Using E-Hub to Create Value within Supply Chain and Manufacturing Network in Iran for OEM Industry

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Using E-Hub to create value within supply chain and manufacturing network in Iran for OEM industry

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Abstract

With improvement in the Internet infrastructure and software, it is easier to conduct business over Internet then ever and e-commerce has become part of daily routine. The purpose of the thesis is to provide a better understanding of why and how Hub within supply chain is used in the B2B setting. The benefits, risks and strategies of e-Hub and its emerging usages are analyzed ad presented with the result of case studies of car manufacturer companies. Analysts believe that enormous cost savings and effectiveness can be achieved through the utilization of Hub for purchasing of B2B model. E-Hub within supply chain enlarges customer based, broadens the search for suppliers for its raw materials to lower its production cost. The promise is simple: to streamline routines processes, and help companies consolidate their purchasing practices, enabling them to receive better discount and better service from suppliers.
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# Table of contents

**Chapter 1 : Introduction**

1.1 Background 8
1.2 Problem Discussion 13
1.3 Research Propose 16
1.4 Dispositional of Thesis 16

**Chapter 2 : Literature Review**

2.1 The management of supplier issues 18
2.2 Supply chain & manufacturing networks 19
2.3 Design of a manufacturing network 23
2.4 Management of a manufacturing network 25
2.5 Enterprise resource planning systems 26
2.6 Utilization of information technology 35
2.7 e-SRM services functions 38
2.8 e-SRM Processing 39
2.9 e-SRM Technology Services 41
2.10 E-Marketplaces 42
2.11 Electronic Data Interchange (EDI) 43
2.12 Internet 44
2.13 Benefits associated with e-procurement technology 46
2.14 Risks associated with e-procurement 50
2.15 Strategies development of e-procurement 53
  2.15.1 E-procurement practices 54
  2.15.2 E-procurement Strategies 55
  2.15.3 E-procurement models 56
2.16 E-procurement models by other authors 62
2.17 Emergence or research questions and conceptualization 63
  2.17.1 E-procurement strategies 67
  2.17.2 E-procurement practices 67
  2.17.3 E-procurement models 68
2.18 Emerged frame of references 69
Chapter 3: Methodology

3.1 Research Purpose
3.2 Research Approach
3.3 Research Strategy
3.4 Data collection
3.5 Sample Selection
3.6 Validity and Reliability

Chapter 4: Empirical Data

4.1 Case study: Auto Chassis International (RENAULT GROUP)
   4.1.1 Know how
   4.1.2 Engineering
   4.1.3 Products
   4.1.4 Research & Development
   4.1.5 Certification

4.2 An Overview of EDI in my sample area
   4.2.1 How EDI Works in Renault Group
   4.2.2 The Need of EDI in Renault Group
   4.2.3 Frequently Asked Questions in “ACI PARS” one of the members of Renault Group in Iran

4.3 The itx2 WebEDI service dedicated to the automotive industry
   4.3.1 Main functionalities
   4.3.2 The set-up of the Web EDI solution
   4.3.3 Overview
   4.3.4 Data base set-up
   4.3.5 Incoming documents processing
   4.3.6 Dispatch Advices and Invoices Input
   4.3.7 Documents Tracking

4.4 eCar - Web EDI Solution-Supply Chain Management
   4.4.1 An Information Systems Consulting Company dedicated to EDI & e-Commerce B2B
   4.4.2 Web EDI intended to fulfill the supply chain requirements based upon GALIA/ODETTE recommendations
   4.4.3 Web EDI: deployment
4.4.4 Web EDI: deployment

4.4.5 How can the benefits associated with implementation of e-hub within supply chain and manufacturing network in B2B organizational setting described? 112

4.4.6 How can the risks associated with adoptions and integrations of e-hub within supply chain and manufacturing network in B2B organizational setting be described? 113

4.4.7 How can the e-hub strategies within supply chain and manufacturing networks in B2B organizational setting be characterized? 114

4.5 Data Analysis

4.5.1 RQ1: How can the benefits associated with implementation of e-Hub within supply chain and manufacturing network in B2B organizational setting be described? 116

4.5.2 RQ 2: How can the risks associated with adoptions and integrations of e-hub within supply chain and manufacturing network in B2B organizational setting be described? 119

4.5.3 RQ 3: How can the e-hub strategies within supply chain and manufacturing network in B2B organizational setting be characterized? 120

Chapter 5: Findings and Conclusion 124

5.1 RQ: How can the benefits associated with implementation of e-hub within supply chain and manufacturing network in B2B organizational setting described? 124

5.2 RQ: How can the risks associated with adoptions and integrations of e-hub within supply chain and manufacturing network in B2B organizational setting be described? 127

5.3 RQ: How can the e-hub within supply chain and manufacturing network strategies in B2B organizational setting be characterized? 129

5.4 Overall conclusion 132

5.5 Implications 133

5.5.1 Implications for management 134

List of Tables 6
List of Figures 7
Ref. 136
Appendix 143
Persian abstract 146
List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1</td>
<td>Three most frequently identified barriers to e-procurements technologies</td>
<td>53</td>
</tr>
<tr>
<td>2-2</td>
<td>Comparison of direct and indirect purchases</td>
<td>54</td>
</tr>
<tr>
<td>2-3</td>
<td>Production -versus non production-related items</td>
<td>55</td>
</tr>
<tr>
<td>2-4</td>
<td>Comparison of various e-procurement models</td>
<td>58</td>
</tr>
<tr>
<td>3-1</td>
<td>Differences between quantitative and qualitative data, adapted from Saunders, (2000)</td>
<td>73</td>
</tr>
<tr>
<td>3-2</td>
<td>Research strategies connected to criteria, adapted from Yin (1994)</td>
<td>74</td>
</tr>
<tr>
<td>4-1</td>
<td>Explanation of coding</td>
<td>115</td>
</tr>
<tr>
<td>4-2</td>
<td>Benefits associated with e-procurement implementation</td>
<td>116</td>
</tr>
<tr>
<td>4-3</td>
<td>Risks associated with e-procurement adoption</td>
<td>119</td>
</tr>
<tr>
<td>4-4</td>
<td>E-procurement strategies utilized organizations</td>
<td>120</td>
</tr>
<tr>
<td>4-5</td>
<td>Statical table to find-out the relative frequencies</td>
<td>121</td>
</tr>
<tr>
<td>4-6</td>
<td>E-procurement practices utilized by organization</td>
<td>122</td>
</tr>
<tr>
<td>4-7</td>
<td>E-procurement models utilized by organizations</td>
<td>123</td>
</tr>
</tbody>
</table>
List of Figures

<table>
<thead>
<tr>
<th>Figure Number</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>Horizontal versus vertical communities</td>
<td>11</td>
</tr>
<tr>
<td>2-1</td>
<td>A manufacturing network</td>
<td>20</td>
</tr>
<tr>
<td>2-2</td>
<td>Sequential network</td>
<td>21</td>
</tr>
<tr>
<td>2-3</td>
<td>Parallel manufacturing network</td>
<td>22</td>
</tr>
<tr>
<td>2-4</td>
<td>2002- KPMG consulting – collaborative supply chain management</td>
<td>26</td>
</tr>
<tr>
<td>2-5</td>
<td>Collaboration footprint :the impact of flexibility</td>
<td>28</td>
</tr>
<tr>
<td>2-6</td>
<td>The border collaboration footprint the more need flexibility</td>
<td>28</td>
</tr>
<tr>
<td>2-7</td>
<td>Building and e-Hubs balancing process and data integration in business</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>flexibility</td>
<td></td>
</tr>
<tr>
<td>2-8</td>
<td>Value web collaboration with e-Hubs</td>
<td>30</td>
</tr>
<tr>
<td>2-9</td>
<td>The e-Hubs solutions : meeting expanded  business requirements</td>
<td>31</td>
</tr>
<tr>
<td>2-10</td>
<td>E-SRM B2B e-marketplace functions by Ross</td>
<td>36</td>
</tr>
<tr>
<td>2-11</td>
<td>Enterprise Resource Planning System by Bocij et al. (2003),</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-13</td>
<td>Infrastructure of the Internet by Bojic et al.(2003)</td>
<td>45</td>
</tr>
<tr>
<td>2-14</td>
<td>Emerged frame of references</td>
<td>69</td>
</tr>
<tr>
<td>3-1</td>
<td>Schematic Presentation of the Methodology</td>
<td>70</td>
</tr>
<tr>
<td>5-1</td>
<td>E-Procurement Environment</td>
<td>133</td>
</tr>
</tbody>
</table>
Chapter 1

Introduction

In the first chapter, the reader will be provided with the background of research. Under problem discussion the foundation of the research is build. Also the disposition of thesis, which contains outline of study, will be discussed. Furthermore, I will bring your attention about the problem area and finally present research problem.

1.1. Background

Supply Chain Management (SCM) has received a lot of attention during the last 20 years from both practitioners and academics (Szejczewski and Goffin, 2001). Furthermore, Ross(2003) states that SCM has risen to the perhaps today’ s most critical business strategic paradigm.

Handfield and Nichols (1999) break the concepts of Supply Chain Management. They define the supply chain as “all activities with the flow and
transformation of goods from the raw materials stage (extraction), through to the end user, as well as the associated information flows.

And in the other side, for the past decade, the impact of web-based technology has added velocity to all the activities and avenue of business. Business organizations are now under a tremendous pressure to improve the responsiveness and efficiency in term of product development, operation and resources utilization with transparency.

In this, lead times needs to be reduced to the extreme extent to meet the changing demands in different regions of the world. With the emerging application of internet and information and communication technology (ICT), the companies are forced to shift their operation from traditional way to a virtual e-business, e-procurement and e-supply chain philosophy.

To have a well working Purchases and Supply Management (PSM) function can be necessary if a company’s goal is to develop and maintain in effective supply chain. According to Sevensson (2004) supplier segmentation is one fundamental business activity to improve the outcome of a company’s effort to maintain and enhance its position in the marketplace.

Technology has always been important for a company’s interaction with its suppliers. The introduction of the telephone, for instance, dramatically changed ability of company to communicate. The last ten years have again seen a dramatic change in how technology can affect a company’s ability to work with its suppliers. The main reason for this change is the advent of powerful IT driven business tools (Ross, 2003).

According to Ross (2003) there are various kinds of information technologies that can support the management function within the area of SCM. As an example he states that the advent of internet in the middle of the 90’s has forever changed the way companies are doing business. Another one is Electronic Data Interchange (EDI), that in 2003 was the most widely used IT – application within supply chain activities. Furthermore, he brings up Enterprise Business Systems (EBS) commonly recognized as Enterprise resource planning (ERP) systems that nowadays serve as a backbone in company’s transaction and information management function. To
summarize his standpoint he state that the IT development the last ten years transferred SCM in to perhaps the most potent mechanism for competitive advantages.

E-commerce (EC) has change the business model profoundly. The models appear under names such as “the name economy”, “business”, “webonomies” to mention few. They all have in common the web one way or another. E-commerce is seen as the new tool that will revolutionize business as we know it today (Knudsen, 2000). Application of web –technology is no longer on after that in forming business strategy but rather the cause and driver, hence changing the very definition of value (Kalakota and Robinson, 2000). E-commerce has been brought to prominence in recent years by the popularization and commercialization of the Internet. In addition to the commerce of the Internet, EC is practiced through electronic markets (e-market) and EDI (Whitely, 2000) this creates a need for an efficient e-commerce enabled supply chain or value chain management (as each stage adds value to product before passing it on).

B2B (business-to-business) electronic marketplace (e-marketplaces) that use Internet protocols as communication standards have gained widespread application in the supply chain management.

An e-marketplace provides a virtual location, where buyers and sellers meet, but it may also provide mechanisms to support the subsequent transactions between buyers and sellers.

(Chong, 2001) purchasing and supply (procurement) activity of organization is one, which spans both internal services & B2B services, according to Kaplan and Sawhney (2000) market places are classified into four categories:

- MRO (Maintenance, Repair and Operation) hubs are horizontal markets that enable systematic sourcing of operating inputs.
- Yield managers are horizontal markets that enable spot sourcing of operating inputs.
- Exchanges are vertical markets that enable spot sourcing of manufacturing inputs.
Catalog hubs are vertical markets that enable systematic sourcing of manufacturing inputs.

There are two major market places figure1-1:

- Vertical market places, automate supply chains by digitizing and normalizing products catalogues, creating market liquidity by developing facilitator exchange.
- Horizontal market place, seek to make the procurement of common service more efficient because the audience they address, the goods and service bought and sold over them are common to many industries.

Horizontal market makes provide a venue for transacting such goods and service as MRO suppliers, logistics services media buying, outsourced human resources services, temporary works and excess inventory and excess capital equipment. (Kalakota and Robinson, 2000)

![Figure 1.1: Horizontal versus vertical communities](source: Kalakota and Robinson, 2000, p.317)
In the recent years, the focus has shifted to more strategic view of the market. This has accurately assisted in rediscovering supply chain management, like e-procurement is the productive use of the Internet to improve the effectiveness and efficiency of the supply end of the supply chain (Presutti, 2002).

Supply chain management can be described as the chain linking each elements of the manufacturing and supply process from raw materials to the end user, encompassing several organizational boundaries. This broad definition includes the entire value chain and addresses materials and supply chain management from the extraction of raw materials to its end of useful life. (Scott and Westbrook, 1998; New and Payne, 1995) By connecting in the new electronic marketplace of the World Wide Web, a buyers firm is able to streamline its purchasing activities electronically, even when not all of its supplier can automatically process electronic orders. To buyers in supply chain management, procurement systems and B2B electronic markets are perceived as a new procurement channel enabled by the Internet and new technologies of the World Wide Web. Adoption of these technologies and the corresponding business models associated with them, are of great significance to the success of many businesses in the spectrum of industries. (Dai and Kauffman, 2000)

IT publication and business analysts alike have been full of the promises of B2B e-commerce. At the center of all the hype was the possibility of what e-procurement could offer a company as a means for companies to control costs. Electronic negotiation and contracting and possibly collaborative work in specification can further enhance time and cost saving and convenience. (Timmers, 1999) An e-procurement solution automates the key internal procurement process from catalog, requisitioning, procurement receiving and payment processes for indirect and direct commodities. (ITRG, 2002) The ISM (Institute for Supply Management) /Forrester reports on e-business (2002) have shown consistent growth in the adoption of web-based methods for indirect purchases instead of direct purchasing, which contains more percentage of dollars spend on purchase.

An example of this comes from Ovans (2000) “One might not think it would matter to an 8.5 billion company how it buys its pencils. But when they have upward of 60,000 employee in 100 countries purchasing those pencils, not to mention desk,
computer, and spare parts for oil field equipment—the time and costs involve can quickly mount.

Rather than trying to centralized such purchase into some worldwide purchasing office, Schlumberger and other big companies have chosen or choosing to take advantage of the burdening market for e-procurement “. (Ovans, 2000)

1.2 Problem Discussion

According to Aberdeen (2001), "e-procurement allows companies to automate the tactical processes and workflow associated with purchasing. Purchasing managers through e-procurement are able to manœuvre their way out of massive paper trails and make critical strides in efficiency”. The initial rounds of e-procurement technology are used almost exclusively for purchases that are already on contact with a set group of suppliers. ITRG (2002), state that e-procurement includes aspects of procurement function supported by various forms electronic communication, and its use in both the public and private sectors takes many forms including:

- Electronic Data Interchange (EDI) – inter-organizational information system using structured data exchange protocols often through value added networks.
- E-MRO –mechanism for ordering indirect items from an on –line catalogue.
- Enterprise resource planning –automation of procurement related workflows including auto –faxing, auto –emailing or other forms of messaging directly with suppliers.
- Web –based enterprise resource planning –automated procurement workflows but web based.
- E-sourcing –way of identifying new sources of supply using Internet technologies.
- E-tendering –the process of inviting offers from suppliers and receiving their responses electronically.
- E-reverse auctioning –using Internet technology bidders usually bid down the price of their offer against those of other bidders until no further down –ward bids are received.
- E-auction for disposals –using of Internet technology for on line auctions of items for disposal.
- E-informing – use of Internet technologies for gathering and distributing.
- E-collaboration – collaborative procurement related planning and design using facilitating technologies.

This typology is also supported and adapted by several other scholars e.g. (Caldwell et al., 2002; De Bore et al., 2002; Knudsen, 2002; Telgen, 2001).

E-procurement systems in essence mirror the procurement process through the provision of two distinct, but connected infrastructure, internal processing (Internet bass platforms). (Croome and Johnston, 2003) The critical difference is that these systems allow individual employees to order goods and services directly from their own personal computers (PCs) through the web on a real-time basis. Requests and orders are channeled through various forms of hubs or databases. It also allows individual employees to search for items, check availability, place and track orders and initiate payment of delivery. (Sheng, 2002) E-procurement had been the subject of a great deal of research, but again this has tended to focus on the development of inter-organizational electronic networks. In efficient and maverick buying habits redundant business processes and the absence are symptoms of poor procurement practices. (De Bore et al., 2002)

The world of e-procurement is changing at a dizzying pace and B2B procurement is rapidly becoming the most efficient way to conduct all these modes of business.

According to Kalakota and Robinson (2000), these are three catalysts driving growth in the e-procurement space:

- **Cost saving**: Application reduces purchasing costs by nearly 90 percent, which translates into dramatically better margins for buyers. Centralizing procurement activities concentrates that total spending and improves negotiating power.
- **Improves efficiency**: Focus purchasing on strategic, value added upstream portions of the business rather than on transactional, downstream activities.
- **Control**: Increase purchasing role in the company’s total sending, including such non-traditional areas as operating resource procurement. Web-based
procurement exchange provide better inventory management, faster time to market, and use less working capital than traditional means of procurement.

One of the objectives of the e-procurement is to offer International procurement opportunities to the local business, and to improve market access for small and medium size firms that are typically specialized. As with any e-business effort, efficient procurement strategies integrate a company’s business workflow with robust applications infrastructure. The central objective of a company’s e-procurement strategy is to better manage the firm’s operational costs. (Kalakota and Robinson, 2000)

Over the time organizations realize such time and cost savings by linking with major suppliers through private networks, such as electronic data interchanges (EDIs) (McGarvey, 2000). Since 1970’s, some large corporations used EDI networks to process batches of highly structured data from trading parents and to fulfill a procurement function. Conventional EDI technologies have some limiting characteristics like technically rigid, complex standards, significant start-up, implementation and maintenance costs, and “point-to-point” connectivity (lead to absence of community).

These factors make EDI less optimal when the dynamics of an open market are considered. (Schwartz, 2000) Consolidating the purchase process with a few key suppliers capable of providing volume discounts can generate tremendous cost savings. Internal customer service improvement emerged as a significant and relevant issue for procurement professionals and e-business project teams. Electronic negotiation and contacting and possibly collaborative work in specifications can further enhance time and cost savings and convenience.

Web based procurement systems become apparent to early adopters; respondents were highlighting the substantial improvement in internal customer satisfaction from users of electronic procurement systems and a consequent major improvement in user compliance. For today’s industrial age companies must change their current procurement practices to become tomorrow’s e-business leaders. By providing improved visibility in to the process flow, e – procurement can strengthen management control. E-procurement reduce maverick buying, ensures compliance
with corporate policies and institutionalizes a company’s best business practices. While improving and control, implementing e-procurement can improve productivity.

E-procurement can not only build strategic supplier relationships but uses aggregate buying to gain volume discount from suppliers. (Evans and Wurter, 1999).

E-procurement’s benefit fall into two major categories: efficiency and effectiveness. E-procurement’s efficiency benefits include lower procurement costs, faster cycle times, reduce maverick or unauthorized buying well organized reporting information, and tighter integration of the procurement functions with key back-office systems. E-procurement’s effectiveness benefits include the increased control over the supply chain, proactive management of the key data, and higher-quality purchasing decision within organizations. (Kalakota and Robinson, 2000) Many companies are implementing e-procurement strategies concurrently with integrated supply chain efforts. The Web provides the technologies basis for achieving the supply and procurement chain management most firms seek. However, for many companies development of a truly effective integrated procurement strategy is still in the future. Relatively a few firms have a clear vision of what a companies must achieve when reengineering and integrating their procurement processes. Furthermore, no good roadmap exists for how such integration is to be achieved or what the ultimate destination.

1.3 Research Propose

From the problem discussion above, propose of the thesis is to provide better understanding on how e-hub within supply chain and manufacturing network is used in B2B setting.

1.4 Dispositional of Thesis

The thesis is divided into five chapters. The dispositional of the thesis is illustrated in figure 2. In this chapter, the reader is introduced to the background of the research, followed by problem discussion. In the second chapter, the reader is provided with a literature review of previous research conducted within the area of the overall purpose, which serve as theories for the study. Then the reader is presented
with the thesis purpose and based on the theories and purpose research question are formulated. The frame of reference, following the literature review, further specifies the theories that will be used. In the third chapter, the methodology used for this thesis will be discussed. Chapter four will handle the empirical finding, which consist of a company background followed by the gathered data. The empirical data gathered is then analyzed in same chapter. Five and final chapter consist the conclusion and implications, general conclusion are drawn based on the finding of the research conducted. At the end of this fifth chapter, implications for further research are presented.
Chapter 2

Literature Review

In the previous chapter, an introduction and background to the research area of this study was presented, as well as the overall purpose. This chapter presents the literature review for the research area. It is necessary to review literature on supply chain management in the automotive industries and later on will present literature on information technology concepts to reach to e-procurement as an e-Hub within purchasing activities. The Research problem is also discussed which leads to specific research question. Finally we will close the chapter with a frame of reference for this thesis, in which the literature to be used will be conceptualized.

2.1 The management of supplier issues

As the purpose of my study is to investigation how the use of information technologies in SC & MN and their influences on it can be characterized. we first need to get a clear picture of how SCM is applied in the automotive industry.
2.2 Supply chain & manufacturing networks

The use of manufacturing networks has become an essential weapon in many multinational companies’ strategies. A manufacturing network enables a company to develop capabilities to respond to diversity in national or regional demand, while at the same time integrate and coordinate their activities globally to reduce costs and improve productivity (De Meyer et al., 1996). Parameters like speed, flexibility, productivity and cost are improved, but the need for integration and co-ordination of processes and information are increased drastically.

Many companies have implemented an Enterprise Resource Planning (ERP) system in order to support their internal processes. New requirements for collaboration across company borders have led to increased demand for different functionality in the enterprise software. But the traditional ERP-system is still the backbone of many companies information and communication systems.

The ERP-systems can integrate and support a supply chain & manufacturing network. The focus will be on the SC & MN requirements for integration and coordination and to which extent the ERP-systems (with supporting systems) can meet these demands.

Manufacturing companies are subject to tremendous pressures because of ever changing market environments and the fact that manufacturing takes place in a global context where local markets are subject to global standards (Jagdev and Thoben, 2001).

Consequently we see that many multinational companies develop capabilities to respond to diverse national demands, while at the same time they integrate and co-ordinate their activities to reduce costs and improve productivity (De Meyer et al., 1996). These changes force companies to rethink their global strategy in general, and to rethink their manufacturing strategy more specifically. An important element in this new manufacturing strategy is how to establish an efficient, flexible and integrated manufacturing network.
A manufacturing network consists of manufacturing plants that co-operate and share resources with each other. They are not only linked together by a supply chain, but they are also linked at the same level of value adding.

The network can consist of plants within the same company or a network of one focal company and some sub-contractors, see figure 2.

Figure 2.1. A manufacturing network
(Vereecke and Van Dierdonck, 1999)

Almost every large manufacturing company consists of a manufacturing network. The network can be a result of merges, take-overs, and according to a well-prepared strategy or just pure coincidences.

According to Du Bois and Oliff (1992) there are four types of manufacturing network configurations:

- Home country configuration without any plants abroad

- Regional configuration with a division of the international market into a small number of sub-regions, whereby each region is self-contained in its management. Simplicity in management and closeness to local markets triggers this choice.
Global co-ordination where each factory has to play a global role and serve markets; exploitation of local or regional advantages becomes possible in this configuration.

A combination of regional with global co-ordination

As mentioned earlier, a manufacturing network consists of plants that co-operate and share resources with each other not only linked together by a supply chain but also linked at the same level of value adding. By focusing on requirements, materials and payments between the plants in the network, it is possible to further divide manufacturing networks into two types:

- Sequential networks
- Parallel networks

Sequential networks can be considered as a network of supply chains, see figure3. Supply chains constitute a sequential network, where plants receive (buy) unfinished goods from upstream suppliers and transform the products into higher value and passes (sell) them to the next plant downstream the chain. Competitiveness can be achieved through chain integration and process redesign that enables reductions of stock and quick response to focal customers/market segments.

![Sequential network diagram](image)

Figure2-2 : Sequential network

Parallel networks are a group of plants at the same level of value adding that share resources, see figure2-2. Parallel networks are most common between plants in the same company.

Companies allocate jobs (capacity) between plants in order to optimize their resources and fulfill customers’ volatile demand patterns. Manufacturing plants
collaborate in parallel networks to increase their flexibility. The ability of manufacturing plants to fulfill customers orders with respect to due dates, are often constrained by the limitation of capacity.

Thus, manufacturing plants improve their flexibility by sharing production capacity with other plants that are able to provide the same product or service. However, to exploit the full potential of such networks requires extensive communication and monitoring of the order and resources situation in the network.

Figure 2-3. Parallel manufacturing network

A manufacturing network can consequently consist of global, regional or local networks of plants arranged in parallel and/or sequential. In order to use the manufacturing network as a competitive advantage in the increasing global competition, each company has to repeatedly rethink their manufacturing strategy and look for better ways to do things. In particular, there are two crucial and mutual depended questions that should be raised: “How to design a manufacturing network”, and “How to manage the network?” It is important to understand how close these two questions are linked. It is hard to manage a badly design network, and an ideal designed network does not exceed business excellence if the management works against it.
2.3 Design of a manufacturing network

As mentioned earlier there are many questions that should be raised in order to be able to design a manufacturing network according to the current manufacturing strategy for a company. To give some insight in this process, we will address two of these questions here, namely each plant strategic role and the portfolio of products to the different plants. In a manufacturing network, consisting of dispersed manufacturing plants, each plant will have a particular role. According to Ferdows (1989) there are six different strategic roles in a manufacturing network:

- The off-shore plant – utilize local cheap production input factors
- The source plant – as the off-shore plant, but has a more substantial strategic role and can be responsible for particular products or processes
- The server plant – serving a national or regional market
- The contributor plant – as the server plant, but it also develops know-how for the company
- The outpost plant – collects useful information from hi-tech regions or area, e.g. from universities or research centers or technologically advanced competitors, suppliers or customers
- The lead plant – acts as a partner of the HQ in developing manufacturing capabilities within the company

The basis for this model is the level of contribution of the plant to the competitive strategy of the company (strategy role) and the primary location driver. By using this model the company can design a network with the desired profile, e.g. that the company is customer oriented enough or can gain competitiveness through local inputs factors.

- The next question is how to allocate the whole portfolio of products to the different plants. The plants were located in a certain region mainly for reasons of cost, market or technology (De Meyer and Vereecke, 1994), but which product should be produced where?
According to Hayes and Schmenner (1978) and later Schmenner (1982) a company can choose between three principles for focusing their plants:

- **Product focus** – to which extent the plant is producing a limited portion of the company’s products range
- **Market focus** – to which extent the plant is producing for a limited portion of the geographical market supplied by the company
- **Process focus** – to which extent the plant is concentrate on a distinct stage of the production chain

The choice between these principles has strong implications for the range of tasks of the corporate manufacturing staff and the plant management. In the next section we will discuss some aspects of managing a manufacturing network.

### 2.4 Management of a manufacturing network

Managing a manufacturing network has many similarities to supply chain management. Supply chain management can be defined as: “The management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the chain as a whole” (Christopher, 1998). In addition to the supply chain perspective there are also the challenges associated with how to manage and co-ordinate an integrated parallel network. A major contribution from the supply chain perspective is that each company in a chain is dependent on each other and yet paradoxically by tradition does not closely co-operate with each other. Competitiveness can be achieved through chain integration and process re-design that enables reductions of stock and quick response to focal customers/market segments.

By comparing the management of one large manufacturing plant to many plants that constitute a network, we will see that the management are facing different problems. If the manufacturing plant becomes too large, “diseconomies of scale” will probably occur. As the production output grows, the plant usually has to distribute its products over a larger geographic area. This will affect the distribution costs. There may also be a tendency to increase the level of co-ordination and control more than proportionally, by creating a more bureaucratic organization (De Meyer and
One large plant also has the tendency to become unfocused, there are too many processes and products and it is hard to achieve business excellence. As opposed to this, each plant in a manufacturing network is focused on its core competencies. The challenges are how to integrate and co-ordinate the network in order to achieve an efficient and competitive flow of goods, know-how/technology and information.

At the operational level, the manufacturing network supports three types of flows that require careful control and extensive communication:

- Material flows, which represent physical product flows from the suppliers to the customers
- Requirement flows, which represent order transmission
- Financial flows, which represent credit terms and payments

The focus of the plants has major logistical implications for the company, as it determines to a large extent the flow of goods in the network. In process-focused plant, goods have to be transported in a sequential network. Product and/or market oriented plants operate more as a parallel network and have other needs. In such a network one of the logistical challenges will be to co-ordinate deliveries, e.g. cross-docking.

In order to achieve logistical excellence the manufacturing network is dependent on a thorough and powerful ICT strategy, with ICT systems (e.g. ERP-systems) that support the management, integration and co-ordination of the network.

A manufacturing network is characterized by intensive communication not only between suppliers and customers, but also between the participating companies. The goal is to get everyone in the manufacturing network onto a common platform of logistics transactions and information systems for greater inter-organizational “seamless ness”. This integration can result in significantly faster system response times to volatile changes in marketplace events and patterns of demand. By creating and managing a highly organized network of complementary companies across the supply chain, a manufacturing network can also rapidly build strategic effectiveness and wealth (Boyson et al., 1999).
2.5 Enterprise resource planning systems

Traditionally, the enterprise has many different computer systems and databases to support its various departments. For example, the financial department have systems for accounting and general ledger, the sales and marketing have systems for order management and pricing, while the production department can make use of a Manufacturing Resource Planning (MRPII) system.

An ERP-system is a standard application program, which support execution of business processes throughout the whole company. The ERP-system has functionality that makes the company able to replace many of their applications with a single seamless system with one common database. The term ERP was first introduced by Gather Group in the beginning of the nineties (see www.garter.com). But this type of software goes further back. Already in the seventy, some of the larger integrated software programs did appear (SAP, Oracle, JD.Edwards, Baan etc.).

By the late 1970s the industry had gained considerable MRP experience. Costing information, raw material costs, standard times and overhead allocations could be combined into the MRP algorithm to calculate total manufacturing costs.

*The integration of planning and collaboration systems with the ERP layer will bridge the gaps to provide extended planning cap abilities*

![Diagram showing the integration of planning and collaboration systems with the ERP layer.]

Successful change management also depends on defining the transition of roles and responsibilities and, most importantly, on performance management.
Without the proper incentives and performance management tools in place, the full promise of collaboration will not be realized.

The technology architecture layer requires particular emphasis and is the focus of this white paper. This layer is evolving rapidly, and weakness in technology architecture has the potential to waste hundreds of millions of dollars in IT investments. Conversely, a thoughtful IT architecture can create billions of dollars in new business value.

The collaboration footprint of the past typically required integration along a product line, function or geography. It therefore had a limited organization scope, with fewer systems and connectivity requirements. This limited scope made for a relatively stable operating model.

The narrow collaboration footprint required limited flexibility. This was ideally suited for an ERP solution. These systems employed Client Server three-tier architecture that was developed to replace mainframe technology. This architecture allowed separate servers – actually fully functional computers – to independently handle data management, application/transaction processing and the user/client interfaces.

ERP systems, and the approaches to implementing them, were developed to achieve connectivity through real time data integration and common global processes. Individual components were hardwired to each other – the Internet was not well developed when this technology evolved. ERP systems had, and continue to have, a major positive impact on businesses as they allow companies to achieve a new level of internal collaboration – for those processes engineered into the ERP system.

Of course, legacy systems not replaced by the ERP system, as well as related partner systems, are still connected with inefficient batch or manual interfaces.

The increasingly horizontal nature of the high-tech industry has broadened the collaboration footprint. Implementing a collaboration solution for a value web presents a new level of complexity. As the span of connectivity increases, so do the number of systems, process and organization structures that must be connected.
The ability for any single party to drive change across multiple enterprises is limited. Because of the broad span of organizations involved, the operating model is also less stable. Thus, flexibility is a fundamental requirement of a multi-enterprise collaboration solution. Figure 2-5, below, outlines the business requirements of the new collaboration footprint.

Thus, while ERP systems enabled a new level of collaboration within the enterprise, the collaborative environment – beyond the boundaries of a company’s four walls – requires new technologies and a new approach to implementation. As shown in Figure 2-6 developing the right technology strategy, to enable the right level of integration internally, as well as among business partners, is one of today’s major business challenges.
Once the collaboration strategy is defined, a set of minimum process and data commonality requirements can be established.

It is then possible to use a combination of technologies to design a technical architecture that provides the right balance between integration and flexibility.

We call this web-enabled environment that allows comprehensive internal and external connectivity an eHub; the term refers to all systems and connectors within the enterprise.

The looser coupling of systems and data that make eHubs efficient to implement and operate has been greatly facilitated by new Internet-based technologies. These technologies represent the building blocks of an eHub. They can be combined in different ways to address a variety of business objectives and collaboration strategies. Three specific web-enabled technologies, in addition to ERP systems, that help to deliver the benefits of eHubs are:

- **Enterprise Application Integration (EAI):** used to connect disparate ERP and legacy systems over the web. These tools allow convenient machine-to-machine connectivity inside and outside the enterprise, with looser coupling and more flexibility. The underlying systems don’t need to be modified because data is exchanged between systems using metadata or hyper-relationship tables.

- **The Portal:** allows employees to use the Internet to “drag and relate” data across systems, and execute transactions in these systems with a single sign-on. The Portal also uses metadata or hyper-relationship tables to co-relate data elements. There is no need to hardwire systems. This is a powerful and inexpensive way to enable ad hoc man-to-machine collaboration.

- **The Web Exchange:** web services that can be controlled either publicly, by the users, or privately by an owner or owning body. An OEM and its partners can conventionally process and exchange data using such a service. The information is secured so that partners can only see the data they have permission to see.
Each of these technologies, together with ERP systems, offers a different level of integration and flexibility as indicated in Figure 2-7.

The functionality of the eHub can vary based on the collaboration strategy and on whether it has a “buy-side” or a “sell-side” focus. The architecture, however, is designed from the same components. ERP systems will continue to be used. In fact, ERP vendors are developing new versions of their products in which individual components can be more loosely coupled using the Internet and standards based interactions within the enterprise. The choice is not between ERP and something else.

Rather, the question is how to design the eHub using ERP, EAI, Portals and Web Exchanges to align the technology architecture with the collaboration strategy. We believe that the leading value webs of the future will consist of multiple interconnected and strategically aligned eHubs (see Figure 2-8).
Data

E-Hub represents a superior technology solution to the needs of collaboration compared to ERP systems alone. Let us examine why (see Figure 2-9):

- Implementation cost and time: ERP implementations are typically phased by an entire, often global, functional process. This makes implementations time-consuming, costly and risky.

Also, legacy systems often have to be completely replaced by ERP systems, when batch connectivity of those systems is inadequate.

In constructing an eHub, implementation is sequenced by work roles, not functions.

As Case Histories A and B suggest, this leads to achieving results and savings more quickly – in months rather than years – which can help fund the implementation of additional work roles. The flexibility of an eHub, as presented in all three Case Histories, can also reduce development and maintenance costs.

- Organizational impact: the tight coupling of ERP systems requires extensive change to organizations and processes across the enterprise, resulting in significant change management challenges - another reason why the risk of failure in implementing these systems is high.

As indicated in the Case Histories, the looser coupling of systems and data that an eHub allows limits change to only what is essential for the collaborative operating model to work effectively – thus minimizing the organizational impact.

<table>
<thead>
<tr>
<th>Key Implications</th>
<th>EHR</th>
<th>eHub</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation Time &amp; Cost</td>
<td>Time (HR implementations are sequenced by functional process)</td>
<td>Time (EHub implementations are sequenced by work roles)</td>
</tr>
<tr>
<td>Organization</td>
<td>Extensive change required at functional layer applied to adopt common process/data</td>
<td>Limited organizational change (e.g. operational change is more limited, business processes are adapted)</td>
</tr>
<tr>
<td>Productivity</td>
<td>High for improved functionality</td>
<td>Very high in 100% of internal/external connectivity</td>
</tr>
<tr>
<td>Reporting</td>
<td>Supports one interface only, typically financial</td>
<td>All but reporting, as more than one interface based on business needs</td>
</tr>
</tbody>
</table>
- Productivity: ERP systems bring increases in productivity for processes that are implemented in the system. However, these primarily internal processes typically cover only 60 to 70 percent of an employee’s work. This is not enough. We have found that employees need 100 percent connectivity – internal and external – to achieve dramatic improvements in productivity.

For enterprises building value webs, the question is not if internal connectivity is required, but rather, what form that connectivity should take, and how to create it. (See Case History B for a more detailed discussion of connectivity). As a company achieves near total connectivity, employee productivity increases dramatically. In addition to being able to collaborate effectively with partners, the high connectivity of the eHub also brings significant productivity improvements – a double impact on competitive advantage.

- Reporting: ERP systems provide excellent reporting and detailed levels of information – on those areas that are included within the ERP footprint. The drawback becomes comparing information from ERP-enabled functions to legacy system data, or data from outside the organization. Collaboration requires a forum for data standardization among organizations, allowing participants to get accurate, consolidated reports.

An eHub provides greater reporting opportunities in a number of areas: foremost is the access to more dimensions of the data. Where an ERP system may support data organized geographically, an eHub can provide access to the data by product line, geography and other dimensions.

Also, an eHub allows reporting across enterprises, by aggregating and synthesizing data from all participants.

This thesis has primarily focused on the alignment of the technical architecture with the collaboration strategy. However, as indicated above, successful collaboration also requires process and organizational alignment. Some important considerations of this alignment are discussed below.
- Process alignment: an eHub collaboration solution provides flexible process integration, both internal and external. Process alignment implies end-to-end connectivity; the minimum alignment required is at the priority touch-points of collaboration.

An enterprise must be prepared to give data correctly, as well as to receive data and act on it. This implies both the use of standards – for example, RosettaNet – and an agreement as to what will be shared with the partners. An enterprise that is well aligned can take significant advantage of shared data. It will be able to drive cost out of the value web by reducing inventories and taking advantage of demand signals and alerts in advance of any disruption to operations.

- Organization alignment: transforming organizational behavior is a challenge this is particularly true in multi-organization collaboration efforts. Leading companies have implemented rigorous change management programs to transform behavior and maximize employee adoption. They have retrained employees to make them comfortable with their new collaborative roles. They have also changed measurement and compensation systems, based on the new requirements. Performance management systems must clearly link to the collaboration strategy, track results at the individual and group level, and be actionable.

One large semiconductor company implemented new systems and re-engineered business processes to reduce its inventory by hundreds of millions of dollars, while at the same time improving customer satisfaction. According to the CFO, the single most important factor in this successful project was “changing the evaluation of the fab managers from the traditional inward-looking measurement of efficiency and output, to outward-looking measurements of customer satisfaction and effective supply-demand matching.”

An important consideration is that change must be minimized to reduce risk. Achieving minimum commonality of processes and data, particularly real time data, is essential to minimizing change. When this approach has been taken, change has been relatively well accepted. Employees understand that the change being asked of them is based on the logic and “culture” of the new collaborative operational model, and has been limited to minimize disruption of their work.
For market-exchange relationships most of the information sharing is during negotiating and contracting, the organization coordination are made by proven organizational routines.

In the captive-Buyer management relationship there is a lot of detailed information in areas as; manufacturing, quality and design, in order to handle the intense information flow a broadband connection of some sort is usually implemented, furthermore there is regular and frequent mutual visits.

Captive supplier relationships represent the lowest level of information exchanged. Communication is usually focused on complex coordination tasks.

In the case of strategic partnership relationships information exchanged in both frequent and rich. These relationship exchange information using reports, standardized rules and operating procedures, electronic transfer of schedules, and face-to-face contact. There is as well information exchange during practice of guest engineers.

To succeed with creating an effective supply chain Childhouse et al. (2003:2) argue that it is crucial to develop realistic understanding among buyers and sellers about concepts such as trust and cooperation. They argue that information sharing is the most effective way to achieve this understanding. Hammer (2001) furthermore states that you have to “communicate relentlessly “ to build openness and trust.

IT plays an important role in exchanging information as stated by Zisdisin and Ellarm (2001). The authors argue that new information technologies such as internet and ERP systems support building information flow bridges between buyer and suppliers. Ross and Rockart (2002) furthermore bring up that with an increased demand of sharing information it is a prerequisite to have a powerful IT infrastructure in order to stay competitive however, IT can also decrease the level of interaction between suppliers and neglect traditional ways (Westberg 2003). To replace a meeting concerning a shared buyer-seller activity demanding rich information exchange with email correspondence for instance would be damaging for a company. This is as well suggested by Ryssel et al (2004)
2.6 Utilization of information technology

In this section we will provide an overview of literature on IT. In order to find an answer to how the use of IT in SC & MN can be characterized we will being with presenting literature on the definition of IT and what IT consists of. Furthermore, we will present various IT tools related to SC & MN that are utilized in today’s business environment. Finally, in order to investigate the influenced of IT on SC & MN on we will provide an overview of literature concerning how IT has influenced relationships. E-Hub consists according to Ross(2003) of two board parts, e-procurement and e-sourcing. “E-procurement deals with the utilization of Web-tool sets to automate the activities associated with purchase order generating, order management and procurement statistic and e-sourcing, with the utilization of the Web to develop long-term supplier relationships”(Ross, 2003). To get a better understanding of the activities related to e-SRM Ross (2003) states that e-SRM can be divided into four other parts. Ross (2003) is referring to these four parts as the EBS Backbone, e-SRM Services, e-SRM Technology Services and e-Processing (figure 2-10). The EBS-backbone can be seen as the company's ERP system. ESRM Services cover the traditional buyer function that has been enhanced with the utilization of IT applications, for example product- and supplier search. E-processing is dealing with new ways to handle the transactional process. The last part, e-SRM Technology Services, handles the technological architecture that is needed to effectively connect the company's backbone and front-end functions. (Ibid.)
Commonly an EBS (Enterprise business system) is referred to as an ERP (Enterprise resource planning) system. Ross (2003), however, argues that it should nowadays be referred to as an EBS, as it is more of a business system than a resource system. In this literature overview we will refer to Ross's (2003) definition as other authors such as Shield (2001) as well states that the acronym ERP does not encompass the whole picture.

The EBS system is computer software that" provides a single solution from a single supplier with integrated functions for major business functions from across the value chain such as production, distribution, sales, finance and human resources management' (Bocij et al., 2003).

Ross (2003) suggests that the main role of an EBS is to provide the purchase function with a database of useful information that facilitates work. He divides EBS into four subcategories, namely Procurement history, Accounting, Purchasing Planning and Performance measurement.
Procurement History: In order to make the right decisions regarding, for example, the supplier it is important to have information on past transactions and available suppliers.

Accounting: An EBS-system should have an accounting function so that, for example, transactions can be recorded automatically.

Purchasing planning: When planning future sales the EBS-system can help the company by, for instance, automatically generating MRO (Material requirement planning) schemes.

Performance measurement: With the help of performance measurement a company can analyze its performance of changes in work routines or the degree of value a certain supplier relationship has.

Shield, (2001) presents another acronym for EBS, namely XES (eXtended Enterprise System). Even if Ross (2003) and Shields (2001) are using different acronyms they both point out that the acronym ERP is not showing the total use of an EBS.

The main reason for implementing an EBS is according to Bocij et al. (2003) that previously isolated functions (e.g. manufacturing and finance) can be integrated. They argue that without an EBS different functions sometimes purchase a mixture of applications with poor inter function information flow as the result. Additionally, as the main reasons for implementing an EBS Bocij et al., (2003) list following other major benefits:

- Integration of all internal and external value-chain processes, resulting in increased customer value.
- Better sharing of information within the organization since all modules of the systems are compatible.
- Reduced cost of buying from a single supplier
- Using best-of-breed solutions applied by other companies
Bacij et al. (2003) also discuss problems of EBS. They argue that the main disadvantage of an EBS is the cost charged by the EBS vendors. Furthermore, an implementation of an EBS usually demands changes in the company's processes, where people also have to adapt and get used to first. Finally, because of the big changes required to implement an EBS companies almost always need the support of consultants which is increasing the costs even more.

### 2.7 e-SRM services functions

Ross (2003) mentions that with the advent of new technologies several of the purchase function's traditional activities have been enhanced and made more effective. He divides eSRM services; into Supplier Search, Product Search, Strategic Sourcing and Value-added Services.

- **Supplier Search:** A big problem in the past was that this activity was very hard to perform due to' a lack of reliable and rich information. With the utilisation of 'web based tools such as for instance 828 marketplaces, the process of gathering information regarding suppliers is done in a far more effective way.
- Product Search: The new IT applications, especially web-based tools, have provided companies with the opportunity to search for products in a far more effective way than in the past. Especially with the help of different kinds of e-marketplaces, for example on-line catalogues.

- Strategic Sourcing: "Strategic sourcing can be defined as a systematic, cross functional, and cross-enterprise process that seek to optimize the performance of purchase goods and services through reductions in total cost, sourcing cycle time & assets"(MitcheU, 2001). Utilizing new IT applications offer companies to manage this activity in a far more effective way. The IT applications are in general separated into two categories; decision support tools and negotiation tools. (Ibid.)

- Value-added Services: With the help of new IT-applications such as financial a.11d billing services, comparison shopping functions, collaborative design, advertising, promotions, and dynamic pricing, just to name a few, companies are able to improve several value-added services. Utilizing these new value-added services also enable the buyer and seller to go beyond just transactional interaction and can, for instance, help the buyer and seller to develop common strategic goals.

2.8 e-SRM Processing

Ross (2003) states that the introduction of new IT applications provides companies with new ways of handling the transactional process in the buying function. According to the author this part of e-SRM can be further divided into product catalogue management, requisitioning, RFQ, shopping tools, auctions, purchase order generation and tracking and Logistic.

- Product catalogue management: The main issue in the management of a product catalogue on-line is to lever the fact that it is dynamic. It is a seamless activity to add, remove or change content.

- Requisitioning: The goal of the IT application used in this type of activity is to be able to bring together a certain amount of e-hubs and display the right kind of information. When using the IT application a company searching for a product has
access to a lot of various e-hubs even if for the company it looks like a one stop affair. The most difficult task for the IT application is to provide a company with the right information. This might not be that difficult when buying MRO (Maintenance, Repair, and Operations Supplies; further information can be found under e-hubs) products that are usually standardized products bought on price. However, products that are not MRO products usually require more information such as for instance customers care rating, service quality and performance history.

- RFQ: This activity is traditionally labored intensive and expensive. With the utilization of IT technologies in this area a company can cut cost, reduce lead times and get access to a greater supplier base. A company can, for instance, at an e-hub specify its needs and suppliers can right away send their suggestion back.

- Shopping tools: To automate the procurement process further a company can introduce, shopping agents. A shopping agent is programmed software that performs shopping related activities by itself. When coming to for example the purchase of pens the shopping agent will be alerted when the inventory of pens reach a certain minimum level. The agent in turn starts looking for suppliers that are selling pens and matches the best offer according to certain criteria programmed into the software. The pens are then automatically ordered and paid by the shopping agent.

- Auctions: The main benefit from on-line auctions is that the buyer is able to reach out to a large supplier base and in this way increasing the competition between suppliers. This will in turn increase the pressure on competition especially on price. Because of auctions being price focused they are usually used” for the purchase of MRO products. The use of auctions as a new way of handling the transaction process is as well supported by lap (2001).

- Purchase order generating and tracking: Utilizing IT applications provides the ability to automate the purchase order generating. Furthermore, the purchase order generated can be used to track the order in manufacturing and distribution in order to highlight order critical criteria.

- Logistics: Nowadays, companies using IT applications are able to greatly increase the control and economy of the logistic aspect of the transaction process.
Several logistic companies are offering product tracking services, carrier selection, freight bill payment and network planning only to mention some of the services provided.

Lap (2001) states that new IT tools can create new ways of doing business, referring to this area as relationships influencing IT, stating reverse auctions as an example.

2.9 e-SRM Technology Services

E-SRM technology services handle the technological architecture that is needed for a company to be able to perform e-SRM related activities (Ross, 2003). The author segments eSRM technology services into web processing, security, member services, content search and management and workflow.

- Web processing: Utilizing IT applications requires companies to have a technology infrastructure that is able to handle a maximum of data communication and transactions. This problem is usually solved by using a multiple of servers.

- Security: When doing business with the help of IT applications it is crucial to have a good security system. A company does not want other people to get their hands on important information. With the use of for example authorization, encryptions and validation keys the security level of a company can greatly increase.

- Member services: One main advantage of e-business is that through e-business it is easier for companies to provide personalized service. IT applications provide the ability to better analyze customer behavior and thus build a good base for personalizing services.

- Content search and management: A company should offer other companies the ability to in an effective way search for content about their company. This is done in order to make the interaction between buyers and sellers as effective as possible.

- Workflow: Here, an IT application, for instance including a section in which a company can design its own specific workflow that guides a company across the procurement process is suggested. In general, this IT application consists of
various templates of basic processes that can be customized after different business needs.

Simchi-Levi et al. (2003) present an optional view of the technology architecture in a context of information technology infrastructure. The authors differentiate between interface / presentation devices such as personal computers, bar-code scanners and terminals; communication involving IT tools such as LAN (Local Area Network), Internet, EDI and wireless communication; databases, such as legacy data bases, relation databases and object.

2.10 E-Marketplaces

According to Kaplan and Sawhney (2000) a company can split its purchasing of goods and services up into two broad categories, manufacturing inputs and operating inputs. Manufacturing inputs are goods and services that are inputs into the main process, such as raw materials. Opening inputs, however (also referred as MRO) are goods and services that are purchased to support the main process, such as for example office equipment. Kaplan and Sawhney (2000) also argue that companies differentiate in purchasing of goods or services in the way of sourcing and refer to systematic sourcing and spot sourcing. Systematic sourcing are, as the name tells, repeated purchases that usually involve negotiating concepts. Spot sourcing on the other hand is purchases goods or services at just one occasion.

Figure 2-12 presents a graphical interpretation of Kaplan’s and Sawhney ‘s (2000) e-marketplace segmentation
The B2B Matrix

<table>
<thead>
<tr>
<th>How business buy</th>
<th>Operating input</th>
<th>manufacturing input</th>
</tr>
</thead>
</table>
| Systematic sourcing | MRO Hubs  
Ariba  
W.W. Grainger  
MRO.com  
BizBuyer.com | Catalog Hubs  
Chemdex  
SciQuest.com  
PlasticsNet.com  
VerticalNet  
BuildDirect |
| Spot sourcing | Yield Managers  
Employees  
Adaucion.com  
Capacity Web | Exchanges  
e-Steel  
PaperExchange.com  
Altra Energy  
IMX Exchange |

Figure 2-12: The B2B matrix by Kaplan and Sawhney (2000), adapted by the authors

2.11 Electronic Data Interchange (EDI)

Ross (2003) states that EDI is an IT tool that is of interest for SRM. Furthermore, other authors as well discuss EDI as an important tool in inter–organizational relationships. (Handfield and Nichols (1999), Simichi –Levi et al. (2003), Kappelman et al. (1996).

An EDI system “ makes use of standard protocols to share information among participant companies through computer – to – computer exchange of electronic documents relating to purchasing, selling, shipping, receiving, inventory, financial and other activities “ (Arche and Yuan, 2000). Adapting EDI is a way of making the supply chain more efficient (Lauer, 2000).

EDI is identified as “ inter–company –computer –to -computer exchange of business documents in standard formats “ (Bowersox and Closs, 1996)

There are various benefits for a company to utilize EDI. Bowersox and Closs (1996) list some direct benefits from the use of EDI technology:
1-Increased internal productivity
2-Improved channel relationship
3-Increased external productivity
4-Increased ability to compete internationally
5- Decreased operational cost

However, the authors highlight the necessity to consider that a successful implementation of EDI requires not just technological capabilities but also organizational commitment. The implementation process needs to include both technical and human components. According to Kappelman et al. (1996) “technology, however, cannot guarantee the success of business, only facilitate it”

In the automotive industry, the big three (Chrysler, Ford, and General Motor) introduce mandatory EDI for their suppliers suggesting that suppliers unable to adapt new technology will either go bankrupt or sell out (Lauer, 2000).

2.12 Internet

The last IT tool Ross (2003) discusses in the context of SRM is the internet - the IT technology that made business authors talking a brand new world and technology that would forever revolutionize the way of doing business (Kalakota and Robinson, 1999).

Chaston (2001) defines the Internet as “Small area network belonging to individual organizations (local area networks or LANs), network spread across large geographic areas (wide area networks or WANs) and individual computers”. Bojie et al. (2003) describes the Internet as a large scaled client/server system. The client (PC’s) asks for a service from a server, usually a local ISP (Internet Server Provider). The ISP is connected to a large ISP that is linked to the national and international infrastructure. The exit and entry points to a country’s internet infrastructure can be seen as super highways and the local ISPs as country roads. (Ibid)
Another way to describe the internet is suggested by Porter (2001) in the context of its usability: “an enabling technology – a powerful set of tools that can be used wisely or unwisely, in any industry and as a part of almost any strategy”.

Porter (2001) suggest using the value chain as the base for understanding the impact the internet has on companies. The value chain is described by Porter (2001) as a framework to identity value creating activities.

I have already mentioned the definition and classification of e-procurement in my first chapter, but we need to develop our understanding a bit further. There are a lot of definitions for e-procurement suggested in different literature. Below, some of the collected ones are quoted:

- E-procurement is essentially and Internet /Intranet based purchasing application or hosted service that streamlines buying trading partners, maximizes trade efficiency across the entire supply chain, and provide strategic e-commerce capabilities in Internet time (ITRG, 2002).
- An e-procurement technology is defined as a technology designed to facilitate the acquisition of goods by commercial or a government organization over the internet (Brunnelli, 1999). (Carabello, 2001).

- E-procurement is a technology solution that facilities corporate buying using the Internet. It has the power to transform the purchasing process because it pervades all of the steps identified by the supply manager (Presutti, 2002).

In the past few years, B2B procurement strategies have become a major top management focus. Many executives realized that B2B is not so much a technological revolution as it is business enabled by technology. (Kalakota and Robinson,2000)

There are five key challenges facing corporate procurement functions today:

-Reducing order- processing costs and cycle times.

-Providing enterprise – wide access corporate procurement capabilities.

-Empowering desktop requisitioning through employee self service.

-Achieving procurement software integration with a company’s back office system.

2.13 Benefits associated with e-procurement technology

An e-procurement solution provides access to, and easy purchasing from, catalogues of many different suppliers while eliminating paperwork, automating the approval process and enforcing the purchase polices that apply to each Buyers’ suppliers (ITRG, 2002). Typically cost saving is the main motivator for companies to implement e-procurement. As cost per transaction using e-procurement is reduced by 65% compared to “traditional” procurement transaction. By contrast, the source of saving in B2B auctions comes from accessing a broader base of suppliers budding for the buying needs of organization, thus the saving derived from joining & bargaining power would translate into more aggressive discount for member of the consortia.(Davila,2002)
The use of e-procurement is through to have implications for information asymmetries or impact in inter-organizational relationships and in particular for search and monitoring costs. Alternative explanations for the benefits of e-procurement arise from resource based perspective through which electronic commerce presenting opportunities to enhance firm resource (Dhillon et al, 2000 and Rasheed et al,2001). The other major benefits to adopting e-procurement system are reduced operating costs and searching costs, which lead to high returns on investment (Dai and Kauffman, 2000).

According to ITRG (2002), many companies have found immense benefits from their e-procurement projects, including the following:

- Process efficiencies amounting to annual savings.
- Ability to link into existing systems, such as ERP.
- Reductions seen in lead times within the procure-to-pay cycle, in some cases by 50%.
- Self-invoicing on behalf of clients can add to the bottom line.
- Month-end reconciliation can end the problem of the wrong items being ordered or the wrong prices being offered as business process have been streamlined and all was working off the same catalog.
- The buyer is engaged in more strategic product management, leading to better contracts being negotiated.
- Maverick spending is reduced.
- Reduction in stock levels can lead to saving of millions of dollars.
- While there is some evidence that electronic commerce in procurement may not result in reduced costs in acquisitions in particular markets,(Lee,1998), various cost reductions and benefits have been identified,(De Bore et al,2002). These include the implications of e-procurement for the following:

  - The cost of expenditure on goods/services related directly to the production/service delivery.

  - The cost of non-production goods and services.

  - The cost of operational purchasing activities —e.g., requisitioning, ordering,
expending and administrative support.

- The cost of tactical procurement activities - e.g., formulating specifications selecting suppliers, negotiating with suppliers, contracting, disposals etc.

- The costs of strategic procurement activities - e.g., spend analysis, transaction analysis, market analysis, planning, developing purchasing policies etc.

- Internet benefits arising from investments in particular inter–organizational relationships and ,

- The contribution of investments in particular inter–organizational relationships to revenues.

Another similar view of e-procurement benefits according to Davila et al,(2002) and presutti,(2002) are:

- Cost savings

- Process efficiency

- Better information

- Reduced Maverick spending

- Streamlined process

- Better inventory level

According to Davila et al (2002) cost saving is the primary rational for investment across all technology platform, through the manner in which these savings are delivered various. Adopting of e-procurement technologies report saving of 42 percent in purchasing transaction costs.( Davila et al ,2002)

According to presutti, (2002), cost reduction and negotiation are one of the reasons that transaction costs fall so precipitously e-procurement. Reductions is labour costs in the purchasing process , increase in purchase volume leads to better
price from supplier and leads to better negotiation i.e. suppliers are ready to reduce the price as they get the assume of transaction from the buying company. The effect of e-procurement on inter – organization enhance the benefits of e-procurement on an organization. (Presutti ,2002)

Companies using e-procurement report saving of 42% in purchasing transaction costs associated with less paperwork which translates into fewer mistakes and a more efficient purchasing process. In a labour intensive, paper-based purchasing process, transaction costs can range from $70 to $300 per purchase order for example, GE (General Electronic) saw those costs drop to 30%. Other firms have experienced even greater reductions. (Presutti, 2002) Different authors have elaborated on the benefits that accrue from adopting e-procurement technologies. These benefits are expected to accelerate the rate of adoption of these technologies once the uncertainties that remain around e-procurement are reduced to levels that encourage significant resources commitments leading towards higher process efficiency. (Davila et ai, 2002)

Buyers and sellers share information in real time to build specification that add value to resulting product and build strong relation. The larger the base of participants (buyers from the point of view of a seller and sellers from the point of view of buyers) the greater will be the business value of e-procurement solution. Clear guidelines are established which helps share information across different departments within the organization. (Presutti, 2002)

Organizations expect cost reduction from e-procurement software to be derived from the additional control over maverick Spending (purchase of goods from suppliers with which the organization does not have formal relationships. Negotiated process based on volumes) and the benefits effects associated with the additional purchase-related information inherited in that technology. (Davila et ai, 2002)

The simplification of the e-hub (purchasing process that e-procurement technologies) are credited which also has a favorable impact on the purchasing cycle time (Davila et ai, 2002). The system also allows the company's purchasing department around the world to share' information about their best suppliers. Except reduction in material costs, benefits also include reducing sourcing cycle times by 25-
30% and time to market by 10-15%. E-procurement users also report a reduction in the number of suppliers, associated cost benefits of lower managerial complexity, lower prices and a headcount reduction in the purchasing process. Cutting those cycle times helps in streamlining the process and has a significant impact on the revenue generation potential for the firms because products get to market faster, allowing the firm to position it to capture market share from a first to market position.

E-procurement system enables firms to more efficiently and accurately capture and aggregate how much they are spending corporate wide in various purchasing product area, allowing the firms to bring what may be significant buying power leverage to market. Material cost reductions in the range of 5% to 20% we are realized because the e-procurement solution helped firms to reach a wider supplier base, identified an unidentified and qualified source of suppliers. (Presutti, 2002)

Finally, there is also impact on firm's asset base and the inventory level can be significantly reduced. There are no problems like stock outs, wrong product ordered faster delivery, etc, and there is better inventory control. An effective e-procurement strategy for example, extranets link the system of buyers and suppliers over the Internet facility real time exchange of information in the buyer 's production schedule and develops capabilities that allow a degree of flexibility of suppliers. (Presutti, 2002)

2.14 Risks associated with e-procurement

A mention above e- procurement has lot of benefits but still its expected growth rate has been revised downwards. Recent market observation indicated that the adoption of e-procurement technology in to the business main stream is occurring in a much slower than expected. One reason is the implicit association that investor have made between e-procurement technologies and the business to customer (B2C) models responsible for the internet bubble bust. More often, the slow down has been associated with technology –related issues. (Davila, et al,2002) Internet base e-procurement systems and B2Belectronic market solutions need to be compatible to greatest possible extent with the exiting technologies , to have a reasonable chance to be widely adapted in the marketplace this leads to problems like investment cost (Dai and kauffman,2000)
The risks associated with the e-procurement have been holding companies from adopting it (Davila, et al., 2002). A study by the conference broad in 2000 pointed to the problem in the implementation side and concludes that ‘organization are finding (e-procurement) implementation more complex more expensive and more time consuming than they originally envisioned’ and that consultants have been ‘widely criticized for overstating the business case of e-procurement’. (Conference Board, 2001) Companies were jumping onto the e-procurement bandwagon without fully understanding the inter – organizational collaboration and network effects underlying these technology models, the complexities of integrating these technologies with existing Enterprise Resource Planning system. (Gilbert, 2000) Most respondents using e-procurement technologies are relatively new to e-procurement; only 34% have been involved in any e-procurement technology – related initiative for a year or more. The low adoption rate has also constrained e-procurement technologies users from leveraging the associated capabilities with their suppliers. (Davila et al., 2002)

In addition to technology – related risks, there are risks associated with integration of these technologies impose on supplier – customer relations and with the security and control mechanisms required to ensure their appropriate use. (Davila, et al., 2002)

Certain risk that with the adoption of e-procurement those need to be addressed before these technologies are widely accepted. These risks mentioned by Davila, et al., 2002 are as follows:

**Internet business risks:** Companies are uncertain about having appropriate resource to successfully implement an e-procurement solution or not.

Implementing an e-procurement solution requires not only that the system itself successfully performs the purchasing process, but most important, that it integrates with the existing information infrastructure.

**External business risks:** E-procurement solutions need to not only “talk” with internal information systems, but also need to cooperate with external constituencies – mainly customers and suppliers. External constituencies need to develop internal
systems that facilitate the communication through electronic means – an issue that demands technology investments as well as incentives for these constituencies. For e-procurement technologies to succeed, suppliers must be accessible via the Internet and must provide sufficient catalogue choices to satisfy the requirements of their customers. Suppliers, especially in low margin industries, may be hesitant or even unable to meet such demands without guarantees of future revenue streams. And also since the business models associated with e-procurement technologies (e.g. auctions, consortia, and exchanges) clearly envision the use of suppliers with whom the buyer has not previously transacted business, companies need to develop mechanisms that provide the buyer with assurance that the supplier meets or exceeds recognizable and industry enforced standard relating to supplier quality, service, and delivery capabilities.

**Technology risks**: Companies also fear the lack of a widely accepted standard and a clear understanding of which e-procurement technologies best suits the needs of each company. The significance of this risk factor seems to suggest the need for clear and open standards that would facilitate inter-organization e-procurement technologies.

Without widely accepted standards for coding, technical, and process specifications, e-procurement technology adopting will be slow and will fail to deliver many of the benefits expected.

**E-procurement process risks**: Another set of risks has to do with the security and control of the e-procurement process itself. Organizations must be confident, for example, that unauthorized actions will not disrupt production or other supply chain activities when committing to E-procurement technologies.

This strategy however is defined as riskier in the absence of any well defined solution and companies may end up betting on the wrong technology (Davila et al, 2002).

According to the results in the study conducted by Davila et al (2002), one-third of all respondents believe that at least 40% of their competitors are implementing or have plans to implement an e-procurement strategy.
organizations pursuing an aggressive strategy, over 50% believe that their competitors are doing the same. (Davila et ai, 2002)

Table 2-1: Three most frequently identifies barriers to e-procurements technologies utilizations

<table>
<thead>
<tr>
<th><strong>E-procurement software</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Problem of integration with existing system.</td>
</tr>
<tr>
<td>- Lack of common standard for e-commerce software development.</td>
</tr>
<tr>
<td>- Lack of suppliers accessible through the organization's e-procurement system and/or lack of suppliers investment in catalog development.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Internet Exchange</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Not enough suppliers to create a liquid marketplace.</td>
</tr>
<tr>
<td>- Supplier reticent to participate in selling environment where ore- eminent focus is on price.</td>
</tr>
<tr>
<td>- Supplier reticent to participate because control is lost over the presentation of brand name and product feature.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>E-Auction</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Organizational discomforts with auctions, as opposed to honoring commitment to supplier partnering and consolidation.</td>
</tr>
<tr>
<td>- Downwards price pressure on vendors resulting is diminished customer service to quality.</td>
</tr>
<tr>
<td>- Inability to identify potential items for auctions.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Purchasing Consortium</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Pricing is not significantly better than the one available without consortium.</td>
</tr>
<tr>
<td>- Getting the sufficient number of vendors in to the process.</td>
</tr>
<tr>
<td>- Ensuring conformance to state laws and regulations that required a bidding process.</td>
</tr>
</tbody>
</table>

2.15 Strategies development of e-procurement

Recent market evolution indicates that the adoption and integration of e-procurement technologies into the business mainstream is occurring at a much slower
pace than expected. Procurement technologies are still in its early stages but rapidly evolving. This process is particularly complex because the final outcome may be different as for the market segment and adopt different technology based solutions. Regardless of the current focus on indirect goods as a way of experimenting with the technology is expected to evolve into procurement processes that facilitate inventory management and the purchase of capital goods. (Davila el ai, 2002)

2.15.1 E-procurement practices

In the procurement circle, the line is often drawn between direct and indirect materials. A good breakdown between direct and indirect materials was provided in Eisenmann (2002). His model is shown in the table 2-2. Indirect materials constitute what are typically referred to as MRO (maintain, repair, and operation) goods, where direct materials are those that are closely linked to production or service delivery. According to the table below, we find that direct purchases which are aimed at external customers with largely unpredictable purchases (based on the current need of the line) and has a large order size compared to indirect material that are aimed at internal customers, the purchases are internal driven and has a smaller order size. However, for direct purchases where a line sends 80% of total dollar for the total number of purchase order is only 20% compared to indirect purchases. The total dollar send is 20% but the total number of purchase order is 80%, making it more desirable (Eisenmann, 2002).

<table>
<thead>
<tr>
<th></th>
<th>Direct Purchase</th>
<th>Indirect purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase predictability</td>
<td>Volatile</td>
<td>Internally-driven</td>
</tr>
<tr>
<td>Order size</td>
<td>Large lots</td>
<td>Often small</td>
</tr>
<tr>
<td>Collaboration with suppliers</td>
<td>Varies, usually high, but low for commodities</td>
<td>Varies, low for MRO supplies, high for equipment and services</td>
</tr>
<tr>
<td>Percentage of Total Dollars spent</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Percentage of total numbers of purchase orders</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td>End Customer</td>
<td>External customer</td>
<td>Internal employees</td>
</tr>
</tbody>
</table>

Table 2-2: comparison of direct and indirect purchases
Table 2-3: production -versus non production- related items

<table>
<thead>
<tr>
<th>Characteristics of product, or</th>
<th>Characteristics of Non-production, or MRO Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production items: raw materials,</td>
<td>Operation resources: offices and supplies, MRO supplies, travel</td>
</tr>
<tr>
<td>- Scheduled by production</td>
<td>- Ad hoc, not scheduled</td>
</tr>
<tr>
<td>- Locus operation: buyer's desktop</td>
<td>- Locus of operation: employee desktop</td>
</tr>
<tr>
<td>- No approvals required</td>
<td>- Approval required</td>
</tr>
<tr>
<td>- High degree of automation</td>
<td>- Almost no automation</td>
</tr>
<tr>
<td>- Driven by design</td>
<td>- Driven by catalog</td>
</tr>
</tbody>
</table>

The ISM/Forrester reports on e-business (2002) have shown consistent growth in the adoption of Web-based methods for indirect purchases. Much of this is due to the fact that firms both in the services and manufacturing sectors- are increasingly making routine purchase for operating and office supplies through online sites, either independently or as part of hosted catalogs. However, when the ISM/Forested results are looked at more closely, it can be seen that the driving force behind this over all shift to sourcing indirect goods and services via Internet is the largest purchasing organizations. It must be remembered that the exact breakdown on what is a direct purchase and what is a indirect one varies even within companies- and even depending upon the timing and circumstances of the purchase. Although purchases of indirect goods may be often outpaced spend on direct materials, acquisition of MRO goods has therefore not been looked upon as a strategic issue. (Wend in, 2001)

2.15.2 E-procurement Strategies

The E-procurement market is still evolving with the development of technology and new models to serve the needs of the market. There are various strategies that companies adopt towards e-procurement technologies. The majority (70%) are taking a "wait and see" approach (strategy). These companies are either aware of the developments, but not committing resources (37%) or investing selectively until the best e-procurement model can be identified (33%). These
companies do not perceive that the current state of development merits shifting their established procurement process to the e-world; never the less, they are active in experiments and widespread. The strategy reflects active experimentation but no sizeable investment until the best e-procurement model is defined (Davila et ai, 2002).

A smaller set of companies (4%) adopting a more passive strategy of observation without experimentation. Their adequacy (and risk) will depend on how quickly organizational learning can be absorbed without creating the "absorptive capacities" that the wait and see companies seem to be developing. (Davila et ai, 2002) A moderate number of organizations are taking aggressive strategy (27%), stating that they are adopting e-procurement technology declaring that they are 'investing significantly to gain a competitive lead (3%) or moving 'fast into e-procurement solutions (24%) (Cohen and Levinthal, 1990). This strategy however is defined as riskier in the absence of any well defined solution and companies may end up betting on the wrong technology (Davila et ai, 2002).

According to the results in the study conducted by Davila et ai (2002), one-third of all respondents believe that at least 40% of their competitors are implementing or have plans to implement an e-procurement strategy. Among organizations pursuing an aggressive strategy, over 50% believe that their competitors are doing the same. (Davila et ai, 2002)

2.15.3 E-procurement models

There are roughly seven basic types of e-procurement trading models in the current market scenario. These seven models for trading exchanges can further be categorized into public or private exchange. Before an e-procurement solution can be deployed, a company must undergo significant procurement process reengineering, various e-procurement models all attempt to solve similar business process problem. (Kalakota and Robinson, 2000) The seven E-procurement models (trading models) are by Kalakota and Robinson (2000)

1- EDI (electronic data interchange)Networks

2-Business to employee(B2E) requisitioning applications
3-Corporate procurement portal

4-Trading exchanges: First generation: communities, storefronts and REF (request for proposal) \REQ request for quote \facilitators)

5-Second generation: virtual distributors and auction hubs

6-Third generation trading collaboration hubs

7-Industry consortiums: joint-venture procurement hubs.

The e-procurement market is still very young, however the new business models required to serve this market are evolving rapidly. Table 2-4 lists the seven basic types of e-procurement trading models in use and their key difference.
<table>
<thead>
<tr>
<th>Trading Model</th>
<th>Characterizes</th>
</tr>
</thead>
</table>
| EDI network                           | - Handful to trading partners and customers  
  - Simple transactional capabilities  
  - Batch processing  
  - Reactive and costly value-added network (VAN) change |
| Business to employee (B2E) requisitioning applications | - Make buying fast and hassle-free for company’s employee  
  - Automated approval routing and standardization of requisition process  
  - Provide supplier management tools for a professional buyer |
| Corporate procurement portals         | - Provide better control over the procurement process and let a company’s business rules be implemented with more consistency  
  - Custom, negotiated price posted in a multi-supplier catalogs  
  - Spending analysis and multi-supplier catalogs Management |
| First generation Trading Exchange : Community catalogue And storefronts | - Industry content, job posting and news  
  - Storefront: new sale channel for distributors and manufactures  
  - Product content and catalog aggregation service |
| Second generation : Trading exchange transactions oriented Trading exchange | - Automated requisition process and purchase order Transaction  
  - Supplier, price and product/service availability discovery  
  - Catalog and credit management |
| Third generation : trading exchange collaborative supply chain | - Enable partner to closely synchronize operation and enable real time fulfillment  
  - Process transparency resulting in restricting of demand & supply chain  
  - Substitute information for inventory |
| Industry consortiums: buyer and supplier led | - The next step in the evolution of corporate procurement portals |
**EDI (electronic data interchange) Networks**

Historically large business have realized time and cost savings by linking with their major suppliers through private networks called EDI's (electronic data interchanges). These systems automate the procurement process, support automatic inventory replenishment and tighten the relationship between buyers and their primary suppliers. EDI was originally based on a company's private network (mostly large firms), it required large capital outlays to implement and adding each new supplier was costly. Making it unaffordable for small firms and prevented them from establishing EDI connections with their buyers or suppliers. EDI and extranets tend to operate best in strategic partnerships; some major EDI vendors are Steering Commerce, Harbinger and general electric information services.

**Business to employee (B2E) requisitioning applications**

Corporate purchasing worldwide is undergoing major structural change. The concept of implementing employee self service procurement seemed futuristic when the majority of businesses were still getting used to the idea of office e-mail systems. Companies have always strived for improving everyday business transactions (like ordering office supplies and processing reports). Desktop requisition enables employees to purchase the products and services they need online, by just logging into the corporate intranet to the companies suppliers Web-based commerce sites: a company can eliminate the paper intense and costly purchasing process of traditional business. Consolidating the purchasing process to few suppliers provides volume discounts and can generate tremendous cost savings, Example, Ford requisition desktop software.

**Corporate procurement portals**

After realizing the benefits of automating their requisitioning processes, many companies (particularly ones with significant power like IBM) choose to implement procurement portals for buying production and non production related goods. Procurement portals do a lot more then basic purchasing, more recent procurement strategies focus on restructuring the entire order-to-delivery process rather than on specific tasks within the process.
- Trading exchanges (First generation: communities, storefronts and RFP\RFQ facilitators).

First generation trading exchanges are information and content hubs. The clunky procurement applications are giving way to sophisticated B2B portals called trading exchanges. These exchange functions like online trade magazines, providing industry news and trends, product information, directories of industry participants classified and white papers. Other mechanisms used "by trading exchanges include chat rooms, discussions forums, bulletin boards and career centers. The communities can be used for conducting commerce in both direct and indirect goods. Advertising is the primary source of revenue while others charge a subscription fee for membership and these Emarkets can also receive generation fees for product sales resulting from storefront traffic.

Another form of the first-generation trading exchange is the request for proposal (RFP) and request for Quote (RFQ) facilitator's exchange, which operates a Centralized online marketplace. In this marketplace a pre-approved group of suppliers submit fixed priced, sealed bids in response to real-time RFQs issued by a buyer. It includes both high level and detailed requirements that the suppliers must satisfy.

- Second generation: virtual distributors and auction hubs

Second generation trading is exchanging focus on obtaining their revenue from each of buying and selling transaction that occurs within the exchange. Virtual distributors (VDs) offer one stop shopping for a fragmented buyer and seller community by pulling together dissimilar product information from multiple catalogues and from 'multiple suppliers' and/or manufactures into in a mega catalog. VDs assist in streamlining the sourcing of direct goods, lowers transaction costs by issuing a single purchase order and passing the order to each relevant supplier that ships the product direct.

Auction hubs are becoming a popular sales channel for 'spot buying' unique items, such as used equipments, surplus inventory and perishable goods. These hubs function similarly to a stock market. Buyers and sellers meet, usually anonymously to
agree on prices on commodities, such as raw materials, energy or telecommunications capacity. Auctions are of two types: forward and reverse. Forward auctions allow a multitude of buyers to bid for products/services from an individual seller on a competitive basis at below market prices and it tends to be seller centric. Reverse auction or open-bid systems: buyers list the products or services they desire, and pre-qualified sellers bid on fulfilling the need. Reverse auction are effective for industries that trade in one-of-kind, non standard, customized Products. Auctions are commonly used as a mechanism for liquidating F surplus inventory at the best possible price. Auction hubs can be independent-"dot-coms or backed by major industry players, but remaining neutral is the key to their success.

- **Third generation trading collaboration hubs**

  Transaction hubs are giving way to integration and collaboration hubs. These types of trading exchanges provide transaction functionality to the participating companies, helping companies with end-to-end management of their supply chain. Collaboration hubs seeks to create one common platform to enable all participations in an industry supply chain to share information, conduct business transactions and collaborate on strategic and operational planning. Collaborative hubs provide value continuously by increasing site "stickiness", generate multiple reverse streams and increase competitive barriers to entry. Collaboration efforts may include product planning and design, demand forecasting, replenishment planning and pricing and promotional strategies. Collaboration hubs promise to enable supply chain to attain new levels of cooperation and information sharing whereby partners collaborate on strategic and operational planning.

- **Industry consortiums: joint-venture procurement hubs**

  Industry Titans and large firms have responded to the competitive threats recreated by new start-ups (mostly dot-corns) by forming either buyers or suppliers. In a buyer consortium, a group of large companies combine their buying powers to drive down prices. An industry's traditional leaders have two significant advantages over net born start-ups when creating trading exchanges for high volume commodity goods: instant commercial activity and liquidity. Supplier sponsored consortiums have begun to emerge in response to start-ups exchanges and buyer consortiums. They are
formed in industries in which a few firms represent the highest concentration of market power.

The success of the industry consortiums remains to be seen, with regards to issues like consortium governance, technology and antitrust concerns needs to be addressed. With powerful traditional competitors, each with its own technology standards and systems, finding a common technological ground will be difficult. The companies will have to work hard to satisfy the requirements of all the members. Finally anti-trust concerns are discussed among industry specific giants. Many fear that collusion between dominant players will be at the expense of the industry's smaller firms.

2.16 E-procurement models by other authors

According to Wilson (2002), e-procurement as the amalgamation of sales and purchasing business models and calls for differentiating based on application and functions. The first application is the "buy-side procurement" which refers to one organization using electronic systems to purchase goods, such as office stationary, from contracted suppliers. These suppliers are also using e-procurement systems for management of all processes relating to purchase. This is simply coalescing of the corporate procurement portals and business to employees (B2E) applications. Also these models are generally driven much more then specific requirements of the buying organizations than other models. (Wilson, 2002)

The second 'application is "sell-side procurement ". This term is used to describe how one supplier sells to a number of buying organizations using electronic systems such as, using e-procurement systems and e-commerce technology. This model is also referred to as "e-sales". Seller side procurement models are often used extensively in 82C (business to consumers). Well designed seller side solution is usually offering a higher level of customazations for each buyer than their B2C retail counterparts. This type of model attracts big suppliers firms that have a stronger position in relationships with their buyers. (Wilson, 2002)

The third application is "e-marketplace and trading hubs" which is a combination of industry consortium and the trading exchanges. The marketplace
model brings together many different buying and selling organizations in one trading community. The most popular e-marketplace function is auction used for variety of product category. This type of model often helps to increase collaboration between companies in a single industry sector or providing the opportunity of e-procurement in companies who would normally be to small to benefit. (Wilson, 2002)

According to Grackin (2001), to simplify different e-procurement models, they are two basis co-existence models that many companies consider when contemplating an e-procurement strategy. First is that “enterprise solution” model in which a company can build direct electronic links with its trading partners. A company can create a solution (with the help to packaged applications), which could both direct and indirect procurement processes. Some of these processes included:

- Product life-cycle management
- Procurement
- Trading management
- Auctions
- Collaboration (demand planning, Co-management processes and vendor managed inventory initiatives.)

A second model by is an “e-market place solution” typically created by an independent dot-com, or industry consortia. This model is focused on procurement of indirect goods such as office suppliers, building board participation and providing aggregate view of available products. It also represents new channel of the sell-side and alternative source for the buy-side i.e. potential or procure commodities at lower prices. (Grackin, 2001)

2.17 Emergence or research questions and conceptualization

As the theories discussed in the begging of chapter two suggest that it is hard to cover all the areas of e-procurement, I have highlighted a research propose of the thesis in previous chapter. It will be used to guide us in our research. Taking into
consideration the propose three research question are formulated:

RQ1: How can the benefits associated with implementation of e-hub within supply chain and manufacturing network in B2B organizational setting be described?

RQ2: How can the risks associated with adoptions and integrations of e-hub within supply chain and manufacturing network in B2B organizational setting be described?

RQ3: How can the e-hub strategies within supply chain and manufacturing network in B2B organizational setting be characterized?

The propose of conceptualization is to either explain graphically or in the narrative forms, conceptualization present the main points that are going to be studied (Miles and Humberman, 1994). In order to answer the research questions as stared above, I have to conceptualize them by building a frame of references. I will do this by reviewing the literature presented in previous chapter. My frame of reference will constitute a base for analyzing the collected data connected to each relevant research question. Since I have studied several theories in the same area, I have selected the one of the fits my research requirement.

How can the benefits associated with implementation of e-hub within supply chain and manufacturing network in B2B organizational setting be described?

In this section we conceptualize the research questions and select theory(s) that will help us discuss the benefits associated with the implementation of an e-procurement in a B2B Organization. This will further help in understanding what motivates companies to execute an e-procurement, to gain a better understanding and recognized the pattern while reviewing the literature. The theories for this section are put forward by ITRG (2002) and De Boer et al (2002); the authors have divided the benefits into cost and non-cost benefits. As these theories are quite extensive and due to the limitation of time we can follow only the most common identified benefits.
Also, similar view of e-procurement benefits is provided by Davila et al (2002) and Presutti (2002). The reason behind selecting them over other researches is because they have only highlighted the main benefits, and their research is quite new. Also, the following benefits are supported by two researchers which make the literature more reliable. According to Davila et al (2002), cost savings is the primary rationale for investment across all technology platforms, through the manner in which these savings are delivered varies. The benefits recognized by both authors are as following:

- **Cost savings**

Precipitous reduction in transaction costs

Better negotiation

- **Process efficiencies**

Reduce paperwork, fewer mistakes leads to more efficient purchasing process.

- **Better information flow between company and supplier**

Clear guidelines between buyers and suppliers Supplier information shared across different departments within the organization.

- **Reduced maverick spending.**

Purchases take place only with authorized suppliers on negotiated prices based on volume.

- **Streamlined process**

Reduction in sourcing cycle time (products get to market faster and firms gain higher market share).

- **Better inventory level**

Real time exchanges i.e. no stock outs, wrong product ordered faster delivery,
etc, and better inventory control.

*How can the risks associated with adoptions and integrations of e-hub within supply chain and manufacturing network in B2B organizational setting be described?*

For this research question, we will be using the risks pointed out by Davila, et al (2002). The reason for selecting their study was because of its broad categorization under four headings which covers risks that are associated with implementation of e-procurement in B2B setting.

- **Internal business risks**
  - Uncertainty about E-procurement solutions
  - Integration with the existing information infrastructure

- **External business risks**
  - Need to develop internal systems that facilitate the communication through electronic means
  - Risk of previous transaction between buyer and suppliers
  - Low assurances from suppliers on standards, quality, services and delivery capability

- **Technology risks**
  - Lack of a widely accepted technological standard for coding, technical and process specifications

- **E-procurement process risks**
  - Security and control of process

*How can the e-hub strategies within supply chain and manufacturing network in B2B organizational setting be characterized?*
For this research question, we will highlight the e-procurement strategies adopted in the B2B setting. Further, how the strategies can be differentiated on the basis of the material procured by the e-procurement solution including the models and reason for choosing a particular research work.

2.17.1 E-procurement strategies

According to Davila et al (2002), we found that the authors have an exhaustive understanding of the e-procurement strategies. Their adoption and their work in the field of e-procurement is fairly recent. The strategies by Davila et al (2002) would give us essential clues to study the current market scenario and integrate the results in understanding the e-procurement strategies. The strategies that will be considered in the study:

- Wait and see approach
  - Selective investments (no sizeable investment until one best model is defined), active in experimentation and widespread.
- Passive approach
  - Observation without experimentation
- Aggressive approach
  - High investments to gain competitive edge, ready to take risks

2.17.2 E-procurement practices

Different authors have identified the importance of material (direct or indirect) in adoption of the e-procurement strategies. For e-procurement practices we will be relaying on ISM/Forrester reports on e-business (2002), it has recognized the current focus on indirect materials as the way to experiment with technology to evolve into procurement processes and inventory management. The reason for selecting them over others is because their theories are quite recent and also it is supported by two authors making it more reliable.

- Direct material (or purchases)
- Closely linked to production or services delivery

- Indirect material (or purchases)

- MRO (maintenance, repair and operations) goods

### 2.17.3 E-procurement models

According to Kalakota and Robinson (2000), the e-procurement model is still in its evolving stages. However, the new business models required serving this market is still in its evolving even rapidly; and they compiled seven basic types of e-procurement trading models in use and also their differences. However, it is not possible to carry out such an intensive research; hence it's necessary to consider other authors, like Grackin (2001); who have further divided the seven trading models into just two key models based on the strategy used by the company.

But for our research, we decided to consider Wilson (2002), as his work is most recent and still integrates the seven basic trading models by Kalakota and Robinson. He describes the models based on their application and functionality.

- **Buy-side procurement**

  One organization using electronic system to purchase goods from contracted

  - **Suppliers also using e-procurement.**

-Sell-side procurement

  One seller sells to number of buying organizations using electronic systems and e-procurement technologies.

- **E-marketplace and trading hubs**

  It's a Market place that brings together many different buying and selling organizations within one trading community

### 2.18 Emerged frame of references

In figure 2-14 below the frame of references as emerged from the conceptualization an the three research questions are presented:
Figure 2-14: Emerged frame of references

Figure 2-14 shows the three research questions: how can the benefits associated with e-procurement implementation be described, how can the risks associated with e-procurement be described, how can e-procurement strategies utilized by organizations be characterized. Further, this figure clarifies how these research questions fit together and help is answering the purpose of thesis.

The figure starts from benefits that are the drivers for companies leading to implementation of e-procurement strategy.

Risks are present throughout the process both in starting and after implementation of e-procurement. Risks help the organization identify the pitfalls and help in better implementation of e-procurement. And all these components interact together which takes place within the e-procurement environment.
Chapter 3

Methodology

A method is a tool, a way to solve a problem and research new knowledge (Holme and Solvang, 1997). In this chapter, the procedure of the research will be presented. We will describe what methods we have used and how we created the thesis. For doing this, we have to follow a series of steps, while at the same time using validity and reliability criteria to assure that the study fulfils certain standards (Foster, 1998). These steps are showed below in figure 3-1.

Figure 3-1: Schematic Presentation of the Methodology
SOURCE: Adapted from Foster, 1998, p.81
3.1 Research Purpose

According to Yin (2003), the purpose with research is to state what is to be accomplished by conducting research and how the results of the research can be used. The research purpose can be divided into different groups. According to Reynolds (1971) and Yin (2003), scientific research has three purposes: exploratory, descriptive, or explanatory.

Exploratory research is appropriate when a problem is difficult to structure and when there is uncertainty regarding what models to use, what characteristics and relations that are important. The research is designed to allow an investigator to just "look around" with the respect to some phenomenon, with the aim being to develop suggestive ideas. (Reynolds, 1971) The purpose of an exploratory research is to gather as much information as possible about a specific subject. It is further common to use many different sources to gather this information. The technique that is best suited for information gathering when performing an exploratory research is interviews. (Yin, 2003)

The objective of descriptive research is to provide a description of various phenomenon’s connected to individuals, situations or events that occur. The purpose might be to develop empirical generalizations. Once such generalizations begin to appear, they are worth explaining, which leads to theory development. (Reynolds, 1971)

Moreover, descriptive research is often used when a problem is well structured and there is no intention to investigate cause/effect relationship. The objective with an explanatory research is to analyze cause-effect relationship, explaining what cause produces what effects. (Yin, 2003) According to Reynolds (1971) the goal with the explanatory study is to develop a theory that could be used to explain the empirical generalization that was developed in the descriptive stage. This provides a cycle of theory construction, theory testing and theory reformulations (and back to step one). (Reynolds, 1971)

The research purpose and research question of this thesis indicates that this study is primarily descriptive. This study is descriptive since it is our intention to
describe the area of research and try to explain the data collected in order to find out the differences and similarities with frame of reference. But we are exploratory in our research and we also begin to be explanatory. We have stated a purpose of the study that makes us exploratory. And since I begin to explain by evaluating answers to the research question, that makes our study explanatory.

3.2 Research Approach

There are different ways to address the matter, while conducting a research. Research approaches can be divided in two categories, first deductive versus inductive research and secondly qualitative or quantitative. We have stated the existing theories relating to our research, which will later compared with reality. Finally, I aim to draw logical conclusions from our finding. Therefore it is quite clear from the start the research is deductive due to the way I developed our purpose and research questions.

The best research method to use for a study depends on that study’s research purpose and the accompanying research questions, (Yin, 2003). There is on significant difference between these two approaches. In the quantitative approach, results are based on numbers and statistics that are presented in figures. In the qualitative approach, the focus will be on describing an event with the use of words, which approach to choose depends on the problem definition together with what kind of information is needed. The two approach to are used for thesis suitability and will also be used together, (Holme & Solvang, 1997). Finally, the qualitative and quantitative methods refer to the way one chooses to treat and analyze the selected data. The quantitative approach is also characterized by studying few variables on a large number of entities. To find answer to its research problem, this is normally done in broad sense by using surveys with already set answering alternatives. This approach furthermore, is considered especially useful when conducting a wide investigation that contains many units, (Holme & Solvang, 1997). Characteristics of qualitative studies are that they are based largely on the researcher’s own description, emotions and reactions, (Yin, 2003).
The qualitative approach also includes a great closeness to respondents or to the source that the data is being collected from Renault Group. It is characterized by gathering abundant information and to investigate several variables from a few numbers of entities. To make use of the possibility to gather high quality data, the most common way to do this is with the use of case studies and interviews where no set answering alternatives are being offered, (Holme and Solvang, 1997).

Table 3-1: Differences between quantitative and qualitative data, adapted from Saunders, (2000)

<table>
<thead>
<tr>
<th>Quantitative data</th>
<th>Qualitative data</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Based on meaning derived from numbers</td>
<td>- Based on meanings expressed through words</td>
</tr>
<tr>
<td>- Collection results in numerical and standardized data</td>
<td>- Collection results in non-standardized data requiring classification into categories</td>
</tr>
<tr>
<td>- Analysis conducted through the use of diagrams &amp; statistics</td>
<td>- Analysis conducted through the use of conceptualization</td>
</tr>
</tbody>
</table>

Basically, the core qualitative data is that the data collected should provide the researcher with a deeper understanding of the research problem (Johansson, 2002). Quantitative data is numerical data or other sort of data that can be quantified, (Saunders, 2000). The data collected through a quantitative method is characterized by it distant to what is studied, rather than trying to understand a problem, (Johansson, 2002). The qualitative approach was found to be more suitable for the purpose of this thesis, as the purpose is to gain better understanding of how an e-Hub within supply chain and manufacturing network is used in B2B setting. For doing so, we need close contact with the subjects, instead of generalization. Finally as the intention with this thesis is to describe, and find as complete and detailed information as possible, the qualitative approach is the most appropriate method.

3.3 Research Strategy

A research project’s research strategy explains how the researcher collects and analyses empirical data (Yin, 1994). The research strategy works as a general plan where the researcher explains how researcher wants to carry out the projects to answer the research questions (Saunders, 2000).
The choice of the research strategy is not linked to the nature of the research purpose, (Yin, 1994).

The type of research question posed is according to Yin (1994) the most important criterion. The author suggests that the type of research strategy to employ is linked to how the research question is formulated, if it is a “who”, “what”, “how”, or “why” question. An important remark to the “what” questions is that if the study is exploratory, and of the mentioned research strategies in figure 4.3 adapted from Yin (1994), is useable.

According to Yin (2003), there are five primary research strategies in the social science: experiments, surveys, archival analysis, histories, and case studies.

Base on Yin (2003) each strategy has its own advantages and disadvantages depending on three conditions:

- The type of research question posed.
- The extent of control an investigator has over actual behavioral events.
- The degree of focus on contemporary, as apposed to historical, events.

By applying Yin’s (2003) reasoning and solely looking at the stated research questions, it appears that an experiment, history or a case study could fit as appropriate strategies.

Table 3-2: Research strategies connected to criteria, adapted from Yin (1994)
We have chosen to conduct our research with the help of the case study, which is generally superior when answering “how” and ”why” questions about a specific topic, (Yin, 2003).

In generally a case study is a dealing with a single case or a small number of cases, its main goal is to find rich information about the research area and the enacted processes, (Saunders, 2000).

A case study strategy is covering a small number of units with many variables (Johansson, 2002). In case study research can employ various kind of data collection methods such as questioners, interviews, observations and documentary analysis. One of the risks with a case study strategy is that it can feel a little unscientific, (Saunders, 2000). Yin (1994) further addresses the problem of case studies stating that conducting a good case study is hard and no one knows what kind of skills a researchers should posses to carry out a good case study.

In details a case study is an empirical research it is that investigates a contemporary a phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used.

This definition not only helps us to understand case studies, but also distinguishes them from the other research strategies (Yin, 2003).

A case study can involve a single and multiple –case study. The single case study makes an in depth investigation regarding only one entity, such as an organization or a decision. However when making a multiple-case study, two or more entities are studied which gives the opportunity of comparisons. Yet, there is a risk with the multiple –case study, since each case might be less in –depth investigated, (Yin, 2003).

I have selected single case studies in one car manufacturer group as our research strategy. This is the most appropriate strategy as the thesis aims for deeper and detailed study.
3.4 Data collection

Yin (2003) states, "a major strength of case study data collection is the opportunity to use many different sources of evidence" (p. 91). By using multiple measures of the same phenomenon, the validity of any scientific study increases. Findings or conclusions resulting from a case study are likely to be more convincing and accurate if based on several different sources of information. No one of the different sources has a complete advantage over the others. The different sources are highly complementary; hence, as many sources as possible should be used. The six most commonly used sources for data collection in case study is: documentation, archival records, interview, direct observations, participant-observation, and physical artifacts. All these sources have their own strengths and weakness. (Yin, 2003)

The data collection methods that will be used for this research are interviews and documentation. The interview is chosen as the major primary data collection method because of its strength in focusing directly on the topic of the case study. Interviews can be conducted personally or via telephone. Some potential disadvantages with an interview are that it can be biased on poorly constructed questions, there is a risk for reflexivity, i.e. that the interviewee tells the interviewer only what he/she wants to hear. (Yin, 2003)

Yin (2003) describes the following three different types of interviews: open-ended, focused, and structured. The most commonly used interview method is the open-ended, where the researcher asks the respondent unstructured questions, thus allowing the interview to be more of a discussion. The respondents can be asked for facts as well as their own personal opinion. When a focused interview takes place, the respondent is interviewed during a brief period of time. Still, the character of the interview is open, and it may be conducted by a conversation between the respondent and the researcher. However, the researcher is probably following a questionnaire. The purpose with a focused interview could be to confirm certain facts that are already known to the researcher. The third form of interview, survey, is more of a combination of an interview and a survey. The interview is structured and based on predetermined questions (Yin, 2003)
For this research, interview will be performed personally and via phone and face to face interview. Telephone interview, was considered because of the geographical distance from the interviewee as well as limited time and financial resources but really I have traveled to France to find out better conclusion. The interview guide (see APPENDIX A) is written in English and the interview is also conducted in English in order to avoid any chance of misinterpretations and translations errors. As referred by Yin (2003), a recording device was used throughout the interview to accurately register the data. Use of recording device helps in double checking data and it also reduces the possibility of missed information. In the end of the interview, it was made sure that no questions according to the interview guide were left out. Also interview guide was send in advance to the interviewee, so that they would have sufficient time to prepare for the interview and gather necessary information. Finally websites of companies will act as a source of documentation. That will further strengthen my study. (Yin, 2003)

As according to Yin (2003) documentation helps in stable, unobtrusive and broad coverage of data collection. Also use of multiple source of evidence for a study's data collection is called triangulation and is a desired pattern for dealing with case studies, in order to converge evidence and establish the occurrence of an event; it also makes the study more reliable.

3.5 Sample Selection

When conducting research, it is often impossible, impractical, or too expensive to collect data from all the potential units of analysis included in the research problem. Hence, a smaller number of units, a sample, are often chosen to represent the relevant attributes of the whole set of units, the population. Because the samples are not perfectly representative population from which they are drawn, the researcher cannot be certain that the conclusions will be generalized to the entire population. (Graziano & Raulin, 1997)

For my thesis, I will use single-case sampling, because single-cases could add confidence to findings. By looking at a range of similar and contrasting cases, we can understand the case finding, grounding it by specifying how and where and, possible, why it carries on as it does (Yin, 2003). The sample selection will include criteria that
companies should have implemented an e-hub solution in the company or helps to provide an e-procurement solution to other companies. The reason for taking these two perspectives is that, when a company is implementing e-hub for procurement, it is easy to get in depth information. And when a company is providing e-hub solutions, it is easier to get wider information about its customers (companies) and adoption of e-procurement.

These two perspectives are further compared from French and Iranian companies' views. This will help us in getting an inter-cultural perspective for our thesis purpose. The different between the French and Iranian companies also brings up the difference between the Europe and Asian companies that use or provide an e-procurement solution.

While selecting the e-procurement solution, providers from French and Iranian, it was considered to study an established company (A company that is using e-hub or providing e-procurement service for few years). The reason for this choice is due to the recent e-procurements evolution in the business community. The companies approached regarding the study were first contacted via mail and telephone. Company considered for this purpose was Auto Chassis International (ACI France & ACI Pars in RENAULT Group). Both companies were founded around 1991 and 2005). Also both are leading e-procurement service provider in their own country. While selecting users of e-procurement, it was tried that the user company should be related with the service provider company. In Iran which my study is focused on, I have just find out ACI Pars that will cover all of my area problem and starting for WEB EDI offer by French and affiliated company to create and gain more value. This is also my novelty for my thesis to study around this country.

Therefore my sample selection is same as population where we are concentrating on that area.

3.6 Validity and Reliability

Validity and reliability helps to measure the research and add strength to the findings. Validity is the most important requirement on a measurement instrument.
Three sorts of validity need to be considered. (Yin, 2003) According to Yin (2003) there are three forms of validity: construct validity, internal validity, and external validity.

- Construct validity: establishing correct operational measures for the concepts being studied.

- Internal validity: establishes a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships.

- External validity: establishing the domain to which a study's findings can be generalized.

To increase the validity we sent e-mail in advance containing the issues (guideline) that we are going to be discussed and as far as possible to avoid misunderstandings. As the study was conducted in French and Iran, it became necessary that we make the purpose of the study clear for the interviewee before the interview. However, at no point interview guide was provided to the interviewee.

I increased validity of the research by constructing an interview guide and got it proof read by our supervisor and also got feedback on it. This increased the external validity and replication logic in multiple-case studies. Theories must be tested through replication of the findings in similar surroundings meaning that a specified theory has to come up with the same result. The data collected was not verified or any feedback was taken from the interviewee after the interview, which can reduce the validity. This was due to the limitation of time which unfeasible for the study.

Reliability is the extent to which research results would be stable or consistent if the same techniques were used repeatedly. Also the role of reliability is to minimize the errors and biases in a study.

Two things can increase reliability: the use of a case study protocol and the development of a case study database. Yin (2003) regarding reliability of observations, Yin (2003) says that to increase the reliability a common procedure is to have more than a single observer making an observation, whether it is of the formal or
the casual variety. Hence, when resources permit, a case study investigation should use multiple observers.

To increase the reliability in my study, I also took notes during the interviews. These notes were both answers and reflections that came from the respondents. To increase

The reliability even more, I used a tape recorder and recorded the interviews. By taking this measure, I tried to minimize the probability of misunderstanding and the risk of leaving out something vital.

Further I attempted to avoid leading and subjective questions that was facilitated by the use of the more structured interview guide. In addition the same interview guide was used during all this sessions. The reliability is influenced by the fact that people “perceptions vary over time that make it difficult for another researcher to achieve the same result even if the same sample were to be used. A change like that could affect the reliability negatively hence making personal interpretation and giving leading question difficult to avoid.

Hereby we progress on to the next chapter where I present the empirical data collected and analyze them for the research.
Chapter 4

Empirical Data

In this chapter, I will be presenting the empirical data from the French and Iranian companies. This chapter is divided into sections, where each company is first introduced. Afterwards the company's data is divided into sections according to the research questions posed and frame of reference. Data is collected using information available at the company's website and from the interview with the concerned person like a key contact manager Mr. Patrick THURIER.

4.1 Case study

* Auto Chassis International (RENAULT GROUP)*

ACI designs, develops, validates and manufactures front-and-rear-chassis and suspension systems. With over 4000 employees, ACI uses a wide range of in-house technologies (casting, stamping, metal forming, hydro forming, machining, heat
treatment, spot and arc welding, painting and assembly). ACI provides a full range of services to meet and needs of automobile manufacturers worldwide.

4.1.1 Know how

Auto Chassis International has a clear objective to become a reference and one of the world leaders in chassis design, development and manufacturing by 2005. Aided by substantial investments, Auto Chassis International provides its customer with the latest technology at a low cost by maximizing its research and innovation skills equipped with state-of-the-art computation, simulation and validation systems.

Managed by the Chassis Systems Department (nearly 400 people), the Research and Innovation activity represents 4 million Euros.

4.1.2 Engineering

- **450 Engineers and Technician**

- 150 workstations

- CAD: CATIA V4/V5, EUCLID, IDEAS, UG

- Software: ADAMS, CATIA, IDEAS, OPTRIS, NASTRAN, ABAQUS, RADIOSS, FALANCS, N’CODE

- Simultaneous Product and Process Engineering

Finite Element Design and process simulation stamping, forming, hydro forming, welding, and press fitting simulation.

- Prototypes Workshop

  Representative of production: Arc welding, spot, welding, machining, system assembly, 3D control.
➢ Test Laboratory

35 Test rigs-1500 m² – 80000 hours of testing/year.

4.1.3 Products

As one of first important suppliers for Renault, Auto Chassis International provides full service design, development and manufacturing capabilities for front and rear complete modules as well as for sub-modules (Rear Axle, Sub-Frame, Back and Front corners, Disk and wheel Hubs).

4.1.4 Research & Development

Applying its R&D skills to products and process engineering, Auto Chassis International's R&D plan meets its customer needs and orientations by offering lightweight and cost effective products. The Research and Innovation policy targets weight and cost reductions combined with shorter lead times. Weight reduction research concentrates mainly on introducing new materials like high-strength steel blank, inox, and the increased use of aluminum, in the chassis modules.

It also aims at redesigning systems for product simplifications - integrating functions with less components - both preserving and improving performances offered to the customer. Auto Chassis International is committed to reducing development time by increasing numeric modelizations of design and manufacturing processes. The Chassis Systems Department allocates a large part of its budget (around 6%) to Research and Innovation. The activity is managed by Projects, each Project Manager making full use of all the skills in the Chassis System Department.

4.1.5 Certification

Already SQCA, ISO9001 and QS9000 certified, Auto Chassis International has obtained a new quality certification: ISO / TS 16949. The achievement of such an internationally recognized referential speaks for Auto Chassis International's Quality System and ensures its capability to fully satisfy Car Manufacturers' needs worldwide.
Auto Chassis International has also taken the necessary steps regarding the environment and has obtained the ISO 14001 certification. Auto Chassis International's Environmental Policy clearly shows its commitment to improving its effects on the environment, above all in its development of an environmentally-friendly industrial policy.

4.2 An Overview of EDI in my sample area which is as same as selected population.

E-Car = Service provider, Sample of car manufacturer in Iran = ACI PARS (RENAULT GROUP) same

Service users = Suppliers within RENAULT GROUP.

EDI stands for Electronic Data Interchange. It is simply the computer to computer exchange of business documents between companies. EDI documents use specific computer record formats that are based on widely accepted standards. However, each company may use the flexibility allowed by the standards in a unique way that fits their business needs. EDI is used in a variety of industries. In fact over 80,000 companies have made the switch to EDI to improve their efficiency. Many of these companies require all of their partners to also use EDI. Computer-to-computer exchange of information is much less expensive than handling paper documents. Studies have shown that processing a paper-based order can cost $70 or more while processing an EDI order costs a dollar or less. Much less labor time is required. Fewer errors occur because computer systems process the documents rather than processing by hand. EDI transactions between companies flow faster and more reliably than paper documents. Faster transactions support reduction in inventory levels, better use of warehouse space, fewer out-of-stock occurrences and lower freight costs through fewer emergencies expedites. Paper purchase orders can take up to 10 days from the time the buyer prepares the order to when the supplier ships it. EDI orders can take as little as one day. EDI’s efficiency has made it an important contributor to the efficiency of business communications in many industries. Business documents like invoices, purchase orders, and advanced ship notices can all be exchanged between companies through EDI.
4.2.1 How EDI Works in Renault Group

Here is an example of how an EDI transmission works: A buyer prepares an order in his purchasing system and has it approved. Next, the EDI order is translated into an EDI document format called an 850 purchase order. The EDI 850 purchase order is then securely transmitted to the supplier either via the internet or through a VAN (Value Added Network). The buyer’s VAN is a like an electronic post office that interconnects with the supplier's VAN. The VAN makes sure that EDI transactions are sent and received. The supplier’s VAN ensures that the supplier receives the order. The supplier’s EDI system then processes the order. Data security and control are maintained throughout the transmission process using passwords, user identification and encryption. Both the buyer’s and supplier’s EDI applications edit and check the documents for accuracy.

Each trading partner has unique EDI requirements. These will include the specific kinds of EDI documents to be processed, such as the 850 purchase order used in the example above, 856 advance ship notices and 810 invoices. In fact, most any business document that one company would exchange with another company can be sent via EDI. However, each EDI document must be exchanged with each partner in exactly the format they specify. Many partners will have an EDI implementation guide or kit that explains their specific requirements. Maps are required to translate the EDI documents from the trading partner’s format into the format that is useable by the receiving party. The following graphic demonstrates the typical transaction flow between suppliers and customers.

* Flow chart between customer and supplier back office system
EDI capability involves either buying or outsourcing the following components:

1. Software for communications, mailing of EDI transactions, mapping and translation.
2. VAN, ASYNC, BISYNC, and Internet communications as required by various partners.
3. Hardware including a server or PC, communication devices and peripherals
4. Secured office space and monitored security
5. Data backups and redundant power for reliability
6. Additional software will be needed if integration of the EDI transactions with back office systems is desired.
7. A WAN will need to be contracted for ongoing EDI transmissions.
8. Personnel must be trained in how to use the software and communication devices.
9. Maps will need to be developed for each EDI document type to be exchanged with each partner. Maps translate the encoded EDI record into a usable format. E-Car specialty is outsourcing all of the components of EDI for small and mid-sized companies. All our clients need is internet access and email. We take of all the 9 items listed above for you - all of the software, VAN transmission, hardware, communications, mapping, translation and labor.

4.2.2 The Need of EDI in Renault Group

More and more customers want their suppliers to have the ability to reliably exchange EDI documents. They are under pressure to reduce their procurement process costs by automating manual processes such as invoice data entry. As a result, EDI capability is a requirement for doing business with many customers. Suppliers want to develop closer customer relationships. They want to make themselves less expensive to buy from by reducing the administrative burden on their customers. There is a need to increase efficiency for all businesses. Suppliers are finding they can reduce costs by automating B2B (business-to-business) processes with EDI. Money is
saved in improving the speed and accuracy of documents they receive from their customers. Both suppliers and their customers have found that inaccurate or late B2B documents create expensive exception processes. Suppliers want to maintain control of their customer relationships and documents. They want to preserve the unique business arrangements they have worked hard to create with their customers and continue selling to their customers in the way they want to buy.

4.2.3 Frequently Asked Questions in “ACI PARS” one of the members of Renault Group in Iran

These questions are:

A. What is EDI?

EDI stands for Electronic Data Interchange. EDI is the computer-to-computer exchange of business documents between companies. EDI replaces the faxing and mailing of paper documents. EDI documents use specific computer record formats that are based on widely accepted standards. However, each company may use the flexibility allowed by the standards in a unique way that fits their business needs. EDI is used in a variety of industries. In fact, over 80,000 companies have made the switch to EDI to improve their efficiencies. Many of these companies require all of their partners to use EDI.

B. Why does ACI PARS business partner require EDI?

The computer-to-computer exchange of information through EDI is much less expensive the manual handling of paper documents. Studies have shown that processing a paper-based order can cost $70 or more while processing an EDI order costs a dollar or less. Much less labor time is required. Fewer errors occur because computer systems process the electronic order documents instead of manually processing the documents by hand. EDI transactions between companies flow faster and more reliably than paper documents. Faster transactions support reduction in inventory levels, better use of warehouse space, fewer out-of-stock occurrences, and lower freight costs through fewer emergencies expedites. Paper purchase orders can take up to 10 days from the time the buyer prepares the order to when the supplier
ships it. EDI orders can take as little as one day. EDI’s efficiency has made it an important contributor to the efficiency of business communications in many industries. Business documents like invoices, purchase orders, and advanced ship notices can all be exchanged more efficiently between companies through EDI.

C. Why do they need EDI?

More and more customers want their suppliers to have the ability to reliably exchange EDI documents. They are under pressure to reduce their procurement process costs by automating manual processes such as invoice data entry.

Because EDI is so efficient, many companies require their business partners to be EDI capable as a condition for doing business. Suppliers want to develop closer customer relationships. They want to make themselves less expensive to buy from by reducing the administrative burden on their customers. There is a continuing need for most businesses to increase efficiency. Suppliers are finding they can reduce costs by automating B2B (business-to-business) processes with EDI. Money is saved through improving the speed and accuracy of electronic documents they exchange with their customers.

D. What is EDI compliance for ACI PARS?

EDI compliance is the ability to send and receive EDI documents in the way that your partner requires it. Each EDI document must be exchanged with each partner in exactly the format they specify. Each trading partner has unique EDI requirements. Most partners will have an EDI implementation guide or kit that explains their specific requirements. Maps are required to translate the EDI documents from the trading partner’s format into the format that is useable by the receiving party. EDI compliance must be tested and approved. E-Car handles everything - all of the mapping, translation, communication and testing requirements for our clients. E-Car solution will make you EDI compliant with your EDI business partners.

E. How do they implement EDI?
We will take care of everything required to make you EDI capable and EDI compliant. EDI capability involves either buying or outsourcing the following components: Software for communications, mailboxing of EDI transactions, mapping and translation. VAN, ASYNC, BISYNC, and Internet communications will be required by various partners. A server or PC, communication devices, and peripherals will be needed as well as secured office space, monitored security, backups and redundant power. Additional software will be needed if integration of the EDI transactions with back office systems is desired. A VAN will need to be contracted for transmissions. Personnel must be trained in how to use the software and communication devices. Maps will then need to be developed for translating the encoded EDI documents into a useable form.

Our service takes care of everything. We minimize your cost and effort through: • Automating the document flow between you and your partners • No mapping • No investment in hardware • No new staffing • No lengthy contracts • No annual fees • No software to purchase or maintain. They will take care of everything required to make you EDI capable and EDI compliant.

F. What is Web-based EDI?

Service provider provides Web-based EDI. All you will need is a fast Internet connection and email. You will be notified of new EDI transactions via email. Your EDI documents will be translated by Service provider into easy-to-read web forms on our secure internet site. You will be able to see your EDI documents at the office or at home or anywhere you have internet access. Your name and password will be required to access your EDI documents.

G. Do they need to buy software?

No, you do not need to buy any software. You will access our secure server via the internet. Our system will take care of everything. All you need is internet access, email, and our EDI service.

H. Do they need an EDI VAN?
Yes, an EDI VAN is needed for EDI with many business partners. Service Provider (S.P) is an EDI VAN and takes care of all of our clients’ requirements. A VAN is a Value Added Network. A VAN is responsible for the secure and reliable communication of EDI documents. Your business partner probably already has one. Some business partners do not use a VAN and use the internet for transmission of EDI documents via AS/2. Service provider has AS/2.

Capability and takes care of the transmission of documents with these business partners also. Does all this sound a bit confusing? Don’t worry. Service provider provides a complete solution. We take all of the VAN and AS/2 details.

I. How does EDI service work?

The best way to understand how RENAULT GROUP EDI service works is to view a demo on “e-Car.

J. What does a supplier have to do?

Simple – Call them and sign up for the service. Service provider takes care of details and headaches. Supplier will need to provide S.P. with the complete company name, address, and a number to identify their company. S.P will take it from there. Supplier will be provided with one-on-one training and have the opportunity to do some test documents. Then S.P. will move you to production status. That is all supplier has to do.

K. Can they satisfy each of customers’ EDI requirements?

Service provider can satisfy each of your customers’ EDI requirements. They have extensive experience with many, many companies. Even if some business partner is not listed, they can quickly implement EDI for them.

L. How much does EDI cost?

Web EDI monthly fees are as affordable as a cell phone. If you would like a quote for the Service provider service that fits your needs.
M. Why is this service less expensive?

This is less expensive because they specialize in web-based EDI service for small and mid-sized businesses. We do not sell software.

Their systems are maintained on our secure internet based servers. This is much less expensive than distributing software to thousands of computers throughout the world and maintaining that software on computers with various operating systems. Their solutions run on new computer servers that cost up to ten times less than comparable servers cost 5 years ago. They pass the software and server savings on to their clients in the form of less expensive solutions.

N. How can service provider help the suppliers of ACI PARS?

Simple - We take care of everything you need to be EDI capable and EDI compliant with your business partners’ requirements. Our outsourced EDI service is easy to use and easy to get started. E-Car specialty is outsourcing all of the components of EDI for small and mid-sized companies. All our clients need is internet access and email. We take of everything - all of the software, VAN transmission, hardware, communications, mapping, labor and EDI expertise.

O. What does E-Car take care of “behind the scenes”?

Here is an example of how an EDI transmission works: A buyer prepares an order in his purchasing system and has it approved. Next, the EDI order is translated into an EDI document format called an 850 purchase order. The EDI 850 purchase order is then securely transmitted to the supplier either via the internet or through a VAN (Value Added Network). The buyer’s VAN is a like an electronic post office that interconnects with the supplier's VAN. The VAN makes sure that EDI transactions are sent and received. The supplier’s VAN ensures that the supplier receives the order. The supplier’s EDI system then processes the order. Or in the case of S.P. clients, they provide VAN transportation and our servers provide all of the software and hardware that are required to process EDI documents. Only internet access and email are needed. Data security and control are maintained through out the
transmission process using passwords, user identification and encryption. Both buyer’s and supplier’s EDI applications edit and check the documents for accuracy.

Each trading partner has unique EDI requirements. These will include the specific kinds of EDI documents to be processed, such as the 850 purchase order used in the example above, 856 advance ship notices and 810 invoices. In fact, most any business document that one company would exchange with another company can be sent via EDI. However, each EDI document must be exchanged with each partner in exactly the format they specify.

Many partners will have an EDI implementation guide or kit that explains their specific requirements. Maps are required to translate the EDI documents from the trading partner’s format into the format that is usable by the receiving party. S.P. handles all of the mapping and translation requirements for our clients. EDI capability involves either buying or outsourcing the following components:

Software for communications, mail boxing of EDI transactions, mapping and translation is needed. Direction connection and Internet communications will be required by various partners. A server or PC, communication devices and peripherals will be needed as well as secured office space, monitored security, backups and redundant power.

Additional software will be needed if integration of the EDI transactions with back office systems is desired. A VAN will need to be contracted for transmissions. Personnel must be trained in how to use the software and communication devices. Maps will then need to be developed. E-Car specialty is outsourcing all of the components of EDI for small and mid-sized companies. All their clients need is internet access and email. They take of everything: all of the software, VAN transmission, hardware, communications and labor.

P. Why should RENAULT choose e-Car?

We provide more of what small and mid-sized businesses need. They are more affordable, have more partners, provide more service, are more reliable, and their solutions are easier to use.
As maybe of you are aware, Auto Chassis International is using a solution to provide faster and more efficient communications between ACI and suppliers, on top of the rational EDI.

Thus, it is not able to send you delivery schedules by fax, but ONLY via the WEB EDI solution.

This will give you the possibility to:

- Receive email notification when you have new delivery call
- Display, print, save locally information from the delivery schedules
- Prepare the goods shipping, print Galia labels and delivery note
- Send Advanced Shipping Notification while saving the delivery note.

For that, you just need a PC with an Internet connection, and follow those steps:

1) Contact one of our partners below, in order to create an account and select a contract that fit your needs in order to access the WEB EDI solution.

2) Contact our Electronic Communications department to validate the link, and be able to receive delivery calls.

3) Watch for your email box, you will receive a notification of new delivery call in the WEB EDI site.

4) Prepare the good shipping from the WEB EDI site, and when we receive the Advance Shipping Notification, we will receive by email a certification of Electronic Communications with ACI.

4.3 The Web EDI service dedicated to the automotive industry

This Web EDI service allows to the suppliers to securely exchange EDI messages with their customers using GALIA/ODETTE standards by simply using a standard browser and an Internet access.
It complies with the GALIA specifications and with the criteria of service quality and support required by the automotive industry for its supply chain management processes.

### 4.3.1 Main functionalities

The application software iTX2, developed by TX2 CONCEPT, certified by GALIA, installed on a web server allows to:

Displays the EDI messages sent by buyers to suppliers having subscribed to the service as web forms,

- Orders forecasts
- Call for delivery
- Payment advice

Displays the Web forms related to the message received in order to send messages in return to the buyer:

- Dispatch advice
- Invoice

These forms are pre-loaded with data contained in received order messages; they can be completed or modified by the supplier.

- Sends e-mail to the supplier indicating that a message has been received
- Edits and prints the packing labels corresponding to dispatch advices (GALIA format).

The service insures secured private access to the suppliers, the confidentiality and integrity of the received / sent data, and the tracing of the exchanged messages.

This service is operated on a 24H/24, 7days/7 basis on a « high availability level platform » by TX2 CONCEPT.
4.3.2 The set-up of the Web EDI solution

The set-up of the Web EDI solution is very simple. On the supplier’s side the only requirements are:

- A personal computer with an Internet browser,
- An Internet access and a mail box,
- A subscription to the Web EDI service.

The persons that will use the service must be familiar with:

- The use of the Internet and the web application software.
- The aspects of the logistics and the invoicing/payment rules related to business with the companies evolving in the automotive industry.

A help guide is available online. The intuitive approach of the Web EDI service makes its use very simple but it is recommended to order a phone training at date of start-up, in order to get quickly all the benefits of the advanced functionalities of the software.

In case of technical problem (not including those related to the lack of training), you can call our support team from 9 a.m. to 6 p.m.

4.3.3 Overview

This application allows you to process standard EDI messages sent by your customers in the automotive industry. It also allows you to input and send dispatch advices and invoices.

- The type of message that you may receive are:
  - Delivery instructions (Delins and Delfor)
  - Delivery schedules (Caldel)
The type of message that you can send are:

- Dispatch advices
- Invoices

The system also offers additional functionalities:

- Automatic processing of delivery instructions (to create automatically dispatch advices)
- Odette labels print-out

In order to use this application, you have to:

- Fill your own database
- Consult and print delivery instructions
- Input dispatch advices
- Input invoices

4.3.4 Data base set-up

To access the system, you have been assigned a user identification. This identification allows you to have your own work space, which consist of your own database.

Before starting processing messages, you have to fill correctly your database, as long as it is not possible to input dispatch advices or invoices for articles which do not exist in the database.

1. Your identification

The first screen allows you to fill the information concerning your company. The following page appears.

You are considered as a vendor.
You must then add a shipper site. You may add as many shipper sites as needed.

2. Buyers

The first screen allows you to add buyers.

3. Consignees

A consignee must be attached to a buyer. For each buyer you must input at least one consignee.

4. Package types

You must input the different package types that you will use.

5. Articles

An article must be attached to a buyer. That means that if you sell the same article to several buyers, you must create as many articles as necessary.

For each article, you must input the information necessary to create later a dispatch advice.

If you are going to process invoices, you must also fill the information related to prices.

6. Carriers

Information will be used in dispatch advices.

7. Legal information

Information will be used in invoices.

4.3.5 Incoming documents processing

1. Delins et Caldel

The options "Long-term" (View Delins) and "Short-term" (View Caldel) allow you to consult delivery instructions and delivery schedules.
2. Generate from Delivery Instructions

This option allows you to process automatically the received Delins and Caldel. The information contained in these messages are sorted and consolidated by Date + article + delivery point, and then displayed as shown below:

   To process requirement lines, you just have to select them and press the button Generate. The system will then create as many dispatch advices as necessary.

4.3.6 Dispatch Advices and Invoices Input

1. Dispatch advice

You may access to the dispatch advices input by different ways:

1. By selecting the menu option "Manual Input". You may create a dispatch advice

2. By selecting the menu “Desadv list”. You may modify a previous one.

3. From the option "Long-term" or "Short-term"

1.1. Header
1.2 Quantities

The articles referenced in the database which are related to the buyer are automatically displayed. You just have to fill the quantities for the articles you ship.

1.3 Package details
1.4 Validation

When you have finished the input, the system shows you the whole document. If you press the validate button, the dispatch advice will be automatically sent.

2. List of dispatch advices

The system displays a list of the dispatch advices from the option “Desadv List”.

Each dispatch advice may have the following status:

Desadv waiting to be sent / Desadv pending
3. Invoices

The system displays a list of the invoices. Each invoice may have the following status: Invoice waiting to be sent / Invoice pending

4. Labels

You may print transport or package labels
4.3.7 Documents Tracking

This list shows you the details concerning the transmission of all documents.

4.4 e Car - Web EDI Solution-Supply Chain Management

*The Agenda for e-CAR Web EDI*

1. e-Car Web EDI

2. e-Car deployment utilities

- The mission:

  Consulting and development in Information Technology

  Focused on EDI systems - Automotive Industry

  Expert e-Commerce and B2B

- Service provider:
Since 1988

Legal form: SARL - capital 41 800 Euros

Operational Team: 8 Development and Consultant Resources

Our customers: Big enterprises and government agencies

4.4.1 An Information Systems Consulting Company dedicated to EDI & e-Commerce B2B

Automotive industry

EDI & EDIFACT training seminars in partnership with Galia & VDA - PSA, Renault, Renault VI, Valeo, P O, Michelin, Atos Origin, Faurecia, TRW, Trèves, SAP, Visteon, Magneti Marelli, Hutchinson, Esso, PUM, …more than 700 attendees

EDI projects:

PSA, Visteon, Faurecia, Plastic Omnium, Mitsubishi, ESSO, Valfond, SLI Socop,

4.4.2 Web EDI intended to fulfill the supply chain requirements based upon GALIA/ODETTE recommendations

- First GALIA approved web EDI solution.
- A "Supply chain" application.
- An application devoted to the Customer/Supplier relationship management, taking in account the customer logistics profile constraints
- Designed from ODETTE and GALIA standards
e-Car®: Architecture

Web EDI solution for SMEs
e-Car®: Major capabilities

EDI messages and e-Forms:

Delivery forecast
Call off delivery
Picking list
Dispatch Advice
Invoice

Downloading and printout documents:

Download/Upload flat file (ERP structure)
Delins/Caldel printout
Picking list printout
Delivery Note - Odette/Galia/VDA
Package and transport label printout
Invoice printout

e-Car® end user services

- Logistics services – Delivery Forecast, Call Off, Dispatch and Invoicing.

- Administration services forms - customization of your own e-Car, repository management services for your articles, organizations, user account management

- FAQ and integrated mail facilities to support on line e-Car application usage.
e-Car®: Services panel

Delivery forecast – DELFOR

- Warning to supplier as of Delivery Instructions receipt
- Easy browsing through Delivery Instructions details
- Summary to enable access to all Delivery Instructions irrelevant of arrival date or originating Manufacturer
- Fully compliant to OEM profiles derived from Odette

Available services include:
- Header and Detail form for every Delivery Instruction
- PDF print of Delivery Instructions Details paper layout
- Downloading DELINS message in XML format or any other upon request
- Save and archive/restore facilities
Delivery forecast – DELFOR
e-Car®: Services panel

Dispatch – DESADV

⇒ Dispatch advice set up:

- Either, automatically relying on Picking Lists – (Elapsed time 1 to 2 minutes): Consignee - Place of discharge - Period
- Or, using an on the fly dispatch set up service available through the Dispatch Advice forms

⇒ Print out

- Delivery Note - compliant to Odette standard or any other upon request
- PU and HU labels - ETI1 Standard - ETI 8 Global Label - VDA - ...
- Labels PDF file downloaded to avoid print trouble when printing directly with Html format

Select automatic option to enable item numbering: applies to DN, PU, Invoice
e-Car®: Services panel

Documents generated by e-Car

### Delivery Note

**Consistent with Odette standards**

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Consignee</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACI LE MANS</td>
<td>PACY TECHNOLOGIES 27120 PACY</td>
<td></td>
</tr>
<tr>
<td>72086 Le Mans Cedex 9</td>
<td>PAYS DE L'ILE-DE-FRANCE</td>
<td></td>
</tr>
</tbody>
</table>

#### Line Item

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>VAT Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAS TRANSVERSAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Payment Details

<table>
<thead>
<tr>
<th>Payment Currency</th>
<th>Payment Date</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Taxable Amount</th>
<th>Rate</th>
<th>VAT Amount</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artikel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discount</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount after VAT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INVOICE AMOUNT</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
e-Car®: Services panel

Your own e-Car® account

User preferences
4.4.3 Web EDI: deployment

Ecar®: A multi-lingual application

Languages:
- French, English - Odette & Galia standard vocabulary
- German, Spanish, Italian
- On line Help screens are in English & French
- New languages easy to implement

4.4.4 Web EDI: deployment

Ecar®: includes a set of configuration forms. Fast efficient and productive

Forms aimed to suppliers usage:
- Articles, Seller, Consignors, Payee, Addresses, Codes
- Supplier user rights

Forms aimed to eCar administration usage:
- Common configuration information: OEM data shared by multiple suppliers are kept consistent and keyed in only once.

According to Sumeet Vinayak, e-procurement mainly takes place in two stages: preordering and post ordering. In preordering one basically divides the companies spending into three categories A, B, C. In A you have relationships, where the companies are technologically advanced and one does not have too many suppliers. Basically there are secrets or binds which the company will not like to share or to outsource or which they cannot put in an e-procurement platform (like auction it or give it to a service provider) but they can still use an RFQ module of e-procurement and online exchanges. (Exchange or collaborative hubs)

In the B category, you have voluminous products and not so technologically
advanced products, one has a fragmented supply base and the company would go for best prices in terms of the material that is if one requires, you will take to the auction platform. (Reverse auction). In the C category items you have mainly the MRO items so the company goes for catalogue buying. In post ordering you interact with your suppliers online and get in to the supply chain management.

According to Sumeet Vinayak "most companies are going for straight implementation and connecting to the existing ERP (service provider platform) as in the case with ACI. However only few companies have really gone into the implementation like ACI (Auto- Chassis International). ACI is into both direct and indirect material through e-hub within supply chain and manufacturing network.

4.4.5 How can the benefits associated with implementation of e-Hub within supply chain and manufacturing network in B2B organizational setting described?

According to Sumeet Vinayak there are mostly tangible and non tangible cost benefits that can be made available to a company after the implementation of e-hub. The cost benefits identified by ACI are direct cost benefits (reduced material cost by 5-10 % and transaction cost cutbacks of 40-60%) enjoyed by the company and cost economy due to strategic procurement rather then a mundane kind of activity, hence limiting maverick spending. Effects of e-procurement can also be felt on the internal organizational relationships by savings from investments, generation of revenue and maintenance of the buyer-supplier relationship.

Some of the most important non tangible benefits are process efficiencies where the burden of paperwork and other formalities are reduced to minimum, transparency in the purchase process, and increase in output per employee, diminution of the procurement cycle to 20%, better spend management and optimal inventory level while streamlining the inventory flow or workflow. Strategic benefits identified are improved and strengthened supplier relationships, standardization of best practices, increased responsiveness to customer demands and selling. According to Sumeet Vinayak any change is not easily welcome, so it becomes important to integrate the new process or system to the existing process, avoid any duplication in
the effort like making the adoption process easy and also reduce the teething problems. What attracts companies to e-procurement are not only the cost benefits which are the most imperative benefit but the visibility of the entire process and knowledge management

**4.4.6 How can the risks associated with adoptions and integrations of e-procurement in B2B organizational setting be described?**

Adoption and responsiveness to e-hub is identified as the vital risk that restricts the wide acceptance along with the apprehension to adopt a new technology and availability of tangible and non-tangible benefits within the company. Internal business risk is more towards the adoption and implementation of technology with the suppliers especially when the buyers themselves are not technologically advanced and mature like using the e-procurement software or service without proper training to smaller details like accepting the purchase order online. Anything within the proximity of four walls of a company is understandable to make people work but outside, these four walls the company needs to develop a strategy or plan for the adoption from traditional to a new and more technologically advanced process.

External business risk is not given that much value compared to adoption, implementation and training as its gets integrated into the new system and previous relationships are improved. However e-procurement does lead to a better transparency that takes place between the buyers and the suppliers which is welcomed by both the parties which facilitates a degree of standard and quality for the organization.

Suppliers in Iran are mostly part of a wide unorganized sector alongside with the infrastructure makes the adoption of e-hub in procurement technology a farfetched inspiration guided by quality and delivery capabilities. Lack of overall technical standard contributes to technological risk.

Process risk like security is not an issue of apprehension from both the buyers and suppliers side. As quoted by Sumeet Vinayak with adoption of e-procurement control issues may arise within the organization may be in its initial stages. However transparency and visibility delegates the control all across the organization.
4.4.7 How can the e-hub strategies within supply chain and manufacturing network in B2B organizational setting be characterized?

The strategies adopted is mostly dependent on the type of industry and material to be procured as of now most companies are looking into e-procurement as a means to immediate cost reduction with tools like auction on a immediate basis.

The e-procurement strategies used by an organization are critical to the material. According to Sumeet Vinayak the earlier market scenario was 'wait and watch approach' to passive strategies but now people are sure of their wants and therefore are ready to take more risks. While there are still others who have already adopted these new technologies, completed one cycle and are moving on to the next step.

For most industries e-procurement is largely used for indirect material which can be packaging to logistics, but then there are certain industries like auto-industry which has slowly moved from indirect to direct material. However Iran market is still in the preliminary stages of e-procurement and still struggling with the ERPs, SAPs before it even starts to consider e-procurement solutions.

Most Iranian companies consider more indirect material than direct material as the source of e-procurement, for direct materials it's a longer cycle and longer waits before the results can be analyzed and judge the benefits of e-procurement are judged, while indirect material is less expensive and results can be almost viewed immediately.

The initial models used for e-procurement in Iran were mostly based on the trading hubs model but they did not work out as intended, due to the diverse markets segments, the buyer-supplier communities could not come together in one platform due to various reasons. As for the trading hubs by industry leads, the most troubled part is information sharing with its competitors; as transparency across the companies did not take place. The most popular e-procurement model now in Iran are the 'buyer side' model which allows the companies to purchase goods from contracted suppliers,
while the 'supply side' model is not so popular due to the fewer adoption capacities of the suppliers.

4.5 Data Analysis

In this section, I will be presenting our observed findings from the empirical data collected (French and Iranian companies). Miles and Huberman (1994) provide three different 'flows of activities' in analyzing the gathered data; data reduction, data display and conclusion drawing. I will compare French and Iranian case against our conceptualized framework by 'within case analysis' and 'cross-case analysis' where the one French and Iranian (Family companies) cases will be compared to each other.

To present a better understanding of the data, I have compared the data across the table for my case according to the conceptualized frame of reference. In order to make this data display as clear and concise as possible, the company's opinions will be presented in an abbreviated and coded manner. Miles and Huberman (1994) claim that coding and summarizing segments of data into number of smaller analytic units also helps the researcher in obtaining a more integrated schema for understanding local incidents and interactions. And finally, it lays the groundwork for cross case analysis by surfacing common themes and directional processes in case study. In order to be able to benefit from Miles and Huberman's (1994) proposed advantages the different responses derived and analyzed from the case companies connected to their adopted strategies will be assigned a specific symbol or code. As for the research questions the data will be presented accordingly:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>Supports the theory</td>
</tr>
<tr>
<td>-</td>
<td>Doesn't support the theory</td>
</tr>
<tr>
<td>0 or +-</td>
<td>Partially supports the theory</td>
</tr>
<tr>
<td>?</td>
<td>Identifies something new or adds to the theory</td>
</tr>
<tr>
<td>NA</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

Table4-1: Explanation of coding
If the correlation is (+) it denotes that the theory is supported by the data collected from the case study of the company. (-) denotes that the theory is not supported by the data collected. However (0 or +/-) represent only a partial support to the theory with the data collected, (?) denoted if something new identified or the data collected adds something new to the theory.

4.5.1 RQ1: How can the benefits associated with implementation of e-hub in B2B organizational setting be described?

<table>
<thead>
<tr>
<th>(Type of benefits) Category :</th>
<th>Case study (ACI Pars – Renault Group)</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive (frequency)</td>
<td>Negative</td>
</tr>
<tr>
<td>Cost saving</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Process efficiencies</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Better information</td>
<td>5</td>
<td>Ø</td>
</tr>
<tr>
<td>flow between company and suppliers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced maverick spending</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Streamline process</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Better inventory level</td>
<td>7</td>
<td>Ø</td>
</tr>
</tbody>
</table>

Table 4-2: Benefits associated with e-hub implementation

- Some more explanation for results column in table 4-2:

With considering at least 4 positive responses regarding to my interview with 5 key contact persons in ACI Pars (Renault Group) the result is (+), for at least 4 negative responses, it will be (-), and for 3 or 2 positive or negative responses, we will see Ø that it means Neutral.

The names of interviewees are:

1) Mr. M. Richard (IT Manager of ACI France)
2) Mr. P. Thurier (SAP Project Manager of ACI France)
3) Mrs. S. Renault (B2E Manager of ACI France)
4) Mr. S. Vincine (Purchasing Manager of ACI France)
5) Mr. J.A. Guegan (MD of ACI Pars)
• Cost savings

Within case study ACI Pars I found that they support the theory, they identified cost savings (benefits) to be the most imperative benefit enabled by strategic procurement. Hence we establish an overall match between the data and theory presented by Davila et ai, (2002) and Presutti, (2002).

• Process efficiencies

According to Presutti, (2002) process efficiency relates to less paperwork, which translates into fewer mistakes and more efficient purchasing process. Significant resource commitment leads to higher process efficiency Davila et ai, (2003).

Case study ACI Pars added something new to the theory regarding process efficiency, they stressed on the value of visibility and transparency across the entire process and knowledge management as the most imperative benefit along with cost benefits. It lead towards reduced paperwork and other formalities as explained by Davila et ai, (2003) and Presutti, (2002) it is acknowledged in all four cases.

• Better information flow between buyers and supplier

According to Presutti, (2002) and Davila et ai, (2003) e-procurement leads clear guidelines between buyers and suppliers and suppliers information is shared across different departments within the organization.

At the same time in my case study also agrees to the theory presented by the authors. They stress on better buyer-suppliers relationships which contributes to maintaining better relationships, savings from investments and generation of revenue. It was also understood how this leads to standardization of best practices, increased responsiveness to customer's demands and selling. Consequently

We notice how these companies sustain the theories by Davila et, (2003) and Presutti, (2002).

• Reduced maverick spending
We were in accordance with Davila et al., (2003) and Presutti, (2002) maverick spending is controlled i.e. purchases only from authorized suppliers.

With case study ACI Pars I found that they support the theory this attributed in reduction of mundane activities hence limiting maverick spending. Therefore I found an agreement between these four companies in accordance to the Davila et ai, (2003) and Presutti, (2002).

- **Streamlined process**

  Streamlined process as per Davila et ai, (2002) and Presutti, (2002) e-procurement has a favorable impact on the purchasing cycle time i.e. Products get to market faster and firms gain higher market share.

  While in case study ACI Pars recognized benefits like reducing procurement cycle which streamlined the inventory or workflow. We also found them integrating new technology to the existing process to avoid duplication within the company. Therefore we established agreement with the theories by DaviJa et ai, (2002) and Presutti, (2002).

- **Better inventory level**

  Presutti, (2002) and Davila et ai, (2002) elaborates on reduced inventory level due to real time exchanges i.e. no stock outs, wrong product ordered faster delivery and better inventory control.

  In case study ACI Pars, they recognized increase in optimal inventory level as a benefit of e-procurement. As a result it was established that the data was in correlation to the theory by Presutti, (2002) and Davila et al, (2003).

- **Most important benefits associated with the e-procurement solution**

  According to Davila et al (2002) cost savings is the primary rationale for investment across all technology platforms, through the manner in which these savings are delivered varies.
Within case study ACI Pars cost benefits were recognized to be the most important benefits associated with the e-procurement solution. This draws parallel to Davila et al (2002) that cost savings is the primary rationale for investment across all technology platforms.

4.5.2 RQ 2: How can the risks associated with adoptions and integrations of e-hub in B2B organizational setting be described?

<table>
<thead>
<tr>
<th>How can the risks associated within e-Hub described</th>
<th>Case study</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Internal business risks</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>External business risks</td>
<td>Ø</td>
<td>5</td>
</tr>
<tr>
<td>Technology risks</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>e-Hub process risks</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 4-3 : Risks associated with e-procurement adoption

- Some more explanation for results column in table 4-3:

With considering at least 4 positive responses regarding to my interview with 5 key contact persons in ACI Pars (Renault Group) the result is (+), for at least 4 negative responses, it will be (-) and for 3 or 2 positive or negative responses, we will see Ø that it means Neutral.

The names of interviewees are as same as mentioned before.

- Internal business risks

According to Davila et al (2002) internal risk restricts companies are uncertainty about having inappropriate resources to successful implementation and integration with existing information infrastructure.
Case study ACI Pars also partially agrees to the theory, the vital risk identified is responsiveness to e-procurement, the need to develop a strategy for adoption and integration of technologically advance process. It values the adoption, implementation and training employees for better integration of technology and improving previous relationships.

- **External business risks**

  According to Davila et al (2002) external risk constitutes a need for developing internal system to facilitate Internet based communication. There is also risk of no previous transaction and low assurance from suppliers on standards, quality and delivery capabilities.

  Case study does not agree to the theory according to the interviewee e-procurement leads to transparency between buyers and suppliers which are accepted by both the parties. This facilitates a degree of standard and quality for the organization.

- **Technology risks**

  According to Davila et al (2002) the adoption of e-procurement will be slow and may fail to deliver results due to lack of widely accepted technological standard and unmatched solution to suit the company needs.

  Within case study ACI Pars the data was in correlation to the theory, lack of overall technical standard contributes to technology risks. Large unorganized sectors, lack of infrastructure makes quality and delivery capabilities a farfetched inspiration.

- **Process risks**

  Another risk identified by Davila et al (2002) is related to the security and control of e-procurement itself.

  While case study ACI Pars also partially agrees to the theory, it acknowledges that process risks may arise especially during the initial stages which leads to transparency and visibility that delegates control all across the organization.
4.5.3 RQ 3: How can the e-procurement strategies in B2B organizational setting be characterized?

<table>
<thead>
<tr>
<th>E-procurement Strategy</th>
<th>Auto Chassis International (Case study)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wait and see approach</td>
<td>-</td>
</tr>
<tr>
<td>Passive approach</td>
<td>+</td>
</tr>
<tr>
<td>Aggressive approach</td>
<td></td>
</tr>
</tbody>
</table>

Table 4-4: E-procurement strategies utilized organizations

- E-procurement Strategy

According to Davila et al. (2002), three different kinds of strategy or approaches have been identified regarding e-procurement. Wait and see approach which means that the company makes selective investments and is active in experimentation and widespread with e-procurement solution. Second one is passive strategy i.e. company just indulged into observation without experimentation of e-procurement system. And finally aggressive strategy i.e. company does high investments to gain competitive edge, and is ready to take risks regarding e-procurement (Davila et al, 2002).

We found that the ACI Pars agrees with the theory, as according to them the early scenario of the industries was wait and see and passive approach. Not many companies were ready to take risk, but now they are sure about the e-procurement solution. But most of them are changing to aggressive adopters, for those who have already adopted the solution it's about moving one step forward.

<table>
<thead>
<tr>
<th>E-purchasing strategy</th>
<th>Number of interviewee to be agreed on</th>
<th>Relation frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wait and see approach</td>
<td>2</td>
<td>2/5</td>
</tr>
<tr>
<td>Passive approach</td>
<td>1</td>
<td>1/5</td>
</tr>
<tr>
<td>Aggressive approach</td>
<td>4</td>
<td>4/5</td>
</tr>
</tbody>
</table>

Table 4-5: Statistical table to find-out relative frequencies
While case study ACI has adopted the aggressive strategy and were the first mover in terms of adoption of e-procurement technology. They identified the need to accept new technology and gain competitive edge. It successfully formed ACI to acquire resources, save money and achieve higher efficiency. The adoption of e-procurement within ACI started with only one department but in time was adopted across the organization. It was a deliberate and strategic attempt to take on the aggressive strategy rather than passive or wait and see approach. Hence we found that ACI agrees to the theory forwarded by Davila et al., (2002).

- E-procurement practices

According to Eisenman (2002) and the characteristics Kalakota and Robinson (2000), e-procurement practices can be divided into two parts depending upon the materials purchased on the system. Direct material or purchases this type of purchases includes products that are closely linked to production or services delivery. And indirect material or purchases includes products related with MRO (maintenance, repair and operations) goods. (Eisenman, 2002; Kalakota and Robinson ,2000). According to ISM/Forrester reports on e-business (2002), the current focuses of purchases are on indirect materials compared to direct material.

<table>
<thead>
<tr>
<th>E-procurement practices</th>
<th>Auto Chassis International (Case study)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct material</td>
<td>+/-</td>
</tr>
<tr>
<td>Indirect material</td>
<td>+/-</td>
</tr>
</tbody>
</table>

Table 4-6 : E-procurement practices utilized by organization

Within case study (ACI Pars) the data collected partially agreed to the theory. As in most Iranian companies consider direct material purchasing takes longer cycle and longer wait before the result can be judged and benefits can be identified. Where as in indirect material results can be viewed immediately. But it's also found that there is a shift in the market towards direct material, like in auto industry. However it's quite slow due to lack of technological and low acceptance by buyers and suppliers.
- E-procurement models

According to Wilson (2002), e-procurement models are based on their application and functionality. He highlights three models, first buy-side procurement i.e. one organization using electronic system to purchase goods from contracted suppliers also using e-procurement. Second sell-side procurement i.e. one seller sells to number of buying organizations using electronic systems and e-procurement technologies. And finally e-marketplace and trading hubs which includes marketplace that brings together many different buying and selling organizations with in one trading community. Wilson (2002)

<table>
<thead>
<tr>
<th>E-procurement models</th>
<th>Auto Chassis International (Case study)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy side procurement</td>
<td>+</td>
</tr>
<tr>
<td>Sell-side procurement</td>
<td>Na</td>
</tr>
<tr>
<td>market lace and trading hubs</td>
<td>Na</td>
</tr>
</tbody>
</table>

Table 4-7: e- procurement model utilized by organizations

In case study also the data agrees with the theory, trading hubs were most widely used by companies before. But due to the diverse market segmentation, the buyers and suppliers communication could not be brought on a single platform. Now most companies are adopting a buy side model which allows the companies to purchase goods from contracted suppliers, while the sell side model is not so popular due to the fewer adoption capacities of the suppliers.
Chapter 5

Findings and Conclusion

In this chapter I will, conclude the findings from my research question posed in chapter one through our findings: thereby fulfilling the stated purpose of the study. In order to do so, I will reaffirm each of the research questions and answer them in separate sections, because on my research we conducted. Based on the empirical data and the analysis, findings and conclusions will be drawn. I will also give overall conclusions before presenting implications for management, theory and future research.

5.1 RQ: How can the benefits associated with implementation of e-hub within supply chain and manufacturing network in B2B organizational setting described?

My conducted research indicates benefits are the drivers for companies to implement e-hub as an e-procurement & e-logistic solution. And although the risks
are present throughout the process the benefits clearly over power them. Cost saving has been identified by everyone in Iranian and French companies. And it is felt that it is easy to speak about cost benefits compared to other benefits as its effect can be seen immediately in companies' savings. But in Iran cost saving is not just related with precipitous reduction in transaction costs and better negotiation, its effect can be seen in reduction in fixed cost, man power cost, and variable cost through technological intervention.

While the French firms have a totally different view from its Iranian counterparts regarding process efficiency. According to them process efficiency is not just about less paper work and less mistakes. It helps in reduction of suppliers used for the procurement (purchasing and supply) process before implementation of e-procurement solution. It's stressed that e-procurement leads to professionalism in work, better business control and cleans up the other processes within the company. A new finding emerged regarding process efficiency with e-procurement while collecting data from Iran, they stressed on the value of visibility and transparency across the entire process and knowledge management as the most imperative benefit.

The research indicated an agreement between most companies regarding the benefit of better information flow between buyers and suppliers. Some main points identified were increase in number of transaction, transparency in process, standardization of best practice and increases in responsiveness to customers. A relation between better information flow and saving from investments and generation of revenue was also acknowledged. We however add to the study that it is not always necessary that the employees/buyers know the supplier thus there can be restricted information flow, the users just log in and check for the products they are interested in they don't normally care if they have good knowledge about the suppliers or not (when they start trusting the system and the service provided).

A consensus between the companies was documented regarding the reduced maverick spending. They all confirmed that using the recognized supplier for purchasing products, leads to control and regulation of spending, and transaction easier and less expensive for company purchasing. The study helped us understand the concept of contract compliance, which in a way relates to reduced maverick
spending. It's about purchasing from the suppliers with whom the company already have some relationships or agreement.

Same trend were recognized in reduction of maverick spending with benefit from streamlined process. Here some points are worth mentioning like single process makes the process smoother and effortless information flow, minimizing data errors, automating requisitions, and reduction of procurement cycle. Another related effect can be noticed in integrating new technology to the existing process to avoid duplication within the company.

There was a difference in the point of view between Iranian and French companies about inventory level. Although they recognized that, real time exchange helps in reduction of problems like stock out and delivery problem. Time saving was identified because of better inventory level in some cases the whole process of procurement that took two months. While with e-procurement implementation it was done in two hours. Although it is regarded as a benefit but it's not that valuable as it has become an accepted norm. It is acknowledged that specific benefit of inventory level is mostly related with companies using e-procurement for direct material purchase. While now few companies have started using their e-procurement system for purchasing indirect material as well.

When inquired about the most important benefit regarding e-procurement, cost benefit was mostly recognized as important and essential. However some companies also stressed on contract compliance and process saving. Similarly, few companies identified sale relationships with both internal and external customers to be beneficial. Consolidation of purchasing practices leads to greater discounts and better service from suppliers.

It is interesting to note that the French companies had most disagreement with the theory as they felt that the current e-procurement scenario is changed considerably in the last one year. And the theory supporting e-procurement is yet not updated. On the other hand the Iranian companies hardly had disagreement or anything to add to the existing theories. When comparing the French companies to their Iranian counterparts the benefits are more partially agreed or disagreed. This can be due to the
technological and economical differences between countries, and also the adoption rate of the solution by companies.

As for the conclusion for research question 1, we would propose a number of points that seem to describe the benefits in implementation of e-hub within supply chain and manufacturing network regardless of the context:

Cost benefit is the main driver for a company to implement e-procurement. Process efficiency leads to reduction in numbers of suppliers and cleans up unwanted processes, brings visibility and transparency across processes and helps in knowledge management.

- Eliminate time zone obstacles, reduced maverick spending and streamlined buying is strongly associated with e-procurement implementation.

- Using the recognized suppliers' data base for buying products has positive effect on e-procurement.

- Integration of new technology to the existing process avoids duplication.

- Contract compliance and better sale relationship (internal and external) are also identified as one of the most important benefits of e-procurement

5.2 RQ: How can the risks associated with adoptions and integrations of e-hub within supply chain and manufacturing network in B2B organizational setting be described?

My research indicates that while most companies have accepted the risks involved in adoption of e-hub in procurement (purchasing & supply) others have moved forwards and have identified additional risks associated with e-procurement. These internal risks have been holding back companies from adopting e-procurement solutions; more then one company identified it to be expensive to integrate with existing system and unwillingness to accept a new technology. Companies identifies the need to provide proper training at all levels for better understanding and collaboration across the organization. Investigation of the French based e-hub provider enlightens the lack of managerial commitment constraining the adoption of
e-hub in procurement. Hence a need to change the overall behavior and management is acknowledged.

The research recognized external risks associates with e-procurement which mainly constitutes - customers and suppliers. There are risks of dealing with new customers with no previous records, lack of integration between the system used by the suppliers and the companies and connectivity. While the solution providers both in French and Iranian suggest that e-hub in procurement leads to transparency between buyers and suppliers and most of the risks are taken care of before a company they actually get into a contract. Consequently we found that its mostly small companies that are apprehensive of adopting e-hub in procurement which can be further augment by geographical, cultural and cost risks and organizational limitations.

As mentioned, adoption of e-procurement is slow and results are delayed mostly due to lack of technological standards. This may be true in a developing country like Iran, where within the auto manufacturing company there is a coexistence of both traditional and modern technology. There are large unorganized sectors; lack of infrastructure makes 'quality and delivery capabilities farfetched inspiration as brought up by the e-hub in procurement solution provider in Iran in the data presentation. While the French counter part suggested that risk related to technology are always present with IT solutions and ever developing. They also concluded that countries like French considered adoption of e-procurement is regular standard and commonly accepted.

All through individual companies differ in there specific way to deal with risks related to security and control. It was analyzed that this risk has become universal and virtually taken care of by a separate department or division. Based on the finding from the research in both French and Iran it can be understood that these risks are more fundamental during the initial phases of implementation of e-hub in procurement within supply chain and manufacturing network, but once the roles get defined it becomes part of a system or process. On the whole this leads to transparency and visibility to delegate control across the organization. Unauthorized actions however may disrupt production or any other activity.
The fact that most companies still recognize these risks requires organizations to ensure appropriate use of e-procurement technology. The risk is not in only technology itself but imperfect application of technology. The research indicates that companies might see more advantages of e-procurement, there might be a correlation between benefits of adoption and perceived risks. In order to present the risks associated with e-hub, we derive the main conclusion from the study briefly:

- Implementation and integration with existing infrastructure holds back companies from widely accepting e-procurement.

- Lack of managerial commitment constrains adoption of e-procurement.

- Risk of dealing with new customers with no previous records and integration of technologies makes potential e-procurement users apprehensive.

- Overall perceived risk vary between companies combined with Geographic, cultural and organizational diversification.

- Process risks lead to transparency and visibility across the organizations.

- Security and control risks are present mostly in the initial stage of e-hub implementation.

5.3 RQ: How can the e-hub within supply chain and manufacturing network strategies in B2B organizational setting be characterized?

The e-hub in procurement (purchasing and supply) market is still evolving through development of technology and new practices. In order to explore the research question, the theory was compared to reality. First we look at the strategic approaches based on clues from the current market scenario. Our finding proves that there is no one approaches best suited to match the needs of all companies. It was not surprising to find all our respondents answer to this research question differently. The study hence suggested that the theories are not fully corresponding to the reality of the companies investigated.
The research indicated that, while the French firms supported the 'wait and see' approach quickly changed their strategy to aggressive approach due to the benefits associated to first movers. This is also acknowledged by the Iran based auto company in terms of adoption of e-hub technology and attains competitive edge. I found that most companies are ready to make a sizeable investment when the risks are high.

The research also shows some indications that now there are some changes to the theory (these theories where common a year ago) now a different approach is taken by companies its some where in between aggressive and passive approach, like a moderate approach. Companies following this approach are quite common in current market situation, now companies have good knowledge about e-hub and are willing to implement it in near future. This finding however is different from the Iranian solution provider, as they recognize all these strategy still existing in Iran, but companies are now moving towards adoption of e-hub in procurement. I will further like to conclude that the three different approaches identified by theory are not necessarily different it can be that a company starts with an approach and then changes it on later stage to convene its current requirements.

It is important to highlight that there are few differences between the French and Iran e-hub solution provider. The French solution provider does not agree much with the theory and identifies totally different approach to e-hub adoption. On the other hand the Iranian solution provider acknowledges theory and feels that those approaches still exits in market. Regarding French and the Iranian auto company there is not much difference although they both had different approach in the beginning currently follow the same approach. Overall, we feel that there is more correlation between Iranian companies and the theory used for the research then with French companies.

In my research regarding the e-hub practices adopted by companies, I found that both direct and indirect materials are purchased from the e-hub solution. French small firm was the only company that uses e-procurement for just purchasing indirect material, but it is also influenced by their industry requirement, as small firm does not need much e-hub direct material unlike a auto company. In the Iran companies and French companies I found that e-hub is not just limited to one particular purchasing practice, but both direct and indirect material are purchased now through e-process.
Further it was noticed that there is a shift in the purchasing practice the trend is moving more towards direct material from indirect material like in auto industry, which has been using e-hub as a very important issue. However, few companies also use e-process for purchasing direct material but are not moving towards indirect material.

The main finding from the theory suggested that indirect materials are purchased mostly by e-process solutions. However there is a rapid change in the market scenario in both countries towards direct material purchase. The highlighting fact is that there are similar results in both the countries indicating the same regarding e-procurement practices. Although not so similar relation is seen with the French firms and Iranian manufacturing company, overall a good balance between the companies regarding the e-hub in procurement practices.

The research indicates that when compared, e-hub in procurement models to the theories in all the case studies the result were surprisingly similar. All through companies recognized all the three models in the adoption of e-procurement; the buy side procurement model was implemented. Mostly as specific requirement of the buying organizations are met by this model compared to other models like sell side or trading hubs. Other factors that helps in influencing this decision are large customer base for suppliers, big players assure suppliers of better revenue and relations.

On the other hand in such as country like Iran sell side may not be appropriate considering the unwillingness to adopt and fewer adoption capabilities of the suppliers. While trading hubs which were widely considered by companies has been rejected due to lack of technical development and diverse market segments that makes it difficult to bring buyers and suppliers on a common platform. Hence we establish that the adoption of e-hub in procurement is also effected by the e-hub in procurement practice of the company (direct or indirect material) and the strategic approach implement by the company.

Overall it was interesting to see the how the three variables: strategies, practices and models provided us with an in-depth look into the changing trends in the B2B sector. I found that the French companies which are technologically more developed cited more then once changes to existing theory. While it's Iranian
contemporary more or less agrees to the theory adopted in the thesis with few changes. Overall companies have shown positive response to e-hub in procurement process. Hence we see how technology affects the responsiveness of the users and providers across the globe.

In order to present the e-procurement strategies adopted in B2B organization, we briefly derived the main conclusion from the study:

- Companies will change their strategic approach to suit the needs of the company (when the technology is right and to gain competitive edge).

- Emergence of 'moderate approach' would make it easy for companies to adopt e-procurement technology (both in purchasing and supply).

- The change in trend from indirect to direct material marks the evolvement of new e-procurement practices.

- Buy side models are found to be more favorable in the current market scenario.

- Availability and investment capability affects the responsiveness to adopt e-procurement technology.

**5.4 Overall conclusion**

In this section, we directly address the research purpose of the thesis and also give an overview of our overall finding from the study. The purpose of this research was to provide better understanding on how e-procurement is used in B2B setting. We have conducted an extensive analysis and managed to collected sufficient information in order to provide comprehensive answers to the research questions.

Figure 5-1: below illustrates how our research questions were framed and how we linked them to analyze, findings and collusions of the thesis. This figure also helps us to compare the study to the emerged frame of reference presented in figure.
5.5 Implications

In this final section of the thesis, I will provide implications for managements i.e. managers and practitioners who provide e-hub solutions or work with e-procurement technology. Thereafter, I will provide implications to the theory i.e. responses to the theories adopted in the thesis. I will conclude the thesis with recommendations for researchers who can use this thesis to further creating a deeper understanding in the field of e-hub in procurement process.
5.5.1 Implications for management

My research indicates that contract compliance is the basis of e-hub benefits. If any company wants to take advantage of benefits like reduced cost and better negotiated price, they need to make the supplier feel secure about the numbers of transactions they will be able to provide each year. Although benefits related with the cost are easy to see and show in paper. But non cost benefits like better relationships with supplier, professionalism in work better business control and cleaning up of unwanted processes should not be overlooked.

Technological and security related risks are not so significant any more in the business community especially regarding e-hub. As the companies implementing e-hub are taking care of it from the initial stage, this further boosts e-procurement implementation. But management has to be prepared for the changes that it brings out for example they need to have a level of managerial commitment. Managerial troubles may arise when management is not able to take decision regarding the implementation of the e-procurement solution.

Also employees' adoption of the system is an integral risk, as the system is made for the employee's use they have to be compatibles and comfortable using it. All the above implication is suited for Iranian and French companies. Technology has passed the initial stage of development in France but the managers also need to keep in mind that they are able to cope up with the future development in the system. However, the managers in technologically developed country like France also need to be aware of the technological development in other countries they are cooperating with when thinking about applying e-hub with International suppliers and customers. Technology is ever changing and it needs to be integrated with the existing system which can sometimes be a setback.

Regarding strategic approach French companies have identified a new 'moderate approach' which makes sense as e-hub in procurement system which suits the needs of present market. But for the Iranian companies it's still mostly passive or 'wait and see' approach, because it's still in the development stage. There is a shift in the e-hub within supply chain and manufacturing networks, and a big practice from indirect to direct material which will help those companies too that need direct
material from their integrated procurement solution. Buyer side models are mostly in use right now in both Iran and France market. It felt that as soon as the supplier will be ready to adapt e-procurement solutions and will be ready to make the required investments in near future there can be a shift towards supplier side or trading hubs models.
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APPENDIX

Interview Guide

1. Company Profile

- Company Name
- Name of the respondent and position
- Year of companies establishment
- Products
- No of employees
- Revenue

2. Introduction to e-procurement

- What are the ICT (information and communication technology) related process in the company?
- When did the change take place from traditional to ICT?
- What is your understanding of e-procurement with regards to company perspective?
- What is the current e-procurement solution used in the company?
- What functions are supported by the current e-procurement solution (ED!, MRO, E-tendering, E-auctions, etc)?

3. Benefits from e-procurement (RQ1)

- What are the benefits associated with the implementation of e-procurement in the B2B setting?
- What do you think about cost saving as an benefit associated with e-procurement?
  - Precipitous reduction in transaction costs
  - Better negotiation
- How influencing is process efficiencies regarding e-procurement adoption?
  - Reduce paperwork, fewer mistakes leads to more efficient purchasing process.
- What do you feel about information flow between company and supplier, has this been influenced by e-procurement adoption?
  - Clear guidelines between buyers and suppliers
- Supplier information shared across different departments within the organization.

- Do you feel reduced maverick spending is a benefit related with implementation of e-procurement?
  - Purchases take place only with authorized suppliers on negotiated prices based on volume.

- How do you feel about streamlined process regarding as an benefit associated with e-procurement?
  - Reduction in sourcing cycle time (products get to market faster and firms gain higher market share).
  - Wider supplier base and identify therefore unidentified and qualified source of suppliers.
  - Reduction in material costs, number of suppliers and lower prices

- Do you perceive better inventory level as a benefit associated with e-procurement implementation?
  - Real time exchanges
  - Develop capabilities that allow degree of flexibility with suppliers

- What are the most important benefits associated with the e-procurement solution?

4. Risks with e-procurement (RQ2)

- What are the risks associated that restricts the company from the widely adoption e-procurement solutions?

- How do you feel about internal business risks in the adoption of e-procurement technology?
  - Uncertainty about e-procurement solutions
  - Integration with the existing information infrastructure

- What you think about external business risks, and there influence on adoption of e-procurement mainly with customers and suppliers?
  - Need to develop internal systems that uses electronic medium for communication
  - Risk of previous transaction between buyer and suppliers
  - Low assurances from suppliers on standards, quality, services and delivery capability

- How much importance is laid on technological risks?
  - Lack of a widely accepted technological standard for coding, technical and process specifications

- How do feel about risks associated with e-procurement process risks?
- Security and control issues.

5. Strategies with e-procurement (RQ3)

- What is the current e-procurement strategic approach of the company?
  - Wait and see approach: Selective investments, active in experimentation and widespread
  - Aggressive approach: High investments to gain competitive Edge, ready to take risks
  - Passive approach: Observation without experimentation

- What is the ratio of direct or indirect purchases from the current e-procurement solutions? (Note: reason for not implementing the other)

- Can you describe the e-procurement model of the company? .
  - Buyer side model: Electronic system to purchase goods from contracted suppliers
  - Supplier side model: One seller sells to number of buyer, using electronic systems and e-procurement technologies
  - Trading hubs model: Brings together many different buying and selling organizations in one trading community.

- Is there anything you would like to add to this topic?