How do electronic invoicing operators create value? Empirical evidence from Finnish and Italian operators

Esko Penttinen
Helsinki School of Economics, Finland
esko.penttinen@hse.fi

Alessandro Salgaro
Politecnico di Milano, Italy
alessandro.salgaro@polimi.it

Timur Haussila
Helsinki School of Economics, Finland
thaussila@gmail.com

Abstract

In this paper, we compare the differences in the value creation models of electronic invoicing operators. We apply the e-business value creation model by Amit & Zott (2001) and compare the four dimensions of value creation logics (efficiency, complementarities, lock-in, and novelty) between the main Finnish and Italian e-invoicing operators. Based on the in-depth interviews conducted with nine operators in Finland and ten operators in Italy, we find that the banks focus on delivering the market with a cost efficient way of transmitting electronic invoices. Out of the total sample of 19 operators, we were able to distinguish three players who outperformed in all the four dimensions. These were all large operators and market leaders in their respective countries. All of the 19 operators scored a higher-than-average on at least one of the four dimensions.

Keywords: Electronic invoicing, value creation, comparative case study

1. Introduction

Electronic invoicing has been recognized as one of the most important sources of productivity increases in Europe EEI (2007). Some European countries have been more active than others in enforcing the transition to electronic invoicing. As an example, since 2005, Denmark's public authorities primarily receive invoices in electronic format and this has been stipulated by law Brun (2007). The benefits of moving from paper invoices to electronic invoicing are clear. The Finnish State Treasury and some Finnish companies have estimated that an incoming paper invoice incurs costs amounting to 30-50 Euros to the receiver company. By moving to electronic invoicing, these costs can be lowered considerably. According to the European Associations of Corporate Treasurers (EACT), the resulting cost reductions in the supply chain expenditures total 243 billion Euros across Europe EEI (2007). In addition to the monetary savings, there are considerable environmental effects as the transition from paper bills to electronic invoicing in the EU alone would save over 14 million trees (estimates of, e.g., Pagero and PayItGreen).

Electronic invoicing is not something totally new. Invoices have been transmitted in electronic format for decades. Already in the 1970s, EDIFACT was used by large companies as a means to

exchange invoice data. These systems were point-to-point systems, and required somewhat heavy investments in establishing the connection between the two companies or organizations. In this paper, however, we leave these legacy systems out of our scope and define electronic invoices as invoices transmitted through XML-based open standards, e.g., Finvoice or the TEAPSSXML standard in the Finnish context. Our focus is on the automation of invoicing processes and this in turn requires that the invoice data is sent in a structured format. Therefore, invoices that are transmitted as attachments (PDFs etc) in e-mails are not considered as electronic invoices. This is because e-mail attachments do not allow for the invoice data to be automatically processed in the payment system.

In this paper, we compare the value creation models of electronic invoicing operators in Finland and in Italy. To do this, we have conducted interviews and gathered qualitative data from nine Finnish e-invoice operators and ten Italian operators.

The paper is organized as follows. After the introduction, in the second section, we develop the theoretical framework used in the study. In the third section, we present the research methodology. In the fourth section, we present the empirical findings from the case studies. In the remaining sections, we discuss the implications of the findings and present the conclusions.

2. Development of theoretical framework

The common objective in value creation is how to create value to offerings more successfully than the competition (Devlin, 2000). The question which elements are important in adding value becomes a key consideration in attempts to formulate strategies that enable to create and deliver superior value compared to competitors. Furthermore the value of the organization quantifies an organization's worth to owners as successfully implemented strategies will increase the value of the organization. In economic terms, value created is the difference between the benefit a firm provides to its consumers and the costs it incurs for doing so. Above mentioned concept of value considers value from the perspective of company whereas Woodruff (1997) and Porter (1985) focus more on analyzing the customer value. Woodruff (1997) states on perspective of customer value that is considers what organizations customers want and believe that they get from buying and using a seller's product (Woodruff, 1997). Moreover, Porter (1985) defines the value as the amount buyers are willing to pay for what a firm provides them and the value is measured by the revenue.

To examine the value creation models of electronic invoicing operators, we apply the Amit and Zott (2001) framework. The framework was developed to investigate how companies can create value through e-business in the emerging context of the Internet. The model distinguishes four sources of value creation in e-business: efficiency, complementarities, lock-in, and novelty. We consider these four dimensions are especially suitable for conducting research on the value creation of electronic invoicing. The dimensions portray many of the key aspects that are important in the domain of electronic invoicing. In the following paragraphs, we shed light on these aspects.

2.1 Efficiency

Transaction efficiency is one of the primary value drivers for e-business and the improvements in transaction/trade processes facilitate companies to create valuable services or goods for their

customers. Enabling customers to benefit from scale economics through demand aggregation, streamlining the supply chain and speeding up transaction processing often benefits both the vendors and customers. As the efficiency of a service provider increases the costs per transaction decrease. In other words, the greater the efficiencies enabled by a service, the lower the cost will be, and hence the more valuable it will be.

In terms of electronic invoicing, efficiency of the delivery process relates to the degree to which the delivery process is efficient in terms of speed and cost structure. Therefore, we define that a higher transaction cost per invoice leads to the lower efficiency. Transaction cost is divided into two parts: initial set-up cost for connecting to the system and the transaction fee charged per invoice. The network width is strongly related to the cost as the wider the network of the operators, the easier it is to reach their counterpart.

2.2 Complementarities

Complementarities exist when two product bundled together create more value than the total value of products separately. Porter (1996) argues that achieving fit between complementary activities leads to sustainable competitive advantage, because rivals will get little benefit from imitation unless they successfully match the whole system. In the resource-based theories complementarities are emphasized due to their role among strategic assets in source of value creation (Amit and Schoemaker, 1993) where as the network theory highlights the importance on complementarities among internal strategic assets as a source of value creation (Gulati, 1999). According to Amit and Zott al (2001), companies operating in the field of electronic business tend to leverage the potential that complementarities offers them, both by creating and offering these complementarities by the company itself or by developing a partner network for it. Furthermore, complementarities are likely to be protected from imitation by causal ambiguity because the firm is in a better position to obtain knowledge about the interaction among activities than outsiders.

In terms of electronic invoicing, complementarities refer to the need to develop complementary services alongside the delivery process. Typically, these services complement the actual delivery process. Examples of these services are archiving services and workflow systems. We argue that operators providing these complementary services tend to create more value than the operators that do not provide these complementary services.

2.3 Lock-In

By definition, lock-in consists of methods that prevent customers and strategic partners to migrate to competitors. Value is created by motivating customers to engage in repeat transactions and maintaining and improving the network of strategic partners. The repeat transactions tend to increase transaction volumes. The association of strategic partners results in both customers' motivation to pay for the service and increased motivation for the partners to stay in the network (Amit and Zott, 2001). The two main components that create lock-in are switching costs and positive network externalities (Amit and Zott, 2001; Farrel and Klemperer 2006). The network externalities can be both positive and negative effects that the users' actions have on another one's welfare (Milgrom & Roberts, 1992). According to Farrel and Klemperer (2006), the network effects arise when a user wants compatibility with other users so that he/she can interact or trade with them, or use the same complements.

In terms of electronic invoicing, here, lock-in relates to the degree to which the operator uses customization and progressive pricing to create switching costs. The operator may also set a minimum duration of the contract and thus prevent their customers from migrating to competitors.

2.4 Novelty

Traditionally sources of value creation through innovation have been introductions of new products and service, new methods of production, distribution and entry to new markets. Possibilities created by information technology have emphasized companies to innovate in the ways they do their business since virtual markets make possibilities of innovation almost endless. For example, novelty can encompass new participants in the transaction, new content in the transaction or, as mentioned, and a new overall structure of the transaction. There are several ways in which e-business can create novelty for a firm. Being the first to launch a service or product can create first-mover advantage for a company innovators may benefit from their past actions even when market has become mature. Being the first or considered as patriot in an industry makes it easier to capture mindshare, create brand awareness and reputations, and furthermore to create switching costs. (Amit and Zott, 2001)

In the case of electronic invoicing, novelty means innovating new kinds of services alongside the electronic delivery process. We also argue that by participating to the national and international discussion on the standardization issues on electronic invoicing, the operator can increase their ability to create value through novelty.

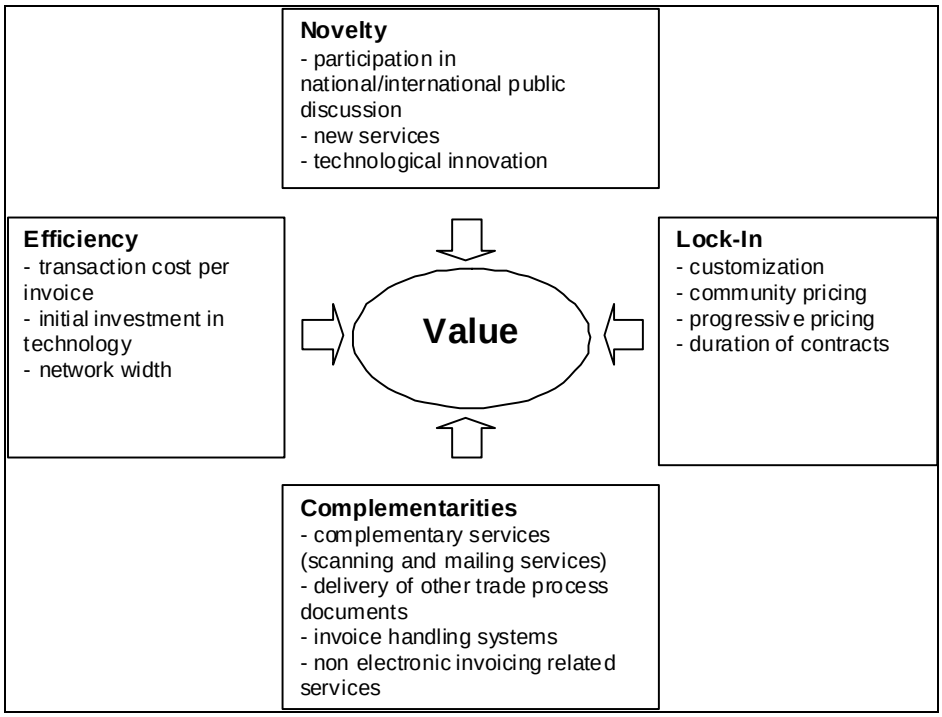

Figure 1. Conceptual framework for the study (adapted from Amit and Zott 2001)

2.5 Operationalization of the constructs

To operationalize the constructs of the theoretical framework to the context of electronic invoicing, we conducted expert interviews and derived the following set of measures. A one-to-five scale has been adopted for all the operationalized constructs, in order to have a more homogeneous outlook and more readable charts.

Table 1. Operationalization of the constructs

Construct	Operationalization	Description/question	Scale	Source
Efficiency	Transaction cost per invoice	What is the full cost of one invoice to be delivered including the transmission cost and the eventual translation cost?	1 = high, 5 = low	Expert interviews
	Initial investment in technology	What is the start-up cost of implementation of electronic invoicing system?	1 = high, 5 = low	
	Network width	How many customer companies are connected to the network?	1 = low, 5 = high	
Complementarities	Converting paper invoices to electronic data and vice versa: Scanning and mailing services	Does the operator provide scanning services (paper invoices scanned into electronic format) and mailing services (printing paper invoices and mailing them to customers that are not yet in the e-system)?	1 = no, 3 = service by others, 5 = yes	
	Payment services and invoice credit services	Does the operator provide payment initiation, reconciliation, and credit services?	1 = no, 5 = yes	Expert interviews
	Other trade process documents (EDI services)	Does the operator allow the delivery of other than e-invoicing trade documents?	1 = no, 3 = some documents, 5 = all the trade process documents	
	Invoice handling systems	Does the operator provide document handling systems such as workflow management systems (e.g. internal invoice handling workflow systems)?	1 = no, 3 = basic, 5 = advanced workflow	
	Non electronic invoicing related services (tax payment, credit collection etc.)	Does the operator provide tax payment services? Does the operator provide credit collection services?	1 = no, 5 = yes	
Lock-in	Customization	How customized is the operator offering to its customers in terms of interface and mapping?	1 = low, 5 = high	
	Community pricing	Does the operator charge extra fees for the invoice sent to other operators?	1 = no, 5 = yes	
	Progressive pricing	Does the operator use progressive pricing (e.g. smaller transaction fees for large quantities of invoices)?	1 = no, 3 = not always, 5 = yes	
	Duration of contracts	What is the minimum duration of the contract?	1 = short, 5 = long	
Novelty	Participation in national/international public discussion	How much the operator participates to national/international discussion on standardization of electronic invoices?	1 = not involved, 5 = higly involved	

	New services	Does the operator have distinctive new services in its product range?	1 = no, 3 = few, 5 = many	Amit & Zott (2001)
	Technological innovation	Does the operator innovate new technologies (e.g. any format in any format out technologies)?	1 = no, 5 = yes	
	Year of launch	When did the operator initiate electronic invoicing services?	1 = 2004->, 3 = 2000-2003, 5 = -2000	
	Responsiveness	How fast does the operator react to changes (e.g. legislation changes, customer requests)?	1 = slow, 5 = fast	

The above measures were used in the empirical part of the study to distinguish differences between the operators. We next describe the research methodology used in the study.

3. Methodology and Research Process

The study was conducted using case study methodology. The case study methodology is preferred when "how" or "why" questions are being posed, investigators have little control over events, and the focus is on a contemporary phenomenon within real-life context (Yin, 1994). According to Yin (1994), the case study is an empirical inquiry that investigates a contemporary phenomenon within the real-life context, especially when boundaries between phenomenon and context are not clearly evident. It is a form of investigation of a certain empirical topic by following a set of procedures specified before the launch of the investigation (Yin, 1994).

In our research, the use of the case study methodology was especially appropriate as electronic invoicing is an emerging field of business and it is not clearly defined by everyone. As an example, we wanted to make sure that the respondents understood that the topic of research was pure electronic invoicing and not, for example, transmission of invoice data in pdf-attachment or EDI exchange. In our research, we defined electronic invoicing as invoice data transmitted directly to the payment system of the receiver in a structured electronic format. As a result, the use of the case study methodology and interviewing the key informants in the organization was seen as the best way to proceed with data collection.

The research process followed the following path. First, we identified the research problem which was to examine the value creation models of electronic invoicing operators. A secondary research objective was to explore the differences between the Finnish and Italian operators. Second, we identified the value creation model by Amit & Zott (2001) as a fruitful basis to conduct the research. Third, we conducted expert interviews to operationalize the conceptual framework. These experts consisted of practitioners from business and government sector working on electronic invoicing issues. We also interviewed academic experts working on invoicing and billing issues. Fourth, we contacted the operators and conducted interviews in order to gather data based on which we could evaluate each of the value creation components.

4. Empirical Study

In the empirical part of our study, we interviewed nine Finnish operators and ten Italian operators. We interviewed marketing managers and directors of the business area. Concerning the Finnish

sample, three of the interviewed operators were banks and six of them were IT operators. The Italian sample consisted of three banks and seven IT operators. In the interviews, we first asked some background questions concerning the operator. We then proceeded to asking more specific questions concerning the services the operator offers to the market. Finally, we asked questions concerning the market and how the operator sees its market offering compared to the other players in the field of electronic invoicing. The interview questionnaire used in the Finnish study can be found in appendix 1. The Italian study followed a very similar questionnaire.

For each operator and for each dimension (efficiency, complementarities, lock-in, novelty), we calculated the average value which was used in the comparison tests. These comparison values were normalized subtracting the country specific average and dividing by the country specific standard deviation. This was done to assure data purity concerning possible bias in the countries. The normalization was done on all the following tests except the last one comparing the differences between the Finnish and Italian operators. The data were gathered by two different research groups, one per country studied (Finland and Italy).

4.1 Differences between banks and IT operators

First, we were interested in finding out the differences in the value creation models of banks vs. IT operators. To do this, we combined the data on Finnish and Italian banks and combined the data on Finnish and Italian IT operators. The results are illustrated in the following chart (Figure 2).

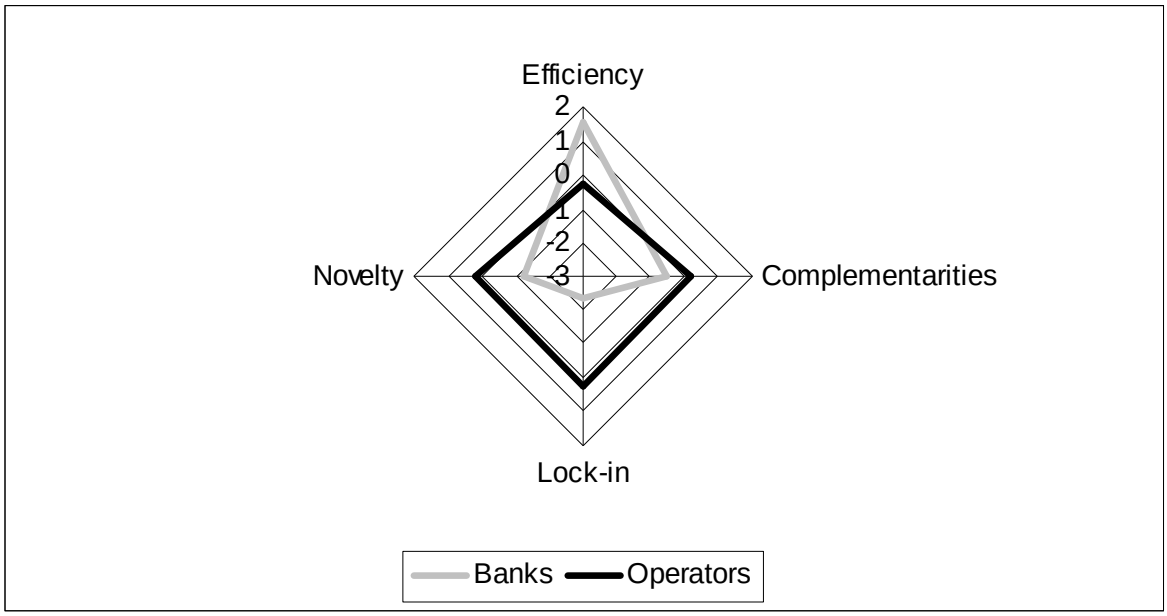

Figure 2. Comparison between banks and IT operators

The results show that the banks' value creation logic in terms of electronic invoicing is mainly based on creating cost efficient means of transferring the invoice data. The banks are thus not so much interested in creating long-term relationship and lock-in, nor in providing new services and complementary services other than payment services. On the other hand, the IT operators, on average, use a much more balanced value creation model. The chart above describes the aggregate results of the IT operators. Next, we take a closer look at the clusters of IT operators.

4.2 Differences between operators (other than banks)

In the second phase of our analysis, we wanted to find out whether there are differences in the way the IT operators create value in electronic invoicing.

4.2.1 All round players

First, we wanted to illustrate the operators that performed well on every dimension. To do this, out of the total sample of 19 operators, we selected the three operators who scored above average on all four dimensions. Figure 3 presents these operators.

What is common to all of these three companies is that they are all large companies and market leaders in their respective domestic markets. They are all operating mainly in the business to business market and electronic invoicing represents only a part of the company's market offering. We could conclude that these players are all round players with a wide range of different kinds of product offerings related to the digitalization of business transactions.

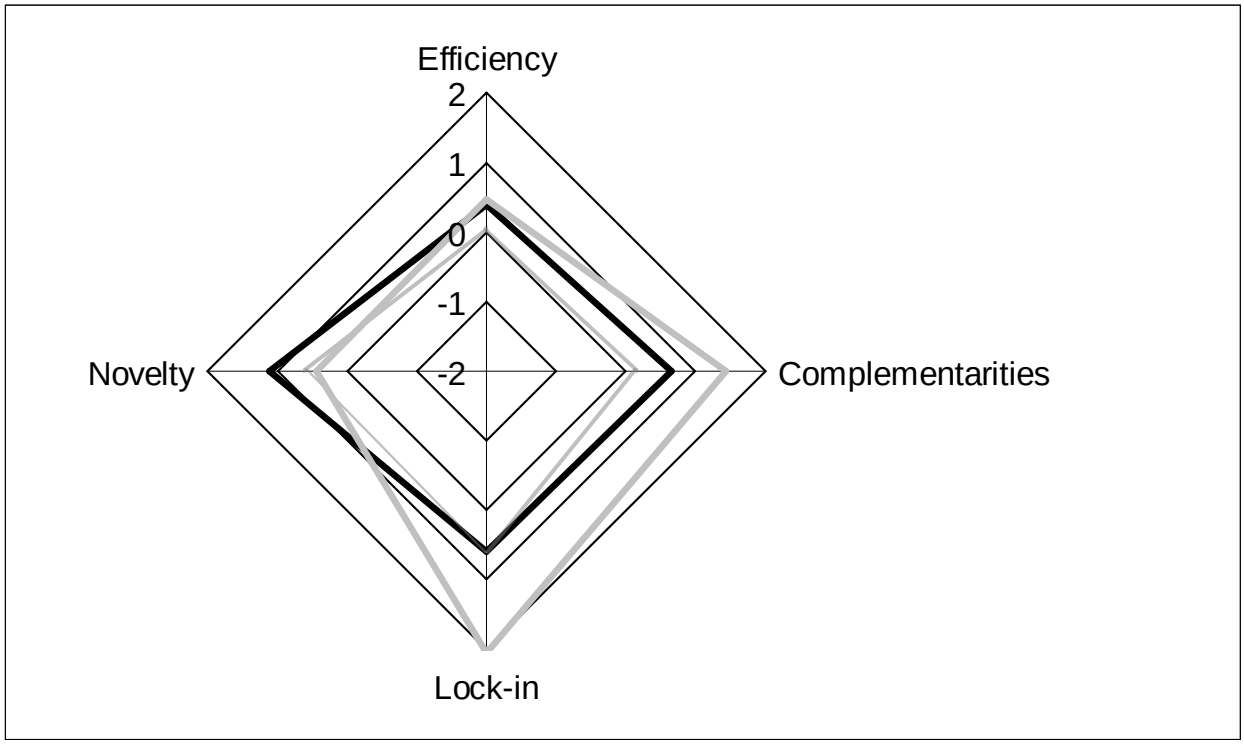

Figure 3. Allround players (IT operators)

4.2.2 Invoice-focused operators

Next, we wanted to take a look at those operators who are focusing on electronic invoicing only and, therefore, score low on complementarities. Four operators fit this requirement and they are depicted in the following chart (Figure 4).

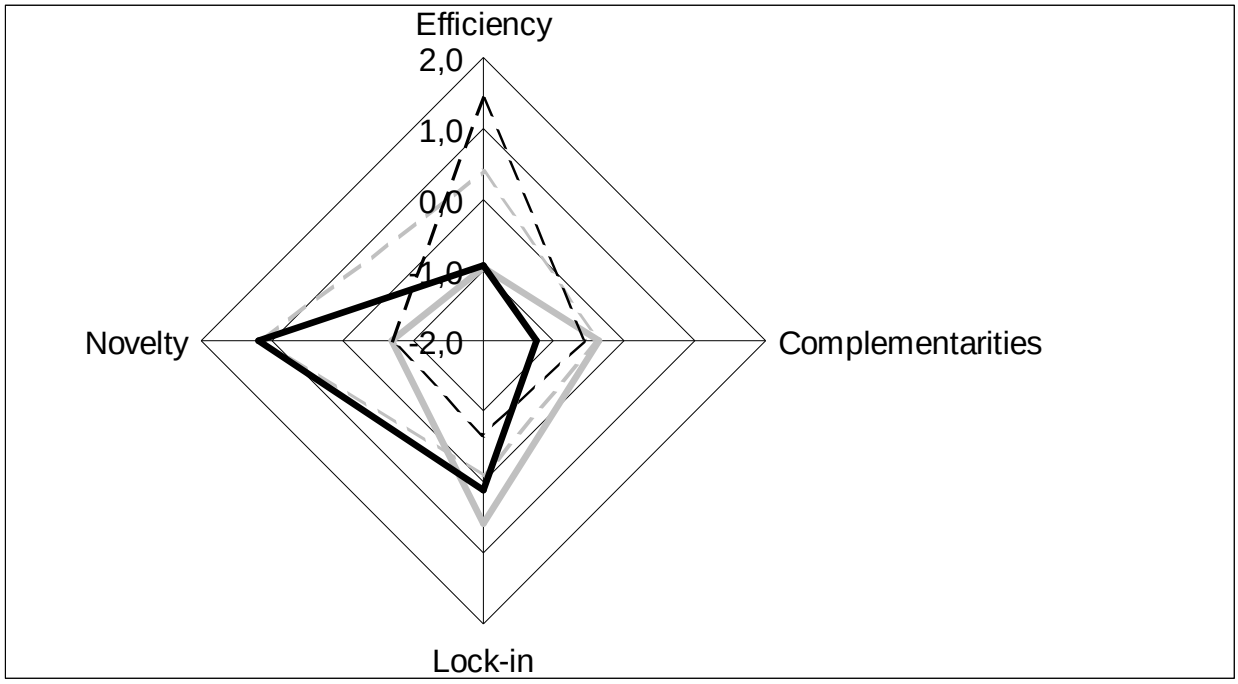

Figure 4. Invoice-focused IT operators

The results show that, surprisingly, these operators differ greatly in their value creation logics. One of them generates value mainly through cost efficiency and low transaction costs. Two of them are highly innovative and one of them mainly focuses on creating lock-in. This suggests that the market is still very open and also pure e-invoicing operators have space to differentiate.

4.3 Differences between Finnish and Italian operators

Finally, we wanted to examine the differences between the Finnish and Italian operators. The following chart presents the averages of the Finnish and Italian operators including banks. The numerical values used in this chart are not normalized.

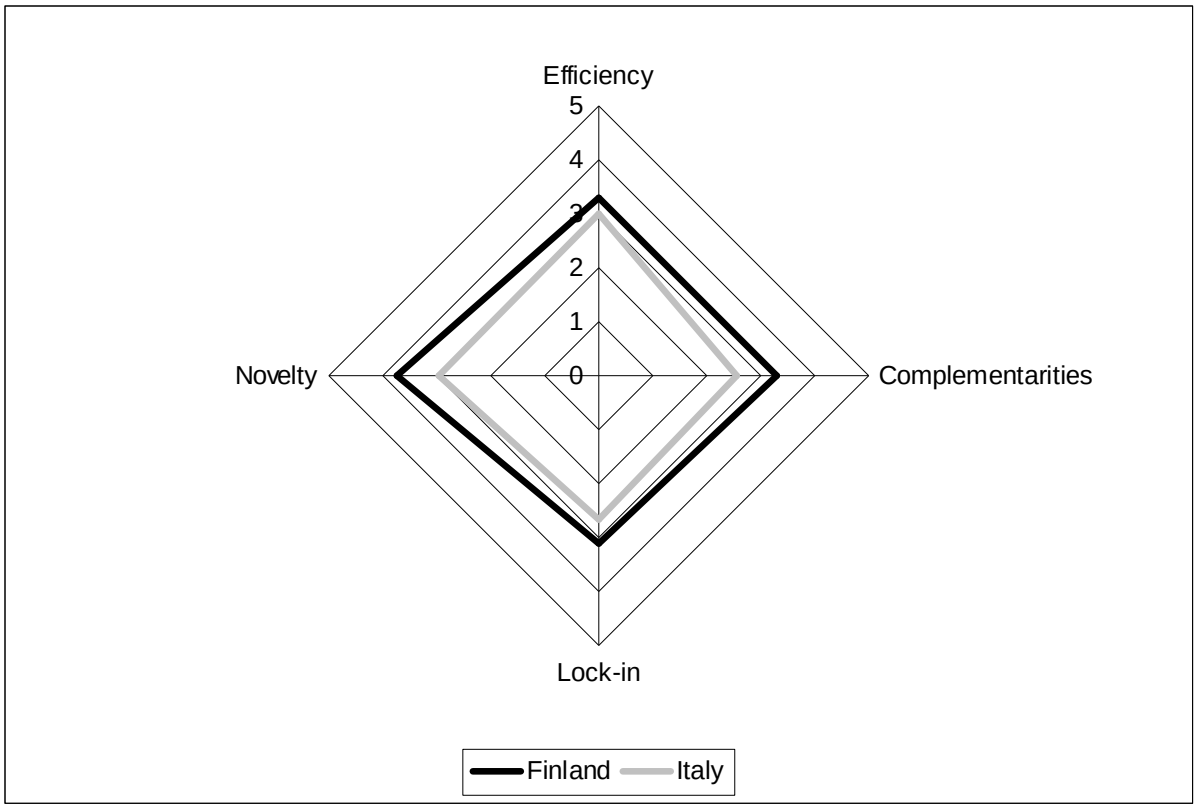

Figure 5. Comparison between Finland and Italy

We can see that Finland scores slightly higher values on each of the four dimensions. The greatest difference is on the novelty dimension, meaning that Finnish companies are more involved into international discussions and tend to consider innovation more important. Italian operators tend to be more reactive. As of today, electronic invoicing has not diffused in Italy. In Finland, the penetration of electronic invoicing in the business to business domain is around 20%. We interpret that this difference in the diffusion of electronic invoicing explains why Finland scores slightly higher values on each of the dimensions.

5. Discussion and conclusions

In this paper, our objective was to study the differences in electronic invoicing operators' value creation models. To do this, we selected the value creation model by Amit and Zott (2001) and interviewed 19 operators in Finland and in Italy, assessing the different aspects of value creation. We operationalized the Amit and Zott (2001) framework in the case of electronic invoicing and derived a set of comparison values for each of the operators. We then conducted comparison tests.

Our main findings indicate that – first – the banks offer a cost efficient way of transmitting invoice data. With their services, the banks have targeted especially the small and medium sized companies who want to send electronic invoices cost efficiently and want to avoid lock-in situations. In this way, the banks are leveraging the existing network they have created for payment transactions. Second, we found considerable differences in the value creation models among the operators. All of the operators scored at least better than average on one of the

dimensions, meaning that there are different focus areas on value creation. Third, we found that the average score for Finnish companies was slightly higher in all the dimensions. This reflects the more mature market of electronic invoicing in Finland.

The main limitation of this study is the number of empirical observations. We conducted interviews among 19 operators representing around 40% of the total operator market. We mainly focused on large operators. Operationalization of the constructs used in this study needs refinement and further testing. We have already initiated iterative improvement process within the EU expert group on electronic invoicing. Further studies could further develop, test, and eventually validate the Amit and Zott (2001) model in the case of electronic invoicing.

References

1. Amit, R. and Schoemaker, P. "Strategic assets and organizational rent," *Strategic Management Journal*, (14:1), 1993, pp. 33-46
2. Amit, R. and Zott, C. "Value Creation in E-Business," *Strategic Management Journal*, (22), 2001, pp. 493-520.
3. Brun, M. (2007) Electronic Invoicing to the Public Sector in Denmark, http://www.epractice.eu/cases/EID, accessed 29.11.2007.
4. Devlin, J. "Consumer evaluation and competitive advantage in retail financial services," *European Journal of Marketing*, (35:5), 2001, pp. 639-660.
5. EEI (2007). European Electronic Invoicing http://ec.europa.eu/enterprise/ict/policy/standards/einvoicing/2007-07-eei-final-rep-3-2.pdf, accessed 28.3.2008.
6. Farrell, J. and Klemperer, P. Coordination and Lock-In: Competition with Switching Costs and Network Effects, *CEPR Discussion Paper* No. 5798, 2006.
7. Gulati, R. "Network location and learning: the influence of network resources and firm capabilities on alliance formation," *Strategic management Journal*, (20:5), 1999, pp. 397-420.
8. Milgrom, P., and Roberts, J. *Economics, Organization, and Management*, Prentice-Hall, Englewood Cliffs: NJ, 1992.
9. Porter, M. E. *Competitive Advantage*, The Free Press. New York, 1995.
10. Porter, M. E. "What is a strategy?" *Harvard Business Review* (November-December), 1996, pp. 61-78.
11. Woodruff, R. "Customer value: The next source for competitive advantage", *Journal of the Academy of Marketing* (25:2), 1997, pp. 139-153.
12. Yin, R., *Case Study Research: Design and Methods*, Sage Publications, Thousand Oaks, CA, 1994.

Appendix 1

Interview questions

Background questions

1. What is your definition of about e-invoice
2. What kinds of solutions related to e-invoicing your company offers
3. To which standards your e-invoicing service is based on? Is the use of other standards possible?
4. When did your company start to offer e-invoicing services?
5. How many person in your company are specialized in e-invoicing

Services

1. Of which services your operator services consist of? Can you describe the typical customer case?
2. Are the operator services only component of other services, or are they marketed independently
3. Do you offer integration services to third party solutions, such as different ERP solutions?
4. Are your services customized separately for every customer or are the implementation mostly standardized?
5. How are the operator service priced? How do you measure the quality of your service?
6. Does your company provide service to connect links to other operators, or is it customers responsibility to do this?
7. Does your company create new innovative e-invoicing services?
8. Do you participate in research and public discussion about e-invoicing?
9. Does your company take part to standardizing e-invoicing

Markets

1. Are your service aimed for a some specific customer group
2. For how many company you currently offer operator services
3. How many e-invoices are transmitted each month
4. In which countries you offer e-invoicing service? How do the markets differ from each others
5. What is your market share in your operating countries?
6. Who are your main competitors in different countries?
7. How do you differ from your competitors?

Appendix 2

Interviewed companies

Finland	Core business	Founded	Revenues	Market share	Personnel
Nordea	Banking				
OP	Banking				
Sampo	Banking				
Basware	Financial management	1985			
Enfo	Information logistics, IT outsourcing, printing and scanning	1964	$140 million		
Itella	Information logistics, printing and scanning	1638 (as the postal office)			
Liaison (Anilinker)	Information logistics				
Logica (WM-data)	Information logistics				
TietoEnator	Information logistics, IT outsourcing, supply chain integration		1.8 billion		
Italy					
Unicredit	Banking				
BNL	Banking				
Intesa Sanpaolo	Banking				
Intesa	Supply chain integration, printing and scanning, Certification authority	1987			
Credemtel	Banking system service provider, Software provider	1989			
Sia Ssb	Banking system service provider, Software provider	2007 by the merge of SIA and SSB			
Sterling commerce	Supply chain integration, software provider	1975			
Tesi	Supply chain integration, software provider	1995			
Comdata	Printing and scanning, paper and electronic archiving	1987			
eBilling	Printing and scanning, electronic archiving	2001			