

# THE IMPACT OF ELECTRONIC DATA INTERCHANGE AND E-INVOICING ON BUYER-SELLER RELATIONSHIPS IN BUSINESS-TO-BUSINESS MARKETS

Information Systems Science  
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THE IMPACT OF ELECTRONIC DATA INTERCHANGE AND E-INVOICING  
ON BUYER-SELLER RELATIONSHIPS IN BUSINESS-TO-BUSINESS  
MARKET

RESEARCH OBJECTIVES

The objective of this thesis is to determine the influence of technology (Electronic Data Interchange and Electronic Invoicing) adoption and implementation on buyer-seller relationships in the business-to-business market.

In addition, this study aims to identify if the impact on the buyer-seller relationship differs depending on whether the company implementing electronic invoicing is an EDI-user or whether a non-EDI company is adopting digitalization from scratch.

As a theoretical framework, this study applies the taxonomy designed by Cannon and Perreault. The framework has been tested and found appropriate in an earlier research examining the impact of electronic invoicing on buyer-seller relationships in the business-to-business market. The empirical part of this thesis focuses on identification of changes in the business-to-business relationships along the corresponding framework dimensions.

RESEARCH METHODS

The methodology applied in this thesis is qualitative. The research comprises the study of three case companies that operate in different fields, such as textile production and marketing, machinery and power plant building, and airlines.

SOURCE MATERIAL

The sources used for this thesis comprise relevant articles and publications available on the Internet, journals and magazines. The material for the empirical part of the research was gathered through in-depth interviews of key personnel, and additional questionnaire e-mailed to the case companies.

RESULTS

Based on the results of this study, we can say that the implementation of electronic invoicing affects the various aspects of the business-to-business relationship with different strength. The research supported no assumption that there would be a difference in the impact of the implementation of electronic invoicing between an EDI user and a non-user. Furthermore, we found that electronic invoicing implementation in each case was driven forth by a supportive function, such as finance and/or accounting department. The process has been initiated and implemented by a supportive function regardless of the existence of EDI in the core business (business units).

KEYWORDS

E-invoicing, EDI, buyer-seller relationship, business-to-business markets

ORGANISAATIOIDEN VÄLISEN TIEDONSIIRRON JA SÄHKÖISEN  
LASKUTUKSEN VAIKUTUS YRITYSTEN VÄLISIIN SUHTEISIIN  
YRITYSMARKKINOILLA

Cases: Wärtsilä, Finnair, Marimekko

### TUTKIELMAN TAVOITTEET

Tutkielman tavoitteena on tunnistaa ja analysoida organisaatioiden välisen tiedonsiirron (OVT) ja sähköisen laskutuksen käytön vaikutusta yritysten väliseen suhteeseen yritysmarkkinoilla. Lisäksi, tarkoituksena on tutkia onko vaikutus erilainen niissä yrityksissä, joissa ennen sähköisen laskutuksen käyttöönottoa on ollut käytössä OVT verrattuna yrityksiin, jotka siirtyivät sähköiseen laskutukseen paperilaskutuksesta.

Tutkimuksen työkaluksi on valittu Cannon ja Perreaultin luoma teoreettinen kehys. Tämä kehys oli sovellettu aikaisemmassa samaa aihetta käsittelevässä tutkimuksessa, joka tutki yritysten välistä suhdetta myyjän näkökulmasta. Tutkielman empiirinen osuus tutkii yrityssuhteiden muutoksia teoreettisen kehyksen määrittelemien ulottuvuuksien mukaan ostajan näkökulmasta.

### TUTKIMUSMENETELMÄ

Tutkimusmenetelmäksi on valittu kvalitatiivinen tutkimus – case menetelmä. Empiirinen osuus käsittää kolme eri alan yritystä, josta yksi edustaa design ja tekstiilituotantoa, toinen energia-alan laitteiden valmistusta, ja kolmas on lentoyhtiö.

### AINEISTO JA LÄHTEET

Tutkimuksen lähteenä ovat käytetty ajankohtaiset julkaisut ja tutkimukset. Internetistä saatavana olevat lähteet, kuten laatumarkkinatunnettujen aikakauslehdet ovat laajasti käytetty niiden ajankohtaisuuden takia. Tietoa on kerätty case-yritysten avainhenkilöiden haastatteluista ja yrityksille lähetetyistä lisäkyselyistä.

### KESKEISET TULOKSET

Keskeisen tutkimustuloksen mukaan, sähköisen laskutuksen käyttöönotolla on yrityksille moniulotteinen vaikutus yritysten väliseen suhteeseen; myös, vaikutuksen voimakkuus eroaa toisistaan. Tämä tutkimus ei löytänyt vahvistusta olettamukselle, että sähköisen laskutuksen käyttöönotto yrityksessä edellyttäisi organisaatioiden välisen tiedonsiirron käyttöä entuudestaan. Tutkimus indikoi, että digitalisointia ajava taho kaikilla case-yrityksillä on ollut talousosasto, eikä ydintoiminnot. Sähköinen laskutus otettiin käyttöön talousosaston toimesta, siitä riippumatta oliko ydintoiminnoilla käytössä organisaatioiden välinen tiedonsiirto tai ei.

### AVAINSANAT

Sähköinen laskutus, OVT, yritysmarkkinat, ostajan ja myyjän välinen suhde

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## 1 Introduction

### ***1.1 Background of the research***

This thesis is a part of the research conducted within the Full SEPA (Single Euro Payments Area) project, which is the first phase of the Real-Time Economy (RTE) program. This four-year program is co-funded by and carried out in collaboration with the Helsinki School of Economics, TietoEnator and TEKES. (Penttinen, 2008)

The Real-Time Economy is not something completely new, and by definition, it is an environment where all business transactions are conducted in the real-time without any storing or forwarding procedures. The first phase of the RTE program – Full SEPA focuses on the systems providing electronic payment and invoicing, though in general, RTE comprises also other processes than financial procedures, e.g. taxation, customs, ordering and accounting.(ECB, 2006)

The relevance of the subject is justified by versatile reasons. The SEPA project represents “end-to-end straight through processing” that will foster European integration, enable international payments to be handled as domestic ones, and therefore fade national and cross-border differences. In addition to substantial economical benefits, this integration will improve competitiveness, innovativeness and quality of the customer service. Although SEPA is not a one-shot project, it is only the first step in the RTE program, followed by other operations such as electronic ordering, electronic accounting, electronic auditing and electronic taxation. (ECB, 2006)

This thesis focuses on the electronic invoicing and analyses its impact on the business-to-business relationship through the prism of the determined relationship connectors. The early research conducted by Tuija Salomäki examined the same subject from the seller point of view in the context of the one company. Despite the same research question, the approach of this study obtained a slightly different angle in the part related to the starting point in the movement process towards electronic invoicing. Here, we put emphasis on

the differences and similarities in the transformation process between companies that move from paper invoicing to the electronic format and companies that implement electronic invoicing in addition to EDI (Electronic Data Interchange) system. Furthermore, the relationship between partners reflects benefits and losses obtained from digitalization process. These benefits and losses are drawn on the perceived advantages and disadvantages of the electronic invoicing and EDI implemented in companies.

This subject attracted me, because I have some experience of working in the business-to-business environment on the seller and customer sides participating in the implementation of the electronic invoicing process. It seems to be of the great interest to explore and compare the implications on the relationship between business partners taking into consideration the difference of their EDI and non-EDI backgrounds.

## ***1.2 Objectives and research questions***

The objective of this study is to explore and examine the implication of electronic invoicing process on the business-to-business relationship given the different electronic backgrounds of the case companies. In the relationship, the seller represents a producer or supplier and the buyer represents a customer. This research is conducted by analyzing technology implication in each particular case from the buyer's point of view. It was stated by Cannon and Perrault (1999) that it is the customer, who ultimately makes a decision whether to purchase from the supplier or not. Even if the supplier and buyer have different views regarding their relationship, it is the customer's view is likely to be a determinant.

This study aims to answer the question:

What is the implication of electronic invoicing on the business-to-business relationship?

In order to answer the main question, we designed the set of sub-questions.



The theoretical part of the research discusses the sub-questions on the conceptualization of the interaction between business-to-business partners, the main theoretical approach to their relationship, the impact of electronic invoicing based on the earlier research and current situation on the business-to-business market (including EDI and e-invoicing models).

- What is the main theoretical approach to business-to-business relationship?
- What are the inter-organizational relationship factors affected the adoption and implementation of EDI?

The empirical part of the thesis establishes questions from the operational point of view.

- What impact does the digitalization of invoices make on business-to-business relationship?
- What advantages and disadvantages does the digitalization of invoicing generate? (see also Salomäki, 2008, p.3-4)
- How the implication of digitalization differs depending on whether the company implementing electronic invoicing is an EDI-user or whether a non-EDI company is adopting digitalization from scratch?

### ***1.3 The scope of the research and limitations***

This research focuses on the implication of electronic invoicing on the relationship between the seller and buyer from the buyer's point of view. The empirical part of the research examines three case companies that differ by an industry, size, organizational structure and technology stage. Therefore, the companies' invoicing volume and value are also different. Some of the companies have a long experience of operating EDI with their partners, some moved to electronic invoicing from processing paper invoices. In addition, this research identifies the advantages and disadvantages of EDI and e-invoicing implementation in the case companies.

In the earlier research, the author stated that the study on the first case was preliminary and had some limitations. Firstly, that study focused on a single supplier in the textile service sector. Secondly, there might be a considerable difference in views on the relationships between a supplier and customer; therefore, it has been seemed more practical to study the relationship only from one side. Thirdly, the study suffered the timeframe limitations and difficulty of finding customers willing to participate in the study. (Salomäki, 2008)

This research as well experienced some timeframe limitations and difficulty in finding case companies. In opposite to the previous research case study, this research is carried from the buyer's point of view. There might be considerable differences in the views on the relationships between not only a supplier and customer, but also internally, between purchasing and sales departments within the same company.

In addition, the analysis of the impact on the supplier's performance evaluation has been left out of the scope, as the profound examination of the supplier's satisfaction requires conducting wider research within suppliers of the case companies.

#### ***1.4 Methodology and earlier research***

The theoretical part of the thesis introduces some theories applied in the earlier research. The subject was mainly investigated from the economical point of view (i.e. applying Transaction Costs Theory) by examining monetary savings or competitive advantage. The previous research (Salomäki, 2008) examined the impact of electronic invoicing on the business-to-business relationship by applying a framework designed by Cannon and Perrault. That research was based on information acquired from the journals and magazines due to the relevance of these sources.

For the empirical part of the research, this thesis applies a qualitative method. Soy (1998) claims that case study research is an excellent tool for to an understanding of a complex

issue or object. In addition, the case study research method provides the necessary tools for analyzing each case company within context of a theoretical framework, as well as to compare findings between cases.

As the cases study are based on the open-end interviews, additional questionnaires sent to the key personnel and some internal information available from the case companies, the qualitative method better fits the purposes of this study. In addition, the study uses results acquired from the earlier research (Salomäki, 2008) that applied qualitative methodology for examining the case company Lindström.

### ***1.5 Structure of the research***

This research comprises two major entities: a theoretical part and empirical research. Starting with introduction, the second chapter of the theoretical part presents a short overview of the previous research on the subject and some theories applied in this research. Therefore, it introduces the theoretical framework created by Cannon and Perrault in 1999 that comprises six relationship connectors. Further, in the chapter, each of the key connectors is defined and reflected on the findings obtained from the earlier research. In addition, this chapter describes the buyer-seller relationship in the market, and discusses the aspects of the business-to-business relationship, its formation and instances. The chapter continues with the literature overview concerning business-to-business relationship, and moves to the factors influencing the adoption and implementation of Electronic Data Interchange.

The third chapter discusses digitalization of the invoicing process. The chapter begins with a definition and process overview of EDI (Electronic Data Interchange), its technological aspects, presents standardization issues, as well as advantages and disadvantages of the application for a user. Further, the chapter presents the definition of electronic invoicing and technology overview, describes the models applied in business, and statistics related to the implementation of electronic invoicing in the companies.

The fourth chapter presents methodology applied for the research.

The empirical part of thesis starts in the fifth chapter. The chapter provides a short introduction on the case company of the earlier research and findings obtained from it. Each subchapter begins with the background of a particular case company and corresponding objectives and predecessors for the implementation of electronic invoicing. Therefore, the subchapter introduces outcomes from the digitalization, and presents findings drawn on the research question. Each subchapter provides a short summary on the case company study.

The sixth chapter presents the comparison of implications associated with the implementation of electronic invoicing in case companies, given the different electronic backgrounds of the companies. Finally, the chapter outlines findings of the research, presents conclusions and suggestions for the future research.

## **2 Theoretical approach to buyer-seller relationship**

This chapter presents the model designed by Cannon and Perrault, representing taxonomy of the aspects that will be projected onto the buyer-seller relationship. In addition, this chapter provides a short overview of the most important theories, focusing more precisely on Transaction Cost Theory, because of commonality of theory's constructs with a model applied in this thesis.

The inter-organizational relationship, i.e. the business partnership between trading partners was analyzed in various research. The aspects emphasized by researchers differed, as well as, applied theories and models. The key theories used in the research on business relationships are Resource Dependency Theory, Transaction Cost Theory and Social Network Theory.

The main construct of the Resource Dependency Theory is power of one organization upon another. The Resource Dependency Theory proposes that actors (organizations) lacking in essential resources, in order to obtain needed resources, are seeking to establish relationships with those who are abundant. The organizations are viewed as coalitions altering their structure and behavioral patterns to acquire and maintain needed external resources. The organizations acquire external resources in order to decrease their dependency on others, as well as, to increase dependency of others on them, modifying, therefore, the organizations' power with other organizations. Originally, the theory has been formulated to examine relationships between organizations, but it is also applicable to the relationships between the business units within organizations. (York University)

The Social Network Theory proposes social relationships in terms of nodes and ties, and therefore, displays the relationship concepts as a social network diagram, where nodes are the points, and ties are lines. The social networks have been used to examine the inter-organizational interaction, as well as, associations and connections between individual employees at the different companies. These networks provide companies with the ways for to gather information, tackle competition and benefit from price and policy setting. (York University)

The Transaction Cost Analysis (TCA) is the dominant theoretical framework employed in the literature to model variations in governance structures. TCA provides the efficiency-based guidelines to determine which governance structure would be appropriate for which type of task, and tries to align a governance structure with transactions required for the performance of the task. (Bello, Dant and Lohtia, 1997)

## ***2.1 Transaction Cost Theory***

According to some theorists, the total costs in a company can be divided into transaction or coordination costs, comprising all the information necessary to coordinate the work of people and machines involved in primary process, and production costs that are costs

evolved from a primary process, consisting of all the costs necessary to create and distribute produced goods or services. (York University)

In economics and related disciplines, transaction cost is a cost incurred in making an economic exchange. There are different kinds of transactions costs: costs of search and information, bargaining costs, policy and enforcement costs and so forth. The search and information costs comprise costs caused by search for the best supplier, partner, customer, price level or availability of goods on the market. The bargaining costs imply costs associated with establishing of the “tamper-proof” contract meaning the achieving of the appropriate agreement with other party. The policy and enforcement costs are the costs of monitoring and enforcing the implementation of the contract. (York University)

The Transaction Cost Theory suggested that the costs and challenges associated with market transactions favor sometimes hierarchies (or in-house production), yet sometimes – markets as an economic governance structure. A new governance structure is the recently emerged intermediary (hybrid), in other words it is a relational mechanism between these two extremes. (York University)

Drawing on Williamson (1991), the manner in which the performance of a specific task is organized and allocated by a firm describes the governance structure for that task. The hierarchy governance structure is in question when a company performs tasks within its boundaries through bureaucratic control and coordination; meanwhile the market governance structure evolves when tasks are performed outside the company through market coordination and outsourcing. The hybrid governance structure is taking place when the performance of the tasks by economic units within boundaries of a company and economic units outside the company is carried out jointly.

The Transaction Cost Theory also conceptualizes the intra-organizational production as series of activities linked by transactions. According to Spraaakman (1997), transactions are directed by market price. In the intra-organizational context, an activity is the partial production of a good or service, while a transaction is that stage in the activity series

when one activity ends and another one begins. Thus, the hybrid or relation occurs when goods or services are transferred between divisions.

In context of the inter-organizational relationships, the transaction costs are generally defined as the costs of writing, monitoring, and enforcing contracts. Williamson (1981) argues that transaction costs arise from transaction specific assets, environmental uncertainty and internal uncertainty, whether transaction specific investments are investments in those assets that have been tailored for a particular transaction and cannot be easily transferred.

According to Bello, Dant and Lohtia (1997, p.122) the transaction costs are caused by running a market-based system and/or associated with the allocation of tasks to external agencies, and thus are affected by the market competition.

Observing patterns of company's governance structures, Bello et al. (1997) argued that the importance of transaction costs is overstated. The companies also account for the production costs and strategic considerations to determine their boundaries. Therefore, the researchers concluded that the economization of transaction costs alone explains no the large number of alliances and partnerships witnessed in industry today. Even under conditions of the current uncertain environment and substantial transaction specific investments, the large number of companies prefers the hybrid governance structure and outsourcing to vertical integration. The attention, therefore, should be paid on the expanded economizing framework that supplements the analysis of transaction costs with the analysis of production costs and evaluation of strategic considerations.

In their research, Heide and John (1990) identified that the recent trends in the industrial markets indicate that buyers and sellers are increasingly supplanting conventional "arm's length" arrangements with "alliances" involving closer ties. Therefore, the authors present a joint action as a key aspect of the closeness in the buyer-supplier relationship. The newer relationship emphasizes more tight integration of roles based on the joint activities of the partners. Drawing primarily on a normative theory of transaction costs, the authors

defined the conditions under which these relationships are useful: an ability to safeguard the relationship-specific investments and facilitate the adaptation to uncertainty.

Spraakman (1997) stated three conditions in favor of in-house production: the asset specificity, uncertainty and frequency (see also Williamson, 1985). The Transaction Cost Theory advances these conditions as the conditions inducing lower transaction costs associated mostly with the in-house than general market production. These same conditions encourage the use of internal audit. Therefore, it has been found that the usefulness of findings obtained by internal audit for cost economizing has a positive and significant relationship with the asset specificity, yet a relationship between uncertainty and usefulness is negative and insignificant. Nevertheless, the research indicated that the Transactional Cost Theory is applicable for an examining of the phenomenon of internal audit in governmental organizations as well. (Sprakman, 1997, p.324)

According to Cannon and Perrault (1999), the Transaction Cost Theory proposes that companies chose the most efficient governance mechanism to safeguard transactions from potential opportunistic behavior of the exchange partner. Due to the uncertainty and investments into relation-specific assets, the transaction costs may rise, leading to the hierarchical or internal production.

The Transaction Cost Theory (TCA) conceptualizes relationships along a market – relationship –hierarchy continuum. Though TCA and the taxonomy designed by Cannon and Perrault have the similar constructs, including monitoring of the supply market and sole sourcing, cooperative norms and trust, internal and external uncertainties and relation-specific adaptations, the underlying assumptions of the taxonomy differ from those of TCA. For instance, in TCA, the relation-specific adaptation is conceptualized as a condition, yet Cannon and Perrault's model defines it as a connector. In addition, TCA focuses on individual transactions, not on a relationship. (Cannon and Perrault, 1999, p.455)



## **2.2 Cannon & Perrault framework**

This subchapter presents a theoretic framework – the model designed and applied by Cannon and Perrault (1999) in their research on buyer-seller relationship. This subchapter comprises sections each assessing a particular relationship connector, i.e. the dimension analyzed by Cannon and Perrault against the corresponding dimension applied by other researchers.

The framework models a buyer-seller relationship as a simultaneous combination or mix of six relationship connectors. In their research, Cannon and Perrault have developed the taxonomy of the business relationship types based on an empirical research using a large sample of more than 400 actual relationships between business customers (buyers) and their suppliers. In addition, the authors provided insights into the designed taxonomy by demonstrating how the identified connectors, i.e. the dimensions are associated with the antecedent market and situational conditions, and buying company evaluations of the customer satisfaction as well.

Cannon and Perrault (1999) justified their model by identifying and analyzing the prototypical relationship patterns that reflect their modal types and, therefore, project the actual business practices. The researches applied a cluster analysis method and designed a relationship taxonomy assuming that the relationship connectors have necessary no correlation with each other.

The figure below represents the model designed by Cannon and Perrault, (1999):

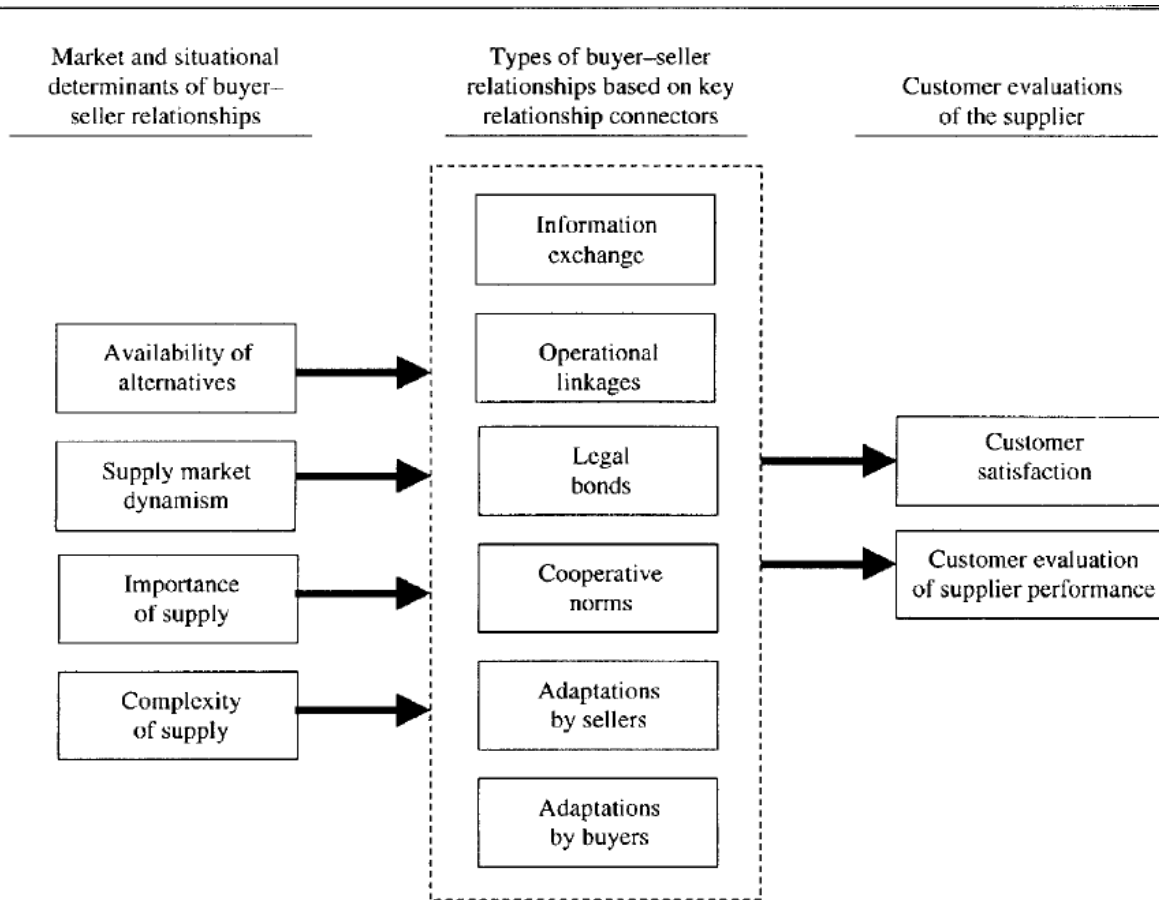


Figure 1: The model representing six relationship connectors. (Cannon & Perrault, 1999, p.442)

### 2.2.1 Information Exchange

According to Cannon and Perreault (1999), open exchange of information is expected to be useful to both parties. Information sharing is considered as a form of a cooperative norm along with flexibility and solidarity (Macneil, 1980). In addition, some authors, for example Smith and Aldrich (1991), as well as, Morgan and Hunt (1994) argue that the sharing of timely and meaningful information increases and fosters trust between the parties.

According to Chae, Yen and Sheu (2005), information sharing, its quality and quantity refer to “the extent to which critical and proprietary information is communicated to one’s supply chain partner”. Monczka, Petersen, Handfield and Ragatz (1998) highlighted the effectiveness of the extent to which information is shared in a partnership, as well as the level and quality of the disseminated information.

The open and collaborative information sharing is leading to the positive effect on the inter-firm relationship. On the one side, the higher level of collaboration may entail more information sharing, on the other side a lower interdependence level is linked with decreasing demand for information exchange. The information sharing is recognized providing the fully utilization of IT capabilities in the supplier-retailer relationship, whether a lower level of information sharing is linked with a lower level of IT utilization within a supply chain. (Chae, Yen & Sheu, 2005)

According to Cannon and Perreault (1999), the willingness of both parties to share important information such as product design, opening books, cost information, future product development plans and supply/demand forecasts can be defined as an indicator of the open sharing of information.

Sheu, Yen and Chae (2006) found that information sharing along the inventory systems, information technology capabilities and coordination structure is an important component of supply chain architecture, and an enabler of supplier-retailer collaboration. In addition, the information sharing is defined is a key requirement for the collaborative inter-organizational relationships. In contrast, Chae et al. (2005) stated that the low interdependence is related to the lower demand for information sharing, and can result into the low commitment, even opportunistic behavior between the partners.

Homburg, Jensen and Krohmer (2008) claimed that information sharing – the information transmission as a bilateral issue at the interdepartmental level. The information transmission, or dissemination, is a necessary condition to the use of information by a marketing and sales department. The information exchange is characterized to be very

strong in the relationship between wholesalers and supermarkets within the fresh produce supply chains. (Clements, Lazo & Martin, 2008).

### **2.2.2 Operational linkages**

Cannon and Perrault (1999) defined the operational linkages as facilitators of operations, i.e. procedures, routines and interactions between inter-organizational systems. The study carried by Clements, Lazo and Martin (2008) indicated that a relationship characterized by strong information sharing is also defined by strong operational linkages, i.e. the communication between parties is supported by systems, procedures and routines.

Some authors discussed structural linkages, for example, Homburg, Jensen and Gruner (1998) defined the structural linkages as extent to which the formal horizontal platforms or channels were established for the interdepartmental activities within an organization. Martinez and Jarillo (1989) presented the structural linkages as the continuum of coordination mechanism in an intra-organizational context, whereas Cannon and Perrault (1999) claimed the structural linkages being an important element in a taxonomy of inter-organizational interfaces.

### **2.2.3 Legal Bonds**

Cannon and Perreault (1999) defined the legal bonds as the detailed and binding contractual agreements that specify the obligations and roles of both parties in a relationship. The legal bonds provide a governance mechanism to the exchanging parties. The formal, detailed contracts provide partners with two benefits: the protection available through the legal system and regulation of the relationship by furnishing a plan for the future. However, some companies still prefer to establish “handshake” contracts with no formal, detailed business agreement. Nevertheless, whether the formal contract is signed or not, the legal bonds go beyond the basic obligations and protections. (Cannon and Perreault 1999, p. 443)

#### **2.2.4 Cooperative Norms**

According to Cannon and Perreault (1999), the cooperative norms connect the parties through their expectations about working together in order to achieve the mutual and individual goals.

Pavlou (2002) defined the cooperative norms as the values, standards, and principles to which “organizations adhere”. As values and norms discourage opportunism, the cooperative norms encourage responsible behavior, and hence establish a ground for a successful buyer-seller relationship.

Macneil (1980) emphasized that both flexibility and solidarity shape the cooperative norms, whereas flexibility refers to the willingness to make adaptations, solidarity reflects on the expectations of maintaining a successful relationship. The cooperative norms build trust by creating the comfort and shared understanding between the partners; therefore, both of the partners are expected to act upon these norms. (Schaefer, 1993)

Cambra-Fierro and Polo-Redondo (2008) claimed the cooperation to be an antecedent of the satisfaction. It is a key element along the communication, trust and adaptation to expectations for the increasing satisfaction of a buyer and seller. The same authors also founded that the cooperation implies not only the joint projects, but also emerges in the internal context of a relationship, i.e. the problem solving. According to Anderson and Narus (1990), the cooperation refers to the mutual collaboration between a supplier and customer.

#### **2.2.5 Adaptations by sellers and buyers**

Cannon and Perreault (1999) defined the buyer-seller adaptations as an investment in a process, products or procedures, in order to meet specifically the needs of the other party.

The parties therefore, become connected through these relationship-specific adaptations. (Clements, Lazo & Martin, 2008)

Chae, Yen and Sheu (2004) identified the connection between the mutual investments and increasing interdependence between partners in respect to creation of the long-term relationship. In the context of the supply chain management, the relation-specific investments serve as indicators of commitment and willingness to make transactions. Therefore, the transaction-specific investments refer to the enhancement of cooperation and collaboration between parties. (Bensaou & Anderson, 1999)

Considering the buyer-supplier adaptation, Mukherji and Francis (2008) revealed that the greater the joint action between parties is, the most likely the companies would make the adaptive changes. The authors suggested that the specialized investments provide the most benefits through the joint actions and cooperation. In general, Mukherji and Francis (2008) concluded that the power make an influence on the supplier's actions yet trust and joint actions affect the adaptations made by both parties.

According to Håkanson (1982), the adaptations are an important aspect of a relationship that can occur during the process of a single or overtime recursive transactions. These transactions can result into the cost reduction, incremental revenue or differential control over the exchange.

According to Claycomb and Frankwick (2008), the relationship specific investments made by a buyer can be associated with the gains in productivity. In addition, the timely, accurate, adequate communication from a supplier and joint problem solving with a buyer reduces uncertainty, and support the relationship specific investments made by a buyer.

Citing Johanson and Mattson (1987), the “adaptations are important for at least three reasons. First, they strengthen the bonds between firms. Through adaptations the companies become increasingly dependent on each other”. The dependencies may be

mutual, but not necessary symmetric, as the one party can be more dependent than the other one. Second, reinforcement of the relationships through adaptations makes their more durable. Thus, the conflicts and disagreements should be solved within a framework of the relationship. The handling of the problems within a relationship implies that partners should apply conflict-resolution methods, but not just switch to another supplier or buyer. Third, the importance of adaptations induces that there is a space for an improvement and change in the relationship. As the improvements and changes, however, imply investments, the limitations should be imposed on the specific adaptations in order to prevent losing one's independency and identity.

### **2.3 *Business-to-business relationship***

This subchapter provides the insights into the nature of the business relationship, describes the aspects, i.e. the market and situational determinants that are relevant within the specific relationships and factors affecting interaction between business partners.

The relationship between a buyer and seller can bear various characteristics. The partners can be connected by the formal contracts or informal agreements, involving the open communication or strictly defined information secrecy. The relationship can be associated with the open cooperation or operated independently. In order to provide the additional insights into business relationship, Cannon and Perreault, (1999) defined four market and situational antecedents and outcomes of buyer-seller relationship. These market and situational factors are availability of alternatives, supply dynamism, importance of supply and complexity of supply. The factors reflect the key conditions according to which relationships can be shaped.

Johanson and Mattson (1987) claimed that the relationships imply the specific inter-firm dependence relations that are different in their nature from the general dependence to the market relationship in the traditional market model. A company has a direct and specific dependence relationship with companies it has an exchange relation with. Similarly, a

company has an indirect and specific dependence relationship with counterparts of these companies it has an exchange relationship with and whose network they (counterparts) are operating within. The construction of a relationship with a company and its counterparts is considered important for establishing in a new market. Both buyer and seller can initiate establishing in the new markets or networks through the building of the new relationships and/or breaking old ones. In addition, a supplier company can become established in a new network along the initiation of a buyer company.

The market activities of the companies are cumulative by their nature, i.e. the establishment, maintenance, development, and completeness of a relationship are the processes that induce the satisfactory returns and creation of a position within a network. This network position is an important concept, as at a different point of time a company occupies a certain position in the network. These positions determine and characterize relations to other companies; convey results of earlier activities in the network, both by a company and other companies; constitute the base that provides a company with development possibilities and constraints in the network. (Johanson and Mattson, 1987)

Bandyopadhyay and Robicheaux (1995) proposed six individual dimensions for to analyze the basic concept of relationalism between a supplier and dealer. These dimensions are

- solidarity that refers to the relative importance of the arm-length bargaining
- mutuality that associates with extent to which parties are monitoring each individual transactions and/or the entire exchange process
- flexibility that reflects the extent to which the rules governing the exchange process are changeable
- role integrity that represents the contrast of the role played in the simple relationship versus roles maintained in long-term relationship
- duration of the relationship that depicts the degree to which the parties believe to continuity of their relationship
- trust that represents the trust between the parties in the exchange relationship.



## ***2.4 Relationship factors affecting EDI implementation***

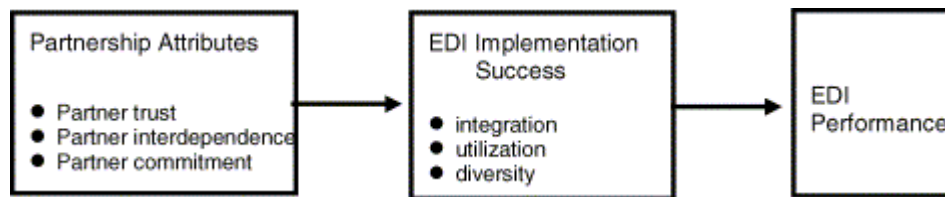
According to Mohr and Spekman (1994), the partnership is a strategic relationship between the independent firms that strives for mutual benefits and yet acknowledges the high level of mutual interdependence. Lee and Lim (2005) founded that the existence of commitment and trust indicates a complexity of relationship interchange between partners demonstrating the willingness to work for a continuous relationship. As the implementation of IOS on the inter-organizational level is committed to the mutual technological and administrative adaptations, as well as, social-learning aspect, therefore, interdependence, commitment and trust are the very important partnership attributes for the value added networks and EDI. Hence, the commitment, interdependence and trust were classified as the relationship attributes or antecedents for a promotion of the EDI implementation.

Referring to Lee and Lim (2005), another relationship attribute – the power, is a one that is affected by the partnership interdependence. Nevertheless, according to Saunders and Clark (1992), some customers have used their power to encourage suppliers implementing EDI, yet Hart and Saunders (1998) discovered that the power and volume of EDI transactions have a negative relation, i.e. though the electronic networks may facilitate the easier exchanges, they will not necessary lead to the growth of the volume of interactions. Furthermore, trust is claimed to be related to diversity but not to the volume of exchanges. In addition, the trust is observed to be related to an increase in the diversity of EDI use, in contrast to the power, which was negatively related to the diversity. (Hart and Saunders, 1998)

Håkanson founded that the power and dependence are the considerably influencing aspects of the seller-buyer relationship. He claims that the company resources, such as competence, expertise, technical skills and information can be transformed into a base of power by which a one company influences another one. According to definition given by Håkanson, “means of power comprise the activities by which a company transforms its inert resources for actually influencing another company’s behaviour”. For example,

advertising and promotion, sales effort, promises or threats can be such influencing activities. Håkanson alleviates the importance of the means of power in the industrial marketing and purchasing context.

This picture represents an effect of the partnership attributes through the EDI factors on EDI performance in organizations.



**Figure 2: The effect of partnership attributes on EDI performance. (Lee, Lim, 2005).**

Lee and Lim (2005) characterize an electronic data interchange system (EDI) as a “form of inter-organizational electronic commerce where one trading partner (a buyer or seller) establishes individual links with one or more trading partners through a computer-to-computer electronic communication method”. The next three dimensions measure the implementation of EDI:

- integration (the extent to which data can be entered into internal applications with no additional processing)
- utilization (the extent of electronic transactions in a organization)
- diversity (the number of the different types of standardized documents processed by EDI)

The high level of EDI integration into the internal information systems refers to the operational efficiency and effectiveness, higher quality of customer service, and improvement of an inter-organizational relationship. It was suggested that trust is a critical factor affecting willingness of the partners to integrate their systems, and expand the percentage of transactions. (Lee and Lim, 2005)

The extensive utilization refers to the technology penetration to and support of the other business processes in an organization. Due to the high set-up costs, the volume of transactions supported by EDI has been expected to reach a sufficient level in order to provide organizations with the significant benefits. Hence, the interdependence and commitment have a significant effect on the EDI performance through the integration and utilization. (Lee and Lim, 2005)

Diversity relates to the degree of how widely and comprehensively an organization uses EDI. The diversification of document formats enables a seamless communication between trading partners' and organizations diverse functions. The partner attributes had no a significant effect on the diversity of EDI implementation, possibly due to the utilization of value-added networks (VANs). VAN supports the conversion and transmission of documents with the prominent communication speed. In addition, VAN enables the EDI transactions, providing the partners with message standards, communication protocols and operation procedures. Therefore, the diversity of document formats by organizations itself has less effect on the EDI performance. (Lee and Lim, 2005)

Some other factors, such as industry-specific, organizational, as well as the factors associated with the sufficiency and sophistication of the information systems in an organization have been reported as affective on the implementation of EDI. The industry-specific conditions comprise the external pressure and existence of standards, while the organizational factors imply organization size and managerial attitude. These factors influence the willingness of management to incur with the high initial investment and changes in business practices involved with implementation of EDI. (Lee and Lim, 2005)

As the implementation of EDI requires some initial investment, possible changes and adaptations in the information systems, an EDI user tends to be a large company with the increasing volume of electronic transactions and number of trading partners. (Banerjee and Golhar, 1989) According to the researchers, many of these companies being at the early stage of implementation were continuously adding new trading partners.

Furthermore, Banerjee and Golhar (1989) divided the factors influencing the willingness of EDI implementation into five categories: a customer, communication, peer pressure, cost saving and productivity. In respect to the EDI-user organizations, the authors founded that factors bearing the most significant impact on the implementation of EDI was a customer request and better customer service. The influence of customer request was higher among the EDI-users than non-users, yet the increase in sales was less significant factor for the users.

According to Banerjee and Golhar (1989), the other significant factors for both users and non-users were the increasing speed of communication with trading partners, reduction of paper work and improvement of data control. While the current users emphasized the significance of quick response, the non-users perceived the accuracy of the data as a more important factor. The peer pressure and improvement of competitiveness were considered to be significant factors for both groups, while the factors related to productivity, such as productivity growth and internal efficiency were founded to be more important for the users. The non-users emphasized the ease of order processing, aid in accounting and billing, as well as internal efficiency. In addition, the aid in accounting and billing were somewhat less important for the current users. The factors related to cost reduction had less significance for both, users and non-users, yet the decrease of administrative costs was indicated as a significant factor for the non-users.

Angeles, Corritore, Basu and Nath (2001) identified that within the US, the selection of EDI standards, relationships with trading partners, support and commitment of top management, the availability of value-added networks (VANs), security, and audit controls are the key factors in the achieving success in EDI implementation. The factors, however, considered critical for the success in international EDI are the availability of a mature and reliable telecommunications infrastructure, access to international VANs, “friendliness” of laws governing global trade, and security in electronic data transmission.

According to Holmes and Srivastava (1999), the greater collaboration in the planning and implementation of EDI leads to the larger outcomes. Their research indicated that the failure to predict the diffusion of EDI might originate from the poor relationship between trading partners. However, EDI may occur with no change in the relationship, i.e. the pre-EDI relationship will remain unchanged after the implementation. In addition, the development of a relationship with a trading partner is likely to lead to a treatment that is more favourable during an EDI implementation.

In respect to relationalism between the small and large companies, Holms and Srivastava (1999) have suggested the two-pronged strategy. In order to achieve the benefits from the adoption of the costly technology, EDI in particular, the small companies should develop their relationships to make favorable implementation strategies more likely. In advance of possible mandates, the small companies should become as proficient as possible with EDI, and learn its nuances with a friendly partner, and therefore, be prepared for the requirements of a more demanding and powerful partner. In order to ensure organizational readiness for the adoption of technology, Iacovau, Benbasat and Dexter (1995) proposed to increase the promotion of the perceived benefits at the EDI pre-adoption stage, and the provision of the financial, technological and managerial assistance to small organizations.

Concerning the adoption and impact of technology in the small organizations, Iacovau et al. (1995) defined three factors that influenced the EDI practices: the organizational readiness, external pressure and perceived benefits. The organizational readiness in a small company comprises two dimensions: first, the financial readiness that refers to resources available for to cover the EDI installation costs, implementation of enhancements, communication charges and other ongoing expenses; second, the technological readiness that implies the level of sophistication of IT and IT management including hardware, software, necessary expertise and a competent project leadership.

The researchers claimed that the relationship between the perceived benefits, EDI adoption and integration is moderate, while the pre-adoption awareness of EDI benefits is

low. The relationship between the readiness of an organization to adopt technology and integration is moderate as well, between the dependency and adoption it is even strong, yet the impact of readiness on adoption is weak.

The small companies considered as unprepared adopters and pressured by their trading partners to adopt technology, can improve their trading relationship along the implementation but not necessary to improve the internal processes, e.g. the integration of EDI system due to the lack of the resources. Iacovau et al. (1995) stated that the highly integrated systems require organizational readiness and perceived benefits; otherwise, the adoption will provide the small companies only with limited benefits. In addition, the subsidies provided by EDI-partners or implementation initiators have been observed to speed up the integration of the system with other company's processes.

The external pressure refers to competitive pressure and imposition by trading partners, i.e. the requirements set for suppliers to use EDI transactions. This factor is considered to be very critical for an adoption of EDI by small organizations. Because of its network nature, such impositions are especially prevalent in case of EDI. First, the external pressure is represented by a strategy such as recommendations, e.g. the sharing of information of the more effective operations via the use of EDI; second, the promises, e.g. the subsidized rewards for the adoption and usage, discounts and other incentives; third, the threats, e.g. the negative sanctions applied by a larger company to its smaller partner in case this partner is to fail becoming EDI-capable. (Iacovau et al.,1995)

The perceived benefits imply the direct benefits that are operational savings related to the internal efficiency of the organization and indirect benefits, mostly tactical and competitive advantages or opportunities referring to the impact of EDI on the business processes and relationships. (Iacovau et al., 1995)

### **3 EDI**

This chapter introduces Electronic Data Interchange (EDI), provides a short technological overview, presenting the characteristics of this application in respect to standardization, as well as, some advantages and disadvantages reflected in the literature.

#### **3.1 Definition**

According to the National Institute of Standards and Technology, an organization that issued the standard for Electronic Data Interchange in 1996, EDI is “the computer-to-computer interchange of strictly formatted messages that represent documents other than monetary instruments. EDI implies a sequence of messages between two parties, either of whom may serve as originator or recipient. The formatted data representing the documents may be transmitted from originator to recipient via telecommunications or physically transported on electronic storage media”. (Federal Information Processing Standards Publication 161-2)

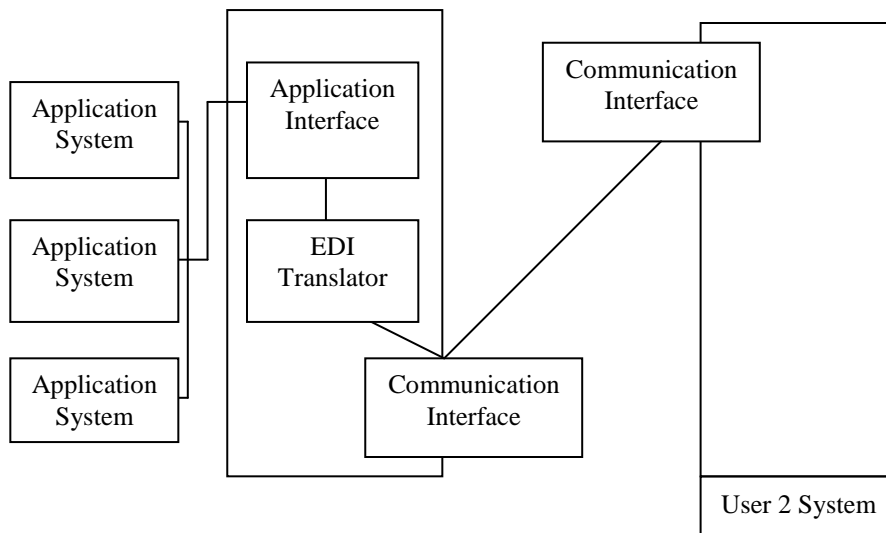
According to the Council Directive 2001/115/EC and Commission Recommendation 94/820/EC, EDI is essentially defined as an electronic transfer of data from computer to computer, using an agreed format, and processed automatically and unambiguously. There should be an agreement providing for procedures guaranteeing origin and authenticity of data. (European Commission, 2001)

According to Levy and Gantz (1987), EDI comprises three basic components: the application software, translation software and communication network. The application software enables the operations such as purchasing, order processing, account payable and accounts receivable. The translation software provides the conversion of data into standard format, whether the communication network ensures the delivery of information between partners.

Swatman, Swatman and Fowler (1994) identified two separate tasks of EDI related to the ability of the application to link input and output information flow allowing a seamless connection to functions such as purchasing, order entry, shipping, inventory management, accounts payable and receivable. The first one, is the in-house application, which translates the outgoing information from unstructured, company-specific formats into the structured EDI formats and vice versa. The other one is the network communication software, which transmits the new structured message to its recipient.

Banerjee and Golhar (2002) defined EDI as a system that “automates routine transactions by integrating tasks and functions across a predetermined set of organizational boundaries”. EDI comprises three basic functions: first, data transfer between partners, i.e. the actual transmission; second, data transformation or translation between proprietary format, i.e. the data format used by sender or recipient, and the standard format that is required to meet transmission protocol; third, directing data to and gathering it from different computer applications.

This scheme demonstrates how the data flows between a sender and recipient, i.e. represents the basic functions of EDI (Powers, 1989).



**Figure 3: The scheme of EDI system (Powers, 1989)**



### 3.2 *Standardization*

The standardization of messaging formats is a prerequisite for the seamless information exchange between parties. Each message is composed of the sequence of standardized elements according to the standardized syntax. The assembling, disassembling, and processing of the messages by computer is ensured not only by the standardization of the message format itself but also by standardization of each data element within the message. (Federal Information Processing Standards)

The implementation of EDI requires the group of interrelated standards. The minimum requirement comprises four of them:

- the syntax (defines message composition and separates parts of a message)
- types and definitions of application data elements (the length of elements)
- the message type (defined by the identification and sequence of data elements)
- the control data elements (the definition and sequence of elements in headers and trailers)

The additional three requirements:

- data segments(a set of short sequence of data elements)
- the manner in which more than one message may be included in a single transmission
- the manner of adding protective measures for integrity, confidentiality, and authentication into transmitted messages

There are three basic standards of EDI: X12, UN/EDIFACT and HL7. The first one, X12 standard, was developed by the Accredited Standards Committee X12 on Electronic Data Interchange (ASC X12) and accredited by the American National Standards Institute (ANSI); The second one, UN/EDIFACT was designed by the United Nations (UN) Economic Commission for Europe – a Working Party (Four) on Facilitation of International Trade Procedures (UN/ECE/WP.4). The third standard, HL7, was

developed by Health Level Seven, Inc. (an ANSI-accredited standards developer) for applying in certain healthcare applications. (Federal Information Processing Standards)

The UN/EDIFACT standard can be used for any domestic or international applications, yet X12 is designed for any domestic application. Despite the variety of standards, the standardization organization aims to adopt a single universally used family of EDI-standards. The adoption of the single standard implies the more efficient use of the application and minimizes the aggregate costs. According to the FIPS (Federal Information

Processing Standards), the single standard would

- minimize needs for the training of personnel in use and maintenance of EDI standards
- eliminate the duplication of functionality and the costs of achieving that duplication, now existing in different systems of standards
- minimize requirements for the different kinds of translation software
- allow for a universal set of data elements that would ease the flow of data among different but interconnected applications, and thereby maximize useful information interchange.

### **3.3 *The advantages and disadvantages of EDI***

The subchapter 3.2 highlighted the advantages of the movement toward the single universal family of EDI-standards. This subchapter focuses on the multiple advantages and disadvantages of the EDI integration into organizational systems widely examined in the various research.

Annis (1992) outlined that the benefits provided by EDI can be classified as strategic and tactical. According to Swatman, Swatman and Fowler (1994), the business strategic benefit of implementation of EDI is based upon the two forms of integration. The first

one comprises the integration of the incoming information from external sources with existing organizational sources and practices. The other one contributes to EDI as a facilitator of the business process reengineering, in which the integration of the internal systems themselves may lead to the change in the entire structure of an organization.

The tactical benefits for an organization contribute to the business processes and practices. Swatman et al. (1994) claimed that the implementation of EDI has direct impact on the savings on labour in the area of data transcription, controls, error investigation and correction, and consequently fewer delays in data handling. According to Annis (1992), the benefits implied faster and more efficient information exchange with trading partners, improved quality due to the redaction of errors, omissions and lost or misplaced documents, and increased productivity and reduced out-of-pocket expenses, such as labour, printing, posting, faxing and filing.

EDI requires no human intervention, with the exception of some special situations, such as the quality control or necessary corrections when errors occur. Considering the information exchange between a buyer and seller, EDI has been used for the sending of bids and requests for quotation, orders, shipping information and invoices. Thus, the messaging exchange can bear the informative or legally binding characteristics. (Federal Information Processing Standards)

In addition to the reduction of paper flow, growing productivity, cost saving and efficiency of information exchange, Scala and McGrath (1993) pointed some benefits that can be categorized strategic as well. These strategic benefits are an opportunity to take an advantage of the new technology, compliment and enhancement of the company's marketing efforts, improvement of cash flow, standardization of the programs, and procedures and enhancement of the relationship with customers and suppliers.

Banerjee and Golhar (1989) stated that some significant advantages of EDI are the communication speed, interface capability, growth potential (to accommodate increased volume of data), confidence (reliability), compatibility, and the control of the system.

Despite the multiple advantages, the researchers identified some disadvantages of EDI. These disadvantages are involved most likely with the implementation or usage of EDI or bear economical characteristics. According to Scala and McGrath (1993), EDI lacks the understanding and necessary education, and it is complex to use. The standards are still incomplete, the legal ramification of EDI has not been tested yet, and there is lack of security needed by company. In addition, EDI requires high volumes to attain the economic benefits, yet many of trading partners do not use EDI.

Moreover, EDI causes impact on the organizational culture, requires the high-level management commitment to be successful, affects the organizational structures, procedures and controls, requires a high initial capital expense, yet on the other side the return on investment of using EDI is hard to quantify. In addition, there are too many EDI application vendors that implies difficulty of making the right choice related to incompatibility between partners. (Scala and McGrath, 1993)

Banerjee and Golhar (1994) identified some more or less affective disadvantages of EDI, such as the lack of data integrity, security issues, lack of control on transactions and lack of audit trails. These factors are considered as the disadvantages in the organizations using EDI, and in the non-user organizations, they are anticipated as the reasons to avoid implementation. Some researches identified more or less important factors influenced the implementation of EDI. These factors are the lack of audit trail, lack of signature for authorization of transaction, lack of data integrity, lack of hard copies of documents, lack of data security, lack of control due to the computer initiation of transaction and due to the customer/vendor initiation of transaction. The research carried by Banerjee and Golhar (1989) indicated that the disadvantages of EDI have been associated with the general lack of signature for authorization, audit trails and a universally accepted standard for data transmission, whether the lack of signature and data integrity, lack of control and hard copies were proven more significant for the non-users.

### **3.4     *Implementation of EDI***

This chapter discusses some issues and success factors contributed to EDI implementation in the industrial companies. In addition, it presents the difference between these factors in the domestic and international markets.

Despite the various benefits of EDI, the actual use of EDI remained less than it has been predicted in 90's (Banerjee and Golhar, 1994). The majority of the various benefits of EDI presented in the subchapter 3.3 are drawn on the literature that investigated the implementation and exploitation of EDI in the early 90's. Nevertheless, the advantages, such as the seamless information transfer, accuracy, relevance of information and the automation of particular activities justified themselves in domestic and international context.

Holmes and Srivastava (1999) identified two general approaches contributed to implementation strategy of EDI. The first one is the autonomous approach, which means that a company initiating EDI implementation leaves the target company to fend for itself with learning and implementation of EDI. The other one is the collaborative strategy, which often contributes to the mandates posed by larger companies initiating EDI implementation. The collaborative strategy usually implies the support in planning and implementation, even the financial support. The initiating company aims to spread EDI costs on more partners as possible; in order to achieve the larger payoffs it is building collaborative joint relationships.

The high levels of investments and complexity have been recognized as the main friction factors for implementation (Scala & McGrath, 1993, Banerjee & Golhar 1994). Nevertheless, the lower diffusion level can arise from some difficulties and barriers related to implementation process. For example, according to Holmes & Srivastava (1999), the smaller companies can experience EDI to be difficult to use, expensive to implement and/or not useful. Moreover, the smaller companies cannot often achieve the

same savings on transaction costs as the large companies do, but they spend on implementation their resources for to obtain little or no benefit at all.

In addition, Angeles (2000) argues that the emerging newer technologies and forms of inter-organizational communication, such as internet-based XML-format are possibly caused the switch from the traditional EDI to the internet-based environment. However, Angeles, Corritore, Basu and Nath (2001) have concluded based on the Gartner's source that non-internet based EDI networks will continue to account for a considerable segment of the total EDI users even though the Internet is expected to make the significant impact on it.

Some researchers, especially at the earlier stage of EDI diffusion, emphasized most likely technical factors as the barriers for implementation, e.g. the complexity, lacking compatibility of software and hardware, availability on third-party VANs, security and control issues, and lack of standards. (Banerjee and Golhar, 1989; Scala and McGrath, 1993)

In later research, the focus has been shifted more to the managerial, cultural and relationshipwise issues. Thus, in the research covered fifty six American companies, Angeles, Corritore, Basu and Nath (2001) identified that "the five top rated factors in terms of their criticality in EDI success in the US are: selection of EDI standards, relationships with trading partners, the support of a top management champion, availability of VANs, dependable security, and audit controls. The least important are factors pertained to issues dealing with hardware and software compatibility among trading partners, cost-benefit analysis, electronic signatures and training in EDI technology". As for international market, the most critical success factors are mature telecommunications infrastructure, availability of international VANs, international trade laws, security issues for international data transmissions, and universally accepted standards such as EDIFACT and X12.

In their research based on survey of one hundred eighty six companies in the US, Steinbart and Nath (1992) identified the main issues and problems related to the global

establishment of the international data communication networks and successful inter-organizational operation systems. The emerging problems are not only technical, related to the connection quality, hardware and software compatibility and transmission speed, but also they bear political character in a form of imposed constraints on international telecommunications and data flow. In addition, authors emphasized the lack of international standards and importance of top management support. The factors considered by companies participated in the survey to be essential for success are establishment of corporate standards and help centers.

Because EDI requires the high-level compatibility down to the transaction level, this issue has received more emphasis at the inter-organizational level in general and in the international context in particular. (Williams, Hood, Chen and Russel, 1997) On the one side, the companies benefit from the high degree of compatibility by growing the number of transactions and amount of the data transferred, as well as the ease of obtaining financial reporting. On the other side, the high-level integration is assumed to bear the problems of internal control. In addition, the high degree of interconnectivity and speed of transactions may cause difficulties to define legal boundaries, and lead to confusion over ownership and liabilities.

Williams et al. (1997) underlined that the accounting information flow is rather political, social, organizational and economic process. The researchers define the accounting information as the aggregation of accounting data into the various types of reports, which construction depends on the contextual factors and professional expertise. The problem related to accounting data obviously occurs because of the method to record and process the data and of its conceptual nature. The concerns related to accounting and data issues have been caused by differences in the accounting traditions between countries.

The security, auditing and control issues are considered as the risks of the implementation of EDI at the technical and organizational levels. According to Williams et al. (1997), hacking into the system and fear for the misdirecting of important information are reasons for not implementing EDI by some companies. Furthermore, the main concern

for auditors is the loss of control on the information in paper format, i.e. impossibility to provide the stamp or signature on the invoice. Nevertheless, the standardization of accounting data and compatibility may help development of the standardized auditing procedures.

Finally, there are commonly used types of the EDI network configuration such as private EDI network, VANs provided by third party and combination of private and VAN. The research provided by Angeles, Corritore, Basu and Nath (2001) supported the “conventional wisdom” that VAN is the most suitable network configuration comparing to others due to the easy connection among the multiple trading partners with diversity of soft- and hardware.

### **3.5 *Digitalization of invoicing process***

This chapter provides the definition of digital invoicing, describes the invoicing process, digital invoicing enabling technology, gives an overview on the models available in the market and acquaints with some statistical information representing the penetration of electronic invoicing in Finland and some other countries.

#### **3.5.1 Electronic Invoicing**

Electronic Invoicing, in other words, the transmission of invoice in electronic format has been one of EDI processes for decades. (Real Time Economy Community) The transmission of invoicing data is enabled by the standardized formats EDIFACT and X12 that were presented in subchapter 3.2. In the EDI context, sending and receiving of invoices would require the implementation of EDI between each pair of business partners, which makes this solution complex and expensive especially for the small companies. Therefore, some tendencies to avoid such expensive and “heavy” solutions have emerged in the market.



The new internet technologies, such as formats based on XML (eXtensible Markup language) (Angeles, 2000), enable the transmission of information over the internet via operators in structured standardized formats, and therefore lower the barrier to implement electronic invoicing in companies. The supreme benefit of implemented technology is that it can be used with mutual partners.

The flowchart below depicts the invoice transmission process between entities A and B.

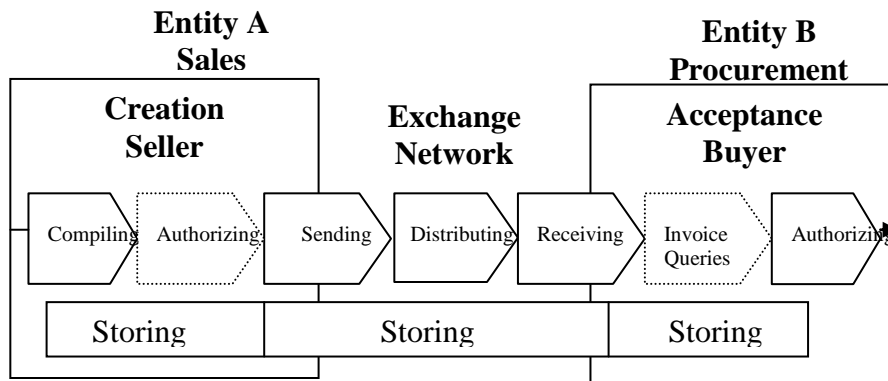


Figure 4: The invoicing process (Boer et al., 2008, p.68)

### 3.5.2 Definition

According to the European Commission, “Electronic invoicing - e-Invoicing - is electronic transfer of invoicing information (billing and payment) between business partners (supplier and buyer)”. Electronic invoicing implies the secure exchange of e-invoices “inclusive the relevant data between suppliers and buyers involving the upgrade of their sales and procurement systems. The purpose of electronic invoicing is to streamline the administration of the billing and payment process by eliminating paper handling for both buyers and suppliers. E-invoices can be archived in an electronic format making it easier and cheaper to retrieve them when necessary.”(European Payment Council)

The difference should be made between invoices as a part of data transmission process in the EDI context and electronic invoices transferred over the Internet in open xml-

standards. Electronic Invoicing is defined as a transmission of structured and VAT compliant invoicing information in open xml-format that can be automatically processed by company's payment system. In Finland, the adopted standards are Finvoice and TEAPSSXML. Electronic Invoicing differs from the sending invoice as an attachment to electronic mail in jpg or pdf-formats, which cannot be classified as an electronic invoice due to the impossibility to process the attachment further by payment application. (Real Time Economy Community)

Another important feature provided by definition of electronic invoicing is that in addition to automatic posting and handling by receiving part, the e-invoice should be available as an image alike a traditional paper invoice format for circulating over departments and personnel in charge. This feature underlines another benefit of electronic invoicing application in comparison with EDI. The invoices transmitted by EDI are in computer language form and cannot be visualized e.g. for auditing or circulation. The transmission of EDI-invoices, therefore, is not considered as electronic invoicing. (Tieke)

The recipient of the electronic invoice can be a company or consumer. In general, there are two models of electronic invoicing: business-to-customer (B2C) and business-to-business (B2B). The B2C process comprises the Electronic Bill Presentment and Payment (EBPP), while B2B process represents the Electronic Invoice Presentment and Payment (EIPP). EBPP is characterized as a tool, by which a bill is presented and paid via the Internet, and that enables the regular billing of large number of consumers. By analogy, EIPP is determined as a tool, by which an invoice is presented and transferred to a payee via the Internet, and that reached yet no significant adoption rates. (The Council for Electronic Billing and Payment (CEBP), 2001)

This paper will further focus only on the EBPP models for B2B, leaving B2C processes out of the scope.

### **3.5.3 Electronic Invoicing as a part of SEPA**

According to European Commission, the importance of electronic invoicing contributed to its being an “essential part of an efficient financial chain” and a link between internal processes and payment systems within the company. Boer, Booijink, Liezenberg and Nienhuis (2008) defined electronic invoicing as a part of end-to-end trade process that has a strong dependency on other processes including taxation and contraction.

Saving on costs is the other important aspect of electronic invoicing launching across and within European countries by creation and establishment of SEPA (Single European Payment Area). The total saving for businesses is estimated to account for up to 64.5 billion euro per year. (European Commission)

The European Payment Council stated the vision and defined the goals for the deployment of the payment services provision in the context of SEPA. By definition, SEPA is “the area where citizens, companies and other economic participants can make and receive payments in euro, within Europe, whether between or within national boundaries under the same basic conditions, rights and obligations, regardless of their location. The geographical scope of SEPA encompasses 27 EU member states, Iceland, Liechtenstein, Norway, and Switzerland.

SEPA is an EU-wide policy-maker-driven integration initiative, which will have an impact on all euro payments, because of the introduction of SEPA payment schemes and standards. Every citizen, merchant, public administration and corporate with a banking relationship in the euro area will eventually be affected by SEPA, as will everyone in the payment supply chain.” (European Payment Council)

### 3.5.4 Advantages and disadvantages of electronic invoicing

The establishment of common standard, simplification and fostering of payment processing are expected to lead to the improvement of cash flow, cost reduction and be a facilitator of access to new markets. (European Payment Council)

The Council of Electronic Billing and Payment presents the advantages of migrating toward electronic invoicing:

- shortened transaction cycles and accelerated revenue cycles
- improved cash flow management
- increased marketing opportunities
- improved productivity
- reduced direct costs (e.g. postage and printing)
- enhanced customer service (The Council for Electronic Billing and Payment (CEBP), 2001)

Nevertheless, according to Boer et al. (2008), the market for electronic invoices is highly fragmented, and less than 5% of invoices are transferred electronically in any sense. In addition, there still exist barriers at the business area, standardization and legal issues, as well as some shortages of trusted exchange models, and authoritative, comprehensive market information.

There are some limitations identified in favour of paper invoices, and so far, these limitations have relevant implications on the implementation of electronic invoicing.

- Contractual limitations (when a trade contract (domestic or international) sets the stricter conditions, such as a requirement to deliver any documentation in paper form)
- Authority and capacity (a requirement to deliver additional legal documents to ascertain authority and capacity of involved parties)
- Record keeping (the legislation by tax authorities (e.g. Sarbanes-Oxley Act in the US) to store the considerable amount of previously electronic documentation in paper form)

- Fraud and fear (the fear of an opportunity of unauthorized access to the system and identity theft)
- Immaturity of technology use (maintenance and data storage are not protected appropriately against data theft and unauthorized manipulation, lack of sufficient control over internal procedures and/or the Internet) (Boer et al., 2008, p.19)

### **3.5.5 Technology Implications**

According to the definition of e-invoicing provided by EU Council Directive (2001), electronic invoicing is the sending of invoices by electronic means, i.e. the transmission or availability of invoice to a receiver, storing of e-invoices using electronic equipment for processing (including data compression) and storage of data, employing wires, radio transmission, optical technologies and other electromagnetic means. By definition, there are no paper documents involved. (Boer et al., 2008, p.21)

Some definitions differ in their core in respect to the generic features of an electronic invoice. For example, Boer et al. (2008) classified the electronic invoices as structured and unstructured documents, yet some sources (e.g. Real Time Economy Community) stated that electronic invoice is structured, while the unstructured document cannot be considered as electronic invoice. (see section 4.2)

According to Boer et al. (2008), an electronic invoice can be classified as follows:

- Unstructured invoice (for example, PDF, JPED, HTML or email) is a document created manually or automatically from a system and compiled into an electronic document. In addition, the paper invoice can be scanned by optical equipment and considered as an electronic document.
- Structured invoice document (e.g. EDI or XML) comprises the compilation of structured data into an e-invoice message according to predefined structure, format and content. As the format of the structured invoice is predefined, the

involved parties are familiar with the system requirements for the further processing of the invoice. (Boer et al., 2008, p.24)

The difference in the transmission of unstructured and structured documents is the other aspect of the electronic invoicing as an electronic exchange process. Here, once again, the electronic exchange of an unstructured document enables no automatic processing in the payment system of the parties; whether according to the definition given by RTE Community, the data of electronic invoice should be automatically processed by the receiver's payment system.

Boer et al. (2008, p.24-25) suggested three electronic exchange solutions for the transmission of the unstructured and structured documents:

- The exchange of an unstructured e-invoice by e-mail as an attachment to the message (e.g. PDF, MS Word, HTML, and other formats)
- The electronic presentment of invoices online in the web environment comprising the placement of invoice on the Internet Portal by creditor or debtor. In case a creditor placed an invoice on the Portal (e.g. at the market place HTML-format), he/she informs a debtor that e-invoice is available on the Internet and vice versa. The e-invoice is often unstructured, and there may be no technical agreements or standards between a sender and receiver.
- The transmission of structured e-invoices by messaging protocols, such as HTTP, SMTP, AS2, SOAP (Simple Object Access Protocol), and AMQP (Advanced Message Queuing Protocol). Both parties are familiar with the formats and the system requirements to send and receive structured e-invoices, and are capable to handle them.

These three solutions presented above are considered to be e-invoicing solutions. (Boer et al., 2008, p.24-25)

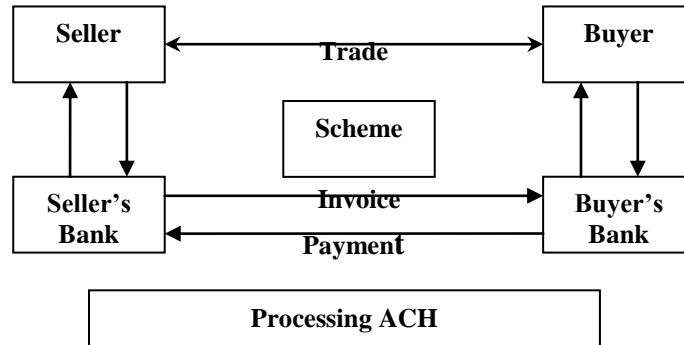
During the lifecycle of an electronic invoice, comprising the exchange and presentation stages, its format can be changed. Hence, the format of the document at the exchange stage (structured or unstructured) can be changed by a service provider. Moreover, at the presentation stage an invoice will be converted into a format understandable for a human e.g. for the further circulation or audit control. The presentation format is mainly unstructured, such as PDF, HTML or a proprietary presentation format powered by ERP systems. For example, such proprietary formats convert a structured exchange format as EDI or XML into the formats understandable by human. (Boer et al., 2008, p.91)

### **3.5.6 Models**

In comparison with EDI that requires private or third party networks for the message exchange, the exchange of XML messages flowing between trading entities over open networks, grows exponentially. In addition, these messages consist of structured content and can be processed by STP straight to the recipients' system in the uniform way. The automation of the process leads not only to the elimination of the human intervention, diminishing costs and errors but also to the higher-level integration in the business process.

As the invoice is a part of a request for payment, there is obvious synergy between the payment system and electronic invoicing. However, the payment habits vary across and within Europe; the introduction of SEPA will create the integrated payment environment based on a set of common payment instruments. The standardization of message content, its semantics and syntax, as well as the use of exchange networks are observed to be the significant challenge. Unless the standardization requirements are met, the business process integration will be suboptimal, due to the efforts required to maintain the multiple exchange domains (networks) and the appropriate interfacing with internal systems. (Boer et al., 2008, p.72)

Here is the scheme presenting the integration of invoicing and payment between trading parties.



**Figure 5: Model of integration between invoicing and payment (Boer et al., 2008, p.27)**

According to Boer et al. (2008, p72), the trading parties (entities) have two basic solutions for the business process integration within the end-to-end trading process: internal and external. The internal solution comprises re-engineering of the process and the appropriate software (e.g. ERP, CRM, accounting, treasure management software etc.) This solution facilitates not only integration within the end-to-end trade process, but also the integration with other business processes.

The external solution of business process integration within trading process represents the outsourcing of one or more trade processes to the external service providers, such as invoicing service providers, trade platforms or procurement portals, providing both, the additional value in the business process integration and the exchange of information. The outsourcing solutions often focus on either seller (e.g. accounts receivable automation) or buyer (e.g. accounts payable automation) side. Therefore, the degree of utilization of the “service providers is often the result of the power distribution in the contractual relationship”. (Boer et al., 2008, p.73)

The Council for Electronic Billing and Payment (2001) outlines three current models comprising Electronic Invoicing Presentment and Payment, such as Seller Direct, Buyer



Direct and Consolidator models. Nevertheless, the trading parties can apply and leverage these models as such, or adopt them with some innovations and moderations.

The benefits and challenges for trading partners provided by a model differ depending on the process owner, yet in common, all three models cover the end-to-end trading process. The B2B process comprises business transactions including procurement, contract administration, fulfillment, financing insurance, credit ratings, shipment validation, order matching, payment authorization, remittance matching, and general ledger accounting. These transactions can be governed by the complex business rules, e.g. the trading partners may require the use of multiple billing accounts per each customer, with a separate workflow review process for each. (CEBP, 2001)

### ***The Seller Direct Model***

The Seller Direct model comprises the one-to-many relationship scheme controlled by a seller in where EIPP is deployed on seller's domain. The buyer is requested to login into the seller's system in order to accept, reject, and dispute an invoice generated and presented by seller's EIPP. Further, the invoice will be processed to seller's financial institution (e.g. bank), while EIPP transmits the remittance file to a seller. This transmission can be used for the updating seller's account receivable (A/R), as well as a seller can provide an account payable (A/P) for a buyer. In addition to the payment confirmation, a financial institution can report the possible payment returns and rejection to a seller and buyer. (CEBP, 2001)

The figure below depicts the process flow in the Seller Model.

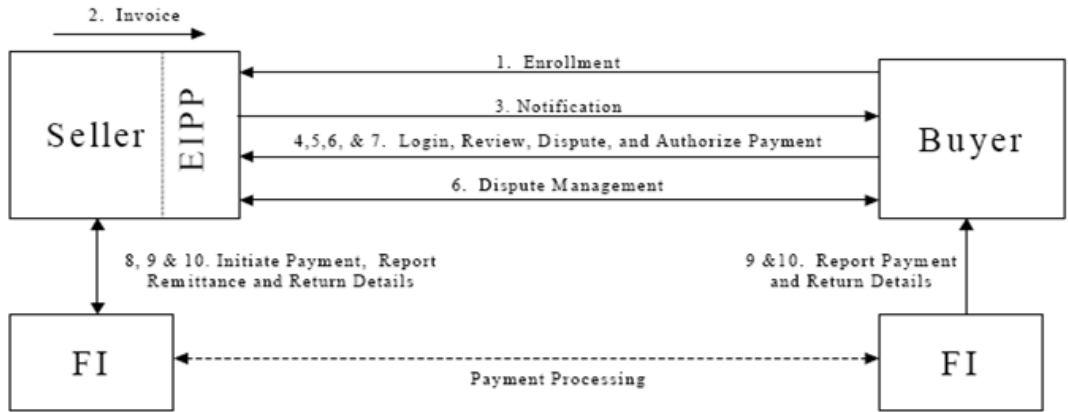


Figure 6: The Seller Model (CEBP, 2001)

There are some benefits and challenges for a seller and buyer related to the Seller Direct model:

	Seller	Buyer
<b>Benefit</b>	Controls, options and transactions <ul style="list-style-type: none"> <li>• Enrollment</li> <li>• Presentment</li> <li>• Payment</li> <li>• Disputes etc.</li> </ul> Is able to integrate with other processes/applications <ul style="list-style-type: none"> <li>• A/R</li> <li>• Customer care etc.</li> </ul> Capitalizes on its site <ul style="list-style-type: none"> <li>• Marketing</li> <li>• Regulations</li> </ul> Less sites to interact for invoicing and payment	Low implementation costs <ul style="list-style-type: none"> <li>• Web browser</li> </ul> Possible incentives set by a seller for to encourage using EIPP
<b>Challenge</b>	Responsibility for EIPP <ul style="list-style-type: none"> <li>• Set-up costs</li> <li>• Operational costs</li> <li>• Scalability</li> <li>• Security</li> </ul>	An ability to access the multiple partners' sites (enrollment, presentment, payment etc.) Necessary to integrate its A/P with multiple seller sites Must comply with seller's payment options

	Possible need to require/convince and/or use incentives for to attract a buyer Possible necessary integration with buyer's A/P and/or maintenance of the multiple data output formats	
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**Table 1. Benefits and challenges of the Seller Direct Model.**

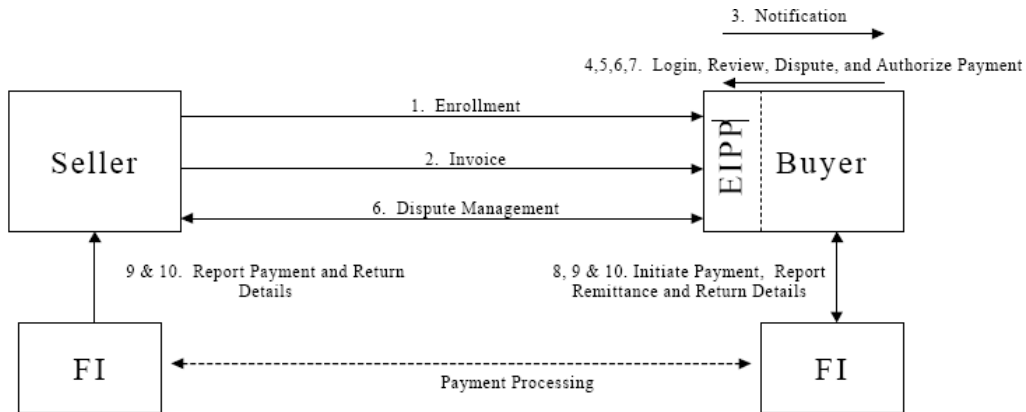
As the seller deploys and controls a model, the buyer should be willing to use it; in the cases when a seller has market power, a buyer might be required to use seller's EIPP.

***The Buyer Direct Model***

The Buyer Direct model implies buyer's control over EIPP application in the same manner as the seller controls it in the Seller Direct model. The model comprises one-to-many relationships, whether a buyer provides interface for the multiple sellers and requires a seller to place an invoice to buyer's EIPP.

EIPP is usually linked to a buyer's A/P application and can provide an additional function such as workflow, payment initiation, seller accounts receivable (A/R) integration, buyer accounts payable (A/P) updates, dispute management, and analysis tools. The seller must comply with the buyer's format and transfer requirements for the documents. The seller can be enrolled to the buyer's EIPP system via web site. The buyer can be logged in its EIPP or view the invoice information via an A/P application. After the authorization and initiation of the invoice payment made by a buyer, the payment will be processed to the buyer's financial institution and A/P will be updated. The buyer's EIPP system may also provide a seller with an A/R application.

The figure below depicts the process flows in the Buyer Direct Model:



**Figure 7: Buyer Direct Model (CEBP, 2001)**

There are some benefits and challenges related to buyer’s EIPP:

	Buyer	Seller
<b>Benefit</b>	<p>Controls options and transactions</p> <ul style="list-style-type: none"> <li>• Enrollment</li> <li>• Presentment</li> <li>• Payment</li> <li>• Disputes etc.</li> </ul> <p>Is able to integrate with other processes/applications</p> <ul style="list-style-type: none"> <li>• A/P</li> <li>• Purchasing /receiving etc.</li> </ul> <p>Less sites to interact for invoicing and payment</p>	<p>Receives payments faster due to the direct submission of the invoices to the integrated buyer’s EIPP system</p> <p>Partnership is strengthening as a seller is willing to use buyer’s application</p>
<b>Challenge</b>	<p>Responsibility for EIPP</p> <ul style="list-style-type: none"> <li>• Set-up costs</li> <li>• Operational costs</li> <li>• Scalability</li> <li>• Security</li> </ul> <p>Possible need to require/convince and/or use incentives for to attract a seller</p> <p>Possible necessary integration with seller’s A/R and/or maintenance of the multiple data input formats for multiple sellers</p>	<p>An ability to access the multiple partners’ sites (enrollment, presentment, payment etc.)</p> <p>Necessary to integrate its A/R with the multiple buyer’s sites</p> <p>Must comply with buyer’s payment options</p>

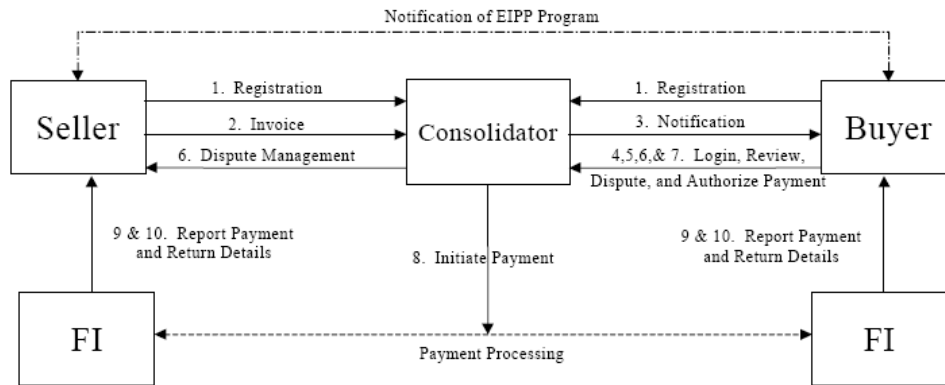
**Table 2. Benefits and challenges of the Buyer Direct Model.**

### *The Consolidator Model*

The Consolidator Model comprises a many-to-many relationship scheme and controls the EIPP application. This model provides an interface for the interaction between multiple sellers and buyers, eliminating the need for the point-to-point connections.

This model is suitable for both parties: the sellers and the buyers. By sending an email notification, the consolidator alerts the buyer to view and pay a new invoice through the consolidator. Alternatively, the buyer may request the seller to place invoices through the consolidator. The consolidator’s EIPP system may provide some additional functions (e.g. workflow protocols, payment initiation, seller accounts receivable (A/R) integration, buyer accounts payable (A/P) updates, dispute management, analysis tool, etc.) (CEBP, 2001)

The figure below depicts the process flows in the Consolidator Model:



**Figure 8: The Consolidator Model (CEBP, 2001)**

The table below presents the benefits and challenges assigned to the buyer and seller within the Consolidator Model:

	<b>Buyer</b>	<b>Seller</b>
<b>Benefit</b>	Can reach multiple partners (the number of payment connection and direct invoices is reduced) Standardized interaction with sellers	Can reach multiple partners (the number of direct invoicing and payment connection is reduced) Standardized interaction with buyers

	<ul style="list-style-type: none"> <li>• Enrollment</li> <li>• Presentment</li> <li>• Payment</li> <li>• Disputes</li> </ul> <p>Obtains an opportunity to provide the seller with multiple services that may not have itself</p> <ul style="list-style-type: none"> <li>• Multiple data formats and transmission protocols</li> <li>• Security</li> <li>• Analytic tools</li> <li>• Scalability etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Enrollment</li> <li>• Presentment</li> <li>• Payment</li> <li>• Disputes</li> </ul> <p>Obtains an opportunity to provide the buyer with multiple services that may not have itself</p> <ul style="list-style-type: none"> <li>• Multiple data formats and transmission protocols</li> <li>• Security</li> <li>• Analytic tools</li> <li>• Scalability etc.</li> </ul>
<b>Challenge</b>	<p>Possible need to require/convince and/or use incentives for to attract seller for using consolidator's EIPP</p> <p>Must to comply with consolidator enrollment requirements and payment options</p> <p>May not be able to integrate with the consolidator's existing A/P and purchasing/receiving function</p>	<p>Possible need to require/convince and/or use incentives for to attract buyer for using consolidator's EIPP</p> <p>Must to comply with the consolidator enrollment requirements and payment options</p> <p>May not be able to integrate with the consolidator's existing A/R and customer care</p> <p>Limitations on seller messaging to buyer</p> <ul style="list-style-type: none"> <li>• Regulatory</li> <li>• Marketing etc.</li> </ul>

**Table 3. Benefits and challenges of the Consolidator Model.**

***The Summary on models***

The Seller Direct process is considered as an invoicing model deployed within an existing and well-established trading relationship including the payment requirements and credit terms. The Seller Direct Model's EIPP is suitable for processing the high invoice volumes or invoices of high value. Typically, the model has been implemented in

manufacturing, telecommunications, utilities, and health care and financial services industries. (CEBP, 2001)

In comparison with the Seller Direct, the Buyer Direct Model is an emerging model that recognizes the buyer's dominant position within the business-to-business transactions. The trading relationship typically exists, yet the model is also applicable for the business targeting specific industry groups or segments. The Buyer Direct Model's EIPP is appropriate for the high volumes of invoices, and allows also developing the value-added processes for specific industries. This model is suitable for the large buyers who prefer to maintain control of the purchase-order driven invoicing and payment solutions. (CEBP, 2001)

The Seller Direct and Buyer Direct EIPP's may be implemented by three general solutions: an in-house software, the third party EIPP software vendor or ASP (Application Service Provider) solution. Within an in-house software solution, the seller (buyer) is responsible for

- hosting invoice data
- maintaining the third party relationships with entities such as the payment processes
- complete control of customization needs, including the system features and integration with other company applications.

In case of the third-party EIPP software vendor for an in-house solution, a seller (buyer) selects and integrates the software into its current environment. Thus, the seller (buyer) is responsible for

- hosting all invoice data
- operating resources
- maintaining the EIPP system.

The fulfillment of the seller's needs is dependent on the flexibility of the third party software vendor to integrate providing interface with legacy systems. In addition, the

vendor may provide integration capabilities with entities such as payment processors, but the management of relationships is of the seller's responsibility.

The seller's (buyer) service may be provided by the third-party EIPP service/Application Service Provider (ASP). In this case, the EIPP solution is outsourced to ASP e.g. due to the limited information technology resources of the seller (buyer). Therefore, the ASP operates and maintains EIPP on behalf of the seller (buyer) and is responsible for

- hosting of the EIPP application
- providing the interface or direct integration with the seller's (buyer's) web site
- the possible management of payment processing relationship

The full realization of the seller's needs is dependent on the features offered by the ASP service and the flexibility of ASP to integrate with the seller's legacy systems. (CEBP, 2001)

The Consolidator Model provides services for the multiple sellers and buyers attracting more buyers to each seller and vice versa, with no necessary having an established relationship. In general, the consolidator may evolve from the buyer direct or seller direct model, though it does provide an ASP for trading parties. Therefore, ASP enables to amortize the functionality development and broad connectivity between and across buyers and sellers. The ability for amortization, allows a consolidator to provide more flexibility, customization of formats, and AP/AR system connectivity options. The key challenge for the Consolidator Model is the interoperability of the consolidator's system with the systems of the buyer and seller, that can be overcome by established standards (ANSI12) or emerging XML.

As the consolidator is generally a third party, it may provide a variety of additional financial services such as factoring, escrow, insurance, credit ratings and payment processing. The structure of consolidator may vary from market to market according to the needs of buyers and sellers in each industry. (CEBP, 2001)

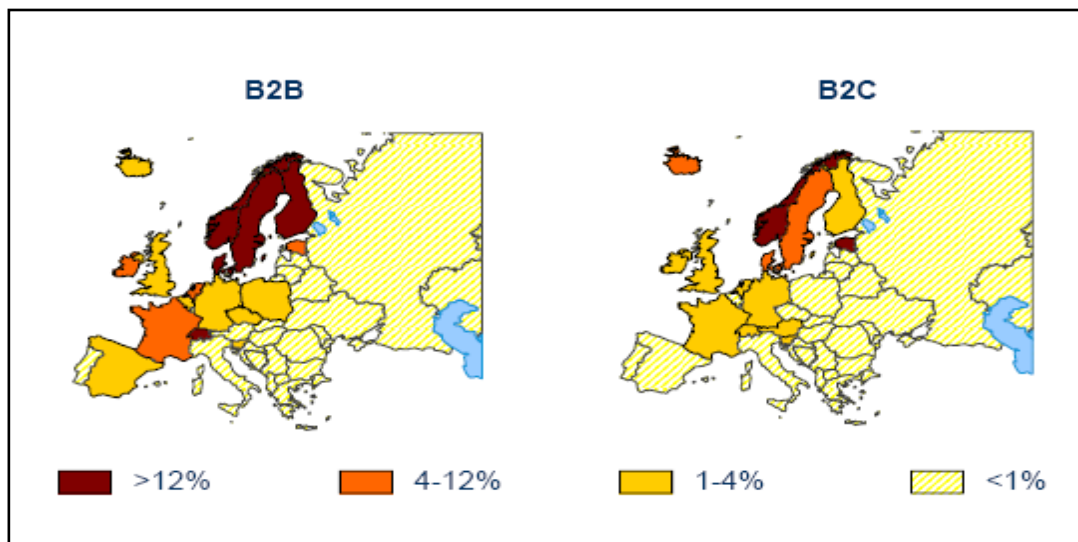


### 3.5.7 Service providers

This section shortly describes the e-invoicing service providers, intermediaries, such as banks and operators. In addition, it presents the statistical data on the market penetration of electronic invoicing in Europe during the last years, as well as introduces the electronic invoicing market shares accounted for the different intermediaries.

According to Koch (2007), the volume of the structured and VAT compliant electronic documents in Europe in 2007 accounted for 30 000 million units. The number of electronic invoices has grown from 240 millions in 2006 to 410 millions in 2007. In 2008, the estimated volume of electronic invoicing was expected to increase up to 610 million documents.

The picture below demonstrates the market penetration of electronic invoicing in European countries in 2008. The figure on the left presents the share of electronic invoicing of the total invoicing volume in European business-to-business market.



**Figure 9: The Market Penetration 2008 (the electronic share of total volume of 30 billions), Koch 2008**

### ***Bank as a service provider***

According to the Federation of Finnish Financial Services (2007), Finvoice is an electronic invoice that has been designed for businesses in order to be presented and transferred on-line by an invoicer/seller to a payer/buyer through the financial institution – bank as an intermediary. Recently, the latest version 1.3 of Finvoice has been released. In Finland, nine banks are providing the Finvoice services: Nordea, Sampo, OP-Pohjola Group, Savings Banks, Local co-operative banks, Svenska Handelsbanken, Aktia Savings bank, Bank of Åland and Tapiola Bank. (FFFS, 2007)

Finvoice is a basic invoice applicable to the business of any size and fulfils the requirements of the most sectors of business. It also can be used as a building block for the sector-specific solutions. Finvoice deploys the XML technology, which enables the presentation of invoice in a form compliant to software applications yet also in a form corresponding to a paper invoice. (FFFS, 2007)

An invoice comprises three parts:

- a transmission frame containing the information required for invoice forwarding
- a specification containing the information required for approval and accounting
- a payment proposal containing the information required for payment

After the seller has generated a ready-made payment proposal, the payment information will be forwarded unchanged and error-free through the entire invoicing and payment chain. The payer, therefore, receives the invoice in an electronic format, and can open and process it in a browser in the traditional way with no additional investment. In opposite, the full automate processing is also possible.

Finvoice enables the fast circulation, verification and approval because:

- the invoice may be directly matched with the purchase order using order references
- the account posting proposal can be approved ‘as is’ in the most cases

- the payment proposal facilitates an error-free payment at the correct time

When Finvoice is forwarded by a forwarding service of the bank, the authenticity of the sender is ensured by bank, as well as the reception approval by a buyer is delivered to a sender. (www.pankkiyhdistys.fi)

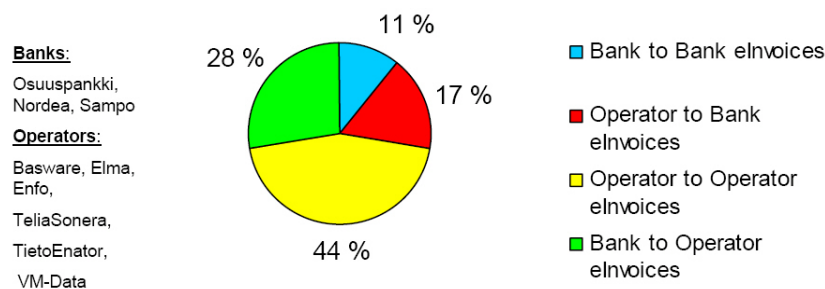
### *Operators*

An operator is an intermediary that enables processing of electronic invoices between the business partners.

The number of operators involved in the processing operations was growing along with the growth of the electronic invoicing volumes. Thus, in 2006, the number of operators accounted for 160, in 2007 – for 260, and in 2008, the number of operators is estimated to reach 340. (Koch, 2007, 2008)

Koch (2007, p.11) demonstrated the usage distribution of the non-bank consolidators (operators) and the bank consolidators in Finland. According to his observation, in case the recipient is a large company, the senders of all sizes (large, medium and small companies) prefer using the services of non-bank consolidators. Whether invoicing process is taking place between the medium and small companies including consumers, the usage of services of bank consolidators is more common.

According to statistics (Koch, 2007), the market shares accounted for the operators and banks in Finland are as follows:

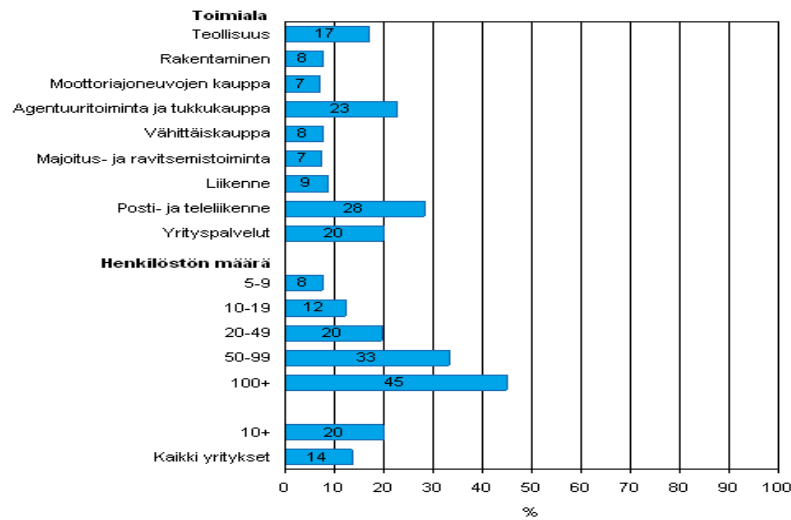


**Figure 10: Market shares in Finland. (Koch, 2007, p.12)**

### 3.5.8 Statistics

According to the statistical survey carried in 2008, the sending of invoice in companies is more common than its reception. Nevertheless, the use of electronic invoicing (in any mode) has been grown since the last year in all business areas. About the one third of the Finnish companies employing at least five employees, have sent the electronic invoices in some mode. (Tilastokeskus, 2008)

In general, 12 percent of the companies have sent the electronic invoices, while 14 percent sent so-called advanced electronic invoices that comprise the electronic invoices and EDI. The one fourth of companies sent invoices in other format electronically, e.g. as an attachment to email.

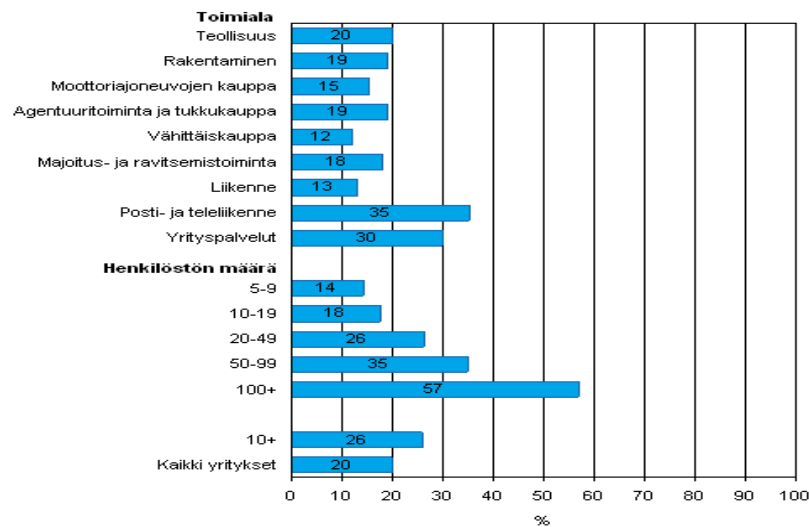


**Figure 11: The percentage of advanced outbound electronic invoices (EDI and e-invoices) sent in 2007 (the shares from the all companies in corresponding industry). (Tilastokeskus, 2008)**

Electronic invoicing is observed to be common in the areas, such as telecommunications, business services, wholesales and industry. In addition, the share of advanced electronic invoicing (e-invoice or EDI) from all electronic invoicing is considerably bigger in the large companies, yet share of the less advanced invoices varies from 21 to 31 percent in the companies of any size.

Concerning the reception of invoice, 49 percent of companies have received at least some type of electronically transferred invoices: 19 percent of electronic invoices, 20 percent of advanced electronic invoices (EDI or e-invoice), and 42 percent of other types of e-invoices.

In summary, the largest share of advanced electronic invoices has been received by the telecommunications and business services. The share of the other forms of electronic invoices between industries has been distributed as follows: 50 percent accounted for telecommunications and business services, 40 – for industry and wholesales, over 40 percent - for alimentation and accommodation, and 30-34 percent - for other.



**Figure 12: The percentage of advanced inbound electronic invoices (EDI and e-invoices) received in 2007 (the shares from the all companies in corresponding industry). (Tilastokeskus, 2008)**

## 4 Methodology

The chapter provides the description of the research method applied for this thesis. In addition, it also presents some reasons for and challenges of the choice of the qualitative methodology in the context of the case study.

This thesis applies the case study methodology. Soy (1998) defined the case study research as an excellent tool for an understanding of a complex issue or object. It also extends experience or adds strength to what is already known through the previous research. Furthermore, the case studies emphasize detailed contextual analysis of a limited number of events or conditions and their relationships. The researchers have used the case study research method for many years across a variety of disciplines.

According to Yin (1984, p.23), the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which the multiple sources of evidence are used.

Despite to the relevance of the method, some critics of the case study research have been expressed. Firstly, the case study research might provide not enough grounds and reliability or generality of findings in case of the small number of cases. Secondly, the intense exposure to study of the case might bias the findings. Finally, some researchers consider case study research usefulness only as an exploratory tool. (Soy, 1998)

Soy (1998) argues that a key strength of the case study method involves using the multiple sources and techniques in the data gathering process. The researcher determines in advance what evidence to gather and what analysis techniques to use with the data to answer the research questions. The gathered data is normally largely qualitative, but it may also be quantitative. The tools to collect data can include surveys, interviews, documentation review, observation, and even the collection of physical artifacts.

This case study research is drawn upon one secondary and three primary cases. The information was gathered through the in-depth interviews with key personnel – the operational level management, and some additional questionnaire provided (e-mailed) to interviewees. Each interview consisted of two parts: general and structured. The background and statistical information about a case company have been acquired within the general part. In particular, the case companies were asked about the electronic

invoicing implementation process, benefits and challenges arisen within pre-implementation and post-implementation period, and statistics reflecting changes in the invoicing process.

The structured part of interview adhered to enabling the examination of the case study with aid of a theoretical framework. The theoretical framework applied in this research is the model designed by Cannon & Perrault (1999) comprising six relationship connectors. These connectors exhibit the dimensions by which the impact of electronic invoicing on the relationship between trading partners can be analyzed. Thus, the questions were designed in order to obtain corresponding information to each dimension.

The case companies differed by many parameters such as an industry, size, organization structure, turnover, number of personnel, invoicing volume, technology background and readiness, and the stage of electronic invoicing implementation. Nevertheless, the criteria for a case company are the willingness of the company to improve the invoicing process and the implementation of electronic invoicing to some extent. Thus, the case study research method provides necessary tools for analyzing each case company within the context of the theoretical framework, as well as to compare the findings between these cases.

The outcomes of the cases are presented in tables demonstrating the strength of influence experienced along a corresponding key connector. According to Salomäki (2008), the effect can be categorized into three groups:

- Strong impacts: there have been considerable changes in a key connector. The changes can be either negative or positive from the seller's (buyer) point of view.
- Weak impacts: there have been some minor changes in a key connector. The changes can be either negative or positive from the seller's (buyer) point of view.
- No impacts: there are no changes in key connectors.

## 5 Cases

### 5.1 Case Lindström

This subchapter presents briefly a background of the case company Lindström and an overview on the main findings obtained from the previous research.

Lindström is a Finnish textile service company founded in 1848. (Penttinen and Hyytiäinen 2008, p. 5) The Lindström Group consists of the parent company Lindström Oy and its subsidiaries Comforta Oy and Vision Design Clothing Oy in Finland, and subsidiaries in Great Britain, China, Latvia, Lithuania, Poland, Romania, Sweden, Germany, Slovakia, Slovenia, the Czech Republic, Hungary, Russia, Estonia and Ukraine. Lindström has representative offices in China, Turkey and India, and Comforta has subsidiaries in the Åland Islands and Sweden. (Salomäki, 2008)

Lindström Oy in Finland provides a work-wear and mat service, hygiene products, industrial and restaurant textile, and personal protective equipment services. All Lindström's subsidiaries abroad provide work-wear services. The mat services are also provided in the Czech Republic, Estonia, Great Britain, Hungary, Latvia, Lithuania, Poland, Russia, Slovakia and Slovenia. Comforta provides hotel and hospital textile services in Finland, and hotel textile services in Sweden and Estonia. Vision Design provides work-wear, PR and corporate textiles and products. (Salomäki, 2008)

The Lindström Group's financial development continued in a positive mode in 2007. The turnover grew by 12.4 percent and was 227 million euros. The number of the personnel in the Group was at the end of the year, when this research was carried out, 2,311 employees (2,177 employees in 2006). (Salomäki, 2008)

The main finding of the research was that the e-invoicing has had the strongest impact on the information exchange, the operational linkages and the adaptations by buyers. The e-invoicing has had weak impact on the cooperative norms and the adaptations by sellers. It



can be concluded that the e-invoicing has not had any impact on the legal bonds. (Salomäki, 2008)

The table below represents outcomes of the research:

Key connector:	No impact	Weak impact	Strong impact
Information exchange			√
Operational linkages			√
Legal bonds	√		
Cooperative norms		√	
Adaptations by sellers		√	
Adaptations by buyers			√

**Table 4. The impact of e-invoicing on the key connectors. (Salomäki, 2008)**

In addition, the research presented a trade-off between benefits and sacrifices associated with the implementation of electronic invoicing. According to the research, one of the most significant benefits of e-invoicing is the more intensive *information exchange*, and therefore the increased cooperation between Lindström and its customers. The increased commitment of the customers is recognized as a benefit induced from the more intensive cooperation. Electronic invoicing has not had any considerable impact on the external information exchange from the sales' and customer service's point of view. Furthermore, the speed of invoicing and payment transactions has increased partly due to the adoption of e-invoicing. In addition, the transparency of information exchange has improved from the invoicing department's point of view. However, e-invoicing has caused sacrifices, such as extra work, because all customers have special needs concerning data content. (Salomäki, 2008)

According to findings, the first significant change in *operational linkages*, emerged from e-invoicing, has been an appearance of operators between Lindström and its customers, and the second - is a broader contact surface between the buyer and the seller. On the one side, Lindström benefited by saving time and money yet on the other side, the changes in operational linkages have been involved with some time and extra work spent due to the switches of operators. The benefit is that the broader contact surface has increased

commitment of the buyer. These changes, the operators and the broader contact surface, have created dependence, and therefore switching costs for both parties. (Salomäki, 2008)

*Legal bonds* between the seller and buyers have not been changed due to the e-invoicing implementation. Customers have not made any new contracts with Lindström, instead, they have made agreements with banks and operators. (Salomäki, 2008)

The adoption of e-invoicing has had some impact on the connector representing *cooperative norms*. The expectations of both exchanging parties to achieve mutual goals jointly have increased, characterizing the higher cooperation. Based on the theory, the development of the cooperative norms reflects trust between the seller and the buyer. Furthermore, the flexibility in problem situations increases as well. (Salomäki, 2008)

Both, Lindström and its customers have made adaptations due to the adoption of e-invoicing. The adaptations contributed to emerging switching costs, and thus relationship-specific adaptations reflect to the calculative commitment in business relationships. It can be concluded that due to adoption of e-invoicing the switching costs, and thus commitment have increased between Lindström and its customers, providing value to the both parties to the extent that these investments have reduced costs and created dependence. (Salomäki, 2008)

## **5.2 Case Wärtsilä**

This subchapter presents a case company, and provides an analysis on the impact of the electronic invoicing implementation on the business relationship between Wärtsilä and its suppliers from the buyer's point of view. In case, Wärtsilä represents a buyer, while suppliers represent sellers. The impact is projected onto the relationship connectors described in the theoretical part of this work.

### 5.2.1 Background

Wärtsilä is a global provider of ship power solutions including engines, generating sets, reduction gears, propulsion equipment, automation and power distribution systems as well as sealing solutions for the marine industry. The company supplies flexible power plants for the decentralized power generation market. In addition, Wärtsilä offers solutions for a base load power generation, grid stability & peaking, industrial self-generation as well as for the oil and gas industry. Wärtsilä provides services for both ship power and power plants; it also provides customers with expertise regardless of their equipment. (Wärtsilä Oyj)

The customers of Wärtsilä are the global or local companies within the merchant, offshore, cruise and ferry, navy and special vessel segments. In 2008, Wärtsilä's net sales totaled in 4.6 billion Euros, and the personnel accounted for 19,000 employees. The company has operations in 160 locations in 70 countries around the world. Wärtsilä is listed on the NASDAQ OMX Helsinki, Finland.

In Finland, Wärtsilä supplies a ship power for all types of marine and offshore applications, and provides the power plants in the decentralized energy market. The global service network provides service, maintenance and reconditioning solutions for both machinery and power plants throughout the lifetime of the installations. The main export areas of the company are Europe, Asia and the Americas. Wärtsilä employs more than 3,000 professionals in Vaasa, Turku, Raisio, Helsinki and Espoo.

The Shared Service Center is situated in Vaasa and globally provides customers with finance and accounting services, such as Account Payable, internal and external payment services, business travelling invoicing, fixed assets, regular reporting and maintenance of the inbound invoicing register for 6 countries.

Further, in this paper, the terms Service Center and e-invoicing will be used for Wärtsilä's Shared Service Center and Account Payable services respectively.

## 5.2.2 Description of the Invoicing Process

The Service Center is processing only purchasing invoices, yet sales invoicing is diffused across the business units. In respect to purchasing invoicing, the company deploys both channels: EDI and e-invoicing. Six years ago, Wärtsilä launched digitalization of invoicing by implementing EDI with 130 suppliers (of which only 30 utilizing EDI-Invoicing).

The Service Center started the implementation of e-invoicing four years ago. Since that, the number of EDI customers has not grown, yet only three customers moved from using EDI to e-invoicing, due to some technical changes in the EDI requirements.

Due to the integration of company's EDI system with ERP processes, e.g. ordering and order confirmations, the implementation of EDI required making agreements between trading parties. The initiator and owner of EDI process implementation is a business unit and thus, the process can be said business driven. In opposite, e-invoicing was initiated and launched by the Service Center, and required agreements between trading parties and intermediary, but no the business agreements per se. 60 percent of invoices arrive in paper format, whether the rest 40 percent are processed by EDI and e-invoicing. Only the small number of domestic invoices is processed by EDI, including insignificant invoicing amount processed in Denmark's unit. The annual electronic invoicing volume (excluding scanned and e-mailed) accounted for 40,000 documents a year.

There are three invoicing channels adopted by Wärtsilä: a traditional paper form, electronic and EDI formats. In general, the invoices can be differed by following types: those that based on an order, e.g. related to the core business of the company, and those that imply no order, e.g. related to telephone or electricity costs. The Service Center provides its customers, suppliers, with diverse e-invoicing models, such as a Buyer Direct model using the internet portal, and Consolidator model, comprising operators and/or banks as an intermediary.

The implementation has been started from the non-order invoices. The share of by-order invoices accounts for 50 percent, and the rest represents non-order invoices. Up to the date, e-invoicing comprises only 200 Finnish suppliers and totals in 40,000 invoices per annum. Since the beginning of the implementation of e-invoicing only three of 30 EDI-users switched to e-invoicing, due to some necessary and costly updates in their systems required by EDI. The costs for paper invoice account for circa 30 euros, for e-invoice (including salary) – 10-15 euros, therefore the invoice provided by EDI is the least expensive.

### ***Paper Invoice***

The delivery of an invoice sent by mail takes in average 2 days depending on the country of origin. In order to fasten the mail delivery to the Service Center, the company established mailboxes for its correspondents in the territory of the Service Center. The processing of invoices is organized as follows: on arrival, the personnel sort invoices by company, by type (order/non-order) and number. Further, the invoices are scanned and verified for completeness. After scanning, an invoice image is moved to archive, yet the data is processed to the invoicing system. The data is proceeded to circulation for the verification of the amount payable. In case the invoice implies no order and is correct, the amount will be posted to the corresponding account. In case the invoice is by order, the system searches for the order and payment information for verification. When the information is correct, the invoice will be processed for the approval in a circulation systems to an invoice owner (orderer or purchaser), who will add the cost center number.

Further, the invoice will be processed back to the circulation. In case when the invoice is by order, the system verifies an order number, price, amount, and using the order number, the system verifies an invoice for conformity. If conformed, the system will process an invoice for payment. Whether there was a mismatch, the invoice will be processed to an approver for the further actions.

The complete circulation process of a paper invoice comprises 2 days for scanning and 2 days for a transfer to the circulation system, but there is no limit set for an approval. Thus, the process can take from 3 to 15 days, yet in the worst case - even 50-60 days.

The delay in an approving can be possibly caused by an absence of the person in charge, while an invoice will be waiting in the system for to be approved. This is considered as the most significant problem related to a paper invoice, as an invoice has to be verified manually due to the possibly incomplete data. The Service Center has set the minimum necessary requirements for the invoice data transferred in a paper and electronic format; thus, if an invoice is incomplete, it will be returned to a sender.

### ***E-invoice***

An e-invoice can be sent to the Service Center via operators, banks or bookkeeping agency. The share of suppliers processing electronic invoices via operators accounts for 205 organizations, while 15 companies are processing their invoices via banks. The choice of a channel depends on the supplier's decision, e.g. suppliers and the Service Center can use services of the different operators. For example, a supplier (e.g. ABB) sends an invoice to an operator (e.g. Basware) in a particular format (TEAPPXML2.1), then Basware forwards the invoice to the Wärtsilä's operator Tietoenator, consequently Tietoenator transforms the information into a format required by Wärtsilä (TEAPPSXML2.7). Within this process, Tietoenator validates an invoice for VAT number for both, a sender and receiver. In case of missing VAT number, the invoice will be returned to a sender at this stage.

After the validation, an operator transfers the invoice via a firewall and middleware to the Service Center's system. Further, the invoice is verified in the SAP system by the MaxPost software for existence of a supplier, and the required data to be complete. In addition, the supplier's data is filled in by the MaxPost software.

Therefore, the invoice is transferred to the invoicing system – MaxFlow, where the invoicing personnel verify if an invoice owner were available. The invoice circulation process takes often from 5 to 15 days. In case of a by-order invoice, the system applies the 3-way-matching, while for non-order invoices (e.g. Sonera, Fazer or Amiga), one approval or no approval at all is required. The 3-way –matching is a component integrated within SAP that fulfills matching of the price, quantity and goods reception data containing in a purchase order with the information in a received invoice. The non-order invoice includes the numbers of corresponding cost centers added by the senders. This practice is compliant to the recursive invoices and considerably fastens the invoice circulation process.

### ***EDI-invoice***

At the EDI side, ten vendors are using an operator for processing invoices. The EDI system is integrated with the ERP processes, such as ordering and order confirmation. In addition, the orders can be transferred to the internet portal, where suppliers can accept and transform them into a compatible form with their EDI system formats. Thus, the formed invoice will be processed to the supplier's EDI, or an invoice can be handled directly in the portal. Therefore, the invoice is transferred to the SAP layer, and further to the 3-way-matching component for the data verification. Whether the information is correct, the invoice will be transferred to the payment system, whether not – the invoice will be forwarded to an invoicing operator. In case of the mismatch of information, an invoicing operator will manually require the information from a purchasing department and a copy of the invoice from the supplier in a paper format. The new invoice will be processed as in the case with paper invoices that induces a scanning procedure.

### **5.2.3 Information Exchange**

This section describes the changes in the information exchange process between Wärtsilä and its suppliers related to the implementation of electronic invoicing. According to the

definition presented earlier, the willingness of both parties to share important information such as product design, opening books, cost information, future product development plans, and supply and demand forecasts can be defined as an indicator of open information sharing. The open exchange of information is expected to be useful for both parties.

The changes in information exchange are multidimensional, i.e. there are changes along the invoicing design process, the invoicing process phases and in the communication between business units and invoicing department (Account Payable).

After the e-invoicing implementation, the more intense information exchange between the Service Center and suppliers has been observed. The intense and tighter cooperation with suppliers included an analysis of the current processes in order to find the mutually appropriate solutions.

The growth in collaboration was identified especially related to the optimization of the ordering process, which induces the successful processing of the invoices. The exchange of information has increased in a comparison with the processing of paper invoices. In addition, e-invoicing required more information exchange comparing to EDI. The growth of the information exchange is partly explained by the role of e-invoicing as the logical end-point of a service chain.

In addition, at the implementation stage, the adoption of e-invoicing by a new supplier and establishment of a process, demanded more collaboration and information exchange in order to diminish the errors and data omission. The internal information exchange between business units and the Service Center, as well as between the business units and the purchasing department has also grown. The understanding and collaboration between units, and in particular, within the purchasing unit has increased.

Although the information exchange has had strongly increased along the e-invoicing implementation, the content of the exchanged information has been also changed. After



the parties have agreed on the operating principle, the communication became less intense. On the one side, the decrease of errors leads to the decreasing amount of claims and non-conformity of invoices, and thus there is no need in communication between a supplier and the Account Payable personnel.

On the other side, with increasing numbers of suppliers, the amount of error possibly remains at the same level, due to the incomplete supplier information in the beginning. The lack of complete, correct information and error occurrence are essential aspects of the smooth e-invoicing process.

In comparison with invoicing via EDI, e-invoicing bears more flexibility and tolerance for errors. For example, due to the rigid structure, there are fewer errors via EDI, but the data requires strict definition, otherwise the error occurs. In case of e-invoicing, if the supplier's name was incorrect, an incomplete invoice can still be identified and corrected.

#### **5.2.4 Operational Linkages**

This section presents the impact of e-invoicing on the formation of and changes in the operational linkages between Wärttilä and its suppliers. The operational linkages comprise the routines, procedures and operations established by trading partners. Before the implementation of e-invoicing, the processing of paper invoice, sending, reception, claims and correction comprised the established procedures. These procedures have been changed along the implementation of e-invoicing in their nature. Currently, the processing of paper invoices represents the basic routine with no process development.

In opposite, the process of electronic invoicing is at the stage of continuous development and improvement. The one of the clear aspects of such improvement is ensuring of the data quality, an ability to add more fields to an invoice, e.g. currently there is an ongoing project in collaboration with ABB in order to enable adding the number of cost center to an invoice.

The invoice processing reported the release of labour resources from the manual routines and invoice approval circulation to the tasks related to the process improvement.

### **5.2.5 Legal Bonds**

This section describes the influence of electronic invoicing on the changes occurring in the agreement between the trading parties: Wärtsilä and its suppliers. According to the definition stated earlier, the legal bonds comprise the detailed and binding contractual agreements that specify the obligations and roles of both parties in the relationship.

The implementation of e-invoicing by both parties, Wärtsilä and its suppliers required no changes in the business agreements. Along the choice of e-invoicing channel, a supplier makes the agreements with banks and operators. The business agreements still remain of the business unit responsibility, yet the Service Center is communicating more rigorously to business units the importance of the information requirements established by e-invoicing, such as a precise e-mail address of the supplier and other data requisites.

In order to ensure the accuracy and completeness of the supplier and buyer data requisites in invoices, the business unit discusses the e-invoicing process requirements with a supplier at the negotiation stage. In addition, the possible changes in payment terms, e.g. the shortening of the payment time will be under consideration in the future agreements.

### **5.2.6 Cooperative Norms**

This section presents the impact of e-invoicing on the cooperative norms that occurred along the implementation of electronic invoicing. According to the definition, the cooperative norms reflect the expectations between two working together trading parties in order to achieve the mutual and individual goals jointly.

Electronic invoicing brought the changes into the cooperative norms to some extent. The Service Center reports the collaboration and cooperation to be more intense in the e-invoicing process development between trading parties than before implementation. According to the Service Center, one of the challenges is to provide a supplier with a correct entire picture of what e-invoicing does mean, due to the misunderstanding of the technology and an adoption threshold associated with a costly implementation of EDI.

The Wärtsilä's business units have set no requirement to their suppliers for the necessary implementation of e-invoicing yet while selecting suppliers, the company prefers those who are implemented or are capable to implement e-invoicing. The digitalization of invoicing process between the Service Center and a supplier is under consideration in each business case separately. The Service Center strives to deploy an understanding of the e-invoicing benefits for a supplier, providing the necessary assistance and advice within the implementation process. During the negotiations for the invoicing process digitalization, the Service Center anticipates the benefits and costs for both parties, provides the necessary information on the digitalization options (models), e.g. EDI, e-invoicing, portals, and creates the cooperative basement for the further implementation process. Nevertheless, in the future, the readiness for e-invoicing might be a selection criterion for a supplier.

Currently, Wärtsilä has 150 suppliers with whom the Service Center is going to negotiate the implementation of e-invoicing in the near future. The process has started with the collaboration with companies sending the large invoicing volumes, and thus relatively more committed as the business partners. Nevertheless, from the Service Center's point of view, e-invoicing induces no dependence or more commitment between parties at the implementation stage. The factors influencing dependence and commitment are strongly business-driving, e.g. the global agreements, prices and terms. The business units classify the suppliers by three classification principles: by a invoicing volume, an invoicing value and purchasing value. In case the invoicing volume reaches at least 1,000 units per

annum, the supplier is considered as a large one, and e-invoicing is implemented benefiting a supplier as well.

The Service Center has established a certain negotiation procedure whereby it makes a first contact by letter, e-mail or telephone telling about the e-invoicing opportunity, and in a two weeks agrees on an appointment with a supplier. In case of a larger supplier, which is aware about the subject, the phone call is enough to inform the supplier.

There are some supplier's expectations reported by the Service Center, such as the flexibility for requirements and schedule, availability of all the necessary data requisites as agreed, more information sharing, advice and precision related to an investment. In 2004, the Service Center started implementing e-invoicing with two customers. The Service Center set the following objectives to achieve that are the largest possible penetration in the market, high process quality, saving on costs and release of the resources from the paper work to the process development. The high quality of the invoicing process implies the fastening of the circulation of invoices. In addition, the Service Center is expecting the mutual understanding, as e-invoicing brings the benefits for both parties, as well as both parties bear the costs. The mutual benefits seen by the Service Center are the transparency of the invoicing process, saving on costs, the omission of the manual routines and the automation of the process.

### **5.2.7 Adaptations by buyer and seller**

This section describes the adaptations made by trading parties in order to implement electronic invoicing. The buyer-seller adaptations are defined as an investment in process, products or procedures, in order to meet specifically the needs of other party. The adaptations can occur during the process of a single or over the time recursive transactions. These transactions can result into the cost reduction, incremental revenue or differential control over the exchange.

The implementation of e-invoicing required some adaptations from both trading parties. The Service Center has to offer the various options for digitalization of invoicing process, e.g. EDI, e-invoicing using bank and/or operators (Consolidator Model) and the internet portal (Buyer Direct Model), where the supplier can submit its orders and form the e-invoice.

Within the implementation, the Service Center had to verify that its invoicing system is capable to receive an e-invoice. Thus, the Service Center had to make some changes in the interface, establish the channel from its own invoicing system through the firewall, set up the necessary middleware between the invoicing system and bank and/or an operator. The link between middleware and the operator required investment, as well as the channel has to work in both directions (sending and receiving).

The buyer, Wärtsilä reported had having to make relatively more adaptations to its system than its supplier had. It has been explained by the necessary customizations and changes in order to satisfy the information requirements of the e-invoicing process. The Service Center had to make some adaptations for each customer separately, but some changes have been made cooperatively with a supplier, e.g. the costs were shared between the partners. The adaptations were not only technical, but also related to requirements set by the EU-directives and legislation. In addition, more and more companies are willing to add the number of cost center directly to an invoice for to prompt the posting and tracking of the costs.

In case the supplier uses a portal, the invoice information is inputted manually. In case the supplier uses the software (e.g. e-printteri) that forms an XML-file and forwards it to a buyer, the investment is required. In addition, the invoicing software that forms an XML file in the supplier's interface requires even more investment. These options ensure that the supplier can adopt any suitable for its company software for to establish e-invoicing channel with Wärtsilä. In fact, about 20 suppliers out of 30 are using a portal.

However, the magnitude of the necessary investments made by Wärtsilä's suppliers varies considerably. The investment depends on whether the suppliers already have e.g. the accounts receivable or ERP systems or not; are suppliers going to join the Wärtsilä's operator or use partners of their own choice. The investment made by buyer, however, varies approximately from 50,000 to 200,000 euros. The seller's investment fluctuates within the same range. This investment might include one or few connections between the counterparts.

In addition, the implementation requires not only the monetary investments, but also the contribution of work resources and time, e.g. especially in the beginning; the process is resource and time consuming even up to six month. Nevertheless, the investment is single from the supplier's point of view, but the benefit is continuous, as the same software can be used with other buyers.

### ***Objectives and future prospects***

In order to benefit more from the e-invoicing implementation and increase the number of partners involved in the process also from outside of Finland, Wärtsilä is planning to make more changes and customization in the Service Center's system.

One important step in the improvement of the e-invoicing was integration of the process with ordering and order confirmation. Earlier, only EDI enabled the automate verification and approval of invoices due to the integration with ERP processes. The integration of electronic invoicing with SAP processes, e.g. warehousing and logistics is sufficient in order to obtain full benefits from digitalization within the supply chain. In addition, the Service Center aims to the full automation of the e-invoicing process, whereby the invoice data can be automatically posted to the corresponding booking accounts with no need for the manual verification and approval.

At some point of time, the Service Center identified the problems with some times too fast invoice circulation process, i.e. an invoice was ready for payment, but products were

not delivered to the warehouse. In order to avoid such problems, the Service Center strives to harmonize e-invoicing process with other business processes. The integration of the invoice processing within SAP means that the process is connected to all modules. Once arrived in the system, the invoice automatically retrieves the purchase order information to the invoice processing system. When the reception of goods is completed (meaning that goods have arrived) the invoice will be booked, and it will be paid according to payment terms when it is due. In case the reception of goods is not completed (goods have not arrived), the invoice will be blocked until the goods are arrived and reported. Once reporting is completed, the system automatically releases the invoices from blocked list. Therefore, the invoices will be paid according to the next payment date or according to the payment terms.

The Service Center set the objective to implement e-invoicing with 500-600 suppliers up to the year 2012. 50 percent of the trading partners are anticipated to be the international suppliers from Europe and other countries, while the number of invoices processed via e-invoicing is expected to reach circa 100-500 thousands. In addition, the EDI channel will provide a connection between 15-20 suppliers. Wärtsilä is constantly disseminating the information concerning benefits of e-invoicing and process implementation in the context of the whole supply chain in the Finnish market especially within small suppliers.

### **5.2.8 Summary on the case Wärtsilä**

This section presents the summary on the impacts on the trading relationship between Wärtsilä and its suppliers analyzed through the prism of key relationship connectors.

The summary table below (adapted Salomäki, 2008) demonstrates the rate of impact on the key connector identified in the case company Wärtsilä.

Key Connector	No impact	Weak	Strong
Information Exchange			√
Operational Linkages			√
Legal Bonds	√		
Cooperative Norms		√	
Adaptations by seller		√	
Adaptations by buyer			√

**Table 5. The impact of e-invoicing on the key connectors in the case Wärtsilä.**

According to the results, the implementation of electronic invoicing has the strong impact on information exchange between the Service Center and the suppliers. The communication between personnel, involved into the design and improvement of invoicing process, and suppliers become significantly close. In addition, the sharing of the accurate and complete information is considered as a critical factor from the achievement of the successful high quality invoicing process. The information exchange between the invoicing personnel and purchasing department, as well as between the purchasing and a supplier has diminished due to the decreasing need to explore the errors occurred in the invoices. However, it is also mentioned, that the internal communication between departments has shifted from error-centered to the more focused on the invoicing process improvement.

The operational linkages have also experienced a strong influence along the e-invoicing implementation. The procedures and routines of transferring invoices have been changed, and the suppliers obtained several options to establish e-invoicing channels according to their capabilities, volumes and values of invoicing, as well as, objectives for a partnership.



The implementation of the e-invoicing has had no impact on the legal bonds, i.e. on the trading agreements between the business units and suppliers. In order to deploy e-invoicing, both parties establish agreements with operators and/or banks separately. However, the business units are expected to bear more responsibility for the completeness and accuracy of the business partner requisites acquired within negotiations.

The electronic invoicing process induced a relatively weak impact on the cooperative norms. The cooperation and collaboration between the Service Center and suppliers has become more intensive and close in order to achieve the objectives and obtain mutual benefits from e-invoicing. However, the growing collaboration implied no increase of the dependence or commitment between partners, as electronic invoicing commit no supplier to particular buyer and vice versa. Therefore, the Service Center considered the benefits obtained from the business site to be a basement for the growing commitment between business parties.

Both parties the Service Center and suppliers had to make the adaptations to some extent. The Service Center offers the diverse options to its supplier depending on the needs, capabilities and invoicing volumes. Due to this diversification of the service, the Service Center had to make relatively more technology adaptations, investments in software, agreements with operators and banks, than a single supplier had.

A supplier also had to make some adaptations, such as investments into software, agreement with operator and/or banks depending on its capability and readiness. From the Service Center's point of view, the Service Center had to make more adaptations, and thus the impact of e-invoicing is classified as relatively strong. The impact of e-invoicing on adaptations by a supplier is considered to be relatively weak.

There are also some other important outcomes related to the case Wärtsilä. As the Service Center provides the diverse services of digitalized invoicing such as EDI and e-invoicing, both options can be compared from the buyer's point of view.

The table below represents the advantages and disadvantages of both channels:

	<i>Advantages</i>	<i>Disadvantages</i>
<i>EDI</i>	<ul style="list-style-type: none"> <li>comprises not only invoicing, but also the orders, order confirmation (integration with ERP)</li> <li>fully automated, effective as no human interference is required</li> </ul>	<ul style="list-style-type: none"> <li>if error occurs, the correction is timely and requires skills</li> <li>when error occurs, the personnel turn to sending paper copies</li> <li>is expensive and timely to implement</li> <li>each set up with a partner requires an investment</li> <li>security issues (control on the large amount of data)</li> </ul>
<i>E-invoicing</i>	<ul style="list-style-type: none"> <li>is relatively easy to implement</li> <li>is much less expensive than EDI</li> <li>single investment, but the system is applicable with many partners</li> </ul>	<ul style="list-style-type: none"> <li>the biggest current challenge is the data transfer between bank and operators (compatibility of the standards Finvoice and TEAPPS)</li> <li>challenges at the implementation stage:               <ul style="list-style-type: none"> <li>-correct supplier information</li> <li>-supplier skills/readiness</li> <li>-pricing (varies by bank and operator, often unclear)</li> <li>-legislation questions (bookkeeping, EU-directives)</li> </ul> </li> </ul>

**Table 6. The advantages and disadvantages of EDI versa e-invoicing, case Wärtsilä.**

### 5.3 Case Finnair

In the beginning, this subchapter provides a short background of the case company. Further, it presents an overview of the electronic invoicing process in the pre- and post-implementation period. Finally, this chapter describes the impact of electronic invoicing on the business relationship in the context of the theoretical framework.

#### 5.3.1 Background

Finnair, an operating Airlines Company was established in 1923. Now it focuses on the transportation of passengers between Europe and Asia via Helsinki. The Finnair Group's operations comprise scheduled and leisure passenger traffic, technical and ground

handling operations, catering, travel agencies, and travel information and reservation services. The number of employees of Finnair Group accounts for 9,500. Finnair operates the leisure flights to more than 60 destinations, e.g. the resorts situated in Mediterranean, in the Caribbean, the Canary Islands, South-East Asia and South America, 13 domestic destinations, as well as, intercontinental destinations, such as Japan, China, South Korea, India and Thailand.

The major shareholder of Finnair is the Finnish government with holding a share of 55.8 percent, while the foreign shareholders own approximately 20 percent of shares. The Finnair fleet comprises more than 60 aircrafts. In total, during 2008 Finnair carried over 8 million passengers (8 270,100).

The Finnair Group consists of several business units that represent four main services: scheduled traffic, leisure traffic, aviation services and travel services. The scheduled traffic service covers the Commercial Division Flight Operations Production Management, Finnair Cargo Oy, Finnair Cargo Terminal Operations Oy and Finnair Aircraft Finance Oy. The turnover of the scheduled passenger traffic and cargo accounted in 2008 for 1736 million euros (external turnover 72% of the Group's turnover), with a number of staff totaling in 4,254 employees (44% of the Group's staff).

The leisure traffic comprises Leisure Flights, Oy Aurinkomatkat-Suntours Ltd Ab, Horizon Tarvel, Calypso -Takeoff/Matkayhtymä Oy. The turnover in 2008 accounted for 455 million euros (external turnover 20% of the Group's turnover), and a number of staff for 464 employees (5% of the Group's staff).

The aviation services consist of Finnair Technical Services, Northport Oy (a ground handling company), Finnair Catering Oy, Finncatering Oy (subsidiary to Finnair Catering Oy) and Finnair Facilities Management Oy. The turnover in 2008 accounted for 446 million euros (external turnover 17% of the Group's turnover), and a number of staff for 3,650 employees (38% of the Group's staff).

The travel services are represented by Area (a travel agency), Finland's Travel Bureau - Suomen Matkatoimisto, Estravel AS (subsidiary to Finland's Travel Bureau) and

Amadeus Finland. The turnover in 2008 totaled in 78 million euros (external turnover 3% of the Group's turnover), and a number of staff accounted for 1,078 employees (11% of the Group's staff). (Finnair Group)

### **5.3.2 Electronic Invoicing**

Until 2000 all inbound and outbound invoices in Finnair have been transferred in a paper format. In 2000, the Finnair's accounting department started a project aiming at the improvement of the accounts payable and receivable. The project group recognized electronic invoicing as one of the opportunities aside of the main project. During the first steps of the project, no one vendor joined the electronic invoicing process. Thus, at the first stage of the electronic invoicing (purchase invoice process) implementation the invoices arrived in a paper format were scanned, and further processed electronically. In 2003, in order to promote electronic invoicing, the accounting department organized a campaign, as a result of which, one supplier from five participated in the demonstration joined e-invoicing.

Finnair's business units in Finland and abroad were at the different stages when the implementation electronic invoicing has begun. Few of business units have had some inbound invoicing software yet some have not. For example, Finnair Technical Services unit had its own ERP system comprising ordering system and EDI. However, Finnair had no a common application environment at that moment neither has today.

The implementation of electronic invoicing was started in one subsidiary and further diffused in other business units. Currently, all purchase invoices except those related to Area's, SMT's and Finnair Technical Services business unit are processed electronically. In the middle of 2007, the domestic invoicing penetration accounted for 23 percent. In 2009, the end-to-end electronic processing covered 40 percent of domestic invoicing in Finnair's 12 business units, while the rest of invoices still arrive in a paper format for to be scanned on arrival. In addition, Finnair has 30 sales units abroad that early processed their invoices in a paper format. Now, also their invoices are processed electronically after scanning.

The invoicing process is integrated with bookkeeping software (accounting system), but not with an ordering (purchasing) system. The invoicing processing system enables the circulation of invoices for verification, posting and approval within business units – invoice owners. In addition, the system provides users with an opportunity to transfer invoices as attachments in pdf-format, automatically add a cost center number and posting account, as well as the good reporting and monitoring capabilities. As an intermediary for transferring invoices, Finnair uses an operator Basware.

At the beginning, not all the personnel were satisfied with the changes brought by the electronic invoicing implementation. The handling invoices Finnair's personnel total in circa 1,000 employees, and they anticipate the changes to be positive. Some temporary errors occur in the system and server, yet the most important issue is to process invoices with no delays during the vacation period. The other issue is observed to be the smooth cooperation between operators. According to Finnair's staff, the problem occurs when for processing e-invoices a supplier uses a bank as an intermediary, therefore the seamless connection between a bank and Finnair's operator works some times improperly.

According to the accounting department, there are no errors between operators, such as missing of invoices or data errors. All the errors are related to the content of the invoice. In addition, electronic processing is observed as a more reliable channel in comparison with electronic mailing. Annually, Finnair processes approximately 300,000 invoices, from which 200,000 invoices are processed electronically including both scanned from the paper and e-invoices.

### **5.3.3 Information Exchange**

According to the accounting department, the information exchange between a supplier and the accounting is considerably fastened. The arrival of an invoice, its circulation and the overall handling until being ready for payment has been accelerated from approximately 4 days to a few hours (e.g. a foreign invoice). Otherwise, the accounting

department experiences no impact of the electronic invoicing implementation on the information exchange process. Because the business units are aware of the content of an invoice, e.g. in a situation when an error occurs, it is possible that the business units and other departments experience some impact on information exchange between them and suppliers.

Nevertheless, the implementation of electronic invoicing affected considerably the information exchange internally, i.e. between departments and business units. This effect is associated with a change in handling invoices. Thus, before the implementation, the invoices had arrived directly to the departments and business units, and therefore the accounting department had no information of a status of an invoice in a circulation process. As the circulation has become transparent, the accounting department has relevant information related to invoices, and it has achieved the controlling and managing position over the invoicing process. The communication and information exchange associated with handling of invoices has increased between the accounting department, other departments and business units. The accounting department claims that the implementation of electronic invoicing caused no commitment or dependency of a supplier to buyer. As electronic invoicing is not a critical criterion for a choice of a partner, the factors influencing commitment and dependency are business related.

#### **5.3.4 Operational Linkages**

The biggest change has occurred concerning the processing of invoices within the business units and account payable.

##### **The old process**

Until the implementation of electronic invoicing, the invoices after arriving were handled by a corresponding business unit. Each business unit verified, posted and approved, and sent its invoices to an accounting department. In addition, each foreign business unit processed its paper invoices, and manually entered the data in to the system. At that

moment, there was no transparency, i.e. the accounting department had no information about an invoice in process.

### **The current process**

Since the electronic invoicing implementation, all inbound invoices (except from two business units and two travel agencies) are processed electronically. The part of invoices is arriving electronically, yet part of them – in a paper format. After the scanning and adding of the basic data, all the invoices are released to a circulation process over the business units for verification, posting and approval. For to speed up the process, the departments, i.e. the invoice owners can create the posting templates for invoices of the same types. Thus, the processing of an invoice will be faster.

The circulation takes in shortest from the tens of minutes to 1-2 days. The automation of invoice processing (not yet in the wide use) would speed up the process up to a few hours. The automation requires setting of so-called agreement numbers that enables automatic matching of the agreement numbers within processing of an invoice. Thus, the posting, verification and approval will be executed automatically.

In case when the personnel in charge are not in office, the invoice will be automatically processed to the other person in order to avoid a delay in a procedure. In case of the missing data, the accounting department in cooperation with a business unit tries to find the correct data from the old invoices. The accounting department strives to avoid returning invoices; only in case when nothing else can be done the invoice will be returned to a sender. The accounting department ensures that an invoice includes all the necessary data by providing instructions to the business units for the further provision to suppliers. In general, the business units are in charge of the completeness and correctness of invoices, as they make the orders and work in collaboration with suppliers.

Related to the foreign units, all the foreign invoices are sent to an accounting department for scanning, with an exception of 10 units in Asia ( China, Japan etc.) that are allowed scanning their invoices themselves due to the specificity of language. Further, after the

scanning the invoices are processed to a regular circulation and payment systems by these units.

### **5.3.5 Cooperative Norms**

At the beginning of the project, the accounting department had some expectations and goals to achieve. The expectations from the electronic purchase invoice process were to improve the process transparency, its effectiveness and efficiency, and circulation speed. The more general objectives related to the improvement of the invoicing process were the cost downsizing, adaptation of the modern technology and an opportunity to offer the better purchase invoice processing tools to business units. The accounting department's estimation for expectations related to the suppliers comprised the efficiency of the invoicing and payment processes, as well as the saving on costs. That is, the accounting department claims that many of suppliers are satisfied, as Finnair is able to handle electronically the inbound and outbound invoices. On the other hand, Finnair so far required no capability for electronic invoicing from its suppliers, thus the suppliers that are not ready to process invoices electronically may still send the invoices in a paper format. Finnair is continuously informing and reminding the suppliers in order to keep them aware about an electronic invoicing opportunity, as in the future the readiness for electronic invoicing might be a criterion for the choice of a supplier.

### **5.3.6 Legal Bonds**

As the electronic invoicing readiness of the suppliers varies considerably, the electronic invoicing capability is still not strictly required. However, before the implementation of electronic invoicing the agreement comprised only the invoicing address. Since the implementation, some changes are made in the new and updated agreements. The change comprises the additional information on the preferences related to invoicing formats accepted by Finnair, for example, the agreement of the fuel business unit presents the



options as follows: in the first place an invoice in the electronic format, in the second – as an attachment in the pdf format, and in the third – in a paper format.

### **5.3.7 Adaptations by buyer and seller**

In order to implement electronic invoicing Finnair has made the considerable investments and adaptations. At the account payable, the company invested into software, bearing the implementation project costs, costs related to a server, the yearly maintenance and update costs, as well as the costs corresponding to the continuous improvement of the system.

At the account receivable, Finnair has made investments into the invoicing software, and it bears yearly the costs related to the maintenance of the system. In addition, the invoicing of 12 business units is processed via the account receivable in the Finvoice format via software Sonet, because not all units are capable to send their invoices in an electronic format. Also, two travel agencies send their invoices (Finvoice-format) using AGM-system.

Considering suppliers, the costs of their adaptations cannot be estimated here, as Finnair requires no electronic invoicing capabilities from its vendors. Only, the changes related to the automation of posting will require some adaptations from the suppliers.

### **5.3.8 Future Projects**

Finnair aims to maximize the benefits of the electronic invoicing process. One of the important goals for the near future is to improve the use of the so-called Order Matching function that enables the automation of posting of costs and adding a cost center number to an invoice. Currently, the invoice has a field reserved for adding of an agreement number that will be in the future added and matched with a number stored in the system. This improvement enables the recursive invoices to be processed and posted automatically.

The main goal is to increase the penetration of electronic invoicing, maximize the automation of the operations related to the process, centralize the purchasing operations to the particular vendors, and speed up the entire invoicing process within and along SEPA.

### 5.3.9 Summary on the case Finnair

The table below represents the summary on the advantages and disadvantages of electronic invoicing based on the comments obtained from an interview of the key personnel.

	<i>Advantages</i>	<i>Disadvantages</i>
<i>Paper Invoices</i>		<ul style="list-style-type: none"> <li>• Very slow, min 4 days</li> <li>• No transparency</li> <li>• Missing invoices</li> <li>• No automation</li> <li>• Account department has no control on the process</li> </ul>
<i>Electronic Invoicing (incl. scanned)</i>	<ul style="list-style-type: none"> <li>• Reliable channel, no invoice missing</li> <li>• Errors free</li> <li>• Automated posting, cost center, monitoring, reporting</li> <li>• Fast: from a few hours to 1-2 days</li> <li>• Transparency of the process</li> <li>• Accounting department manages and controls the process</li> <li>• Savings on costs</li> </ul>	<ul style="list-style-type: none"> <li>• When there are many appendixes, the invoice is easier to handle in a paper format</li> <li>• Cooperation issues between an operator and bank</li> </ul>

**Table 7. The advantages and disadvantages of a paper format versa e-invoicing, case Finnair.**

Key Connector	No impact	Weak	Strong
Information Exchange		√	
Operational Linkages			√
Legal Bonds		√	
Cooperative Norms		√	
Adaptations by seller		√	
Adaptations by buyer			√

**Table 8. The impacts of e-invoicing on the key connectors in the case Finnair.**

According to the results obtained from the case, the impact of the implementation of electronic invoicing on the operational linkages and adaptations made by buyer (the case company) can be considered as being strong. The connectors such as the information exchange, legal bonds, cooperative norms, and adaptations made by seller (Finnair's suppliers) reflected the weak impact.

#### **5.4 Case Marimekko**

This chapter presents the case company Marimekko. Starting with company's background, the chapter gives a short overview of the old invoicing process and describes the implementation of the current electronic invoicing process at the account payable. This chapter sheds the light on the challenges emerging within the electronic invoicing implementation, as well as the advantages evolved from the process.

##### **5.4.1 Background of the case company**

The Marimekko Corporation is a Finnish textile and clothing design company that was established in 1951. The company designs and manufactures clothing, interior decoration textiles, bags and other accessories under the Marimekko brand, both in Finland and abroad. The Marimekko's personnel account for 400 employees, and the turnover totaled in 2008 approximately in 80 million euros. In Finland, Marimekko owns three factories, one of which is situated in Helsinki (fabric printing works), other one at Kitee (the clothing factory), and the other one in Sulkava (bag factory). At the present, Marimekko's own the plants producing slightly less than half of all products sold by the company.

Marimekko owns 23 shops in Finland, one in Stockholm, Sweden, and one in Frankfurt, Germany. In Finland, Marimekko has a retail network covering the entire country that includes both department stores and specialty shops. Some of the specialty shops operate

under the full Marimekko concept, while some of them sell only selected products under retailer's own business concept.

Marimekko has its own subsidiaries and retail shops in Stockholm, Sweden, and Frankfurt, Germany. The export of products to the other countries is managed directly or through the local agents and importers. The Marimekko products were exported to over 40 countries. The foreign retailers account for 1,200 businesses, of which 30 run the concept stores. Marimekko also is engaged in the licensed sales abroad.

#### **5.4.2 Invoicing**

The Marimekko's suppliers can be divided into three general groups: the domestic suppliers (including own stores and real estate), the EU-suppliers and the non-EU suppliers. According to the bookkeeping register, the latest number of suppliers (for a period of 5 years) accounted approximately for 5,000 companies. However, not all vendors supply to Marimekko every year, thus a number of the active suppliers varies around 2,000.

In 2007, a number of invoices processed at the account payable totaled in 16 000 documents. The monthly volume varies between 1,300 and 1,700 invoices. In the fall of 2007, the accounting department started implementing electronic invoicing at the account payable. The estimation for invoicing volume was processing of 17,000 invoices, but already the first months of the year demonstrated that the estimation cannot be reached. The monthly invoicing in the beginning of the year accounted for less than previous minimum, only for 1,100 invoices. In 2008, the number of invoices accounted for 15,500 units. The decrease of invoicing has no connection with the changes in the overall economic situation neither with the consolidation of the travel agency invoicing under a single account implemented in 2009.

The Marimekko's account payable outsourced the first step in an invoice process (arrival, scanning and processing into the system) to an intermediary – operator (consolidator

model). The operator, Itella, accepts three channels by which the inbound invoices may arrive: by mail, by e-mail as an attachment, and electronically. Approximately, 20 percent of invoices arrive electronically; the rest of invoices is received in a paper format and as e-mail attachments. Electronic invoicing has been implemented only with the domestic suppliers that have established an electronic channel with Itella. The rest of the domestic suppliers, the EU-suppliers and non-EU suppliers are allowed to send their invoices in a paper format or as an e-mail attachment (pdf. or tif.-formats). All the non-EU-suppliers are sending their invoices in a paper format due to the incompatibility of standards and customs requirements. Itella processes the electronic invoices, scanned images from paper invoices and e-mail attachments to the Marimekko's account payable using a single channel.

#### **5.4.3 Account Payable: Invoicing Process**

The implementation of electronic invoicing has been in the "air", but the accounting department at that time had no available resources for to start the implementation. In 2007, with the changes in accounting management the electronic invoicing project at the account payable has started. The full implementation took three months. The team of four persons has launched the electronic invoicing process: three of them represented Marimekko, and one – a software vendor.

The implementation comprised the choice on and implementation of appropriate software (Invoice Manager, provided by Opus Capita), building the channel for inbound invoicing between an operator (Itella) and Marimekko's system, and the integration of invoicing circulation with the account payable and bookkeeping modules. Although the project has been launched in 3 months, the guidance and consultancy in processing of invoices along the circulation was required during the following months. Thus, during two months in the beginning of 2008, the one person at the account payable had dedicated almost 100 percent of her working time for serving other Marimekko's invoicing users as a help desk advisor.

At the minimum, the invoicing circulation takes 3 days. One day is booked for arriving of an invoice to Itella, the other – for a scanning procedure and processing of the image to Marimekko, and the other one for the circulation process at Marimekko. In average, the payment term is set for 30 days. However, there are the small suppliers, especially in Baltic countries, whose payment term is quite short – 7 days. In opposite, some suppliers set 14 days net payment, while some of foreign invoices expire only in 60 days. Now, the cash payment discount is not much in use any more.

The old invoicing process involved a large amount of paper work and manual operations. The circulation of invoices was time consuming. In addition, the considerable amount of space has been needed for archiving invoices and receipts, as in accordance with the legal requirements, the documentation has to be stored during 5 years plus an additional current year. The invoice circulation process was organized as follows: all paper invoices arrived to the account payable was sorted by arriving date, stamped with arriving and posting stamps, organized and copied. The copies were released to the circulation over the corresponding departments for verification, posting and approval. Every morning at the account payable has been started by comparing the copies returned from circulation to original ones, making some necessary corrections to posting, inputting invoice data manually to a computer system, and processing the expiring payment invoices to a bookkeeping module, and further to the payment system. At that point, the personnel always verified posting for correctness.

In case, two bookkeeping periods were open, the account payable pondered to which period the cost is corresponded. In addition, if there were too much invoices at a time, the personnel prioritized those that were due to payment at a current day. The data to be entered included a supplier, the invoice number, due date, total payment and posting account with a cost center number. Sometimes the posting or/and a cost center number were missing, and the account payable personnel had to post costs on behalf of the department in charge.

#### **5.4.4 The electronic invoicing process**

Along the implementation of electronic invoicing, the manual handling of invoices comprising the reception of mail, sorting, stamping, copying and organizing has become unnecessary and was eliminated. Now, the electronic invoicing process is integrated with a current bookkeeping module and an ordering process.

Every morning the account payable personnel release to the circulation invoices arrived from Itella last night. At 10 o'clock, the account payable sends an e-mail reminding the personnel about a status of invoices circulating in the system. The software enables to establish a chain that consists at least of a verifier, approver and optional personnel for whose information an invoice can be sent. To make a choice of a single person for each invoice is not possible; every new combination of personnel requires a new chain to be set-up. Optionally, the software enables an invoice to be visible for all corresponding personnel at once or gradually. After the previous step is completed, an invoice will become available at the next stage. After the verification and approval at the department, the invoice will be transferred for approving to the account payable and bookkeeping.

The invoices that are already overdue, are indicated by red colour; the invoices expiring on the current day are marked by yellow, whether those that are due in the future – by green colour. The possible cash discount for the earlier payment is not visible on the main screen with invoice data; therefore, when the invoice is checked for the due date, the special condition is most likely to remain unnoticed and unused. However, according to the accounting department the use of the cash discount condition in invoices becomes more and more rare.

Now, at the account payable, electronic invoicing consumes sufficiently less time. According to the accounting department, the regular handling of invoice at the account payable takes approximately 60 percent of working time, the rest is used to e-mailing and queries related to software and invoices. The overall costs of electronic invoice are estimated to be 40 percent lower than costs of a paper invoice.

#### **5.4.5 Information Exchange**

According to the accounting department that was driving forth the electronic invoicing process implementation, electronic invoicing has no impact on information exchange between suppliers and a buyer. Only at the implementation stage, the communication and information exchange reached a peak along all the links: accounting department – suppliers, accounting department – operator, accounting department – purchasing department and owners of invoices in others departments. In addition, the communication content has been changed to some extent.

At the beginning of the project, the account payable gathered from departments some information related to the performance of new software. Further, the training related to use of the software has been organized for the departments' personnel. The account payable served as a help desk for other departments at the implementation stage, and it is still continuously assisting other departments in problem solving related to the electronic invoicing process.

The accounting department issued a letter suggesting and describing all three available and acceptable ways of invoicing. In addition, all Marimekko's departments were informed about a change of the invoicing address from the location in Herttoniemi to Itella's mailbox.

The accounting department reported that the most typical cases of communication and information exchange between the account payable, other departments, operator and suppliers are the different types of errors. In general, the small amount of errors occurred before electronic invoicing. Currently, the amount of errors remains small, though the quality of errors has been changed.

The typical errors emerging between a supplier and buyer are data errors (content or technical), missing data and incorrect invoicing address (due to the difference of invoicing address from physical location of the company). In addition, the account payable strives for to get rid from faxes and original paper invoices sent by some



European companies. In Europe, mailing may take a long time, but some Baltic companies have the quite short payment terms, therefore in order to fasten processing, it was suggested them to send their invoices as an e-mail attachment directly to the account payable.

In case, the error is related to the content of an invoice (e.g. incorrect sum or quantity, or missing data (orderer is missing)), the person who verifies invoices at the account payable communicates the problem to the purchasing department that further investigates the error with a supplier.

The subjects for communication between the account payable and operator comprises the errors in a invoice format (other than pdf. or tif.), processing of the same invoice twice, queries related to invoicing, and notifications sent by an operator to the accounting department. The amount of information exchange between the account payable and an operator slightly increased due to the errors in invoices. In the case of data error, and depending on its type, the account payable communicates the problem to an operator, and further to an invoice owner (department) and/or supplier.

The typical internal information exchange between the account payable and other departments considers some errors in posting, reminding e-mails and calls, and queries related to correctness of invoices. Despite of the 1,5 years passed after the project has been launched, some suppliers sometimes erroneously send their invoices by company's address or materials by an invoicing address. In some cases, the staff at the account payable had to make a call to European suppliers in order to explain what the difference between locations is. In general, the invoicing channel affected no magnitude of information exchange between a buyer and supplier.

#### **5.4.6 Operative Linkages**

The sufficient changes evolved along electronic invoicing in the operative linkages, invoicing procedures and routines.

Firstly, the direct link between two counterparts a buyer and a seller transformed into the channel connecting these counterparts via an intermediary – operator. Secondly, the entire manual invoicing process at the account payable has been transformed into an electronic one. The new way of processing resulted into the changes in the tasks performed in a department that owns, verifies and approves invoices. The new process affected the content and effectiveness of work at the account payable.

The implementation of electronic invoicing had considerable impact on the operative linkages between those companies who established an electronic channel with an operator in order to send their invoices to a buyer electronically. For those domestic and European suppliers who continue sending invoices as an attachment to e-mail and/or in a paper format, the change remained smaller, resulting into the change of recipient's address. Finally, for the non-European suppliers the change resulted into an invoicing address, as they continue sending invoices in a paper format directly to Itella.

The electronic invoicing has made impact on the processing of invoices in the departments. The personnel and approver who handle invoices along the circulation in the departments have to pay more attention on the correctness and completeness of cost posting. This change in the procedure caused some critics at the departments. At the accounting department, the change in the procedures and routines has been enormous. The manual circulation was replaced with electronic one, and the content of a single task at the account payable has been transformed into entire management of the invoicing process.

Every morning the account payable personnel use an hour (depending on the quantity of the invoices) for releasing invoices into circulation. The transfer of invoices due at a

particular day takes a quarter or half an hour, thus the entire procedure takes approximately two hours. The other change in the invoicing procedure is related to the verification of posting at the account payable before the invoices can be processed to a bookkeeping module. Before the implementation of electronic invoicing, the posting has been verified at the account payable along the manual entering of data into the system. Currently, the account payable personnel print out a list of each hundred of invoices before transferring the data to the account payable in order to verify the posting manually. The personnel at the account payable claims that verification of each single invoice directly from the screen in the circulation software would be complex and take more time due to the user interface of the invoicing software. However, the manual verification of posting is seemed to be necessary by the account payable as a mean to prevent erroneous posting of the costs from passing throw to bookkeeping.

#### **5.4.7 Legal Bonds**

Electronic invoicing induced no any changes into the already existing business agreements neither into the new ones. In addition, the implementation of electronic invoicing affected no choice of suppliers, i.e. the business matters are the criterion for the choice of suppliers. However, Marimekko informs each supplier about three available invoicing channels, but the decision on which to use is still a prerogative of a supplier.

#### **5.4.8 Cooperative Norms**

According to the account payable, electronic invoicing had no impact on the cooperative norms between a buyer and sellers. The buyer had no expectations related to the changes in the relationship between a buyer and sellers emerging from the implementation of electronic invoicing. There are no common goals to achieve, neither collaboration to get tight.

When the buyer's account payable suggested three options for sending invoices, no opportunism took place among suppliers, as even those who had no any invoicing software and compiled their invoices in Excel are capable to send paper invoices by a different mail address.

There were, however, some problems related to some of the European supplier's invoicing software that allowed no entering of two addresses corresponding to the one customer. This problem was solved in cooperation with the account payable by adding a mailbox number and by sending invoices as an e-mail attachment in some cases.

The most important expectation of the buyer from suppliers is that they would send their invoices strictly to Itella. Concerning the internal cooperation within departments, the account payable expected that departments are actively informing buyers about changes in an address, and would be careful in sending the right information to the non-EU suppliers, as these are not given the electronic invoicing options. As the electronic invoicing software enables invoicing process transparency along the circulation between departments, all departments can track invoices independently, and cooperation had no growth at this stage.

The implementation of electronic invoicing affected no dependency neither commitment level between counterparts, as the choice of a supplier is still business driving.

#### **5.4.9 Adaptations by buyer and supplier**

In regards to the non-EU suppliers, and those EU- internal and domestic suppliers who are sending invoices in a paper format and/or as an attachment to e-mail, the only change was the difference in mail/e-mail addresses. Marimekko bears all the costs related to reception of invoices. The suppliers who are sending invoices in electronic format might have to make investments in order to set up electronic invoicing channel with Marimekko via Itella.

From Marimekko's point of view the investments and adaptations have been done in order to set-up the software, establish the electronic channels between software and an operator, circulation and the account payable modules. The overall investment accounted for less than 40,000 euros. Marimekko used no external consulting at any stage of the project.

#### **5.4.10 Future projects**

Marimekko has a few ongoing projects related to improvement of the entire electronic invoicing process.

One of them is a replacement of the old bookkeeping software by a new one produced by MicroSoft that allows the broader reporting and sorting of the data. The same software can be used in Marimekko's subsidiaries, thus the reports to the headquarters could be accomplished automatically with no exporting data to and sorting by Excel.

The other project is the implementation of electronic archive for the account payable. Currently, the invoices are stored in the memory of invoicing software and are ready to be transferred. The same electronic archive is already set at the account receivable side. At the logistics, the delivery list arrives to the warehouse in a paper format. The reception of delivery list in an electronic format and opportunity of automated verification of the data in the delivery list and invoice are the matters for improvement in the future. As this project requires the integration with ERP and considerable amount of recourses, it is anticipated to be not relevant in the near future.

The other larger future project is the extension of electronic invoicing at the account receivable, and further integration of the account receivable with an order and order confirmation. The implementation has been started two years ago, but had stuck with three customers at the testing stage partly due to the lack of resources and a merger

process of the previous operator. Currently, Marimekko is sending the electronic invoices to three large customers. To those customers with whom the electronic channel was not implemented, Marimekko transfers its invoices by e-mail to Itella, and Itella prints and sends them forward in a paper format. The account receivable is still sending invoices in a paper format to the non-EU customers in Asia, America and Australia. In the fall of 2009, Marimekko is planning to send a letter to its customers in order to identify the readiness of customers to establish electronic invoicing at the account receivable.

#### 5.4.11 Summary on the case Marimekko

This section presents the outcomes of the case Marimekko related to the implementation of electronic invoicing, as well as the classification of findings by a corresponding relationship connector in the table.

Key Connector	No impact	Weak	Strong
Information Exchange		√	
Operational Linkages			√
Legal Bonds	√		
Cooperative Norms		√	
Adaptations by seller		√	
Adaptations by buyer			√

**Table 9. The impact of e-invoicing on the key connectors in the case Marimekko.**

According to the findings, the implementation of electronic invoicing has had relatively weak or no impact at all on information exchange between a buyer and suppliers. The implementation project induced the peak of communication at the beginning of the project yet as the process has become routine, the communication level lowered.

The operational linkages had experienced the considerable changes, i.e. the invoicing process was transformed from manual to the fully automated between an operator and the

account payable. Despite of some stages that are still require manual handling (verification of posting, invoices and delivery lists), the procedures and routines have experienced enormous changes.

The implementation of electronic invoicing had no any impact on the legal bonds, as no changes have been made in any business agreement. Nevertheless, a buyer and a seller have to make the separate agreements with an operator.

The implementation of electronic invoicing had a very weak or no impact on the cooperative norms, expectations and aims of the counterparts. It was reported, that the project affected no formation of neither change in dependency and commitment between a buyer and sellers.

The account payable observed the tendency among the small suppliers to externalize invoicing to some service providers. In addition, the software companies provide small firms with more light and moderately priced electronic invoicing solutions. However, Marimekko set no any pressure to suppliers related to the electronic invoicing implementation.

According to the findings, the buyer had to make the relatively extent adaptations and investment comprising financial, time and working resources. The adaptations and investments covered at the implementation stage invoicing software, an electronic channel and agreement with operator, a channel between operator and account payable, and currently the buyer bears the costs related to scanning, processing, storing and disposing of the invoices at the operator's side.

The effect on the supplier's investment and adaptation can be considered as weak, because only some suppliers had to establish an electronic channel and software with operator. The most of the suppliers had not to make any investments or adaptations related to the buyer's implementation of electronic invoicing.

The table below displays the advantages and disadvantages of electronic invoicing anticipated by the Marimekko's account payable.

	<i>Advantages</i>	<i>Disadvantages</i>
<i>Paper Invoice</i>		<ul style="list-style-type: none"> <li>• time consuming process: 8h a day</li> <li>• Manual entering of all data</li> <li>• Invoices are missing during a circulation</li> <li>• Overdue invoices and reminding letters from suppliers</li> <li>• Additional mailing and mailing costs corresponding to the invoices from own shops</li> <li>• The flow of invoices back from circulation was very unstable, some times up to 200 units at a time</li> <li>• No transparency in invoicing process</li> <li>• Some arrived by fax – very unclear copies</li> <li>• Huge amount of paper, invoices, receipts, archive</li> <li>• Archive maintenance and handling: mapping, storing and disposing of old invoices</li> <li>• Need for space (archiving, storing)</li> </ul>
<i>Electronic Invoice (incl. scanned)</i>	<ul style="list-style-type: none"> <li>• Transparency of the invoicing process</li> <li>• Single invoicing channel</li> <li>• Lower cost of invoice</li> <li>• No physical space for archive</li> <li>• Enables the fast circulation</li> </ul>	<ul style="list-style-type: none"> <li>• Errors in scanning: incorrect data picked from an invoice</li> <li>• Some errors in a transferring format</li> <li>• Double invoicing</li> <li>• Correctness of posting in</li> </ul>



	of invoice	departments ->need to print out check lists
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**Table 10. The advantages and disadvantages of a paper format versa e-invoicing, the case Marimekko.**

## 6 Summary and conclusions

This chapter summarizes the findings based on the information obtained from the interviews of the case companies' personnel by mapping this information to the corresponding key connectors in the framework. In addition, the chapter discusses results of the research, its limitations, as well as suggests the topics for the future research.

The summary table below represents six framework connectors. The experienced impact is measured by the relative strength indicators: no impact, weak impact and strong impact. The case Lindström is marked as L, Finnair – F, Wärtsilä – W, and M stands for Marimekko.

<i>Key Connector</i>	<i>No impact</i>	<i>Weak impact</i>	<i>Strong impact</i>
<i>Information exchange</i>		M, F	L, W,
<i>Operational linkages</i>			L, W, M, F
<i>Legal bonds</i>	L, W, M	F	
<i>Cooperative norms</i>		L, W, M, F	
<i>Adaptations by sellers</i>		L, W, M, F	
<i>Adaptations by buyers</i>			L, W, M, F

**Table 11. The impact of e-invoicing on the key connectors in four cases.**

Despite the fact that all the case companies represent the different industries, organizational structure, size and invoicing volume, in respect to the electronic invoicing process they have much in common.

It is important to keep in mind, that the previous research (case Lindström) was carried from the seller's point of view, yet cases Wärtsilä, Marimekko and Finnair represents a

buyer's side and the invoicing process owner in particular. Nevertheless, all four companies experienced the strong impact of e-invoicing on the operational linkages, as the invoicing procedures, routines and entire invoicing process have been significantly changed.

The impact of e-invoicing on information exchange can be characterized as strong for Lindström and Wärtsilä, because information sharing, collaboration and cooperation in the implementation of the e-invoicing system between both parties were considerable. In opposite, the impact on information exchange in Marimekko and Finnair was less significant, and it can be considered as weak. The companies continuously remind their suppliers about the e-invoicing opportunity, in addition, at the implementation stage of the process, both companies experienced the incremental exchange of information, but there was no intensive collaboration and cooperation with suppliers. All the companies underlined the grown circulation speed, transparency of the process, integration opportunities with other processes, and automation capabilities.

Related to the legal bonds, Lindström, Marimekko and Wärtsilä experienced no impact of the implementation of e-invoicing, but Finnair reported adding the electronic invoicing options to the new and up-dated agreements. All the companies, as well as their counterparts, had to establish agreements with operators.

The effect of e-invoicing on the cooperative norms has been relatively weak in all four cases. According to the theory, the cooperative norms comprise expectations of both parties in order to achieve the mutual goals and benefits. The common objective for the implementation of e-invoicing in the case companies were saving on costs, improving the effectiveness and efficiency of the invoicing process, increasing adoption rate, and an opportunity to provide the better service for own business units and customers (suppliers).

All the companies continuously provided their partners with marketing information related to e-invoicing. Moreover, Wärtsilä offers to its vendors the cooperation and

collaboration in problem solving within the system design and implementation. The companies expect their partners to follow the given instructions related to the minimum data requirements, and completeness and correctness of invoice information in order to avoid the unnecessary errors. On the other side, the companies anticipated their suppliers expecting a saving on costs and receiving the clear invoice data requirements. Wärtsilä, Finnair and Lindström estimated that their partners are satisfied with the new invoicing process. However, no one company has had strictly required the implementation of e-invoicing or set the e-invoicing capability as a criterion for a business relationship. Each company is still accepting invoices in a paper format and as an attachment to e-mail. Wärtsilä and Finnair are scanning invoices into the system at their own facilities, yet Marimekko externalized this activity to its operator. The share of electronic invoices excluding scanned and e-mail attachments accounts for 20% in Marimekko, 40% for Wärtsilä (including EDI) and 40% for Finnair (domestic invoicing).

All companies stated that they handle domestic invoicing electronically (including scanned invoices), but all foreign invoices arrive in a paper format and are processed electronically only after the scanning. The common barriers for processing foreign invoices electronically from the beginning to the end are the standardization issues and requirements set by the legal authorities.

The common e-invoicing model provided by these companies is the Consolidator model, in which all transactions are enabled by an operator and/or a bank. Furthermore, Wärtsilä provides their suppliers also with the Buyer model (internet portal), where the customers can pick the orders themselves. The adaptations and investments required by the implementation of e-invoicing by buyers and suppliers considerably vary. The Marimekko's investments are accounted for approximately less than 40,000 euros. Wärtsilä estimated that the investments can differ from 50,000 to 200,000 euros comprising the hardware and software, resources and time.

However, the case companies had to make some single investments into software, establish an agreement with operator, and they are currently bearing the recursive

maintenance costs. In general, from the buyers' point of view, companies' investments were larger in comparison with those made by suppliers, as the buyers required no electronic readiness and capability from suppliers, but accepted invoices in a paper format.

From the seller's point of view (case Lindström), the company's large customer had to make the considerable adaptations and investments that will pay them back during following few years. Lindström had to make the single investments related to e-invoicing and ledger software that paid itself back already. Based on the case Lindström, it was concluded that due to e-invoicing the switching costs and thus the commitment between Lindström and its customers has increased, providing value to both parties to the extent that these investments have reduced costs and created dependence. (Salomäki, 2008)

One of the important factors acknowledged by the researchers Håkansson (1982), Lim and Lee (2005) is that electronic data interchange involves a high level of interdependency of the partners. As EDI implies the sizable investments, agreements and the large amount of data to be transferred between partners, and independent application system tiring both parties, its implementation is justified in the cases in which a high volume of transactions is expected, e.g. in case Wärtsilä. Thus, we can conclude relating to the EDI implementation at Wärtsilä, the mutual interdependence is taking place between the partners.

Wärtsilä, Finnair and Marimekko were concerted that e-invoicing implies no dependency between business parties, as its implementation requires no establishing a unique information transferring channel, but once implemented, both companies may deploy e-invoicing with other partners.

All companies were of the same opinion that EDI and e-invoicing incur a commitment of partners, as the building of the common system, the problem solving related to it, and the elimination of errors at the implementation stage make communication and collaboration more tight.

The commitment related to EDI application is seemed to be more powerful, as along the invoicing data, the channels enable sharing of sensitive business information between partners. The low interdependence (Sheu, Yen and Chae, 2006) is related to lesser demand for information sharing, and can result in low commitment.

Considering e-invoicing, the application provides no additional business information with invoices, but the continuous improvement, such as automation of some operations, correctness and completeness require the more tight and committed collaboration between partners than paper invoicing. Furthermore, in opposite to EDI, where the information transition channel should be established each time with a new partner, e-invoicing involves no switching costs, as the implemented application can be used with many users.

In respect to the impact of the implementation of e-invoicing on the market and situational conditions, case Lindström indicated that due to the switch of a supplier, the switching costs may be significant especially for the bigger customers. Furthermore, the barriers to entry and the threat of new competitors to enter the market are anticipated to be higher than before e-invoicing. In opposite, the availability of alternatives has decreased in the market from the customer's point of view, because only part of the Lindström's competitors is able to offer the service of e-invoicing.

According to the previous research (Salomäki, 2008), e-invoicing may be a competition factor and it has an impact on the choice on a supplier only if two suppliers' services and prices are equal. Already now, some of the biggest customers, as well as in public sector require e-invoicing capability as a prerequisite for to cooperate.

According to Wärtsilä, Finnair and Marimekko, electronic invoicing so far is not a criterion of the choice on the supplier, and therefore e-invoicing cannot be considered as a competition factor between suppliers. Nevertheless, the further automation of operations within e-invoicing process and increasing of e-invoicing penetration in the market, leads to the prioritization of suppliers with the equal capabilities in favour of

those, who have the e-invoicing readiness. Furthermore, all three companies aim to the full e-invoicing process with their suppliers, and in order to achieve this goal, they remind their vendors continuously about the e-invoicing opportunity.

This research also aimed to find how the impact of digitalization differ depending on whether a company implementing e-invoicing is an EDI-user or whether a non-EDI company is adopting digitalization from scratch. In regards to the sub-question of this thesis, we obtained not enough evidence from the case companies in order to claim that the utilization of EDI before the implementation of e-invoicing matters. The accounting department was an initiator of implementation of e-invoicing at all the case companies. Thus, the implementation of e-invoicing was not business driven as for EDI, but driven by a supportive function. The accounting department aimed in first place to improve an invoicing process and achieve the saving on costs. Therefore, through the changes, the accounting department obtained more control over the invoicing process in each of the case company, and its role has been upgraded from a pure accounting/bookkeeping function to the controlling, consolidating and managing the entire invoicing process activity between partners.

Nevertheless, some of companies' units have had their own EDI systems before the e-invoicing implementation (case Wärtsilä and Finnair), but the research provides no information in favour of the assumption that there is difference between an EDI-user and a non-user regarding to the adoption of e-invoicing. Moreover, Wärtsilä claimed that EDI has a slightly negative image among some suppliers due to its complexity and expensiveness, and thus makes an unfavorable effect on the adoption of e-invoicing by association. Referring to this comment, we may suggest the further research focusing on the possible negative influence of EDI in respect to the electronic invoicing implementation.

Based on the information provided by the case companies, all of them are planning to continuously increase a number of e-invoicing customers. Regarding to EDI, the number of EDI partners will slightly decrease or remain unchanged. According to the comments

acquired from the companies, we may conclude that the penetration of e-invoicing is to grow based on the following reasons:

- XML-format is relatively simple and represents more accessible and modern technology
- There are some trends in the business market when the small companies are provided with the simplified and moderately priced e-invoicing tools or solutions by the third parties (some Marimekko's customers)
- Once implemented, e-invoicing can be used with the various partners

These features let us assume that e-invoicing is going to prevail over EDI in many cases in the future. In addition, all companies reported that their goals are associated with the improving integration of the e-invoicing process with other supportive processes, such as ordering, order confirmation, logistics, bookkeeping, and automation within and along the invoicing process itself (a cost center number, posting). Thus, the role of the accounting and bookkeeping units becomes the more important in the adoption and implementation of technology, as e-invoicing and control over the entire process will be apparently concentrated in this unit.

The results of this thesis reveal some tendencies related to the impact of the electronic invoicing implementation on the business-to-business relationship. However, we can suggest more research on the same topic from a buyer and seller's points of view separately in order to identify how the impact on the key connectors possibly differs depending on a purchasing or selling activity. The findings of this thesis support an idea that the impact in a purchasing and selling organization on the information exchange, operational linkages, legal bonds and cooperative norms are more or less similar, but effect on the adaptation and investment is near the opposite. In addition, the larger companies have more resources to cooperate and collaborate with suppliers related to the system improvement and problem solving in order to achieve the mutual goals.

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