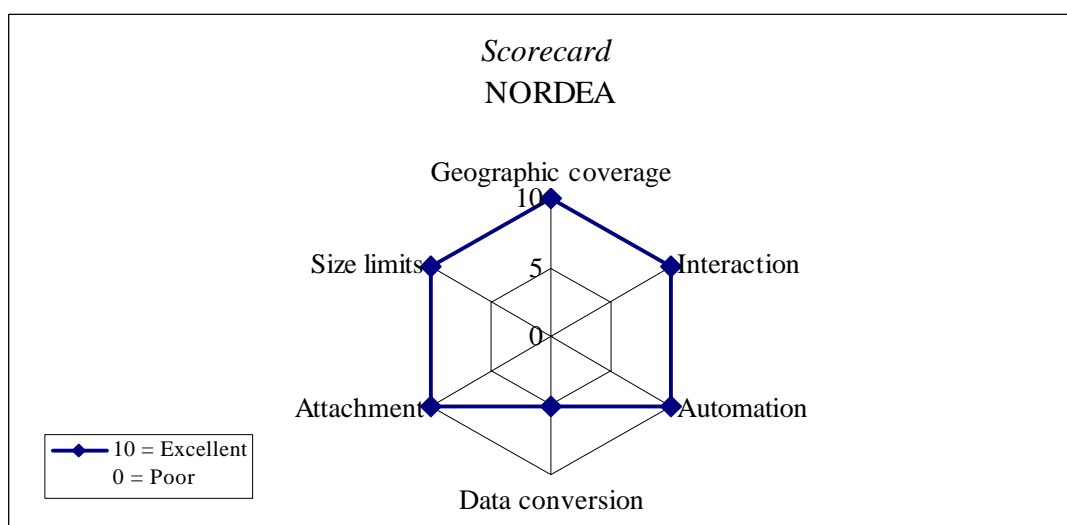
- Client Solutions: Isabel Business Suite 5.0, Isabel Websign, Isabel eInvoice, Isabel 400
- Server Solutions: Isabel One-to-One Server
- Gateways: IsaGate, Isabel eInvoice Server (Isabel, 2002a)

Isabel eInvoice enables an Isabel customer to send an electronic message, which may include an advanced electronic signature and data entered and structured in accordance with the technical requirements described in the contract. (Laroy, 2002)

Isabel offers electronic invoicing solution in Belgium and to Isabel users outside Belgium. The Isabel electronic invoicing solution does not interact with other

electronic invoicing systems. The process of receiving, handling, processing, and archiving can be done if it is integrated by an integration partner. Isabel's basic invoice file format is a Belgian Format, which is determined by the Belgian Ministry of Finance. The Isabel solutions do convert invoice data to other formats. It is not possible to send attachments with the electronic invoicing solution. Isabel has no limits on the invoice size. According to Isabel's Market Analyst Vincent Laroy, Isabel sees an electronic invoice becoming a common product in the near future. (Laroy, 2002)

Figure 25. Nordea



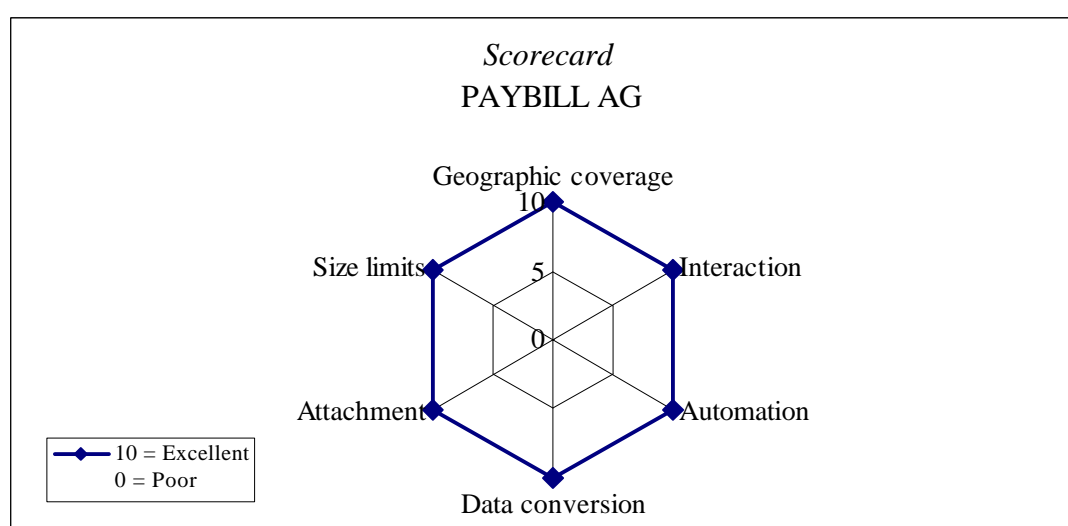
The Nordea Group was established in 2000 and it is a full-scale financial institute providing services in the Nordic countries and the Baltic countries. The Nordea Group derives its origin from the early 19th century from the Nordic banks and insurance companies. (Nordea, 2002) Electronic invoicing is a part of the electronic banking services and the main part of the electronic invoicing offering is to act as a delivery channel linking the customers with one and other. Nordea does not provide any ERP or back office systems. (Näätsaari, 2002)

Nordea offers B2C invoicing in Denmark, Finland, Norway and Sweden. B2B invoicing is offered in Finland and Sweden. Nordea is able to interact with other electronic invoicing solutions since they deliver the transportation of the invoice. In Finland Nordea uses as a basic invoice file format e-invoice (XML and ASCII) and also the Finnish Banker's Associations Finvoice. In Sweden four different PostGiro formats

(based on EDIFACT) are used. In Finland conversion services are not offered, but in Sweden the conversions are offered. Nordea delivers the files without going into the content, therefore it is possible to deliver basically whatever within the transportation frames. There are no limits on the invoice size. (Näätsaari, 2002)

In the next three years Nordea believes the electronic invoicing market will increase. According to R&D and e-business Manager Raimo Näätsaari, the challenge will be how to set proper and working rules and methods between countries. It is easier to find national initiatives. In the near future Nordea wants to promote the benefits arising from exchanging messages between the customers. Also Nordea wants to enable the realisation of Straight Through Processing benefits. (Näätsaari, 2002)

Figure 26. PAYBILL AG



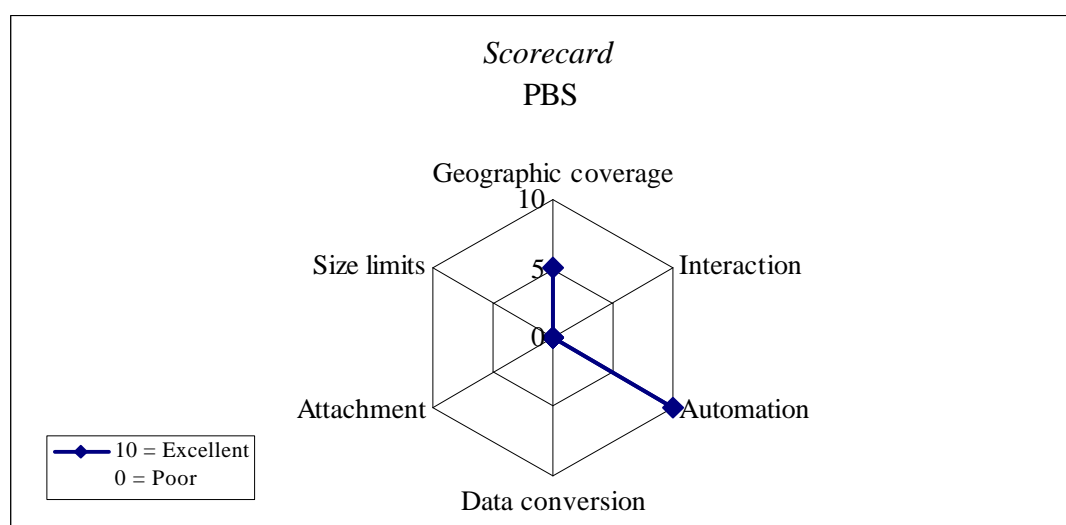
PAYBILL AG focuses on marketing, implementation, development and operation of systems solutions for Electronic Bill Presentment and Payment (EBPP) as well as e-commerce. PAYBILL AG has two products that are BILL2B and BILL2C. (PAYBILL AG, 2002)

PAYBILL AG offers its electronic invoicing solutions in Austria, Germany and Switzerland. Also soon the solutions will be offered in Italy, France, Czech Republic and Hungary. The electronic invoicing solution does interact with other electronic invoicing solutions and a total automation of the process of receiving, handling, processing, and archiving the invoices is possible. The basic file format for the invoices

is XML based and data conversions can be made. Attachments can be sent with the invoices and there are no size limits on the invoices. (Frey, 2002)

In the next three years PAYBILL AG expects the electronic invoicing market be booming. According to Board Director Christopher Frey, the goal in the near future for PAYBILL AG is to serve their customers. (Frey, 2002)

Figure 27. PBS

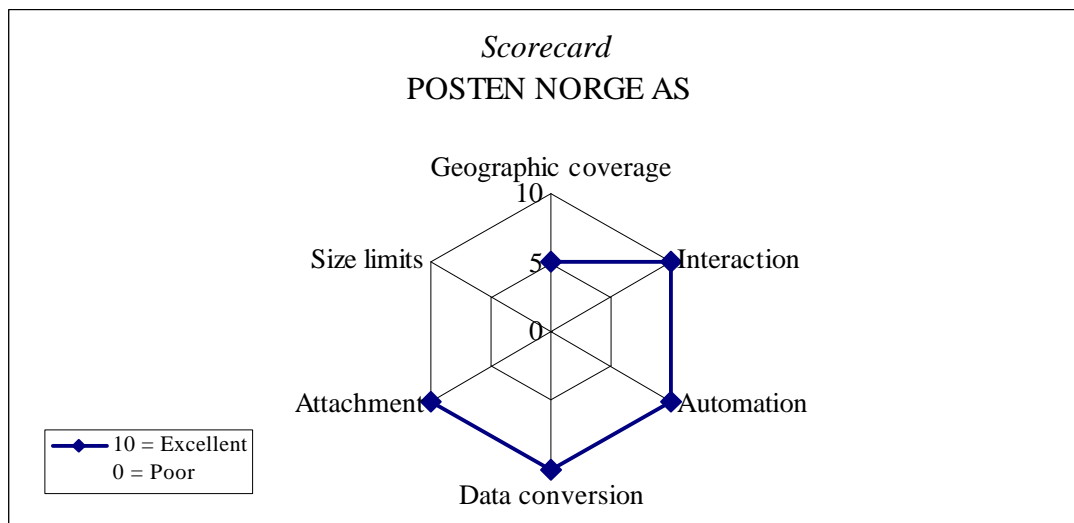


PBS is a company owned by Danish banks. It is an IT-company specialising in electronic payment processing. (PBS, 2002) PBS operates as a service provider to the banking industry in Denmark as well as a sole company providing services to the Danish society. (Gjesten, 2002) The products and services include electronic payments, payment cards, internet commerce, mobile payment, payroll and HRM systems, billing systems, business solutions and so on. (PBS, 2002)

PBS offers payroll and billing services in Denmark only. Interaction with other solutions is not possible. Total automation is possible with their electronic invoicing solution. PBS uses an internal format as the basic file format. At the moment, it is not possible to neither convert data to other formats nor send attachments with the electronic invoicing solution. There are limits on the invoice size. (Gjesten, 2002)

In the future PBS expects the electronic invoicing market to experience growth. With the electronic invoicing solutions PBS hopes to experience growth in the near future, according to Product Manager Kurt Gjesten. (Gjesten, 2002)

Figure 28. Posten Norge AS

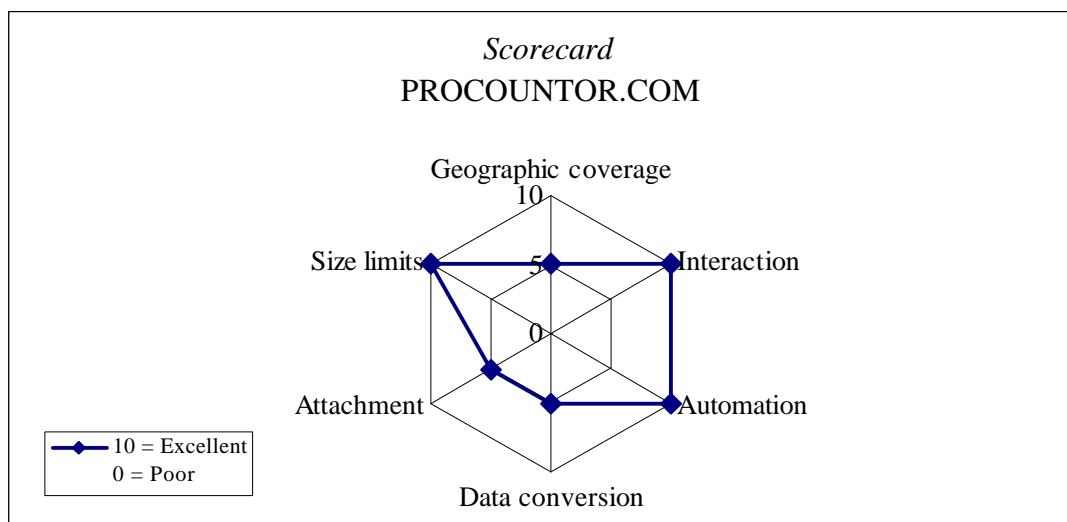


Posten Norge AS is a company offering all regular post services. A daughter company ErgoGroup is developing new products for Posten Norge AS. As a electronic invoicing solution Posten Norge AS offers eFaktura. The services include EDI central, print central, scanning central, archive, payment delivery (eGiro), delivery to Netbank, delivery by secure email (eKurer) and workflow for internal acceptance of incoming invoices. (Robbenstad, 2002)

Currently the Posten's eFaktura is offered in Norway only. The electronic invoicing solution can interact with other electronic invoicing solutions. Total process automation of the receiving, handling, processing, and archiving can be made. EDIFACT and XML are used as the basic file format and the electronic invoicing solution is able to convert data to other formats. Attachments can be sent with the electronic invoices. Information about the limits on the message size was not available. (Robbenstad, 2002)

According to Posten Norge AS, the development of the electronic invoicing market will depend on the solutions available. According to Project Manager Erik Robbenstad, the near future goal for Posten Norge AS in electronic invoicing is to be the leading supplier in the Norwegian B2B market. (Robbenstad, 2002)

Figure 29. ProCountor.Com

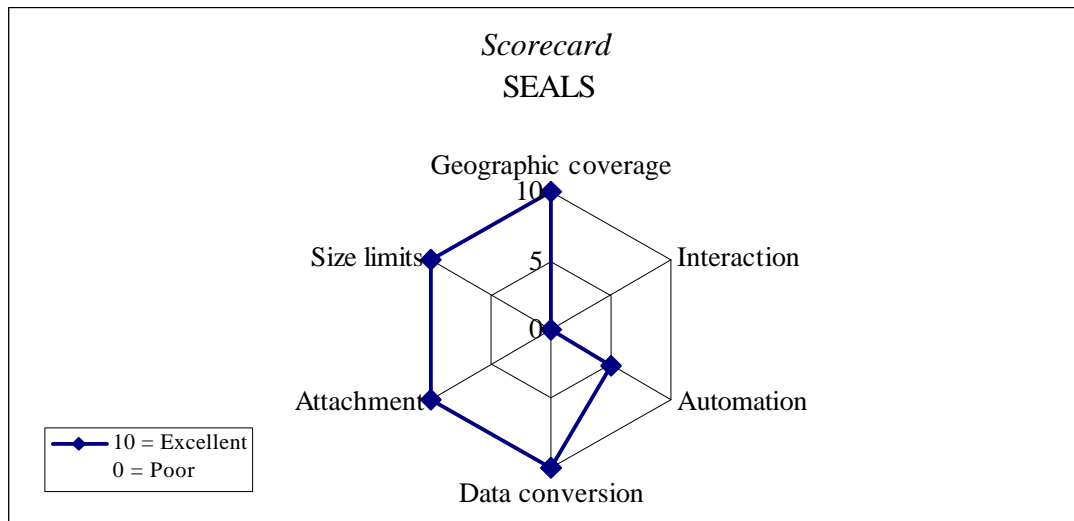


ProCountor.Com can be described as a virtual enterprise and accounting services in the web. Electronic invoicing is a part of the paperless web services. Other services in the web include orders, accounting, salaries, purchases, purchase orders and agreements. (Vahtera, 2002b)

ProCountor.Com offers its services in Finland. ProCountor.Com's solutions do accept invoices from other electronic invoicing systems. Total automation of the process of receiving, handling, processing, and archiving is possible. Einvoiceconsortium v 1.3 is used as the basic file format. The strategic partner Elma can convert the data to other formats for ProCountor.Com. Attachments with invoices can be received, but ProCountor.Com does not send them. There are no size limits on the message size. (Vahtera, 2002b)

Virtual Evangelist Pauli Vahtera from ProCountor.Com still has a target that 50 percent of the invoices being electronic in Finland in the year 2004. According to Vahtera, it is still possible, but hard work is needed for that dream to become true. (Vahtera, 2002b)

Figure 30. Seals

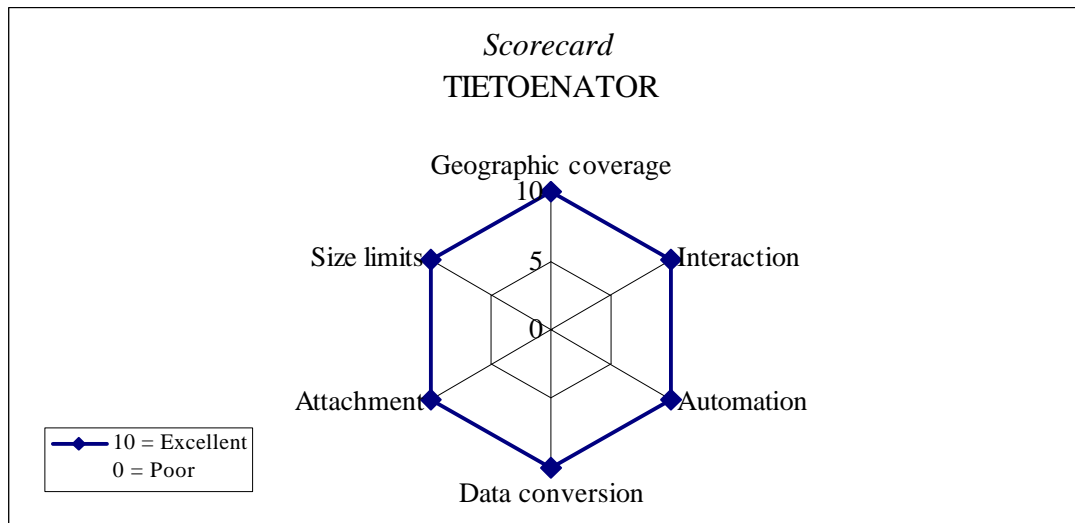


Seals provides electronic document exchange and business process management. In a network called Sealsnet one can exchange invoices, orders and other commercial documents with customers, suppliers, and other business partners. This can be done without system integration and interface management. Seals has close co-operation with its majority shareholder TietoEnator. (Laube, 2002)

Seals has existing customers in Austria, Finland, Germany, Ireland, Switzerland and UK and the electronic invoicing solution can be accessed worldwide. Seals's solution does not accept invoices from other electronic invoicing systems. Seals uses an internal Meta format as the basic file format. One of Seals's core competencies is to convert data in any structured format. Attachments can be sent with invoices and there are no limits on the message size. (Laube, 2002)

Seals believes the electronic invoicing market will experience strong growth if the tax regulations are clearly defined. In the near future with the electronic invoicing solutions Seals hopes to add additional functionality concerning archiving and workflow. According to Managing Director Marcus Laube, the goal is to develop a truly European solution that becomes a market leader. (Laube, 2002)

Figure 31. TietoEnator



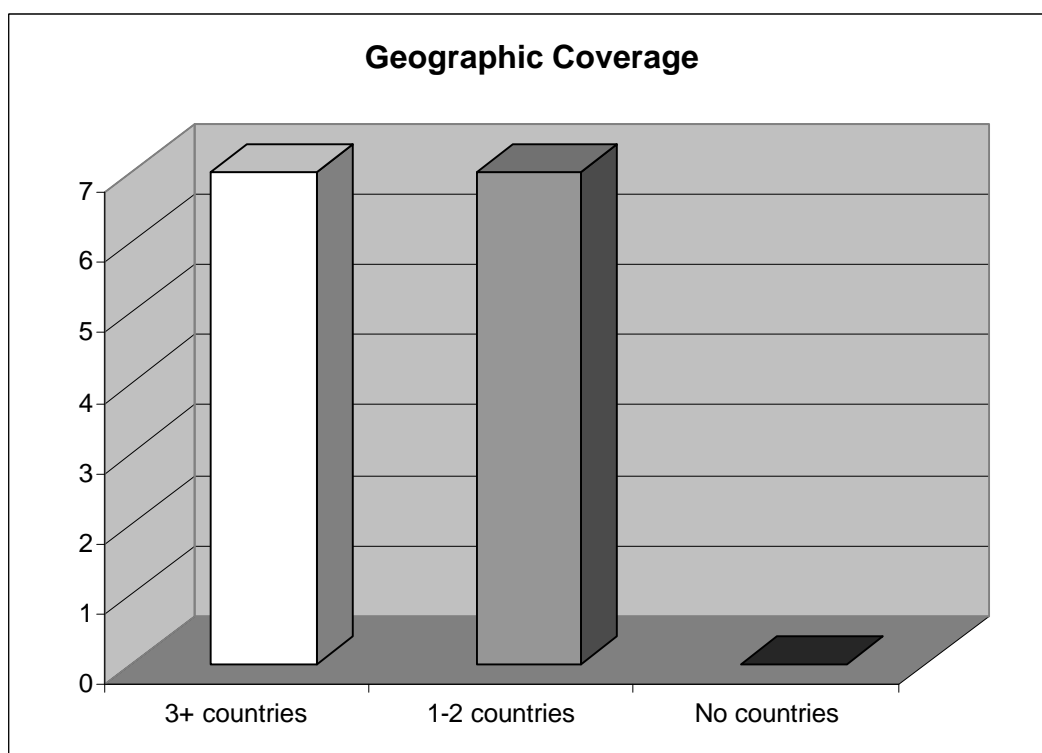
TietoEnator is a supplier of high value-added IT services and the group has locations in 21 countries. TietoEnator focuses on consulting, building and hosting its customers' core business systems in the digital economy. (TietoEnator, 2002) As the electronic invoicing solution TietoEnator offers the whole invoice management chain: billing, interchanging, accepting, posting, workflow functions, bookkeeping, payment and archiving. (Tolvanen, 2002)

TietoEnator offers its electronic invoicing solutions in the main European countries. TietoEnator's electronic invoicing solutions interact with other electronic invoicing solutions and a total automation is possible. The invoice data can be converted to different formats. It is possible to send attachments with the invoices and there is no limit on the message size. According to Development Manager Marita Tolvanen, the goal in the near future is to be a leading service vendor in the market of invoicing managing in those countries that TietoEnator has focused on. (Tolvanen, 2002)

Now that the fourteen companies providing electronic invoicing solutions have been compared, I will discuss the differences of the scorecard results of the electronic invoicing solutions. I will summarize the findings by using column charts on each of the six features: geographic coverage, interaction with other systems, automation, data conversion, attachment, and size limits.

Figure 32 summarizes the results gained on geographic coverage from the fourteen survey participants.

Figure 32. Geographic Coverage

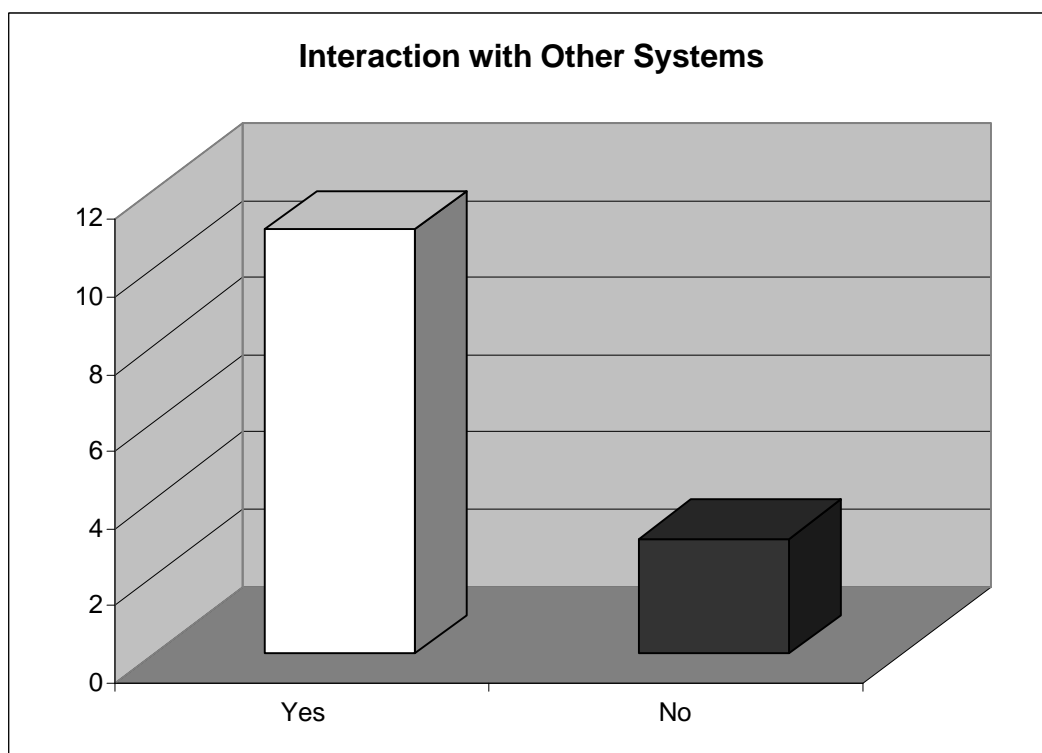


Half of the companies that participated on the survey offer their invoicing solutions in three or more different countries. The other half of the companies have their electronic invoicing solutions offered in one or two countries.

It seems that companies are trying actively to get larger market shares both domestically and internationally. In general, the survey participants were not willing to share information on their current market shares or information on their main competitors. It was obvious that the players of the electronic invoicing market are really interested to see what others are offering and in which markets, but they were not willing to share

much of their own information on market shares or on main competitors. Once electronic invoicing experiences more growth, the market might get saturated. There are so many companies offering various electronic invoicing solutions that not all are going to have enough room to operate. One main feature in the survival battle will be the ability for the electronic invoicing solutions to interact with other solutions. Figure 33 illustrates how the electronic invoicing solutions of the survey participants are able to interact with other solutions.

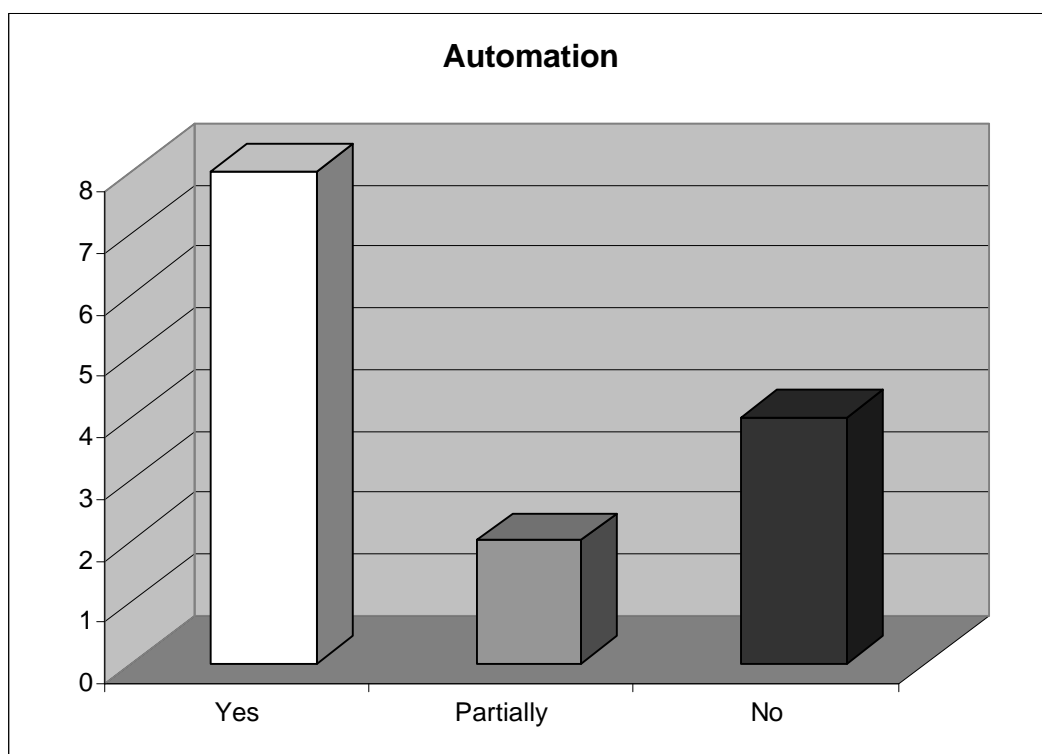
Figure 33. Interaction with Others Systems



Eleven out of the fourteen electronic invoicing providers are able to interact with other solutions, meaning that their electronic invoicing solutions accept invoices from other electronic invoicing solutions. Three of the survey participants did not accept electronic invoices from other systems. These three participants have in common is that they are outside of the Nordic eInvoice Consortium. One explanation for them not having this feature in their electronic invoicing solution could be that they have significant market shares in their home countries and they have not had to figure out how to interact with other solutions. I believe the interaction feature will be important in the future when businesses will want to send electronic invoices across borders.

Automation of the process of receiving, handling, processing, and archiving is a feature that saves time and money. With automation there are fewer typing errors, since the data does not have to be manually fed into the system several times. Figure 34 illustrates the survey participants' possibility to automate of the electronic invoice process.

Figure 34. Automation

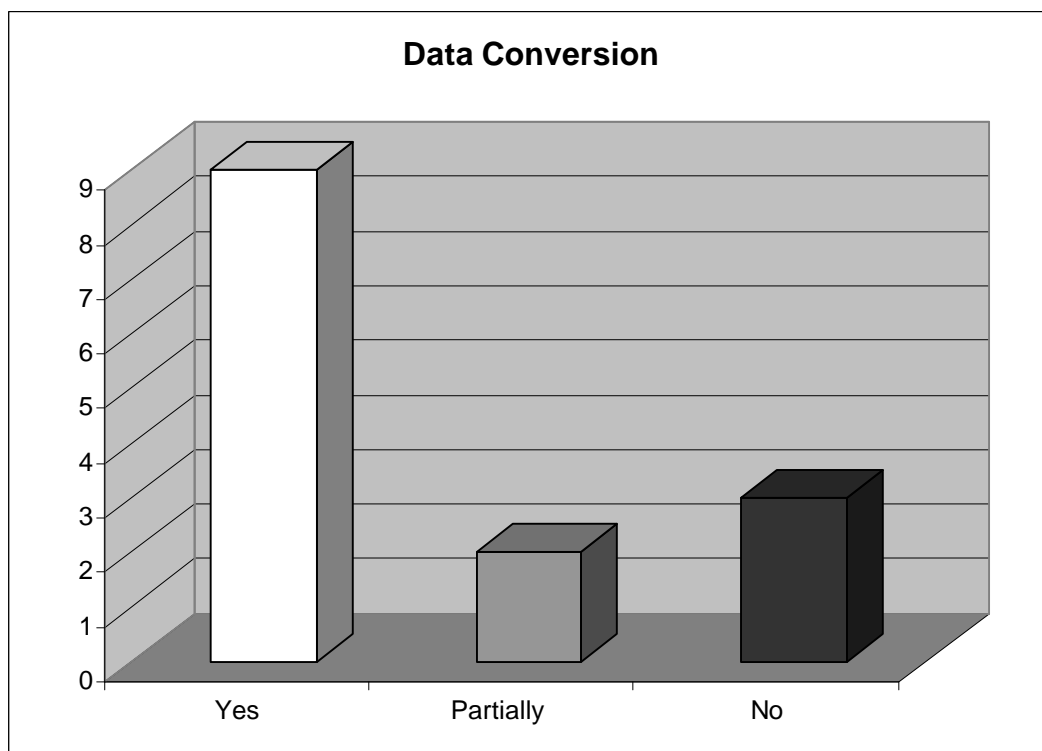


Eight out of the fourteen electronic invoicing providers can totally automate the process of receiving, handling, processing and archiving of the invoices. Two respondents stated that they can partially automate the process and four respondents stated that automation was not possible.

The automation feature in the electronic invoicing solutions is important to gain maximum time and cost savings.

Data conversion feature indicates the independence of transportation of the electronic invoicing solution. Figure 35 illustrates the data conversion possibilities based on the survey results. If the solution is able to convert data to other formats, it will be able to serve more customers and most likely is able to interact better with other electronic invoicing solutions.

Figure 35. Data Conversion

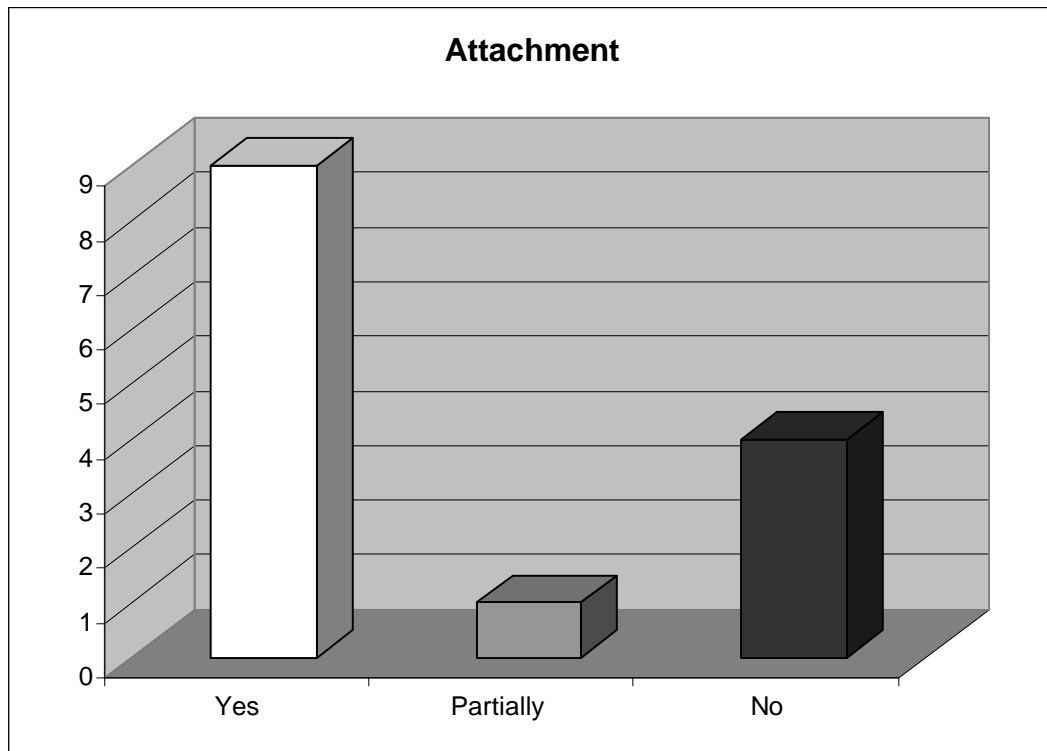


Nine survey participants answered that their solution is able to convert data to other formats. Two companies are able to partially convert data. This means that they can convert data to some but not all formats. Three companies are not able to convert the invoice data to other formats.

If the company is able to convert invoice data, the interaction is easier with other solutions since there are no restrictions on the invoice format received. Also the customer values this feature if they can send and receive the invoices in various formats.

The attachment feature refers to the ability for the solution to be able to send attachments with the electronic invoices. Figure 36 shows how many of the survey participants are able to have attachments with their electronic invoices.

Figure 36. Attachment

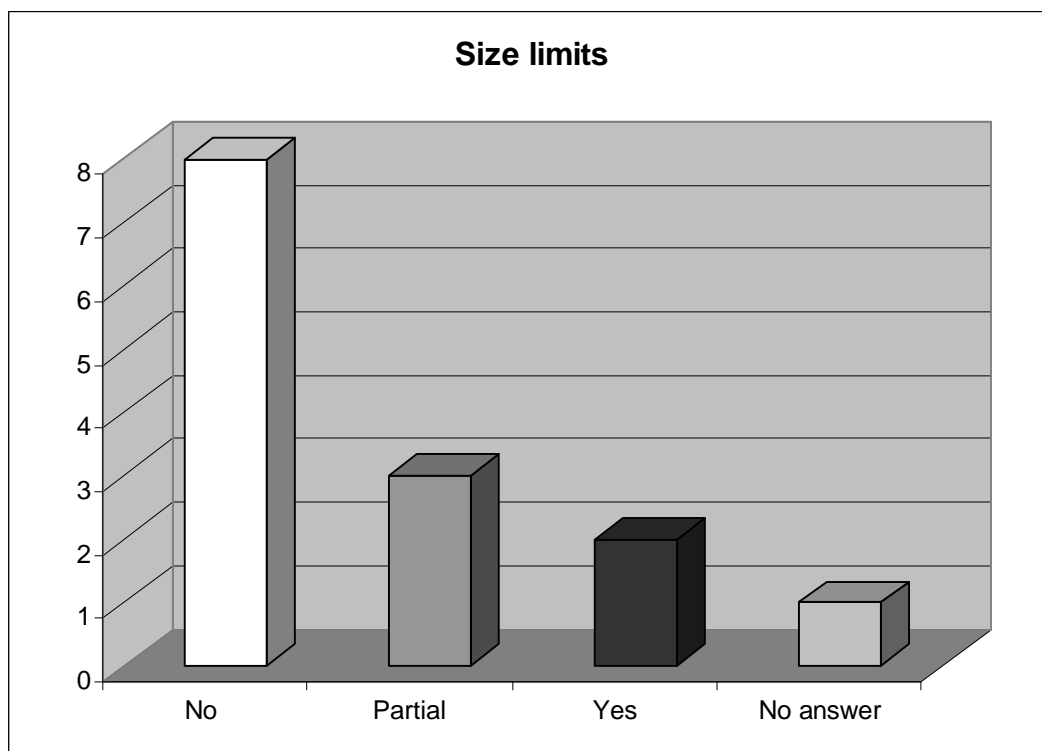


Nine out of the fourteen survey respondents informed that the solution could send attachments with the invoices. One company cannot send invoices with attachments but attachments can be made on received invoices. Four respondents said that attachments could not be sent in their electronic invoicing solution.

Invoices often have some material that would be necessary to attach with the invoice. This is a feature, that offers the customer more choices as well as shows the flexibility of the electronic invoicing solution.

A size limit on an invoice size is a negative feature for an electronic invoicing solution. Size limit meaning that if the message size goes up, the price to send an electronic invoice is higher. Figure 37 illustrates the restrictions on the invoice size based on the survey results.

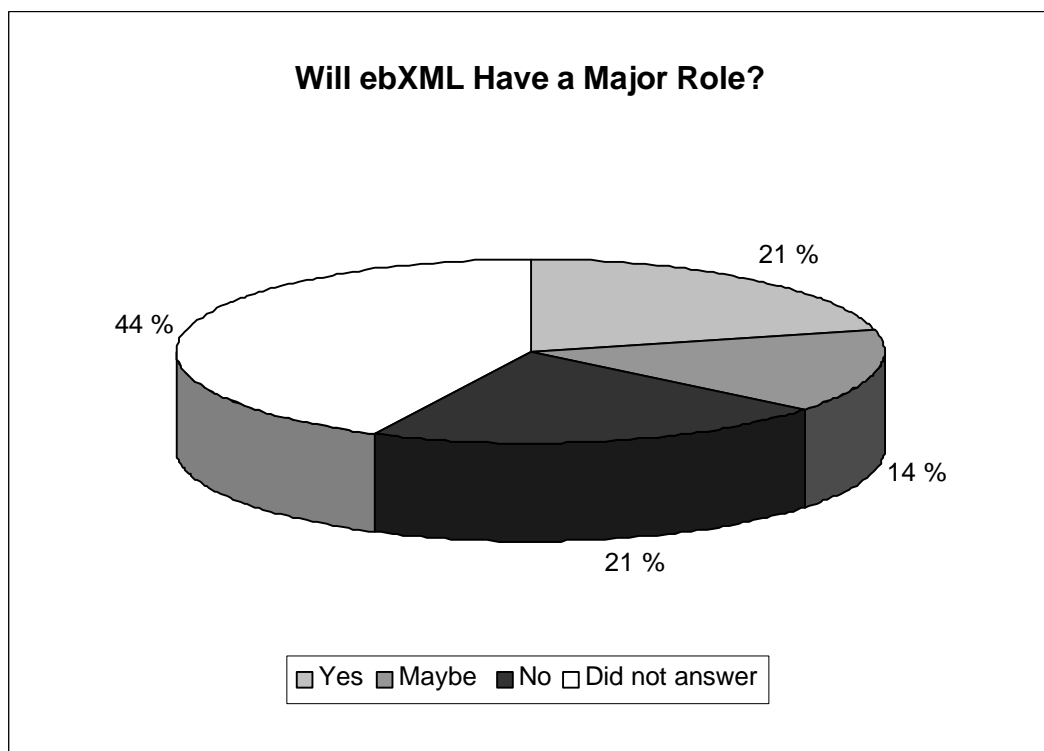
Figure 37. Size Limits



Eight out of fourteen survey respondents stated that their electronic invoicing solution does not have any size limits on the message. Three companies stated that there are partial size limits, for example, that there is a size limit but no price differentiation. Two respondents stated that their solution has size limit and one respondent did not answer to this question. Invoices do vary a lot in their message size. Not having size limits on electronic invoices is a definite plus for the companies.

Besides these features discussed when comparing the electronic invoicing solutions with the scorecards, the survey participants were asked other issues. One question asked in the survey was whether ebXML will have a major role in the future in allowing electronic invoicing solutions to accept invoices from other solutions. Figure 38 demonstrates how the opinions of the survey participants were divided.

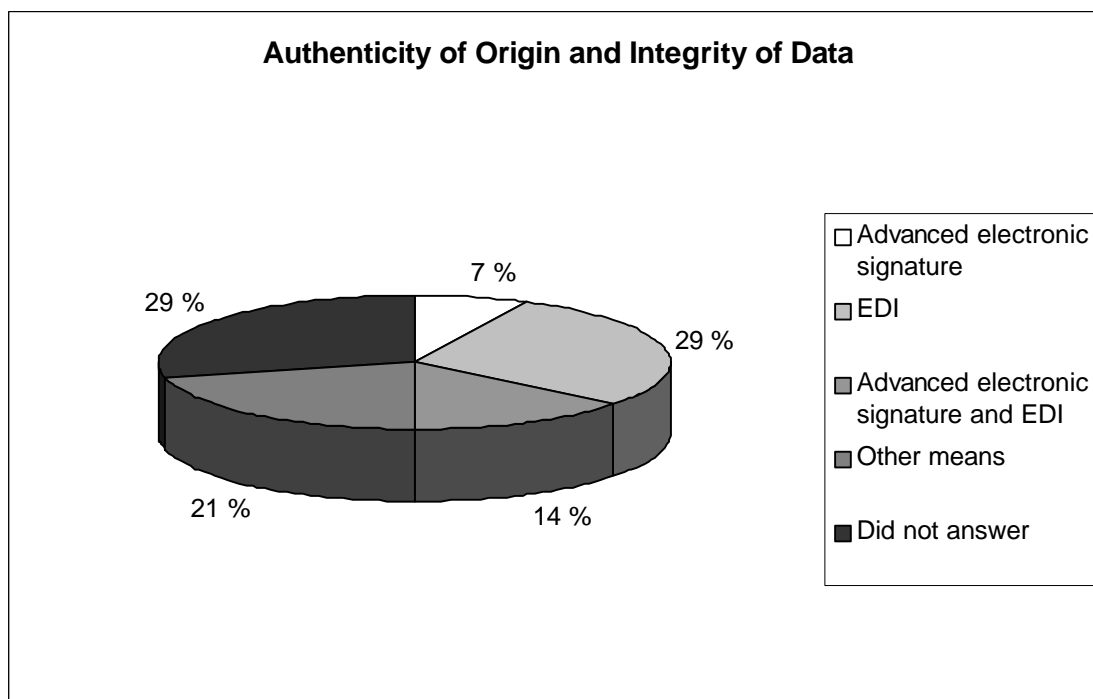
Figure 38. Will ebXML Have a Major Role?



As the results of the survey show, the future role of ebXML is still uncertain. Three respondents believed that ebXML will have a major role in the interaction between the electronic invoicing solutions. Three respondents believed the vice versa. Two survey participants stated that ebXML might have a major role in the future with electronic invoicing, and the rest of the survey participants did not answer the question.

The advanced electronic signature was a long battle in the Directive decision-making process as discussed in chapter 3. Finally the mandatory advanced electronic signature was removed from the final Invoicing Directive. For guaranteeing the authenticity of origin and the integrity of data, the Invoicing Directive allows the Member States to choose one of the three options that are the following: an advanced electronic signature, EDI, or by any other means accepted by the Member State. (European Union, 2002a) The survey participants were asked which of the three options does their electronic invoicing solution use to guarantee the authenticity of origin and the integrity of the data. Figure 39 shows what the survey participants replied.

Figure 39. Authenticity of Origin and Integrity of Data

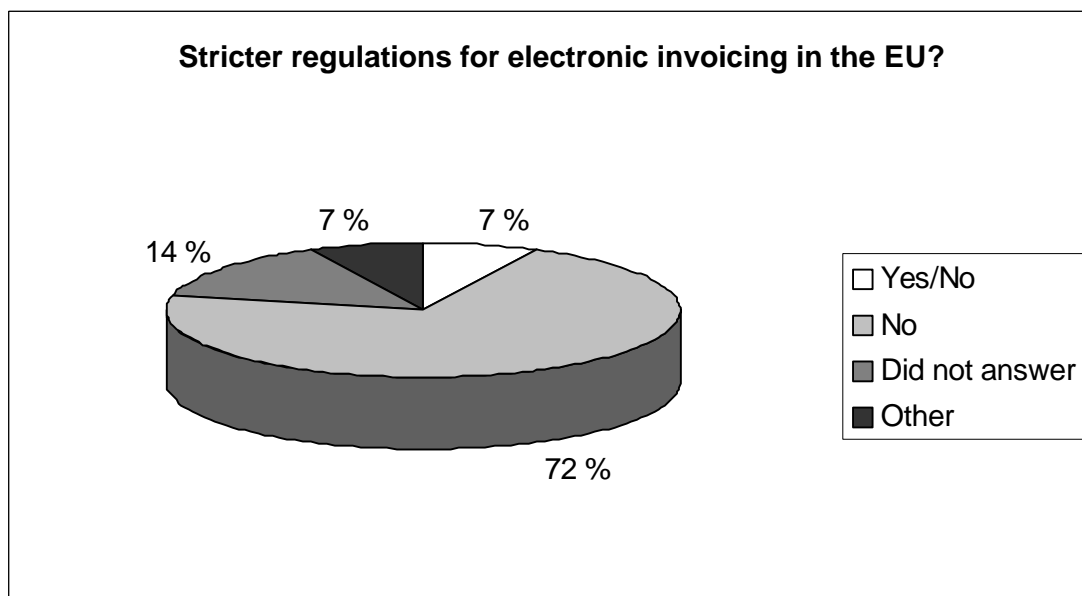


As the Invoicing Directive states these two characteristics, authenticity of origin and integrity of data, must be guaranteed by the following means: an advanced electronic signature, EDI or any other means subject to the approval by the Member States concerned.

Only seven percent of the respondents used only advanced electronic signature in electronic invoicing. 29 percent used EDI to guarantee the authenticity of origin and the integrity of the data. 14 percent used both advanced electronic signature and EDI. 21 percent of the survey participants stated using other means. Almost one third of the survey participants (29%) did not answer this question.

The survey participants were also asked if there should be stricter regulations on electronic invoicing in the EU. Figure 40 summarizes the responses.

Figure 40. EU Regulations on Electronic Invoicing



Out of the fourteen survey respondents, the majority (72%) stated that there should not be stricter regulations. One respondent answered that there should be stricter requirements on the invoice information, but looser requirements on security. One respondent replied that “any regulation should be based on common sense and understanding of the real issue and that these matters should not only be technology driven.” Two survey participants (14%) did not answer this question.

6.4 Possible Reasons Not Having Electronic Invoicing

Electronic invoicing is at very different maturity stages in the EU Member States. Reasons for this could simply be the lack of technology and infrastructure as well as differences in the attitudes.

E-Commerce in Europe publication reports on the results of a pilot study carried out during the first half of 2001 by the European Commission. I will use this study to demonstrate the possible reasons not having electronic invoicing in some of the Member States. This section is based on this particular study, and for the whole text the same source (European Commission, 2001) is used unless stated otherwise.

The pilot survey concluded thirteen of the EU Member States (excluding Belgium and France) and Norway. In this survey 100,000 enterprises were contacted and the response rate was close to 50%. Next, based on this survey, I will describe the computer and network use in each EU Member State and Norway. The basic indicators from the study that I will use are the following:

- Enterprises equipped with computers
- Enterprises with intranets
- Enterprises using EDI
- Enterprises with access to the web

Also the main barriers to using Internet are described with the following seven reasons:

- Lack of security (viruses, hackers)
- Data communications too slow or unstable
- Lacking qualification of personnel/specific know how
- Internet access charges were too high
- Lost working time/irrelevant surfing
- Set-up costs were too high
- Lack of perceived benefits for the company

At the time of the pilot survey Denmark had nearly all indicators above average. 95% of the enterprises in Denmark were equipped with computers. Also 87% of Danish enterprises had access to the web, which is the highest percentage after Finland and Sweden.

The German pilot survey was different from the others because the activity coverage was limited to only distribution section, and hotels and restaurants section. In these two sections 96% of the German enterprises were equipped with computers. The German enterprises recorded high percentages of intranets and EDI, but relatively low concentration of web accesses.

Greece recorded the least computer and network use in the EU. Of the surveyed enterprises only 85% had a computer, 22% had intranets, 5% used EDI and 51% had access to the web. The main barriers to Internet use for the Greek enterprises were lack of security, poor infrastructure quality and a lack of qualified personnel.

91% of the Spanish enterprises had a computer and 67% had access to the web. Poor infrastructure quality, lack of security and high Internet access charges were the main barriers to having an Internet connection.

Ireland differs from the other surveyed countries in that only a very small number of enterprises were surveyed. Of this small sample, all enterprises used computers, workstations or terminals and 85% had a web access.

Computers were found only in 86% of the Italian enterprises, which is the second lowest rate after Greece. Also similar to Greece, Italy had low usage levels of intranets and EDI. 66% of the Italian enterprises were connected to the web.

91% of the enterprises in Luxembourg reported having computers. Intranet usage and web access were ranked amongst the lowest in the surveyed countries.

For the Netherlands data from the 2001 was not available, therefore data from the beginning of the year 2000 was used. In the Netherlands only 88% of the enterprises were equipped with computers and 65% had a connection to the web. The Dutch enterprises recorded the highest rate in the use of intranets as well as the use of EDI.

The survey indicates that Austria computer and network usage represents the average amongst the surveyed countries. 92% of the enterprises were equipped with computers, 27% used intranet, 15% used EDI, and 76% had access to the web.

Portugal had 89% of the enterprises equipped with computers. The usage of network technologies was above average: usage of EDI was 20% and access to web was 72%.

Of all the surveyed countries Finland had the most enterprises equipped with computers (98%) and the most web accesses (91%). In contrast, intranet and EDI usage was below average. Security concerns and the lack of qualified personnel were seen as the main barriers to having an Internet connection.

Also Sweden had a high percentage (97%) of enterprises equipped with computers as well as connections to the web (90%). EDI usage was below average.

The United Kingdom had 92% of the enterprises equipped with computers. The network technologies were below average with only 63% having an access to the web.

Norway has high percentage of enterprises equipped with computers, following the path of the other Nordic countries (Finland, Sweden, Denmark). Norway has a high percentage of web accesses compared with the EU countries participating in the pilot survey, nevertheless the lowest amongst the Nordic countries.

Belgium and France did not participate in this 2001 pilot survey. However, the results of recent Eurobarometer were provided in the publication. In Belgium 93% of the enterprises had a web access and this rate was 73% for France. (European Commission, 2001)

Table 9 summarizes the computer and network usage in the EU Member States and Norway.

Table 9. Computer and Network Usage in the Member States and Norway (2000-2001)

Country	Enterprises equipped with computers (%)	Enterprises with intranets (%)	Enterprises using EDI (%)	Enterprises with web access (%)
Denmark	95	29	19	87
Germany	96	44	25	67
Greece	85	22	5	51
Spain	91	31	4	67
Ireland	100	56	45	85
Italy	86	21	5	66
Luxembourg	91	22	17	55
The Netherlands	88	73	57	65
Austria	92	27	15	76
Portugal	89	28	20	72
Finland	98	26	16	91
Sweden	97	41	15	90
The United Kingdom	92	27	15	63
Norway	93	21	18	73
Belgium				(93)
France				(73)

Source: European Commission, 2001

Those countries that have high percentages on both categories; enterprises equipped with computers and enterprises with web access, also are the most advanced in developing the electronic invoicing systems. The countries that fit to these categories are Denmark, Ireland, Finland and Sweden. Ireland's high percentages in these categories can partly be explained by a very small sample group. Also another explanation is that of this small survey sample in Ireland there was an over-representation of large enterprises (more than 100 persons employed).

The results of the pilot survey showed that enterprises were mainly concerned about the security issues of a connection to the Internet such as viruses and hackers. Another main barrier to Internet access for more than half of the enterprises surveyed was technical

issues (slow or unstable data communication). (European Commission, 2001) Table 10 summarizes the barriers to using the Internet.

Table 10. Barriers to Using the Internet, First Half 2001

(% of enterprises reporting barrier as important) (1)

	(%)
Lack of security (viruses, hackers)	66
Data communications too slow or unstable	55
Lacking qualification of personnel/specific know how (2)	47
Internet access charges were too high	44
Lost working time/irrelevant surfing	41
Set-up costs were too high (3)	41
Lack of perceived benefits for the company (2)	40

(1) All participating Member States, excluding the Netherlands

(2) Excluding Sweden

(3) Excluding Finland

Source: European Commission, 2001

For electronic invoicing to reach the whole EU will take many years. As shown previously, some of the Member States are lacking both the technology and infrastructure for electronic invoicing. A country has to first get the basic computer equipment and web accesses to nearly all of their enterprises. Then slowly after the basic infrastructure is ready web banking and electronic invoicing can step in.

The survey showed that the Nordic countries have computers and accesses to the web in almost all enterprises. This partly explains why Finland, Sweden, Denmark and Norway are so much ahead of the other countries in implementing electronic invoicing solutions. For many years the Nordic countries have had a range of electronic financial services and web banking for both businesses and consumers. After this kind of successful infrastructure is in use, introducing electronic invoicing for companies is relatively easier to do than it would be in countries where businesses are missing the very basic element, computer equipment or web accesses.

6.5 Summary and Conclusion of this Chapter

Chapter 6 showed the empirical results that were found through the research. The third and fourth parts of the research objective were reached by identifying companies that provide electronic invoicing solutions in the EU and Norway, and comparing the electronic invoicing solutions. This chapter described the findings on electronic invoicing solutions as well as compared the solutions based on the survey responses. The chapter also discussed the possible reasons for electronic invoicing not existing in some of the EU Member States.

7. Conclusion

Chapter 7 will conclude the thesis with a thought on the future of electronic invoicing. Also the chapter discusses the reliability and validity of the research and gives recommendations for future research are given.

7.1 Structure and Objective of this Chapter

This chapter is structured in the following matter: section 7.2 has views and estimates on the future of electronic invoicing in the EU and Norway. Section 7.3 discusses the reliability and validity of the research. The recommendations for further research are given in section 7.4. The objective of this chapter is to conclude the thesis by analysing the theory part and the empirical part. The last part of the research objective, which is to discuss the future of electronic invoicing as well as the possible effects of the Invoicing Directive, is reached.

7.2 Future of Electronic Invoicing in the EU and Norway

The electronic invoicing market is growing rapidly. Large companies want to automate their processes, including the process of receiving, handling, processing, and archiving the electronic invoices. Small companies want to outsource the accounting services. Governmental agencies are starting to wake up to see the new electronic invoicing possibilities. What all of these various sizes of companies and governmental agencies have in common is the interest to save time and money. To put it the other way, with the use of electronic invoicing solutions the labour hours can be used more efficiently in tasks that promote the business activities. At the moment for a company to change to electronic invoicing, it gives the image of a modern company using brand new technologies to serve the customers better. Most likely in the future an electronic invoice will become a common tool and it will be more of a requirement than an advantage as Marko Kolkka stated in chapter 6.

Electronic invoicing does simplify the whole process of receiving, handling, processing, and archiving of the invoices as discussed in chapter 4. A company saves time and money with electronic invoicing solutions, due to the automation of the invoice process. One advantage of electronic invoicing amongst the many others is that the invoice data does not need to be repetitively entered manually; therefore there are fewer errors in the process.

Suvi Anttila, the Finnish Legislative Counsellor, sees that the harmonised regulation of electronic invoicing is a step forward in contributing to the development of e-invoicing and e-commerce. The harmonised rules contribute towards the reduction of administrative costs of businesses and improvement of the functioning of the Internal Market. On the whole, Anttila believes that countries whose businesses carry out to larger degree cross-border-transactions will benefit the most. (Anttila, 2002)

With the numerous possibilities that electronic invoicing solutions bring along; there are challenges that have to be faced. It seems that there are many so called standards developed by various organisations and companies. Examples of different standards that have been developed are the Nordic eInvoice Consortium's "eInvoice v.1.3", the Finnish Bankers' Association's "FInvoice", TietoEnator's "TEappsXML v.2.3" and the Danish "e-faktura". Of course, all of these standards try to build a common framework, but the real question is how will all these electronic invoicing solutions be able to interact across the borders.

Electronic invoicing is expected to experience rapid growth and Table 11 illustrates IDC's forecasts on electronic invoices amounting of the total volume of invoices.

Table 11. Electronic Invoices of the Total Invoices in the Nordic Countries

	2001	2002	2003	2004	2005
Finland					
B2B	2 %	10 %	20	35 %	50 %
B2C	1 %	7 %	10 %	17 %	25 %
Sweden					
B2B	0.5%	2 %	8 %	15 %	30 %
B2C	2 %	8 %	11 %	18 %	25 %
Norway					
B2B	0.3%	1 %	2 %	10 %	20 %
B2C	1 %	5 %	9 %	14 %	20 %
Denmark					
B2B	1 %	2 %	6 %	13 %	25 %
B2C	0.3%	1 %	2 %	8 %	15 %

Source: Peltonen, IDC, 2002

It has been estimated that in Finland there are 400 million invoices sent per year. The amount of sales invoices is estimated to be 30 billion per year in the EU. By the end of this decade at least 10 billion of them are estimated to be in electronic format. (eInvoice Consortium, 2001)

Invoices have been a traditional part of postal services. Electronic invoicing will affect the posts' revenues because the quantity of delivered paper-based invoices will decrease considerably. Posts are aware of this trend, and have developed electronic invoice services to stay as a part of the delivery of invoices. (Peltonen, IDC, 2002)

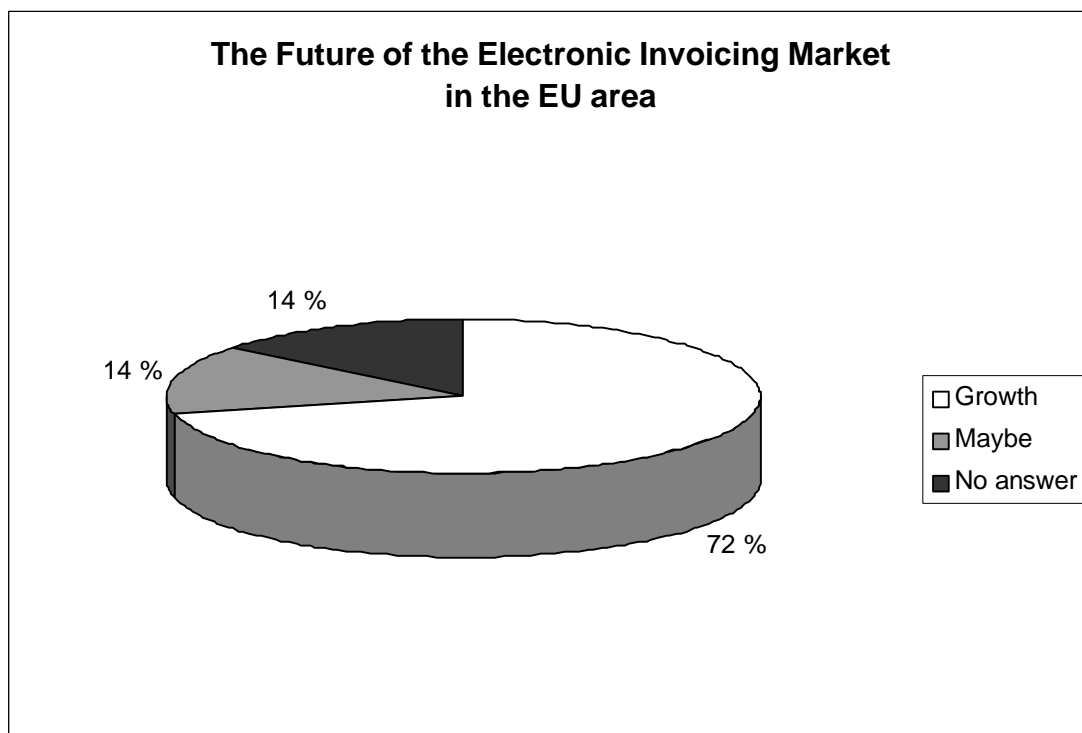
Heli Salmi from Elma Electronic Trading sees electronic invoicing being revolutionising. She describes that explaining an electronic invoice to an ordinary person can be very hard. For a so-called ordinary person it can be difficult to understand that an invoice comes through a line, after which you can view the invoice from the web. Then by explaining that there is an eInvoice Consortium and various suppliers that send invoices between each other. A person who is trying to understand electronic invoicing experiences feelings from astonishment to horror and confusion. Also there are the accounting and economics people that have a history of being conservative.

Traditionally for these people paper copies are very important, and trying to persuade them into a paperless environment is definitely a challenging task, according to Salmi. In other words, the beginning of electronic invoicing has been slow in a sense that it is so new and revolutionising thing. (Salmi, 2002a)

Heli Salmi sees it as a positive sign that there are electronic invoicing providers beyond the Nordic countries. In Sweden there has not been much work yet done with electronic invoicing. (Salmi, 2002a) This might explain why I did not receive any responses from Sweden to query requesting to participate in this study. Salmi agrees with the IDC's figures, but says that they could be shifted forward with a few years. For the rest of the Europe Salmi is not familiar with their accounting services, but knows that some countries are still required to sign the paper invoices. For these countries, the success of electronic invoicing does not look too bright in the near future. (Salmi, 2002a)

Figure 41 summarizes the opinions of the survey participants on the future of electronic invoicing market in the EU area.

Figure 41. The Future of the Electronic Invoicing Market in the EU Area



As the Figure 41 illustrates, 14 percent of the survey participants stated that there the market might move forward. One survey participant replied that the growth depends on

the solutions available. Another participant stated that the electronic invoicing market might go forward in the Nordic countries, Germany and Benelux countries, but for the rest of the Europe he remains doubtful. 14 percent of the survey participants did not answer this question. The clear majority (72 percent) of the survey participants believed that electronic invoicing market would experience growth in the EU area in the next three years. Some of these answers for this question stated that the electronic invoicing market will experience “rapid growth”, “growth”, “strong growth”, “booming”, “an electronic invoice will become a common product”, “the growth will go from the North to the Southern Europe” and so on. Also some of the survey participants believed that there would be strong growth in the electronic invoicing market if the tax regulations will be clear. Similarly, one respondent stated that the challenge will be how to set proper rules and methods between companies.

Suvi Anttila, Finland’s Legislative Counsellor, believes the electronic invoicing market to continue to develop quite rapidly, and the standards laid down in the Invoicing Directive will affect this development. (Anttila, 2002)

The new Invoicing Directive affects EU in a sense that electronic invoicing has to be allowed by 2004 in all Member States and the preauthorisation can be required. The Directive does give the basic minimum requirements for the content of an invoice. But other than that it does leave the Member States with variety of options. In my view, the Invoicing Directive is not putting any restrictions on electronic invoicing, but neither is not furthering the development of electronic invoicing as a whole. Of course, that is not what a Directive is supposed to do. Directives can be described as instructions to the Member States to introduce legislation. Directives indicate the goals to be achieved without laying down the manner of achieving them. (Schulze & Baumgartner, 2001) Therefore, for the promotion of electronic invoicing in the EU there should be a one, clear, independent forum that is funded by the European Union.

The European Commission has asked CEN/ISSS to assess standards implications arising from the Invoicing Directive. CEN/ISSS provides market players with range of standardization-oriented services for the Information Society in Europe. CEN/ISSS has a short-term focus group to overview what standards are relevant to electronic invoicing, to examine whether these are sufficient to enable the use of electronic invoices, and to make specific recommendations concerning any amendments on the

Directives. (CEN/ISSS, 2002) This is a valuable focus group for the standardization issues, and as it stated the group is for short-term. The EU should develop a separate forum for the long-term development of electronic invoicing.

Electronic invoicing will experience rapid growth in the future, no doubt about it. The challenges that the electronic invoicing market will face must be dealt somehow. One solution could be that the European Union would set up this independent forum for electronic invoicing. This forum would consist of a group of technical and economical experts whose purpose would be to enhance the development of electronic invoicing in the EU as a whole. This group would act as a central collaboration unit for the different parties in the electronic invoicing field.

The forum should try to help all these various electronic invoicing providers to be able to interact with each other across the borders. Also the forum could offer help in adding flexibility to the solutions. Flexibility meaning, for example; the features discussed earlier in the thesis such as interaction with others, automation of the invoicing process, ability to convert data to other formats, attachment possibility, and not having invoice size limits. Naturally the list of features would go further on. The forum should research the possibilities of using ebXML as the main standard method for exchanging invoices, conducting trading relationships, communicating the invoice data in common terms and defining and registering the business processes. Before ebXML really gets started, the forum should develop a registry that has all the companies in the EU use electronic invoicing solutions.

In December 2002, TIEKE, a Finnish Information Society Development Centre, published a national registry of organisations that use electronic invoicing solutions.

The registry is available on the web for everyone and it indicates the following:

- the basic contact information of the organisation,
- the ability to receive or send electronic invoices,
- the invoice presentation format,
- the electronic invoicing address (stream of numbers), and
- the electronic invoicing operator it uses and operator's contact information.

(TIEKE, 2003)

This registry is a great idea to get the companies to send and receive invoices between each other. Contracts between the sender and receiver should be as little as possible, because it makes electronic invoicing complicated and slows down the growth.

According to Pauli Vahtera, there is no need for separate contracts if the companies are listed in a common registry. (Vahtera, 2002a) The forum of the EU should further develop TIEKE's registry and expand the coverage to the whole EU.

For the Southern Member States the forum would help to build up an infrastructure for electronic invoicing. The forum would prevent those Member States that do not currently have a proper infrastructure in place from falling further behind technologically.

As it was mentioned in the beginning of the thesis, electronic invoicing is one of the building blocks of e-Europe and the invoice is probably the most important document in commercial trade (Sanderson, 2000). The spread of electronic invoicing solutions will happen, but how fast is the real question. Naturally, an electronic invoice will become a common product faster in those countries that already have a proper infrastructure, web accesses, right equipment and open attitudes. For others it will take longer. Despite the challenges there will be, electronic invoicing is making its way through.

7.3 Reliability and Validity of the Research

I had basically zero knowledge when I started on this thesis. The data sources for this thesis were press releases, articles, company homepages and presentations, brochures, demos and other publicly available material. Also interviews with the electronic invoicing experts as well as the EU legislative experts were conducted to gain a greater understanding of the whole.

Although going through all these data sources I had limited knowledge on the topic. This limited knowledge has most likely resulted in data limitations. In other words, in this thesis there can be both missing information and limited understanding of the electronic invoicing solutions as well as the Invoicing Directive. Missing information and limited understanding means that all companies that offer electronic invoicing solutions are not

included in the study, and there might be some minor misunderstandings with interpreting the EU Directives.

It would have been very valuable to do this research in a company that provides electronic invoicing solutions or acts as a delivery channel. This way I would have received the help and guidance from the true experts. If I had devoted even more time to the thesis, I would have gained deeper understanding on the electronic invoicing solutions. However, the research objective of this thesis was reached, and by reaching that goal I can be happy to have been able to contribute new general scientific knowledge to the academic world.

7.4 Recommendations for Further Research

The theory part of the thesis was important to give an overview on electronic invoicing and describe the legislation regarding electronic invoicing in the EU. The empirical part identified companies that provide electronic invoicing solutions in the EU and Norway. The empirical part included the comparison of the electronic invoicing solutions. The thesis was concluded with discussion on the future of electronic invoicing as well as the possible effects of the Invoicing Directive.

This study has contributed to the general scientific knowledge with new information on electronic invoicing solutions in the EU and Norway and the effects of the EU Directives. As mentioned in the beginning of the thesis, the electronic invoicing field is still at its very early stages. As electronic invoicing has not been thoroughly studied, it is not surprising that there are still many areas to cover. Further researches should investigate the electronic invoicing solutions in other European countries and in the rest of the world, especially in the United States. Maybe it could be a good idea to go into deeper technicalities of the solutions when comparing them.

A great challenge will be how can all these various electronic invoicing solutions interact with each other across borders. Would ebXML be the answer to this? Time will tell. And for now, I leave that question for the future researchers to think about.

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APPENDIX: The Survey

Swedish School of Economics and Business Administration
M.Sc. Program in Advanced Financial Information Systems
Tiina Rautajoki
Survey for Master Thesis

October 8th, 2002
Helsinki, Finland

SURVEY

This survey is used as a part of the master thesis at Swedish School of Economics and Business Administration (www.shh.fi) in Helsinki, Finland. The topic of the master thesis is "A Comparison of Electronic Invoicing Solutions in the EU and the Effects of the EU Directives". By participating in this study you will assist on giving a better understanding on the electronic invoicing market, the legislation as well as the technologies used. After the thesis has been accepted by the University in December, you will receive an electronic copy of the thesis free of charge in return for your efforts.

The survey consists of four parts. The first part includes general questions about your company. The second part deals with more specific questions related to your electronic invoicing solution. The questions in the third part will be used to compare the characteristics, technologies and services of the electronic invoicing solutions that exist in Europe. The last part includes a few questions on the EU Directives that have affected electronic invoicing in general as well as questions on the future of electronic invoicing.

Please use this form to fill in your answers. If you have a direct link where I could find the information asked in the questionnaire, please make a note next to the question, so you do not need to fill it in. Also if there is confidential information that you do not wish to share, please do not answer that question. I hope you can send me your replies by October 15th, 2002 by e-mail (tiirau01@pafis.shh.fi).

Thank you for your time!

Part I BACKGROUND DATA

In Part I, there are a few questions on general data that I will use to briefly describe your company in the thesis.

Question 1: General information

- a) Please briefly describe the activities of your company.
- b) The year your company was founded.
- c) How many employees do you have in your company?
- d) How big is your electronic invoicing team?
- e) Your title.

Question 2: General key data

- a) What were the net sales in year 2001 (in euros)?
- b) What was the operating profit in year 2001 (in euros)?

Question 3: Subsidiaries and strategic partners.

- a) Please name your main domestic and foreign subsidiaries, if any.
- b) Please name (or describe the nature of) your domestic and foreign strategic partners related to electronic invoicing, if any.

Part II YOUR ELECTRONIC INVOICING SOLUTION

The information asked in Part II is used in combination with Part I in the thesis where I briefly describe your company and your electronic invoicing solution.

Question 4: Please name and describe what your electronic invoicing solution consists of? What services and options does your electronic invoicing solution offer?

Question 5: Customers

- a) Is your electronic invoicing product/solution targeted for businesses or consumers?
- b) If your product is targeted for B2B, is it for small, medium or large enterprises and who are your main customers?
- c) Do you plan to include small companies (those for example who only have the basic MS software) as your customers? If so, how do you plan to do it?
- d) If your product is targeted for B2C, who are your main customers?

If your company is serving directly the end-users, please answer the following two questions:

- e) How many customers does your electronic invoicing solution serve?
- f) How many electronic invoice transactions do you have per month?

Question 6: Electronic Invoicing Key Data

- a) What were the net sales in year 2001 (in euros) for electronic invoicing solutions?
- b) What was the operating profit in year 2001 (in euros) for electronic invoicing solutions?
- c) Please give an estimate of the pricing level of your electronic invoicing solution (the actual product + implementation + transaction costs)?

Question 7: Market share

- a) In which countries do you offer your electronic invoicing product/solution?
- b) What is your estimated (%) market share in each country?
- c) Who are your main competitors?
- d) What is your average annual growth estimate in the next three years (%)?

Part III ELECTRONIC INVOICING SOLUTIONS: The comparison

The information asked in Part III will be used to compare the characteristics, technologies and services of the electronic invoicing solutions that exist in the EU and Norway.

Question 8: Can your electronic invoicing solution be used to totally automate the process of receiving, handling, processing, and archiving the invoices?

Question 9: Technical information

- a) What does your electronic invoicing solution use as the basic file format (some standard or an internal format)?
- b) Does your electronic invoicing solution convert the invoice data to other formats (independence of transportation)?
- c) Is it possible to send attachments with your electronic invoicing solution?
- d) Are there any limits to the message/invoice size (ex. larger message size → price goes up)?

Question 10: How does your electronic invoicing solution guarantee the four basic characteristics:

- authenticity of origin,
- non-repudiation of origin and of receipt,
- integrity of the content of the invoice, not only during transmission but during the whole invoicing process up to the end of the legally required storage period, and
- integrity of the sequence of invoices?

Question 11: Interaction with other electronic invoicing solutions

- a) Does your electronic invoicing system accept invoices from other electronic invoicing systems?
- b) In your opinion is ebXML going to have major role in allowing electronic invoicing systems accepting invoices from other systems?

Part IV EU DIRECTIVES AND THE FUTURE

This last part deals with the EU Council Directive 2001/115/EU amending the Directive 77/388/EEC with the view of simplifying, modernising and harmonising the conditions laid for invoicing in respect of value added tax (VAT). Also there are a few questions on the future of electronic invoicing.

Question 12: EU Council Directive 2001/115/EU states that the Member States shall accept electronic invoicing provided that the authenticity of origin and integrity of the data are guaranteed by one of the following means:

- a) Advanced electronic signature,
- b) EDI, or
- c) any other means subject to the approval by the Member States concern.

Which of these three methods your electronic invoicing solution uses? If your answer is (c), please specify.

Question 13: EU Member States have until 2004 to implement the Council Directive 2001/115/EU.

- a) Do you feel the current EU Directive is truly harmonising the electronic invoicing in the EU or is it a step backward for businesses and will reduce the competitiveness of Europe's economy?
- b) Should there be stricter regulations on electronic invoicing in the EU?

Question 14: Please describe the current legislation of electronic invoicing in your country. This question is used in section where I discuss the different requirements in each country.

- a) For electronic invoicing are there permissions needed or prescribed standards?
- b) Is electronic storage allowed?
- c) How long is the storage period?
- d) Please mention if you know an expert in this field or if you have a link to a website where is more information about this topic.

Question 15: Future of electronic invoicing

- a) What are your goals in the near future with your electronic invoicing solutions?
- b) How do you expect the electronic invoicing market to develop in the EU area in the next three years in general?

Question 16: Do you wish to add any additional comments?

If you have brochures and demos of your electronic invoicing solution they are greatly appreciated.

Thank you so much for taking part on the survey! After the thesis has been accepted by the University in December, I will email you a copy of the thesis. Also the thesis will be posted at my homepage as a pdf-file.

Best Regards,

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