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Master of Science in
Management, Economics and Industrial Engineering

ANALYSIS OF THE ADOPTION LEVEL AND BEHAVIOR OF ELECTRONIC INVOICING IN EUROPEAN COUNTRIES

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Executive Summary

Introduction and Objectives

The e-Invoicing has become a subject of great importance and source of several benefits for the European industry, however there isn`t an realistic and clear view about the status of the e-Invoicing adoption in each country, by the contrary exists different figures and reports with unrealistic statistics and rates that creates uncertainty by the stakeholders inside the country.

On this basis, this thesis pretends to go deeply in this subject, researching and analyzing the e-Invoicing European landscape, characterized with different regulations and conditions by each country, but without indicators and realistic figures to identify crucial factors and best practices that facilitate the interoperability and increase the adoption.

The main objective of this research is to obtain a reliable and updated view of the e-Invoicing adoption in Europe, confronting the data with local stakeholders and establishing a methodology and criteria that permits compare and classify the different European countries and its behaviors and patterns.

Is also a concern of this thesis, to identify the conditions, best practices, barriers and enablers that characterize the e-Invoicing in Europe with the aim of increase the interoperability and enable the interchange cross border of e-Invoices, especially in Italy. Contributing with the studies and research of The Observatory in Electronic Invoicing, in which the idea of this research was born and its support allowed the completion of this work.

Methodology

The methodology followed for perform this research is divided basically in two phases, the data collection and the empirical analysis that allows at the end identify summary notes, facts, measures that create awareness about the actual situation in Europe of the e-invoicing and suggestion to increase the adoption and diffusion of the e-Invoicing.

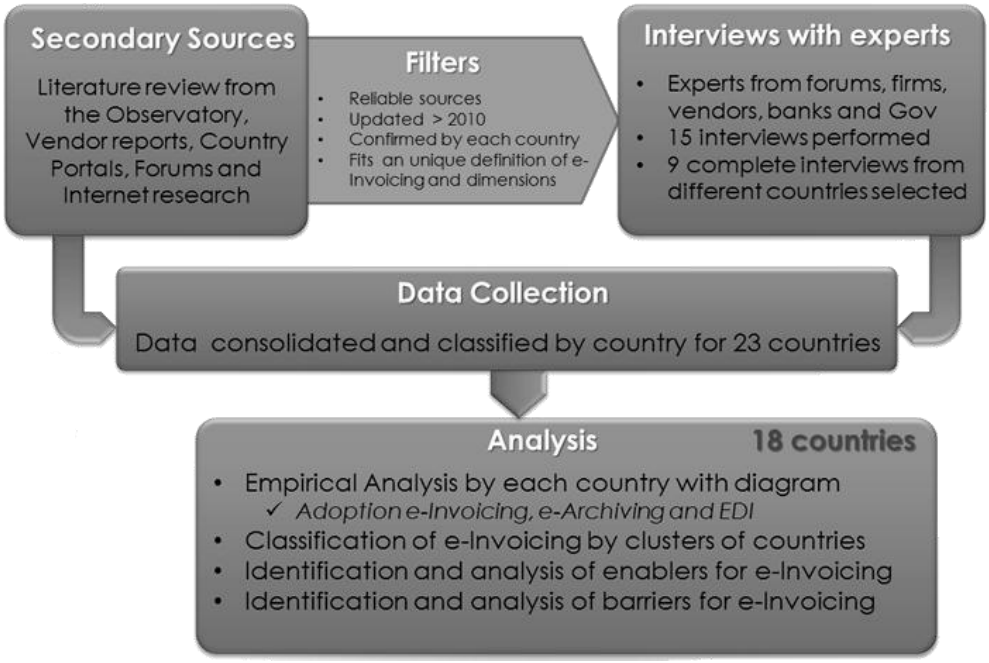

Figure 1. Methodology of the research

The data collection phase consists first on the research, comparison and analysis of secondary sources that contains data about electronic invoicing in European countries and the related terms and subjects that are also interesting for an overall analysis. These additional concepts are basically the level of adoption, electronic archiving, Electronic Data Interchange and the penetration of e-Invoicing in the different markets and type of companies.

The next step in the data collection phase after have analyzed and selected the significant data of the secondary sources for each country, was to identify contacts, experts and new possible sources for confirm the data and obtain new perspectives of the information analyzed. With this starts the phase of interviews and questionnaires to experts with the aim of confirm the previous data and to get new one, directly from the stakeholders of the e-Invoicing in the different countries.

The questionnaire was designed with the aim of get more details about the situation is a specific country, confirm the data obtained before and collect perception from the industry, banks and government about the electronic invoicing status in Europe. At the end of the data collection phase, is reviewed the data collected of each country and are selected the countries with more significant data and which represents the real status of Europe in its different regions.

Literature Review

The literature reviews is the conceptual basis of this research and consisted in read and analyze different kinds of information and concepts about electronic invoicing from specific sources. At next are listed the kind of literature that is of interest for this research:

- Reports of vendors, government, banks and different stakeholders of the e-Invoicing market.
- Articles and data from communities and organizations formed to promote the e-Invoicing.
- Interviews and questionnaires made to e-Invoicing experts of each country.

An important step in this section was to read and determine the correct definition for each concept of the research, which would be the ones that are used in the rest of the document. The concepts described at following are the ones of interest, which will be searched in the literature review for each European country.

*Electronic Invoicing is the i*nterchange and storage of legally valid invoices in electronic format only between trading partners. The interchange does not use or require paper-based invoices and have legal and tax validity.

A *Regulatory Framework*, is the set of laws and requirements established by the government agencies for the adoption of e-Invoicing; and a European Commission Recommendation, is a recommendation that is passed from the European Commission to the Member States and is a non-binding act, however coming with a 'good backing' since it will have been discussed with the Member States first.

For this research we will refers to *level of adoption*, as the percentage of companies and public administration entities that are using the e-Invoicing in their normal an productive processes, not necessarily all the invoices have to be sent electronically, but the e-Invoicing must be implemented and is use.

E-Archiving and Substitutive Conservation, are the electronic storage of invoices and depends of the regulation and conditions of each country, also must grant the originality and integrity of the invoice. In this Substitutive conservation refers to the use of digital signatures and other mechanisms to grant of the originality of the invoice stored.

EDI (Electronic Data Interchange), refers to the structured transmission of data between organizations by electronic means. It is used to transfer electronic documents from one computer system to another (i.e.) from one trading partner to another trading partner. For electronic Invoicing there are specific standards as EDIFACT.

The final important concept related with the research is Order to Payment Cycle, which is the full cycle since an order is made by a client until the payment is made to the provider, is present in all the companies and includes the Invoicing process as one of its pillars. The e-invoicing and automation of all the cycle include a lot of benefits and changes to a company.

This research is made among the European Countries, especially the ones of the European Union, as the objective is to analyze the approach to e-Invoicing from countries different from Italy but that have similar conditions and regulation. However there are analyzed other countries from Europe that present interesting characteristics and conditions to get a low or high rate of adoption. Also the reference literature is focused in the adoption by large enterprises, SME's and public administration, identifying the most developed areas in each country and the presence of leadership in some productive sectors that have promoted the adoption of e-Invoicing

Empirical Analysis

The empirical analysis consists in review the data one more time and analyze in comparison with the other countries, highlighting the conditions, enablers and barriers to the electronic invoicing adoption identified in each country. Each country is analyzed in the more important dimensions of e-Invoicing that would be the strictness, proactivity, interoperability, adoption in SME's, adoption in public administration, EDI and adoption in large enterprises.

In this way is used a spider web diagram as an analysis tool with the aim of synthetize the more significant result and afterwards identify similar patterns between diagrams and classify the countries by clusters. As shown in the figure 2.

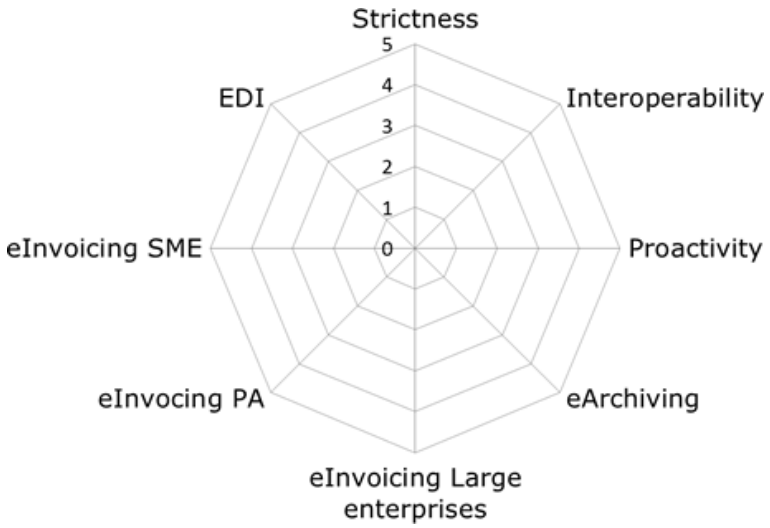

Figure 2. The spider web diagram for the country analysis

Summary Notes

Finally as part of the purpose of this thesis is to show and highlight the best practices, conditions and problems that have presented the electronic invoicing in Europe during the last years, in the summary notes are shown, analyzed and explained the most relevant results of this research that will be useful for further project of the observatory and also for the different experts and stakeholders of electronic invoicing in other countries that helped with this works and are interested in the results to take measures and propose new projects in their own countries.

In this section also are described the different clusters and shown the countries that belongs to each one, highlighting the common facts, problems and conditions of the electronic invoicing in Europe. Also are identified and summarized the enablers and barriers of the electronic invoicing in Europe suggesting measures to incentive them and to overcome them respectively.

In the Figure 3 is shown the status of adoption determined for each European country as result of this research, below are described the main facts and characteristics of the e-Invoicing adoption level in Europe:

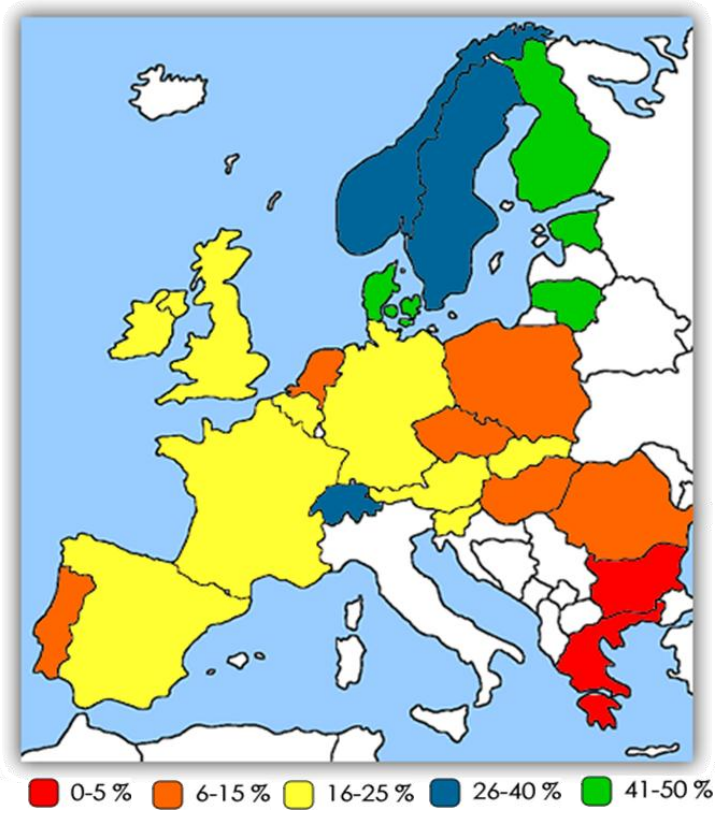

Figure 3. Level of e-Invoicing Adoption in Europe

- E-Invoicing still in an early stage of adoption in Europe.
- Clear superiority in adoption and better conditions for e-Invoicing in the Nordic and Baltic region.
- Still divided the perception about the adoption rate between vendor reports and official figures.
- Non EU members, which don't have obligation and recommendations by regulatory framework, have in average higher adoption.
- Large Enterprises represents major part of the adoption, by the contrary the public administration and the SME's are the less developed in e-Invoicing adoption.

Another important result from this research is the analysis of the status and behavior each European country towards the e-Invoicing and the following classifications in

clusters with the aim of obtain a global view of the position and situation of each country.

There are 3 models of behavior towards the e-Invoicing in the European countries, as shown and explained in the figure 4.

Figure 4. Classification by clusters of the e-Invoicing patterns in Europe.

The last remarks and summary notes obtained through this research are:

- The adoption of EDI still low especially by the proliferation of SME's, however is the most used mechanism among MNC's and large companies.
- The level of adoption in Europe still considerably low and only few European countries are increasing its adoption and have established a good basis of e-Invoicing implementation in PA.
- The technical fragmentation, complex regulations, passiveness and lack of integration are the main barriers for the e-Invoicing adoption.
- A simple and looser regulation, the standardization, the integration of stakeholders and the support to SME's are the main enablers for the e-Invoicing adoption.

1 RESEARCH PURPOSE

1.1 Introduction

This chapter aims to provide a brief but precise context of the objectives of this research, describing the main questions, concerns and the overall view that motivated the definition of this thesis subject.

Also in this chapter is clarified the focus and scope reached, mainly exposing the opportunities of getting new interesting results and the limitations to get definitive conclusions; at the end of this chapter will be clear the reasons to use this methodology of research, the countries selected to make an in-depth analysis and the characteristics and conditions that make of electronic invoicing a prioritized subject in the economic agenda of the European countries.

1.2 Research context

Nowadays, Information and Communication Technologies (ICTs) have become an important tool to support company innovation and performance improvement as their role in organizations become increasingly pervasive and strategic.

A deep, critical knowledge of ICTs and more importantly, of their impact on business, can help lead companies towards most effectively exploiting these technologies in order to maximize obtainable benefits. The ICT & Management Observatories from Politecnico di Milano were formed with precisely this objective in mind: to help spreading the awareness of the importance of ICTs in business.

One of this Observatories is the “Osservatorio Fatturazione Elettronica e Dematerializzazione”, that is specially focused and dedicated in research and a analyze all the conditions and aspects involved in the development of the electronic invoicing in the Italian Industry, but also including the government, the European context and other elements in their research.
One of the main objectives for the observatory is to analyze the European scenario in terms of adoption rates, level of development, normative and standardization. However the Observatory during the last year

have most focused in the electronic invoicing in Italy and only in a superficial way have presented results of secondary fonts about the other countries.

In this way the Observatory proposed this research as Thesis of Master degree with the aim of obtaining a wider and trustful point of view of the current status of the electronic invoicing, going deep into the analysis of fonts in different languages, classifying the results to identify patterns and trends and finally confronting the sources and the results in an effective way.

1.3 Objectives

The objectives of the research are:

- Obtain a clear and objective landscape of the status of electronic invoicing in Europe, reviewing the latest literature, articles and updates in the normative of each country.

- Identify the conditions, measures, internal and external factors that have caused the low or the high development in each European country, depending of its culture, economy, government and position that have taken during the last years with respect to this phenomenon.

- Identify trustful and integral sources of information for the European countries, confronting and comparing the data presented by the different secondary sources with data obtained through interviews and questionnaires to companies, vendors, experts and researchers on this subject around Europe.

- Establish a framework of measurement and a classification of the different European Countries according to its behavioral patterns or environmental conditions that allows differentiate the capabilities of each country and also helps identify action plans and measurements that should be taken.

- Conclude about the obstacles, enablers, negative and positive conditions that affect directly the adoption and correct development of electronic invoicing among the industries, especially in the Italian context.

1.4 General research approach and expected findings

The approach used in the development of this research consists basically of three steps, first the review, comparison and analysis of the secondary sources, in the second step are confronting the data and features obtained with experts and stakeholders of the e-invoicing in different countries and at the end as a last step have analyzed the results, establishing clear measurement indicators and classifying the different patterns in Europe toward the adoption of the electronic invoicing. These steps are explained further in the section 2 Research Methodology.

This research is based most of all in a theoretical perspective, analyzing conditions, regulatory frameworks and factors with qualitative measures, however are used some quantitative data and statistics for characterizing the status of adoption in every country.

1.5 The significance of the study

Despite of the existence of different studies and statistics about the status of adoption and development of the electronic invoicing in the European Countries, there are a lot incongruences and uncertainties in the results due mainly to the differences between the definition of electronic invoicing between countries, between legislations and even in the culture and language of each country.

For this reason, as this subject is also relatively new, is necessary to do a comparison of sources and confront of data with different actors directly involved in this process, establishing clear mechanisms for obtaining a real and objective point of view that this research can offer.

This study offers a collection and analysis of data updated from the most important sources and stakeholders of the electronic invoicing phenomenon around the world.

1.6 Limitations of the study

The main limitation of the research is the lack of unification and diffusion of the different statistics about electronic Invoicing in each country, mostly due to the

manipulation of data by the government or vendors or by the contrary because the low attention on the subject.

In this way, the insufficiency of numerical percentages and quantitative data for certain countries, requires to treat the problem in a different way, looking for data on alternative sources and deducing the results in different aspects of electronic invoicing through the consequences of their measures or legislations, in case that explicit data is not available or can`t be obtained through direct contact with experts.

These limitations about the differences between countries, the lack of standardization and the increasing problem of interoperability between the invoices cross border, influenced also the realization of this research, because with the overcome of the blindness and scattered data about the adoption and the use of electronic invoicing of each country, will be easier to identify best practices of electronic invoicing in each country and after adopt improvement measures to obtain the multiple benefits of this practice.

In terms of scope, this research only covers the electronic invoicing in European countries, especially that ones in the European Union, because recently has been introduced a regulatory framework shared between countries, so they must receive and adapt it to each internal normative framework, which gives an opportunity to analyze the different approaches followed by each country. For the analysis and deep research were selected certain countries of Europe characterized for higher economic development or for presenting interesting models of electronic invoicing implementation.

2 LITERATURE REVIEW

For the comprehension and understanding of this research, starting with the problem, methodology and results, is necessary to establish a theoretical base that defines the different terms and concepts used for electronic invoicing and of course clarifying the concept of invoicing itself in the context of the European countries.

In this chapter will be analyzed and reviewed the concept of Electronic Invoicing in the European context, which changes ambiguously between countries, industry, perspective and even purpose of its use causing confusion with results or statistics that are no comparable between; so the main objective of this chapter is to define in a clear way Electronic Invoicing and the different concepts related that are considered in this research.

In the first section is defined the concept of Invoice, describing the characteristics, importance and use in B2B with the goal of describing well how it changes the process with the introduction of electronic invoicing.
In the second section is introduced the change and evolution to electronic invoicing, explaining how it works, how appeared, the different implementation types and phases of a normal invoice process, highlighting at the end the benefits that an organization can obtain with a correct e-Invoicing implementation.

At this point, before going into the details of the other elements that surrounds the e-Invoicing field as the Electronic Archiving and the Electronic Data Interchange, must be clarified the reason to mention and describe these elements. In simple terms, the electronic invoicing is the way to dematerialize and digitalize the invoices; the electronic archiving is the way for the conservation of the electronic invoice and EDI (Electronic Data Interchange) by recommendation 820/95 is a way to transfer the invoices in an electronic way.
For this reason, as the aim is to analyze the electronic invoicing and its benefits in a general way, in the third and fourth section are reviewed the concepts of electronic archiving and Electronic Data Interchange in detail, which as is described above, are an important part of what electronic invoicing means, so are necessary to understand them well in terms of evaluate its use and development in the different countries and how it promotes the electronic

invoicing as an all phenomenon. The section five deals with the electronic invoicing in a wider context, involving the different stakeholders, that participates in the process, are affected by or simply influence in another way the evolution of this international trend.

In the last two sections is described the evolution and current situation of electronic invoicing, first doing an overview of the different continents and different approaches in the world to get advantage of this solution, and after going deep of the previous and current status in Europe, focusing on the legislation of the community and on the general facts and characteristics of the process.

The main literature sources

The literature reviewed is almost in its majority from Europe, being scientific articles, industry reports, official country documents and research websites the main sources of this research. The subject of this thesis as a new technology trend in practically all the productive sectors, gives also the essence of digital to the material published about it, so the scope of the literature research has been focused through the internet, in sources from different countries without matter the language and from the mid of 2010 for statistics of adoption and implementation or a little bit older for the definition of some concepts that haven`t presented changes or legislations in each specific country.

2.1 What is an Invoice

For a good understanding of how it works the electronic invoicing and why can provide different kind of benefits to an organization, must be identified the characteristics of a normal invoice, but specially its weaknesses and disadvantages against a globalized and fast changing business world.

2.1.1 Definition

An invoice is a document certifying the delivery of a product or the provision of a service, showing the date of accrual and the amount payable in consideration for the product or service provided. (Asimelec, 2010)

The invoice is a fundamental part of the sell, buy or interchange of goods and services, so in this way, must contain the issuer's and the recipient's details, a description of the products and services provided, unit prices, total prices, discounts and taxes.

The importance of the invoice lies is its authenticity and in what it represents; it is considered to be fiscal proof of delivery of a product or provision of a service affecting the tax-paying issuer (the seller) and the tax-paying recipient (the purchaser). The original should be kept by the recipient. Generally, the issuer of the invoice keeps a copy or the original (database) recording the issuance, in which case the recipient does not have to keep invoices copies.

Another reason for the proper management of invoices is the tax law of each country, in the context of Europe, the properly drawn-up invoice is the only tax receipt that gives the recipient the right to claim a tax refund (VAT). This is not the case for documents that substitute invoices, such as receipts or tickets. (European Commission, 2006)

The different types of invoices are (Asimelec, 2010):

- *Standard invoices*: stating the supply transaction. For electronic invoicing the format most used.

- *Amendment invoices*: showing corrections to one or more previous invoices, or product returns, packaging and packing or volume extra fees. In terms of electronic invoicing, these kind of invoices have a different treatment and are simplified depending of the communication channel.
- *Summary invoices*: showing a group of invoices for a specific period. Applied to electronic invoicing, this type of invoice is used specially for the EDI method, when is necessary and in some countries mandatory to send a summary specifying the invoices of the data sent.

There are also the following variations (Asimelec, 2010):

- *Pro-forma:* an invoice which states an offer, showing the exact form that the invoice will take after the product has been supplied. It has no value for accounting purposes or as a receipt.

- *Copy:* states the transaction to the issuer, with the same details as the original invoice. It should be marked as a copy so that it can be distinguished from the original.

- *Duplicate:* stating the transaction for the recipient, in the event of loss of the original. It is issued by the same issuer who issued the original and has the same details as the original.

It should be marked as a duplicate so that it can be distinguished from the original, especially in the event that the original is found.

2.1.2 The content of an invoice

A normal invoice as a standard document, at least must contain certain information that describes the transaction of sell or buy of goods, they would be the issuer's and recipient's details, a description of the products and services provided, unit prices, total prices, discounts and taxes. (Asimelec, 2010)

In the context of the European Union, at next are described the fields required for a correct invoice issued in Europe:

Under the European Council Directive 2001/115/EC on 20 December 2001 (hereafter referred to as the European Invoicing Directive) the mandatory contents of an invoice are as follows (CompTIA, 2005):

- Date of issue of the invoice
- A sequential number, based on one or more series, which uniquely identifies the invoice
- VAT identification number of suppliers

- VAT identification number of customer in case where the customer is liable to pay the VAT due [1]
- Full name and address of supplier
- Full name and address of the customer
- Quantity and nature of the goods supplied or the extent and nature of the services rendered
- Date of supply of goods or rendering of services or the date on which payment of the account was made if different from invoice date
- Price per unit
- Any discounts or rebates not included in the unit price
- Taxable amount per rate or exemption
- The VAT rate applied
- The VAT amount payable in the national currency
- Where an exemption is involved or where the customer is liable to pay VAT, reference to the provision of the 6th Directive, the national legislation or any other indication
- Where the person liable to pay the tax is a tax representative; the identification number for VAT purposes, together with full name and address[2]
- Local requirements not in compliance with the Directive [3]

2.2 What is Electronic Invoicing

After reviewing and defining what is an invoice and the context in which the invoices are issued and received, in this section is defined the concept of electronic invoicing in general terms, differentiating between the different concepts and sustaining which is the best definition to be managed in this research as a point of reference.

Nowadays, there is often news of electronic invoices in the media. However, much of this news is not about electronic invoices but other phenomena related

[1] Additional rules apply in Austria, Belgium, Czech Republic, Greece, Italy, Lithuania, Portugal, Slovak Republic, and Spain.

[2] Depending on the Member State, this reference may be to the Directive, the corresponding national.

[3] This includes Belgium, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Slovak Republic and Slovenia

to the digitalization of invoicing (or other documents in the trade process). For this reason it is important to define what an electronic invoice is.

According to the European Commission, electronic invoicing (e-Invoicing) is the electronic transfer of invoicing information (billing and payment) between business partners (supplier and buyer). The point of view of the Commission is quite juridical, and on their web pages electronic invoicing is especially related to the directives on value added tax and electronic signatures, at next we`ll review the definition form a more technical and practical point of view. (European Commission, 2006)

2.2.1 Definition

The electronic invoicing, that from now on will be treated as e-invoicing is essentially the digitalization and sending of invoices with certain conditions. This simple definition belies different e-invoicing solutions that differ primarily on their depth of integration with other business processes, also the definition differs depending on the country and even the business area in which is applied. (DB Research, 2010)

At next is made the disambiguation between, the two traditional definitions of e-invoicing, at one side there are invoices that are merely sent as PDF files by e-mail. Apart from being sent electronically these invoices are frequently treated like traditional paper invoices, i.e. The recipients print them out and file them away. This simple form of e-invoicing is a very popular mass billing method in the B2C segment, for example for sending electricity and telephone bills.

The large number of invoices in these cases means that small unit cost reductions quickly add up to major savings, e.g. From no longer having to pay for postage. Moreover, household bookkeeping methods are in most cases simpler than those used by companies, which means that there are fewer barriers to the acceptance of electronic invoices. (DB Research, 2010)

At the other end of the spectrum there are solutions that fully integrate electronic invoices into ordering, bookkeeping and settlement systems. Especially where suppliers processes are closely integrated with those of their

customers – just-in-time production in the automotive sector is one example, complex systems for e-invoicing do pay dividends. Besides invoices there are other documents that can also be interchanged electronically. Such systems are very efficient, but they are also very specific and costly.

That is why such forms of electronic invoicing are currently primarily considered for use in intensive, long-term business relationships where a great deal of trust has been established. With the increasing standardization and broader adoption of e-invoicing it is, however, likely that more deeply integrated solutions will also become interesting for a wide range of companies. Electronic invoices can be transmitted directly between the trading partners or via a third party – a so-called consolidator. This gives rise to a variety of e-invoicing models, that will be treated further in Section 3.2.3.

In order to summarize, e-invoicing cuts through many disciplines, requires a lot of knowledge (spanning business, regulations and IT), and involves a lot of complexity. So according to the objectives, context and scope of this thesis, a good definition of e-invoicing is:

E-invoicing is the interchange and storage of legally valid invoices in electronic format only between trading partners. The interchange does not use or require paper-based invoices. E-invoices have legal validity, and can be used to prove compliance or as tax originals. This research is about e-invoicing in general, and most considerations apply whether you are sending e-invoices or receiving them, unless otherwise stated. (Gartner, 2009)

In operational terms, some conditions must be included to clarify more the scope of the definition:

- The seller must ensure that the invoice contains the correct data and that it is authentic. (Gartner, 2009)

- The buyer must verify the authenticity of the invoice, match it for goods or services received, and execute payment. (Gartner, 2009)

- The seller and the buyer (or a third party on their behalf) must both store the readable and authentic (this comes with a lot of added strong security)

invoice for a period of time and make it available to a tax authority on request. (Gartner, 2009)

- The necessary and sufficient condition of an electronic invoice is that it is an electronic operation from end to end. In addition to this, one may require in principle that the invoice can be paid on the basis of this electronic document although, however, the transferring of the invoice does not necessarily involve the payment. (Itella, 2010)

- The so-called hybrid solutions in which invoices received on paper are scanned to become electronic, or paper invoices printed from electronic data, are not electronic invoices. Solutions of this kind can still support the electronification of invoicing, but wouldn`t be considered as e-invoicing for the interests of this thesis. (Itella, 2010)

- Telematic transmission of invoices (or 'telematic invoicing') means the transmission of data and information contained in an invoice using a telematics channel, e.g. Fax, email or publication on a Web portal. In this case, the sender and recipient are still obliged to 'materialise' the document (print on paper). (DIG Polimi, 2008)
- Electronic Invoicing according to the Regulatory Framework in Europe (VAT compliant), refers to an invoice in digital format with a time reference and the digital (qualified electronic) signature of the issuer (which guarantees authenticity and integrity) sent, following prior agreement, in electronic form to the recipient who use substitute archiving in place of paper to save the invoice in its original format. (DIG Polimi, 2008)

2.2.2 From invoice to e-invoicing: some background information

Before examining the current status and issues arising in the development of e-invoicing it is important to understand the background to traditional paper based processes.

The transformation from traditional paper based invoicing to e-invoicing is heralded to hold considerable promise by both public and private sector advocates. In Europe alone annual benefits to society of hundreds of billions of

euros have been forecast by various commentators. In a digital real time economy the availability of Internet technology, cost pressures and a desire for new sources of value all act as drivers for the adoption of e-invoicing. (EBA-Innopay,2010)

Electronic invoicing has been recognized as one of the most important sources of productivity increases around the world, and especially in Europe (EEI, 2007). Some countries have been more active than others in enforcing the transition to electronic invoicing. As an example, since 2005, Denmark's public authorities primarily receive invoices in electronic format, and this practice has been stipulated by law (DIG Polimi, 2010). The benefits of moving from paper invoices to electronic invoicing are clear, which are reviewed in deep in Section 3.2.4.

Electronic invoicing is not something totally new. Invoices have been transmitted in electronic format for decades. Already in the 1970s, EDIFACT was used by large companies as a means to exchange invoice data. These systems were point-to-point systems, and required rather heavy investments in establishing the connection between the two companies or organizations. (Pentinnen, 2008)

On the other hand there is much more to achieve. Less than 10% of invoices are in any sense electronic, adoption rates by country and sector are highly variable and the market for electronic invoicing services is highly fragmented. Barriers in the area of strategic commitment, business processes, standardization, legal clarity, trusted exchange models and reach are felt to exist. (EBA-Innopay,2010)

2.2.3 Types of Invoicing and processes

For a complete understanding of the concept of e-invoicing and in order to present the benefits and differences between countries legislations, is necessary to review the different possible implementations of e-invoicing inside a company and the impact that it causes to the normal processes.

E-invoicing takes for granted that a company has a clear, structured process, which, on receipt of an invoice, reconciles it with goods and services delivered,

accepts it automatically if an agreed on set of criteria is met, and starts the payment. Implementing buyer e-invoicing is more challenging in organizations with fragmented accounts payable (AP) systems and processes. Organizations that have already implemented shared services for AP will realize the greatest benefits, because they already have only a small number of locations where invoices are received. (Gartner, 2009)

The change for receiving or sending invoices, affects the internal business processes, mutual agreements among business partners, financial transactions, taxes, and legal compliance, and a lot of the IT infrastructure that supports all this. The business processes to get invoices paid change slightly company by company (and sometimes within a specific company, depending on trading partner agreements, or on different business practices in different geographies, or of the type of invoice); (tax) laws and security norms (for example, e-signatures and how advanced/qualified they are, or the rules for issuing them or building certificates). On the other hand, for many buyer-supplier communities, the continued prevalence of paper-based or fax-based invoices and the inertia it has produced have severely limited the ability to leverage e-invoices to automate the purchase-order-to-invoice reconciliation processes and the rest of the payment process. (Gartner, 2010)

The different types of e-invoicing solution differs basically in how is implemented and integrated with the different processes inside the company and the level of automation reached, this depends mainly on the legislation of each country and the infrastructure provided by the company for this solution. At next are reviewed and described detailed with diagrams the different kinds of e-invoicing implementations with the aim of consolidate the concept and be able to understand the differences, advantages and problems of an e-invoicing solution.

As follows, are shown the three main types of invoicing processes, the manual, semi-automated and fully automated, then are compared describing the costs, advantages and disadvantages against the others and finally is presented the Fully automated Order to Payment Cycle as the model that can provide more benefits with the integration of the company processes.

MANUAL INVOICING PROCESS vs. SEMI-AUTOMATED INVOICING PROCESS USING TRADITIONAL PDF INVOICES and FULLY AUTOMATED E-INVOICING PROCESS

This diagram (*see Figure 6*) depicts a simple manual invoicing process between two companies. The number of steps involved will vary depending on the size of the business, the number of departments and controls involved, and the complexity of internal systems and processes. (EUEBL, 2009)

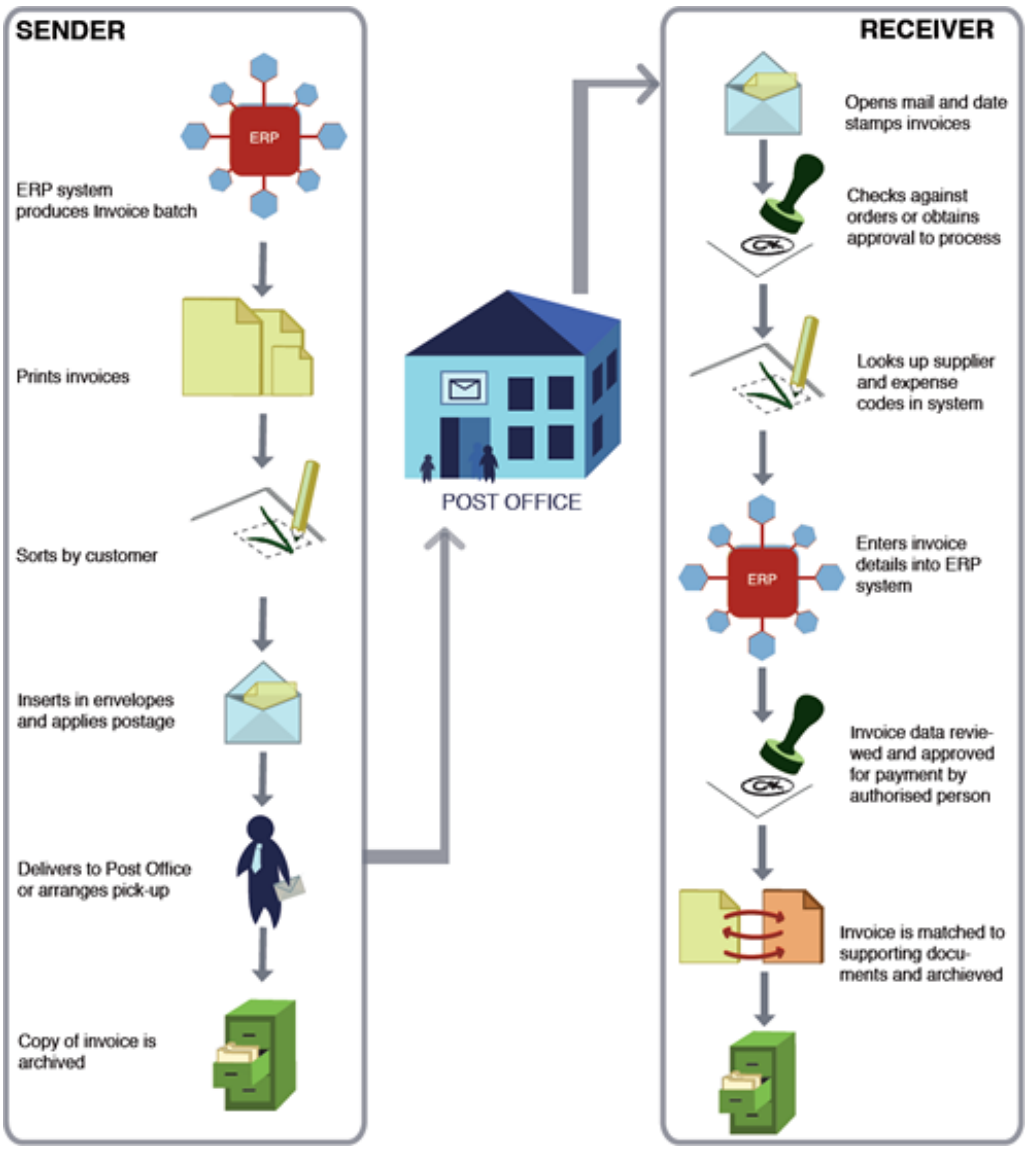

Figure 6. Manual standard e-Invoicing process (EUEBL, 2009)

In this scenario, there are unnecessary costs and time spent by both parties on highly repetitive tasks allowing for human error in every step of the process.

In the semi-automated invoicing process, are introduced the PDF invoices as digitalization of the invoice, this diagram depicts a typical situation where the supplier is sending invoices in a PDF format via email to the receiver.

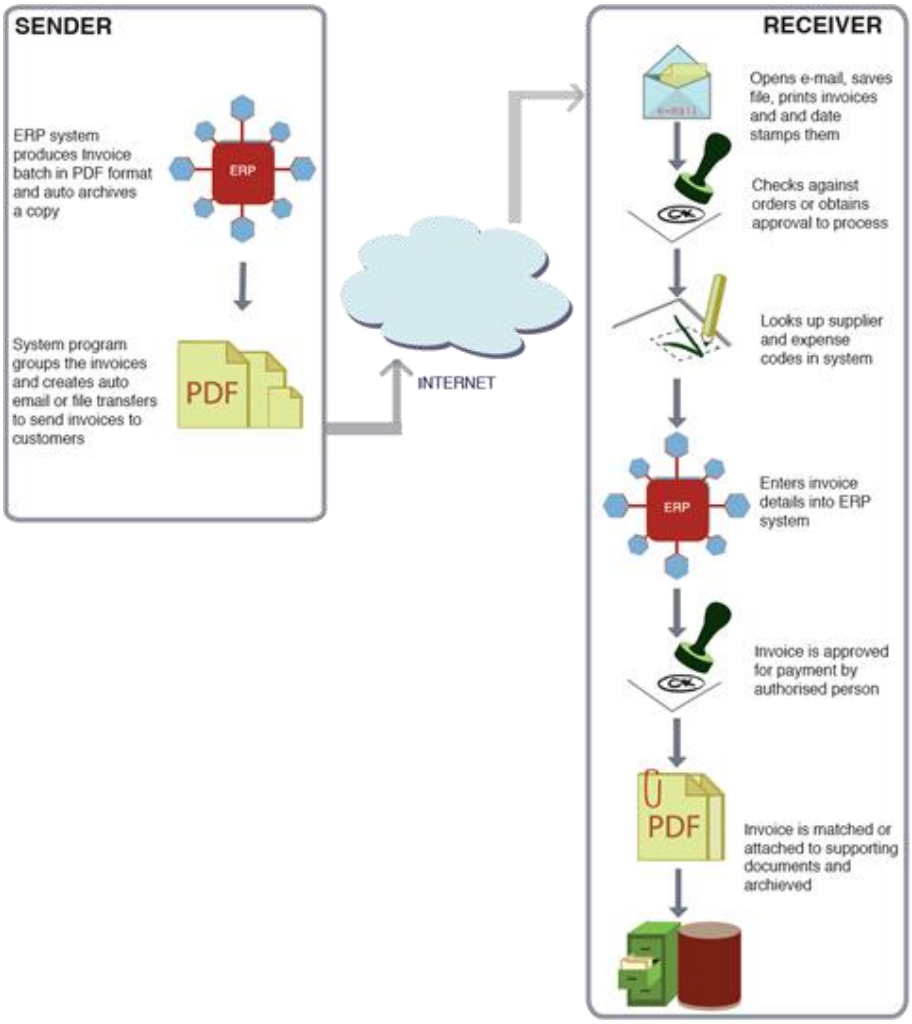

Figure 7. Semi-automated Invoicing with PDF invoices (EUEBL, 2009)

In this diagram (*see Figure 7*) the supplier provides invoices in a PDF format on a web-based portal for the receiver to view, print, or downloads. The supplier (Sender) realizes all of the efficiencies but there is no change in process for the receiver.

For the fully automated e-Invoicing process, this diagram (*see Figure 8*) depicts a typical process between two trading partners where both companies have e-Invoicing capability.

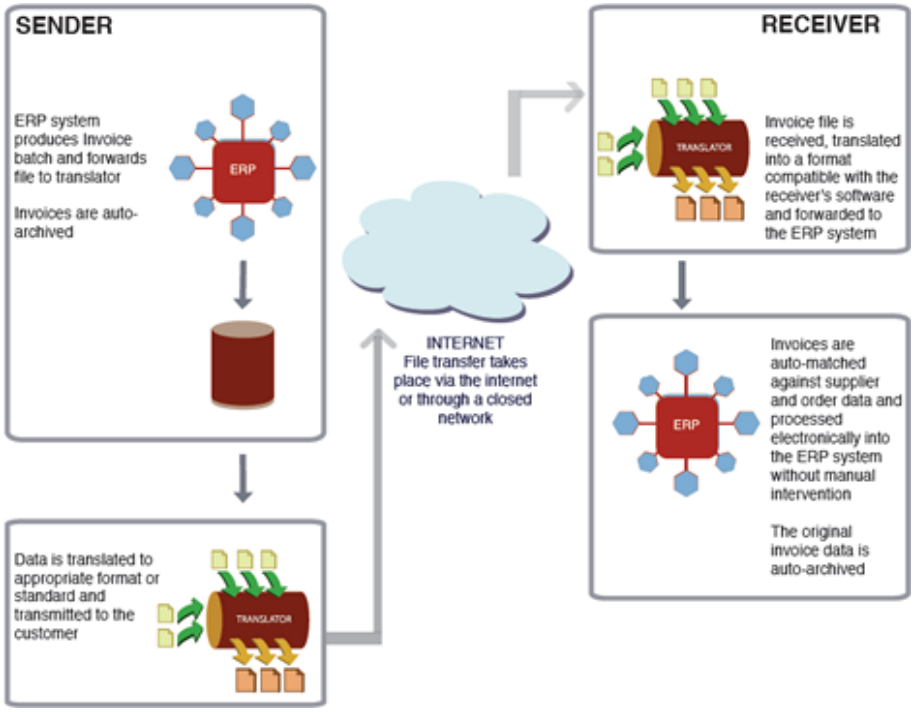

Figure 8. Fully automated e-Invoicing process (EUEBL, 2009)

In this scenario, both parties realize the full benefits of e-Invoicing resulting in reduced costs, integrity of the data, and an overall improvement in the relationship.

Comparison of costs, advantages and disadvantages

The key considerations in the Manual process are:

For the Sender

- Cost of labor for invoice printing, sorting, stuffing envelopes, posting, and archiving.
- Cost of postage and paper.
- Environmental impact of paper and physical delivery.
- Possible printer or mailing errors resulting in missing invoices.
- Possible sorting errors resulting in one customer receiving another customer's invoice.

- The cost of calling customers for late payments as a result of missing invoices.
- The cost of posting invoice copies and possibly extending terms.
- The cost of the organizational structure (manpower) to manage invoices handling.
- Cost of paper documents archiving.
- Cost related to archive management (e.g. Searches, logistics, etc.).
- Impact on customer relations as both parties generally believes the other is at fault.

For the Receiver

- Cost of labor for opening mail, sorting invoices by supplier, date stamping, matching to orders or other supporting documents, looking up supplier numbers and account codes for processing, entering the data into the computer and checking the input for accuracy .
- Possible errors in data entry resulting in incorrect payments and reconciliation issues with suppliers or incorrect internal postings leading to further accounting problems.
- Cost of additional staff in order to segregate data input from invoice approval.
- The cost to maintain the paper archives.

The key considerations in the semi-automated process with PDF's are:

For the Sender

- Reduces labor, printing/downloading, archiving and postage costs.
- Eliminates manual handling errors.
- Eliminates the environmental impact of producing and delivering paper documents.

- Improves the relationship by sending timely and accurate invoices.

For the Receiver

- Retains the cost of labor for opening mail, sorting invoices by supplier, date stamping, matching to orders or other supporting documents, looking up supplier numbers and account codes for processing, entering the data into the computer and checking the input for accuracy.
- Possible errors in data entry resulting in incorrect payments and reconciliation issues with suppliers or incorrect internal postings leading to further accounting problems.
- Cost of additional staff in order to segregate data input from invoice approval.
- The cost to maintain the paper archives.

The key considerations in the Fully automated process are:

For the Sender

- Reduces labor, printing, archiving and postage costs.
- Eliminates manual handling errors.
- Eliminates the environmental impact of producing and delivering paper documents.
- Improves the relationship by sending timely and accurate invoices.
- Improves the efficiency and the process control.
- Improves performance management.

For the Receiver

- Reduces the labor involved in sorting, matching, data entry, and archiving.
- Eliminates data entry errors and associated reconciliation issues.

- Eliminates the need for additional staff to review the data entry.
- Eliminates the environmental impact of archiving paper documents.
- Improves the efficiency and the process control.
- Improves performance management.
- Improves the relationship by turning invoices around for payment in a timely and accurate manner.

FULLY AUTOMATED ORDER-TO-PAYMENT CYCLE

This diagram (*see Figure 9*) depicts a typical end-to-end transaction between trading partners and their banks. Any number of additional parties may be involved such as e-business service providers, freight forwarders, customs agents, finance or factoring companies, etc. The parties have expanded their e-Invoicing capability to include e-Orders, e-Payments, and e-Remittance advices.

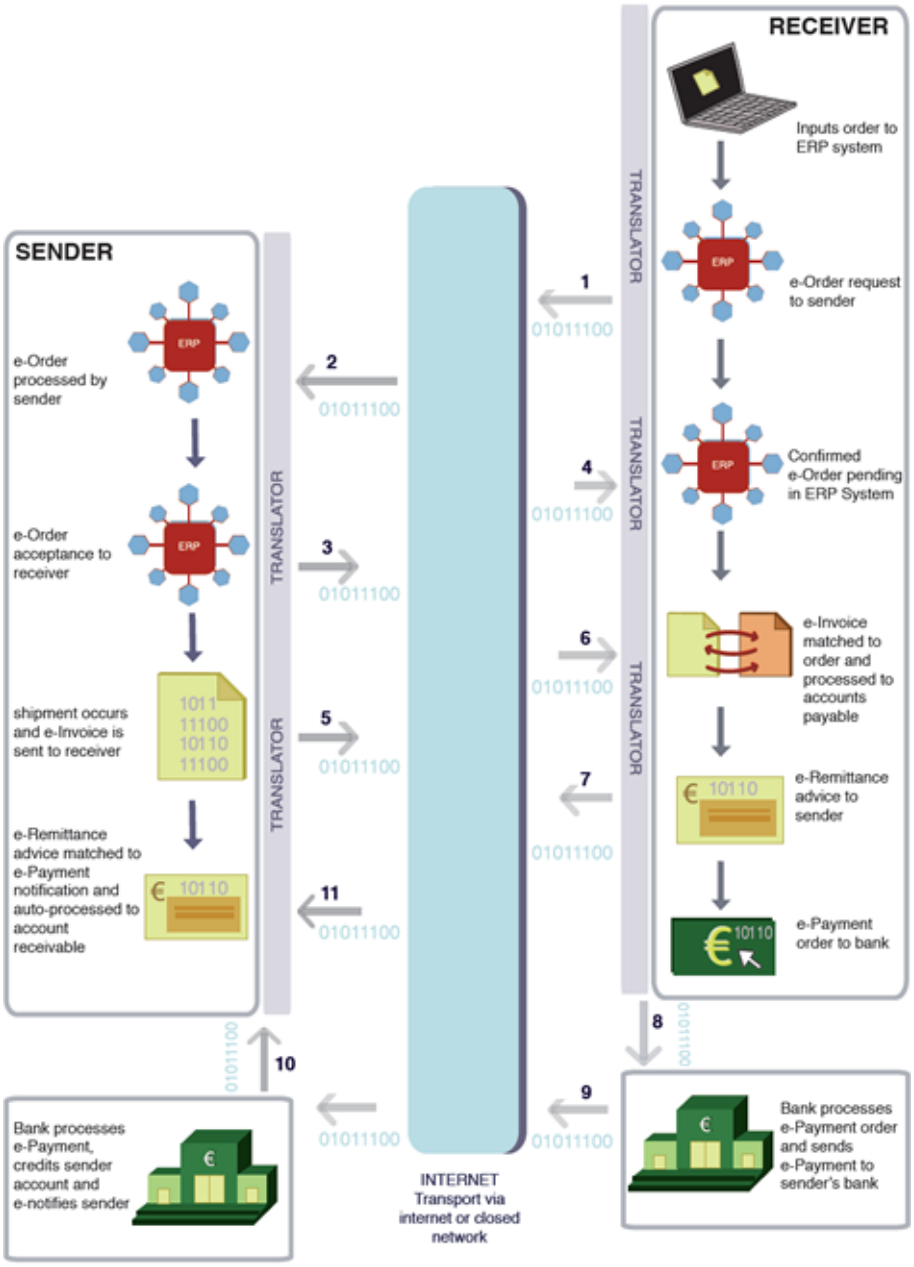

Figure 9. Fully automated Order to Payment Cycle (EUEBL, 2009)

In this scenario all parties involved in the transaction realize the benefits of the end-to-end integration. Integrity of data is realized throughout the transaction because the information created for the initial order is re-used electronically to produce the shipping request, inventory adjustment, invoice, Accounts payable records, payment request, transfer of funds, remittance advice and final allocation of cash to the supplier's Accounts receivable system – removing the margin for error in all of these activities. The impact to the environment is also significant as all parties involved will eliminate printing and delivery of paper documents. (EUEBL, 2009)

2.2.4 Benefits of Electronic Invoicing

At the end of this section are described and explained the benefits than can bring the e-Invoicing to the companies and different organizations, with the aim of understand well the reason for be a popular trend in the B2B market during the last years and around the world.

According to the European Associations of Corporate Treasurers (EACT), the resulting cost reductions in the supply chain expenditures total 243 billion Euros across Europe. The European Union estimate is 238 billion Euros. In addition to the monetary savings, there are considerable environmental effects as the transition from paper bills to electronic invoicing would save over 14 million trees in the EU alone (estimates of, e.g., Pagero and PayItGreen). (EEI, 2007)

Electronic Invoicing has great benefits for the companies that use it, both as issuers and recipients. There are many reasons for using electronic invoicing, ranging from the purely economic to the environmental. The following are some of the most important advantages (Asimelec, 2010) :

- *Cost saving*, both for the issuer and for the recipient. Switching to e-invoicing can reduce costs in several ways. The electronic process is faster, reduces float, processing errors, eliminates paper processing, saves postage, reduces failed payments and penalty interest and improve customer relations. Dematerialization of the process can reap unprecedented benefits, although researchers widely disagree about the extent of potential savings. (Capgemini, 2006)

- *Efficiency improvement*, from an end-user perspective, great efficiency gains are expected when moving from paper invoicing to e-invoicing. First, there is a huge potential for better resource allocation in terms of switching manpower from low productivity manual processing towards high output knowledge-based activities. Second, there is the expected efficiency gain in terms of systems integration, which means that e-invoices can be more easily or even automatically reconciled with purchase orders and deliveries. Third, a reduction in data being re-entered or manually processed will reduce errors in the invoice creation process and in the invoice handling process. (EBA-Innopay, 2010)

- *Integration with ERPs for the issuer*, the electronic process they were already carrying out continues. The invoice has been issued and sent with just one click from the ERP. For the recipient, the data can be automatically introduced into their applications.

- *Cash management optimization*, due automation makes it possible to balance accounting entries and to compare documents (delivery note/invoice), while also minimizing human error. A closer integration of the physical and financial supply chain gives rise to opportunities to better manage cash flow and liquidity resources, to deploy shared service centers for the centralized control of invoicing and related payment activity. (EBA-Innopay, 2010)

- *Real-time access to information*, making possible to verify the status of the invoice and all its related information (errors, rectifications, payment collections, delivery of goods, delivery notes, etc.), accurately and on a real-time basis.

- *Reduction in handling times*, because the immediacy in the dispatch and delivery of electronic invoices reduces management to an absolute minimum and makes it possible to resolve any discrepancies in a short time. (Pentinnen, 2008)

- *Quick decision-making*, because the immediacy of communications makes it possible to take decisions, such as on financing needs, in a shorter period of time.

- *Automated administration and accounting*, due to the integration of business systems means that all data entry and accounting operations require a much lesser degree of human involvement.

- *Monitoring of erroneous actions*, through alert systems that detect discrepancies between accounting and invoicing operations or the application of erroneous rates. (Trustweaver, 2009)

- *Efficient use of financial resources*, because the adoption of e-Invoicing facilitates access to means of financing such as factoring or confirming.

- *Better use of employees' skills*, enabling them to devote their time to tasks with greater added value for the company.

- *Reduction in disputes arising from the handling* of invoices between issuer and recipient.
- *Improvement in problem resolution*, reducing them and resolve them more quickly. (Pentinnen, 2008)
- *Reduction of payment collection periods*, given that the payment of invoices is achieved more quickly.
- *Improvements in the negotiation of payment deadlines*, given that the certainty in the application of payment deadlines not affected by delays arising from problems allow a certain margin for additional management.
- *Improvement of the company's commercial relationship and image*, as a result of the foregoing effects. In general e-invoicing provides an opportunity to enrich customer relationship management provided that the appropriate features and functionalities are built into the seller's services. (EBA-Innopay, 2010)
- *Reduce the environmental impact*, in terms of reducing paper consumption and energy costs for transportation are also significant, generating carbon savings which could amount to reductions in CO2 emissions of 1 million tons per year 7 for the EU. (IBM , 2008)

At next is shown, the magnitude of benefits in cost reductions calculated in Italy, through market studies and interviews with the different sectors of the industry, the magnitude of the reduction of costs, depends on the type of the electronic invoicing implementation (DIG Polimi, 2009):

- *Approximately 7-8 billion € per year, in the case of pervasive adoption of unstructured electronic invoicing models, both in B2B as well as B2C relationships;*
- *Approximately 12-15 billion € per year, in the case of adopting, basically in B2b relationships- structured electronic invoicing models, with automation limited exclusively to the activity of invoicing;*
- *Approximately 60 billion € per year, in the case in which structured electronic invoices approaches were extended to the entire order-to-*

payment-cycle, according to total integration and dematerialization cycle models.

2.3 What is Electronic Archiving

The term of electronic archiving, which from now on will be treated as e-Archiving, not only refers to the digital storage of e-Invoice, but also to the electronic storage of any business document that can be useful for a company or for any organization. The digital revolution has impacted considerably the field of management of documents and archiving translating a complex and expensive process in an easy and cheaper opportunity to exploit, especially for the electronic invoicing.

In the European context, organizations are obliged to store sales and purchase invoices, besides for a correct implementation of e-Invoicing, is necessary the use of electronic archiving by regulatory framework and also to grant all the benefits that can be obtained. (EC, 2006)

As a principle, invoices can be stored any place and in any medium (CD, DVD, Hard drives, Local Databases, Servers, etc.), as long as there are guarantees as to integrity, authenticity and readability. (Comptia, 2005).

The Article 60, 3 VAT Code specifies : " (...) Invoices stored by electronic means which guarantees a full online access to the data concerned, can be stored in another Member State of the European Community, if the VAT administration is priorly notified. The authenticity of the origin and the integrity of the content of the invoices, as well as the readability, needs to be guaranteed during the whole of the conservation term." (EBA-Innopay, 2010)

However, Member States can impose conditions on the place of storage regarding:

- Need for notification if storage abroad.
- Limitations of the storage to countries where mutual assistance agreements exist.
- Need for full on-line access.

Member States can also impose conditions on the format of storage:

- Storage of original format.
- Storage of data guaranteeing the authenticity of origin and the integrity of content.

Another important condition in e-Archiving is the duration of storage, which affects the storage capacity and the processes of a company depending on the number of years required. The duration of storage is not harmonized throughout the EU.

To the sales invoices, the archiving rules of the Member State where the transaction takes place for VAT purposes apply. For the purchase invoices, the rules of the Member State where the taxable person is established are applied. (Comptia, 2005).

2.4 What is EDI

Another important concept in the phenomenon of e-Invoicing is EDI (Electronic Data Interchange): an electronic transfer of data from computer to computer using an agreed structured format that can be generated and read by a computer and processed automatically. (European Commission, 1994)

The adoption of EDI has been a longstanding practice of enterprises who wish to closely couple with their trading partners and exchanging trading information in a secure and structured way using clear standards and procedures (B2B). E–invoicing will usually be an integral part of the information exchanged. However, in some countries, the EDI invoice still requires a paper summary, in accordance with national legislation. (European Commission, 2001)

Initially, EDI was largely adopted by large corporations and is prevalent in industries such as retail, healthcare, automotive and technology. Newer developments, e.g. Web EDI, have increased the adoption of EDI among smaller enterprises, although the adoption rate of EDI is still highest in the group of large companies. The standard approach is often good-established using standards such as EDIFACT, and GS1. (EBA-Innopay, 2010)

As shown in the Figure 10, the use of EDI depends directly on enterprise size, due mostly to the considerable costs that must be taken into account for the implementation. (EBA-Innopay, 2010)

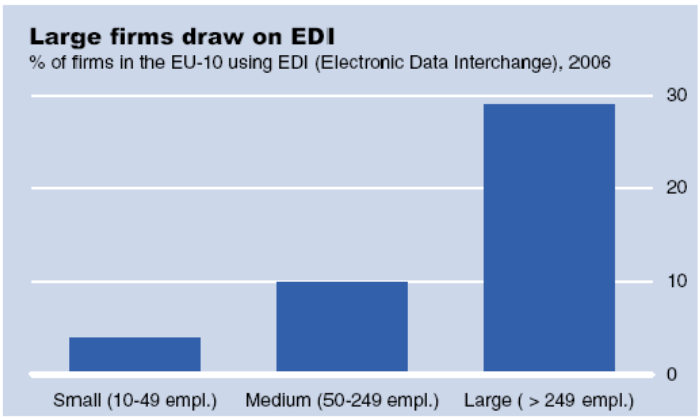

Figure 10. Usage of EDI per company size (E-business watch, 2006)

EDI is often supported by specialist service providers and value-added networks. Often industry-level initiatives such as GS1 for the retail sector, RosettaNet for technology and Odette for automotive provide a governance, standards and rules framework.

However, given the fact that in some countries the EDI invoice still needs a paper summary, EDI invoicing does not completely solve the dematerialization problem. (EBA-Innopay, 2010)

2.5 Electronic Invoicing technologies

In this chapter are reviewed briefly the different technologies and techniques that support the electronic Invoicing process, some of them arose as a response of additions to the regulatory framework, others as a response to the integration of processes and actors in the Order to Payment Cycle and finally other simply are used to increase the efficiency and ease of use of the electronic invoicing as an industry solution. At the end is described deeply the term of Electronic Signatures as represents a main difference between the Electronic Invoicing in the different European countries depending of the regulatory framework.

The main technologies used in electronic invoicing in a broad sense (i.e. Including the integration and dematerialization of the trade process) are as follows:

- Software for Integration with Corporate Management Systems, all those applications that read the data in files exchanged with partners and populate the ERP database, or, conversely, use the ERP data to generate files sent to partners.

- Supply Chain Integration Tools, as EDI/ Wed EDI translators or the applications to normalize input formats or to format data in various output formats. This category also includes Web-based solutions to manage orders to suppliers which mainly allow the exchange of orders and invoices and the sharing of information on the state of the order (tracking). e-Catalog applications, i.e. These tools supporting the recursive purchase of a product/service via a Web catalogue, are also in this group.

- Secure Data Transmission Technologies, as VAN (Value Added Network) or VPN (Virtual Private Network), that use the Internet for data transmission, as well as the more recent transmission channels like CBI 2, the infrastructure for integration with the banking world, and PEC (Certified Electronic Mail).

- Document management platforms, typically with a modular structure to support different activities as required. In most cases, the main modules on such platforms are: (I) the document creation/formatting module which generally also extracts the required data for the invoice from the management system; (I) the module that manages the multichannel dispatch of the invoices; (III) the substitute archiving module which applies the digital signature and the timestamp. The various models in an individual platform can be developed internally by the provider, or acquired on license from the software vendor specialized in a particular activity;

- Character recognition software (OCR or ICR) used to read paper documents and automatically insert the required data in the processing system;

- Optical document acquisition devices, typically scanners;
- Storage devices, i.e. The hardware for document archiving.
- Signature devices, i.e. Hardware that applies electronic signatures to documents, specifically the HSM (Hardware Security Module) typically used for mass signatures, the smart cards or the USB tokens. At next are reviewed the types of digital signatures in deep as representing one of the main differences between the European regulatory frameworks.

Electronic Signatures

The last important term, for the good understanding of how it works the e-Invoicing, is the one of electronic signatures. From a practical perspective, an electronic signature is a technology that provides (EBL, 2009):

a) Assurance that the 'signed' invoice received is actually from the company, or person, who claims to have issued it – otherwise known as 'Authenticity of origin';

b) Assurance that the 'signed' invoice has not been modified – otherwise known as 'Integrity of data'.

The format containing the invoice, namely, the file where the invoice data are stored before being signed electronically, has no legal relevance unless the invoice is issued to a public entity. It could be a PDF file, an RTF file, an Excel document, plain text, HTML, XML, etc. Any format is valid, provided that it is subsequently signed electronically in order to make it legally valid. (Asimelec, 2010)

In Europe, three distinct terms are used as follows:

a) *Electronic signature* is a legal term mentioned in the 1999 Electronic Signature Directive. In practice any code, identifier or mark meant to authenticate electronic data or an electronic transaction could be an electronic signature. PKI is just one of the technologies that can be used to create electronic signatures (Asimelec, 2010).

b) Advanced electronic signature (AES), has specific legal and technical requirements that must be satisfied (EBL, 2009):

- 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 ensure that any subsequent change of the data is detectable.

For example, the use of a PKI based key pair (public/private key) and a certificate (that can be purchased online from a trusted provider and downloaded) complies with this. There are also a number of solutions and services currently available on the market that can be integrated into the e-Invoicing process providing transparent functionality.

An alternative approach is the web of trust scheme (see Figure 11), which uses self-signed certificates and third party attestations of those certificates. The term "Web of Trust" does not imply the existence of a single web of trust, or common point of trust, but rather any number of potentially disjointed "webs of trust". Example of implementations of this approach are PGP (Pretty Good Privacy) and GnuPG (an implementation of OpenPGP, the standardized specification of PGP). Because PGP and GnuPG implementations allow the use of email digital signatures for self-publication of public key information, it is relatively easy to implement one's own Web of Trust. (Gutmann, 2007)

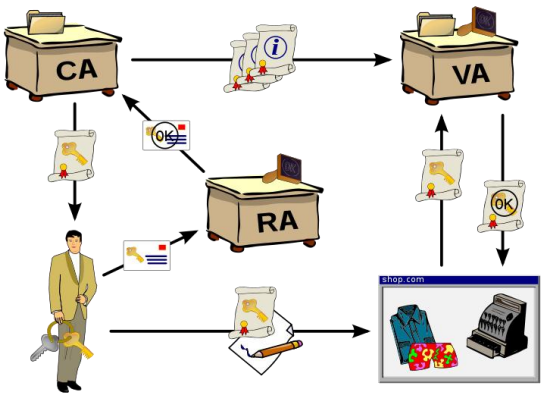

Figure 11. The principle of a public key infrastructure (Asimelec, 2010)

c) *Qualified signature is an Advanced Electronic Signature that must also be supported by the use of a Secure Signature Creation Device and based on a 'Qualified Certificate' to assure the signer's identity. In particular (EBL, 2009):*

- The certificate on which the signature is based is Qualified, adding the requirement that the signer's identity is verified by the registration authority. The certificate must be purchased at a Certification Authority where there is typically a face-to-face registration (e.g. City house, bank, etc.). In most countries, qualified certificates may only be issued to physical persons (individuals) and not legal persons (companies); however, in some cases a CA will allow a company name to be mentioned in a certificate. To apply for Qualified Certificates, the applicant must register as a subscriber once, while renewals can be done without additional authentication processes. The person that signs a document is uniquely identified via his Qualified Certificate.
- The signature is generated using a Secure-Signature-Creation-Device (SSCD). This means that the private key and the certificate are stored on a secure device. Some examples of SSCD include:
    - Smartcard - where a PIN code to access it is needed.
    - USB token - which contains a smart card chip inside, providing the functionality of both USB tokens and smart cards.
    - Hardware Security Module (HSM) - used widely to secure the root key in a PKI system.
    - In some countries, a software-based security module may also be recognized as an SSCD.

Therefore, an ordinary electronic signature that is not Advanced, could certainly not be Qualified. Qualified certificates are issued by specific operators that meet certain legal requirements and are subject to legal liability for providing the service to their customers. In theory, the trusted third party should effectively create a circle of trust among its users.

In practice, technical interoperability can be problematic when multiple operators are involved. Secure technologies are emerging constantly, as are the standards they are based upon.

Additionally, certificates carry expiry dates and can be revoked (e.g. In case of loss of the private key) so they need to be well-managed in order to ensure ongoing validity. (EBL, 2009)

2.6 Stakeholders of electronic Invoicing

The e-invoicing phenomenon didn`t rise up from one day to another, has passed through different phases and have involved different actors and stakeholders that are the responsible for its use and diffusion worldwide. At next is described the role performed by this different stakeholders and also is explained which opportunities they have in this field and how are impacted by the growth of the e-invoicing.

The main stakeholders identified in the whole electronic Invoicing market and environment are:

- The Government, as being the enabler of the use of the e-Invoicing in the productive sector and being in charge of define and approve the regulatory framework for its use and implementation, besides of promoting the use of e-Invoicing in public administration entities to take advantage of the benefits and show it to the local industry.
- The Banks , as the e-Invoicing is only a part of the entire Order to Payment Cycle, they are mostly interested in improving the efficiency and the effectiveness of this process and integrate the different activities since an invoice is received, until is paid by the bank, obtaining mutual benefits with the industry.
- The Providers, because being the e-Invoicing a subject relatively unknown in the industry and with a certain resistance for adoption, at the end they are the responsible for creating awareness in the sector about the benefits and provide to the market clear solutions to the industry needs.
- The Industry and SME's, as they receive directly the benefits of the e-Invoicing and are involved by the regulatory framework imposed by the

government, by offers of implementation of the providers and by proposals of integration with the banks. Especially the SME's are important for the e-Invoicing as it solves a concurrent problem for them and it gives tools for being more efficient.

2.6.1 The role of Government

The Government and Public administration play a crucial role in the development of e-invoicing in each country, not only for being responsible for establishing the legislation about it, but also for adopting the e-invoicing and promote it among the companies.

Since the public sector can play an important part in boosting adoption of e-invoicing, an active role of the public sector in standard-setting by market participants would be very welcome. A jointly established standard that satisfies public sector requirements should allow state authorities to promote their declared objective of boosting the efficiency of the European economy by actively using e-invoicing. The use of such a standard by state institutions would have the side-effect for private users by reducing the uncertainty surrounding the legal and above all tax recognition of electronic invoices and boost their acceptance. For example in Germany, the recently founded Forum für elektronische Rechnungen is meant to be a platform for cooperation, bundling state, user and provider interests in order to promote e-invoicing. (DB Research, 2010)

Although the coordinated standard - setting is promising, it will remain open if a critical mass of e-invoicing users will be reached. This is because it remains a market-oriented process with each potential user taking his individual decision whether or not to use e-invoicing.

European public administrations have been collaborating for some time now in order to firm up interoperability criteria, which are desirable, without prejudice to sovereignty issues, in public procurement and other development activities carried out by public authorities. One of the most relevant developments is the Peppol Project (Pan-European Public Procurement Online). The aim of this project is to establish a pilot solution at European level that, together with

national solutions, will facilitate an interoperable electronic public procurement system across Europe. (Asimelec, 2010)

Also is important to mention, the specific role taken by governments and public bodies in Denmark, Spain, Sweden, Finland, Italy, representing the currently most advanced public sector initiatives in Europe. (EBA-Innopay, 2010)

From the standardization point of view, it is worth mentioning two initiatives of the CEN (European Committee for Standardisation). One of these is the CEN/ISSS Business Interoperability Interfaces for Public e-procurement in Europe Workshop (BII), which, based on UBL, defines the necessary messages based on the ontology defined by CODICE (Interoperable Components and Documents for e-procurement), among other references. CODICE is a development promoted by the General Directorate of State Assets, which is part of the Spanish Ministry of Economy and Finance). (Asimelec, 2010)

EU governments are also engaged in a major initiative, PEPPOL (pan-European public procurement online), whose objective is to allow any company and, in particular SMEs, in the EU to communicate electronically with any European governmental institution for the entire procurement process. The PEPPOL initiative has an e-Invoicing component which will allow the exchange of e-Invoicing documents between all relevant stakeholders. (EBL, 2009)

The other initiative is the CEN Workshop on e-Invoicing, which has already initiated Phase III, following the publication in previous phases of relevant documents and surveys on the application of electronic invoicing regulations throughout Europe. (Asimelec, 2010)

As far as is possible to tell at this stage such public sector initiatives are not designed to create a parallel stream to private sector activity but rather to help deliver and stimulate a common user experience for all situations.

2.6.2 The role of Banks

"Driven by a desire to get paid more quickly, companies are moving more of their invoices and payment to the internet. Businesses care more about faster cash flow than they do about cutting costs." (Gartner, 2001).

In this way, E-invoicing has attracted increased interest within the banking community over the last couple of years. Banks' interest in e-invoicing has been twofold (Swift, 2008):

a) To provide a platform for customer to customer communication of e-invoices and

b) To provide e-invoice integration with existing cash management and supply chain services. Offering an e-invoicing solution represents an added level of sophistication to the core banking service proposition that banks offer to their corporate customers. This business has the potential to become a differentiator in the marketplace and serves to complement traditional product offerings in transaction banking.

Whatever the public sector impetus, broadening e-invoicing adoption in Europe will require a serious effort from the private sector. Banks have a vital role to play, and there are unprecedented opportunities to seize. Of all private sector institutions, they are probably the best placed to shape the development of e-invoicing, and consequently to profit from it.

Consequently, they are well placed to reach out to potential new adopters. In the SME market banks could act as invoicing consolidators, connecting and distributing e-invoices on behalf of a range of billers and buyers. The banks would no doubt face competition from IT providers and others, but their ability to integrate e-invoicing with payments and cash management should give them a golden opportunity to build large proprietary platforms. (PWC, 2009)

2.6.3 Involvement of Providers

The business of service providers in the e-invoicing market is to add value to invoice senders and/or invoice receivers. Such value added services can be categorized, ranging from exchange and conversion services (mainly focused on the creation of an exchange network) to complete sourcing of accounts payable or accounts receivable management services.

In Europe there are a large number of service providers and service solutions with a huge variety of product features and business models. This in part is a reflection of the variety of countries, languages, commercial practices, service concepts, legal environments and implementations of relevant EU directives. Many of the generic models are similar to practices carried out in North America and elsewhere. (EBA-Innopay, 2010)

The general characteristics of the providers of e-Invoicing in Europe are (Billentis, 2011):

- SME focused providers.
- Providers in certain geographical regions: countries with government initiatives, such as Estonia, France, Spain & Switzerland; others in Southern and Central/Eastern Europe.
- Providers from the financial services industry segment.
- Rapid internationalization of the offering.
- Increasing cooperation among providers, interoperability for cross-platform message exchange.
- Mergers & Acquisition deals are expected to in the next years to consolidate and increase the market penetration.

The overall number of service providers in the e-invoicing market (see Table 1) has grown from 160 in 2006 to 400 in 2009. Some commentators suggest a continued growth in the number of service providers, whilst others are expecting a major consolidation. (EBA-Innopay, 2010)

2006	2007	2008	2009
160	260 (+60%)	350 (+34%)	400 (+14%)[18]

Table 1. Number of invoicing service providers in Europe (Billentis, 2010)

2.6.4 Companies and situation of SME's

Many promising community based and commerce solutions have been launched. Surveys have shown that over half of the companies with large invoice volumes are planning to implement e-invoicing and archiving and over one third are already

involved in some way. Over 70% of such companies have reported increased efficiency. (EBA-Innopay, 2010)

In the corporate to the SME market where large buyers receive invoices from smaller suppliers or large suppliers send invoices to smaller buyers, the power distribution in such supply chains is often in favor of the large enterprise and as a consequence, they can enforce their e-invoicing requirements on SME‘s. (EBA-Innopay, 2010) Such requirements can include:

- Choice of e-invoice content standard: large buyers often impose their e-invoice format on SME‘s. This can be a proprietary standard, or a more widely adopted standard.
- Connectivity options: Large enterprises can require smaller entities to use certain connectivity options for the delivery of e-invoices, such as AS2, or similar communication protocols. In certain cases, it is not uncommon that the larger entity also offers a web portal for the issuance or presentment of invoices, but the choice is often limited from an SME‘s point of view.
- Service provider: Where enterprises have outsourced their e-invoicing process to a service provider or a business process outsourcing partner, smaller entities are often forced to use that service provider for delivery or presentment of e-invoices to that enterprise.

Electronic invoicing allows SMEs to grow their business, in terms of orders, customers or suppliers, without having to invest in a proportionate number of employees to carry out repetitive administrative tasks, for which the process automation is best suited. Employees currently entering invoice data manually into the company’s internal system, opening and closing envelopes and archiving paper documents, will be able to allocate their time to more value added tasks, such as customer relationships. (EBL, 2009)

A key benefit of electronic invoicing for SMEs, beyond the efficiency and cost reduction, is the opportunity (or competitive advantage) to have access to a wider market of potential customers and suppliers, especially large corporations, who prefer working with e-capable trading partners. Any

opportunity to improve and expand business relationships in the current economic conditions is extremely valuable and worth pursuing. (EBL, 2009)

Also have be taken into account that, the development of the Internet and in particular, Internet based technologies, such as Software as a Service (SaaS) and cloud computing, has led to new models for outsourcing of business processes, especially targeted for SMEs. Software as a Service is a concept that makes it possible to deliver software over the Internet, enabling service providers to deploy software solutions once and make it available to a large number of enterprises. This has significantly reduced the required implementation investment for the end user, and low IT skills for implementation, management and use are required from the end-user. (EBA-Innopay, 2010)

With the growing adoption of the Internet and Internet based technologies, many more solutions for e-invoicing in the SME market can be based on these technologies, as they effectively allow SMEs to outsource their e-invoicing and related processes without the risk and complexity often accompanied with large IT projects. (EBA-Innopay, 2010)

E-invoicing is rapidly becoming the preferred means to exchange invoice data. SMEs must be prepared for this natural market evolution.

2.7 The landscape of the Electronic Invoicing in Europe

As being the focus and scope of this research, now is reviewed in a general way the current situation of the e-invoicing in Europe, identifying the common facts, initiatives of the European Commission and conditions that have allowed or blocked its development in Europe.

E-invoicing in Europe forms part of a global trend in North America, and Asia Pacific, being the areas of growing activity for e-invoicing, as to the digitalization of the invoice refers, as shown in Table 2 . In all three areas, overall penetration remains relatively low but growing. There is some evidence for a greater focus on EBPP in North America and on EIPP in Europe. Both areas have seen a reasonable adoption of EDI particularly in industries with tight and integrated supply chains. Both Japan and Australia have seen growing activity. It is

estimated that Europe accounts for 56% of the e-invoicing market, while North America and Asia-Pacific accounts for 35% and 7% respectively. (SWIFT , 2008)

Country	% of e-invoicing market	E-invoicing adoption (2008 estimate)
Europe	56%	4-15%
North America	35%	3-10%
Asia-Pacific	7%	[unknown]

Table 2. Relative size of e-invoicing market and adoption in three major global areas (SWIFT, 2009)

2.7.1 Current status of e-Invoicing in Europe

Europe generates around 27 billion invoices per year and the number of invoices being sent electronically is growing exponentially. Out of the 25 countries in Europe, Germany, Sweden, Norway and Finland send the most e-invoices, followed by France, UK, Netherlands and Belgium. (Accountis, 2010)

To help facilitate and support this growth in e-invoicing, the EC Directive on Invoicing (2001/115/EC) was introduced in 2004. It was the aim of the Directive to simplify and harmonize VAT invoicing requirements across Europe to make it easier for businesses to conduct cross-border trade. Each member state was required to implement the Directive by January 2004. Since then all e-invoices have been accepted as legal VAT documents by all EU Member States, provided that they meet with specified security requirements.

There is no doubt that the Directive provided a valuable set of guidelines for member states to follow regarding e-Invoicing in Europe. But unfortunately it did not lead the way to one common legislation used collectively by all, far from it. (Accountis, 2010)

There are two findings that describe and helps to see the current picture of the e-Invoicing in Europe:

1. *E-invoicing continues to grow very rapidly from a low base, but there remain major under-addressed market segments, particularly in the*

SME (Small and Medium-Sized Enterprises) sector. (EBA-Innopay, 2010)

There are compelling forces at work to encourage the growth of e-invoicing. But although it has been in the 'early stages of development' for over 20 years, it is reported that less than 10% of volumes are currently based on electronic communication instead of paper. Annual corporate and public savings of over €200 billion are estimated to be available across Europe as a whole. (Accounts, 2010)

The adoption rate of e-invoicing is accelerating with varying growth rates per country and variations between business-to-business and business-to-consumer invoicing. The Nordic countries are well recognized as leaders, but many other western European countries are seeing strong growth as well. Domestic volumes predominate but cross-border invoicing is also growing, as market integration occurs at both a trade and enterprise level.

In general, the current focus is on outbound and inbound volumes from and to the large corporate entities and public administrations, especially in the accounts payable area, and mass-consumer invoicing initiatives from utilities and similar entities. The strong market power of these players is driving these developments. The role of the public sector is instrumental in some cases, for example in Denmark and Spain. (EBA-Innopay, 2010)

2. *The European market for e-invoicing services and solutions is very fragmented, and reaching all potential e-invoice users is a key issue, which banks could assist in addressing.* (EBA-Innopay, 2010)

A wide variety of e-invoicing services and solutions are offered by over 400 service providers focusing on varying needs and different market segments. This picture has not altered substantially since 2008 although anecdotal evidence would suggest that less than 50 service providers have a real critical mass of customers and business volume. Service providers who act as 'consolidators' and other players, including banks, overlap in functionality and reach. (DB Research, 2010)

Service providers are often geographically oriented. There are many ways of exchanging invoices including bilateral, 3-party and 4-party models. To try to deal with this fragmentation and the need to reach, service providers have

begun to connect with each other based on interoperability or roaming agreements (the word roaming appears to now be less favored and market participants mainly talk about ” interoperability” agreements).

Bank-inspired models have also shown a promising ability to address the ‘reach‘ problem with SMEs and consumers and indeed, where such models co-exist with service provider models, there is an encouraging trend of adoption. Banks have notable assets including trust and experience with payment networks and the ability to provide supply chain financing. Many non-bank service providers bring strong business integration and IT skills and are often used by corporations and banks for business process outsourcing. There are also initiatives, which promote an ‘any to any‘ model, in which trading parties could participate in an open eco-system to exchange messages with their counter-parties. (EBA-Innopay, 2010)

To describe the complete situation, also is important to mention the role of European Governments in the development of e-Invoicing in Europe; a growing number of European governments are committed to fostering e-Invoicing adoption. In order to reduce the administrative burden to companies, EU governments (such as The Netherlands) are simplifying and harmonizing the national legal framework removing current legal barriers. A harmonized legal framework and the adoption of a common global standard are two fundamental conditions for reaping the potential benefits of e-Invoicing. (EBL, 2009)

An important activity that EU governments could take is the promotion of a global non-proprietary standard, that satisfies the needs of communities currently using national and industry specific standards. As the single largest buyer in the European economy, the public sector would give an enormous impetus to convergence towards a common standard, reducing the costs and complexities of data translation across the entire e-Invoicing ecosystem.

Certain EU Member States, especially in countries where e-Invoicing is mandatory for the public sector, offer simple tools for users in the Business-to-Government domain. The Danish National IT & Telecom Agency launched an open e-Business framework – NemHandel – for the exchange of e-Business documents in a secure and reliable environment. (Pentinnen, 2008)

EU governments are also engaged in a major initiative, PEPPOL (pan-European public procurement online), whose objective is to allow any company

and, in particular SMEs, in the EU to communicate electronically with any European governmental institution for the entire procurement process. The PEPPOL initiative has an e-Invoicing component which will allow the exchange of e-Invoicing documents between all relevant stakeholders. (EBL, 2009)

At the same time, the European Commission is running an e-Invoicing and e-Ordering pilot project (e- PRIOR) with a number of suppliers. The main goal of this project is to gain real-life experience with e-Invoicing and to share the lessons-learned with Member States and any other interested stakeholders. (Asimelec, 2010)

The other side of the order-to-payment cycle is payments. SEPA (Single Euro Payments Area) is an initiative of the European Union for the creation of a single payments market within which electronic payments are simple, safe, cost effective and efficient. SEPA will make it possible for individuals, companies, government agencies and others, no matter where they are located in Europe, to make and receive Euro payments by using two payment instruments (SEPA Credit Transfer and SEPA Direct Debit) and to use credit and debit cards with standardized basic conditions, rights and obligations in every country. (EBL, 2009)

Despite all the efforts and facts in favor of the adoption of e-Invoicing, technical obstacles to e-invoicing adoption in Europe are due in large part to differing practices among EU member states. The most notable involve lack of cross-border agreement on VAT rules, uncertainty about the legal validity of electronic documents, differing standards for the recognition of electronic signatures, the variety of Electronic Data Interchange (EDI) standards in use, and the lack of standardized invoice formats. (PWC, 2009)

Large private sector companies are currently making good use of B2C e-invoicing, especially for bill presentment. However, the companies best placed to build confidence in e-invoicing – the banks themselves– have often hesitated to make what look like risky, unilateral investments, given the need for multilateral action to break down barriers to e-invoicing adoption. (PWC, 2009)

At next are presented and reviewed some overall dimensions and statistical trends about the e-Invoicing in Europe:

The total number of invoices exchanged in Europe in 2009 was approximately 32 billion (paper and electronic). 50% of this is B2B and 50% is B2C. As many

as 200 billion commercial documents, including payroll slips were resented in some kind of standardized forms, including the invoice totals mentioned. (See Table 3)

Country	Amount (mln)	Country	Amount (mln)
Germany	6,500	The Netherlands	1,200
UK	4,200	Belgium	900+
France	4,000	Austria	800 (2006)
Italy	3,000	Switzerland	650
Spain	1,800	Finland	400
Sweden	1400	Norway	350

Table 3. Number of invoices in some key European countries (EBA-Innopay, 2010)

E-invoicing remains to be mainly a domestic activity, since 95% of all transactions are between entities with the same address. Nevertheless as intra-European trade grows, cross-border invoicing is also set to grow. Further, at the enterprise level integration is also taking place with the growth of shared service centers which will also stimulate cross-border invoicing. (EBA-Innopay, 2010)

E-invoice penetration rates are growing fast from a low base (See Table 4). For B2B the total volume of processed e-invoices is expected to reach 1,265 million, for B2C, volume is estimated at 925 million in 2010 Growth rates in 2009 are estimated to be 40% for the B2B segment, while the B2C growth rate is 25%. The total number of e-invoices sent in 2009 is estimated to be 1.36 billion (against 1 billion in 2008). (DB Research, 2010)

Year	2006	2007	2008	2009	2010[14]
# E-invoices In millions	510 B2C: 250 B2B: 260	730 B2C: 300 B2B: 430	1,010 B2C: 400 B2B: 610	1,360 B2C: 500 B2B: 860	2,190 B2C: 925 B2B: 1,265
Market penetration	1.7%	2.4%	3.4%	4.5	7%

Table 4. Growth of e-invoicing in B2B and B2C segments (DB Research, 2010)

Adoption rates differ largely per country. The Nordic countries are still ahead in terms of B2B adoption rates (> 12%) followed by Ireland, Spain, The Netherlands and Estonia (6-12%) and the rest of Western Europe (1-6%). Adoption rates for B2C are lower, but follow a similar pattern: the Nordic countries (6-12%) followed by Western Europe (1-6%). (Billentis, 2010)

B2B adoption is mainly driven by Business to Business and Business to Small Business e-Invoicing. Adoption of Small Business to Small Business e-invoicing is relatively low.

Invoice users

The invoice users are the senders and receivers of e-invoices. The number of users of e-invoicing is growing fast. Reported growth rates in the B2B segment are 50% in 2009, but also the B2C segment shows significant growth (22% in 2009). The total number of registered businesses in Europe is at least 20 million15 with some estimates up to 23 million (See Table 5). (EBA-Innopay, 2010)

Company size	Amount
SME	~23 Million
Large	~200,000

Table 5. The total number of European businesses per company size

The number of consumers participating as receiver in e-invoicing has grown from 23 million to 28 million, a growth of 22%7. The total number of consumers in Europe is 490 million. (Enterprise Europe Network, 2010)

		To (receiver)				
		Corporate	Medium	Small	Consumer	TOTAL
From (sender)	Corporate	12%	2%	3%	43%	**60%**
	Medium	7%	10%	1%	5%	**23%**
	Small	0%	8%	8%	2%	**18%**
	TOTAL	**19%**	**20%**	**12%**	**50%**	

Table 6. Number of invoices exchanged between market segments (Postfinance 2010)

The Table 6 illustrates some of the key directional flows of invoices between various market segments. The information is based on Swiss figures and is representative of an advanced European society. In particular it should be noted that over one third of all invoicing takes place within the SME sector and between SMEs and consumers, 43% of invoicing takes place between large entities and consumers, and the rest (principally B2B involving large companies) accounts for around 24%. (Billentis, 2010)

The above analysis illustrates the importance of creating much wider reach into the SME and consumer sectors. Even if the figures were to be appreciably inaccurate when applied to Europe as a whole, the point still stands.

2.7.2 The role of the regulatory framework

E-invoicing has been encouraged by the adoption of European legislation supporting e-invoicing but this legislative framework requires further evolution, especially in greater clarity and harmonization. E-invoicing should not be legally more demanding than paper invoicing. (Billentis, 2010)

The proposal of the European Commission to simplify, modernize and harmonize the VAT directive (Directive 2006/112/EC) is a promising development, being less prescriptive of technology, while preserving safety and auditability.

Recently a new draft VAT Directive was adopted as a first step by ECOFIN with the initial support of all EU Member States. Although this piece of legislation will be required to complete EU institutional processes, it is an encouraging development. (European Commission, 2010)

It is important that as these new more flexible rules are introduced major efforts are made to achieve harmonization across the European Union and that a high degree of clarity is provided, especially for ‘cross-border’ transactions within Europe. This should also apply to other non-VAT regulations that affect e-invoicing although these are not as critical as the VAT rules.

The current rules for e-invoicing are based on European Union Directives, which have been transposed into Member State laws and regulations. EU Council Directive 2001/115/EC provided for the acceptance of e-invoicing under a number of conditions and these rules were later incorporated in the 2006 VAT Directive and are set out in the box below (EBA-Innopay, 2010) :

COUNCIL DIRECTIVE 2006/112/EC of 28 November 2006 on the common

ART. 233

1. Invoices sent or made available by electronic means shall be accepted by Member States provided that the authenticity of the origin and the integrity of their content are guaranteed by one of the following methods:

a. By means of an advanced electronic signature within the meaning of point (2) of Article 2 of Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community framework for electronic signatures ;

b. By means of electronic data interchange (EDI) as defined in the Commission Recommendation of 19 October 1994 relating to the legal aspects of electronic data interchange (—EDI Recommendation‖), if the agreement relating to the exchange provides for the use of procedures guaranteeing the authenticity of the origin and integrity of the data. Invoices may, however, be sent or made available by other electronic means, subject to acceptance by the Member States concerned.

2. For the purposes of point (a) of the first subparagraph of paragraph 1, Member States may also ask for the advanced electronic signature to be based on a qualified certificate and created by a secure-signature-creation device, within the meaning of points (6) and (10) of Article 2 of Directive 1999/93/EC.

3. For the purposes of point (b) of the first subparagraph of paragraph 1, Member States may also, subject to conditions which they lay down, require that an additional summary document on paper be sent.

(European Commission, 2006)

In summary, for e-invoicing to be compliant with laws in the European Union, there are a number of major conditions laid down (EBA-Innopay, 2010):

- *The acceptance* by the customer: the customer should be able to decide whether to accept or decline e-invoicing by the supplier.
- *Authenticity* of origin and integrity of content must be guaranteed. Authenticity means that the declared source of the invoice is the true source. Integrity means that there must be no undetected alteration of data throughout the life of the invoice including the period of creation, transmission, processing and the relevant storage period. This can be achieved by means of an advanced electronic signature, by the use of Electronic Data Interchange (EDI) or "other means" accepted by individual Member States. (European Commission, 2006)
- The invoice must contain *ten mandatory items of information* with the possibility of an additional four items in specific circumstances (European Commission, 2006).
- *Archiving* requirements are specified.

At next are described in deep the conditions and details that must take into account to fulfill the legal requirements of the e-Invoicing.

The three technology options

The EU Council Directive 1999/93/EC defines an Advanced Electronic Signature and specifies the following requirements :

- Connected to the signer in a unique way.
- It must be possible to identify the signer.
- It must be created under the exclusive control of the signer.
- There must be the possibility to trace every subsequent change.

Additional requirements may include:

- Qualified certificate (Art. 2 (10)).

- Secure-signature creation device (Art. 2 (6)).

The transposition of the Directive on the Advanced Electronic Signature has been completed in different ways in EU Member States. (European Commission, 2006)

EDI is defined by the Commission Recommendation 94/820/EC essentially as an electronic transfer of commercial and administrative data using an agreed format, from computer to computer and processed automatically and unambiguously. There needs to be an agreement providing for procedures guaranteeing the origin and authenticity of data within such an EDI method.

'Other means' include any other means approved by a Member State that guarantees authenticity of origin and integrity of content. (European Commission, 2006)

e-Archiving requirements

The EU Council Directive 2001/115 defines requirements for the archiving of invoices in a secure and safe way for the duration of the storage period as defined by Member States. Consequently the archiving of e-invoices is as a crucial part of the process as the creation, exchange and settlement.

The conditions for e-archiving are (PWC, 2006):

- Every taxable person shall ensure that copies of invoices issued by himself, by his customer, or in the name and on his behalf, by a third party, and all the invoices which he has received are stored.
- The authenticity of the origin and integrity of the content of the invoices, as well as their readability must be guaranteed throughout the storage period.

The place of storage :

- Any EU member state, if there is online access to the data.
- Outside the EU, if there is online access to the data and the country where invoices are stored respects the European Data Protection

principles. Even then Member States can exclude this if there are no mutual assistance agreements with the latter country. Some Member States do not permit storage outside the EU. (European Commission, 2006)

The period of storage:

- The storage period is defined by the individual member state. (European Commission, 2006)

The format of storage:

- Member States have the option to require storage in original format: e.g. Invoices sent or received electronically, must be stored electronically in most Member States.
- Member States have the option to require the storage of additional information. (European Commission, 2006)

Cross-border e-invoicing and e-archiving

The effort required for being compliant may appear more difficult when enterprises are doing business cross border in the EU as uncertainty exists with relation to which country's rules apply. The rules on invoicing are those applicable in the Member State where the supply takes place for VAT purposes (this can be in the Member State of the supplier or the customer, depending on the type of transaction).

It must also be noted that e-Invoicing is at the crossroads of other legal fields, like corporate tax, accounting and privacy law and these areas should be dealt with just as they would with paper invoices (e.g. data privacy considerations regarding location of invoice storage, archive period, etc.). (EBL, 2009)

Summary of basic of requirements of each country Regulatory Framework

In the table 7 can be seen the basic requirements and its compliance in each European country which permits to identify the similitudes and differences between regions and even between countries with the same economy and conditions.

	EDI accepted	E-signature type - mandatory only when EDI not used and other means not accepted	Other means accepted	Customer agreement required	Notification to authorities re-quired before issuing e-invoices
Austria	Yes	AES	No	Yes	No
Belgium	Yes	AES	Yes[4]	Yes	No
Denmark	Yes	AES	Yes	Yes	No
Estonia	Yes	QES	Yes	Yes	No
Finland	Yes	Any	Yes	Yes	No
France	Yes	AES	No	Yes	No[8]
UK	Yes	AES	Yes[5]	Yes	No
Greece	Yes	QES	Yes	Yes	No
Spain	Yes	QES	Yes[7]	Yes	No
The Netherlands	Yes	AES	Yes	Yes[6]	No
Portugal	Yes	QES	No	Yes (E)	No
Slovak Republic	Yes	QES[2]	No	Yes	No
Sweden	Yes	Any	Yes	Yes	No
Switzerland	Yes	QES	No	No	No
Hungary	Yes	QES[3]	No	Yes	No
Germany	Yes	QES	No	Yes	No
Latvia	Yes	QES	No	Yes	No
Ireland	Yes	AES	Yes	Yes	No[1]
Norway	Yes	AES	Yes	Yes	No
Poland	Yes	QES	No	Yes (E)	No
Luxemburg	Yes	AES	No	Yes	No
Slovenia	Yes	QES	No	Yes (E)	No

Table 7. Country specific requirements for e-Invoicing in Europe (EBL, 2009)

At following are explained the terms used in the table:

[4] In Slovak Republic, complementary regulations to the Electronic Signature Law No. 215/2002 came into force on April 8, 2009.
[5] In Hungary, a time stamp is required.
[6] In Belgium, when using other means to ensure authenticity and integrity an individual authorization is required from the Belgian Ministry of Finance.
[7] In the UK, the existence of business internal controls, or good practices, when using other means, is sufficient to ensure compliance (HMRC Notice 700/63 Electronic Invoicing, June 2007).
[8] Since 16 February 2009, enterprises in the Netherlands are free to choose the form (PDF, for example) and means by which electronic invoices are issued, sent and received. In practice an electronic signature or the use of EDI is not mandatory anymore. However the rules only apply to transactions within the Netherlands. When using other means, notification to authorities is not required anymore.
[9] An individual authorisation is required by the Spanish tax authorities when using other means.
[10] In France, it is recommended to contact and notify tax authorities when using EDI for ensuring VAT compliance.
[11] In Ireland, if other means are used, the Revenue Commissioner must be notified accordingly.

Term	Description
Electronic Data Interchange (EDI) accepted	Acceptance of the specific Member State of an EDI system as one of the options to comply with VAT requirements for authenticity and integrity.
Type of e-Signature - mandatory ONLY when EDI is not used and other means are not accepted.	Mandatory use of a specific electronic signature in a Member State to ensure compliance, required only when a company does not use an EDI system, or when the use of other electronic means is not accepted in the Member State.
AES	Advanced Electronic Signature
QES	Qualified Electronic Signature
Any	Acceptance of any type of e-Signature (ES, AES, QES) in the specific Member State to ensure compliance
Other means accepted	Member State's acceptance of other electronic means to ensure compliance. Use of EDI or any type of electronic signature is therefore not mandatory.
Customer Agreement to receive e-Invoices	The customer has to agree to accept e-Invoices from the sender. The agreement can be reached informally between trading partners, or in certain Member States an explicit formal agreement may be required.
(E)	Explicit agreement (see above)
Notification to authorities required before issuing e-Invoices	It refers to the need to notify national authorities before issuing e-Invoices, in specific circumstances.

Table 8. Country specific requirements for e-Invoicing: Terminology

In the section 4 Empirical Analysis are described more in detail the different characteristics of the regulatory framework in the countries analyzed,

2.7.3 European Interfaces

Despite a number of barriers exist to greater adoption of e-invoicing in Europe, the service provider interoperability and harmonization of messaging standards are two subjects that have received significant attention for improving the situation. For example, there are over 15 different e-invoicing message standards in use today within different vertical industries and country boundaries. In this way, a handful of pan-European standards represent the majority of transaction volume with a long list of others competing for adoption. (CBI, 2011)

Each of the major countries in Europe have adopted one (or two) major e-invoicing messaging standards. In many cases, the public sector, eager to reduce procurement costs, have mandated the use of a specific messaging framework. (DB Research, 2010)

Below are some of the more popular country-specific standards and also other standards used on a Pan-European basis:

Country	Standard	Description	Source
Austria	*ebInterface*	Is an XML format, it was designed as an alternative to more complex EDIFACT-based interfaces for small and medium businesses. The standard is on its third release and is now integrated into many popular ERP systems.	CBI, 2011
Denmark	*OIOUBL and OIOXML*	Contains an e-invoicing standard, OIOUBL is a customization of the OASIS UBL 2.0 standard for the specific needs of the Danish business community. OIOUBL is designed as a replacement for OIOXML, an older Danish e-invoice standard.	CBI, 2011
Finland	*Finvoic*	An XML schema used in Finland and Belgium for B2G, B2B and B2C e-invoicing. Finvoic is often used in a four-party model by local Finnish banks such as Nordea and specialized providers such as Isabel of Belgium.	CBI, 2011
Italy	*CBI*	Means Interbank Corporate Banking in English. CBI is a network connecting 600+ banks and 800,000 corporates to exchange invoices, payments and other documents. CBI has built an e-invoicing standard based upon UN/CEFACT for secure exchange between buyers and sellers.	CBI, 2011
Netherlands	*Standaard Digitale Nota*	Proprietary format used as part of the Via Mijn Bank initiative. The format is a product of cooperation between the major Dutch Banks and invoicing consolidators.	CBI, 2011
Norway	*e2bformat*	Popular with small and medium businesses for e-invoicing both in the private and public sector. There is a planned convergence between e2b and the NES UBL standards.	CBI, 2011
Norway	*NES UBL*	Stands for Northern European Subset (NES) Universal Business Language (UBL), a new format that will be the standard required by the government for e-invoices.	CBI, 2011
Spain	*e-facturae*	Popular for public sector e-invoicing and in the banking system to support factoring. I have also seen it referred to as Factura-e. Spain's goal is to create a convergence between the e-facturae and the new UN/CEFACT cross-industry invoice standard.	CBI, 2011
Sweden	*SFTI* (Single-Face-To-Industry)	Originated in the public sector, is a based upon EANCOM messaging standards utilizing X.400 or S/MIME for transport. SFTI supports complex e-invoicing scenarios such as metered services, payment cards, subscriptions, rentals and leasing as well as upstream processes such as price list, call-off	CBI, 2011

		and dispatch advice.	
Sweden	*Svefaktura*	As SFTI is too complex for many SMEs in Sweden. Consequently, the government developed Svefaktura (SwedInvoice) with the goal of "the simplest approach possible." The standard includes XML messaging specifications, communications and security protocols, but offers very limited opportunities for customization.	CBI, 2011
Portugal	*SAF-T*	The Standard Audit File is an XML message scheme used to support taxation and audit purposes. Based upon the OECD's SAF-T format, the standard includes a few customizations to support the local Portuguese market.	CBI, 2011
Pan-European Cross Country	*EDIFACT INVOIC*	The most popular of all the e-invoicing standards is the original EDI standard developed by the United Nations. EDIFACT stands for United Nations/Electronic Data Interchange For Administration, Commerce and Transport (UN/EDIFACT). EDIFACT has many derivatives in different vertical industries and country implementations	EBA-Innopay, 2010
Pan-European	*Tradacoms*	Is the most popular e-invoicing message standard in the UK, particularly within the retail industry. Originally developed by the UK Article Numbering Association (ANA), the standard has been obsolesced since 1995, but is still widely used around Europe.	EBA-Innopay, 2010
Pan-European Cross Country, Industry specific: Grocery	*EANCOM*	Is a GS1 EDI standard that is based upon UN/EDIFACT, which only includes a subset of the EDIFACT messages. EANCOM is very popular in the retail sector	EBA-Innopay, 2010
Pan-European Cross Country, Industry specific: Automotive	*VDA 4938*	E-invoicing standard designed for the European automotive industry. VDA stands for Verband der Automobilindustrie, which is a German-based e-business standards organization that is part of ODETTE. VDA is also used for engineering designs, materials management and logistics exchange by over 4000 automotive OEMs and parts suppliers throughout Europe.	EBA-Innopay, 2010

Table 9. List of standards of e-Invoicing around Europe

2.8 Landscape Electronic Invoicing in the rest of the World

The e-invoicing around the world have passed through different processes and evolution, which depends of several internal and external factors of each country, as the economic development, the legislation, the development of the industry and not less important the penetration of the internet and ICT.

The main features of e-invoicing in the world as a brief review are (Billentis, 2011):

- Almost all markets with classical evolution from issuer-centric B2C direct model towards recipient-driven B2B model.
- Legislation: world is divided into two groups
    1. Parts of Europe with demand for E-Invoices without electronic Signature.
    2. LATAM & Asia with the obligation for electronic signature and the US with increasing popularity for it
- E-Invoicing as real-time or near real-time audit instrument for the government; aim to reduce the shadow economy (over-/under invoicing, not declared deliverables).
- Market learned, that on-boarding of trading parties is a major project and needs budget.

At next is described the situation of the e-Invoicing in each continent and reviewed the main differences and factors that influenced its development.

2.8.1 North America

In the U.S., there is no real VAT concept in taxation, but the final transaction between buyer and seller carries a tax that depends on state and federal administrations. This tax is generally enforced by examining the records of a company, which the Internal Revenue Service regulates very heavily for taxpayers who keep records only in electronic format.

Despite a 1996 law that requires the U.S. government to make payments electronically, only 27% of federal contractors use e-invoice presentment and payment (EIPP) to present invoices, and only 26% receive payments from the government via EIPP. Many companies (several U.S. government agencies have e-invoicing mandates as well) send and receive payments electronically, but the purchase-to-pay and order-to-cash processes are not fully automated, nor are they particularly well-integrated to process or produce e-invoices. There are no explicit requirements for e-signatures. (Gartner, 2009)

The Canada Revenue Agency (CRA) has issued a series of circulars on electronic transactions and records for income tax purposes. These rules also apply to e-invoices. (Gartner, 2009)

In summary the main features of the e-Invoicing in North America are (Billentis, 2011):

- Still very consumer and bill issuer focused.
- Payment and Procurement as the main drivers.
- Companies are giants; preference for direct model for AR/AP optimization; demand for 3rdparty operators linked with electronic payment and closed loop with e-Procurement.
- The hindrance for faster market penetration.
- Lack of standards (market awareness, not reality).
- Very little initiatives in the public sector.
- Large enterprises (> $ 500m revenues) with around 50% usage, but very limited usage among SMEs.
- 3rd party operators are not very powerful compared to Europe and LATAM.

2.8.2 South America

The landscape in South America is less developed that in the North America or the European countries, except for some initiatives in an industrialized country as Brazil and multinational companies.

In summary the main features of the e-Invoicing in South America are (Billentis, 2011):

- Very strict legislation.
- Digital signatures pre-requisites.
- Typically online interaction with the government before issuing an E-Invoice respectively shipping goods.
- E-Invoicing mandatory in some countries for invoices to the public sector and/or within the private industry.
- Many European companies strongly affected by obligation from Brazil (e.g. 5,000 companies in Germany).
- Service providers with key roles; some giants.
- Brazil as potential inspiration for other countries abroad, e.g. Mexico after January 2011.

2.8.3 Asia

In Asia the most developed and growing markets are Japan and China, so in these two countries are focused the mostly all initiatives for the mass adoption of e-Invoicing in Asia.

Japan is a notable exception among economically strong Asian countries in that paperless invoicing is not permitted without explicit approval from the tax authorities. (Gartner, 2009)

E-invoicing, as known in other parts of the world, is prohibited in China. The Chinese tax authorities are rolling out a central-government-controlled e-hub under the Golden Tax Project, which will increasingly be the only permitted channel for invoicing, reporting and paying applicable taxes. The project is designed for the communication of tax-relevant transaction information among businesses, which makes it an automated law enforcement engine requiring little manual intervention by the tax authorities. (Gartner, 2009)

In summary the main features of the e-Invoicing in Asia are (Billentis, 2011):

- The leaders are Singapore, Hong Kong, Taiwan, South Korea and the Shipping Industry.

- Electronic trading (and financing) is more in the foreground than just E-Invoicing.
- Most countries are in the evolution phase 1: Large bill issuers start with “Bill Presentment” via portals.
- China not yet permitted, except state owned invoice checking network.
- Japan still with legal constraints (permitted only with explicit approval of the tax authorities).
- India with public sector project to push electronic business/invoicing; intends to go the “European way”.
- Russia: Legislation will now allow E-Invoicing; take-off.

2.8.4 Africa

E-invoicing remains illegal in the vast majority of African countries. Some Northern African countries, such as Tunisia and Morocco, have matured regulatory and institutional frameworks for the recognition of electronic transactions (including e-signatures) in general, but they do not have specific regulations for e-invoicing. (Gartner, 2009)

South Africa has allowed e-invoicing since September 2002, but e-invoicing traffic remains low among businesses and tax authorities.

In summary the main features of the e-Invoicing in Africa are (Billentis, 2011):

- The leader is South Africa and Kenya with some volume in B2B and B2C.
- Most countries are in the evolution phase 1: Large bill issuers start with “Bill Presentment” via portals respectively via online banking (Egypt, Tunesia).
- A South African solution provider is strongly influencing the market awareness with its’ email based approach, not only in Africa, but also in some Commonwealth States.

3 RESEARCH METHODOLOGY

3.1 Introduction

In this section is described in a detailed way the steps followed for the literature review, the main data collection, the confront of data with the use of interviews and questionnaires and finally, the analysis and approach used to interpret the data and present the facts identified and the results processed in a comprehensive way.

Also are explained the instruments and tools used in the research process, establishing the parameters and filters to obtain reliable and complete information but also identifying as starting point what will be considered as Electronic Invoicing and which aspects of it are interesting for the purpose. This is the main step of the methodology since each European Country has a different point of view and approach with respect to the Electronic Invoicing.

At the end is presented the method of analysis used, which aim is to identify general aspects and patterns that can be analyzed for most of the countries, and that permit determine a basic framework to measure the main aspects of electronic invoicing in a European Country visualize the different adopted models.

3.2 Instruments

This research is supported by diverse research instrument most of all used for the data collection process. First is reviewed manually the bibliography, sources and literature managed and collected by the Observatory along these years classifying the data by countries and purpose of the document with the aim of facilitating the posterior phase of data collection.

The search engines are the main instrument of research for this thesis due to the need for updated information that's is scattered along the internet from different countries and in different languages. In this way "Google" is

used in the initial phase of searching for new literature and another sources of information, after are used scientific search engines as Gartner and IEEE to look for specific elements and academic articles. When new specialized sources are identified, the search information will turn around in this circle of trustful, identifying specialized forums, blogs, portals, webpages vendors, government webpages and associations fully dedicated to the electronic invoicing, so in this way relationships and bounds between the information can be created, so at the end can result in reliable and consistent data for the analysis.

Another instrument used in this case for the data analysis is the radar chart or also known as spider web chart, that consists of a sequence of equiangular spokes, called radii, with each spoke representing one of the variables. The data length of a spoke is proportional to the magnitude of the variable for the data point relative to the maximum magnitude of the variable across all data points. A line is drawn connecting the data values for each spoke. This gives the plot a star-like appearance and the origin of one of the popular names for this plot. (NIST/SEMATECH, 2003)

Radar charts are a useful way to display multivariate observations with an arbitrary number of variables, and in this research will focus on the main elements of electronic invoicing that concerns for the analysis in the European countries. It's described in detail in the section 2.4 Method of Analysis.

3.3 Data collection

3.3.1 Basic research

The main phase of the data collection process is focused on the review, search and analysis of secondary sources, following an organized approach for check the existing literature managed by the observatory and after executing iterative steps for the search and evaluation of new possible useful information.

The steps followed for the search were:

1. Review the bibliography and existing sources identified by the Observatory, checking for useful or related information for the research but specially identifying sources of updated a reliable data.

2. Define the keywords that can be used to comply with the research purpose, also is necessary to provide different variables that can result in interesting additional or confronting information.

3. Execute iterative searches through Google and Bing with the aim of diversifying the kind of data collected and with the possibility of identify new sources of reliable information. For this task are considered some parameters and conditions to comply before collecting some data (are explained below), also is necessary to register all the history of searches so it can be obtained consistent data in an organized and efficient way.

4. Identify reliable sources that can have more important data, so it can be performed specific searches, for example in a different language or data published by specialized entities in Electronic Invoicing, by country or at European level.

5. Evaluate again the data obtained, looking for incongruences, repetitiveness, lack of reference or unreliable sources and classify it so it can be performed in an easier way the phase of analysis and statistics.

The conditions and parameters considered for the search and classification of the data are the following:

- All the data will be analyzed, but is considered as more important and relevant the information not older than June 2010, as one of the main purposes is given an updated view of the current situation of Electronic Invoicing in certain European countries. Another reason is that the differences between countries and the valuable benefits that involves this practice, convert it in a very changing subject during the last years, with the introduction of new legislations and new strategies for the implementation by each country.

- The data verification process consists in checking the number of coherent and reliable sources that's giving equal or similar data of a certain country or aspects of electronic invoicing. As more sources are found confirming the data, is considered more reliable but has been defined for this process that there must be at least two sources with similar and coherent information for considering it in the results of the research. Exceptions can be found when only is obtained a single source for certain information, in this case is evaluated if the source is reliable and is enough to include it in the results.

- The sources are considered depending of its reliability and recognition in the academic and business field, so are preferred sources as scientific articles, academic or government reports and official data of official communities or market players. Are avoided booklets or documents with some commercial interest of certain vendors, government statistics that reflects some makeup or interest in hiding the real status and also posts in blogs or webpages without any visible or reliable support.

- The main axis of the research is the Electronic Invoicing in the different countries of the European Union, identifying the main characteristics, regulations, practices and status of adoption and use at different levels (Public Administration, Industry and Small and Median Enterprises). Also are reviewed in deep for each country, two main aspects useful for this research: the electronic archiving and the Order to Payment Cycle integration, especially the Electronic Data Interchange.

- For the electronic archiving the aspects that are interesting for the research are the legislation of the time of archiving, procedures about digital signatures and time stamp, and the facts or statistics that shows its use and adoption between the companies.

- In terms of the Order to Payment Cycle, the search is focusing on how Electronic Invoicing is integrated in this cycle, especially with the use of EDI. So the main aspects to rescue from the data are the legislation adopted, the rates of adoption and use of EDI in each country and as this aspect is not so new for the companies, will be accepted data and sources from 2008 onwards.

- For this process of basic research is necessary to clarify and sustain the main definitions made in the literature review, so in that way is clear what is looked for in a wide and uncertain field as is the Electronic Invoicing. So for the data searched and presented is considered the e-Invoicing as the interchange and storage of legally valid invoices in electronic format only between trading partners without use or require paper-based invoices.

- Another clarification is about the data selected in each country as the rate of adoption of Electronic Invoicing. With the adoption is referred to the percentage of organizations (Companies, Public Administration, SME) that use Electronic Invoicing for their regular processes. It doesn't mean that all the processes are realized with e-Invoicing and also the number of invoices or number of companies issuing or receiving are not considered due to the different economies between the European Countries, so this data is better treated as the percentage of the organizations that are in the legal capacity to implement it and actually are using e-Invoicing for productive purposes.

- For the information and data searched and analyzed in this research, is considered more reliable and convenient to treat it independently by each country. It means that are not taking in account statistics, legislations or proposals for standardization, as the one proposed by the Experts Group[12], as is described further in the analysis, is considered that the information presented in this way doesn`t represent the real status and road that each country is following in terms of Electronic Invoicing.

3.3.2 Additional research

The second phase of the research is based in interviews, questionnaires and validation of data with experts in the field. The aim of this approach is to confront the data obtained in the basic research going closer to the use and

[12] Group created under the EU Commission Decision of 31 October 2007 to make recommendations on e-invoicing, jointly sponsored by DG Enterprise & Industry and DG Internal Market & Services and with experts of each European country.

implementation of electronic invoicing, where the benefits, conditions and obstacles to the adoption can be observed more clearly.

The idea of this phase is not to obtain new quantitative results, but instead obtain qualitative results and opinions of people that are involved in the Electronic Invoicing in its daily life, so can give a simpler and more realistic perspective of how is applied the e-invoicing and how is perceived by the different stakeholders from different perspectives.

The results of this phase are presented as study cases and surveys, selecting the more interesting and enriching results, diversifying in the points of view and in the situation of the country from which the expert belongs. The selection of experts consisted in identify contacts in different countries that can contribute knowledge and sincere opinions to the research, in this way were contacted first some collaborator and experts that had a previous relationship with the observatory and after were identified from the articles and the most reliable sources, some persons of different European countries that were selected by the Industry, Government and vendors and have been in touch with the development of e-Invoicing in their country.

Questionnaire for e-Invoicing experts in European countries

1. What do you understand for Electronic Invoicing according to the context of your country?

   This first question aims to clarify the concept of electronic invoicing conceived in their country, to obtain realistic and comparable results with respect to the concept of e-Invoicing managed in this research.

2. Which considers that is the adoption level of e-Invoicing in your country approximately?

   The idea is to get the first perception of the expert about the adoption rate of e-Invoicing, without contaminating the perception with the data of Billentis, due to that sometimes the lack of measures in the country causes simple acceptance of

external studies without reflecting the real status.

3. According to the Billentis report by Bruno Koch the level of e-Invoicing adoption in your country is XX. Do you agree with this estimate or consider that is inaccurate? Why?

Now with this question is confronted the perspective of Billentis in its last report, the idea is to collect feedback about this data directly from the experts of each country and give and idea about the quality of this source and how is measured this rate.

4. What do you think of the position of the government towards e-Invoicing in your country? There are portals, standards or obligation in Public Administration to impulse the adoption?

As the experts of each country are directly related with the government of the country, is of interest to hear the perception and opinion about how has attacked the government this subject and how has been affected the industry and the other stakeholders of the e-Invoicing by the decisions about his subject.

5. How do you see the development and adoption of EDI (recommendation 820/95 for e-Invoicing) in your country? If is widely used, in which sectors and conditions is more common?

The EDI is one of the most important elements to understand the development of the e-Invoicing in each country but paradoxically is the one with less measured data and indicators, mostly caused by the confusion with the traditional EDI used in the large companies since the 70's. So this question is trying to clarify and obtain more data and perceptions about it.

6. What is your opinion about the Regulatory Framework in your country? Do you think has been positive or negative for the adoption and development of the e-Invoicing in

your country?

At first sight can be deduced that the regulatory framework is the main factor to block or promote the e-Invoicing in a country providing easy mechanisms for its implementation. In this way this question aims to perceive different opinions about the regulatory framework and about the changes made by each country.

7. Is the digital signature or other mechanisms required for the e-Invoicing in your country? In your opinion what is the position of the industry against these measures, is seen as an obstacle or an enabler of the e-Invoicing?

The aim of this question is to collect the internal perception of the use of digital signatures in Electronic Invoicing and to know better about its implementation and its real use in the industry.

8. What is your perspective about e-Archiving in your country? Do you think is well defined in terms of regulation and diffused between the companies?

As EDI, the term of e-Archiving is also rarely treated separately and for this reason, there isn't neither too much data about it. The aim of this question is to collect opinions about the status of e-Archiving in each country, how is going the development and which mechanisms has been used to collect its benefits.

9. Which is the percentage of SME's in your country approximately?

In some European countries, the majority of companies are SME's, for this reason is important to facilitate their access to the e-Invoicing. So the aim of this question is to measure the impact that the e-Invoicing can cause in each country through its penetration in the SME`s market.

10. What is the situation and level of penetration of the e-Invoicing in the SME's? Do you think that are prepared for the e-Invoicing and that are supported by the government

and other stakeholders in this process?

Following the question above, this one aims to understand better the situation of the SME's and the efforts realized to promote the e-Invoicing between them.

11. How do you see the possible interchange of e-Invoices cross country in your country? Is already done or do you think is feasible?

Another uncertain subject about e-Invoicing and that have led increasing attention is the interchange of e-Invoices cross country. The aim with this question is to get a reliable concept about the possibility to do it in each country and about the efforts from the government to establish it.

12. How do you see the status of the e-invoicing of your country compared with the rest of Europe? Do you have data of other countries? How you see the future for e-Invoicing in Europe?

Finally in the questionnaire is asked of each expert to give their personal concept and opinion about the future of the e-Invoicing in his country and compare it with the rest of Europe, based on their knowledge and experience.

3.4 Method of analysis

The analysis of the results as mentioned above, is focused on the measure in a qualitative and quantitative way of certain aspects of the e-Invoicing in each European country, that were considered relevant to identify patterns of behavior between countries or to analyze causes or consequences of the different decisions and regulatory frameworks used against the adoption and development of the e-Invoicing in each country or region.

The first step after have collected all the data for the different countries, was to analyze the different results, identify the most interesting cases between

countries and select certain countries for a deep analysis and classification. These are the criteria used for the selection of the countries:

- Countries that are points of reference in Europe in terms of economic and industrial development.
- Countries with high rates of e-Invoicing adoption in general terms.
- Countries with a special development and focus in certain aspects of the e-Invoicing, as in EDI, e-Archiving or special types of implementation.
- Countries with considerable leadership of e-Invoicing in specific sectors, as public administration, SME or a specific industry area.
- Countries with peculiar conditions in their regulatory framework or technology used that affects their rates of adoption.
- Countries that represent a region or a group of countries with similar characteristics with respect to the adoption of e-Invoicing.

After the countries selection, each country is reviewed and analyzed again, extracting the most significant data to feed the spider web diagram for the axes defined. These axes are defined according to the most important aspects of e-invoicing for this research and that help to classify and identify the patterns and conditions that characterize the European landscape nowadays.

The spider web diagram consists of eight axes, each one representing one dimension of the development of the e-Invoicing in a specific country (see Figure 5). Also there is a scale of magnitude from 0 to 5, which measures and represents the level of development or qualification in each element.

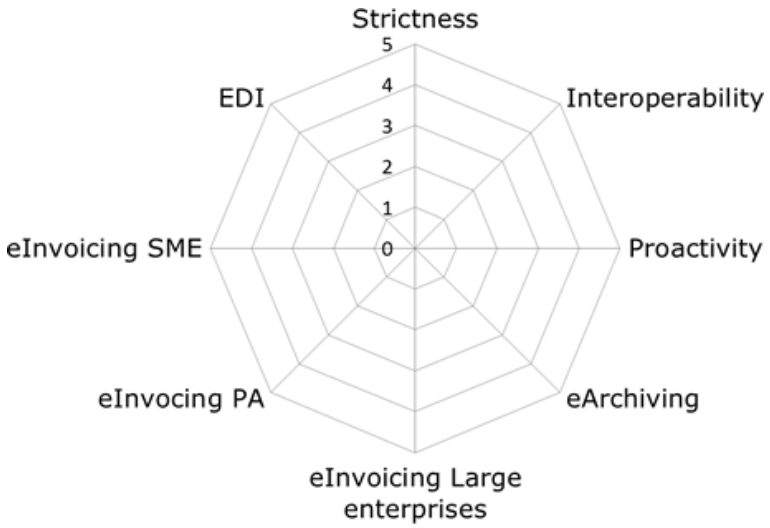

Figure 11. The spider web diagram for the country analysis

The dimensions (axes) that are measured and analyzed in this diagram are:

1. *Strictness*: This dimension refers directly to the Regulatory Framework, if the requirements for the implementation of e-Invoicing in a company or in Public Administration are loose (magnitude 0), it means that there aren't specific conditions for the creation and transmission of the e-Invoices, on the contrary the requirements are stringent (magnitude 5), it means that there are more than one specific requirement for the management of e-Invoices as qualified signatures, time stamp or special condition for the transmission.
2. Interoperability: This aspect became more important during the last years and refers to the capability of adapting to standards or changes in the regulatory framework and the possibility to send or receive e-Invoices cross country easily. A low interoperability (Magnitude 0), means that the country is closed and reluctant to the use of standard implementing e-Invoicing models not recognized and accepted by other countries, in the other way a high interoperability (Magnitude 5) would mean that the country have implemented or even created common standards recognized among the European community, also if participates in communities that promotes the cross country e-Invoicing and the unification of Regulatory Frameworks.

3. Proactivity: Refers to the level of awareness of the country with respect to the benefits and the importance of e-Invoicing and about the actions and conditions that grant high adoption rates and easy access to the benefits by the different stakeholders of the e-Invoicing market. A high rate of proactivity (magnitude 5) means that the government and industry promotes the adoption of e-Invoicing, taking measures for its promotion and can be considered as a model by the other countries, instead a low proactivity (magnitude 0) shows a passiveness and reluctance to promote a create the conditions for the internal adoption of the e-Invoicing, creating obstacles and ignoring the benefits of its use.

4. e-Archiving: This dimension measures the development and correct use of the e-Archiving in the country; it means that the regulatory framework permits to do it in an easy way, existing a wide use of it among companies. A low rate of e-Archiving (magnitude 0), means that the country doesn't have clear rules to do it and is not practiced by the companies, in the contrary a high rate of e-Archiving (magnitude 5) means that the e-Archiving I well defined by the regulatory framework, the companies have been doing it for a while and there are identified conditions and best practices for its correct development.

5. e-Invoicing Large Enterprises: In this axis is measured the level of adoption of the e-invoicing in the large enterprises, which are the main aim in this market and who can obtain higher benefits because the volume of invoices managed. A lower rate of e-Invoicing adoption in the large enterprises (magnitude 0) means there is no penetration of e-invoicing in the market or the regulatory framework no facilitate its adoption among the large enterprises, instead a high adoption of e-Invoicing by the large enterprises (Magnitude 5), shows a solid market for e-Invoicing and large and mature companies in the implementation and in the gaining of the benefits.

6. e-Invoicing PA: It refers to the obligation and development of the e-Invoicing in the public administration of the country. If the rate of adoption of the e-Invoicing in the Public Administration is low, it

means that there is no obligation by the PA to implement e-Invoicing and also the government is not active in obtaining the possible benefits, in the other way if the rate of adoption is high (magnitude 5), means that the almost all the public administration entities use e-Invoicing and in some cases is an obligation imposed by the government to promote the e-Invoicing inside the country.

7. e-Invoicing SME: In this axis is measured the adoption level of the e-Invoicing in the Small and Medium Enterprises, because is considered that is an important dimension of the adoption of e-Invoicing in each country, due that normally the e-Invoicing is only conceived for large enterprises, but the majority of European companies are SME's and also the e-Invoicing can bring important benefits and impulse the business. A low e-Invoicing adoption rate in the SME (magnitude 0), means that the SME's in the country haven`t adopted the e-Invoicing in a massive way because the strict conditions of the regulatory framework or a bad penetration and ignorance about the benefits; in the contrary a high adoption rate by the SME's (magnitude 5), would mean a great adoption and acceptance of the e-Invoicing by the SME's through the support of the government, organizations and a flexible regulatory framework that facilitate the accessibility to the benefits.
8. EDI: This dimension refers to the level of use and development of Electronic Data Interchange in terms of e-Invoicing. A low adoption level of EDI (magnitude 0) means that the EDI as a solution for e-Invoicing is not used at all, because the ban by the regulatory framework of the country or the use of other means less expensive, in the contrary a high adoption level of EDI (magnitude 5) shows a positive adoption of EDI as an e-Invoicing solution, becoming a leader in its implementation and establishing best practices to obtain greater benefits.

After performing the analysis in each country according to the interpretation and organization of the data collected before, is possible to perform an overall analysis of each diagram, identifying patterns and exceptional cases

that in this are shown as figures, so each figure determines tendencies of strength or by the contrary weakness in certain dimensions.

Based on this, the different country diagrams are classified and groups are made according to similar characteristics and behaviors according to its dimensions, determining the possible causes and consequences that has led the countries to its current status with respect of e-Invoicing, assigning a name to identify the different groups and finally extracting summary notes about the current status of the e-Invoicing in Europe, its evolution and how can be continued its development.

The final scheme used to analyse each country in the empirical analysis section is the following:

1. *General overview:* In this section is introduced the country with a brief description of its economical position in Europe and its main industries, as well another characteristics that are related with the e-Invoicing. Also is shown in general terms the actual situation of the e-Invoicing in the country and are listed and described the main characteristics, facts and conditions that represents the e-Invoicing situation in the country, as well the concepts of EDI and e-Archiving in the case that are representaive in the country.

2. *Spider web diagram:* In this part of the empirical analyisis of each country, is shown the diagram and explained the form and the different characteristics and behavior that are evidenced in the figure. Also are highlighted the main axes and facts that influences the final diagram of the country.

3. *Enablers:* Lists and describes the different conditions, efforts and characteristics of each country that enables an easier development of the e-Invoicing and therefore increases the adoption level.

4. *Barriers:* In this part are described and analyzed the measures, behavior and conditions that have blocked or desacelareted the development of e-Invoicing and consequent adoption in each country.

5. *Summary notes:* Finally to conclude the empirical analysis of each country, is summarized the current status of the e-Invoicing in the country compared with the rest of Europe, are highlighted the main enabler or barrier that determines this status and is analyzed the future of the e-Invoicing in this country, as well are given some appreciations about the measures and efforts in which the country have to focus in to achieve a higher adoption level.

4 EMPIRICAL ANALYSIS

In this section is reviewed and presented the data collected in each country, describing its characteristics and statistics with respect to the Electronic Invoicing phenomenon and analyzing the causes and conditions for obtaining these results.

The results are presented in each country, first with a general overview in which are presented the characteristics, conditions, level of adoption and internal changes in the regulatory framework. Also is shown the analysis made with the spider web diagram and based on this are identified and described the advantages, barriers and summary notes of the e-Invoicing status in the specified country.

In the countries that was possible to perform and interview with an expert to obtain another perspective and to confirm the data, this data of this questionnaire is presented below the country.

4.1.1 Germany

4.1.1.1 General overview

Germany is recognized for having the largest economy in Europe, characterized by high level technology, high level of exports, productivity and innovation. Is one of the most industrialized countries in Europe and has specialized in the sectors of engineering, especially machinery, automobiles, chemical goods and metals.

However the electronic invoicing hasn't been adopted at the same pace of the economy despite of the big opportunities that can offer in terms of cost savings. The results obtained by this research shows that less of 10% of the German companies has adopted full e-Invoicing solutions, while the 58% of the large companies, especially in the automotive and engineering sectors are using already e-Invoicing.

This can be explained taken into account that more of the 99% of the German companies approximately are catalogued as SME's, and the penetration of the use of e-invoicing has been very weak compared with

other countries, at next are described the main characteristics and facts of the e-Invoicing in Germany:

- The use of Advanced Digital Signature and EDI is permitted, but as defined in the EC Directive 2010/45, doesn't matter if an invoice is on paper or electronic form while the authenticity of the origin, the integrity of the content and the legibility of an invoice is granted.

- Each taxable person shall determine the way to ensure the authenticity of the origin, the integrity of the content and the legibility of the invoice. This may be achieved by any business controls which create a reliable audit trail between an invoice and a supply of goods or services.

- Other than by way of business controls authenticity of the origin and integrity of the content of an electronic invoice can be guaranteed by an advanced electronic signature based on a qualified certificate and created by a secure signature creation device, or by electronic data interchange (EDI), as defined in Article 2 of Commission Recommendation 1994/820/EC of 19 October 1994. It will be acceptable in Germany to issue electronic invoices e.g. With email and PDF. The new legislation will be in effect from mid June 2011.

- There are no government official standards or Official Portals, but there's a suggested mail format for the new legislation, that will be useful for the SME , http://rechnungsmail.de/

- Exists e-Procurement Banking Portals with potential to expand into e-invoicing, although the engagement of banks is in an early stage of development.

e-Archiving

- There aren't specific rules for the electronic storage of invoices (e-Archiving), so the general rules of the German Fiscal Code, Section 147 are extended for all type of invoices.

- In this way in Germany is required to keep incoming invoices and copies of outgoing invoices for 10 years from the end of the calendar year in which the invoice was issued.

- The e-archiving is not efficient due to the lack of specific rules of it, only applies the principles of data access and auditing of digital, meaning that copies must be readily accessible and exact copies of incoming invoices and reproductions of outgoing invoices must be maintained.

EDI

Germany is recognized as one of the leaders in the use of the traditional EDI, due to mostly to their large engineering and automotive industries. So the approach of Germany to the e-Invoicing has been mostly by this mean. The German legislation allows electronic invoices transmitted via electronic data interchange (EDI) without the obligation to use digital signatures to ensure authenticity and integrity of the data.

The recommendation of the German law for the use of EDI in e-Invoicing, contains the message implementation guideline for the UN/EDIFACT message INVOIC and is a subset of the Global INVOIC, which has been developed jointly by AIAG, JAMA/JAPIA and Odette for use in the automotive industry.

To summarize and perform an overall analysis of the e-Invoicing in Germany, at next is shown the spider web diagram (see Figure 12) in which the different dimensions are analyzed according to the procedure described previously and the data collected to the secondary sources and interviews.

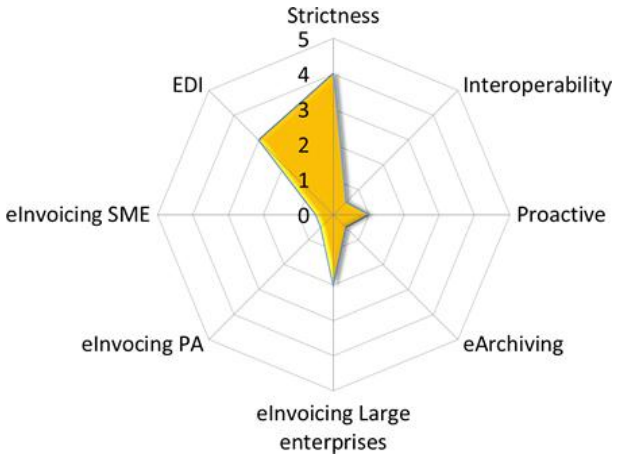

Figure 12. The spider web diagram for the dimensions of e-Invoicing in Germany

In the diagram can be noticed the low balance of the e-Invoicing dimensions, in which highlights a high level of strictness for the implementation of e-Invoicing but a really low level of adoption in general, lack of interoperability and proactivity in this field, becoming a passive actor in e-Invoicing environment in Europe.

Despite of having a considerable level of EDI development and all the conditions in terms of technology for the e-Invoicing implementation, is clear the need of a sensibilization and support of the government to the SME's, so they can access to the benefits of e-Invoicing.

4.1.1.2 Enablers

- The main and maybe the unique enabler of Germany in the adoption of e-Invoicing, is its high experience and development of EDI, but this must be exploited with correct rules and mechanisms to provide access to the SME's as well and no only to the large industry.
- Germany has one of the solidest economies in Europe and also have access to high quality technology, innovation and specialized human resources, it means that have great conditions to take enabler of the e-Invoicing benefits.

4.1.1.3 Barriers

- The main barrier is the lack of proactivity and the general passiveness of the government and industry towards the e-Invoicing, there are not realistic figures of the adoption of e-Invoicing and much less are conceived and measured the benefits that can be obtained.
- The current regulatory framework is not well defined for the current German situation, so the rules and legislation for the paper invoices are

applied to the e-Invoicing in a wrong way as in the case of the e-Archiving.

4.1.1.4 Summary notes

Germany must start to take the e-Invoicing as a serious phenomenon that can generate many benefits to the industry and to the government as well, also taking into account the high level of SME`s existing in the country, it must be implemented a standard and portal that support the access to the e-Invoicing as in other European countries. The regulatory framework must be reviewed and adapted as well, in fact there are some update with respect to the no obligation of digital signatures for 2012.

4.1.2 France

4.1.2.1 General overview

France is one of the leading industrialized countries, being the second largest economy in Europe with numerous companies in the consumer and industrial goods sector. Despite of this, France also is relatively new in the field of Electronic Invoicing with an adoption rate of less of 10% of Full Electronic Invoicing and with scarce relevant data about the implementation and benefits made in the industry.

However as can be seen in other large European economies, France have been one of the leaders in the use of the traditional EDI and had taken advantage of this to apply for electronic invoicing. There follows are presented the conditions and characteristics of the e-Invoicing in France:

- There aren't government standards or Oficial Portals for the support and diffusion of e-Invoicing.
- EDIFACT is widely accepted in France and operators supporting both EDI and newer forms of e-Invoicing such as B-process, Cegedim, GS1, Deskom and Seres, with own interfaces.
- The engagement of banks for the adoption and diffusion of the e-Invoicing is in an early stage of development .

- The French tax law offer 2 options for the implementation of the e-Invoicing, as an addition to the European regulatory framework:
    - Art 289 of the General Tax Code 3 allows an EDI "traditional" structured. This format allows, with predefined fields in the document, automated process.
    - On the other hand, Article 289 V of the General Tax Code 4 allows electronic invoicing in unstructured formats (word or pdf), more accessible and less expensive. With simple electronic signature.

e-Archiving

- There is no general regulations on e-Archiving in France. However, there are standards for electronic archiving (AFNOR NF Z 42013). The regulation is specific to the electronic invoices for tax purposes, which imply a guarantee of integrity and restoration of data, there is a set of rules set forth by the CGI for the conservation and archiving of e-Invoices.

- The rules for the e-Invoicing are not clear and are more an adaptation other paper invoices rules, which create confusion between the companies. The invoices sent electronically must be retained in their original size during the recovery period (current year and three previous years) on a computer, then for three years on (Paper or Electronic) chosen by the company.

To summarize and perform an overall analysis of the e-Invoicing in France, at next is shown the spider web diagram (see Figure 13) in which the different dimensions are analyzed according to the procedure described previously and the data collected trough the secondary sources and interviews.

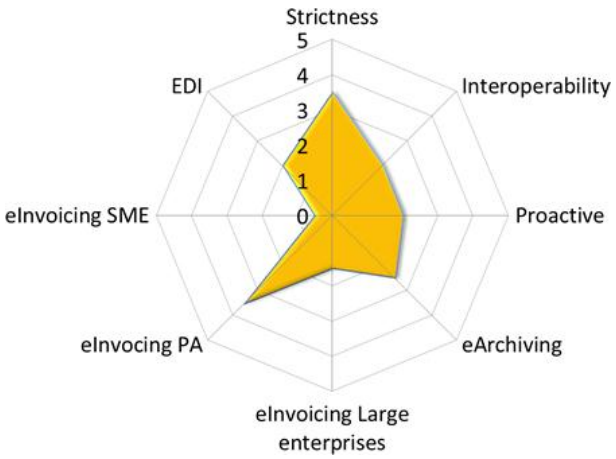

Figure 13. The spider web diagram for the dimensions of e-Invoicing in France

It shows an early developed e-Invoicing environment, there aren`t clear conditions and regulations to promote the e-Invoicing in the large enterprises and especially in the SME's, however there have been increasing interest by the public administration in the use of e-invoicing and in this way extended it to the industry.

As in other industrialized countries, despite the requirements in France are not so severe, the approach of the industry to e-Invoicing has started with the EDI in the big companies.

4.1.2.2 Enablers

- Despite the early development and adoption that have presented the e-Invoicing in France, this country counts with the technology and conditions to achieve greater benefits.
- France also counts with an extensive experience and diffusion of traditional EDI in the industry, from must take advantage to implement and extend e-Invoicing along the large enterprises.

4.1.2.3 Barriers

- The main barrier is the low attention that has received the e-Invoicing by the large enterprises and SME's, in part caused by the lack of proactivity of the government and an old regulatory framework without clear conditions.
- France doesn`t have its own standard and have been isolated from communities and organizations in the e-Invoicing environment.

4.1.2.4 Summary notes

France has started to recognize the importance of e-Invoicing and the positive impact that can produce in the industry and especially in the SME's that also conforms the highest percentage of companies. Despite have started to implement obligations of e-Invoicing in Public Administration, also must focus on promoting it in the industry showing the benefits that can be obtained.

Is clear the lack of revision in the regulatory framework because the requirement of a digital signature but any kind of document, which doesn't' makes too much sense in terms of security. Also is necessary more work on the interoperability and a definition of an own or an Euoropean standard to give a clear vision to the industry and promote the e-Invoicing cross borders, which considering the considerable amount of exports In France would benefit the market in general.

Situation of France by expert Luis Molina

Edicom is a company dedicated to the development and implantation of high performance business-to-business (B2B) transaction systems. Specialists in consulting and EDI software development (applications and processes) and data integration (XML, EDIFACT, X12, XBRL, etc.), with our own Value Added Network SEDEB2B for secure information transfer, as well as solutions in the field of Continuous Replenishment (CRP) and Traceability.

Edicom dedicates an important part of its resources to research and development of new communications solutions and how to implement the latest technological breakthroughs. The Edicom catalogue covers a wide range of possibilities to deal with any project, independently of the type of partnership, volume or size of the client.

Luis Molina Apestegui is a Commercial Director in Edicom, have been working in the Italian Subsidiary of Edicom for nine years and have experience in electronic invoicing and IT for enterprises for more of ten years. In the last years have focused in the European e-invoicing Market, working on the assessment and implementation of e-Invoicing for different industries in Spain, France, Italy and other European countries.

1. What do you understand for Electronic Invoicing according to the context of your country?

   For Edicom the electronic Invoicing is defined as a solution completely digitalized in the format and means to send the invoice and to archive it at the end, where is no necessary the management of paper invoices, but we have to adapt our solutions depending of each country.

2. Which considers that is the adoption level of e-Invoicing in your country approximately?

   In Edicom we don`t have exact figures about it, but I'm pretty sure that is less than in Spain.

3. According to the Billentis report by Bruno Koch the level of e-Invoicing adoption in your country is < 10 %. Do you agree with this estimate or consider that is inaccurate? Why?

   As I mentioned before, that statistic depends of the criteria used by Billentis. But in my opinion that rate must not be real and should be higher, taking into account that EDI is widely adopted in France, especially in the automotive sector.

   I think it should be between 10 and 20 % as in Spain.

4. What do you think of the position of the government towards e-Invoicing in your country? There are portals, standards or obligation in Public Administration to impulse the adoption?

   The government of France has been passive with respect to e-Invoicing.

5. How do you see the development and adoption of EDI (recommendation 820/95 for e-Invoicing) in your country? If is widely used, in which sectors and conditions is more common?

   France is one of the leaders in the use of EDI and almost all the companies that had implemented the traditional EDI, now are using it for implementing e-Invoicing, especially in the large industries, as the automotive and big retailers.

6. What is your opinion about the Regulatory Framework in your country? Do you think has been positive or negative for the adoption and development of the e-Invoicing in your country?

   In France the regulatory framework is looser than in Spain and other European countries, however this is not seen as an enabler for an easier e-Invoicing adoption and is necessary to establish more guidelines for the SME's.

7. Is the digital signature or other mechanisms required for the e-Invoicing in your country? In your opinion what is the position of the industry against these measures, is seen as an obstacle or an enabler of the e-Invoicing?

   In France is not required the use of advanced digital signatures, instead is widely used a simple digital signature nut it doesn`t affect or enable the adoption.

8. What is your perspective about e-Archiving in your country? Do you think is well defined in terms of regulation and diffused between the companies?

   The regulatory framework about e-Archiving in France is not so clear and detailed as in other countries, which sometimes cause confusions among the companies. The rules have been adapted from similar regulations of other countries as Spain.

9. Which is the percentage of SME's in your country approximately?

   Is the same that in other European countries, near 100%.

10. What is the situation and level of penetration of the e-Invoicing in the SME's? Do you think that are prepared for the e-Invoicing and that are supported by the government and other stakeholders in this process?

    Still considerably low and is reserved to the large enterprises.

11. How do you see the possible interchange of e-Invoices cross country in your country? Is already done or do you think is feasible?

    Is the opposite case of Spain. In France has not been doing too much work about it and due to the loose requirements for e-Invoicing, is easier for them to receive e-invoices cross border than send e-Invoices that complies the external conditions.

12. How do you see the status of the e-invoicing of your country compared with the rest of Europe? Do you have data of other countries? How you see the future for e-Invoicing in Europe?

    Despite the EDI in France is widely adopted, the e-Invoicing still in early development. But as I said before, the adoption not only depends on costs and available technology, the government involvement, integration of stakeholders and the business culture of

each country are primordial to analyze the status of the e-Invoicing in a European country.

4.1.3 Spain

4.1.3.1 General overview

Spain is another of the largest economies from Europe but unlike the others, is one of the most active countries in the field of e-Invoicing and has involved the different stakeholders in the promotion and diffusion along the country.

The approximate rate of adoption according to the results obtained by the secondary sources and interviews is between 10-20 % of the Spanish companies including the Public Admistration which have implemented e-Invoicing in almost all its entities and the SME's that also have received support and guidance on the implementation.

At next are presented the main aspects and factors that enabled the development of the e-Invoicing in Spain:

- The main aspects regarding electronic invoices, i.e. Authenticity & integrity, issuance, storage, service providers, etc. are laid down in Order EHA 962/2007 of the Ministry of Economy and Finance of Spain. According to this Order, in Article or Section 2, says there are three possible methods to guarantee authenticity and integrity in Spain are EDI, E-Signature (the most used with a qualified signature), and other means subject to prior authorization (article 3 order EHA 962/2007).

- Another important rule is the Order PRE 2971/2007. This one sets up the e-invoicing technical format to be used by the providers of the General Administration of State (AGE). This format is FACTURAE.

- Factura-e is based on standards, it uses an XML Schema (XSD), the W3C standard for data interchange on the Internet and it also uses e-signature based on XADES, the standard for e-signature on XML supported by ETSI, and it has the portal www.facturae.es to support the process of implementing.

- EDI is not permitted for PA and if is used, is required a summary document in paper form be created at periodic intervals, as of today, EDI is still the system of choice in environments such as commercial retail and the automotive industry.

e-Archiving

- Invoices must be kept for four years from the last date of the legal period available to declare such an invoice in the VAT returns, as prescribed by statute (Article 19 Royal Decree 1496/2003 of 28 December on invoicing obligations).

- Where electronic invoices are stored outside Spain, the taxpayer must make the invoices or stored information available to the Spanish tax authorities without undue delay whenever requested. The electronic storage of invoices outside Spain is only permitted where full and immediate online access to the invoices is guaranteed.

- Storage of invoices in a country with which there is a "mutual assistance" agreement, similar in scope to that laid down by Directives 76/308/EEC and 77/779 EEC and by Regulation (EEC) No. 218/92, will only be accepted when storage is undertaken by the taxpayer himself (following notification to the Tax Administration) or by third parties duly authorized on a case by case basis by the Tax Administration.

- Generally, taxpayers must store invoices in their original form. However, they are also entitled to elect for either the certified scanning of invoices or the storage of authenticated printed versions.

To summarize and perform an overall analysis of the e-Invoicing in Spain, at next is shown the spider web diagram (see Figure 14) in which the different dimensions are analyzed according to the procedure described previously and the data collected trough the secondary sources and interviews.

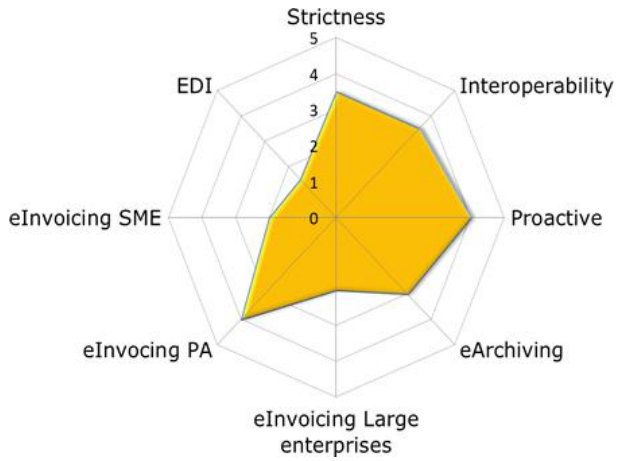

Figure 14. The spider web diagram for the dimensions of e-Invoicing in Spain

In this case, the spider web diagram shows a more balanced environment for the e-Invoicing in Spain, which that despite is still missing a lot of work in the field, the development of the e-Invoicing has grown in adoption but also the different types of companies, but also has increased its interoperability and the use of e-Archiving reaching an equilibrium between strictness and proactivity. However Spain has to improve its performance in the adoption of EDI and e-Invoicing in the SME's.

4.1.3.2 Enablers

- Spain has been very active in the e-Invoicing market and general development internally and in other countries, creating guides for the companies and especially for the SME's and promoting portals and standards as Factura-e to support and facilitate the implementation.
- The implementation of e-Invoicing in almost all the Public Administration entities has permitted the diffusion along the companies and also the pressure for the suppliers of Public Administration which helps with the resistance of change and shows to the industry about the great benefits that can be obtained.

4.1.3.3 Barriers

- The adoption in the large enterprises still very low, despite of the efforts made for the diffusion, however this is caused in part by the lack of integration of the EDI to the e-Invoicing in the industry, because since is used the traditional EDI it would be easier to implement EDIFACT.
- The interchange of e-Invoices cross borders haven`t been tried yet in Spain, in part by the low integration with the e-Invoicing process of other countries.

4.1.3.4 Summary notes

Spain is a good example about that a large economy also can facilitate and promote the e-Invoicing penetration through government programs and the integration of the different stakeholders of the e-Invoicing for the creation of portals, standards and documentation to diffuse the benefits and possibilities for access easily to e-Invoicing.

However is still missing work in the update of the regulatory frameworks and revision of the current rules to harmonize it with the national standards and the possibility of interchange e-Invoices cross country, also is needed to improve the adoption of the large enterprises and continue with the education and guidance to the SME's.

Situation of Spain by expert Luis Molina

Edicom is a company dedicated to the development and implantation of high performance business-to-business (B2B) transaction systems. Specialists in consulting and EDI software development (applications and processes) and data integration (XML, EDIFACT, X12, XBRL, etc.), with our own Value Added Network SEDEB2B for secure information transfer, as well as solutions in the field of Continuous Replenishment (CRP) and Traceability.

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latest technological breakthroughs. The Edicom catalogue covers a wide range of possibilities to deal with any project, independently of the type of partnership, volume or size of the client.

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1. What do you understand for Electronic Invoicing according to the context of your country?

   For Edicom the electronic Invoicing is defined as a solution completely digitalized in the format and means to send the invoice and to archive it at the end, where is no necessary the management of paper invoices, but we have to adapt our solutions depending of each country.

2. Which considers that is the adoption level of e-Invoicing in your country approximately?

   In Spain I think the e-Invoicing is around 20% and still growing, due especially to the efforts of the government in the diffusion, and the integration and collaboration between the different stakeholders as banks, SME`s and larger companies.

3. According to the Billentis report by Bruno Koch the level of e-Invoicing adoption in your country is 10-20%. Do you agree with this estimate or consider that is inaccurate? Why?

   Yes, I think this range can be accurate depending on the criteria used to determine that measure but the adoption of e-Invoicing in Spain fits to that result.

4. What do you think of the position of the government towards e-Invoicing in your country? There are portals, standards or obligation in Public Administration to impulse the adoption?

   The government in Spain has been active compared with other countries and has established the standard Factura-e as an obligation for Public Administration, however the major part of these entities are not yet prepared for a full implementation.

5. How do you see the development and adoption of EDI (recommendation 820/95 for e-Invoicing) in your country? If is widely used, in which sectors and conditions is more common?

   EDIFACT is widely used among the largest companies in Spain, however there aren`t exact figures about it because a considerable proportion are multinational companies.

6. What is your opinion about the Regulatory Framework in your country? Do you think has been positive or negative for the adoption and development of the e-Invoicing in your country?

   The regulatory framework has been well defined and updated during these years ins Spain and has been diffused and explained to the enterprises but still difficult the implementation for the SME's.

7. Is the digital signature or other mechanisms required for the e-Invoicing in your country? In your opinion what is the position of the industry against these measures, is seen as an obstacle or an enabler of the e-Invoicing?

   Is required and widely diffused also with Factura-e, the standard for the government and that is also promoted between the SME's.

8. What is your perspective about e-Archiving in your country? Do you think is well defined in terms of regulation and diffused between the companies?

The e-archiving is implemented integrated to the e-Invoicing, but refers only to the digital archiving of the invoices and doesn`t imply another controls and requirements as in Italy.

9. Which is the percentage of SME's in your country approximately?

   The segment of SME's is very significant and important in Spain, I think is around 99 %.

10. What is the situation and level of penetration of the e-Invoicing in the SME's? Do you think that are prepared for the e-Invoicing and that are supported by the government and other stakeholders in this process?

    Is still low, however is increasing relatively fast with the support and guidelines of the government, but is also driven by the obligation and requirements by the large enterprises and distributors to the SME's which deals with them.

11. How do you see the possible interchange of e-Invoices cross country in your country? Is already done or do you think is feasible?

    Spain has been working on improving the interoperability and have achieved great results in this field, however the problem is not to send the e-Invoices from Spain, but in Spain because is difficult for the other countries comply with the Spanish regulations.

12. How do you see the status of the e-invoicing of your country compared with the rest of Europe? Do you have data of other countries? How you see the future for e-Invoicing in Europe?

    The diffusion and efforts in the definition of e-Invoicing are positive to increase the level of Adoption, however there is a lot of companies

that are not ready yet for the implementation of e-Invoicing in their processes due to costs or lack of technology infrastructure.

4.1.4 United Kingdom

4.1.4.1 General overview

United Kingdom despite of not form part of the European Union, is the third largest economy in Europe after Germany and France, and represents an important and strategic partner for commerce with the other European Countries.

Also the United Kingdom has presented a process of e-Invoicing development similar to the other European countries, despite that is no covered by the recommendations and Regulatory Framework provided by the European commission. The approximate adoption level obtained through the secondary sources and interviews, is between 10-20% with a 80% of adoption in large enterprises mostly awarded for the use of EDI, which is very popular in the UK industry.

The conditions, rules and facts about the e-Invoicing in the United Kingdom are the following:

- As mentioned before the European Commission recommendations and regulatory frameworks doesn`t apply for UK, also the law doesn't compel to use electronic invoicing, it's up to the companies to issue paper or electronic VAT invoices.
- The Regulatory Framework in the UK, says that the companies can invoice electronically where the authenticity of the origin and integrity of the invoice data are guaranteed. This can be achieved by:
    - An advanced electronic signature using XML-based standards and secure networks.
    - Electronic data interchange (EDI) with standards such as UN/EDIFACT, ODETTE and TRADACOMS.
    - Other means for supplies within the UK (Comma-delimited ASCII, PDF and http-s, SSL, S-MIME and FTP).

- There isn’t government promoted standards in the UK, but exists Zanzibar Managed, a UK Government’s Electronic Procurement Managed Service, in which the Supplier Portal (e-Invoicing hub) facilitates e-Invoicing free-of charge for big and small suppliers of the government.

- There aren`t specific solutions for the cross border sending's in the UK, but the electronic receipt of invoices and credit notes from countries which are not Member States of the EU is permitted, so long as they provide sufficient evidence to support the calculation of VAT on imports in the case of goods or the reverse charge procedures in the case of services.

e-Archiving

- The UK Regulatory framework dictates to store the e-Invoices for 6 years.

- Must be guaranteed the authenticity and the integrity of the content of the source documents throughout the storage period by electronic or procedural means, and store all the data related to the invoices; and in a readable format. They must readily be able to recreate the invoice information as at the time of its original transmission, and it must keep history files so that can find the appropriate details from any particular time in the past if they are asked a visiting officer.

- The companies that perform e-Archiving in the UK must be able to meet the obligations as regards the production of records by giving:

    - Physical access to the systems on their premises;

    - Indirect access (providing information on electronic media, or possibly via remote access to their systems);

    - A resident audit program installed at the request of the visiting officer; or any other reasonable method agreed with the government agency.

EDI

The UK description of EDI is: “a computer-to-computer exchange of structured data that permits automatic processing by the recipient”.

- There should be an interchange agreement between the EDI trading partners making provision for the use of procedures that guarantee the authenticity of the origin and integrity of the data. Examples of such procedures include:
    - Use of secure networks;
    - Controls over access to networks (for example, checking "trading relationships");
    - Syntax checking of data in accordance with the rules of the transmission standard;
    - and summary file control reporting.
- In the UK there’s and adoption of EDI approximately of 56,3 % in Big Enterprises but is low in SME and EDI is not used in PA.
- All suppliers using EDI billing are required to advise HM Revenue & Customs for VAT purposes and Bank involvement is not relevant.

To summarize and perform an overall analysis of the e-Invoicing in the United Kingdom, at next is shown the spider web diagram (see Figure 15) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

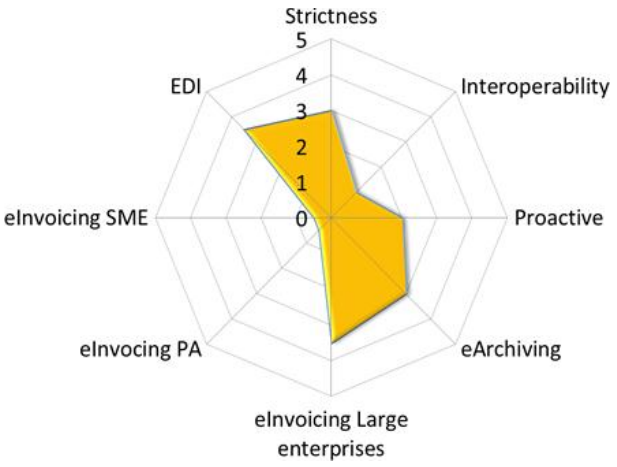

Figure 15. The spider web diagram for the dimensions of e-Invoicing in the United Kingdom

In the United Kingdom the e-Invoicing have grown especially with the use of EDI in the large enterprises, as traditional EDI is widely implemented among the UK industry and they had a lot of experience with it. In that way that is the dimension most developed in the UK and is used by the large enterprises, however the e-Invoicing still very low in the Public Administration and SME's.

Is notice also that the regulatory framework gives a different option of e-Invoicing implementation to facilitate the access by SME's, however the government has been relatively passive about it and there isn`t standards or campaign to promote it in the industry.

4.1.4.2 Enablers

- The high development of EDI, enables the diffusion and implementation in the large enterprises, however is not suitable for SME's and Public administration.
- Not being covered by the European Commission Regulatory Framework, UK has the possibility of applying best practices of the other countries, to establish clear regulations that impulse its adoption in general.

4.1.4.3 Barriers

- Despite of the considerable adoption in the large enterprises through EDI, the information about the different solutions and possible benefits haven`t been diffused in a correct way due to the passive behavior of the governments and lack of integration between stakeholders.
- Despite of being free of establishing its own Regulatory Framework, it also can be a disadvantage in terms of lack of competition and pressure

from the other European countries, being isolated of the general development.

4.1.4.4 Summary notes

The United Kingdom is a good example of the development of the e-Invoicing outside of the European Union, despite that has more adoption and development of EDI than other European countries, also is visible the lack of clear indicators and general recommendations to support the industry and especially the SME's.

Also is necessary the involvement of the banks and Public Administration into the e-Invoicing environment and the participation in the European communities and standards, looking to increase the interoperability and the possibility of sending e-Invoices cross borders.

Situation of United Kingdom by expert Tony Nisbett

Tony Nisbett is a Subject Matter Expert on e-Business, EDI, e-Invoicing and Digital Signatures, currently working with IBM. Tony has been involved in electronic trading for over 25 years. For the past 10 years he has been working for IBM EMEA as an SME in their Integrated Managed Business Process Delivery group, providing technical input to the e-Business integration of IBM suppliers, and suppliers to IBM's outsourced application clients. He also provides e-Invoicing support to Banking and Financial Service colleagues.

Tony Nisbett is chairman of the EDIFICE Bill/Invoicing Task Group and contributes to the CEN ISSS e-Invoice Plenaries and Work Groups. More recently has been helping to drive the compliance work around e-Invoicing according to the EU Directives.

1. What do you understand for Electronic Invoicing according to the context of your country?

In UK is not mandatory the implementation of e-Invoicing in the industry, basically the definition refers to the digitalization of invoices and its interchange where the authenticity of the origin and the integrity of the data are grant.

2. Which considers that is the adoption level of e-Invoicing in your country approximately?

   I don't have any figures because it is very difficult to get them. Depends if is made a difference between PDFs and fully integrated B2B. The UK is a classic case of a lack of knowledge of take-up due to the low regulatory requirement and positioning of treatment. E-Invoicing is high in B2C if you class e-Billing PDFs from utility companies as e-Invoicing, and it is well established in EDI.

3. According to the Billentis report by Bruno Koch the level of e-Invoicing adoption in your country is 10-20%. Do you agree with this estimate or consider that is inaccurate? Why?

   There are many ways to assess and measure e-Invoicing adoption, it may be that the methods used in each country differ from Bruno's. In the UK there aren`t reliable measures and indicators, but I think that such rate fits to adoption of e-Invoicing in the UK if is considered the PDF's interchange as e-Invoicing.

4. What do you think of the position of the government towards e-Invoicing in your country? There are portals, standards or obligation in Public Administration to impulse the adoption?

   The UK government is completely ignoring the subject, even though with the sensible implementation of proper e-Procurement along with e-Invoicing, there are huge cost savings and efficiency improvements to be had.

5. How do you see the development and adoption of EDI (recommendation 820/95 for e-Invoicing) in your country? If is widely used, in which sectors and conditions is more common?

   UK as I mentioned before, is well established in EDI, it is IBM's second largest EDI sector after Germany and in front of France. EDI in various forms has been around for 20 years and apparently is not increasing or decreasing whilst Internet/email based e-Invoicing is growing in the background without any fanfare.

6. What is your opinion about the Regulatory Framework in your country? Do you think has been positive or negative for the adoption and development of the e-Invoicing in your country?

   In UK have been given less importance to the Regulatory Framework and in my opinion is in early development, with some uncertain aspects and loose regulation. Low regulatory activity allows parties (rightly or wrongly) to send PDFs which are printed by recipients.

7. Is the digital signature or other mechanisms required for the e-Invoicing in your country? In your opinion what is the position of the industry against these measures, is seen as an obstacle or an enabler of the e-Invoicing?

   Digital signatures are not mandatory and are not widely used among the companies, especially in SME's where is more common the interchange of PDF's or other documents without signature.

8. What is your perspective about e-Archiving in your country? Do you think is well defined in terms of regulation and diffused between the companies?

   As the e-Invoicing regulation, the e-Archiving definition and development is also at an early stage and practically are applied the same rules for paper invoices in a digital context.

9. Which is the percentage of SME's in your country approximately?

   The Business Population Estimates for the UK and Regions 2010 issued by the Department for Business Innovation and Skills illustrate that 99.9% of the total enterprises in the UK are SMEs. SMEs provide 59.1% of the jobs in the private sector and generate 48.7% of the turnover of the private sector.

10. What is the situation and level of penetration of the e-Invoicing in the SME's? Do you think that are prepared for the e-Invoicing and that are supported by the government and other stakeholders in this process?

    Despite that there are not much control and requirements for the SMEs in the implementation of e-Invoicing there isn't neither enough diffusion and support of the other stakeholders, so in my opinion the adoption level in SME's still very low.

11. How do you see the possible interchange of e-Invoices cross country in your country? Is already done or do you think is feasible?

    Besides the interchange of e-Invoices cross border through EDI by the large enterprises and Multinational companies, there isn't development about it in part because the lack of interoperability.

12. How do you see the status of the e-invoicing of your country compared with the rest of Europe? Do you have data of other countries? How you see the future for e-Invoicing in Europe?

    In the UK is necessary to pay more attention to this subject and not only by the large enterprises, also by the government and SME's because the UK is backward compared with other European countries.

4.1.5 Finland

4.1.5.1 General overview

Finland is another industrialized European country focused in services and manufactures, that despite of doesn`t count with a really large economy as the other countries, is recognized by its high productivity, innovation and high penetration of technology.

With these characteristics and others that are explained further, Finland has become one of the European leaders in terms of adoption and a point of reference in its regulations and its implementation approaches. According to the analysis of the secondary sources and the confront of data with the interviews, the e-Invoicing adoption level in Finland is between the 20-50%, with an approximate of 51% in large enterprises.

The main facts and characteristics of the e-Invoicing in Finland are described below:

- Finland in practice accepts any e-invoicing process that meets reasonable business requirements, the Finnish tax authorities use means extraneous to the processes of taxable persons to monitor transaction flows.

- Exists a standard called Finvoic, that is basically an XML schema used in Finland for B2G, B2B and B2C e-invoicing. Finvoic is often used in a four-party model by local Finnish banks such as Nordea and specialized providers such as Isabel of Belgium.

- The most common e-Invoicing methods used in Finland are: Advanced or qualified electronic signatures, EDI and other methods as per the big companies practices.

- The involvement and collaboration between Banks, providers, government and industry has been important to promote the adoption of e-Invoicing and the creation of standards and tools for an easier implementation.

e-Archiving

- Under the Finnish VAT regulations, invoices must be retained for 6 years from the end of the calendar year during which the financial year (to which the invoices relate) has ended, the use of WORM devices has often been recommended to ensure robustness.

- As a general rule, invoices must be stored in Finland. A taxable person is, however, entitled to regularly keep its invoices in another EU Member State provided that the storage is set up for full on-line access to the information in question.

- In Finland there are no specific requirements as to the format that can be used to archive e-Invoices. The format must, however, enable the invoices' conversion into a clear written form (i.e., Any readable format) whenever necessary.

To summarize and perform an overall analysis of the e-Invoicing in Finland, at next is shown the spider web diagram (see Figure 16) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

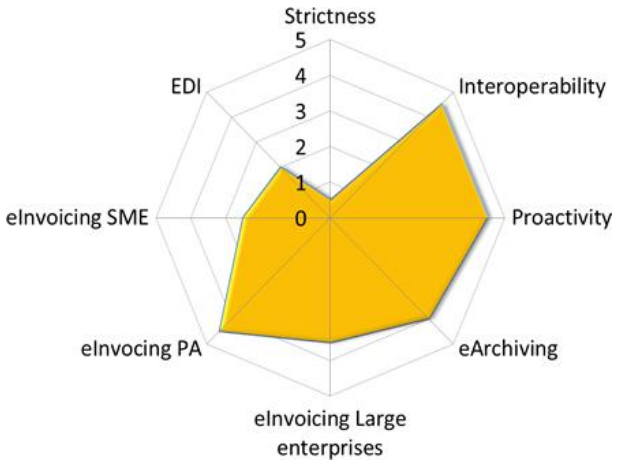

Figure 16. The spider web diagram for the dimensions of e-Invoicing in Finland

The spider web diagram of Finland shows a different situation compared with other countries as Germany and France, with a wider area of development and a high rate of interoperability and proactivity in the diffusion and research of e-Invoicing.

Is important to mention also its lack of strictness, being the regulatory framework loose with respect the requirements and the obligations imposed to the companies for the implementation of e-Invoicing. Finland has focused in facilitate the access to the benefits of e-Invoicing adopting it almost completely for public administration and integrating the banks, large companies and SME`s for a general development.

4.1.5.2 Enablers

- The main enabler in Finland of e-Invoicing is its experience and best practices established for the implementation of e-Invoicing, as also its own e-Invoicing standard, that combined with the stakeholders integration and diffusion have reached a high level of adoption.
- The loose regulation but specially the continuous support of the government and academic research, have permission to create ideal conditions for the increasing adoption of e-Invoicing.

4.1.5.3 Barriers

- A barrier in Finland is the low adoption of EDI, despite it is replaced with e-Invoicing with XML, is needed to determine which mean is more convenient for the large enterprises that has already implemented the traditional EDI in their processes.
- Also the loose regulations can be counterproductive if they are not managed and diffused well, especially between the SME's, due that the loose regulation, doesn't mean a lack of control and responsibility, so if is not well managed can produce frauds and auditory problems.

4.1.5.4 Summary notes

As mentioned before, Finland has been the reference point for talk about e-Invoicing in Europe and has led the main studies and proposal to standardize all the e-Invoicing market and regulatory frameworks in Europe. However is still

missing a considerable part of the industry for the adoption, especially in the SME sector.

Finland shows that for high levels of e-Invoicing adoption is not necessary to have a high technology or complicated mechanisms for the e-invoice creation, by the contrary demonstrate that with a clear program of diffusion and the participation of the different actors of the process can be established a simple but an efficient process.

Situation of Finland by expert Jari Salo

The e-Invoicing activities in Finland concentrate around the Finnish e-Invoice Forum. The main goal of the e-Invoice Forum is to promote the widespread adoption and use of electronic invoicing based on common standards and procedures. A further goal is to support inter- and intra-organizational collaboration between all parties in the field.

TIEKE Finnish Information Society Development Centre, co-ordinates the e-Invoice Forum. The Forum is a central collaboration and a meeting point for the different parties in the field, such as developers, service providers, experts and the users of electronic invoicing.

The work group works under the chairmanship of Ministry of Trade and Industry with Mr. Jari Salo, Adviser from TIEKE serving as the secretary.

TIEKE Finnish Information Society Development Centre has a key networking role as a neutral and non-profit organization in promoting the efforts of its members, within the public and private sectors alike, with an ultimate goal to create viable tools and expertise for use in the information society.

1. What do you understand for Electronic Invoicing according to the context of your country?

   The Electronic Invoicing in Finland is defined simply as the interchange of invoices in electronic format by any mean that meet

reasonable business requirements and preserve the integrity of the data.

2. Which considers that is the adoption level of e-Invoicing in your country approximately?

   The figure of organizations using e-Invoicing is above 30 %, the bigger the organization, the more they use e-Invoicing: in organizations with over 250 employees the penetration is about 75%, but in organizations with below 10 employees the penetration is less than 30%. However, only less than 20 % of organizations are sending over 60% of their Invoices electronically, again this figure is larger among big companies.

   In the adoption also must be made the difference between sent and received invoices, TIEKE do have e-Invoicing address registry with over 38 500 entries (organizations) with the possibility to receive e-Invoices and 34 000 entries with possibility to send e-Invoices. Over 26 000 of those organizations have the possibility to do the both. Of course there are other organizations than companies involved in e-Invoicing address register too.

   This figure is not, however, directly comparable with the penetration figures (percentage) as there is, especially among smaller companies, different arrangement to send and receive e-Invoices with e.g. Through accounting company's e-Invoicing address and not all the e-Invoicing addresses are entered into the registry. I hope this will still give an estimate of the asked ratio.

3. According to the Billentis report by Bruno Koch the level of e-Invoicing adoption in your country is 20-50%. Do you agree with this estimate or consider that is inaccurate? Why?

   The Billentis figures are exactly as correct as any other rate given according to certain/suitable criteria. As I mentioned before it has to be explained completely all the criteria and this criteria is not so clear in the Billentis report.

4. What do you think of the position of the government towards e-Invoicing in your country? There are portals, standards or obligation in Public Administration to impulse the adoption?

   The Finnish government has been always supporting and had promoted the use of e-Invoicing and provide the access to all kind of enterprises. I think that portals, standards and all the studies realized about this subject has permitted to determine clear indicators for the adoption and to spread the benefits and mechanisms for implementation among the industry. However the reception and adoption by the SME's still low.

5. How do you see the development and adoption of EDI (recommendation 820/95 for e-Invoicing) in your country? If is widely used, in which sectors and conditions is more common?

   In the beginning of this year we made a survey on the use of electronic data communication between Finnish companies. Concerning invoices about 70 % of companies use XML- based formats (different formats like Finvoice, TEapps, etc.) for invoicing and about 30 % used EDIFACT based formats (INVOIC, GS1/EANCOM INVOIC). Of course this figure is not again total figure but among those companies using any kind of EDI the invoice penetration was about 80%.

6. What is your opinion about the Regulatory Framework in your country? Do you think has been positive or negative for the adoption and development of the e-Invoicing in your country?

   The Regulatory Framework in Finland has been reviewed and studied during the last years and I think has worked well with respect to the context of the country. Because taken into account the a high percentage of the companies are SME, doesn`t make sense to establish strict and complicated controls that can block the adoption. However as I said before, depends on the context of the country and can`t be generalized to other countries with analyzing the conditions and crucial factors.

7. Is the digital signature or other mechanisms required for the e-Invoicing in your country? In your opinion what is the position of the industry against these measures, is seen as an obstacle or an enabler of the e-Invoicing?

   The digital signatures are not mandatory in Finland, however are suggested in some cases, especially to the possible interchange of e-Invoices cross borders with the aim of grant the integrity and originality of the e-Invoices and to comply the regulations of other countries.

8. What is your perspective about e-Archiving in your country? Do you think is well defined in terms of regulation and diffused between the companies?

   In Finland e-Archiving is necessarily linked to e-Invoicing and have developed at a similar rate, however especial regulations have been established to facilitate the archiving of e-Invoices, especially for the SME's.

9. Which is the percentage of SME's in your country approximately?

   In Finland we do have total 320 000 companies of which about 303 000 are small ones (0-9 employees). So the use of EDI/e-Invoice is quite much concentrated to larger companies.

10. What is the situation and level of penetration of the e-Invoicing in the SME's? Do you think that are prepared for the e-Invoicing and that are supported by the government and other stakeholders in this process?

    As I mentioned before despite the penetration of e-Invoicing in SME is approximate less than 30% , that I think is one of the highest rates in Europe. However the adoption process has been very slow and is necessary more work to diffuse and spread the benefits among the

SME, especially to achieve the implementation of e-Invoicing in all its processes.

11. How do you see the possible interchange of e-Invoices cross country in your country? Is already done or do you think is feasible?

    Finland have been working in this subject during the last years and have performed many studies about it in collaboration with other Nordic countries. And is possible to do it with certain countries but is necessary more integration for performing it in the rest of Europe.

12. How do you see the status of the e-invoicing of your country compared with the rest of Europe? Do you have data of other countries? How you see the future for e-Invoicing in Europe?

    Despite that Finland is considered one of the leaders in this field, I consider that is still missing a lot work to increase the adoption, especially among the SME. Also is necessary to review the conditions to establish a standard for a real e-Invoicing cross border in all Europe.

4.1.6 Estonia

4.1.6.1 General overview

Estonia despite of being a small country, has presented a rapid growth during the last years and has the strongest economy in the Baltic region. Estonia is a self-sustaining country in terms of production and services, having industries in telecommunications, textiles, chemical products, banking, services, food and fishing, timber, shipbuilding, electronics and transportation.

In e-Invoicing, Estonia is one of the countries that presents more adoption by the different stakeholders and is most often classified as a Nordic country because it similar regulations and conditions for the e-Invoicing adoption, as in Finland or Sweden.

According to the analysis of the secondary sources and the confront of data with the interviews, the e-Invoicing adoption level in Estonia is between the 20-50%, with an approximate of 88% in large enterprises.

However the impact has been more significant in Estonia than in other countries, as is a small country with successful experience with B2C e-Invoicing and therefore the benefits in B2B have been identified earlier. The main facts and characteristics of the e-Invoicing in Estonia are described below:

- There`s the standard Estonian E-invoice XML but this format is not found a wide range of use today, and there`s not an official government portal however the Estonian Ministry of Finance along with Estonian Post's subsidiary service. The Estonian e-Invoicing Centre (www.arvekeskus.ee), offering the e-invoicing service environment to government agencies to help reduce administrative costs.

- Estonia is a little exceptional compared to other European countries, if in most countries the B2B e-invoicing is developed first, then in Estonia the development started with B2C e-invoicing and is the leader in the market with the portal B2C arved.ee.

- The legislation is very flexible and there is no additional demands to e-invoices compared to paper invoices. The general rules set in VAT directive are applicable for invoicing, authenticity and integrity are ensured "by other means. Estonia accepts any electronic invoice that is processed and stored in accordance with good business practice.

- There is not an official way or obligation to do the electronic invoicing, there is a standard proposed in XML, but still more used the informal tools as paper, PDF or even mail.

e-Archiving

- Invoices must be stored for seven years and there`s not specific rules about how to do it, depends on good practices that the companies implement.

- Invoices can be stored anywhere, as long as immediate availability is guaranteed.

To summarize and perform an overall analysis of the e-Invoicing in Estonia, at next is shown the spider web diagram (see Figure 17) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

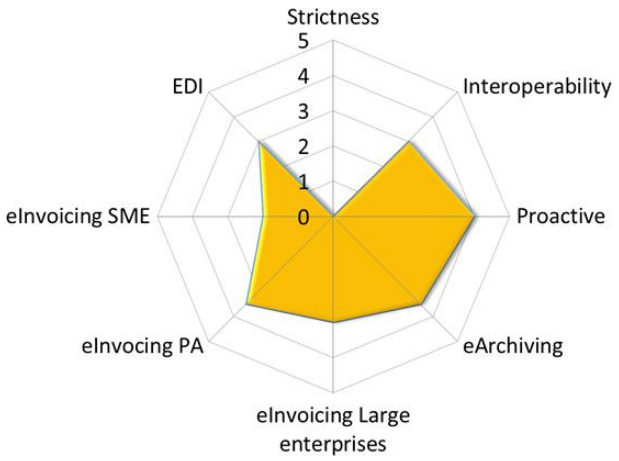

Figure 17. The spider Web diagram for the dimensions of e-Invoicing in Estonia

In the spider web diagram can be summarize what have been said above about the behavior of e-Invoicing in Estonia. There`s a loose regulation that has combined with efforts in interoperability and proactivity by the government, have enabled increasing adoption levels in Public Administration, SME's and Large enterprises.

4.1.6.2 Enablers

- Its large experience in B2C e-Invoicing have facilitated the penetration of B2B e-Invoicing in the industry, which have identified earlier the possible benefits that can be obtained.
- The support of the government and the idea of keeping the rules simple have allowed a quick and easy development and adoption of e-Invoicing in Estonia, including the SME's.

4.1.6.3 Barriers

- Estonia still in an early stage of interoperability, because even if inside the country is easy to implement e-Invoicing, for cross border interchange is necessary to adopt standards and to establish an intermediate point to deal with the rest of Europe.

4.1.6.4 Summary notes

Estonia is an example about that is not necessarily a large economy, exclusive technology and big companies achieve a higher adoption rate, by the contrary with a simple regulatory framework, support of the government and the integration of stakeholders are obtained great results in terms of diffusion and adoption.

However as mentioned before, this situation still limited inside Estonia, so is necessary the integration with other countries and participate actively in forums and in the European e-Invoicing environment to improve the interoperability and enable the cross border e-Invoices interchange.

4.1.7 Netherlands

4.1.7.1 General overview

The Netherlands has a very strong economy and has been playing a special role in the European economy for many centuries. Foodstuffs form the largest industrial sector and other major industries include chemicals, metallurgy, machinery, electrical, goods and tourism.

However the e-Invoicing penetration in the Netherlands has been low and have caused a low impact in its industry. According to the analysis of the secondary sources and the confront of data with the interviews, the e-Invoicing adoption level in Estonia is between the < 10%, with an approximate of 10% of adoption in Public administration.

The government and industry have started to recognize the benefits of the e-Invoicing adoption, but it's still in early stage of development in Public Administration, SME's and large enterprises. The main conditions and characteristics of e-Invoicing in the Netherlands are described in next:

- There are two portals in the Netherlands for e-Invoicing, Platform ELFA (Group of Organizations directly or indirectly linked to e-Invoicing) and Digipoort (E-invoicing Portal that able electronic billing invoices that are submitted to the government electronically received and processed).

- The Netherlands accept advanced electronic signatures, "proper EDI" based on the European Commission 1994 Recommendation, as well as "other means", these implementations can be put in place without prior consultation with the tax authorities. The channel and medium for invoicing can be freely chosen by trading partners.

- Ministries in the Netherlands have been obliged to accept electronic invoices from commercial organizations since January 2011.

- Standaard Digitale Nota, is a proprietary format used in the Netherlands as part of the Via Mijn Bank initiative. The format is a product of cooperation between the major Dutch Banks and invoicing consolidators.

e-Archiving

- The general rules of Articles 2:10 Civil Code, 52 State Tax Act and more specifically, Article 31 (6) Turnover Tax Decree 1968, apply to the electronic storage of invoices and require the retention of invoices for seven years.

- Directive 2001/115/EC has been implemented by amendments to the Turnover Tax Act 1968. Article 35c sets out the rules for the storage of incoming and outgoing invoices. However, it does not specify a retention period for invoices. Where invoices are sent or received electronically, electronic storage is permitted, provided that the authenticity, integrity and readability of the content of the invoice are guaranteed throughout

the retention period. Data that verifies the authenticity of the invoice and the integrity of the content must also be stored.

To summarize and perform an overall analysis of the e-Invoicing in Estonia, at next is shown the spider web diagram (see Figure 18) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

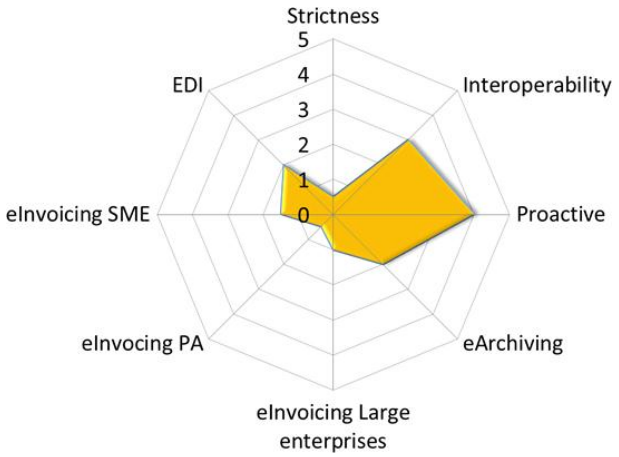

Figure 18. The spider web diagram for the dimensions of e-Invoicing in the Netherlands

In the spider web diagram can be noticed that despite Netherland have a loose Regulatory Framework as in other countries, its adoption level still really low in Large Enterprises, SME's and Public Administration, due in part to its lack of proactivity in previous years and that the regulations are not so clear and updated for the changes in the industry with respect to e-Invoicing.

4.1.7.2 Enablers

- In the Netherlands there are large enterprises that can take advantage of e-Invoicing and promote it to the rest of the companies as SME's, through obligations and requirements of the largest distributors.

- The loose Regulatory Framework can facilitate the access to the e-Invoicing by the SME's, however it should be combined with government support and integration of all the country stakeholders in e-Invoicing to clarify the conditions, requirements and possible benefits.

4.1.7.3 Barriers

- The main barrier for the adoption of e-Invoicing has been the lack of diffusion and passive behavior of the industry towards the implementation of e-Invoicing. In some cases has been limited to the use of EDI by the large enterprises but ignoring the possibilities for the Public Administration and SME's.

4.1.7.4 Summary notes

The Netherlands has the conditions and enablers to increase the adoption of e-Invoicing, as a permissive regulatory framework, large industry and proactivity by the government, however it still in an early stage of development and is necessary more work on this subject.

Especially is necessary to define well the regulation for e-Archiving and the possibility to interchange e-Invoices cross borders, also must be promoted in the SME's as well as has been diffused the last years in the Public Administration through portals.

Situation of Netherlands by expert Fred Van Blommestein

Fred van Blommestein is a business consultant specialized in B2B electronic business. He is also assistant professor at the University of Groningen where he is doing research to flexibly B2B e-business.

He is involved in the development of e-business standards for many years and member of several UN/CEFACT groups and teams. Fred is an expert

on the interface between Supply Chain Management and Information Technology (inclusive). He led many SCM implementation and improvement projects.

Also Fred was the expert who assisted the CEN ISSS Cross Industry Collaboration Project to draft Business Requirement Specifications for Ordering, Shipping, Scheduling and Cataloguing. He also was involved in a number of projects to implement electronic (public) procurement. Currently he is a member of the Dutch e-invoicing stakeholders team, that co-ordinates e-invoice implementation at the Dutch national level.

1. What do you understand for Electronic Invoicing according to the context of your country?

   Officially the Electronic Invoicing in the Netherlands is defined as the electronic management of the invoice through the Payment Order Cycle with the use of mechanisms that grant its integrity as digital signatures or EDI. However in Netherland have permitted the use of other means as PDF's so it depends on the sector.

2. Which considers that is the adoption level of e-Invoicing in your country approximately?

   It all depends on the definition of e-invoicing. If you include the sending of PDF invoices by email, the adoption rate (certainly among companies > 10 employees) is probably as high as 20%. If, however, e-invoicing is defined as a true application-application messaging, I guess the rate is as low as 10%. This figure has been confirmed by a recent investigation of the University of Twente in Enschede.

   Mind that "adoption" means that a company that "adopted" e-invoicing sends e-invoices to one or more business partners. It certainly doesn't mean that the majority of invoices is sent electronically.

3. According to the Billentis report by Bruno Koch the level of e-Invoicing adoption in your country is less than 10%. Do you agree with this estimate or consider that is inaccurate? Why?

   Statistics are tricky. I have compared many of them and even found the statistics of our governmental statistics body unreliable.

   We were stunned by Billentis' figures too, in my opinion in the conditions that are explained by the report of Billentis, the Netherlands adoption rates are higher: >18% on average. It depends a bit on B2C, B2B, company size and company age, as I mentioned before.

4. What do you think of the position of the government towards e-Invoicing in your country? There are portals, standards or obligation in Public Administration to impulse the adoption?

   The Dutch Government has created a Portal called Digiport for the management of e-Invoices in Public Administration and since this year are obligated to implement. However during the last year has been passive in terms of diffusion and the SME's that the highest percentage in the Netherlands doesn't know too much about the possible benefits and that's the next step for the government, banks and other actors of this market.

5. How do you see the development and adoption of EDI (recommendation 820/95 for e-Invoicing) in your country? If is widely used, in which sectors and conditions is more common?

   In some selected industry sectors in Holland sending EDI invoices is the rule, mainly in the supply of large scale retail companies. Also, the sectors that invoice consumers on a large scale (insurance companies, telecom, utilities) in general have automated the whole process, including direct debiting the customers. However the EDI adoption is not so high compared as in other countries as in the UK.

6. What is your opinion about the Regulatory Framework in your country? Do you think has been positive or negative for the adoption and development of the e-Invoicing in your country?

   Despite is based on the European Commission Regulatory Framework, the regulations in the Netherlands about e-Invoicing still in an early stage and needs a revision to clarify the steps to follow for the implementation, especially for the SME's.

7. Is the digital signature or other mechanisms required for the e-Invoicing in your country? In your opinion what is the position of the industry against these measures, is seen as an obstacle or an enabler of the e-Invoicing?

   The use of digital signatures in the Netherlands is not mandatory, so except by the large enterprises is not widely diffused. However with the standard Digitale Nota created by the integration of banks and industry, the idea is to increase its diffusion and accessibility for implementation.

8. What is your perspective about e-Archiving in your country? Do you think is well defined in terms of regulation and diffused between the companies?

   The e-Archiving is not conceived independently of e-Invoicing as I know that other countries as Italy do it, in this way is part of the e-Invoicing and a new set of regulations based on the paper invoices rules has been established.

9. Which is the percentage of SME's in your country approximately?

   The 50% of the Dutch companies are one-man-companies, another 30% have less than 10 employees. So I would say that in SME it would be more than 99%.

10. What is the situation and level of penetration of the e-Invoicing in the SME's? Do you think that are prepared for the e-Invoicing and that are supported by the government and other stakeholders in this process?

    The e-Invoicing for SME still in phase of diffusion and hasn`t been adopted on a large scale, but I think that with the new measures of the government and the support of the different stakeholders of the process the situation will improve in the next years.

11. How do you see the possible interchange of e-Invoices cross country in your country? Is already done or do you think is feasible?

    The idea of interchange of e-Invoices cross country is not well developed in the Netherlands, I think first must be established well the regulatory frameworks and increase the adoption before to think about it.

12. How do you see the status of the e-invoicing of your country compared with the rest of Europe? Do you have data of other countries? How you see the future for e-Invoicing in Europe?

    Netherlands despite of being near of the development of e-Invoicing in other countries, it still in and early stage of development, for example, automatically processing of received e-invoices is still not widespread (with the exception of suppliers of large scale retail).

    Compared with other countries I think is not so different the situation, due that the diffusion and measure indicators have not been well defined and generalized for the whole Europe, so there is not a clear of the European situation.

4.1.8 Ireland

4.1.8.1 General overview

Ireland despite of not being a large industrialized country, has a lot of SME's with business in all Europe, especially with the United Kingdom with whom has established a closer business relationship.

According to the analysis of the secondary sources and the confront of data with the interviews, the e-Invoicing adoption level in Ireland is between the 20-50%. The main facts and characteristics of the e-Invoicing in Finland are described below:

- There aren`t government standards or Official Portals
- Invoices may be transmitted between trading partners using either an electronic data interchange (EDI) system, or an advanced electronic signature (AES) and associated system, which satisfy the requirements set out below. A taxable person may also use a different electronic system to the EDI or AES systems, provided the requirements in question are met and the person notifies the Revenue Commissioners accordingly.
- The electronic system in use must be capable of:
    - producing, retaining and storing, and making available to a Revenue officer on request, electronic records and messages in such form and containing such particulars as are required for VAT purposes,
    - reproducing paper copies of such records or messages,
    - allocating a unique identification number for each message transmitted, and
    - maintaining the electronic records in such manner as allows their retrieval by reference to a trading partner or the unique identification number of the message.

- The system in use must also:
    - preclude the repeated transmission of a message and the omission of a message from the electronic record,
    - verify the origin or receipt of a message from a trading partner, and
    - guarantee the integrity of the contents of a message or an electronic record related to that message during transmission and during the period for the retention of records for VAT purposes.

e-Archiving

- Every taxable person must retain all books, records and documents relevant to the business, including invoices, credit notes, settlement vouchers and debit notes (and copies of any such documents issued to another person).
- These business records must be preserved and stored in the State in their original form* for 6 years from the date of the latest transaction to which they refer, unless the written permission of the local Revenue District has been obtained for their retention for a shorter period. This rule applies equally to electronic records and messages.
- In addition, a taxable person keeping electronic records must retain and store particulars such as details of the form of encryption, electronic signature, etc. used and the format in which they are stored and how they can be accessed.

To summarize and perform an overall analysis of the e-Invoicing in Finland, at next is shown the spider web diagram (see Figure 19) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

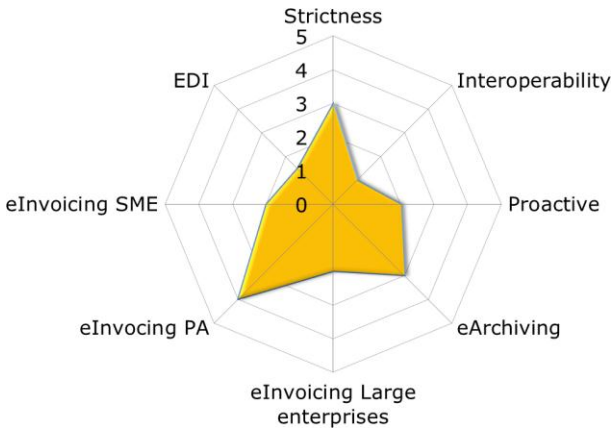

Figure 19. The spider web diagram for the dimensions of e-Invoicing in Ireland

In this diagram can be noticed a balanced development of the e-Invoicing in Ireland, in which are required the use of EDI and digital signatures, but also is possible the use of other mechanism depending of the capacity of the enterprise and always granting the originality and integrity of the invoices. Also the increasing adoption is due in part to the high diffusion and obligations in the Public Administration, that have pushed also the development in SME's and in the large enterprises.

4.1.8.2 Enablers

- The main enabler in Ireland is the flexibility in the regulations; because the normal methods are required for increase the interoperability, but also is permitted the use of other methods with the aim of facilitate the access to SME's.
- Another factor that has increased the adoption level in Ireland is the pressure by the Public Administration towards their suppliers, causing the moving to e-Invoicing of new and smaller companies.

4.1.8.3 Barriers

- Despite the flexibility can be seen as an enabler for the adoption, also is necessary to establish some limits and more control in the definition of

the regulatory framework, also in the creation of solid rules for the e-Archiving.

4.1.8.4 Summary notes

The Republic of Ireland has proposed a new model of e-Invoicing that appears to be working, especially with the increasing level of adoption among the companies. Showing that is possible to have a balance between strictness and diffusion, however is necessary to work more until reach the complete adoption in the public administration and to keep updating the regulatory framework to not risk the interoperability with other countries and the future interchange of e-Invoices cross borders, especially with UK.

Situation of Ireland by expert Dr. Edmund Gray

Dr. Edmund Gray from Ireland, has 27 years Software Project development experience and 14 years implementing UN/CEFACT and related standards. Currently he is a Member of the National Standards Association of Ireland (NSAI) and an Irish Delegate to UN/CEFACT message standards where he is Project Lead in UN/CEFACT Delivery Process Data Model.

Previously he was Technical Lead for EU Commission funded Project http://www.etenclearview.eu/, which validated SaaS based software for international trade. Edmund is an advocate of open XML based messaging standards and the interoperability of secure and reliable message systems. He was the Project Lead of an Irish Government funded project involving the use of digital certificates for secure message transport with 30 other software providers around the world.

1. What do you understand for Electronic Invoicing according to the context of your country?

   In Ireland doesn`t exit and the official definition by the government, however among the industry, the e-Invoicing refers mostly to the invoices interchanged in digital format with mutual approval between

parts, so the European Commission recommendations are followed but for example the PDF are permitted as e-Invoices.

2. Which considers that is the adoption level of e-Invoicing in your country approximately?

   I know that in the case of Italy, the Observatories and collaboration between stakeholders have facilitated the obtaining of these measures. However here in Ireland we don't have such facilities and so we are in the dark in regards to accurate statistics. All I know is that we would not be leaders and are in fact trailing in adoption of e-Invoicing.

3. According to the Billentis report by Bruno Koch the level of e-Invoicing adoption in your country is 20-50%. Do you agree with this estimate or consider that is inaccurate? Why?

   The statistics may be skewed because of the prevalence of Multinational Companies here. Of the indigenous companies the most active sector is the Retail Sector (Clothing, Food etc.), which is dominated by 4 or 5 Supermarket Chains and here I expect that we have nearly 100%. If you then looked at the DIY or Building Materials Sector you would find it is relatively low – maybe somewhere between 20-50% - even though there have been initiatives for over 5 years. This is mainly because it is a fragmented market with no company having more than 20% of the market. You also have to consider that PDFs are considered as e-Invoicing and this may also skew figures. Overall I would be surprised if we had more than 20% using e-invoicing.

4. What do you think of the position of the government towards e-Invoicing in your country? There are portals, standards or obligation in Public Administration to impulse the adoption?

   Currently there is very little Government activity in regard to e-Invoicing (and they are usually a major driver in other countries) but

this will change next year as they have started to consider the potential savings.

5. How do you see the development and adoption of EDI (recommendation 820/95 for e-Invoicing) in your country? If is widely used, in which sectors and conditions is more common?

   Is not widely used and only has been diffused in large enterprises that are mostly multinationals of other countries.

6. What is your opinion about the Regulatory Framework in your country? Do you think has been positive or negative for the adoption and development of the e-Invoicing in your country?

   Is not well defined, because still exists confusion about what is e-Invoicing between the industry and about what is permitted and what not.

7. Is the digital signature or other mechanisms required for the e-Invoicing in your country? In your opinion what is the position of the industry against these measures, is seen as an obstacle or an enabler of the e-Invoicing?

   Is suggested but is not required, in fact as mentioned before, the PDF's without digital signature can be considered as e-Invoices in Ireland. However as the e-Invoicing penetration has been higher in Multinational Companies, they prefer to use it to follow international standards.

8. What is your perspective about e-Archiving in your country? Do you think is well defined in terms of regulation and diffused between the companies?

   A specific e-Archiving regulation still under construction, right now there are only some general rules adapted to the context, that are applied also for paper invoices.

9. Which is the percentage of SME's in your country approximately?

   According to the European commission statistics, the percentage of SME's is around 99,5%.

10. What is the situation and level of penetration of the e-Invoicing in the SME's? Do you think that are prepared for the e-Invoicing and that are supported by the government and other stakeholders in this process?

    I don't have such information, in fact, I am involved in a CEN Workgroup that are producing a Report for the benefit of SMEs for the EU Commission and we have difficulty getting this type of information. But I think that must be really low, despite there is not a stringent control about the e-Invoicing, the benefits and ease of implementation haven`t been diffused correctly among the SME's.

11. How do you see the possible interchange of e-Invoices cross country in your country? Is already done or do you think is feasible?

    In my perception I think the National companies that have introduced e-Invoicing to its processes are not totally prepared to an interchange cross border, because the interoperability, however it actually occurs in the Multinational Companies that have to interchange e-Invoices between subsidiaries but there is less control in these cases.

12. How do you see the status of the e-invoicing of your country compared with the rest of Europe? Do you have data of other countries? How you see the future for e-Invoicing in Europe?

    I have assisted to several conferences and as being part of different organizations, but I know only the superficial result of other countries. However I think that maybe we have a higher e-Invoicing than in other countries, but is clear that we're not leaders in the Market.

Different subjects must be reviewed for the future development, as the adoption of EDI that is really in the UK our neighbor and also how to integrate the different stakeholders as banks and SME's.

I think that the e-Invoicing is just starting to follow the correct road and the government started to realize the benefits and the possible measures that can be taken to increase the adoption, especially in SME's. However is a long road and I don`t think that is going to happen really early.

4.1.9 Lithuania

4.1.9.1 General overview

Lithuania has one of the most growing economies in Europe with an impressive economy development during the last years. Most of the trade Lithuania conducts is within the European Union, and there is a gradual but consistent shift towards a knowledge-based economy with special emphasis on biotechnology, mechatronics and information technology industries.

The approximate adoption level obtained through the secondary sources and interviews, is < 10% with a 26% of adoption in large enterprises . The conditions, rules and facts about the e-Invoicing in the Lithuania are the following:

- There aren`t government standards or Official Portals.
- In Lithuania, e-invoicing is mainly regulated by the Law on Value Added Tax, which states that VAT invoices may be issued in a paper form or, if prior consent of the recipient exists, by electronic means.
- e-Invoicing is allowed in the following ways:
    - a secure electronic signature, as defined by the Law on Electronic Signature, which implements the Directive 1999/93/EC of 13 December 1999;
    - a specialized electronic data interchange (EDI) equipment, the specifications of which are in compliance with

UN/EDIFACT standards, as defined by the Recommendation 1994/820/EC of 19 October 1994;

- a software of any commercial bank registered in Lithuania or of any other entity, the specifications of which are also in compliance with UN/EDIFACT standards, as defined by the Recommendation 1994/820/EC of 19 October 1994

e-Archiving

- The obligatory storage period for invoices is 10 years.
- VAT invoices issued by Lithuanian taxable persons for the supply of goods or services within the country, VAT invoices received and other data relating to such documents must be stored inside the country (in Lithuania).
- VAT invoices issued electronically may be stored not only in Lithuania but also in another Member State of the European Union. However, full access to the data contained in them must be ensured (allowing them to be read, received by electronic means, etc.).
- VAT invoices issued and/or received by electronic means must be stored together with the details of the sender and recipient of the invoice and the dates on which it was issued, sent and/or received.

To summarize and perform an overall analysis of the e-Invoicing in Lithuania, at next is shown the spider web diagram (see Figure 20) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

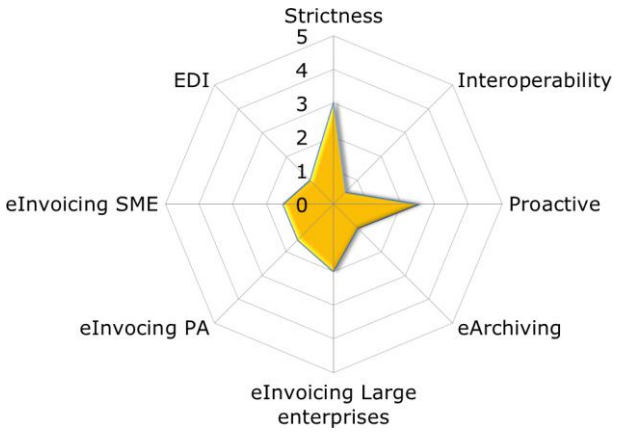

Figure 20. The spider web diagram for the dimensions of e-Invoicing in Lithuania

In the spider web diagram is shown the behavior of e-Invoicing in Lithuania presenting an average strict regulation with low development in the other aspects. However during the last years the government is more proactive towards e-Invoicing and the adoption is starting to grow.

4.1.9.2 Enablers

- The proactivity of the government and the initiatives of the Lithuanian banks for a stakeholder integration, have enabled to find another mechanisms to perform e-Invoicing and to support its development in the SME`s.

4.1.9.3 Barriers

- With the absence of large industries and multinational companies, the responsibility of increase the adoption lies in the SME's which doesn`t count with the enough support and simple mechanisms to adopt e-Invoicing.

4.1.9.4 Summary notes

The e-Invoicing in Lithuania still in an early stage of development, however the recent integration between market stakeholders and the initiatives created by bank can generate more opportunities to access to e-Invoicing by the SME's. The interoperability is one of the issues to improve.

Situation of Lithuania by expert Tomas Kamblevicius

Thomas Kamblevicius works as an Associate Lawyer at Law firm Lideika, Petrauskas, Valiunas ir partneriai LAWIN that is the largest business law firm in the Baltics.

LAWIN has always been at the forefront of the Baltic information technology and communications markets, advising its leaders and participating in major transactions. The firm has significant expertise in advising major global information technology companies. LAWIN has also taken part in the most innovative and complex technology related projects including the first purely electronic agreements, electronic invoicing and Internet filtering issues.

LAWIN provides legal services for a wide range of technology related issues of technology acquisition deals to domain name disputes. Members of our team are widely regarded as leading lawyers in computer software and database protection. We gained notable experience as participants in the establishment of the first Science and Technology Valley in the region.

1. What do you understand for Electronic Invoicing according to the context of your country?

   In Lithuania has commonly used the definition of e-Invoicing provided by the European Commission in the Recommendation of 1994, it means that the e-Invoicing refers to the digitalization of invoices and interchange with other companies and government by secure mechanism.

2. Which considers that is the adoption level of e-Invoicing in your country approximately?

   According to the statistics that we manage in Lithuania, the 50% of enterprises are receiving e-invoices and 29, 2 are receiving e-Invoices. So I would say that the average of adoption in Lithuania is about the 30%.

3. According to the Billentis report by Bruno Koch the level of e-Invoicing adoption in your country is < 10%. Do you agree with this estimate or consider that is inaccurate? Why?

   In my opinion this data is inaccurate and reflects a lack of information about our country, however is necessary to check the used criteria to determine this rate. Because even in Eurostat is shown a rate of 41% of adoption among companies in Lithuania.

4. What do you think of the position of the government towards e-Invoicing in your country? There are portals, standards or obligation in Public Administration to impulse the adoption?

   Despite there is no Portals or official standards for e-Invoicing, the government has supported its diffusion and implementation.

5. How do you see the development and adoption of EDI (recommendation 820/95 for e-Invoicing) in your country? If is widely used, in which sectors and conditions is more common?

   In Lithuania there aren`t so many companies that had implemented traditional EDI, only the large Multinationals. So the use of XML or PDF's is more common.

6. What is your opinion about the Regulatory Framework in your country? Do you think has been positive or negative for the adoption and development of the e-Invoicing in your country?

   The regulatory framework in Lithuania has always been linked to the recommendations of the European Commission, so it doesn't present many differences. However is necessary to update it and strengthen some aspects of the e-Invoicing in our country.

7. Is the digital signature or other mechanisms required for the e-Invoicing in your country? In your opinion what is the position of the industry against these measures, is seen as an obstacle or an enabler of the e-Invoicing?

   Is suggested as a mechanism to grant the integrity of the e-Invoices, but is not mandatory.

8. What is your perspective about e-Archiving in your country? Do you think is well defined in terms of regulation and diffused between the companies?

   e-Archived as a single concept is not so diffused in Lithuania. The rules about the storage of e-Invoices given by the European Commission recommendations are applied.

9. Which is the percentage of SME's in your country approximately?

   Is really high as in the other European countries, approximately the 99,7% of the Lithuanian companies are SME's and in a major part are micro business.

10. What is the situation and level of penetration of the e-Invoicing in the SME's? Do you think that are prepared for the e-Invoicing and that are supported by the government and other stakeholders in this process?

There is not specific data about it, but in my perception still low.

11. How do you see the possible interchange of e-Invoices cross country in your country? Is already done or do you think is feasible?

    There is not too much work about this subject in Lithuania and is not contemplated yet in the regulations.

12. How do you see the status of the e-invoicing of your country compared with the rest of Europe? Do you have data of other countries? How you see the future for e-Invoicing in Europe?

    Despite Lithuania and the other Baltic countries have developed a good level of adoption among its companies, is necessary more integration and communication with the rest of Europe, especially to establish a standard criteria and clear indicators to measure the real adoption.

4.1.10 Norway

4.1.10.1 General overview

Norway is also one of the growing economies in Europe and has one of the highest GDP in the region. The Norwegian economy is an example of a mixed economy, a prosperous capitalist welfare state featuring a combination of free market activity and large state ownership in certain key sectors. Also Norway ss recognized as one of the leaders of e-Invoicing for B2C.

According to the analysis of the secondary sources and the confront of data with the interviews, the e-Invoicing adoption level in Norway is between the 10-20%, with an approximate of 48% in large enterprises.

The main facts and characteristics of the e-Invoicing in Norway are described below:

- E-invoicing in the sense of using EDIFACT is pretty much in use in Norway. It has been also an increase of using XML-based e-Invoicing, but based on different "standards".

- NES UBL – stands for Northern European Subset (NES) Universal Business Language (UBL), a new format being introduced in Norway, that is the standard required by the government for e-invoices also it has a Portal called Project NESUBL where it support the management of e-Invoicing.
- Norway has introduced a special law from 2012 to have NESUBL mandatory for all invoices to governmental sector (not the municipalities).
- Norway is very advanced in using e-Invoice in the b2c-market.

e-Archiving

- According to Norway's Bookkeeping Act, any legal entity required to file returns under the country's VAT Act is also mandated to archive records. When doing so, the following requirements should be met:
    - invoices, like other accounting records, must be archived for 10 years;
    - a back-up of electronic accounts must be kept, independently of, and remotely from, the original electronic data;
    - contents of archives must be accessible in legible, unencrypted formats throughout the retention period;
    - archives must be available for printing at any time throughout the retention period;
    - archive managers must provide tax authorities with any assistance required to gain access to accounting systems and accounting materials, including all hardware and software necessary for this purpose.

To summarize and perform an overall analysis of the e-Invoicing in Norway, at next is shown the spider web diagram (see Figure 21) in which the different dimensions are analyzed according to the procedure described

previously and the data collected through the secondary sources and interviews.

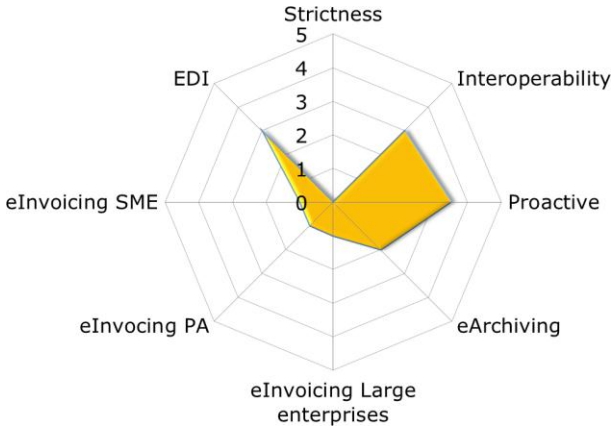

Figure 21. The spider web diagram for the dimensions of e-Invoicing in Norway

In the spider web diagram of Norway can be noticed the lack of strictness in its regulatory framework and its efforts in interoperability and proactivity, however the adoption level still really low. Also must be highlighted the average development of EDI in Norway, reaching a considerable adoption.

4.1.10.2 Enablers

- The efforts in achieving a high interoperability, the proactivity of the government and lack of requirements for perform e-Invoicing can allow an increasing adoption that still in an early stage.
- The development in EDI increases the awareness of the benefits of e-Invoicing among the companies.

4.1.10.3 Barriers

- The diffusion and integration stakeholders is really low in Norway and that blocks the adoption among companies, especially in SME's.

4.1.10.4 Summary notes

The e-Invoicing adoption level still really low in Norway, however it has all the conditions for a correct and increasing development, so it must put more efforts in the diffusion, integration of stakeholders and apply the best practices learned in the implementation of e-Invoicing B2C.

Situation of Norway by expert Dr. Arild Haraldsen

Dr. Stefan Arild Haraldsen is the CEO of NorStella, a private non-profit foundation for e-business and trade facilitation, also has been chairman of NordiPro, Head of Delegation to UN/CEFACT Management Forum, secretariat of e2b Invoice Forum in Norway, secretariat of Service providers e-messaging, participant in NESUBL and member of the Advisory Group to UN/CEFACT Management Forum. Has focused his work on ebXML and interoperability for e-Invoicing in Norway.

NorStella was established on 1 January 2003 and is appointed by the Norwegian Government as the national contact point for all international standardization activities in the field of electronic business and trade facilitation. It is a user oriented, independent, non-profit, private foundation located in Oslo. Its predecessor was Norwegian EDIPRO, established in 1994 to implement EDIFACT for transporting messages, and to use EDIFACT for customs clearance.

NorStella deals with Internet-based standards like ebXML, Core Components, UBL and semantic technologies, and covers all kinds of industries.

1. What do you understand for Electronic Invoicing according to the context of your country?

   In Norway there are diverse definitions of e-Invoicing, however the most used is the one that refers to the digitalization of the invoices sent and received before in paper. There aren`t special requirements in Norway for e-Invoicing.

2. Which considers that is the adoption level of e-Invoicing in your country approximately?

   There is no reliable data about the use of e-Invoice in Norway, partly because of the problems with defining e-Invoice and partly because the Service Providers are hiding the numbers because of competition.

   But it is low. I can mention that in 2009 only 624 companies used e-Invoice, sending 50 million e-Invoices. Of 640 000 invoices that were sent from private suppliers in 2009 to the public sector, only 3% of these were e-Invoices. (Today it is about 8%).

3. According to the Billentis report by Bruno Koch the level of e-Invoicing adoption in your country is 10-20%. Do you agree with this estimate or consider that is inaccurate? Why?

   Yes, considering EDI and the other types of e-Invoicing it would be in that range.

4. What do you think of the position of the government towards e-Invoicing in your country? There are portals, standards or obligation in Public Administration to impulse the adoption?

   The government has been passive toward this subject, however, this will of course change when e-Invoicing will be mandatory for the public sector in July 2012.

5. How do you see the development and adoption of EDI (recommendation 820/95 for e-Invoicing) in your country? If is widely used, in which sectors and conditions is more common?

   EDI is used by large companies, but is not widely used and diffused by other kinds of companies.

6. What is your opinion about the Regulatory Framework in your country? Do you think has been positive or negative for the adoption and development of the e-Invoicing in your country?

   Is loose in its regulations and is in early development, I think it need more specifications and guidelines for the implementations, especially for the SME's.

7. Is the digital signature or other mechanisms required for the e-Invoicing in your country? In your opinion what is the position of the industry against these measures, is seen as an obstacle or an enabler of the e-Invoicing?

   Is not mandatory, but at some point in my opinion will be necessary its use for guarantee the interoperability with other countries.

8. What is your perspective about e-Archiving in your country? Do you think is well defined in terms of regulation and diffused between the companies?

   There aren`t clear indications and regulations about e-Archiving, only the adaptation of the rules applied to the normal paper invoicing.

9. Which is the percentage of SME's in your country approximately?

   Close to 90 % of Norwegian companies are small and medium sized companies not able yet to use e-Invoices.

10. What is the situation and level of penetration of the e-Invoicing in the SME's? Do you think that are prepared for the e-Invoicing and that are supported by the government and other stakeholders in this process?

    I don't have a figure about it, but I'm sure that is relatively low.

11. How do you see the possible interchange of e-Invoices cross country in your country? Is already done or do you think is feasible?

    I have heard of some approaches between the Nordic countries including Norway, but is easier because there aren`t strict regulations in these countries. However is necessary more work to establish the interchange of e-Invoices with the rest of Europe.

12. How do you see the status of the e-invoicing of your country compared with the rest of Europe? Do you have data of other countries? How you see the future for e-Invoicing in Europe?

    In Norway the adoption of e-Invoicing in B2C is really high compared with other countries, however is not well defined for B2B and the is not much support of the different stakeholders. But I hope that this will change the next 3 years.

4.1.11 Greece

4.1.11.1 General overview

Greece due in part to the recent economic crisis is one of the smallest economies in Europe with a high dependence of the tourism, however it has also industries in the maritime sector, transport, communications and technology.

The approximate adoption level of Greece obtained through the secondary sources and interviews is less than 10%. The conditions, rules and facts about the e-Invoicing in Greece are the following:

- There aren`t government standards or Official Portals
- E-invoicing has been traditionally utilized by large companies only exchanging proprietary invoice formats or EDIFACT invoices. Additionally, electronic document interchange between companies in general is taking place in Greece
- There are two ways to allow a Greek company to adopt and / or receive electronic invoices:

- To establish itself an electronic invoicing system based on either the technological standards of electronic signatures in the system or EDI.
- To electronic invoicing services to a provider application (Application Service Provider - ASP) or a third company that develops electronic billing software over the Internet (digital Outsourcing).

- The adaptation on November 20, 2003 (Law 3193/2003) of the European Directive 2001/115CE dated December 20, 2001 to Greek law allows fiscal dematerialization of invoices and enables the total removal of paper from the entire invoicing chain.

e-Archiving

- Taxable persons may decide freely on the place of storage of invoices within Greece, subject to certain requirements and on condition that the stored invoices or information are made available without unwarranted delay to the competent authorities within the time limits stated in the requests made by those authorities.
- If the place of storage is outside Greece, the taxable person must notify the competent financial authority of the place of storage prior to the first storage of invoices, as well as any change of place.
- The period is the same as the period for prescription of the right of the State to impose the tax, which is currently six years.

To summarize and perform an overall analysis of the e-Invoicing in Finland, at next is shown the spider web diagram (see Figure 22) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

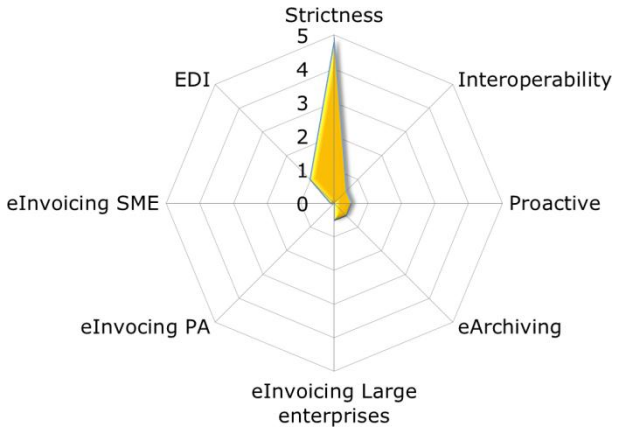

Figure 22. The spider web diagram for the dimensions of e-Invoicing in Greece

The spider web diagram of the e-Invoicing in Greece shows a clearly and undeveloped landscape with nearly nothing of e-Invoicing adoption and a senseless strictness in the regulatory framework. Blocking almost completely the development of the other aspects excepting only some cases of EDI in the multinational companies and large enterprises.

4.1.11.2 Enablers

- Actually there are not enablers, support or even awareness about the benefits that can bring the e-Invoicing to the industry in Greece.

4.1.11.3 Barriers

- The main barrier for e-Invoicing in Greece is the stringent regulatory framework that doesn`t offer alternative way to implement and still requiring the use of paper invoices, therefore the e-Invoicing doesn`t add value for the companies.

4.1.11.4 Summary notes

Exists a total blocking of the e-Invoicing by the government measures and in this way there is only e-Invoicing through EDI used by MMNC's. Is necessary to review the regulatory framework and to make drastic al changes that allows to perform a real e-Invoicing. Also is necessary the

pressure and integration of the industry to claim for an appropriate environment to the e-Invoicing development.

Situation of Greece by expert Dr. Nikolaos A. Kyrloglou

Dr. Nikolaos Kyrloglou is currently Advisor to the Board of Directors in Informatics matters at the Athens Chamber of Commerce and Industry, Greece. He is working on a number of European Commission and Nationally funded projects in the area of electronic commerce emphasizing in secure e-com.

Also he is teaching at the Athens University of Economics and Business as a visiting Professor. In the past he worked with INTRACOM S.A., Development Programs Department as the Project Manager of EC (DG-III) and nationally funded projects. He has also performed technical work in EC funded projects in the area of Microelectronics. He has been entrusted with tasks relating to the evaluation of proposals for research and development projects related to e-Invoicing, submitted within the framework of the programs managed by the Industry Directorate-General of the Commission of the European Communities.

1. What do you understand for Electronic Invoicing according to the context of your country?

   The Greek law on e-invoicing is a "direct" translation of the directive. However, it is not easy to fully implement it, as the Greek Ministry of Finance (MoF) insists on various additional measures in order to consider an invoice as valid for domestic purposes. Traditionally paper issued invoices in Greece had to be written on specially perforated by the MoF paper to ensure no fake invoices would be issued.

   Later on, as computer (or cash register) issued invoices became the norm, they modified this procedure with the introduction of a special secure signing device, that is manufactured by various companies and approved by the MoF. This device intercepts data being sent to the printer and computes a hash value of the data and its internal unique id. Then this hash value is printed on the bottom of each

invoice and stored in an internal memory. In the case of a tax inspection the memory is read and compared to the invoices issued by the company.

An additional problem is that the law foresees that even a dispatch mote has to be stored physically for a period of 5+5 years after the actual delivery of the goods – this makes e-invoicing a "luxury", as a company usually issues a joint invoice/dispatch note that physically accompanies the goods in transit and then is stored as an invoice for tax inspection purposes.

2. Which considers that is the adoption level of e-Invoicing in your country approximately?

   Is very low, due to these mentioned complexities, e-invoicing has not taken off in Greece – of course companies (especially large ones e.g. Supermarkets) insist that they get the data electronically from their suppliers to avoid data entry, but the invoices or the dispatch notes are still printed and sent.

3. According to the Billentis report by Bruno Koch the level of e-Invoicing adoption in your country is < 10 %. Do you agree with this estimate or consider that is inaccurate? Why?

   I would believe that the numbers of penetration that you mention must be roughly true, due to the difficulties and strict regulations for the implementation.

4. What do you think of the position of the government towards e-Invoicing in your country? There are portals, standards or obligation in Public Administration to impulse the adoption?

   The government, especially the Minister of Finance hasn`t realized yet the benefits of the e-Invoicing and have not allowed the

completely dematerialization of the invoice, so I think is its direct responsibility the lack of adoption of e-Invoicing in Greece.

5. How do you see the development and adoption of EDI (recommendation 820/95 for e-Invoicing) in your country? If is widely used, in which sectors and conditions is more common?

   Its development is low and have been reserved for the large enterprises and Multinational Companies, but even with EDI is still necessary to print the invoice.

6. What is your opinion about the Regulatory Framework in your country? Do you think has been positive or negative for the adoption and development of the e-Invoicing in your country?

   As mentioned before, is really strict and doesn`t make sense with the concept of e-Invoicing, because is necessary to print the invoice.

7. Is the digital signature or other mechanisms required for the e-Invoicing in your country? In your opinion what is the position of the industry against these measures, is seen as an obstacle or an enabler of the e-Invoicing?

   Currently MoF, according to a directive they issued in 2009, insists that also in e-invoicing the same procedure is followed – they don't care what type of signature will be used as long as the hash value is "printed" (or included) in the invoice data.

8. What is your perspective about e-Archiving in your country? Do you think is well defined in terms of regulation and diffused between the companies?

Considering that is still necessary to print the invoice that is sent electronically, there aren`t regulations and control about e-Archiving because the archiving of the paper invoices prevails.

9. Which is the percentage of SME's in your country approximately?

   Almost the 100 % of the companies are SME's in Greece.

10. What is the situation and level of penetration of the e-Invoicing in the SME's? Do you think that are prepared for the e-Invoicing and that are supported by the government and other stakeholders in this process?

    Is low and there isn`t almost e-Invoicing at all, due that if is necessary to print the invoice, implement e-Invoicing does not matter and doesn`t create value for the company.

11. How do you see the possible interchange of e-Invoices cross country in your country? Is already done or do you think is feasible?

    There`s no way and doesn`t make sense to interchange e-Invoices cross border with the current regulation.

12. How do you see the status of the e-invoicing of your country compared with the rest of Europe? Do you have data of other countries? How you see the future for e-Invoicing in Europe?

    There are now a lot of discussions as to how to modify the above scheme to simplify it for companies and at the same time make it easier for the MoF to perform inspections – the new law which entered into effect on April 1st, foresees that all transactions over 3000 Euros (and starting December 1st over 1500 Euros) have to be routed through the banking system and at the same time the data will have to be sent to a MoF database.

    This, however, is not e-invoicing and up to now it is not yet clear how this will be implemented and what effect this may have an e-invoicing.

4.1.12 Belgium

4.1.12.1 General overview

Belgium's strongly globalized economy and its transportation infrastructure are integrated with the rest of Europe. Its location at the heart of a highly industrialized region helped make it the world's 15th largest trading nation in 2007. The economy is characterized by a highly productive work force, high GNP and high exports per capita. Belgium's main industries are machinery and equipment, chemicals, finished diamonds, metals and metal products, foodstuffs.

According to the analysis of the secondary sources and the confront of data with the interviews, the e-Invoicing adoption level in Belgium is less than 10%, with an approximate of 83% in large enterprises. The main facts and characteristics of the e-Invoicing in Belgium are described below:

- No government Official Portal, but is widely adopted the Finvoic – XML schema used also in Finland B2G and B2C e-invoicing. Finvoic is often used in a four-party model by local Finnish banks such as Nordea and specialized providers such as Isabel of Belgium.

- From 1 January 2010, the Belgian VAT administration accepts any type of invoices sent or stored electronically. It is not necessary anymore that the invoice has an “advanced” electronic signature, or that the invoice is sent electronically according to a protocol such as Electronic Data Interchange (EDI), but still suggested to grant the authenticity, integrity and legibility of the invoices.

- With this measure, the government aims to increase the use of electronic invoicing by businesses, that were limiting the use of e-Invoices for intra- businesses and also to promote the use between SME.

e-Archiving

- Following article 60 of the Belgian VAT Code, both suppliers and buyers are required to archive one copy of each invoice issued or received (original copy for incoming invoices).

- All invoices and fiscally relevant documents must be archived for 7 years as from the date they were issued. Books must be stored for 7 years as from January 1 of the year following that of the closing of the financial year.

- In addition to these requirements, Belgian VAT regulations specify that:

    - e-Invoices sent and received must be stored in their original formats along with the data which guarantee the authenticity of the origin and the integrity of the content of the invoices, i.e. electronic signatures and accompanying certificates;

    - authenticity and integrity of e-Invoices must be guaranteed throughout the entire archive period.

To summarize and perform an overall analysis of the e-Invoicing in Belgium, at next is shown the spider web diagram (see Figure 23) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

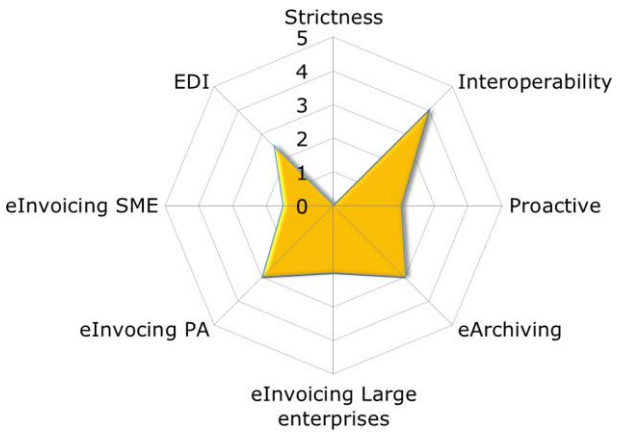

Figure 23. The spider web diagram for the dimensions of e-Invoicing in Belgium

As can be noticed in the spider web diagram of Belgium, there has been a balanced development of the e-Invoicing, due in part to its loose and flexible regulation, efforts in interoperability and in the diffusion towards the public administration and the SME's.

4.1.12.2 Enablers

- The flexible and simple regulatory framework and the use of international standards as Finvoic, have increased the e-Invoicing adoption facilitating the access to the SME`s.

4.1.12.3 Barriers

- Despite the integration of stakeholders and the open minded measure to adopt international standards, there`s missing more support and proactivity by the government causing a lower adoption by SME's and the absence of portals and other standards that support also the e-Invoicing in public administration.

4.1.12.4 Summary notes

The e-Invoicing development in Belgium is just starting, but with the recent measure of adopt international standards and to simplify the regulatory framework, have achieved a notorious growth of the e-Invoicing adoption level. Another strength of the model adopted by Belgium is its high level of interoperability and the balanced adoption in the different sectors, however is necessary more work, especially with a more active position by the government and the e-Invoicing stakeholders.

4.1.13 Austria

4.1.13.1 General overview

Austria is one of the richest countries in Europe, recognized by having a well-developed social market economy, and a high standard of living. Its main industries are construction, machinery, vehicles and parts, food, metals, chemicals, lumber and wood processing, paper and paperboard, communications equipment, tourism.

According to the analysis of the secondary sources and the confront of data with the interviews, the e-Invoicing adoption level in Austria is between 10-20%, with an approximate of 46% in large enterprises.

The main facts and characteristics of the e-Invoicing in Austria are described below:

- E-Invoicing is regulated in the VAT-Law stating that the recipient must agree to the electronic form of transmission and that authenticity and integrity is provided. This can until now be done by using EDI or advanced electronic signatures
- By the end of 2011, invoices can be sent by fax, unsigned. Then also Faxrechnungen with an advanced electronic signature are to be fitted to deductible.
- No government Official Portals but they had a standard widely used and promoted.
- ebInterface, is an XML-format widely used in Austria. It was designed as alternative to more complex EDIFACT-based interfaces for small and medium businesses. The standard is on its third release and is now integrated into many popular ERP system.
- Cross border e-Invoicing allowed with Germany and described the provisions for electronic invoices are only relevant when it comes to the deduction in Austria.

e-Archiving

- Any invoices and records referring to invoices must be kept for seven years from the date of issue or creation, as appropriate.
- The electronic invoices, including signature by the invoice recipient - such as paper bills – must be kept for this period (e.g. CD, DVD). The expression on paper is not enough.

EDI

- EDI is allowed, if companies that are together in constant commerce, manage invoices transmitted by electronic data exchange, in addition per billing period, a summary paper invoice is required or it is transmitted under the above conditions (digital signature, certificate), it means a summary invoice electronically. Austria has the same preconditions for the use of EDI as Germany.

To summarize and perform an overall analysis of the e-Invoicing in Austria, at next is shown the spider web diagram (see Figure 24) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

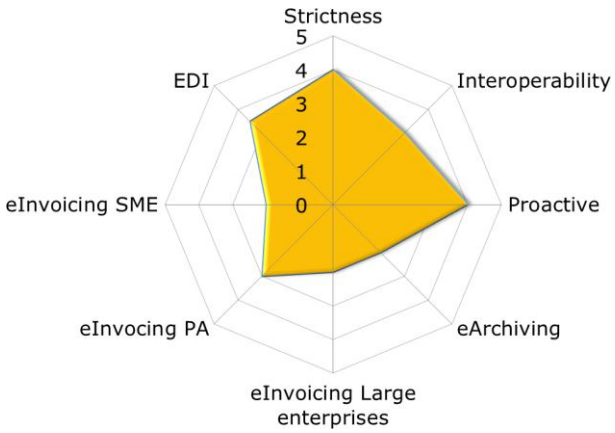

Figure 24. The spider web diagram for the dimensions of e-Invoicing in Austria

The behavior of Austria towards e-Invoicing has been balanced, presenting an average adoption level in large enterprises and public administration, thanks to the proactivity of the different stakeholders and despite the strictness of the regulatory framework. The adoption of EDI is also considerable in Austria.

4.1.13.2 Enablers

- The interoperability and integration with German industry enables to call the attention of more companies and increase the diffusion due to the strong commercial relationship between both countries.
- The proactivity of the government in the diffusion and adoption of standards and also the penetration of e-Invoicing in the Public Administration, have facilitated the accessibility to SME's.

4.1.13.3 Barriers

- Despite the general development of the e-Invoicing in Austria, the strict requirements for perform it still hard to accomplish by the SME`s, also in part due to a low support by the government and the market stakeholders.

4.1.13.4 Summary notes

Austria has established reliable mechanisms to enable the e-Invoicing adoption with an average strict regulatoy framework, also promoted by the diffusion of EDI in the large enterprises and the active postion of the stakeholders towards the e-Invoicing. However the adoption in SME's still low and are necessary mechanisms to enable its acces to e-Invoicing.

4.1.14 Sweden

4.1.14.1 General overview

Sweden is an export-oriented mixed economy featuring a modern distribution system, excellent internal and external communications, and a skilled labour force. Timber, hydropower and iron ore constitute the resource base of an economy heavily oriented toward foreign trade. Sweden's engineering sector accounts for 50% of output and exports. Telecommunications, the

automotive industry and the pharmaceutical industries are also of great importance.

In terms of structure, the Swedish economy is characterized by a large, knowledge-intensive and export-oriented manufacturing sector, an increasing, but comparatively small, business service sector, and by international standards, a large public service sector. Large organizations both in manufacturing and services dominate the Swedish economy.

According to the analysis of the secondary sources and the confront of data with the interviews, the e-Invoicing adoption level in Sweden is between 20-50%, with an approximate of 32% in large enterprises.

The main facts and characteristics of the e-Invoicing in Sweden are described below:

- The Invoicing Directive did not trigger any inclusion in Swedish law of specific integrity and authenticity requirements for electronic invoicing. Existing rules concerning accounting material were deemed sufficient and applied equally to electronic invoices.

- In summary, no technical measures are mandatory for e-invoicing, as long as the invoice remains unchanged.

- The main methods used are EDI-invoice, e-Invoice (advanced or qualified electronic signatures) and e-Giro (initiative by banks), self-billing, invoice-files via e-mail and online services (ASP, web-EDI, etc.) and scanning of paper invoices. The banks and other private providers offer different solutions related to e-invoicing. The Swedish government has decided that all government agencies shall handle invoices electronically by July 1 2008.

- There are 2 standards. SFTI, Originated in Sweden's public sector. SFTI (Single-Face-To-Industry) is based upon EANCOM messaging standards utilizing X.400 or S/MIME for transport; and Svefaktura, due that SFTI is too complex for many SMEs in Sweden. Consequently, the government developed Svefaktura (SwedInvoice) with the goal of "the simplest approach possible." The standard includes XML messaging

specifications, communications and security protocols, but offers very limited opportunity for customization.

- Is ready for e-Invoicing cross border, through CENBII/PEPPOL has interchanged e-Invoices with Denmark.

e-Archiving

- Under the Swedish Tax Payment Act, invoices must be stored for seven years. The storage period is ten years for companies to which the Swedish Accounting Act is applicable.

- According to the main rule of the Swedish Accounting Act, the invoices must be stored in the same form in which they were received by the company. Accounting material prepared by the company must be stored in the form it was in when it was compiled. Received accounting material can be converted from electronic form to paper after three years from the end of the calendar year in which the financial year ended, if this is performed in a secure fashion.

To summarize and perform an overall analysis of the e-Invoicing in Sweden, at next is shown the spider web diagram (see Figure 25) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

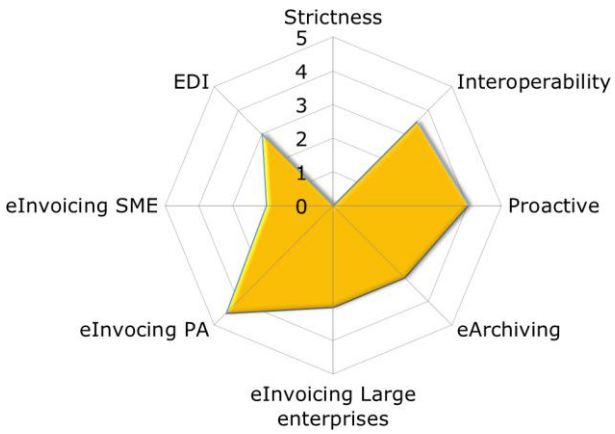

Figure 25. The spider web diagram for the dimensions of e-Invoicing in Sweden

As can be noticed in the spider web diagram of Sweden, there is a loose regulatory framework that doesn`t require special conditions to perform e-Invoicing and also there is a high penetration and adoption level of e-Invoicing in the Public Administration. The other dimensions of e-Invoicing are developed with an average level of interoperability and proactivity.

4.1.14.2 Enablers

- The integration of the e-Invoicing stakeholders has been important in the development and increasing adoption of the e-Invoicing. The banks are active players of the adoption and also the government and the industry have worked together for the establishment of standards and to increase the interoperability.
- The active participation of the public administration and its obligation to adopt e-Invoicing, have permitted the diffusion towards the SME's and the general development.

4.1.14.3 Barriers

- There aren`t specific barriers to implement e-Invoicing, however the existence of diverse standards and methods to implement it can confuse some companies that desire to adopt it, especially in the SME's sector.

4.1.14.4 Summary notes

Sweden is one the countries that's advanced in terms of e-Invoicing compared with the rest of the European countries, with the common characteristic of a flexible and loose regulation, an active position by the stakeholders and efforts in interoperability and diffusion at different levels, since EDI to e-Invoicing for SME's.

4.1.15 Denmark

4.1.15.1 General overview

Denmark is one of the most competitive economies in the world, and is known for the Danish cooperative movement within among others farming, the food industry (Danish Crown), dairy production (Arla Foods), retailing (Brugsen), wind turbine cooperatives and co-housing associations.

The approximate adoption level of Denmark obtained through the secondary sources and interviews is between 20-50%, with an approximate of 98% in B2G e-Invoicing.

The conditions, rules and facts about the e-Invoicing in Denmark are the following:

- NemHandel is the Government Portal for e-Invoicing allowing the free e-Invoicing use.
- For B2B accepts advanced electronic signatures, “proper EDI” with an interchange agreement based on the European Commission 1994 Recommendation, as well as “other means”. OIOXML electronic invoicing, which was introduced as mandatory on 1 February 2005 for all public authorities in Denmark.
- E-Invoicing supported for B2G companies in different ways, according to their level of IT readiness:
    - Through an electronic invoicing system, by sending an OIOXML digital invoice directly from their own system to their public-sector customer via the VANS network;
    - Through a digital invoice portal, which resembles an Internet bank where companies compose their invoices using a login and password, and then send it electronically;
    - By sending a paper invoice with an EAN number to a Read-In bureau. Here it is converted to an electronic invoice and forwarded to the correct public institution. This solution ensures that foreign companies and companies without the necessary IT can still do business with the public sector.

- OIOUBL and OIOXML – contains an e-invoicing standard used in Denmark. OIOUBL is a customization of the OASIS UBL 2.0 standard for the specific needs of the Danish business community. OIOUBL is designed as a replacement for OIOXML, an older Danish e-invoice standard.

- Is ready for e-Invoicing cross border through CENBII/PEPPOL has interchanged e-Invoices with Sweden.

e-Archiving

- Registered companies using, issuing or receiving electronic invoices for the use of accounting shall store the electronic invoices in their original form and format.

- Businesses must keep accounting records, including e-Invoices, for 5 years after the end of the year in which the taxable acquisition takes place.

- Storage must be in such a way that the requirements for authenticity and integrity are respected and such that no data are lost entirely or partially due to errors, crashes or other interruptions, whether data stored in the registered factory or from a third party.

- Registered companies using electronic invoicing must store descriptions of the systems including hardware and software, and the procedures used. Furthermore, the registered company store contracts and certificates as part of the description.

EDI

- It is a prerequisite for the use of electronic data interchange (EDI) that between the parties is a contract, which sets procedures for electronic data exchange, which ensures that the conditions for e-Invoicing are met.

To summarize and perform an overall analysis of the e-Invoicing in Denmark, at next is shown the spider web diagram (see Figure 26) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

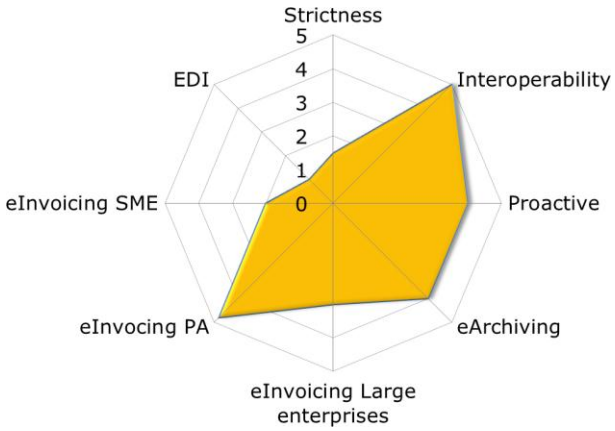

Figure 26. The spider web diagram for the dimensions of e-Invoicing in Denmark

The spider web diagram of Denmark shows a clear high level of e-Invoicing adoption in the Public administration, also with a high level of interoperability, good proactivity and development of the e-Archiving. The adoption level is one of the highest among the countries but with a low penetration of EDI.

4.1.15.2 Enablers

- The main enabler for the e-Invoicing adoption in Denmark has been the work done to increase the e-Invoicing adoption in the Public Administration. This has permitted to reach almost a 100% of penetration, but the most important is that has boosted the development of e-Invoicing in other dimensions, creating possibilities for the SME's, improving the interoperability and establishing a flexible regulatory framework.

4.1.15.3 Barriers

- There aren`t strong barriers in Denmark for the e-Invoicing adoption, however the adoption in the SME's still considerably low as consequence possibly of being focused in the diffusion to the public administration but no supporting and integrating the SME's in that process.

4.1.15.4 Summary notes

Denmark stands out as one of the leaders of e-Invoicing adoption with one of the highest levels in the public administration and as common fact with the other developed countries also has a good level of interoperability and proactivity by the government and the different stakeholders. However is necessary more work in other aspects as the SME's adoption, showing that there isn`t a Country that have attacked the e-Invoicing development in all its dimensions.

4.1.16 Portugal

4.1.16.1 General overview

Since the 1990s, Portugal's economic development model has been slowly changing from one based on public consumption to one focused on exports, private investment, and development of the high-tech sector. Business services have overtaken more traditional industries such as textiles, clothing, footwear, cork (of which Portugal is the world's leading producer), wood products and beverages.

Industry is diversified, ranging from automobile (Volkswagen Autoeuropa, Peugeot Citroen), aerospace (Embraer), electronics and textiles, to food, chemicals, cement and wood pulp. Volkswagen Group's AutoEuropa motor vehicle assembly plant in Palmela is among the largest foreign direct investment projects in Portugal. Modern non-traditional technology-based

industries like aerospace, biotechnology, and software, have been developed in several locations across the country.

The approximate adoption level of Portugal obtained through the secondary sources and interviews is less than 10%.The conditions, rules and facts about the e-Invoicing in Portugal are the following:

- There aren`t government Official Portals or support to SME.
- Portugal accepts advanced electronic signatures and “proper EDI” with an interchange agreement based on the European Commission 1994 Recommendation.
- Electronic invoices must be capable of being presented in the Portuguese SAF-T format; the Standard Audit File is an XML message scheme used to support taxation and audit purposes in Portugal. Based upon the OECD’s SAF-T format, the standard includes a few customizations to support the local Portuguese market.
- The big distribution companies (ex. Electricity, Telecommunications, etc.) are the most advanced referring to the introduction of the e-invoice for the transactions with other companies and final clients.

e-Archiving

- The obligatory storage period for invoices is 10 years.
- Electronic storage is permitted for invoices issued electronically on condition that full, on-line access to the data is guaranteed and the integrity of the source and contents is assured.
- Electronic storage is also permitted for invoices and sales receipts issued in paper form where the technical specifications of the law are met.
- The electronic system for storing invoices or equivalent documents must, for the legally stipulated periods, ensure:
    - accessible and legible information, notably for use by the tax administration, regardless of the systems and technologies

used, so that the stored information can be read, exported or extracted in document form;

- methods for checking the integrity of tax-relevant information, preventing it from being altered, becoming unusable or being destroyed;
- storage of information required for reconstruction of past transactions;

- preservation of updated technical documentation for computerized invoicing systems which enable their operational integrity to be assessed in an intelligible manner.

To summarize and perform an overall analysis of the e-Invoicing in Portugal, at next is shown the spider web diagram (see Figure 27) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

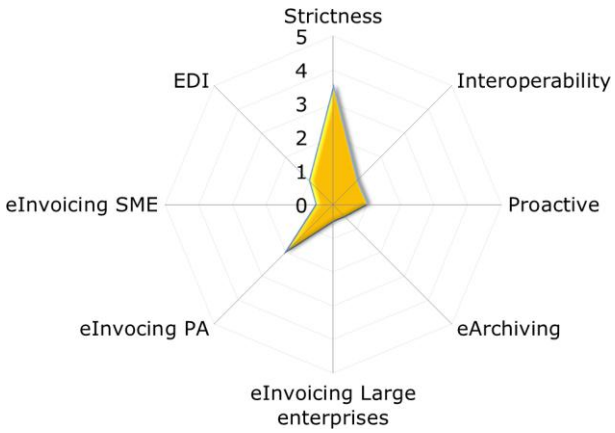

Figure 27. The spider web diagram for the dimensions of e-Invoicing in Portugal

As can be noticed in the spider web diagram of Portugal, the strictness in the Regulatory framework is relatively high considering the low adoption of e-Invoicing that presents in all the sectors. Only the public administration is having an increase in the adoption against a passive position and an ineffective penetration in the SME's and large enterprises.

4.1.16.2 Enablers

- The only clear enabler of the e-Invoicing adoption in Portugal is the establishment of standards and the support to promote the e-Invoicing in the public administration, which despite of being the only sector aware of the e-Invoicing, can create pressure in the future to the suppliers and other companies of the country.

4.1.16.3 Barriers

- The industry in Portugal is aware of the benefits that can bring the implementation of e-Invoicing, but the lack of integration and proactivity to facilitate the access to different stakeholders have prevented its correct development.

4.1.16.4 Summary notes

The e-invoicing in Portugal still in an early development stage, and there aren`t conditions yet to achieve a high adoption level as in other countries. Also the level of awareness and number of initiatives of the e-Invoicing stakeholders in Portugal are really low.

4.1.17 Poland

4.1.17.1 General overview

Poland's high-income economy is considered to be one of the healthiest of the post-Communist countries and is currently one of the fastest growing within the EU. Also has a large number of private farms in its agricultural sector, with the potential to become a leading producer of food in the European Union.

Poland is recognised as a regional economic power within Central Europe, possessing nearly 40 percent of the 500 biggest companies in the region (by revenues).

According to the analysis of the secondary sources and the confront of data with the interviews, the e-Invoicing adoption level in Sweden is less than 10%, with an approximate of 15% in large enterprises.

The main facts and characteristics of the e-Invoicing in Sweden are described below:

- From 1 January 2011 came into force the new directive (directive about the common system of VAT in a relation to regulations of invoicing) that appoints identical treatment of paper and electronic invoices. There are also rules for their storing and rules for making them accessible for the tax authorities.

- This affords businesses an opportunity to issue, send and store invoices in any electronic format. Just like current and upcoming EU legislation acceptance from the customer is still needed, even though this can be achieved either explicitly or implicitly and either in electronic format or in writing.

- To send invoices electronically, two conditions must be satisfied:

    - Authenticity of origin, certainty that the identity of the person supplying the goods or service, is the issuer of the invoice.

    - Integrity of content, invoice data has not been altered.

- The former requirements for a qualified electronic signature and to use EDI no longer apply; however, both methods are mentioned in the new guidance as examples of how to satisfy the required conditions for e-invoices. Sending an PDF invoice per e-mail is also permitted.

e-Archiving

- Requires taxpayers to keep all documents relating to the calculation of VAT until the tax obligation is prescribed, i.e. five years following the end of the year in which the tax payment deadline expired.

- Electronic storage of invoices must comply with several rules contained in the Regulation of the Minister of Finance, which was issued on 14 July 2005 to implement Directive 2001/115/EC. The principal requirements regarding e-Archiving of invoices are as follows:

- the recipient of the invoices shall accept the issuing and sending of invoices in electronic form;

- the authenticity of the electronic invoices shall be guaranteed in one of the following ways: (i) use of a secure electronic signature or (ii) use of electronic data interchange (EDI), in accordance with an agreement based on the European model of data interchange, where the executed agreement sets out procedures guaranteeing the authenticity and integrity of the invoice.

To summarize and perform an overall analysis of the e-Invoicing in Polandl, at next is shown the spider web diagram (see Figure 28) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

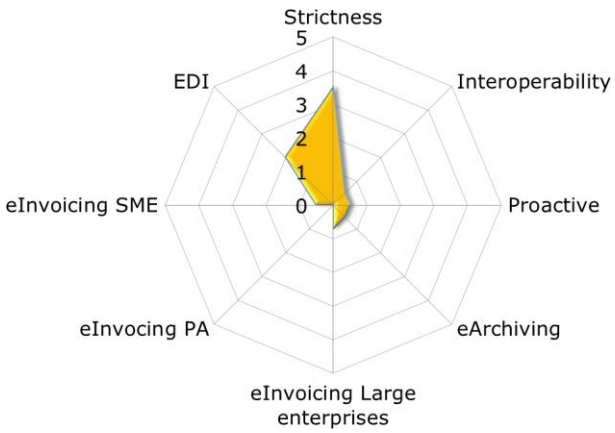

Figure 28. The spider web diagram for the dimensions of e-Invoicing in Poland

As seen in the spider web diagram of Poland, the development of e-Invoicing in Poland has been really poor, with exception of an average adoption of EDI by the large enterprises and multinational companies that are in Poland. Besides the strictness of the regulatory framework is high without almost any effort by the government for promote the e-Invoicing.

4.1.17.2 Enablers

- Since now with the changes in the regulatory framework to abolish the requirements for perform e-Invoicing, is easier to grant the access to e-Invoicing to the SME`s and to the large enterprises that have been apart from it due to its complex requirements of implementation and the costs related.

4.1.17.3 Barriers

- The barriers so far has been the stringent regulation, however another aspects that blocks the development are the lack of proactivity and awareness of the benefits by the governments and different stakeholders of e-Invoicing in Europe.

4.1.17.4 Summary notes

The e-Invoicing adoption in Poland is just starting and the proactivity by the government and integration between stakeholders has been improving. However to increase the adoption to higher levels is necessary enough time to convince the SME's. Also is required to finish of define the regulation and especially review the rules for e-Archiving.

4.1.18 Switzerland

4.1.18.1 General overview

Switzerland has a stable and modern economy and is home to several large multinational corporations. The largest Swiss companies by revenue are Glencore, Nestlé, Novartis, Hoffmann-La Roche, ABB and Adecco. Also notable are UBS AG, Zurich Financial Services, Credit Suisse, Swiss Re, and The Swatch Group. Switzerland is ranked as having one of the most powerful economies in the world.

Chemicals, health and pharmaceutical, measuring instruments, musical instruments, real estate, banking and insurance, tourism, and international organizations are important industries in Switzerland.

According to the analysis of the secondary sources and the confront of data with the interviews, the e-Invoicing adoption level in Switzerland is between 20-50%.

The main facts and characteristics of the e-Invoicing in Switzerland are described below:

- E-invoicing in B2B in Switzerland is driven by large companies that want to streamline their accounts payable processes. They engage service providers who support them in getting their suppliers on board. One-to-one e-invoicing is not common. The industries with the largest adoption are: retail, pharmaceutical and financial services.
- In 2010 the Federal Finance Administration (FFA) took the chair of the national project to foster e-invoicing in and with the Public Administration.
- E-Invoicing is regulated in the Ordinance of the Federal Department of Finance on Electronic Data and Information (OEIDI/ELDI-V) since 30 January 2002 (latest adjustments as per January 1st, 2010).
- It states that e-invoices have to be signed with an advanced electronic signature to secure authenticity and integrity. The signature has to be based on a certificate of a Swiss Certification Authority accepted by the Swiss Tax Administration. The issuance of an electronic invoice can be delegated to a third party that is established in Switzerland. Any third party issuer must be registered as a company in Switzerland.
- The format of the signed e-invoice has to be structured machine-readable data. Unstructured data (e.g. signed PDF) is also allowed if the document is free of dynamic content and the related data can be analyzed in the accounting software. In terms of verifiability and storage of e-invoices the ordinance is referring to the Ordinance of 24 April 2002 on Accounting Records (GeBüV).

- EDI is not allowed as e-Invoicing.

e-Archiving

- In Switzerland, all invoices sent and received must be archived for 10 years, for immovable goods 20 years. Inspection of these archives by tax authorities, whether stored by the taxable entity or a service provider, must be facilitated throughout this period.

- Archives must be maintained in Switzerland unless access, readability, and inspection of fiscally relevant data are guaranteed at all times. In addition, according to Article 10 in the ELDI-V, data must be stored in its original form at the time of transmission; if data is converted to a different format for in-house use, then both versions must be archived and administered with the same index and the converted version must be so labeled.

  To summarize and perform an overall analysis of the e-Invoicing in Switzerland, at next is shown the spider web diagram (see Figure 29) in which the different dimensions are analyzed according to the procedure described previously and the data collected through the secondary sources and interviews.

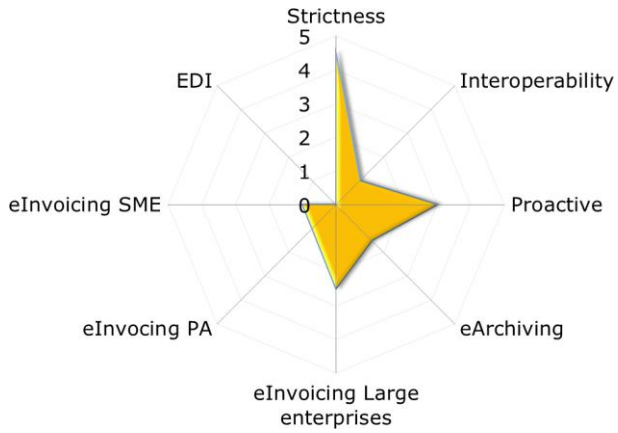

Figure 29. The spider web diagram for the dimensions of e-Invoicing in Switzerland

As can be seen on the spider web diagram of Switzerland, there is a marked level of strictness in the regulatory framework and relative low

adoption level in all the e-Invoicing dimensions, especially in the EDI, which is forbidden in Switzerland.

4.1.18.2 Enablers

- During the last years, the government has been more involved in the e-Invoicing, establishing the conditions and providing the tools to the stakeholders, in order to increase the adoption.
- The banning over EDI as e-Invoicing, permits to the companies to focus in new methods and standards to perform it, causing an integration between stakeholders.

4.1.18.3 Barriers

- The rigorous regulatory framework has blocked the adoption level in Switzerland, despite the efforts by the government to increase through an active position.

4.1.18.4 Summary notes

The e-invoicing adoption level is average in Switzerland and despite that doesn't accept the EDI as e-Invoicing, the penetration has been good. However is necessary more work and diffusion by the different stakeholders, besides Switzerland as not being part of the European Union should take advantage and establish a regulatory framework that boosts the adoption level according to its own interests and conditions.

5 SUMMARY NOTES

5.1 Classification of Europe countries with respect to e-Invoicing

In this section are analyzed and classified the different spider web diagrams obtained of the data analysis of each country. The diagrams were reviewed to look for similar characteristics, concurrent shapes and patterns that determine certain behaviors in a group of countries.

Depending of a specific or more characteristics in a shape, can be identified certain tendencies or instead some lack of development in an e-Invoicing dimension. For the e-Invoicing in European countries were identified five types or similar shapes, after translated in groups of countries with certain characteristics and behaviors that are explained at next:

- *Countries with loose regulation, proactive in the adoption and with government-industries synergies.*

  This group is identified by a down lever concentrated shape with a marked lackness of strictness. The countries that are classified in this group are: Sweeden, Finland, Estonia and Denmark.

  As can be noticed, three of these countries belongs to the Nordic region that has been recognized by its development in e-Invoicing and its figures shows that with a loose regulatory framework and requirements, combined with high proactivity in the diffusion and integration of stakeholders and other countries and finally establishing portals and standards to increase the interoperability, can be increased the adoption in a significant amount.

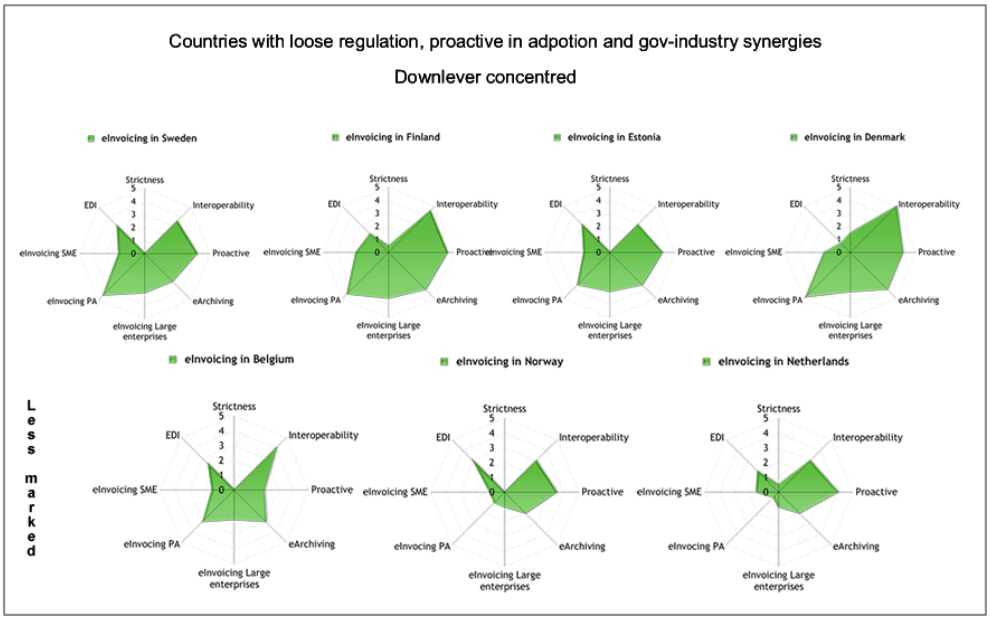

Figure 30. Countries with loose regulation, proactive in the adoption and government-industries synergies

The Figure 30 shows also a low development of EDI in the countries with this characteristics and the e-Invoicing in SME's still low despite these measures and conditions to promote the adoption.

To this group also belogns Belgium, Norway and the Netherlands, shown in the bottom. Identified also by a down lever concentrated shape but less marked, these are less proactive in the diffusion and integration, are more developed in EDI adoption and have less effort in achieving the interoperability between countries through standards and portals.

However the common characteristic is the really loose regulation and obligations in the implementation of e-Invoicing, which means that is possible that these countries are on the way of increase the adoption level to equal the other countries, or that its proactivity and support of the government and other stakeholders is not enough to promote the adoption.

- *Countries with average strict regulation, but developed in adoption and support for the industry.*

  The second group of countries is formed by the countries that its figures are centre balanced, which means that despite of possess a moderate level of strictness in its regulations, also have been able to develop the other dimensions around the adoption. To the group belongs: Spain, Austria, Ireland and France.

  These countries are characterized for having development in almost all its dimensions because have found an equilibrium between a moderate strict regulation without complicated controls and an average proactivity and interoperability to impulse the adoption in the different dimensions.

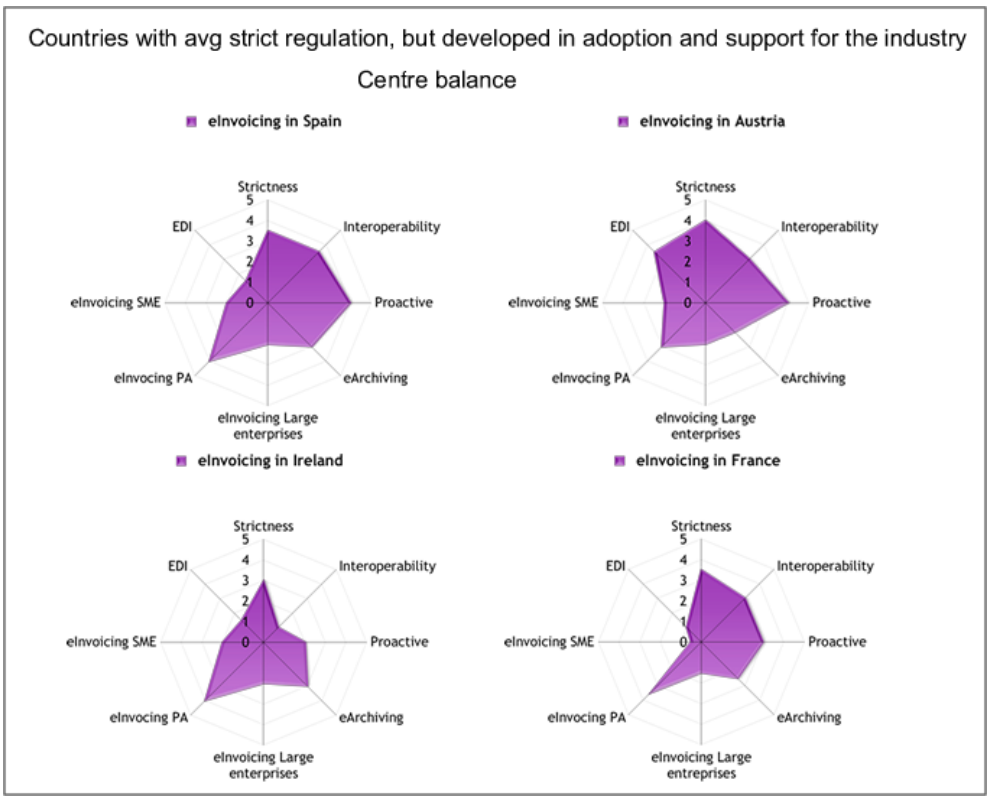

Figure 31. Countries with average strict regulation, but developed in adoption and support for the industry

The Figure 31 shows the different shapes of these countries, and how some are more developed in some dimensions than others but keeping a balance between the different aspect of the e-Invoicing.

- *Countries with stringent regulations, passive and less developed in e-Invoicing adoption*

The last group of countries are the ones vertical concentrated at the top of the spiderweb diagram, which means that its regulatory frameworks are stringent and in some cases complicated, blocking the development of e-Invoicing in its different dimensions excepting EDI as is still necessary for large enterprises and Multinational companies.

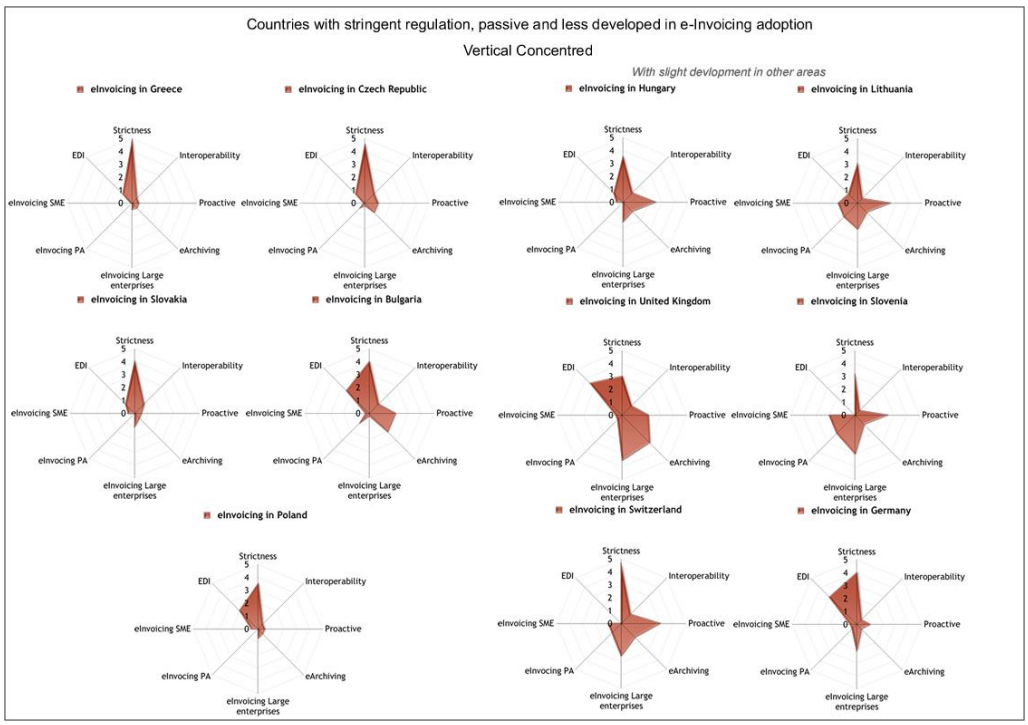

Figure 32. Countries with stringent regulations, passive and less developed in e-Invoicing adoption

The Figure 32 shows how the e-Invoicing adoption level in large enterprises and SME's is really low, as a consequence mostly of an uncertain and outdated regulatory framework that instead of

facilitated and promote the adoption, blocks the e-Invoicing development with pointless controls and requirements that doesn`t support and benefit the companies which wants to implement e-Invoicing.

In this group also there are some countries that present some higeher adoption and follows a tendency of a star with respect to its shape in the spiderweb diagram, which mean that are countries with an strict regulatory framework in terms of requirements and obligation, are not well developed in all the e-invoicing dimensions, but stands out in specific dimensions as SME, Proactivity or EDI with poor results from others.

These countries are Hungary, Lithuania, Germany, Slovenia and Switzerland and are grouped at the right of the Figure 32. Another common characteristic is that are not balanced in its approach to e-Invoicing, so in some cases are proactive but doesn`t work in the interoperability or have an average adoption in SME and large enterprises, but forbids the e-Invoicing for Public Administration, showing certain contradictions in its approach and implementation of e-Invoicing.

5.2 Summary notes about the Regulatory Framework

- Still existing several differences between EU members with respect the Regulatory Framework despite the EC Recommendation and standards suggested, the sociocultural and economical difference obliges to each country to take different measures, also depends of the proactivity of the government, the awareness about the benefits by the industry and the compromise of banks and different stakeholders.

- The regulatory framework is not only related to the VAT Tax regulation, but also to other factors that obliges its adjustment and constant updating. Being influenced by the business culture, politic factors and economical/industrial tendencies that causes that some measures fits more to the development of the e-Invoicing in the country.

- Nowadays the EU is moving toward the balance of countries with strict regulations and loose regulations, and during the last years are more the countries that removed the requirements and obligation as Poland and Belgium.

- The achievement of an integrated and consolidated Regulatory Framework as the one suggested by the Experts Group, seem far away, due to the difference between interest and conditions of each country.

5.3 Summary notes about the e-Invoicing adoption

- e-Invoicing still in an early stage of adoption in Europe : It can be seen that the adoption still really low and specially in the largest countries, what it means that despite the other countries have a higher adoption rate, the number of e-Invoices sent/received can be the same or even lower than in other more industrialized countries.

- Clear superiority in adoption and better conditions for e-Invoicing in the Nordic and Baltic region: As mentioned before, it also depends of the size of the industry and number of invoices issued, however must be highlighted also their efforts to increase the adoption with a loose and updated regulatory framework, integration of the stakeholders (Government obligation) and research and an active position towards the e-Invoicing.

- Still divided the perception about the adoption rate between vendor reports and official figures: After the analysis of the secondary sources and the confront of the figures with the experts, were found in some countries certain countries a contradiction and disagreement with the figures of Billentis (which are the most diffused and used as official in some cases), in some cases the Billentis perspective is optimistic and in other is pessimistic with respect to the real adoption perceived by the internal stakeholder of the countries. However it depends of the criteria used and is clear that in Europe have not been achieved a unique and concerted definition about e-Invoicing, so can be said that the Billentis figures are not so far of the reality but are certainly approximations and based in assumptions.

- Non EU members have in average higher adoption: In this case Switzerland and Norway, that are not obligated to adopt the EU recommendation of 1994 and have introduced different regulations, have presented a higher rate of adoption, which suggests that despite is not the case of all the European countries, but the actual Regulatory Framework can be blocking the adoption in certain way, so it must be reviewed deeply and check the best practices applied in these 2 countries and outside of Europe.

- Large Enterprises represents major part of the adoption: The large enterprises provides the large amount of e-Invoicing solutions adopted for the statistics and in most cases is used EDI, especially in the most industrialized countries as UK, Germany and France, so in the general adoption rates of the countries is unperceived the real situation of the SME's, which for almost all the European countries, represents around 99 % of the companies in each country.

5.4 Summary notes about EDI and e-Archiving

- EDI most common in industrialized and largest economies: The development and adoption of EDI is higher in the largest economies of Europe as France, Germany, Spain and UK, due majorly to the presence of big and traditional industries as the automotive, engineering, pharmaceutical and retailers that used the traditional EDI and could perform an easier transition to EDI.

- EDI is not used by SME's due to its costs and complexity: In countries less industrialized and with a proliferation of SME's the adoption of EDI for e-Invoicing is really low, due mostly to the costs and high technology investment that is necessary for its implementation. In this case EDI is still considered as e-Invoicing but reserved for the multinational companies and the XML and PDF solutions are more used.

- Is accepted by all the EU members but has more resistance: In the Regulatory Frameworks of the EU member and the recommendations of EC is considered as legal e-Invoicing the use of standards supported by EDI as EDIFACT, however in some countries is less diffused, supported an

promoted by the government, because prefers to promote their own standards and also because the resistance of adopt it by SME's. In other non EU members as Switzerland is forbidden the use of EDI as is not considered as e-Invoicing.

- Substitutive Conservation is only performed in Italy: The storage of e-Invoices with the use of certain mechanisms as digital signatures to grant the authenticity, which is known as Substitutive conservation is only widely used and required in Italy. In the rest of Europe is considered a normal electronic archiving without special requirements for invoices, for keep its simplicity and easiness of implementation.

- E-Archiving doesn`t have separate figures due to is related to the e-Invoicing adoption: The e-Archiving in the rest of Europe is necessarily linked to e-Invoicing and its existence doesn't have sense and legal validity separately and in general there is not specific and reliable figures about its adoption. Only changes different rules among countries as the period of storage.

5.5 Issues, barriers and Inhibitors for the adoption

The e-Invoicing in Europe is not a new subject and form the nineties has been presented as a solution to simplify processes and reduce costs taking advantage of the digital revolution, in this case in an important process as the invoicing, which appears in all kinds of companies and organizations, without matter the size or sector.

However, despite of the recognized benefits and all the proposals that have been made by different countries to facilitate the implementation and guarantee the access to e-Invoicing, there are several barriers and issues that have slowed down the growing and adoption. At next are described the main barriers and inhibitors that currently affects the e-Invoicing adoption in different European countries.

Technological and technical obstacles

There is a lot of ways to do e-Invoicing, however one of the main obstacles to implement an e-Invoicing solution that fits into the regulatory framework, requires in some countries a big technical effort and a technology investment that some companies, especially the SME's cannot afford.

But this barrier is not only because of costs, are due in large part to differing practices among European countries. The most notable involve lack of cross-border agreement on VAT rules, uncertainty about the legal validity of electronic documents, differing standards for the recognition of electronic signatures, the variety of Electronic Data Interchange (EDI) standards in use, and the lack of standardized invoice formats.

These differences in technical requirements in the European countries create uncertainty in the SME's and companies that finds difficult to determine which solution implement, which standards or what would be necessary to achieve interoperability in the interchange of invoices with other countries. Also is noticed that this obstacle is bigger where are additional technical mechanisms are required to implement e-Invoicing as the time stamp, qualified digital signatures or substitutive conservation.

In technical obstacles, the Electronic Archiving is another tricky area; some states require hard copies of invoices to be maintained for years, even if the original was electronic. Until recently, many European SME's were also relatively poorly served by IT infrastructure and did not have access to broadband. In short, many potential users are unsure about the validity, security or practicality of e-invoicing, and country-specific practices are restricting the development of cross-border activity.

To overcome this technical fragmentation, is necessary to establish better communication channels in the country and Europe to diffuse the different requirements to implement e-Invoicing, but also is required the integration of companies, SME's, government and vendors to define the most suitable technology for the country and grant the easy accessibility and interoperability in a joint solution.

Stringent regulatory frameworks and the mixed legal situation in Europe

One of the main barriers for the e-Invoicing adoption in the European countries is the heterogeneous legal situation among the European countries and also the high strictness of the regulatory framework of some countries.

Since the first approaches to implement e-Invoicing in the EU countries, the most delicate issue has been the legislation, due to the differences of regulations, culture and requirement of each country. Furthermore, the European Union legislation with respect to e-Invoicing, granted member states an extensive range of options for transposing them into national law. Accordingly, the member states have passed differing legislation.

This heterogeneous legal situation makes companies particularly wary about adopting e-invoicing on an EU-wide basis. Based on the currently applicable guidelines in several EU member states electronic invoices must thus be appended with an advanced or even qualified electronic signature in order to be recognized by the financial authorities for VAT purposes. In other EU member states the prescribed instrument for this purpose is not an electronic signature, but the sending of the invoice via EDI, or via another nationally authorized means of electronic transmission.

This situation has created confusion between the companies and especially the SME's that have to face uncertain and constantly changing legislations that at the end are translated into increasing costs. In general, the legal situation and the lack of interoperability have held back the e-Invoicing development, and lawmakers need to grant the electronic invoice completely equal status to the paper invoice and to dispel legal uncertainties.

Another problem with respect to the legislation is the strict rules and in some cases complicated mechanisms required to grant the integrity of the e-Invoices, which first causes resistance to adopt it inside the countries and also creates an interoperability problem differing with other countries legislations and difficulty the sending of e-Invoices by other countries. However changes and updates among the European Regulatory Frameworks have been appearing during the last years trying to solve this problem, but a standard and the joint regulatory framework are far to be

achieved in Europe so big efforts at communication and integration of rules must be made in the following years.

Passive position towards e-Invoicing and lack of integration between stakeholders

Another complication with the current EU e-invoicing system is that most requirements that are in practice are not published by member states and are extremely difficult or expensive for businesses to obtain, interpret and monitor. This and other problems are caused by the lack of proactivity of the government and stakeholders involved in e-Invoicing.

As mentioned before the government and public administration play one of the main roles in the e-Invoicing adoption, because they can influence directly the regulations and also are the responsible to show, promote and prove the benefits of e-Invoicing to the industry. If the government doesn't support the e-Invoicing through coherent regulations, standards and initiatives to integrate the stakeholders, the e-invoicing adoption hardly can increase except for multinational or large companies.

Also the government is responsible of diffuse the e-Invoicing through the obligation in Public Administration, which also counts with numerous providers in the country that are obliged also to comply with e-Invoicing, however in some countries the e-Invoicing is not conceived by the public administration and are not prepared for its implementation.

At the moment, there is a knowledge gap between businesses and tax departments around requirements, liability and legal questions. Wide knowledge differences frequently exist between different revenue department workers. Sometimes businesses end up educating the revenue services on their own legislative texts, with the inevitable delays for discussion and interpretation.

Big accounting firms, such as PricewaterhouseCoopers or Ernst & Young, are only slowly getting into the business of certifying e-invoicing solutions. Thus far, this is happening in Scandinavian countries and in the U.K., and is likely to be extended to other geographies, but it is difficult to predict how quickly this will occur.

Behavioral resistance towards e-Invoicing

There has also been behavioral resistance to e-invoicing. This is less about legal or technological barriers and more about organizational and business culture. Wider adoption of e-invoicing among SME's will require financial investment, management impetus and open thinking by suppliers and customers alike. This level of confidence naturally takes time to build, especially when potential users are a large and fragmented group, technology is unfamiliar and there is a proliferation of service platforms.

Also before of implementing e-Invoicing have evaluated the risks against the benefits and in some countries as the benefits aren't well known and the regulations are uncertain and changing, is more risky and costly implement an e-Invoicing solution with a short life cycle.

The business culture of a country is also important in reference to the adoption resistance of e-Invoicing. The invoicing process has been performed and improved by decades in physical format, establishing regulations to improve the effectiveness, efficiency and to avoid the frauds, so the e-Invoicing evolution in each country is different depending of the bureaucracy, fraud levels, procurement management and another factor that can create more resistance by the companies, SME's and even by the Public Administration.

Lack of integration between the e-Invoicing stakeholders

Another barrier in this way is the lack of integration of the e-Invoicing stakeholders inside a specific country, as the banks, providers, public administration, large companies and SME's. If the different stakeholders don't have the same interests and aren't aiming in the same direction with the negotiation of regulations, creation of standards and establishing alliances to increase the adoption and diffusion of the e-Invoicing inside the country.

Large private sector companies are currently making good use of B2C e-invoicing, especially for bill presentment. However, the companies best placed to build confidence in e-invoicing, are the banks themselves, and they have often hesitated to make what look like risky, unilateral

investments, given the need for multilateral action to break down barriers to e-invoicing adoption.

Additionally, if a company is procuring or running an e-invoicing solution, then how it knows that it is compliant with the EU directive or with the various tax laws abroad? There is no such thing as compliance with the EU directive itself; what matters is whether there is interoperability with the business partners and fulfillment of local requirements as applied by local tax authorities, VAT laws and general industry practices.

5.6 Analysis of proposed strategies and enablers

Besides the barriers and obstacles that have kept the e-Invoicing rate adoption low in Europe, is necessary to identify and analyze the circumstances and conditions in which the e-Invoicing adoption have grown faster and the factors that have enabled this development.

As we mentioned before, the conditions and characteristics of e-Invoicing can change significantly from one country to another and that's one of the reasons that inspired this research. In order to create value with e-Invoicing inside a country is necessary to know the best practices and factors that have allowed such growth in other countries and in this case in the European Union.

Simple and clear regulatory framework

The main recognized enabler for an increasing adoption, is to set a clear and objective Regulatory Framework, with only the necessary rules and controls in simplified way. Is obvious inside Europe that in the countries where the regulatory framework is looser the e-Invoicing adoption is higher, in part because it facilitates the access to the SME's in an easier and cheaper way.

In this way, a well-built regulatory framework updated with the last EU controls and recommendations and that shows in an explicit and simple process how to implement e-Invoicing and which benefits can be obtained

would promote the adoption among the industry. In contrast, uncertain regulation and complicated mechanisms required can block the development.

Setting of an e-Invoicing standard by market stakeholders

Actually there is an environment of uncertainty between companies about which e-Invoicing solution implement and a mix of standards and practices published by each country and even by different providers in the same country. Therefore is necessary to standardize, maybe not at European Level but the joint work of stakeholders and especially of banks, vendors and public administration entities is necessary to impulse the adoption.

To date no such market standard has become established. The competition between e-invoicing suppliers could be complemented by a level of technical cooperation: service providers, private and public users should jointly define a standard. The adoption of e-invoicing by the public sector would not only provide a boost to the volume of electronic invoices issued, it would implicitly also enhance the legal certainty of electronic invoicing.

Integration of the Order to Payment Cycle

There are numerous benefits that can be obtained with the adoption of e-invoicing alone, however the invoicing is only a process in the chain and to get the greatest benefits and efficiency is necessary to integrate all the processes as one, the Order to Payment Cycle.

Therefore, considering the whole process and not only the invoicing, can improve the perception of the different stakeholders about this solution and increase the diffusion and consequent adoption.

The big potential savings come not from spending less on printing or postage, but from using modern, automated processes for all invoices-related tasks. Advocates of the electronic invoice believe that it will trigger these modernizations in a catalytic process, whereas skeptical persons see e-invoicing as more like the final stage in an already largely automated invoice processing system.

The IT intensity of the sector and e-Invoicing Technological readiness

The e-Invoicing is a technology powered solution and technical mechanisms are necessary for its working, in this way the sectors and countries which are technology intensive are more exposed to a high adoption and research about the subject.

The implementation of e-Invoicing, in fact doesn't require significant investments in technology, it depends on the complexity and regulations for the project. However, the stakeholders consider that for a general growth of e-Invoicing in a country, the technology must be mature. For example in countries as Finland and Spain, the large companies, SME`s and even vendors appreciate the establishment of standards, portals and mechanisms that facilitate the general adoption.

In summary, the IT development in a country is not an essential requirement for the adoption of e-Invoicing, but is clear that is a condition and factor that activates the proactivity in the industry to the use of new technologies to automatize the process and obtain benefits, as with the e-Invoicing.

The presence of dominant companies

As the technology matures, there are other conditions that have allowed a greater development of e-Invoicing in some countries than in with the others. In this case is the presence of dominant companies in the market, not only IT-intensive sectors such as computer services but also banks and insurance companies have fewer reservations about e-Invoicing.

A bigger the company, is bigger the amount of invoices interchanged and at the end is bigger the total benefits that can be obtained with e-Invoicing, for this reason the large enterprises and especially selective sectors as the automotive, pharmaceutics and big retailers have been more proactive in the e-Invoicing adoption, taking advantage sometimes of previous implementations of traditional EDI.

An e-Invoicing solution as its definition still relatively new, requires constant updates and efficiency-enhancing investments pay off sooner where large volumes of invoices need to be processed. This explains the high e-

invoicing share for example in the wholesale trade. The exchange of e-invoices nevertheless often requires specific investments as the processes have to be tailored to certain business partners. This is only worthwhile if the business relationship is longstanding and built on trust as in large companies.

In the end, one or a few dominant companies can be trailblazers and convince their business partners to adopt e-invoicing. One example is the auto industry, where more of the half of big German automakers use e-invoicing. They benefit from their processes being deeply integrated with those of their suppliers. The high e-invoicing share in the car dealing business is thus probably a consequence of the market clout of the manufacturers combined with the fact that the business relationship is geared towards the long term.

The inertia of obligations by the large enterprises to the SME's

This factor is related to the one mentioned before about the impact of the presence of dominant companies to the adoption of e-Invoicing in a country, however is known that more of the 90% of enterprises in each European country are SME's, so in this way despite the importance of the large enterprises, the real impact and awareness about the importance of e-Invoicing must be created in the SME's.

In nearly 40% of all B2B invoices at least one small firm is involved; this is where the inertia is likely to be most pronounced. Although larger companies can demand e-invoicing from small business partners, the savings are likely to be relatively modest with small firms as a deep integration with their other business processes cannot usually be expected. Invoices interchanged between large companies are already heavily automated and optimized via systems such as EDI, modern bookkeeping processes and outsourcing. This trend is likely to intensify but the potential savings are limited by the advanced stage that has already been reached.

In summary, a real and general development of e-Invoicing can be achieved with the compromise of all the stakeholders involved, banks, large enterprises, SME's and public administration, not only adopting the e-

Invoicing but also inciting to the actors to implement it as a way of integration to improve the business relationships.

e-Invoicing management support

This factor is related especially with the adoption of e-Invoicing in SME's, in this kind of organizations, have been lower the penetration of e-Invoicing and not only because the implementation but also because the lack of experience in the maintenance and sustainability of an e-Invoicing system, as in this way is that the government, vendors, banks and other stakeholders should support the SME's.

Management support was mentioned as an essential factor in the transition to electronic invoicing. As in some SME`s is difficult to manage issues as the e-Archiving, digital signatures and interoperability, it must be present the e-Invoicing not only as a digital solution, but also as an essential part of their process so a general restructuration and redefining of the Order to Payment Cycle should be done and for this is necessary the participation of the other actors of the chain. Therefore, can be interpreted that management really needs to take a more holistic view to electronic invoicing and support the electronic invoicing initiatives for it to succeed.

Internal and external communication about e-Invoicing

Another of the main factors that can promote the adoption of e-Invoicing and that affect directly the diffusion of e-Invoicing is the internal and external communication. The e-invoice despite of being in the market for many years it still relatively new and uncertain for the different stakeholders because the lack of communication and attention about this subject

In the companies that adopt e-Invoicing the activity of communicating the benefits and experiences about the implementation of e-Invoicing toward clients and suppliers can have a positive effect on the general adoption of e-Invoicing and also in terms of integration. In this way, the companies that have already adopted e-Invoicing should help and support the clients and

suppliers that are new in the field of e-Invoicing. In addition, the availability of the e-Invoicing option should be made clear to clients and suppliers.

Also, is important the internal communication in a company were can exist inactive links, meaning that the buyer and the seller might already be using e- Invoicing between some business units, while some other business units (in these same respective companies) had not initiated electronic invoicing. By enhancing the communication concerning electronic invoicing, these missing, already established links can be activated with very little effort.

To achieve this, the e-Invoicing project, the benefits and all the details should be well communicated within the company, especially in SME's. The personnel must be given the necessary training and information concerning the implementation of e-Invoicing. In the implantation phase, the employees often need assistance in processing the e-Invoices. The key target group for the internal communication is the purchasing department as it has the most leverage in negotiating new contracts. Another key target group is the sales department that can actively promote electronic invoicing towards the clients.

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- Information on the UBL format on OASIS: http://www.oasis-open.org/committees/ubl/

- Information on UN/CEFACT: http://www.unece.org/cefact/

- Information on the CEN BII (Business Interoperability Interfaces for Public procurement in Europe) specifications: http://spec.cenbii.eu/ http://www.cen.eu/CEN/sectors/sectors/isss/activity/Pages/ws_bii.aspx

- Information on CEN Workshop on e-Invoicing:

http://www.cen.eu/CEN/sectors/sectors/isss/activity/Pages/einvoicing_2.aspx

- Website containing information on invoicing systems in Europe developed by CEN/CENELEC: http://www.e-invoice-gateway.net/

- Information on electronic invoicing on the European Commission website: http://ec.europa.eu/internal_market/payments/einvoicing/index_en.htm

- EEI Platform is the independent platform for professionals around electronic invoicing and invoice processing: http://eeiplatform.com/

- Website of Logius. Logius digital government is the service of the Netherlands Ministry of the Interior and Kingdom Relations dor support e-Invoicing in the country: http://www.logius.nl/english/

- Portal of information and services abut e-Invoicing in Netherlands: http://facturatie.startpagina.nl/

- Information and manual for SME's to adopt e-Invoicing in Spain: http://www.lafacturaelectronica.es/

- Website of the HM Revenue and Customs of UK containing information and legislation of e-Invoicing: http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?_nfpb=true&_pageLabel=pageVAT_ShowContent&id=HMCE_PROD_010205&propertyType=document#downloadopt

- Website of SFTI, one of the standards used in Sweden for e-Invoicing: http://www.sfti.se/in_english_1?pageID=9cd2ac05-da30-4a89-8fb3-dee2d3a55ec0

- Webpage of b-Process, one of the main vendors of e-Invoicing solutions around Europe:
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- Portal of NemHandel, the solution in Denmark to support the e-Invoicing in PA and SME's:
  http://www.nemhandel.dk/faa-nemhandel

- Website of the Euro Banking Association about their efforts and researches in e-Invoicing:
  https://www.abe-eba.eu/E-Invoicing-N=0a60cc46-e50c-4d01-9aec-b2e8f69620be-L=EN.aspx

- Portal of eFaktura, the solution in Norway to support the adoption of e-Invoicing:
  http://www.efaktura.no/Bedrift/Brukerveiledning1/

- Directory of standards and portals about e-Invoicing in Europe:
  http://www.delicious.com/longtailofb2b/?setcount=100

- Website from Netherlands about the development of the e-Invoicing in Europe with reports and different studies:
  http://e-factureren.info/wp/

- Website of ob10, one of the main vendors of e-Invoicing solution in Europe:
  http://www.ob10.com/country/uk/Customer_Case_Studies

- Portal of Gartner about the last news of e-Invoicing:
  http://blogs.gartner.com/debbie_wilson/category/supplier-e-invoicing/

- Portal of the European e-business Lab with new about e-Invoicing in Europe:
  http://www.euebl.org/ebl/category/einvoicing/

- Portal of WKO.at with all the information about the e-Invoicing in Austria:
  http://portal.wko.at/wk/format_detail.wk?AngID=1&StID=434351&DstID=0&titel=Die,elektronische,Rechnung:,Fragen,aus,der,Praxis

- Portal for the support of the e-Invoicing in Turkey:
  http://www.efatura.gov.tr/web/guest;jsessionid=9713279A421964F1BA0B239723125313

- Website of Billentis which contains information and data about their research:
  http://www.billentis.com/EBPP_EIPP_e.htm

- Portal of the standard and about the development of e-Invoicing in Switzerland:
  http://www.swissdigin.ch/apps/swissdigin.nsf/en/ressourcen

- Platform of news and information of e-Invoicing in Netherlands:
  http://platformelfa.nl/

- Website of Accountis, another important vendor of e-Invoicing solution in Europe and contains information and new about the adoption in Europe:
  http://www.accountis.com/e-invoicing/

- Portal of Electronic Invoicing in Latvia:
  https://www.rekini.lv/public/index.jsp

- Portal of e-Invoicing solutions in Lithuania:
  http://www.epay.lt/info_en.html

- Website of Ariba, vendor that have collected significant information about the e-Invoicing in each European country:
  http://exchange.ariba.com/index.jspa

- Webpage with information and statistics about the number of enterprises, size and especially data about the SME's in Europe: http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/index_en.htm

- Website of Eurostat with statistics about e-Invoicing in Europe: http://epp.eurostat.ec.europa.eu/tgm/graph.do;jsessionid=9ea7971b30da9c195afae19f4e1bba15e79f07bb321d.e34RaNaLaN0Mc40LcheTaxiLbN8Re0?tab=graph&plugin=0&pcode=tin00114&language=en&toolbox=data

APPENDIX A – Glossary

This glossary provides short definitions and explanations of technical and economic terms that are used in this thesis. The definitions proposed in this glossary have been extracted from different sources available online and adapted or shortened, if needed. The main sources used are:

- http://ec.europa.eu/idabc/en/home - IDABC (Interoperable Delivery of European e-Government Services to public Administrations, Business and Citizens) is a Community program managed by the European Commission's Directorate General for Informatics.
- http://www.oecd.org/ - OECD: The Organization for Economic Co-operation and Development
- http://www.ebusiness-watch.org/:- European e-Business Watch. The "Sectorial e-Business Watch" (SeBW) studies the impact of ICT and e-Business on enterprises, industries and the economy in general.
- http://en.wikipedia.org: The internet-based encyclopedia Wikipedia was used where appropriate references were provided.

Authenticity: In the context of e-Business, authenticity could be described as assurance of the origin of the data or identity of the sender. Authentication in this context is a method by which a computer recognizes and verifies the identity of the sender of a message or file. The authentication mechanism can be based on something that the entity knows, has, or is (e.g. A password, smart card that uses some encryption or random number for a challenge-response scheme, or a fingerprint).

BII: Business Interoperability Interfaces on public procurement in Europe (BII) is CEN Workshop providing a basic framework for technical interoperability in pan-European electronic transactions, expressed as a set of technical specifications that in particular are compatible with UN/CEFACT.

CEN: The European Committee for Standardization (ISO's counterpart and the European entry point to UN/CEFACT). CEN Workshops are open consensus building platforms for contributing to standards, especially in the ICT area, and their product is a CEN Workshop Agreement.

CEN Compliance Guidelines: These Compliance Guidelines provide an instrument to guide businesses – in the first place for self-assessment – to ensure their e-invoicing solutions, in-house and at contracted third party service providers, can be audited and is under control. In 2009 these guidelines will be published as a CEN Workshop Agreement.

CEN/e-Invoicing: A CEN Workshop providing an open platform for stakeholder consensus on the implementation of e-Invoices in Europe.

Certification Authority (CA): A CA is an entity which issues digital certificates for use by other parties. CAs is characteristic of many public key infrastructure (PKI) schemes.

Cross-Industry Invoice (CII): The CII is the term for the UN/CEFACT standardized invoice, which is the standardized format proposed by the Expert Group for automated invoice exchange.

Data integrity: The assurance that data has not been changed, destroyed, or lost in an unauthorized or accidental manner.

Date/Time stamp: A timestamp is a sequence of characters, denoting the date and/or time a transaction or document is initiated or submitted to a computer system, or the time at which a transaction is logged or archived. The practice of recording timestamps in a consistent manner along with the actual data is called time stamping.

Digital certificate: A small set of structured data that has been electronically signed by a 'certification authority' to 'bind' the identity of a legal or natural person to a 'public key' that can be used e.g. to verify electronic signatures created by that person.

Digital signature: Data appended to, or a cryptographic transformation of, a data unit that allows a recipient of the data unit to prove the source of the data unit and protect against forgery, e.g. by the recipient.

Directive: A Directive is a legislative act of the European Union which requires Member States to achieve a particular result without dictating the means of achieving that result. Although obligatory to implement, Directives normally leave Member States with a certain amount of leeway as to the exact rules to be adopted.

EBPP: Electronic Bill Presentment and Payment (EBPP), usually consumer-oriented bill paying presented and paid through the Internet. Other terms such as IBPP (Internet Bill Presentment and Payment), EBP (Electronic Bill Presentment) and OBPP (Online Bill Presentment and Payment) are also in use but are not used further herein.

ebXML: Short for e-business using Extensible Markup Language, a modular suite of specifications for standardizing XML globally in order to facilitate trade between organizations regardless of size. The specification gives businesses a standard method to exchange XML-based business messages, conduct trading relationships, communicate data in common terms and define and register business processes.

e-Business: automated business processes (both intra and inter-firm) over computer mediated networks. 'Automation' refers to the substitution of formerly manual processes. This can be achieved by replacing the paper-based processing of documents by electronic exchanges (machine-to-machine) but it requires the agreement between the participants on electronic standards and processes for data exchange.

e-Catalogue: An organized descriptive list of products or services made available by suppliers to potential buyers via the Internet.

e-Commerce: the sale or purchase of goods or services, whether between businesses, households, individuals, governments, and other public or private organizations, conducted over computer-mediated networks. The goods and services are ordered over those networks, but the payment and the ultimate delivery of the goods or service may be conducted on or off-line.

Electronic Data Interchange (EDI): refers to the structured transmission of data between organizations by electronic means. It is used to transfer electronic documents from one computer system to another (i.e.) from one trading partner to another trading partner.

EDIFACT: Electronic Data Interchange For Administration Commerce and Transport.

Electronic data: the information that is entered into a data processing system typically without manual intervention, in electronic form.

Electronic Invoice Presentment and Payment (EIPP): Originated in the B2B world and describes the process through which companies present invoices to humans and organize payments through the Internet.

e-Invoicing: the process of issuing, sending, receiving and processing of invoice data by electronic means.

Electronic Signature: Electronic signature means data in electronic form which is attached to or logically associated with other electronic data and which serves as a method of authentication.

e-Procurement: the business-to-business, business-to-consumer or business-to-government purchase and sale of supplies, work and services through the Internet, as well as other information and networking systems, such as Electronic Data Interchange and Enterprise Resource Planning.

e-Remittance advice: an electronic message (whether EDI, XML, etc.) that contains the details required to apply a payment. The file generally contains the payment total, payment date, individual invoice reference numbers, dates, and amounts.

European Commission Recommendation: A Recommendation is passed from the European Commission to the Member States and is a non-binding act, however coming with a 'good backing' since it will have been discussed with the Member States first.

Enterprise Resource Planning (ERP) systems: ERP Systems are automated 'back office' systems used by enterprises that contain many of the tools and software to create, account for and manage invoices as well as many other transactions and corporate processes.

Expert Group: The Group created under A Commission Decision of 31 October 2007 to make recommendations on e-invoicing, jointly sponsored by DG Enterprise & Industry and DG Internal Market & Services.

Four-Corner Model: An exchange model where senders and receivers of invoice messages are supported by their own consolidator service provider (for the sender) and aggregator service provider (for the receiver). It is sometimes termed a four-party model.

An invoicing process set-up whereby each Trading Partner has contracted with one or several separate Service Providers, whereby the Service Providers ensure the correct interchange of invoices between the Trading Partners.

GS1: GS1 is a leading global organization dedicated to the design and implementation of global standards and solutions to improve the efficiency and visibility of supply and demand chains globally and across sectors.

Interoperability: A property referring to the ability of diverse systems and organizations to work together (inter-operate). The term is often used in a technical systems engineering sense, or alternatively in a broad sense, taking into account social, political, and organizational factors that impact system to system performance.

Invoice: The invoice is a document or a data set marked with the word 'invoice' formally specifying details of a (or part of a) trade and all settlement related information for the (or part of the) trade, explicitly and separately stating the applicable tax.

Invoice data: Data relating to an invoice provided prior to the creation of original tax invoice or provided after its creation for other purposes.

Invoicing Directive: The current EU legislation that requests Member States admit the use of electronic invoicing for VAT purposes in the EU.

ISO 20022: ISO 20022 is an International Standard from ISO. It constitutes the financial industries common platform for the development of messages in a standardized XML syntax, using a modeling methodology (based on UML) to capture in a syntax-independent way financial business areas, business transactions and associated message flows.

Northern European Subset (NES): NES was formed in January 2006 with the objective to facilitate the establishment of a common platform for e-commerce in national and cross-border trade. Currently, the initiative comprises government representation from six countries: Norway, Sweden, Finland, Great Britain, Iceland and

Denmark. The technical development of NES is now carried out in the CEN/ISSS Workshop BII.

Open standard: A standard adopted and maintained by a not-for-profit organization, whose development occurs on the basis of an open decision-making procedure available to all interested parties. It is publicly available and the standard specification document is available either freely or at a nominal charge. It must be permissible to all to copy, distribute and use it for no fee or at a nominal fee. The intellectual property of the standard is made irrevocably available on a royalty-free basis.

OASIS UBL 2.0: OASIS (Organization for the Advancement of Structured Information Standards) is a not-for-profit consortium that drives the development, convergence and adoption of open standards for the global information society.

PDF: The Portable Document Format (PDF) is the file format created by Adobe Systems in 1993 for document exchange. PDF is used for representing two-dimensional documents in a device-independent and display resolution-independent fixed-layout document format. PDF is an open standard, and recently took a major step towards becoming ISO 32000.

PEPPOL: Pan-European Public Procurement On-Line (PEPPOL) is a consortium project, with the objective to pilot solutions to make it easier for European economic operators, in particular SMEs, from one country to respond electronically and in an interoperable way to public procurement opportunities and carry out the subsequent business transactions, including invoicing.

PKI: Public Key Infrastructure (PKI) is a set of hardware, software, people, policies, and procedures needed to create, manage, distribute, use, store, and revoke digital certificates.

Portable Document Format (PDF): Is a file format created by Adobe Systems in 1993 for document exchange. PDF is used for representing two-dimensional documents in a manner independent of the application software, hardware, and operating system. Files with a .PDF extension have been created in another application and then translated into .PDF files so they can be viewed by anyone, regardless of platform. Formerly a proprietary format, PDF was officially released as an open standard, and published by the International Organization for Standardization (as ISO/IEC 32000 -1:2008).

Procurement portal: Portals operating as a consolidator in the B2B market. They can provide their services to senders as well as receivers.

Qualified electronic Signature: An advanced electronic signature based on a qualified certificate and created by a secure signature creation device. A qualified certificate is issued by a certification service provider (CSP). An electronic signature backed by a qualified certificate from an accredited certification authority provides the most enhanced form of certainty to a receiver in relation to data integrity and authenticity of the sender

Self-billing: An arrangement where a customer prepares VAT invoices on behalf of their VAT-registered supplier. The customer sends a copy of the invoice to the supplier with the payment. A self-billing application allows customers to create their own invoices, based on usage, date or other parameters, and provides an automated payment remittance via an electronic transfer or web interface.

SEPA: The Single Euro Payments Area or SEPA will be the area where citizens, companies and other economic actors will be able to make and receive payments in euro, within Europe, whether between or within national boundaries under the same basic conditions, rights and obligations, regardless of their location. It consists of the European Union Member States plus Iceland, Norway, Liechtenstein and Switzerland.

Service Level Agreement: A service-level agreement (SLA) is a negotiated agreement between two parties where one is the customer and the other is the service provider. This can be a legally binding formal or informal 'contract'.

Standard: A document established by consensus, and approved by a recognized body, that provides, for common and repeated use, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context (ISO formal definition).

SWIFT: Society for Worldwide Interbank Financial Telecommunication (SWIFT) is a co-operative organization dedicated to the promotion and development of standardized global interactivity for financial transactions. SWIFT is established by and for the Financial Industry.

Three-Corner Model: An exchange model where senders and receivers of invoices are connected to a single hub for the dispatch and receipt of messages (sometimes called a Three-Party Model).

Universal Business Language (UBL): UBL is a library of standard electronic XML business documents such as purchase orders and invoices. UBL was developed by a Technical Committee in OASIS (an industry standards consortium) with participation from a variety of industry data standards organizations. UBL is designed to plug directly into existing business, legal, auditing, and records management practices. It is designed to eliminate the re-keying of data in existing fax- and paper-based business correspondence and provide an entry point into e-commerce for small and medium-sized businesses. Under an agreement between UN/CEFACT and OASIS, UBL requirements will be taken up in modifications to the relevant UN/CEFACT standards documents, including the CII.

UN/CEFACT: The United Nations' Centre for Trade Facilitation and Electronic Business has a global remit to secure the interoperability for the exchange of information between private and public sector entities. It has developed the UN Layout

Key for trade documents and developed UN/EDIFACT, the international standard for electronic data interchange together with supporting components and methodologies.

UN/EDIFACT: The United Nations / Electronic Data Interchange for Administration, Commerce and Transport.

Unstructured data: Data whose meaning has to be elaborated in order to be used by a computer, such as word processing documents, email messages, pictures, digital audio, and video.

UBL (Universal Business Language): a format for exchanging data from one XML business language to another. Based on ebXML Core Components, UBL is designed to provide a common language that acts as an intermediate vocabulary so that one XML vocabulary can interoperate with another. UBL was created to promote e-business over the Internet. Derived from the Common Business Language (CBL), which was sponsored by the U.S. Government, UBL became an OASIS standard in 2004.

Value Added Tax (VAT): VAT is imposed by the national taxation authorities with every transaction in the B2B and B2C markets in the European Union. Registration and administration of this tax is subject to overall European legislation and then local Regulations. The legislation constitutes a Common System of Value Added Tax under Directive 2006/112/EC.

XML (Extensible Markup Language): A means for writing documents that define structured data. XML provides a basic syntax that can be used to share information between different kinds of computers, different applications, and different organizations. Like HTML, it is written in plain text by using tags to specify a structure for its content. Both XML and HTML contain mark-up symbols to describe the contents of a page or file, however, whereas HTML defines how elements are displayed, XML defines what those elements contain.

An XML document can include a self-describing set of rules that identify the tags and their relationships; it allows users to create a language tailored specifically to their needs. Many vocabularies have been developed and a universal language has been created to provide a standard for interoperability between them.