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DG Information Society and Media

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eGovernment
*Interoperability at Local
and Regional Level*



Good Practice Case

eInvoicing in Finland – The Example of the Region of South Karelia

Case Study

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1. eInvoicing in Finland – The Example of the Region of South Karelia

1.1 Case Summary

Electronic invoicing has been used in Finland over 30 years already. The first electronic invoices were sent between large corporations according to internal standards. At the end of the 80's, EDIFACT standard was established for the exchange of electronic invoicing starting between private sector companies and also few governmental units used it. EDIFACT is still quite widely used in Finland.

The eInvoice Consortium was initiated in 1999 by the providers of electronic invoicing services (consisting of both traditional data relaying operators and banks). A new electronic invoicing solution with its own "standard" (known by the name eInvoice format) was developed. That format is some kind of mixture between EDIFACT and XML; an early attempt to have a simpler version of EDIFACT. That format is widely used in Finland. The eInvoice Consortium wanted some neutral party to take the responsibility to promote and foster electronic invoicing further and TIEKE, the Finnish Information Society Development Centre was selected in 2003. TIEKE has a key networking role as a neutral and non-profit organisation. TIEKE is an association and its membership mirrors the key players in the Finnish Information Society, totalling about 100 organizations and companies.

After the European Committee for Banking Standards (ECBS) introduced the electronic Payment Initiator (ePI) standard in July 2003, the banks in Finland developed a new format called Finvoice. Finvoice makes use of, besides ePI, XML syntax and ebXML. The banks made a large effort to introduce the format and also to give rise to necessary software offerings. Lately many private companies and public authorities have implemented Finvoice.

Because there are many electronic invoicing standards in Finland, providers of electronic invoicing services excluding banks have implemented conversion services between those different formats.

The public administration wanted to further standardize its electronic invoicing. In 2003 a project under the Ministry of Finance was carried out to make an electronic invoicing recommendation for public authorities. It was decided that the public administration will not develop any new format or services for its purposes but utilize existing services and formats in private sector. In the recommendation two formats were accepted to be primarily used by public authorities in electronic invoicing, either Finvoice or eInvoice (referring to the eInvoice Consortium format) -standard, which hence have become important standards in the overall business relations in Finland. The State Treasury operating under the Ministry of Finance and serving the state corporation as the financial administration expert is the key driver in promoting eInvoice in governmental units. The region of South Karelia has been one of the main drivers in the testing and implementation of electronic invoice in local administration from the early beginning and already achieved high impacts.

TIEKE has established the eInvoice Forum together with other players in this area. The Forum is the focal point for the different parties in the field (e.g. The State Treasury is a member in the Forum). Today there are in Finland approximately 15 providers of electronic invoicing services, which can be grouped into two main categories with slightly different services: traditional message operators and banks. The target is that a company or public authority can send an electronic invoice with its preferred format to any other company or public authority contacting only the

service provider it has chosen. A recipient can correspondingly receive electronic invoices with its preferred format contacting only its service provider. A technical infrastructure among service providers allows for, besides necessary format conversions, roaming of the electronic invoices between service providers. Roaming is a service offered by the messaging (in this case eInvoicing) network, which allows a sender by contacting only his own service provider to seamlessly and reliably send a message to a recipient having a different service provider (and possibly a different message format). To enable conversion and roaming, the Forum has decided on the following common services (run by TIEKE):

- a common (electronic) address register for all parties,
- a common conversion table between different formats, and
- a common testing service.

This type of a Forum for electronic invoicing was first implemented in Finland, but later several other European countries have started similar activities.

The issues concerning technical/syntactic and semantic interoperability have been solved rather well, but the organizational issues (especially because of the two different service provider groups) have been the biggest challenge. However, as the government is a relative strong player in this field, this issue is not so relevant for them.

Today in the governmental units, out of 2,7 million purchase invoices, about 80% are received and processed electronically but only 20% of them have been sent electronically (most of the purchase invoices are still converted from paper format to electronic by a service provider). The target by the end of 2007 is that 30% of all invoices (purchase invoices and others) will be sent (by suppliers) electronically and that all governmental units are able to receive and process them electronically. The government promotes the usage of electronic invoicing among its suppliers.

1.2 Problem addressed

1.2.1 Specific Problem

The main challenges faced by the establishment of eInvoicing in Finland were the need

- to create the necessary infrastructure for any company or public authority to send an invoice to any another company or public authority on ad hoc basis and so that the companies or public authorities can use the formats they prefer and so that they need not to know the partners capabilities in eInvoicing
- to create acceptable quality of service
- to convince companies and public authorities to use electronic invoicing, even if they already have an efficient invoicing system;
- to bring about the service providers to work together on standardising electronic invoicing and on their connectivity among each other, even if they are competitors;
- for establishment of a support structure to help individual companies and public authorities in using electronic invoicing, even if there is not much budget.

As for all Finland, South Karelia experienced same challenges even to a reduced extend and focusing on the setting up of the eInvoice format. Since it started an ambiguous action plan, further more detailed challenges had to be met:

- compilation of a list with all regional suppliers;
- all about 1,000 SMEs on this list (which constituted the primary target group) shall be ready to send eInvoices by the end of 2006;
- supporting SMEs in adopting eInvoicing by training staff on how to use the respective applications;
- creation of a Web platform providing information on electronic invoicing in a structured way best supporting public administration and companies.

However, it soon turned out all activities above were not the key challenge of the programme. Rather, the tricky part was that the technical and contractual infrastructures were not ready for a region wide adoption of eInvoicing. To solve this problem the project implementers launched a painstaking process of encouraging the eInvoicing infrastructure and service operators to agree on concrete steps to improve the interoperability of eInvoice transmission between them. For eInvoicing transactions to work properly, a great deal of pioneering work was necessary in developing this infrastructure between different eInvoicing service providers.

Specific problems addressed:

- *Number of different eInvoicing procedures and message formats*
- *Lack of a technical national infrastructure for eInvoicing*
- *Persuading service providers working together*
- *Convince companies to use eInvoicing*
- *Low budget for support structure*

...in addition in South Karelia

- *Technical and contractual infrastructure was not ready for a region wide adoption of eInvoice*

The specific requirements concerning interoperability in public administration eInvoicing in Finland were

- to have such service provider offerings that a public authority (or a company) could only have an agreement with one service provider and still be able to send invoices to any other public authority or company and receive invoices from any other public authority or company;
- to have service providers cooperate in such a way that roaming between them to fulfil the previous bullet point requirement is possible for electronic invoices. Roaming means a service offered by the messaging (in this case eInvoicing) network, which allows a sender by contacting only his own service provider seamlessly send a message to a recipient having a different service provider (and possibly a different message format);
- to standardise different eInvoicing formats so that it is possible for service providers make necessary conversions between those formats;
- to standardise different eInvoicing formats so that electronic invoices can be part of the corresponding electronic workflow within the authority (or the company), i.e. electronic invoicing systems are interoperable with back end systems.

To sum up, the standardisation and integration of different existing standards for eInvoicing had to be achieved. As an invoice is a part of a specific workflow, e.g. only the accounting part of a whole ordering process, eInvoicing has to be an integrated process element in a supply chain. For example, the supplier sends an invoice to its personal service provider (bank or eInvoicing operator), which in turn forwards the invoice to the service operator of the addressee (e.g. public authority) which (if required) converts the invoice in the respective format and finally forwards it to the addressee:

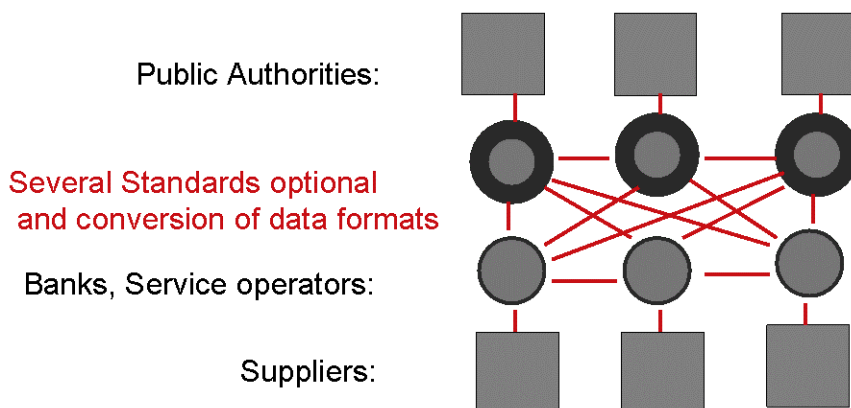


Figure 1: Interoperability Requirement

IOP requirement:
Standardisation and integration of different existing standards for eInvoicing.
As an invoice is a part of a specific workflow, e.g. only the accounting part of a whole ordering process, eInvoicing has to be an integrated process element in a supply chain inside the entity and with other actors

To meet the interoperability requirement, a cooperation and communication model for intermediary services including roaming and conversion of formats and data (clearing) has been employed.

The work to harmonize the concepts, message formats and application of standards has been started by the eInvoice Forum aiming at better quality of service.

Since invoices can be sent throughout Finland without needing to know the service provider and the specific eInvoicing format of the addressee, a common electronic address register has been created as central directory for routing. With the address register the senders and service providers know which public authorities and companies are able to receive electronic invoices.

First of all the efforts in electronic Invoices in Finland lay in the exchange of such invoices where the front-office of the seller sends an invoice to the front-office of the buyer (or the other way around); i.e. interoperability has mainly been achieved in the front-office processes. But in all cases where government units or companies have integrated the invoicing part of any service in their legacy system, IOP between the front- and back-offices respectively in the most advanced cases, among back-offices has been achieved. However, the latter two are outside the actual scope of eInvoicing.

Basic organisational model employed 1:

Roaming and format and data conversion among service providers

Basic organisational model employed 2:

Standardised workflows by harmonization efforts and creation of a central electronic address directory for routing

Service delivery model:

IOP among front-offices whereby IOP in the mid-office or among back-offices is defined on an ad hoc basis (dependent on the service provider)

1.2.2 General Background

Electronic invoicing has been used since the mid 70's already. While first electronic invoices were sent between large companies according to internal standards, EDIFACT became the standard at the end of the 80's; also for few governmental units. In the following years, various eInvoicing service providers offering comparable services evolved which has led to a competitive market in this sector.

The eInvoicing service providers can mainly be grouped into two types of service providers:

- Operators which are typically such companies which have offered EDIFACT clearing house services earlier. They have conversion services and their customers' eInvoicing applications are often linked to ERP systems or financial administration applications. Big companies typically need such services.
- Finnish banks which offer eInvoicing services to their customers. The banks' eInvoicing applications are simpler. Typically, they are web-based and integrated with online banking applications (rather than being linked to ERP systems). Thus, these systems require no or only little investments. SMEs typically prefer this type of service.

Service:

Electronic Invoicing independent of a specific service

Types and level of agencies involved:

- *The eInvoice Consortium consisting of all electronic invoice service operators, banks, several in particular large companies and government unit on different hierarchical levels as well as TIEKE as neutral party who took over the management in 2003*
- *About 15 service providers (eInvoice service operators and banks) as independent competitors on the market*

In 1999 the banks and the operators initiated an 'eInvoice Consortium'. The target was, besides promoting electronic invoicing, to agree on a common standard to be used for roaming between them. The Consortium developed its own 'standard' (known by the name "eInvoice format"). That format is some kind of mixture between EDIFACT and XML; an early attempt to have a simpler version of EDIFACT. Today that format is widely used in Finland. In spite of this effort, over time, different standards have survived or even new ones have evolved. As a result, transactions between different providers were unreliable or even impossible. Thus, for a long time, eInvoices could only be reliably transmitted between eInvoicing parties that used the same eInvoicing (and other messaging) service provider. It was impossible agreeing on a common standard as no one was giving in because considerable investments had already been made in the own developments.

After the European Committee for Banking Standards (ECBS) introduced the electronic Payment Initiator (ePI) standard in July 2003, the banks in Finland developed a new format called "Finvoice". Finvoice makes use of, besides ePI, XML syntax and ebXML. The target was that this standard should be as simple as possible, and that it could be integrated with the existing banks' payment networks. The idea was to make eInvoicing 'affordable for everyone'. eInvoice messages using the XML-based Finvoice format carry the invoice information, but not attachments (e.g. images or *.pdf-files). The banks made a large effort here to introduce the format and also to give rise to necessary software offerings. Lately many private companies and public authorities have implemented Finvoice.

Also the public administration wanted to standardize electronic invoice formats it used. In 2003 a project under the Ministry of Finance was carried out to make an electronic invoicing recommendation for public authorities. It was decided that the public administration will not develop any new format or services for its purposes but utilize existing services and formats in private sector.

For clarification, the tables on the next page illustrate main differences in the structure by comparison of eInvoice and Finvoice data sets.

It was also recommended that public authorities should not do necessary conversions in their own systems, but instead of that use service providers' existing conversion services. In the recommendation two formats were accepted to be primary used by public authorities in electronic invoicing, either Finvoice or eInvoice (referring to the eInvoice Consortium format) -standard. The State Treasury operating under the Ministry of Finance and serving the state corporation as the financial administration expert is the key driver in promoting eInvoice in governmental units.

Other background:

Mainly two types of eInvoicing service providers exist: the Operators whose customers typically aim at integrating eInvoice into their local ERP and accounting systems and Finnish Banks whose customers typically aim at integration with online-banking applications (SMEs)

1) eInvoice - structure of an invoice

| Record type | Occurrences | Description |
|-------------|-------------|---|
| INV | 1 | Initial data record of invoice: Basic data contained in invoice. Typically this data updates the accounts payable application |
| IND | 0..1 | Additional invoice information like cash discount, delivery date etc |
| ADD | 0..n | Optional address information: e.g. for printing services |
| FOT | 0..1 | Footer information: Invoice sender's contact information |
| VAT | 0..n | Value Added Tax information |
| SUM | 0..n | Summary information for the invoice, e.g. total amounts with and without taxes |
| FTX | 0..n | Optional free-text records |
| ACC | 0..n | Optional accounting records |
| EXT | 0..n | Optional content references: A reference to an invoice residing in an external repository |
| LIN | 0..n | Optional line records: data record for invoice line. The record consists of invoice lines in edited format. |
| LFX | 0..n | Optional free-text records for a line LIN |

2) Finvoice - structure of an invoice

| Record type | Occurrences | Description |
|--------------------|-------------|--|
| SellerPartyDetails | 1 | Seller organization and relevant information about it |
| BuyerPartyDetails | 1 | Buyer organization and relevant information about it |
| InvoiceDetails | 1 | Invoice number, type, date, seller reference information, order identifier, agreement identifier, Invoice total amount with and without VAT etc. |
| InvoiceRow | 1..n | Invoice row information |
| EpiDetails | 1 | Electronic Payment Initiator according to ECBS standard |

Table 1 and 2: Comparison of eInvoice and Finvoice

The eInvoice Consortium wanted some neutral party to take the responsibility to promote and foster electronic invoicing further and TIEKE, the Finnish Information Society Development Centre was selected in 2003. TIEKE has established the eInvoice Forum together with other players in this area. The Forum is the focal point for the different parties in the field (e.g. The State Treasury is a member in the Forum). The target is that a company or public authority can send an electronic invoice with its preferred format to any other company or public authority contacting only the service provider it has chosen. A recipient can correspondingly receive electronic invoices with its preferred format contacting only its service provider. A technical infrastructure among service providers allows for, besides necessary conversions, roaming of the electronic invoices between service providers.

As a next step starting 2006/07 towards technical solutions for electronic invoicing will be a look on internationally used standards. For example in Denmark people are applying UBL. For the time being all advantages and disadvantages of the UBL standard have to be considered and evaluated. After the evaluation of the pros and cons the usage of UBL in Finland will be considered properly.

1.2.3 Policy context and strategy

Legally, Finland has two levels of democratic government: the state, and 432 municipalities. Although a municipality must follow the laws set by the state, it makes independent decisions. That is, the decisions of a municipal council, if legal, cannot be appealed.

Municipalities co-operate in 74 sub-regions and 20 regions. These are governed by the member municipalities. The main tasks of the regions are regional planning and development of enterprise and education. Besides, the state organisation is divided into six administrative provinces which are subdivided into 90 state local districts. The provincial authorities are purely administrative divisions of the central government, and hence don't have any own legal power. Regions represent dialectal, cultural and economic variations better than the provinces.

The Region of South Karelia is located in south-east Finland in the Province Southern Finland, bordering on Russia. South Karelia has 137,000 inhabitants on an area of about 5,600 square kilometres. The largest city is Lappeenranta with about 60T inhabitants. There are about 5,000 SMEs in South Karelia, and only very few large firms.

Legislation in Scandinavia imposes no hindrances on electronic invoicing. As a transmitter of electronic invoices, the eInvoicing service provider corresponds to the Post Office so eInvoicing data

Framework conditions:

- *In Finland there are two levels of Government: the autonomous municipalities (which have to follow the law set by the State and the central government with its executive branch, the provincial authorities*
- *Municipalities co-operate in 20 Regions which represent dialectical, cultural and economic variations (better than the purely administrative) Provinces)*

enjoys the same privacy and protection as conventional mail. The Accounting Act in Nordic countries permits the use of electronic archives for both vouchers and accounts ledgers. Many Nordic companies already use electronic archives. The EU-legislation also supports electronic invoicing.

The decision to use electronic invoicing and the development of solutions certainly was mainly market driven and firstly relevant for private companies. The Ministry of Finance recognised the importance of eInvoicing when managing the paperless accounting project for governmental units. It was also recognised that there were too many formats in use, so they wanted further standardize electronic invoicing (see Background above).

Regional strategies, like the longer-term Regional ICT Development Policy for SMEs in South Karelia are promoters of the chosen eInvoicing standards (beside others). The eInvoicing initiative of South Karelia runs under the name "eBusiness on the net 2004-2006" and is designed to strengthen the competitiveness of the entire regional business network through promoting e-Business adoption. I.e. programs from government, Chamber of Commerce or from private consortia for promoting eBusiness (and not eInvoicing in public administration) are to be seen as the main drivers of development and implementation.

South Karelia was the first region in Finland to start a regional eBusiness initiative. Over the last years, other regions have followed suite, and today there exists a broad network of regional eBusiness initiatives. The regional initiatives are linked together in the common eBusiness Network (www.eliketoiminta.com). Today, 9 regions are members of this network, which currently encompasses 20 initiatives, 10 main sponsors, and an area with about 100,000 SMEs. The regional initiatives have different working models and also partly different development objectives. Each of them attempts to best adjust to regional needs. The main rationale for the existence of the network is to be able to share experiences and best practices as well as maintain a common internet portal. eInvoicing is not a main objective of all regional initiatives. Next to South Karelia, eInvoicing is a central focus in the neighbouring Päijät-Häme region, and these two regions are most advanced as regards eInvoicing. Three other regions are just starting eInvoicing initiatives. The Finnish Ministry of Trade and Industry has realized the value of the eBusiness Network and is currently looking at possibilities to make available its services all over Finland.

Legal framework:

- *Legislation imposes no hindrances to electronic invoices and the Accounting Act permits the use of electronic archives for vouchers and account ledgers*
- *Public and non-public driven business strategies linked in the common 'eBusiness Network' promote adoption of eBusiness in general where eInvoicing is a part of*

Legal framework:

- *Project under the Ministry of Finance recommends the use of Finvoice and/or eInvoice (standard of the eInvoice consortium) for use in public administration*
- *eInvoicing operators legally correspond to the Post Office in terms of mailings (privacy and protection of mails)*

Interoperability Framework:

- *Finvoice and eInvoice are based on EDIFACT, XML and ebXML and hence adhere to international business standards*

1.3 Solution

1.3.1 Specific Objectives

The main objectives pursued by the adoption of eInvoicing in Finland are:

- To increase process efficiency: Processing tenders, sales or purchase invoices is a core business activity in the financial administration of public authorities and companies and it provides e-business links for further collaboration. eInvoicing promises substantial savings, as it shortens the average time needed to process an invoice. "ePioneers" are expected to achieve the largest benefits from electronic invoice management, as they have to deal with a huge number of invoices. However, the others should also benefit. Due to this expected benefits, all should hence be motivated to invest in eInvoicing solutions.
- To raise the level of ICT skills of employees in public administration and companies: As employees learn how to use eInvoicing, they acquire e-skills and get prepared to use more sophisticated eServices in the future. Those who operate eInvoicing are hoped to become "ambassadors" for further innovation, once the system works fine. This reflects the strategy to use eInvoicing as a vehicle for advancing G2G, G2B as well as B2B connectivity on the skills side.
- A fact in electronic business is that industries have implemented their own procedures (many are international standards) and any attempt trying to harmonise everything will end up in a chaos. So the eInvoicing solution nationally should be such that it allows several different solutions but still necessary interoperability can be achieved.

In South Karelia, in addition, an effort is made to implement a systematic monitoring of e-business adoption and requirements (the "ePlan"). Sound evidence on the state-of-play in the region is regarded as necessary for planning targeted measures and for monitoring progress achieved.

Targeted by South Karelia by end of 2006 are:

- To have at least 1,000 SMEs adopt eInvoicing;
- To achieve a 50% eInvoicing penetration (= share of eInvoices of all invoices sent between the target group and their regional business partners). This is equivalent to 2.6 million invoices exchanged between SMEs;
- To realize cost savings of 52 million euros for the regional economy (by estimated cost savings of 20 Euro per invoice, 52 million Euro may be saved (2.6 million invoices x 20 Euro));
- To enhance the competitiveness of the entire regional business network.

Objectives to be achieved in Finland:

- *Establishment of eBusiness links among public authorities and companies in order to increase process efficiency*
- *Raise of ICT skills level of employees in order to boost adoption of eInvoicing and eServices in general*
- *eInvoicing solution nationally should be such that it allows several different solutions but still necessary interoperability can be achieved*

Specific objectives of South Karelia:

- *eInvoicing among 1,000 SME's by end of 2006*
- *eInvoicing penetration of at least 50%*
- *Cost savings of about 52M Euro for the regional economy*
- *Enhancement of competitiveness of the entire region*

1.3.2 Implementation

The main challenge and activity has been the setting-up of the technical infrastructure for eInvoicing; I.e. the development of the technical and organisational linkage of electronic invoice service providers. The target has been that although there are many service providers in Finland a company or public authority can send an electronic invoice to any other company or public authority contacting only its own service provider (so that the roaming between service providers works). I.e. from an organisational point of view, these service providers have to collaborate in such a network (even if they are competitors and have different interests) and provide interfaces to allow for seamless transmissions of invoices between any public authority and company in Finland. This process has been set under the leadership of the eInvoice Forum run by the Finnish Information Society Development Centre (TIEKE).

To support the development of the technical infrastructure on a national level the eInvoice Forum has decided on the following common services (run by TIEKE):

- A common (electronic) address-register for all parties. This is a directory with the electronic addresses of all public authorities and companies that are able to process electronic invoices (see also figure 2 below). Besides being a searchable database, this directory allows for routing of electronic invoices among the service providers independently of the electronic invoice formats the sender and receiver use. E.g. an invoice is sent from the seller to its service provider, then the service provider looks up the electronic address of the buyer including its service provider and forwards (routes) the invoice to the buyer's service provider (if different from the sender's service provider). The buyer's service provider then converts the electronic invoice format of the sender to the format of the buyer (if the formats differ).


Implementation issues:

Setting up of a technical and organisational infrastructure for collaboration and routing and format/data conversion among the eInvoicing providers

This includes:

- *A common electronic address register*
- *A common conversation table between formats*
- *A common testing service, (incl. the "LivingLabs" approach in South Karelia)*

Set up of the "eInvoice Forum" as central collaboration and meeting point for the different parties in the field, such as developers, service providers, experts and the users of electronic invoicing



Address Register


(eInvoicing Company Catalogue)

- Open register, free of charge for single users
- About 12 000 entries (public or private agencies that can either send or receive einvoices) (9.2006)
- An entry has the following information:
 - Name of the company
 - Company ID
 - Contact information
 - Can either send or receive einvoices or both
 - eInvoice address
 - Service provider (bank or operator)
 - Service provider ID

Figure 2: Address Register

To do this, the technical network provides...

- ... a common conversion table for the different formats between the service providers. This mainly consists of interfaces allowing for format and data conversion and also concerns the approach to harmonize and further standardise electronic invoices among the service providers.



Mapping of formats

- Mapping table to be used by software companies and service providers (for syntactic and semantic IOP)
- Following columns:
 - Finnish name of the field
 - Specification of the field
 - Remarks incl. legislation requirements
 - one column per a format (several formats are included):
 - the name of the field in relevant syntax
- Support information: UN Trade Data Element Directory and code lists

Figure 3: Mapping of Formats

- A common testing service has been implemented so that the software companies and service providers, even senders and recipients can utilize same testbed system. This allows the parties to test the most common cases before real implementations of new systems.

Case capitalises mainly on following layers of IOP:

- **Technical IOP:**
Creation of a technical infrastructure among the various electronic invoicing operators and banks
- **Syntactic IOP:**
Exchange of invoices via specific formats, most important are Finvoice and eInvoice based on EDIFACT, XML, and ebXML
- **Semantic IOP:**
Enabling format conversion among the different eInvoicing formats of the various operators and banks. Enabling routing of electronic invoices by set up of a central common electronic address register

A regional "LivingLabs" approach has been implemented in South Karelia. This means that the services to be implemented are tested on the basis of real business cases, and that the results of these tests, and difficulties experienced, are then discussed among the involved parties in regular workshops. The main idea behind this approach is to bring together all stakeholders in roundtable workshops, to discuss success and failure and to agree on concrete measures how to overcome difficulties.

Two B2B-eInvoicing LivingLabs carried out in South Karelia in May 2005 showed that 90% of all eInvoices from bank-to-bank were transferred correctly. In bank to operator or vice versa, or between operators, this figure was considerably lower at 40-60%. Thus, work remained to be done.

In addition, South Karelia followed in the framework of its "eBusiness to the net" strategy to help individual companies to use eInvoicing and established:

- eInvoicing trainings. These one or two days' trainings were subsidized by the eBusiness strategy and hence on low costs for the interested parties, mainly the SME's
- A website as main information portal on eInvoicing. This website covers e.g. detailed eInvoicing integration information, a database of about 600 ASPs in the region, and a database of eInvoice addresses of regional companies.

An important actor, coordinating issues on national level described above is the **eInvoice Forum** run by TIEKE. Hence its main goal is to promote the widespread adoption and use of electronic invoicing based on common standards and procedures in Finland. Furthermore, it is to support inter- and intra-organisational collaboration between all parties in the field. To reach their goals the members of the eInvoice Forum work together both on- and off-line, with guidance set by a steering group. This steering group comprises representatives from leading eInvoicing service providers and users. Much of the actual work is done in three working groups:

The technical working group: This group consists of the banks and operators who transmit electronic invoices from sellers to buyers. The task of the technical working group is to resolve technical issues in the different electronic invoice formats and in the transmission procedures.

The user working group: This group consists of the senders and receivers of electronic invoices. This means big senders of electronic invoices such as telecom companies and power companies, but also accountancies and other companies dealing with invoices. The task of the user working group is to reflect the ideas of the users and point out problems from the users' point of view.

Implementation issues:

Setting up of the eInvoice Forum incl. a steering group comprising representatives from leading eInvoice service providers and users.

Main work is done in three working groups:

- *A technical working group*
- *A user working group*
- *The software company working group*

The software company working group: This group consists of software companies who make electronic invoicing software. The task of the working group is to discuss and solve interoperability issues and to develop a testing service for electronic invoices.

Workflow description

In the following the general workflow model of eInvoicing in Finland is presented covering the different possible eInvoicing formats. The second chart presents the workflow from the State Treasury. As it is shown, the invoices directly come from the service provider in the form that the State Treasury's systems can integrate it in its own legacy system. So there are no conversion needs in the systems of the public authority. All conversions including scanning from paper into electronic form is done by the service provider. The invoices that have been scanned are received both as a picture of the invoice and also as a Finvoice format (so the service provider interprets key data elements in the invoice and sends them as data). Rondo is a system that is needed by public authorities for receiving, circulating and approving the invoices. For the comparison of eInvoice and Finvoice format see tables 1 and 2 above.

Figure 4: Workflow of eInvoicing in Finland

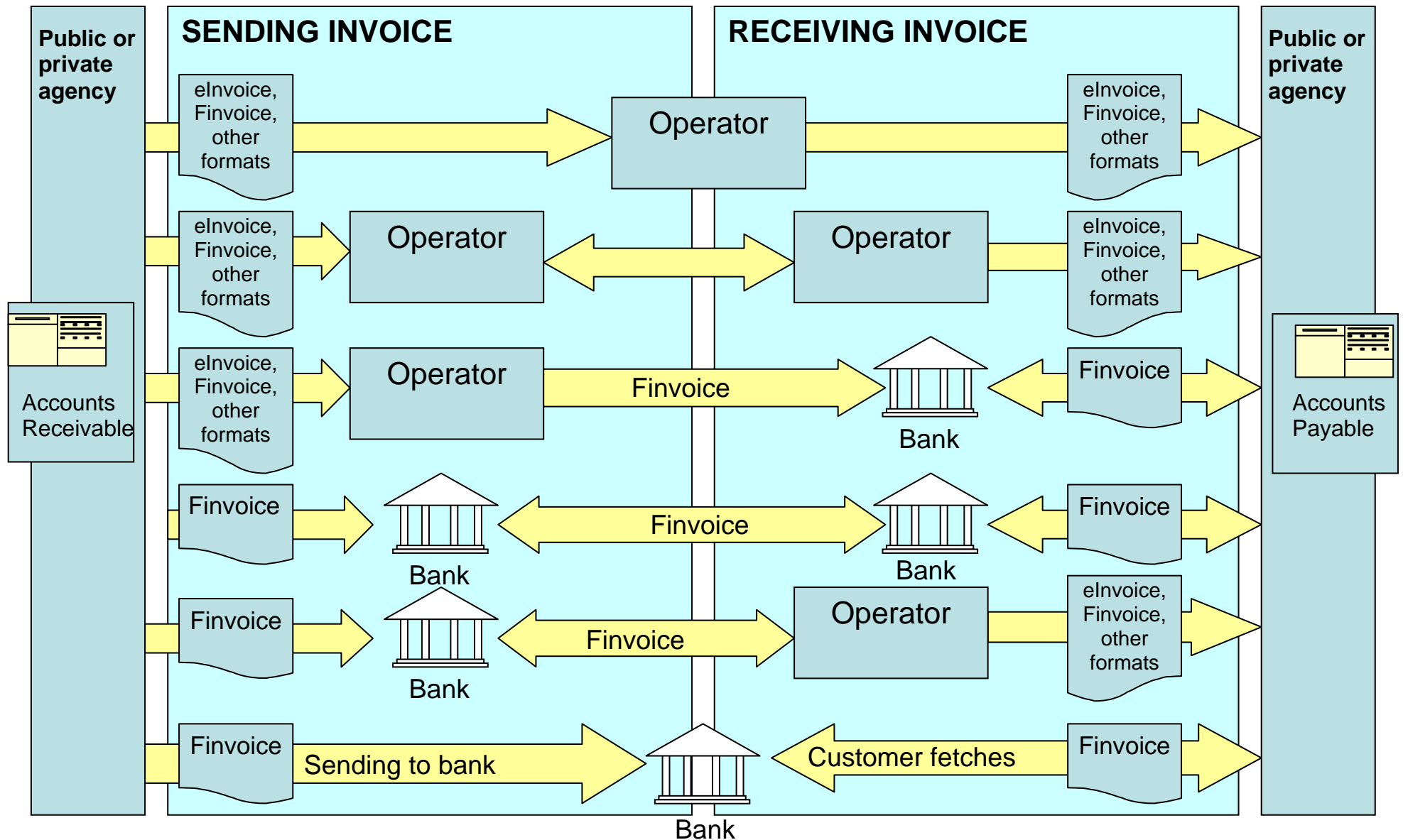
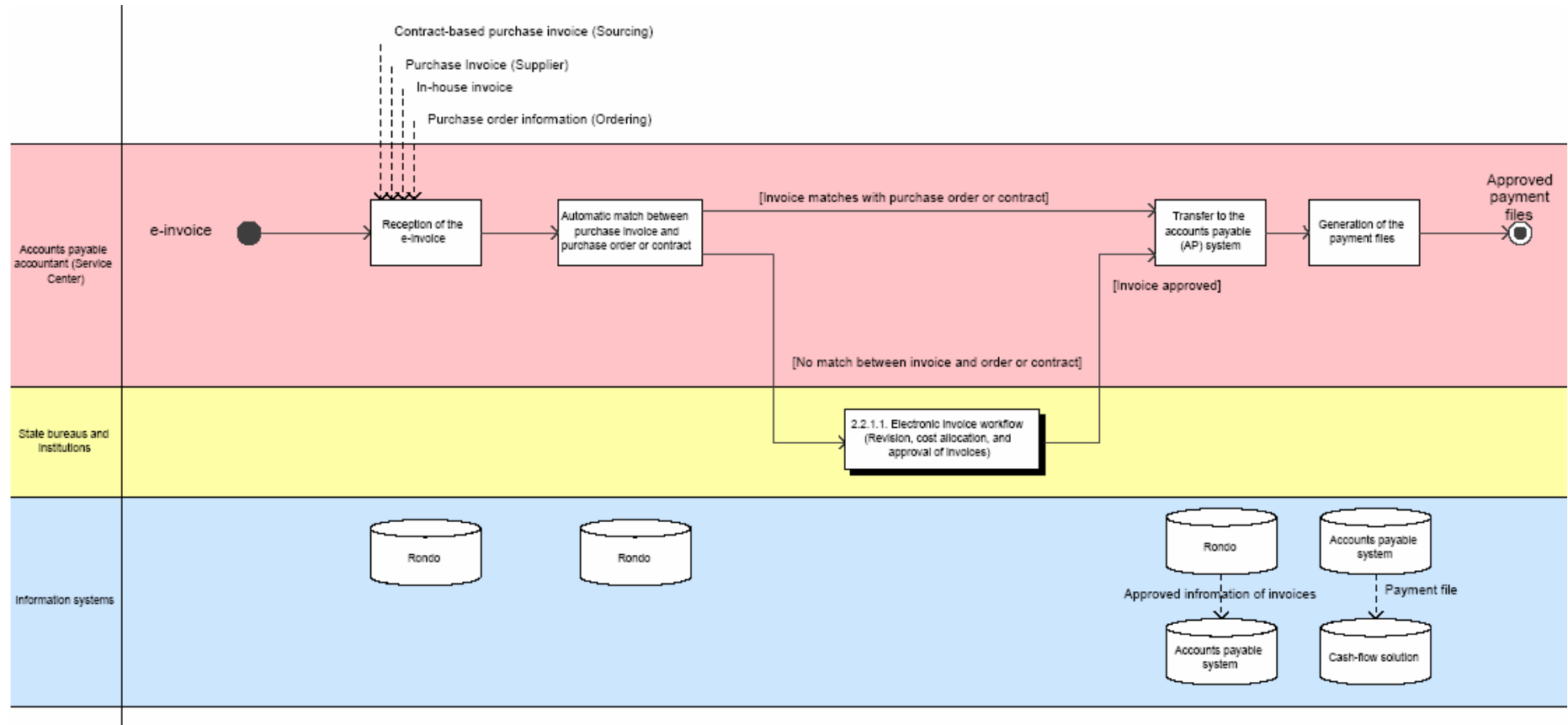


Figure 5: Workflow of eInvoicing of the State Treasure



Security and Privacy

Electronic invoicing like any electronic messaging enjoys security and privacy protection in the Finnish legislation. Whether the messages are encrypted or not, depends on the sender and the recipient. Electronic invoices have no electronic signatures in Finland. Service providers authenticate the senders and receivers of invoices.

Awareness and Marketing

The State Treasury operating under the Ministry of Finance and serving the state corporation as the financial administration expert has been the key driver in promoting eInvoice in governmental units. It makes centrally agreements with biggest suppliers (in respect to the number of invoices) on behalf of individual governmental units about migrating to electronic invoices. It has also analysed the suppliers of individual units with eInvoice capability and, using the eInvoice Forum's address register, found their suppliers with the capability to send eInvoices. It has then informed both parties of the possibility to use eInvoices immediately.

The State Treasury also cooperates closely with e.g. banks to activate SME companies in migrating to electronic invoices.

Also, the government recommendation for using two specific formats within the public administration: Finvoice and eInvoice put on the one hand pressure to the service providers to collaborate among each other in order to be able doing business with governmental units and on the other hand to the private sector becoming ready to receive electronic invoices from governmental units. However, pressure is coupled with positive incentives as it is evident that eInvoicing promises a "win-win" situation with cost savings for both parties involved (the buyer and the seller), at least in the long run.

An example are the banks which have spotted a business opportunity and market in electronic invoicing on a very broad scale. A big bank in South Karelia alone has about ten employees who attend to SMEs in order to market eInvoicing as a service. SMEs respond very positively to this offer. Other banks are also marketing eInvoicing. The collaboration with banks can be considered as a most efficient approach for the policy to work.

The eInvoicing initiative in South Karelia uses various communication channels for marketing the service in particular to SMEs. Most importantly, all organisations involved advocate the goal of eInvoicing adoption and thus promote the policy to SMEs they have contact with. This is done in different contexts, depending on the stakeholder. The main communication instruments are - beside those stated above – organisation of eBusiness seminars which

Warranty of security and privacy:

- *Finnish legislation*
- *Encryption possible by sender if appropriate*
- *No digital signatures are required*
- *Service providers are responsible for authentication*

Awareness and Marketing:

- *Central agreements between the State Treasury and the biggest suppliers*
- *"Natural" pressure by market rules as ePioneers accelerate eInvoicing adoption in the private sector. I.e. everybody who wants to do business with the big ePioneers has to take over their system*
- *Similar the public authorities who 'only' talk Finvoice and eInvoice. Everybody who wants to do business with them has to take over their system*
- *Providing a (proven) 'win-win' situation when using electronic invoices*
- *Convincing work by the eInvoicing operators, the banks, other related organisations and the Chamber of Commerce to do eInvoicing*
- *Seminars and workshops*
- *Newsletter*
- *Funds for trainings that interested parties may learn the system on low costs*

promote eInvoicing, distribution of newsletters, information and events by the Chamber of Commerce and most important: within the "eBusiness on the net" strategy there are funds provided for trainings of SME's in how to use eInvoice software applications. I.e. interested parties may receive training lessons at a low rate.

1.4 Features making it a candidate for good practice exchange

1.4.1 Impact

Today in governmental units 60 - 80% of purchase invoices are received and processed electronically and the target is that by the end of year 2007 all governmental units can receive and process them electronically. Today 20% on invoices are received electronically by the service provider and the target for the year 2007 is 30%. The others are received in paper format and the service provider scans these paper documents and interprets and sends them to the government unit using Finvoice format. The slowing factor is suppliers' ability and willingness to send electronic invoices.

By mid 2005, of 220 million invoices exchanged in Finland (G2G, G2B and B2B), 8% were exchanged using eInvoicing. Considering also the exchange based on EDIFACT format, already 15 - 20% of all invoices were exchanged in electronic format at that time. New figures will be available by Statistics Finland by end 2006.

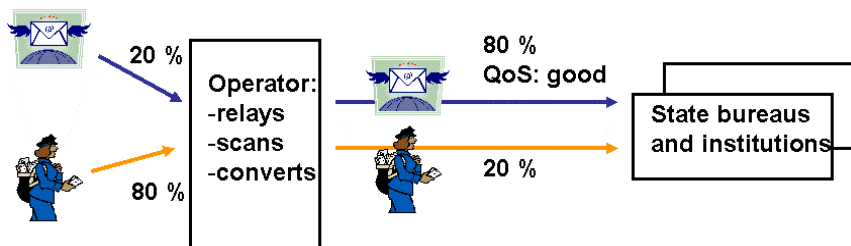


Figure 6: Ratio of invoices sent online, scanned, and by post

The State Treasury in Finland estimates that about 50% of the work hours in financial administration are related to processing invoices. Thus, the main immediate benefit of eInvoicing is cost savings. Evidence from research, mainly conducted by service providers, show that electronic processing of invoices halves the average total cost of processing an invoice from about 40 Euro to 20 Euro. I.e. by a 100% penetration of eInvoicing in Finland (220M) annual cost savings of 4.4 billion Euros may be achieved. Even higher savings may be achieved and are envisaged by integrating invoices in legacy

Outreach:

- By mid 2006, 60 - 80% of purchase invoices are processed electronically aimed at full roll-out by end 2007
- 20% invoices are received electronically aimed at becoming 30% by end 2007
- By mid 2005, 8% of all invoices are sent using eInvoicing and considering also invoices sent in EDIFACT format, already 15 - 20% are sent electronically

Cost Benefits:

- Savings of 20 Euros per invoice which would add up to 4.4 billion Euros by 100% electronic invoicing in Finland (estimated) and 104 million Euros in South Karelia
- Higher savings when invoicing processes are integrated in basic services, i.e. in the legacy applications

systems such as the local accounting system. Provide interoperability here is most challenging but promising in terms of efficiency.

Cost savings can also be calculated for South Karelia. There are 5.2 million invoices sent annually in South Karelia. With an eInvoicing penetration of 50% as envisaged for end 2006, annual savings add up to about 52 million Euros for the regional economy. This impact on cost savings was confirmed by all parties involved in the initiative, including both SMEs and the ePioneers. By August 2005, 27% of invoices exchanged in South Karelia are already sent in the electronic format. I.e. the originally envisaged 50% by end of 2006 may already be achieved.

The biggest city in South Karelia and ePioneer, Lappeenranta, receives 97,000 invoices annually. Currently, about 25% percent of all invoices received by the city are eInvoices. The city scans all incoming invoices which are still sent in paper. An increase in eInvoicing reduces this scanning process, and more quality working time will be left for other projects and activities such as a shift from employment opportunities in the financial administration of the city to the operative field, e.g. health, education and services. With eInvoicing, the city also has much better control over the status of its purchase related invoices, the circulation of invoices is facilitated and the information flow much more efficient. This has positive effects on financial reporting and planning.

A quality indicator is related to the trainings given to users of eInvoicing. Feed-back indicates that they were very pleased with the training provided, in particular because the trainers were flexible and willing to answer questions after the training sessions. The latter is important as most of the problems will only emerge in the practical day-to-day use of the systems.

So far, the scope and depth of the information available on the info website of South Karelia lacks of effectiveness and efficiency as the information offer is quite extensive, possibly even too extensive in its present form. Efforts are now being made to make the web service user-friendlier and thus increase the practical value.

Two of the first adopters of eInvoicing in South Karelia gave very positive feedback about the usefulness of the service; in spite of some initial technical problems early adopters often have (e.g. the technical infrastructure and trainings were only in place for about a year and need to be error proved by the day-to-day praxis). They regarded eInvoicing as very suitable for their needs and were highly satisfied with the quality of the subsidised eInvoicing training. The training has raised their awareness of ICT induced opportunities for increasing the efficiency of such business processes. The motivation to participate in the training resulted from pressure of 'ePioneers' who had contacted the companies and asked them to switch to eInvoicing in their business exchanges.

Performance in Lappeenranta:

- 25% handled invoices are eInvoicing
- Invoices coming on paper are scanned
- More efficient work and reduced workload for invoicing issues, i.e. free resources for other tasks

Supportive factors:

- Training sessions also enabling questioning afterwards in the day-to-day praxis
- Effective and efficient Info-platform on the internet providing structured advice

The two companies experienced the following benefits by using eInvoicing:

- It reduces routine work in the office and the saved working time can be used for other tasks;
- It reduces the amount of paper which has to be processed and stored in the office;
- It cuts the costs for sending invoices up to 50% per invoice. This figure only considers the difference between the cost of mailing a paper-based invoice and sending an invoice electronically. When handling time is included in the calculation, cost saving will be even higher;
- It leads to faster payments as the circulation time of an invoice between the invoicing and paying party is reduced;
- It decreases the likelihood of errors and typos in invoices by eliminating manual data entry;
- It is seen as a modern technology which becomes a must in business relationships. Thus, adoption is a requirement to sustain an innovative image, and a signal to customers that the agency makes every effort to cut costs at their end.

General Benefits:

- *Reduction of routine work and working time*
- *Reduction of amount of paper to be processed and stored*
- *Reduced costs (50%)*
- *Faster payment due to reduced circulation time*
- *Reduced errors and typos by eliminating manual data entry*
- *Competitiveness by using innovative technology*

1.4.2 Relevance of the case for other administrations that could learn from the experience

A number of aspects of eInvoicing in Finland are innovative in nature. First, eInvoicing is a pioneer application which is not yet widely used in most countries. However, most innovative in the Finnish solution is the infrastructure that allows any company or public authority by contacting only its own service provider to send eInvoices to any of its customers regardless of their ICT solutions and with minimal information of each others solutions. The present state of the infrastructure, in particular the technical infrastructure among the eInvoice Forum and the service providers, has been achieved by the development work done since 1999 in Finland. To support the infrastructure, the Forum has decided on the following common services (run by TIEKE):

- a common (electronic) address register for all parties,
- a common conversion table between different formats, and
- a common testing service.

Second, a large part of the impact and results were obtained because all stakeholders were involved: the ePioneers, the eInvoicing service providers, regional interest groups and development organisations. The need for all stakeholders to be involved may not be an innovation as such, but the initiative's approach of focusing on a specific application ("killer application") can be seen as innovative. South Karelia was the first region in Finland where an eBusiness initiative with focus on eInvoicing

Innovativeness:

- *eInvoicing is a pioneer application not widely used in other countries*
- *Infrastructure allowing any company or public authority by contacting only its own service provider to send eInvoices to any of its customers regardless of their ICT solutions*
- *eInvoicing is a 'killer application' as it provides huge benefits for all*
- *All stakeholders are involved in the development and implementation*
- *Natural market pressure will be used to widen adoption by use of the ePioneers as intermediaries*

(among others) was started (2002). South Karelia has become a pioneer of eInvoicing, and not only in Finland. Only the neighbouring region of Päijät-Häme has a comparable level of eInvoicing penetration due to intensive cooperation via the eBusiness Network.

Third is the innovative approach of effectively reaching companies. The ePioneers, i.e. the large companies and public authorities were used as intermediaries to convince companies with whom they do business to adopt eInvoicing. This mechanism was highly successful, as it created a certain amount of market pressure.

Fourth, another innovative good practice to be recommended (in terms of methods) is the "LivingLabs" approach. This instrument for coordination and cooperation is particularly useful when different parties have to agree on common technological platforms or interfaces. The idea is to combine technology tests in a real-life environment (i.e. a "living laboratory") with regular workshops, where the results of the tests are presented and discussed in terms of their implications. At workshops, concrete actions to be taken by individual stakeholders are specified. It has been experienced that this approach was particularly useful to strengthen the commitment of all parties involved, as the workshop environment creates a certain peer pressure.

Fifth, the choice and set-up of the eInvoice Forum coordinated by TIEKE is innovative as the main actors (see also second point) work together on cooperation, harmonisation, standardisation and support issues. So there is a concentration on eInvoicing know how meeting regularly and coupled with the necessary connections to local stakeholders.

In South Karelia, which, as mentioned above is a forerunner in the adoption of eInvoicing a central coordinating agency has been employed. The initiative in South Karelia was not coordinated by the public sector, but by a technology centre formed as a spin-off from the local Lappeenranta University of Technology also with concentration of know how in the region and connections to their local stakeholders. The role of this agency can also be considered a rather unusual yet innovative choice.

Innovativeness:

- *Test of service in real-life situations - the "LivingLabs"- incl. regular workshops and concrete actions*
- *Set up of a Forum consisting of all relevant actors and coordinated by a private company in South Karelia and for all Finland by a non-profit organisation*

1.4.3 Transferability

There is a need for companies and public authorities in every country and also between countries to send invoices to each other. Because of different practices in different countries and industries there are huge IOP problems. Basically there are two feasible ways to solve the problem: either to agree on one solution to be used by all parties or to implement an infrastructure that is simple for companies and public authorities to be used and still flexible enough to allow parties to have a reasonable number of different solutions. Besides invoices the same applies also to other business documents like orders. The Finnish solution is the latter one and it can as such be implemented in any country. The public administration's decision not to develop its own standards and solutions but to adapt to private industries' best practices is also a good example.

eInvoicing in South Karelia has overachieved its own specific, quantitative targets in terms of outputs already prior to the envisaged end of the initiative by 2006. eInvoicing in South Karelia and also in all Finland constitutes good practice that could be considered as a blueprint for replication in other regions and countries, either as a whole or in part. It is strongly embedded within the interregional e-Business Network which facilitates interregional transfer. For South Karelia itself, the success of the initiative in terms of the fast regional uptake of eInvoicing enables the coordinators to consider follow-up initiatives already before completing the current phase. Moreover, the initiative can be regarded as a highly innovative policy, both in terms of its content and its methods applied. The aspects mentioned in the previous chapter should be considered by other eInvoicing or also other eBusiness initiatives, due to their innovative nature, or because they have proven to be successful. Major possible obstacles to be considered are the constellation of the actors (various eInvoicing service operators with different eInvoicing formats, banks, ePioneers other users) and different legal frameworks for invoicing and in particular eInvoicing in other countries. This also concerns e.g. the use of digital signatures; Finnish law does not require signatures on invoices (in contrast to many other countries).

Beside these rather organisational and management issues, from a technical point of view, transferability to other countries is supported by the use of international business standards such as EDIFACT, XML and ebXML for the exchange of eInvoices (see also the Implementation chapter above).

Transferability:

- *Flexible infrastructure that allows parties to have a reasonable number of different solutions (as it is the situation also in or between other countries) which is adapted from private industries' best practice*
- *To other regions within Finland is high as e.g. South Karelia's solution may be used as blueprint for other regions*
- *To other countries, mainly the actor's constellation and the legal framework has to be considered which could differ, e.g. in terms of signatures. Organisational and technical features may then more or less 'easily' be replicated*

Transferability:

- **Technical and syntactic IOP:**
*Technical infrastructure among actors in particular the service operators and banks allowing for routing of invoices via an address directory and which is based on EDIFACT, XML and ebXML is a key enabler of **semantic IOP** which in addition is achieved by format and data conversions via this common platform. As international standards are used as well as interfaces for conversion, transferability can be seen high*

1.5 Results

A very important output of eInvoicing activities in Finland has been the improved interoperability between the various eInvoicing systems and improved cooperation between different parties. The usage of eInvoicing in public administration and private industries is steadily increasing in Finland.

Through the testbeds respectively the "LivingLabs" approach in South Karelia, a working cooperation between competitors in the market could be achieved for the common good. The connections between most service providers by mid 2005 are either already in operation, or being tested, with only a few connections remaining to be tested and established. However, while technically most of the connections are interoperable, problems in the practical sending and receiving of eInvoicing still exist. Besides the problem of the technology itself, a rather important problem lies in the usability of the applications. E.g. requirements to eInvoicing are similar to the traditional post mailings, i.e. you need the exact address of the recipient and of its electronic invoicing operator. Wrong addresses are a frequent source of errors in the eInvoicing processes. As the B2B "LivingLabs" didn't show that much maturity of eInvoicing (90% in bank-to-bank connections and 40-60% in bank-operator and vice versa connections) one has to consider the pioneering work done and that processes in the meanwhile have been improved aiming to be as safe as the postal service, i.e. 100%.

A major mechanism and intended effect of the whole initiative is that eInvoicing is expected to have a snow-ball effect among companies and governmental units. When an agency starts sending electronic invoices to selected business partners, it will soon think of reaping also the benefits of receiving electronic invoices, or sending electronic invoices to other business partners. The business partners of the company will thus be urged to also adopt electronic invoicing. The idea in South Karelia defining the spearhead group of 1,000 companies was the idea that these companies will then talk to other companies who themselves will convince others with whom they have business with to adopt electronic invoicing. The adoption of electronic invoicing may be compared with a huge wheel: it is difficult to get the wheel running, but once it runs it will have massive effects. The legitimated hope behind is that at some point electronic invoicing will become a standard business procedure, one that everyone adopts.

Impact:

- *Improved interoperability between the various eInvoicing systems*
- *Improved cooperation between different parties concerned with eInvoicing*
- *Steadily increase of eInvoice usage*

Problems to be solved:

- *Improvement of maturity of eInvoice exchange among actors, in particular among bank-operator and vice versa*

Performance:

- *Snow-ball effect of integrating companies and public authorities with a critical mass and ePioneers in that a kind of market pressure evolves and the state of the art service delivery changes towards electronic invoicing*

1.6 Learning points and conclusions

There are quite a lot of learning points contained in process of establishing an electronic invoicing infrastructure in Finland and in the Region of South Karelia. Beside that the lessons have been learned by employing eInvoicing, these may also be relevant for e-business policies in general.

National infrastructure for eInvoicing

National infrastructure, consisting of the eInvoice Forum with its cooperation model and support services, has been a major facilitator in implementing the Finnish eInvoicing solution and is also the key learning point for others.

Regulatory framework for invoicing

A major facilitator is also seen in the regulatory framework in Finland regarding the delivery of invoices. In contrast to other countries, Finnish law does not require signatures on invoices. A new discussion in this area could arise from the requirements for using electronic signature in the future. Finland favours a light approach and is against strict rules for the use of digital signature, which is not in line with the approach currently favoured by the European Commission.

Proactive approach and culture of cooperation

Project coordinators say that the cooperative spirit and the proactive mentality ("let's get things done!") in South Karelia was a major facilitator of success. Rather than sitting still and waiting for a common standard for eInvoicing to be established, policy and stakeholders decided together that action should be taken to accelerate this process. A common need to address the problem of having a multitude of standards was acknowledged, in spite of some business conflicts between parties involved.

Enthusiastic project management

The high identification of the project managers with their initiative, and their devotion to the work to be done constitutes a critical success factor. Without this high level of commitment, it would have been difficult to overcome initial barriers in getting all relevant stakeholders involved.

"Win-win-situation"

The eInvoicing initiative was comparatively easy to "sell" to companies and public authorities, as the win-win-situation was commonly recognised. The clear business proposition that eInvoicing will enable them to save costs in the long run has been a major incentive for their participation.

Critical success factors for IOP:

- *National infrastructure as main facilitator in implementing eInvoicing*
- *Legal framework is crucial for success, in particular in terms of using digital signatures*
- *Governance and consensus across public and private agencies in a proactive manner*
- *High identification with the project and its goals*
- *Business requirements should be the driver by providing a "win-win" situation for all actors*

Critical success factors for IOP:

Creation of a momentum / "snow-ball-effect"

The sustained success of the eInvoicing initiative that can already be seen to emerge is a result of creating a snow-ball effect. Policy activities have triggered a development that is now evolving more or less on its own.

Conflicting business interests

Major barriers in the beginning were the conflicting business interests among banks and operators. This situation was due to the specific structure of the Finnish eInvoicing market and may be different in other countries (for the better or worse). A representative of Nordea Bank describes the situation at initial meetings as "controlled warfare". It is one of the major success points of this policy that it was possible to agree on a set of common goals (in particular regarding interoperability) even among direct competitors in the market place.

Dependency on technical preconditions

Although problems of interoperability between systems were largely solved in the first phase of the initiative (a major success of the initiative), there are still technical problems in the day-to-day exchange of electronic invoices. This involves some risk of whether remaining issues can be effectively and efficiently solved.

Focus on a specific application

The decision to focus on eInvoicing as a "killer application" for process integration between public authorities, companies and their business customers proved a successful strategy. Processing invoices is a core business process which is performed on a daily basis in most agencies. Thus, agencies saw obvious and concrete benefits in adopting.

Transparency of objectives and implementation

The whole eInvoicing initiative followed clear objectives and had a straightforward implementation plan. The transparency is high also from the perspectives of the participating agencies. There are clear "rules" how to become eligible for support, and all steps during the implementation run very smoothly. This makes it attractive for agencies to participate, and is in contrast to other support schemes where overly complicated or inadequate administrative burdens (such as having to fill in complicated application forms) act as a deterrent to many companies.

- *Create momentum by enabling a 'snow-ball-effect'*

- *Decisions for the "greater good" rather than for the good of one single actor of the project*

- *Functioning of technical system has to be experienced in the day-to-day use*

- *Focus first on 'killer applications' in order to become a business case and drive adoption and outreach*

- *Provide transparent and simple to understand objectives and implementation rules/steps*

Generate market pressure from all angles

Creating some market pressure on companies appears to be a much more effective mechanism than pure awareness raising activity. The strategy to use large companies and public authorities as "ePioneers" for this purpose shows how this could be done. Market pressure is now expected to be passed on from agencies to their accounting firms.

Involvement of all stakeholders

The necessity to actively involve all relevant stakeholders in an initiative is commonly recognised. It is particularly important however, if there are diverging business interests among specific stakeholders, as in the case of this policy (banks vs. operators). In this case, a particular effort has to be made to agree on specific common objectives to which competitors commit themselves, in spite of their rivalry in the market.

Multi-agency projects have longer lead times

Management of multi-agency projects needs experienced project managers and considerable co-ordination effort. It can be assumed that it takes longer to develop and test systems as the number of agencies involved increases.

Encryption/Error Handling

In relation to agency to agency communication and data sharing, encryption processing and error handling proved to be a more complex task than originally envisaged and was more difficult to do than the actual application development. It is important that sufficient time and resources be assigned to each to ensure successful development and implementation.

Importance of networking

The cooperation with other initiatives within the eBusiness Network of Finnish regions was very important for the eInvoicing initiative. A regional activity with comparatively little resources will often depend on close ties and cooperation with other regions, on sharing experiences and best practices, in order to create momentum.

Ensure interoperability of eInvoicing standards

A specific learning point for similar initiatives that target eInvoicing is to concentrate on standards and interoperability issues right from the beginning. The technical aspects and challenges must not be underestimated, as it is a rather new application that is not yet widely used. This issue will become even more important when eInvoicing is considered on a European scale. Interoperability of standards will be a key challenge to be addressed.

Critical success factors for IOP:

- *Creating some market pressure on companies appears to be a much more effective mechanism than pure awareness raising activity*
- *Involvement of all relevant stakeholders in order to agree on specific common objectives to which competitors commit themselves*
- *The more actors are involved the more time you need*
- *Encryption and error handling may use more time and resources than the actual development of the application*
- *Networking across regions may be more promising than based on the limited resources and outreach in the own one*
- *Agree on standards and interoperability right from the beginning as they are also the keys for cross border communication*

Collaborative testing

Prior to the launch of the service especially when the service is delivered by several parties, collaborative testing processes are needed to test the system 'end to end'. A time-frame and resources have to be provided to carry out full service provision testing. This has successfully been done by the LivingLab approach where results of the test are presented and discussed in terms of their implications.

Technical connectivity

Across companies and administration units lack of connectivity could exist based on differing IT systems. Moreover, old technology within these administration units and companies has to co-exist and be connective with new systems.

Critical success factors for IOP:

- *Collaborative testing of system end-to-end before going live (LivingLab)*
- *Solutions for lack of technical connectivity due to different IT systems used among involved parties and due to old technology that has to co-exist with new technology have to be found*

1.7 References and links

TIEKE has developed eInvoice Forum together with other players in the area. You can read more about it in http://www.tieke.fi/in_english/ebusiness/einvoice_forum/ (last visited on 16.11.2006).

European Commission, Enterprise Directorate General 2005: Impact Assessment of Regional & National E-Business Policies. Final Impact Assessment Report (http://www.e-busn.org/portal/content/documents/pdf/D4_impact_assessment_reportI_final.pdf). Last visited on 16.11.2006.

Annex 1: Assessment Questionnaire for the MODINIS Case Descriptions

In order to ensure that the case descriptions meet the information needs of stakeholders in interoperability at the local and regional level, we ask you to complete this short assessment questionnaire. Your feedback will be used to improve the next version of the present case and will also be taken into consideration when writing up more cases to be described in the course of the project.

Case being reviewed:

1.) Information content

a) Completeness of description

| | | |
|---------------------------|-------------------------|----------------------|
| 1 | ----- ----- ----- ----- | 5 |
| only few relevant aspects | | all relevant aspects |

b) Detail of description

| | | | | |
|-------------------------|----------|-------------|----------|------------------|
| 1 | 3 | 5 | 3 | 1 |
| ----- ----- ----- ----- | | | | |
| too general | | right level | | too many details |

2.) Length of description

| | | | | |
|-------------------------|----------|--------------|----------|----------|
| 1 | 3 | 5 | 3 | 1 |
| ----- ----- ----- ----- | | | | |
| too short | | right length | | too long |

3.) Structure / headings

| | | |
|----------|-------------------------|----------|
| 1 | ----- ----- ----- ----- | 5 |
| unclear | | clear |

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