



UNIVERSITY OF BORÅS  
SCHOOL OF ENGINEERING

# **E-procurement adoption, its benefits and costs**

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Supply Chain Management

By

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## **E-procurement adoption, its benefits and costs: Academic Literature Review**

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## **Abstract**

This thesis report aims at illustrating and describing how e-procurement can contribute in creating value and reducing overheads associated with the procurement process through adopting and implementing e-procurement systems and applications in the supply chain network of an organization. It is an obvious fact that e-procurement plays a vital role in managing the supply chain especially now that outsourcing has become very common in the business market environment around the world. The main purpose of our bachelor thesis work is to find out how e-procurement can contribute in creating value, reducing cost and gaining more profit out of the procurement process. Since this thesis report is meant to cover the available literature on procurement and e-procurement only limited areas of the supply chain management is presented.

When it comes to methodologies, available literatures on procurement and e-procurement have been covered to extract the most plausible information and data related how e-procurement contributes in creating value and reducing costs and overheads in the supply chain management. First a framework of modern procurement processes and stages is given as a basis and then e-procurement is treated being the technologies and key factors in implementation of e-procurement.

This thesis work tries to consolidate prevalent ideas as well as facts that have been tested by means of academic researches carried out by scholars of the field and interdisciplinary of industrial engineering.

**Keywords:** E-procurement, Supply chain management, ERP, Direct cost (DIR), Strategic Purchasing Cost (SPC), Operational Purchasing Cost (OPC), Non Product Related (NPR), Cost Benefits (CB), Electronic Procurement System (EPS)

**Paper type:** Bachelor Thesis Report

## Glossary of Key Terminologies

**E-procurement:** Conducting all purchasing process using the internet or a company's intranet to procure products and services used in the conduct of an organization's business. E-procurement systems are believed to streamline all aspects of the purchasing process in the meantime applying tighter and transparent control over spending and preferences of products or items (Business Dictionary 2014).

**Supply chain management:** Supply chain management (SCM) is to cover the management of the flow of products and services, including the movement and storage of raw materials, inventory, finished products and work in process inventory from the point of origin which is upstream to the point of consumption which is downstream (Wikipedia 2014).

**Enterprise resource planning ERP:** ERP is software, which is designed for the purpose of business process management that allows a company to utilize a system of integrated applications. ERP is to manage most of the business processes as well as automating most of the back office functions related to technology, human resources and services (Webopedia 2014).

**Operational purchasing cost/ operating cost:** Any costs or overheads associated with purchasing process that occurs for the purpose of purchasing an item, product or service, and is related to the operation of the business are called operational purchasing cost (Wikipedia 2014).

**Cost benefit:** It is a business term which describes how much money an organization earns selling its products and services as compared to how much money it spends producing the products or services (Merriam Webster 2014).

**Non Product Related Costs (NPR):** Non-product related cost (NPR) is also called indirect cost (Wikipedia, 2014), which are not directly related to production. NPR can be either fixed or variable, which includes administration, security and personnel costs.

**Cost of Revenue (CR):** As per Investopedia (2014), it is also called cost of expenditure / revenue and it covers the total cost of manufacturing and delivering a product or service. It is written in the income statements to represent the direct cost related to the products and services. Remember that indirect costs like salaries are not included.

**Operational Purchasing Cost (OPC):** The costs of executing operational purchasing activities i.e. the dollar value of putting an order on the supplier.

**Direct Cost (DIR):** Any cost that is associated with materials, labor and expenses directly related to production of a product is called a direct cost (Investopedia 2014).

**Tactical Purchasing Cost (TPC):** The costs of executing tactical purchasing activities i.e. the money spent on selecting a supplier and contracting and negotiating with the supplier.

**Strategic Purchasing Cost (SPC):** The costs of executing strategic purchasing activities i.e. money spent managing suppliers and their relationship with the company and also the cost of running spend analysis.

## 1. Introduction

Supply chain management (SCM), as per the definition and description of the Council of Supply Chain Management Professionals (CSCMP 2010), is to encompass the management of the overall planning and controlling of all processes, which are involved in operations management, logistics, information technology, procurement, transportation, conversion and distribution throughout a supply chain. In other words, supply chain management is involved in managing coordination and collaboration between business related partners, which includes suppliers, third-party service providers, intermediaries, and clients. In essence, supply chain management is utilized to integrate managing supply and demand within enterprises in order to satisfy and fulfil the requirements of end users or customers. Supply chain management ensures to focus on streamlining supply side business activities including the flow of products, services and information aiming to maximize the customer value and, in the meantime, achieve competitive advantages in the marketplace (Investopedia 2014). Procurement (CSCMP 2010) is at the upstream end of the supply chain, but this cannot be seen as processes that only happen in the supply side of the supply chain since the supply chain is seen as a single entity. Like any dynamic system each and every component of the supply chain plays a role in keeping the system balanced and running smoothly.

Thus, all components of the supply chain needs to be coordinated to one another so the objective of the system can be accomplished. Supply chain management's main objective is to ensure that the system is going towards the goals being hard or soft in nature. Hard objectives are the goals that can be measured including quality, speed and cost. Soft objective are the ones need complicated analyses to measure them. They are confidence and security. It seems needless to state the complexity of managing the supply chain.

With today's volatile condition of demand, products short life cycle, proliferation of new products and new brands, products costs skyrocketing and competition increasing among the organizations in all industries, success, development and survival basically depends upon effective utilization of procurement approaches and strategies. In the era of internet and information communication technology, most of the companies enjoy the benefits of online procurement and utilizing it efficiently and effectively; on the other hand, some companies still rely on traditional procurement processes and techniques in spite of the fact that a number of studies have already proved the potentials and advantages of e-procurement. As per the studies by Aberdeen Group (2001), e-procurement helps companies enabling them to decentralize their operational procurement processes and centralize their strategic procurement processes as a consequence of extreme transparency in the supply chain which is definitely provided by e-procurement.

Business to business (B2B) e-commerce has become the central focus of organizations to doing business efficiently and effectively, in which e-procurement is working as a central and main function and has been getting popular since the advent of information technology. It is strongly believed if every transaction is done well and properly using B2B e-commerce, it can contribute an organization to save enormous costs and improve productivity. When it comes to e-procurement, it is the most essential portion of the development in the arena of B2B e-commerce. In addition, e-procurement has the capability to restructure the organization's purchasing approaches and methods fundamentally. E-procurement is dominating; however, still some companies purchase only their office materials online (Neef 2001).



According to Christopher (2000), companies have been provided with entirely new business models since the internet and intranet first emerged which enables and allow organizations to collaborate externally with their most important suppliers at the same time by internally managing their demand proactively. Apart from internal winners that are the buyers, suppliers can also benefit a great deal and are ready to accept this business model of e-procurement. Suppliers can benefit through increased sales volume by providing e-catalogs, reduce sale costs by redefining the role of their salespersons, and reduce operating costs by minimizing the costs of reworking error prone manual orders, improve demand insight by making better forecasts about buyer's demand, and last but not least, improve customer relationships by making a team network, being able to reduce overall procurement costs and strengthen their long-term relationships. The main point shall be noted that all these can be achieved through improved and strong information sharing allowed by e-commerce technologies. Thus, sharing volume of real-time and transparent information would be considered a powerful sourcing tool.

Life seems to have a different view with e-procurement that means any employee can access to a user-friendly point, and browse through the online catalogues of the organization's approved suppliers from the comfort of their desk. Neef (2001) writes in his book that products, parts and items can be identified by models, names or features and the search results prioritize how accurately products match the company's requirements in addition to providing directly the comparison of the products and items between suppliers and the discount can be calculated right away very easily and simply. A company can find out about availability, delivery lead time, and payments as well as doing the payments electronically. The external B2B processes are obviously improved by e-procurement systems and, therefore, e-procurement is, first, considered to be a matter of strategy and then information technology. E-procurement can not only pave the way for reducing costs associated with purchasing but also it will contribute in bringing manufacturing and distribution firms closer allowing them to become extended enterprise, in which supply chain moves towards becoming a constant and uninterrupted process which results in extending from buying organization to selling partner suppliers.

In the history of procurement, at one time, traditionally procurement was carried out by visiting a store and then following the procedures for placing an order or by looking through catalogues and making a phone call. The process of procurement traditionally involved manual procedures and in some point, handling procurement transactions went through slower systemic processes (Hawking et al. 2004). The traditional procurement processes are the basis for the introduction of e-procurement to the system in stages advised by scholar of the field. Along with the emergence of internet, companies started turning their procurement activities towards internet since they found out that it would benefit them a great deal if all procurement processes are carried out correctly and properly. According to Shaw and Subramaniam (2002), e-Procurement played a vital role in business to business B2B e-commerce. Online based business to business e-commerce improves integration and inter-organizational co-ordination leading to cost savings in terms of transactions and great opportunities for competitive sourcing for organizations purchasing products and services. E-procurement is not only a strategic player in the value chain but also is a driver in extending supply chain networks (Hawking & Stein 2004).

Switching to and adopting online based procurement or e-procurement can promise any organization a great deal of benefits and advantages ranging from administrative costs or

overheads, quality, and convenient and cost effective purchasing processes to delivery time streamlining the sharing of necessary information, making it easier to keep track of purchasing budgets and incoming deliveries and helping business organizations to save more money. Industries, business organizations and of course governmental organizations and agencies have been constantly showing great interests in adopting e-procurement since researchers and analysts believe that adoption and utilization of online based procurement result in saving costs and efficiency in purchasing processes. Cost effectiveness, transparency and visibility across all procurement processes, streamlined purchasing procedures, and better internal and external relations are the main drivers for organizations to adopt and implement e-procurement.

## **1.1 Background**

Initially, this would be of importance to understand what procurement, in fact, is. Procurement can probably be defined in so many different ways; however, every definition might have something in common in general. Procurement is a comprehensive function which involves activities and processes for the purpose of attaining or acquiring products and services. In addition, procurement activities can cover up establishing fundamental requirements, negotiation of contracts, and sourcing activities including market research and supplier evaluation as well as purchasing activities required for the purpose of placing an order and receiving goods and services. The main goal of procurement is to receive the right product or service at the right and predefined time, at the specified location, with the right quality and at the right price carrying out the entire process of purchasing efficiently and effectively (Enporion 2005).

Since the emergence and development of internet in the 1990s, along with increasing global competitive pressure, supply chain management professionals, researchers, academics and organizations have been continually looking for different possible ways and approaches to minimize costs associated with procurement, sourcing and supplies, increase efficiency, and of course to reduce lead time as much as possible. In order to tackle all the above-mentioned challenges to some extent, organizations and firms have strong tendency in utilizing e-procurement strategy in an attempt to their all key business processes linked with procurement (Aberdeen Group 2005). The process of e-procurement (Podlogar 2006) from the beginning starts, via internet based protocol, facilitated with the function of creating requisition, approving and managing the purchase order, and accounting or financial process. When procurement takes place online, it can reach marketplaces that cannot be reached with traditional procurement systems. Organizations communicate, transact and interact smoothly and faster being enable to speed up the cycle time in order to perform tasks and run projects properly.

When it comes to the definition of e-procurement, e-procurement (Insight 2014) stands for electronic procurement, which means electronic methods and ways of conducting business transactions, including purchasing, customer's invoice, payments etc. with the development of internet, companies now focus more on advertising and selling their products and services via internet online, which can be reached to millions of customers worldwide very easily and cost effectively.

By taking into account the holistic and tangible advantages, aspects and efficiency of e-procurement, organizations and government sectors in many countries(CIPS) tended to start adoption of e-procurement along with the introduction and development of electronic data interchange (EDI) and it has been increasingly improving and being adopted since internet and world wide web came into being. EDI did a great job in allowing customers to send orders and receive invoices from the suppliers via secure networks as well as letting them exchange and synchronize files related to products, services, specifications, prices and helpful information concerning the customer and supplier's trading practices and whereabouts.

Most of the leading enterprises are (Aberdeen Group 2005) utilizing of e-procurement and are improving the expansion of their e-procurement systems. E-procurement technology and also some other sophisticated technologies in the area of e-procurement and electronic transactions are giving procurement managers and professionals this capability and opportunity to turn into real supply managers. Today the role of procurement is shifting from cost reduction to value creation within the supply chain for the organization.

The development of information technology, in terms of internet, resulted in remarkable changes for enterprise supply chain strategies and practices over the last several years back. Fraser Johanson and Robert Klassen (2005) states that e-procurement and its core role in supply chain management revolutionized in helping business to business practices and enhancing the flow of information along the supply chain network.

## **1.2 Objectives**

Obviously, e-procurement enables and facilitates business organizations, including non-governmental and governmental organizations, to source and follow the purchasing processes in a very simplified manner from the comfort of offices sitting at their desks. Furthermore, it is the matter of fact that one of the most essential and significant parts of supply chain management is information communication technology (ICT), which contributed hugely in terms of simplifying business transactions and the flow of information within the supply chain networks.

Everyone might know that the rapidly increasing competition in the marketplace and also constant economic condition changes have been making industries and organizations to look for and implement new technologies and strategies in order to maintain competitiveness and survive during the time of turbulences in the marketplace. Eaton (2003) believes that any organization which have not adopted and implemented latest technology at the right time would obviously risk losing both customers and suppliers. Economic environment affects the mindset about competitive advantages and also the requirements for costs and overhead reduction business organizations to change their business strategies and way of conducting business operations.

It is strongly believed that e-procurement solutions and implementing the principles of e-procurement can contribute plenty of benefits and advantages to an organization of different size based on their requirements. These benefits and advantages can be achieved if everything, related to e-procurement adoption and implementation, works well according to the expectations and pre-arranged plans. Nevertheless, many challenges, issues, and doubts still stand on the way, some public and private organizations, and companies around the world

are showing skepticism whether e-procurement can create value and minimize procurement overheads.

Therefore, the objective of this bachelor thesis report is to elaborate on the importance of e-procurement in today's rapidly growing technological era by taking into account whether organizations and firms really require adopting and implementing e-procurement systems and solutions. Subsequently, this paper covers and provides with comprehensive and solid information on how e-procurement contributes in creating value to the procurement processes and what advantages and benefits e-procurement can promise an organization when shifting from traditional procurement to e-procurement. Additionally, this thesis aims to describe how e-procurement plays a vital role in reducing costs associated with procurement and purchasing processes through the entire supply chain.

Furthermore, this paper draws the framework of the procurement in the supply chain and shows the implication of electronic technology enabler replaces the paper-based activities so as to see if the implication of electronic procurement has any effect on the system moneywise, in addition to aiming to pinpoint how e-procurement has affected the supply chain in a competitive market environment in general and how it contributes to creating value and reducing procurement overheads in particular throughout the supply chain networks.

### **1.3 Problem statements**

Simplifying the sourcing and procurement processes in any organization is a question that is asked and raised by any company or scholar within the field of industry and technology. Scholars and researchers have been working hard to find out any alternative for the purpose of utilizing and achieving the most profit out of purchasing procedures and procurement process. Some companies might not know or have doubt if e-procurement can possibly create value to procurement process or what benefits and achievements can be obtained when adopting and switching from traditional procurement to e-procurement.

Thus, this bachelor thesis aims to answer the following main questions:

- 1. What are the reasons for adopting and implementing e-procurement systems?**
- 2. How does e-procurement reduce costs and create value in the supply chain?**

The above questions have been covered and answered based on theoretical research, literatures review and perusal of the different articles, books, and journals from different scholars in order to provide detailed and reliable information.

### **1.4 Delimitations**

This thesis report is elaborating the importance of adopting e-procurement, so the research and studies which were done have theoretical background or basis. Inasmuch as we had no access to the companies and organizations how they conduct and implement e-procurement and what advantages and disadvantages the use of e-procurement has, we preferred to review and study different available literatures and, therefore, this thesis has theoretical foundation. We had keen interests in conducting our research and studies at one of the existing companies

to illustrate, analyze, and interpret the real picture of the e-procurement to the readers; however, unfortunately, lack of cooperation from the companies could not allow us to achieve this goal. Therefore, the analysis and information are based on the literature review. Thus, the scope of our studies in this thesis report mainly covers the following areas related to e-procurement:

- Procurement and its principles
- segmentation of the supply base
- e-procurement in supply chain
- e-procurement forms and life cycle
- required e-procurement technology
- e-procurement adoption and implementation
- cost reduction and value creation with e-procurement

Supply chain management (SCM) and logistics are broad and comprehensive fields of study since this thesis report mainly focuses on e-procurement, we did not go deep into supply chain management and its different areas. Nonetheless, concise and comprehensive information is given about SCM.

In addition, when it comes to illustration of the precise percentages in cost reductions and Cost Benefits, B2G, B2C and also Revenue Benefits, future studies could definitely reveal more detailed information.

## **1.5 Structure of the thesis**

This bachelor thesis report comprises of six chapters, which include introduction to the topic of the thesis, methodology, conceptual frameworks, result of the literature review, discussion or analysis of our findings, and the last but not least the conclusions.

### *1.5.1 Chapter one: Introduction*

The first chapter of this thesis as aforementioned introduces the topic of the thesis, supply chain management, e-procurement, and background of the related topic, objectives or the purpose of the thesis, thesis questions, and delimitations. This chapter contains information that could provide a clear word picture of the thesis what this thesis means and how it has been approached.

### *1.5.2 Chapter two: Methods and Materials*

Following the first chapter, the second chapter describes how the thesis was approached and what materials and data were used explaining the different sources, materials, articles and books used for the purpose of accomplishing the target of the thesis and answering the thesis questions as well as covering the topic of this report. In this chapter, it is clearly described how data and information were collected, analyzed, presented and discussed.

### *1.5.3 Chapter Three: Theoretical Frameworks*

The third chapter is allocated for the conceptual frameworks and starts with the literature review of articles, journals, and books from different scholars whose books and articles are valued reliable sources. This chapter, first of all explains briefly the supply chain management; in addition, it describes and illustrates how procurement works, four main principles of procurement, segmentation of the supply base based on the Kraljic's portfolio purchasing model. Moreover, this chapter subsequently describes in details required technology related to the e-procurement applications, integrated frameworks of E-procurement, and important factors for a successful implementation of e-procurement, e-procurement forms, and e-procurement life cycles and so on.

### *1.5.4 Chapter Four: Result of the Literature Review*

Besides, chapter four in the thesis is dedicated for the result of the literature review and here our findings have been categorized and written respectively, corresponding to our thesis questions. This chapter contains information on the reasons for adopting e-procurement systems and solutions, beneficial changes required for an organization to be more effective and productive, successful e-procurement characteristics, substantial benefits through adopting e-procurement depicting how e-procurement provides benefits if it is properly implemented and measured on the regular basis. And also information on the cost related to e-procurement adoption, cost reduction and value creation and some empirical observations, which are meant to exemplify companies which achieved plenty of benefits and advantages through cost reduction increasing value and were satisfied adopting and implementing e-procurement.

### *1.5.5 Chapter Five: Discussions*

Chapter five is for sure designed and allocated for discussions, and analysis of our findings and the result of the research as well as answering thesis questions and sub-question, where one can find out how e-procurement supports companies in terms of value creation, increasing profit margin and cost reduction.

### *1.5.6 Chapter Six: Conclusions*

The last chapter is the concluding section and it is meant to summarize the thesis report answering the thesis questions and concluding the report. In this chapter one can find the answers to both thesis questions.

## **2. Methods and Materials**

First of all, this would be considered necessary to some extent to define and show the differences between method and methodology used to write a thesis work, research paper or simply an essay. Some people still use both method and methodology synonymously and interchangeably in their works. However, based on the definitions from different scholars, the difference between the two words is significantly comprehensible. Method (McGregor & Murnane 2010) is defined as research or review approaches or techniques, tools or processes that are used in doing research or in collecting data for writing a thesis work or an academic essay. Examples of methods are like surveys, interviews, photo voice, review, participant observation, etc. In this case, methodology gives shapes on how to use methods. And when it comes to methodology, it is study and science of how research is carried out, how things are found out and how you gain knowledge about something. We can say that the methodology is all about the principles that direct us how to conduct the practices of our research. In other words, we can simply say that the methodology describes why certain methods or tools are used in making research. Kinash (2008) defines the method as techniques or processes which are used to conduct research; on the other hand, methodology is the discipline that utilizes certain methods.

### **2.1 Design**

Theory is the foundation and the base for this thesis and, therefore, the foundation of this thesis report is based on theoretical observation which involves perusal of academic books, articles, journals etc. Everyone might know the fact that without theory researchers or students may not fully realize how and why phenomena are related to each other and to what extent. Thus, in order to create a basis or reliable foundation for the thesis, the theoretical data have been collected and piled up utilizing different scientific articles, books and literatures. Reeves, Albert, Kuper and Hodges (2008) describes theory and state that scholars, authors and students use interactionism, phenomenology and critical theory in order to design a research or thesis report question, get guidance in the selection of related data, analyze the data and pave the way for explanations of causes as well as influences. Therefore, the data and materials for this thesis report were from only one source, which is the literature review. Inasmuch as we did not have access to any company or organization, we could not collect any empirical materials or information. Every single material for the theoretical part of the thesis was derived from academic literature for example articles, journals, books and a wide variety of articles available on the internet. Various academic articles, journals and books were searched to gather comprehensive, reliable and comprehensive data and information relevant to the topic of the thesis.

Literature review is (About 2014) considered to be the process of studying, evaluating, analyzing, extracting and summing up academically published materials or data about a certain topic. It is an obvious fact that the findings or results of the literature review are assembled in an academic work serving as part of research paper, university thesis etc. Literature review can be used to stand as a reliable foundation for any research or academic work as well as serving as a conceptual framework for it. After choosing a specific topic of our own choice, we decided to compile as much information as possible in an effort to find authentic and reasonable as well as comprehensive answers to the aforementioned thesis questions. As it is quite clear, the topic of our report is adoption and implementation of e-

procurement and the thesis questions are related to necessity of adopting e-procurement, comparison of traditional procurement approach with e-procurement in terms of creating value and paving the way for benefits and also how e-procurement contributes in reducing costs associated with the purchasing processes.

## **2.2 Tim frame**

This bachelor thesis was written, when the topic of the thesis was confirmed by the University of Borås, from April 2014 through October 2014 as part of the bachelor degree. During this time frame of the process of writing the thesis, major changes and modifications occurred in the entire content of the report.

## **2.3 Data Collection and Materials**

The first step towards collecting data and information was to search for the relevant articles, journals and books at the library of Borås University, its online data base and utilizing google.com. Some articles from the different journals and books were attained from the library and the rest of articles were obtained through searching in (Google Scholar) with the keywords that were meant to find the respective articles. The following keywords were used to search for articles:

- "e-procurement"
- "e-procurement and value creation"
- "e-procurement in supply chain management"
- "e-procurement and cost reduction"
- "benefits of e-procurement"
- "e-procurement adoption and implementation"

The table below illustrates how keywords were really used upon searching and what was the outcome of our search showing how many related articles contain each keyword. This point shall be noted that we preferably saved the articles in our computers for the sake of utilizing them any time need be. This process could lead in piling up many articles from different reliable sources and well known authors. The next step was to divide the task of reviewing and reading the articles, so each of us went through different articles, highlighted, outlined and extracted, summarizing important data which could be suitable to correspond to our thesis questions. Through many, appointed date and time, discussions, comprehensive and reliable data were selected to be used in the thesis as the conceptual framework and the results sharing our thoughts and ideas how the compiled data shall be structured in a way which could push us forward by facilitating to move smoothly to the discussions section.



Table I. Keywords used and search hits in Google Scholar.

Key Words	Search Hits in Google Scholar
E-procurement	26,100
E-procurement and "cost reduction"	2730
e-procurement, "cost reduction" and "value creation"	563
e-procurement "cost reduction" and "value creation" in "supply chain management"	421
E-procurement "cost reduction" and "value creation" in "supply chain management" its "benefits"	398
"e-procurement systems" "value creation" and "cost reduction"	83

The literature was reviewed in two phases In phase one, articles were selected in order build a theoretical framework for our thesis; in phase two, we focused on our findings by writing and categorizing the result of our literature review (Bryman & Bell 2011). The following table illustrates the books, and articles, which were reviewed and used in order to build the conceptual framework section of our thesis. The center of our focus was to get as much information as possible related to e-procurement, procurement and supply chain management. As it has earlier been defined, supply chain management is all about the management of the flow of products and services including moving, handling and storing raw materials, finished products and work in progress inventory from the point of origin to the point of consumption (Wikipedia 2014). Everyone perhaps knows what procurement means in business concepts. Procurement, in accordance with Merriam Webster (2014), is the process of purchasing materials or services or in other words obtaining the supplies from the different providers. When it comes to e-procurement, it means conducting all purchasing process via the internet using different mediums (Business Dictionary 2014).

Table II. Books and articles, used to cover Theoretical Framework

Author/ Source, Name & Publication Date of Books/ Articles	SCM	Procurement	E-procurement
Atkinson, B. (2001), <i>"Earning the Return: Purchasing"</i>	✓		
Harrison, A. and Hoak, R. (2011), "Logistics Management & Strategy Competing Through the Supply Chain",		✓	✓
Johnson, M. E. and Whang, S. (2002), "E-business and Supply Chain Management: an overview and framework"			✓

<b>Neef, D. (2001)</b> , <i>E-procurement- from strategy to implementation</i>			✓
<b>Interagency Procurement Working Group, (2006)</b> , "Procurement in the UN System of Organizations"		✓	
<b>Presutti Jr, W. D. (2003)</b> , "Supply management and e- procurement: creating value added in the supply chain"			✓
<b>Boer, L., Harink, J., G. Heijboer, G. (2001)</b> , "A model for assessing the impact of electronic procurement forms"			✓
<b>Rajkumar, T. M. (2001)</b> , "E- Procurement: Business and Technical Issues"			✓
<b>Avery, S. (1991)</b> , <i>Online Buy Systems Help Clean up Business Processes, Purchasing</i>			✓
<b>Baron, J.P., Shaw, M.J., and Bailey, A.D. (2000)</b> , "Web-Based E-Catalog Systems in B2B Procurement"			✓
<b>Porter, A.M. (2001)</b> "A Purchasing Manager's Guide to the E-Procurement Galaxy"			✓
<b>Kraljic,P. (1983)</b> , " <i>Purchasing must become Supply management</i> "			✓
<b>Aberdeen Group. (2005)</b> , " <i>Best Practice in E-procurement</i> "			✓
<b>Feldman, S. (2000)</b> , "Electronic Marketplaces"			✓
<b>David Frederick Ross. (1997)</b> , "Competing Through Supply Chain Management"	✓		

Some books were also studied in order to cover the conceptual framework of the thesis and also gaining enough knowledge of the subject and the topic. Out of which, two more important ones for example, the book that is written by Dale Neef and published by Prentice Hall e-procurement from strategy to implementation. This book seems to be of high importance and value since many scholars, writers and students adopted data and information in their works. We also adopted quite useful data from this book in terms of answers to our thesis questions and also derived plenty of useful information from it, and also another book is logistics management and strategy competing through the supply chain, which was published by Pearson Education in the year 2011. This is a book that is more often used as a course literature in some schools and universities around the world, and it contains quite enough valuable information on logistics management and supply chain management.

Around 25 articles were, related to e-procurement, reviewed and used to find out how e-procurement works and provide comprehensive answers to the research questions. The articles, their respective authors and date of publications are reported in the table III below.

Table III. Main articles used.

<b>Author, name &amp; date of the publication of articles</b>	<b>RQ1:</b>  What are the reasons for adopting and implementing e-procurement systems?	<b>RQ2:</b>  How does e-procurement reduce costs and create value in the supply chain?
<b>Croom, S. R. (2000)</b> , “The Impact of Web-Based Procurement on the Management of Operating Resources Supply”		✓
<b>Chang, H. H., Tsai, Y. C., &amp; Hsu, C. H. (2013)</b> , “E-procurement and supply chain performance”	✓	✓
<b>Johnson, M. E. &amp; Whang, S. (2002)</b> , “E-business and Supply Chain Management: an overview and framework”		✓
<b>Essig, M. &amp; Arnold, U. (2001)</b> , “Electronic Procurement in Supply Chain Management: An Information Economics-Based Analysis of Electronic Markets”		✓
<b>Soares-Aguiar, A. &amp; Palma-dos-Reis, A. (2008)</b> , “Why do firms adopt e-procurement systems? Using logistic regression to empirically test a conceptual model”	✓	✓
<b>Presutti Jr, W. D. (2003)</b> , “Supply management and e-procurement: creating value added in the supply		✓

chain”		
<b>Puschmann, T. &amp; Alt, R. (2005)</b> , “Successful use of e-procurement in supply chains”		✓
<b>Rajkumar, T. M. (2001)</b> , “E-Procurement: Business and Technical Issues”		✓
<b>Ageshin, E. A. (2001)</b> , “E-procurement at work: A case study”	✓	
<b>Boer, L., Harink, J. &amp; Heijboer, G. (2001)</b> , “A model for assessing the impact of electronic procurement forms”	✓	✓
<b>Eakin, D. (2003)</b> , “Measuring e-procurement benefits”	✓	
<b>Australian Government, Department of Finance and Administration (2005)</b> , “Case Studies on E-procurement Implementation”	✓	
<b>Aberdeen Group (2005)</b> , “Best Practice in E-procurement”	✓	
<b>McCrea, B. (2013)</b> , “5 ways to cut costs with e-procurement”	✓	
<b>Lonsdale, C. &amp; Cox, A. (1998)</b> , “Outsourcing: a business guide to risk management tools and techniques”		✓
<b>Davenport, T. H. (1993)</b> , “Process Innovation: Reengineering Work Through Information Technology”		✓
<b>Lamming, R.C. (1993)</b> , “Beyond Partnership: Strategies for Innovation and Lean Supply”		✓
<b>Dong, S., Xu, S. X. &amp; Zhu, K. X. (2009)</b> , “Information Technology in Supply Chains: The Value of IT-enabled Resources under Competition”		✓
<b>Eng, T.Y. (2004)</b> , “The role of e-marketplaces in supply chain management”		✓

<b>Turban, E., Lee J., King, D. &amp; Chung, M.H. (2000),</b> “Electronic commerce”		✓
<b>Malone, T.W., Yates, J. &amp; Benjamin, R.I. (1987),</b> “Electronic Markets and Electronic Hierarchies”		✓
<b>Kambil, A., Henderson, J.C. &amp; Mohsenzadeh, H., (1993),</b> ”Strategic management of information technology investments: an options perspective”		✓
<b>Dell, M. (1999),</b> “Direct from dell. New York”		✓
<b>Johnston, R., and Vitale, M.(1988),</b> “Creating competitive advantage with inter-organizational systems”		✓
<b>Kekre, S., &amp; Mudhopadhyay, T. (1992),</b> “Impact of electronic data interchange technology on quality improvement and inventory reduction programs”		✓
<b>Cash, J.I. &amp; Konsynski, B.R.(1985),</b> “IS Redraws Competitive Boundaries”		✓

All and all, we can dare say that more than enough academic articles, journals, short articles on the internet from different authors were reviewed carefully, so naming all of them in this thesis report would take much more time and space. Thus, we think that some of the most important articles and books, which were aforementioned, are enough to prove the validity of our thesis work.

## 2.4 Analysis of the Data

Data analysis and searching for the answers to our thesis questions were the next steps after piling up enough data and information by reviewing the above-mentioned literatures. After collecting all the necessary and required information and materials, we started forming and writing from the theory for the purpose of gaining the target of our thesis and formulating our thesis report. The theories were almost all of them about supply chain management, procurement, the impact of e-procurement, how e-procurement creates value and reduces costs and overheads, logistics management, the relationship of supply chain management with e-procurement, traditional procurement and electronic procurement comparison and analysis. Analysis and discussions of the materials and data in the thesis were carried out by summarizing and focusing on the main collected information and data. We looked for and tried our best to find out similarities, differences, and reliability of the answers by carefully analyzing the data and information and after doing this; we started looking for appropriate answers and information to the research main and sub-questions. Eventually, after analyzing and concentrating on the answers to the thesis questions, we draw concise, coherent and holistic conclusions.

## **2.5 Validity of the Information**

When it comes to the question why the above mentioned books, journals and articles were selected and utilized, we can say that we used them because these books, journals and articles come from authors and scholars who are lecturers, teachers and supply chain management professionals who have spent many years in the field of supply chain management, logistics management, procurement and etc. Most of these authors are active lecturers and professors in the well-known universities around the world, and some of them are actively working in private and public sectors as supply chain management professionals, managers, etc. We used valuable and academically valid theoretical articles because theories make us learn complex and holistic conceptual apprehensions of things, ideas which one cannot pin down such as how companies operate, how communities are run, why people communicate in certain ways and etc(Reeves et al. 2008). It is merit mentioning that we obtained enough information and theoretical data, which could easily pave the way for us to find answers to our thesis questions and also used some of the data in the theory part of the report.

### **3. Theoretical Framework**

Since theories are the foundations for most of the research studies, these existing nearly factual theories are normally used to explain, depict and understand phenomena in addition to challenging existing knowledge within the limits of assumptions. In fact, theoretical framework is like a structure supporting the theory of research or study describing and introducing the existing theoretical viewpoints that can further elaborate why the research problem under perusal has come into being. Thus, this chapter is dedicated to the theoretical phenomenon relevant to the topic and research questions of this thesis work.

#### **3.1 Supply Chain Management**

Scholars and authors define and describe SCM in different ways; however, all of the definitions about the SCM have something in common and carry similar idea to some extent. Supply chain management SCM is integrated method of making a plan, putting into practice and controlling the flow of materials and services as well as information including the flow of raw material and components through manufacturing products for final distribution to the end users (David 1997). Supply chain management is a business process covering the management of the integration of processes for demand planning and management, customer relationship cooperation, order delivery, product or service start, manufacturing or operations planning and monitoring, collaboration and relationships with suppliers, life cycle support and the last but not least, reverse logistics and their risks and challenges. According to Texas AM University (2014), supply chain management encompasses all operational activities that have to take place in order to supply the right product to the right customer at an appropriate time with the right satisfactory quantity taking from raw materials to delivering to the customer. It is said that SCM concentrates on planning, forecasting, negotiation, purchasing, product assembly, handling, storage, transportation, inventory management, distribution, sale, and customer service allowing companies to strive achieve long-lasting competitive advantages by innovating, designing, introducing and delivering products faster, and cheaper with high quality and standards to gain satisfaction of the end user.

Thus, supply chain management comprises of the areas and activities of operational management, logistics management, procurement and information technology and its main objective is integration of the entire supply chain activities from upstream to downstream (Wikipedia 20014). In other words, streamlining of supply side business activities for the sake of maximizing costumer value at the same time gaining a competitive advantage in the marketplace by being innovative is the core goal of the supply chain management. Through proper management of the supply chain, organizations will be able to minimize waste and speed up the process of manufacturing products or providing services. This is something that can be achieved by keeping tighter control and monitoring of internal inventories, production, distribution and sale in addition to monitoring the inventories of the purchasers which buy the company's products (Investopedia 2014).

It is worth mentioning the procurement or procurement management is one of the significant elements of the supply chain management that must be operated with high precautions so as to increase sustainable profitability and productivity. When it comes to linkage of procurement with the supply chain management, it is strongly believed (Turner & Townsend

2014) that effective procurement strategies and properly managed supply chain allow companies to focus on developing, designing, and delivering products or services that can obviously exceed the expectations of costumers and end users. Moreover, implementing the principles of e-procurement can contribute multiple benefits and advantages to an organization. These benefits and advantages can involve decreased work hour cost per transaction, more timely, accurate and transparent purchasing processes, timely payment, decreased administration costs or overheads, advanced and standard cash flow management and many others (Atkinson 2001).

### 3.2 How procurement works

It is evident that procurement is moving towards acquiring a strategic profile in managing the supply chain. This is an obvious need in businesses that seek competitiveness advantages in narrow margin industries, price sensitive markets, and focal firms that have a high procured value ratio. Now that many companies resort to outsourcing to generate customer value suppliers have become of critical importance in increasingly competitive markets. To achieve business objectives supply chain management uses procurement intelligence to work with suppliers. The following figure 1 depicts this process.

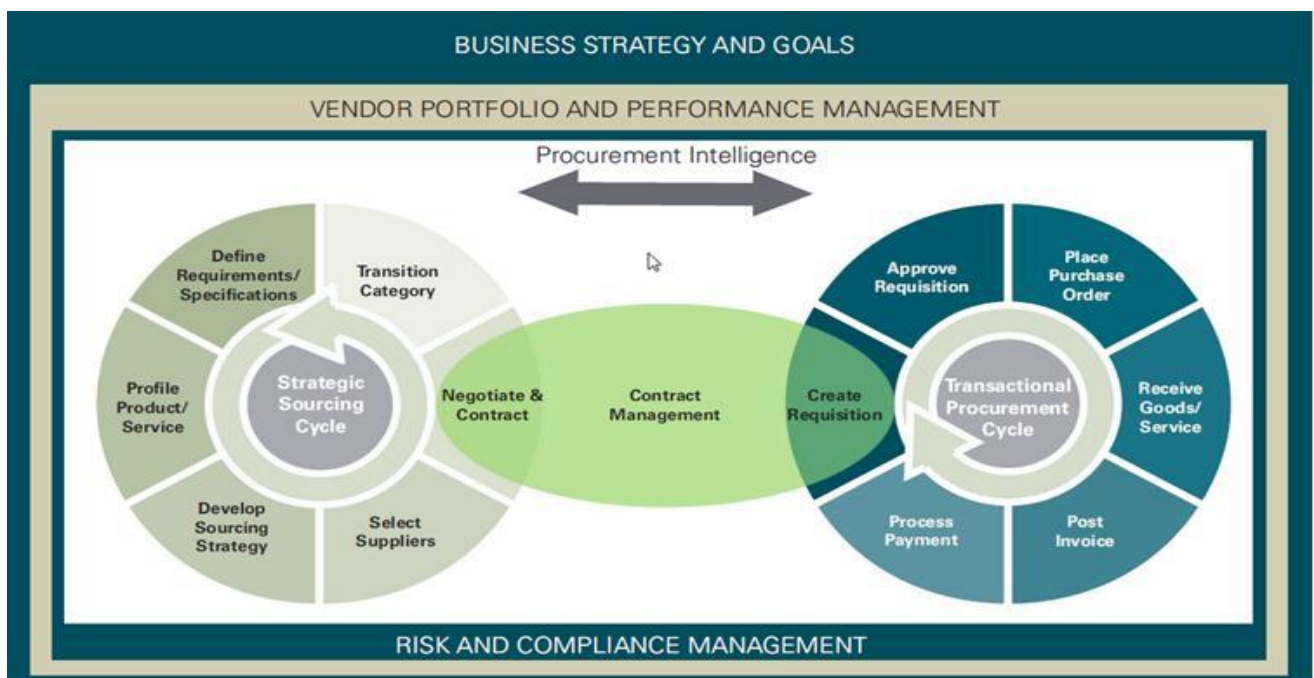


Figure 1 Procurement interlinked processes. Source:(Ravi 2004 ).

As it is obviously illustrated in the figure above the clockwork of the intelligent procurement is interlinked throughout the realm of the inbound flow of material. The left circular processes represent the strategic activities in which procurement contributes in driving the value, and the right circular processes depict the operational activities procurement encompasses. The oval link in the middle is the tactical processes that also tie up the strategic and operational processes together. Certain suppliers are chosen for long term relationship for particular supplies provided that they have been thoroughly assessed in accordance to the products and services they provide and the needs of the focal firm for those services and products. Then a



procurement strategy is developed for that area of spend. The result of strategic sourcing process typically is the appointment of suppliers whose contracts are used in tactical procurement (production planning, project sourcing, etc.) and operational procurement (Harrison & Hoak 2011).

Based upon tactical and operational experiences with contracted suppliers, performance is often evaluated and rated. Vendor rating can then be used as the basis for supplier development and relationship management (Harrison & Hoak 2011). The importance of procurement and its job of coordinating the inbound flow of materials being material planning and control, supplier selection, and risk management, is crystallized in the Kraljic's work stating that few focal firms today may allow procurement to be managed in isolation from the other elements of their business system. Perfect integration, stronger cross-functional relationships and far more top management involvement are all extremely vital. Every face of purchasing organization, from system support to top management style, will ultimately require adapting to these requirements.

The maturity of the procurement function can be evaluated through the figure i.e. the inclination to the activities in the right circle means the firm's purchasing department is oriented tactically. Likewise, the inclination to the activities on the left circle shows that purchasing department is trying to align procurement to its broader strategic role so as to generate competitive customer value (Harrison & Hoak 2011).

### **3.3 Procurement principle**

Different organizations follow certain operating principles for procurement activities depending on the nature of their business. According to Harrison and Hoak (2011) four basic principles make their way in almost all of them (Harrison & Hoak 2011).

#### **I. Business alignment**

This principle is laid down to make sure that procurement supplies what is needed and right for the system. So the first principle begins within the system as to align the objectives of the procurement with its peer's objectives in the supply chain. This leads to internal credibility and avoiding wasting time and money on the wrong supplies.

#### **II. Developing strategies for procurement categories**

This principle's task is to assign a long-term strategic role to procurement in that it participates in product and services thoroughgoing all throughout the organization. The category strategies are developed.

As Smock states, the returns of the principle are numerous like taking a smart approach in sourcing the supplies, smoother flow of material and information which is the result of thorough analysis of spend with rightly selected suppliers for best results on cost, new product development, quality and service (Smock 2004).

#### **III. Total cost of ownership**

Focusing on price and negotiating on the lower price is no longer considered the only factor in choosing the suppliers. Organizations with a strategic view see the whole picture before even considering certain supplier as a potential provider of supplies for the focal firm. Now suppliers for different products and services are chosen according to category strategy and all cost driven factors known to the organization.

#### IV. Supplier relationship management

Closing a contract is the start of supplier relationship management (SRM) not the end of procurement task. Managing the supplier relationship is the great responsibility of procurement staff. If complete benefit of strategic procurement is wished SRM shall never be neglected. To fully realize the benefits of strategic procurement some steps needs to be taken carefully. First step is the reduction of supply base. Second step is the segmentation of supply base. Third step is the establishment of policies for each segment Fourth step is the application of vendor rating and improvement planning. Fifth step is the assignment of executive ownership to key suppliers to encourage relationship potential. Sixth step is the management towards customer of choice (Harrison & Hoak 2011).

#### 3.4 Segmentation of the supply base

Every focal firm tries to maximize its purchasing power. When the strategies have been laid down, suppliers are treated accordingly so to improve the focal firm's position in the market. Kraljic's purchase portfolio matrix is widely used to manage supply risk and expenditure See figure 2.

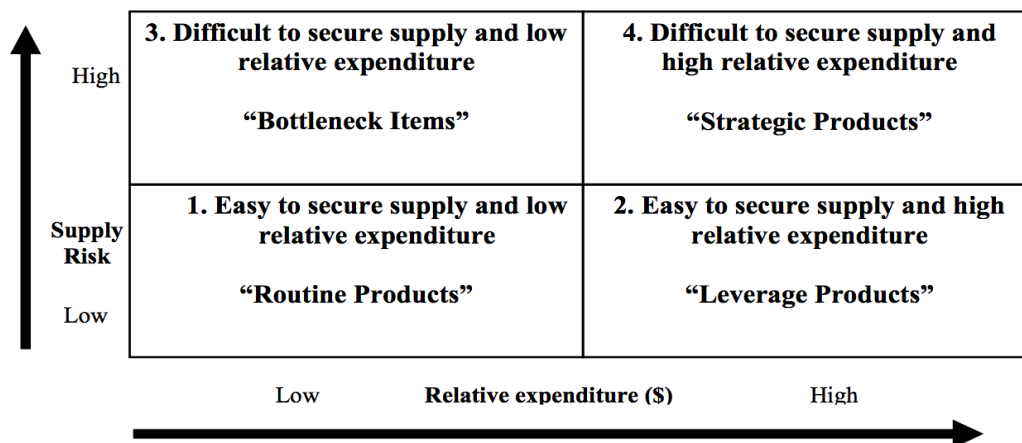


Figure 2 Kraljic's matrix. Source: (Kraljic 1983).

##### 3.4.1 Strategic items

The availability of the suppliers is low, but the buyer has high purchasing power. It refers to products, services that are very critical to the company. It often comes under the category of a complex bundle or package of products and related services. It requires innovative solutions and high level of experts from supplier's side. The attitude of suppliers towards the company, regardless of that the fact they consider the organization a valuable customer, had a strong

impact on the value and quality of products, services that were delivered. The category shows few business transactions, and there are frequently very few vendors on hand. The costs in offering contracts are very vital for both the purchasing company and the vendor. Organizations seek a long-term relationship with preferred supplier or suppliers. It is highly advised that for complex and expensive bundles of products and services, there must be effective supplier relationship management. It is crucial to understand correctly the supplier's requirements by agreeing to obey the performance management criteria as well as interfaces. Keeping regular communication and interactions with suppliers for the sake of ensuring innovation, and continuous service level improvements must be included in the mandate. Organization must encourage local suppliers and vendors by offering incentive to deliver long-term value rather than vendors or suppliers that do not consider the business as significant. The focal firm should help to develop suppliers' performance levels (IAPWG 2006).

#### *3.4.2 Bottleneck items*

The availability of the suppliers is low, and this shortage makes the buyer have a weak stand in the supply chain. These category products are extremely specialized products and services. Technical experts, rather than procurement professionals, often undertake procurement. They often give inappropriate details of technical specifications, which can limit the supply base. There are often few potential suppliers, so in this case there are usually only few transactions and dealings in this category. The focal firm tries to find alternative for the supply, or re-design the product so to reduce the dependency to the supplier (IAPWG 2006).

#### *3.4.3 Routine items*

These items share some characteristics. Usually low value and low volume items. The items in this category (IAPWG 2006) usually cover up to 90 percent of the suppliers of the company. The suppliers are often not big business organizations. Thus, the costs of dealings are often greater than the value of the products themselves. The policies to follow include, procuring at the lowest practical level (decentralized) in order to encourage local suppliers to consider the company as a valuable customer, which of course results in reduced transaction costs. Companies had better focus on ordering and payment terms with suppliers for transaction efficiency that includes direct debiting, orders' aggregation, payment cards, monthly accounts, etc.

#### *3.4.4 Leverage products*

The availability of suppliers is high in spite of high buyer power. In this category, the commodities are commonly used across the entire organization with high volume. These products show commodities where there is the capability of reducing inventory management, handling and inventory storage costs. A few suppliers serve markets with vast distribution networks in a grown-up and competitive supply for products or services in the marketplace. Guidelines to manage the category are, establishment of automated supplier junctions in order to reduce costs related to the process for high volume products, keeping strategic concentration by making sure regular management information reports on the feature of the

expenses, simplifying procurement by establishing a long-term agreement joined with automated paying systems, regionalizing supply by using local suppliers that are agents of centralized arrangements, last but not least, building leverage, targeting off high periods in supply marketplaces etc., by creating collaborative initiatives with other companies (IAPWG 2006).

### **3.5 E-procurement**

Procurement or sourcing deals with the inbound flow of material and coordinating its activities at the upstream part of the supply chain to ensure the smooth flow of supply in the supply chain. Strategic role of procurement is to speed up innovation and drive step changes in cost and performance level. Tactically, procurement contributes to basic value drivers like price competitiveness and service levels. Operationally, procurement makes sure the supply of goods and services in the focal firm to enable it to fulfill its goal in satisfying the needs of the end customer (Harrison & Hoak 2011).

Presutti (2003) believes that an e-procurement system is an information technology-based procuring system that lies at the input end of the supply chain. Scholars see e-procurement as an emerging phenomenon in the business world that calls for a systematic analysis. On the other hand supply chain managers view e-procurement as a want to understand the effect of IT on the acquiring of competency on a practical level (Dong et al. 2009; Jonsson and Gunnarsson 2005 & Presutti 2003). Neef (2001) describe e/procurement and states that e-procurement paves the way for the development of the extended enterprise, in which the supply chain turns into ongoing, and uninterrupted process which extends from a company through partner suppliers. In this case, e-procurement is considered as one of the biggest drivers for supply chain management. Breite and Vanharanta (2001) claim that information technology (IT) has comprehensively altered the concept of the supply chain management compared to any other technology.

### **3.6 Required technology**

#### *3.6.1 Required Internet technologies*

The technologies that are needed to enable staff of an organization to implement e-procurement are marketplaces, intranet and extranet (Boer, Hanrik & Heijboer 2001).

#### *3.6.2 Marketplaces*

These are websites that two sides of a purchase can interact (e-commerce).

#### *3.6.3 Intranets*

These are closed computer networks of websites in which access is granted to the members by a single organization.

#### *3.6.4 Extranets*

These are computer networks of websites in which a limited number of organizations' member have access to the websites.

### 3.7 Required E-procurement technologies

The simplest version of e-procurement is depicted in figure 4. Company A places an order through e-procurement software and company B receives it instantly. This is enabled by an E-commerce server that integrates company A and company B with their back-end ERP systems. This transformation of information occurs via internet. The basic need is the consent of the two companies' back-end ERP systems with the e-commerce server.

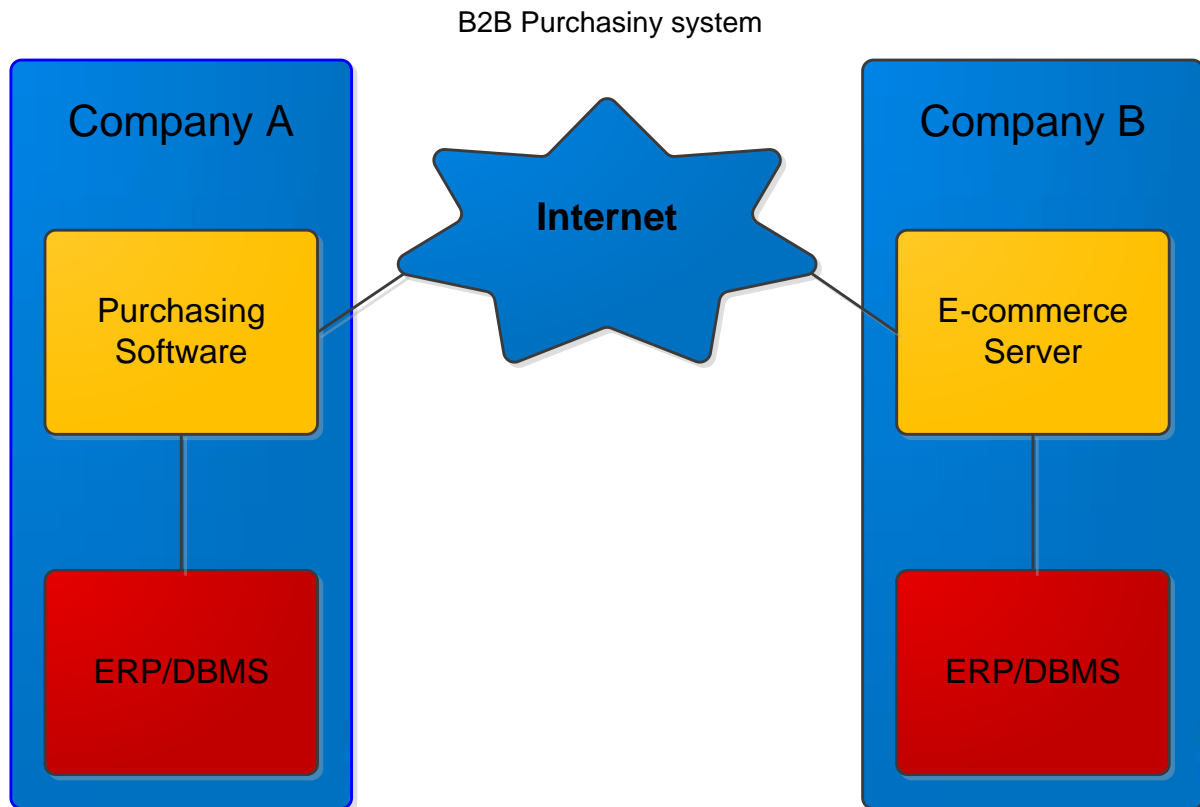


Figure 3. Simplest version of e-procurement. Source: (Rajkumar 2001).

#### 3.7.1 E-Procurement

E-procurement software can manage many purchasing related tasks automatically including order placement, catalog management, payment reporting, transaction, etc. so more time and focus can be dedicated to other activities to be more responsive to the market. The supplier has customized catalog for the buyer that is usually stored in e-commerce server website so the buyer has access to the catalog. The policies for purchasing are predefined in the system of the buyer to avoid incorrect purchase (Avery 1999). In case an unauthorized order was put on the supplier, the e-procurement software refuses to proceed. All the records are kept in the system so any transaction process can be trailed. E-procurement systems can work with different suppliers on condition that the back-end ERP system of the supplier is integrated with the buyer back-end ERP system (Avery 1999). However, these systems have their own drawbacks. Mostly MRO items are purchased via e-procurement since the integration of direct items is a tremendous task to accomplish due to the fact that many different processes and activities need to be integrated.

### *3.7.2 E-Catalog*

This is the supplier's virtual catalog that is available for the buyer to choose the product and or services from. Abundance of suppliers and their catalogs require more effort to assess the catalog of each supplier. Suppliers have different catalog formats and integration to each and every back-end ERP system is cumbersome if not impossible. This can limit the number of suppliers. Catalog aggregation can solve the problem of working with different suppliers.

If the automation of comparison of specifications and prices are wished, a centralized database needs to be kept. And this database of the multiple suppliers must be machine so there would be no need for human observation and manual entering data into the e-procurement system. Financial justification of keeping a centralized e-catalog is the high frequency of orders (Baron, Shaw & Bailey 2000).

### *3.7.3 Auctions*

These are sites that conduct auctions online for the purchaser and supplier to bid on supplies. The purchasing department sends RFQ to four or five suppliers so it can choose the right one for that particular product and or service. Marketplaces are where auctions take place (Rajkumar 2001).

### *3.7.4 Marketplaces*

These are companies that provide services of aggregating the suppliers' catalogs to buyer in the format that complies with the e-procurement system. Marketplaces customize the data the suppliers provide for the buyer. They tailor the format and view of the catalog so comparison of specification and prices conform the purchasing system of the buyer (Porter 2000).

There are some requirements to meet so supply side and buy side can avoid any misinterpretation of data in the marketplace. According to Feldman security, liquidity, transparency, efficiency, and anonymity are the requirements of health working marketplace (Feldman. 2000). Sometimes the anonymity some suppliers may ask contradicts with reliability that partners in any transaction require (Feldman 2000).

## **3.8 Integrated Frameworks**

Company A after searching its aggregated internal suppliers' catalog via e-procurement system or marketplace centralized virtual catalog place an order on company B either through the intermediary marketplace or directly to the supplier. The next step is confirmation of order by the supplier via e-commerce server which simultaneously updates the back-end ERP system of company B. Also after company B confirms the order the back-end ERP system of company A updates itself (real-time data sharing). When the marketplace is used, it contains aggregated content from all suppliers that can be searched. It also provides customized views for specific buyers. This can be seen in figure 4.

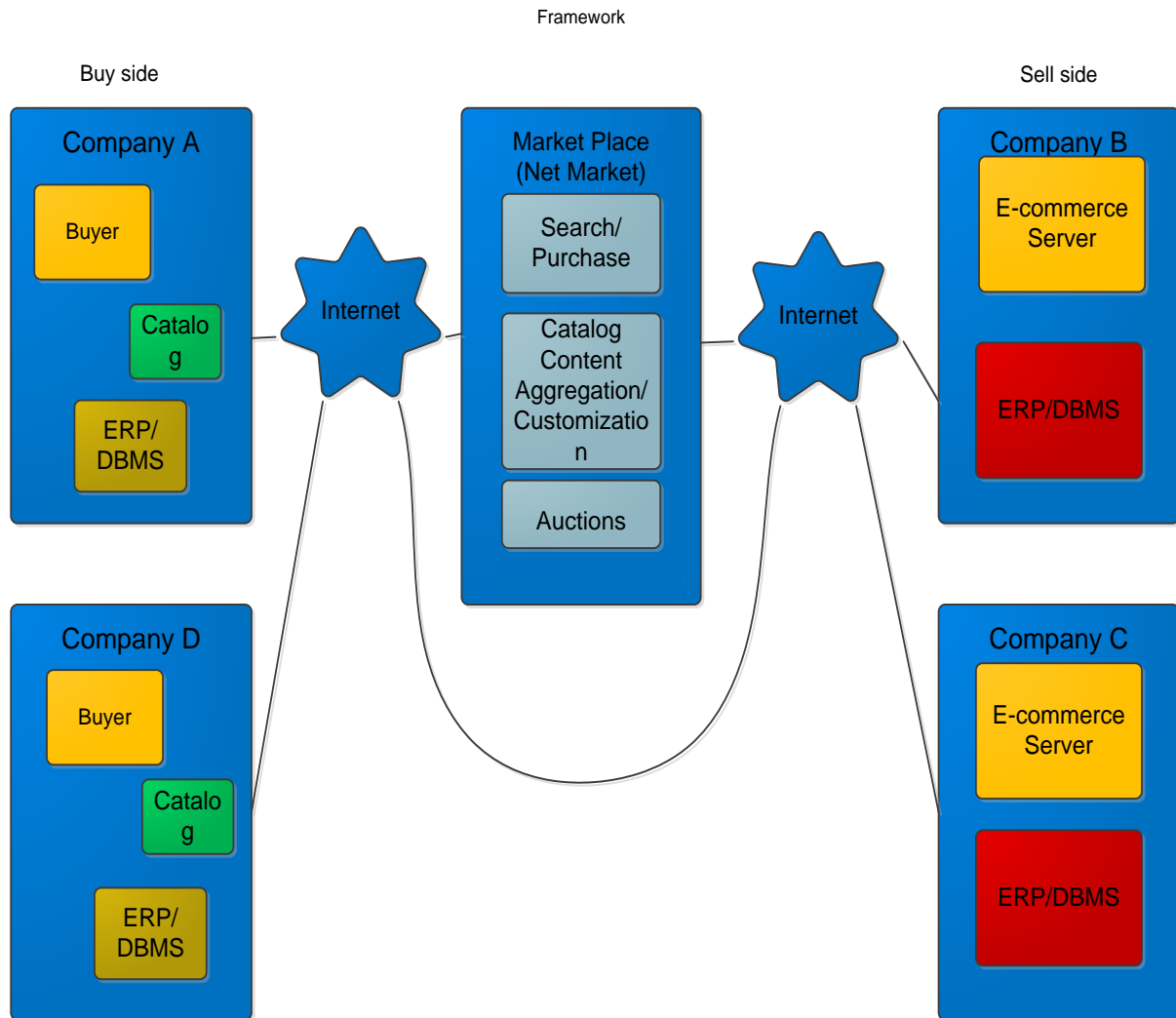


Figure 4. Integrated framework of e-procurement. Source: (Rajkumar 2001).

### 3.9 Factors for successful e-procurement implementation

Rajkumar (2001), in his studies, identifies six key factors to be considered in implementing the e-procurement:

#### 3.9.1 Define an E-Procurement Strategy

T.M. Rajkumar suggests that for a successful transition to e-enterprise in the realm of e-commerce alignment of the business strategies and IT is not sufficient. It calls for a complete merge of business strategy and IT. Core competencies must be identified in order to be competitive in the market so the vision and leadership must come from the purchasing department and identify the areas in which procurement technologies are most likely to benefit the company and provide it competitive advantage (Rajkumar 2001).

#### 3.9.2 Reengineer the Procurement Processes

Since the introduction of e-procurement leads to changes in the strategies and supplier relationship a new design is required to be in line with those strategies. Stakeholders need to be informed to participate in reengineering the procurement processes.

### *3.9.3 Involve Key Stakeholders*

Early involvement of stakeholder in the process is an essential factor to support the implementation. It is the encouragement the system needs to roll the stone.

### *3.9.4 Focus on Segments*

Because of the lack of comprehensiveness of current offering solutions, organization had better segment the procurement strategies according to the area of spend like direct, MRO, etc.

### *3.9.5 Identify Useful Measures*

Easily measurable metric units must be used to tell how well the organization is doing compare to the traditional procurement previously used like time needed, cost, etc. it is also a way to forecast the probability of success.

### *3.9.6 Manage Expectations*

False promises are probably going to have counter effects. Each stage goes through a cycle from infancy to maturity. High expectations too early are discouraging and may lead to a retreat when the expectations are not met.

## **3.10 E-procurement forms**

E-procurement takes many forms and each form of e-procurement facilitates certain area of the procurement processes. Boer, Harink, & Heijboer (2001) state that there are basically five main forms of e-procurement:

- web-based ERP
- e-sourcing
- e-tendering
- e-reverse auctioning
- e-informing

To this list a new form has been added to the former list. (Boer, Harink & Heijboer 2001)

- e-MRO

These forms are treated presently.

### *3.10.1 E-MRO as well as web-based ERP*

With the help of software systems associated with Internet technology, the process of making and approving procurement requisitions, placing orders, and receiving products and services is carried out. When it comes to e-MRO, the products and services comprise maintenance, repair and operation MRO supplies, such as non-product related items. All employees of an organization can at the same time use the supporting software system namely an ordering catalog system.



In the case of web-based ERP, products and services concern product related. It is thought that frequently only the employees of the procurement department or planning department have access to the supporting software systems, which can be web-based ERP system or Enterprise Resource Planning.

#### *3.10.2 E-sourcing*

This is the process that identifies new suppliers for a specific purchasing category which can be achieved by utilizing the Internet technology as usual the internet itself. A purchaser can, by identifying new suppliers, maximize the competitiveness during the process of tendering in the case of this procurement category. In addition, the supply risk associated with this category can be decrease through e-sourcing (Kraljic 1983).The potential rewards that come from identifying the best and lowest-cost supplier are significant (Aberdeen Group 2001).

#### *3.10.3 E-tendering*

This is the process of sending RFIs and RFPs to suppliers and obtaining the suppliers' response, through Internet technology. E-tendering is sometimes also supporting the analysis and comparison of responses. However, the point shall be noted that e-tendering is not used to close the deal with a supplier. In fact, according to Van Weele, e-tendering streamlines most of the tactical purchasing process, without focusing on the content of that process (Van Weele 1988).

#### *3.10.4 E-reverse auctioning*

This process concentrates on the price of the products and services which are put for auctions. However, during the reverse auction, other criteria are mostly neglected. Other criteria can be put into use in the previous phases for the purpose of determining which suppliers are offered to take part in the e-reverse auctions. E-reverse auctioning can be, for sure, used to close a deal between a purchasing company and a supplier if both parties agreement is made on the price.

#### *3.10.5 E-informing*

This is a form of e-procurement that is not directly connected with making a deal, while the others are. The process of collecting and distributing purchasing information is made with the help of e-informing from both external and internal parties with the internet technology. For instance, internal clients and suppliers can access the published purchasing management information on an extranet, so this is called the way of e-informing.

### **3.11 E-procurement life cycle**

Once the business issues have been sorted out, and a decision has been made to implement E-procurement technology, a standard life cycle must be followed.

### *3.11.1 Plan/Analyze*

In this stage requirements for the system are collected. Key stakeholders are assembled to obtain their viewpoints and concerns. Also, users of the e-procurement system are invited to share their view. After a thorough search, an RFO is made to send to the selected vendors. A careful analysis of the vendors' replies is performed to evaluate them by means of the predefined criteria. The most suitable candidate is chosen (Rajkumar 2001).

### *3.11.2 Define/Design*

The standard product needs to be customized to link the gap between the standard product and functionality that suits the adopting e-procurement system. The vendor and adopting company meet to set priorities of the functionalities to adopt first according to the cost of customization. Also, functional specifications are agreed upon before finalizing the contract (Rajkumar 2001).

### *3.11.3 Develop/Construct*

At this point the technical architecture of the procurement system is worked on to inscribe the rules and regulations of purchasing in the system. Modifications to the standard e-procurement system are to be done so the functionalities the adopting company desires can be added to the standard product. A test of workability of modification to the e-procurement system is conducted to get the confirmation of ultimate users of the system (Rajkumar 2001).

### *3.11.4 Implement/Deployment*

Staff is trained and a pilot implementation of a small portion of procurement is done by the e-procurement system. If the testing process is satisfactory after adjustments, a bigger portion of the whole system undergoes a change. This continues until the whole system deploys the e-procurement (Rajkumar 2001).

## 4. Results of the Literature Review

This section of the thesis report is allocated to highlight the findings of our study based on the information and data accumulated as a result of reviewing and studying different articles.

### 4.1 Reasons for adopting e-procurement

When it comes to collecting the data in regard to answering the first thesis questions, articles from different well known authors were selected and reviewed. These articles are written in different countries like USA, United Kingdom, Netherlands and Portugal. 6 reliable articles have been used when looking for information that could answer the first thesis question. It is worth mentioning that out of the aforementioned articles, three of them are written in USA, one in UK, one in Netherlands and one in Portugal. The articles were written in different date and time. As for the provision of information for answering the research questions are concerned, the articles are randomly distributed that means some of the articles have been used to provide comprehensive answers to both thesis questions while some other articles answer only one of the two research questions.

When it comes to the results of our thesis, they are giving a clear picture closer to the year 2013 and recent, so our results are mostly based on recent articles, which provide latest development in e-procurement application worldwide. Nonetheless, as a whole, all of the articles carry similar information discussing in details the importance of adopting and implementing e-procurement and how effective and efficient, the e-procurement systems and solutions are, as well as providing enough solid reasons on how organizations have been achieving tremendous and significant benefits raising their profitability.

Table IV. Articles used to elaborate the answer to the first thesis question.

Author	Reasons	Method	Country	Date
Soares Aguiar & Palma dos Reis	-Rivals extracting value motivation  -Affect the supply chain horizontally and vertically  -Demand for inbound and outbound side as well as inter-organizational modules  -IT infrastructures, IT expertise, and B2B know-how	Empirical studies	Portugal	2008

Ageshin E. A.	<ul style="list-style-type: none"> <li>-Partner relationships, information sharing and supply chain integration</li> <li>-Better supply chain performances</li> </ul>	Case studies	USA	2001
Boer, Harink, & Heijboer	<ul style="list-style-type: none"> <li>-Realize the integral procuring costs</li> <li>-Reach that new, stable situation</li> </ul>	Empirical Research	Netherlands	2001
David Eakin	<ul style="list-style-type: none"> <li>-Hard benefits: price savings and process cost reduction</li> <li>-Soft benefits: efficient processes , Transactional Benefits, compliance benefits, management information benefits, price benefits, payment benefits</li> <li>-Intangible benefits: cultural change, e-platform, financial approval for all expenditures, and high visibility of supplier performance</li> </ul>	Research paper	UK	2003
Aberdeen Group	<ul style="list-style-type: none"> <li>-Support for a larger procurement strategy</li> <li>-For rationalization of supply base, enhancement of contract compliance and aggregation of spending</li> <li>-Constant improvements and success</li> <li>-Find out about its non- value added processes</li> <li>-Trained users can add value</li> <li>-Demonstrate the value, efficiency and effectiveness</li> </ul>	Case studies	USA	2005

Bridget McCrea	<ul style="list-style-type: none"> <li>-Save time and energy</li> <li>-Quick and accurate bid analysis</li> <li>-Remove the wiggle room of traditional bidding</li> <li>-Consolidate the supply base</li> <li>-E-auction contributes lots of benefits</li> <li>-Utilize global scenario planning</li> </ul>	Analysis	USA	2013
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## 4.2 Significance of E-procurement Systems

Soares-Aguiar and Palma-dos-Reis (2008) believe companies that become aware of the benefits that electronic procurement yields are willing to adopt the EP system. Capacity for implementation of EPS is fundamental. Awareness of the fact that rivals are extracting value of the EPS is of great motivation. The findings of Soares-Aguiar and Palma-dos-Reis about the factors involved in adoption of EPS are as follows: E-procurement systems affect the supply chain horizontally and vertically. EPS affect different areas of procurement being: transaction, management, and market making horizontally. Vertically, EPS helps the demand for inbound and outbound side as well as inter-organizational modules. They are connected to the supplier's and buyer's IT system by means of enterprise information system gateway. IT infrastructure, IT expertise, B2B know-how, firm size, readiness of trading partners, competitor adopters' realized success, and the adoption's extent among competitors are very important EPS adoption facilitators. Firm scope does not differentiate EPS adopters from non-adopters, since the scope difference between EPS adopters and non-adopters is not significant. The adoption factors are not of the same importance toward explaining the firms' adoption of EPSs.

According to Soares-Aguiar and Palma dos Reis (2008) based on their categorization of the significance of adopting e-procurement systems, first of all IT expertise and firm size are the most important and stands at the highest level. Secondly, IT infrastructure and B2B know-how are very significant, and, thirdly, trading partner readiness is another important factor for adopting e-procurement systems. Concluding, they believe that organizations the main activities of which are commerce tend more highly to adopt e-procurement systems rather than the organizations which provide manufacturing and services. Thus, organizations with higher levels of IT infrastructures, IT expertise, and B2B know-how are more willing to adopt e-procurement systems. In addition, trading partner readiness will pave the way for adopting e-procurement systems and also competitors which gained a lot of success and benefit from the adoption of e-procurement systems can lead to encourage other firms and competitors to adopt e-procurement systems. See figure 5.

Ageshin (2001) cited in his work that Chang, H. H., Tsai, Y. C., & Hsu, C. H. (2013) regard partner relationships, information sharing and supply chain integration represent the reasons for the relationship between e-procurement and supply chain performances.

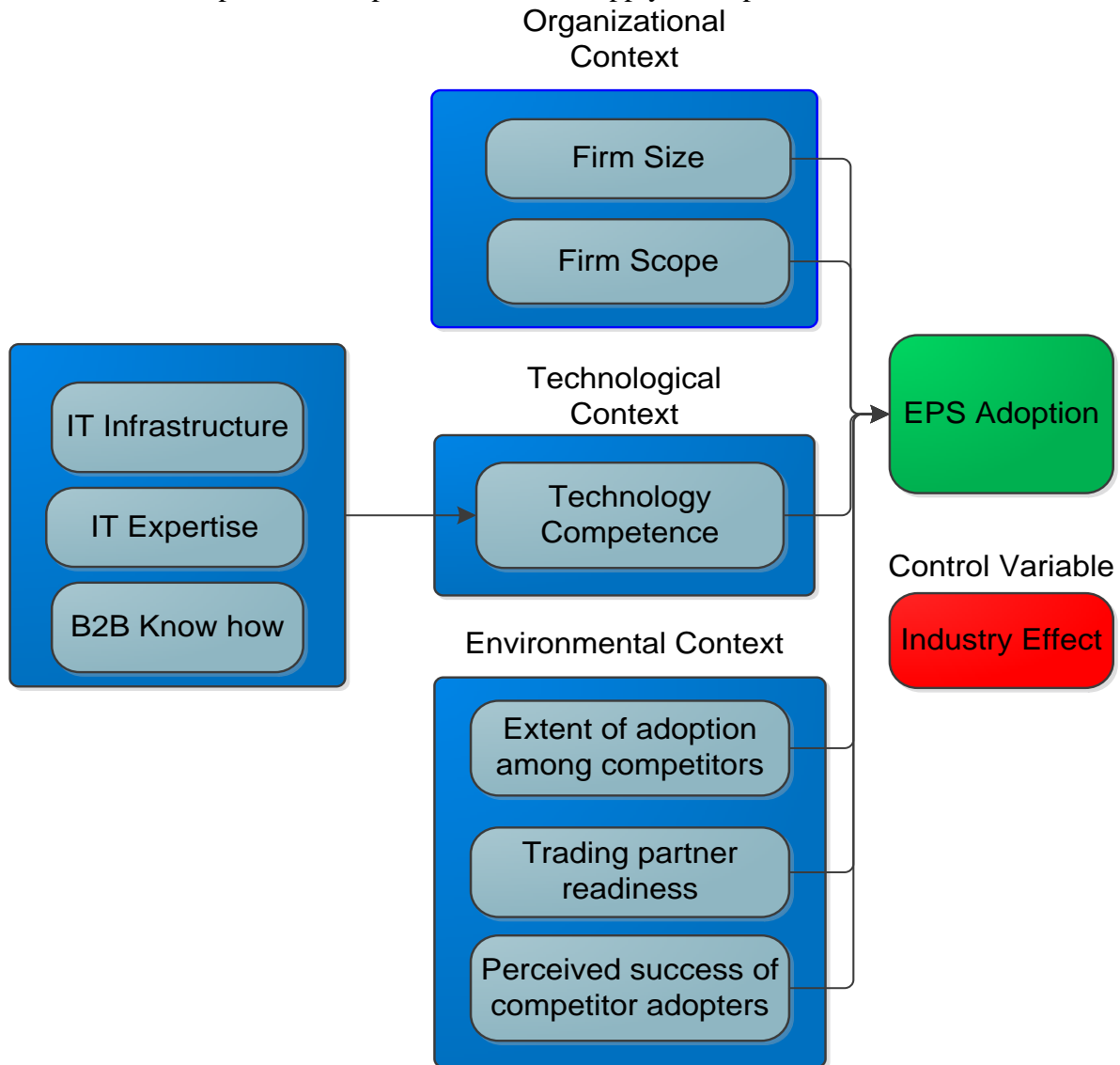


Figure 5. EPS adoption facilitators. Source: (Soares-Aguiar, & A. Palma-dos-Reis. 2008)

H. Teo, K. Wei, and I. Benbast (2003) suggest that through institutional theory as a lens to understand FEDI adoption, mimetic, coercive, and normative pressures existing in an institutionalized environment can be the factors for adoption of IT-based inter-organizational system (Teo, Wei & Benbast 2003).

#### 4.3 Effective Changes

Organization can encounter with changes at different levels upon the use of e-procurement systems that can be organizational level, on the culture of organization, in the department of information systems and at the financial level. The consequence of implementing a form of EP in a company may call for changes at the four levels in the company (Boer, Harink, & Heijboer 2001).

#### *4.2.1 Organization*

This is an area that e-procurement has an impact on the functions of the organization. That is to say that processes are affected by e-procurement implementation and in turn this leads to changes in the activities required executing said processes. The changes vary from diminishing to the introduction of new activities, to variation of required time and efforts (Boer, Harink, & Heijboer. 2001).

#### *4.2.2 IT*

Introduction of e-procurement tools necessitates certain changes in order to fit the tools in the whole information network of the system. All subsystems need to be integrated for smooth implementation of the e-procurement (Boer, Harink, & Heijboer. 2001).

#### *4.2.3 Cultural*

Organizational changes bring cultural changes with them to the system since the ways activities are done are undergone changes which are the result of a change in norms and values. The more radical the changes in the norms and values because of the changes in functions, the more drastic the cultural impacts to the system (Boer, Harink, & Heijboer. 2001).

#### *4.2.4 Financial*

This is the change that e-procurement has on costs and savings on the current stable integral purchasing costs. This change is of two different costs. One, after the implementation of specified e-procurement, the new and stable situation, the company will realize the integral procuring costs and two, the cost that have to be made in order to reach that new, stable situation (Boer, Harink, & Heijboer. 2001).

It is beyond dispute that there is potential for savings from the application of e-procurement, so by implementing the e-procurement, an organization can achieve benefits and value from different segment of purchasing and transaction processes. Eakin (2003), measuring e-procurement benefits, states that the main and primary metrics which shall indicate a return on investment in e-procurement can be hard benefits that are directly measured and deliver improved shareholder value. These benefits are achieved from price savings and process cost reduction. Then, there comes the soft benefits, which seem to be indirect benefits. Even though it appears to be difficult to accurately quantify the soft benefits like individual time freed up through efficient processes, still these benefits can indicate progress well. Lastly, there are intangible benefits, which turn to be beneficial; however, these benefits are not directly measured in financial terms. Thus, intangible benefits include cultural change, e-platform, financial approval for all expenditures, and high visibility of supplier performance.

### **4.4 Successful E-procurement Characteristics**

Aberdeen Group Inc., a leading information technology analysis and positioning service, helping IT suppliers to establish leading roles in emerging markets, conducted a research on a number of firms and organizations and finally came up with ten key findings. Companies are achieving significant and quick value from the use of e-procurement. The most successful

deployment of e-procurement demonstrated the following features and characteristics (Aberdeen. 2001):

1. Successfully deployed e-procurement can utilize technology in order to provide support for a larger procurement strategy and in this case e-procurement is not viewed as just a strategy itself.
2. Organizations have to know how much they spend on what products and with which supplier before implementing or launching any e-procurement initiatives since expense analysis leads to identifying opportunities for rationalization of supply base, enhancement of contract compliance and aggregation of spending as well as determining effective and efficient approach for bringing out e-procurement.
3. Prior to installation of any e-procurement technology, organizations and firms have to improvise a holistic plan for deployment, make a clear goal and milestones for the sake of constant improvements and success.
4. Prior to deploying e-procurement, it is very urgent that a company begin benchmarking all its procurement activities and processes since it enables the company to find out about its non- value added processes which have to be eliminated before implementing e-procurement initiatives. Failure to making internal process flows mapping will result in placing the company at risk of inefficient and costly processes. Researches and time have proved that organizations which experienced success and growth with the use of e-procurement definitely began by mapping their own internal process flows prior to implementing e-procurement.
5. It is an obvious fact that any change has to be started by full support from the top management. When it comes to e-procurement initiatives, it is necessary for the success of e-procurement that top management should declare their full support because successfully deploying any technologies need top level executives support and cooperation.
6. It is very essential that the users have to be trained how to operate e-procurement because trained users can add value to the utilization of e-procurement.
7. Companies must designate a champion from the purchasing or IT department in order to coordinate, monitor, and manage the deployment of e-procurement technology. Besides, the champion will be responsible for driving system installation and adoption, communicate successes, measure results and repair faults.
8. Supplier participation is very vital and is key factor to the success of e-procurement; thus, suppliers should be given incentives and motivation, educated on the value of e-procurement, and provide with tools and services to participate and if failed to participate, penalties shall be imposed.
9. Demonstrating value to all participants, including front line employees, top level executives and external suppliers, is very necessary in order to win support. Companies should find out the areas of spending which can bring about massive benefits and savings in the shortest period of time.



10. Continuous measurement of the performance of e-procurement is a key to success since a company cannot improve what it cannot measure. Companies have to measure user adoption, process improvements, contract compliance, cost savings and vendor performance on a regular basis for the sake of driving continuous improvements in utilization of e-procurement. Thus, these measurements can demonstrate the value, efficiency and effectiveness of e-procurement to all participants in addition to identifying areas for improvements and realignment of processes if need be.

## **4.5 Substantial Benefits through Adoption of E-procurement**

An organization or firm can attain numerous benefits and advantages through the proper utilization of e-procurement, for instance, transactional benefits, compliance benefits, management information benefits, price benefits, payment benefits etc. It is merit mentioning that such benefits will definitely contribute hugely in improving profitability, productivity and efficiency throughout the supply chain (Eakin. 2003). The author suggests that the following benefit and value can be achieved through the proper application of e-procurement adoption and implementation.

### *4.5.1 A. Transactional Benefits*

When it comes to the use of e-procurement, it is true that e-procurement is simplifying any transaction processes in addition to paving the way for several other benefits. The purchase to pay process online is enabled by e-procurement through the use of web based transacting tool by choosing items or products from the pre sourced catalogues of suppliers. The tool is connected to the back end of ERP system for entry, payment and verifying management information.

Thus, electronic processing will result in great time savings and efficiency because of global automated processes which include best practice and the elimination of trivial activities, electronic enabled relationships with suppliers, speeding procurement cycle times and facilitating supplier performance improvements, and greater data accuracy, which helps reduce ordering inaccuracies and paves the way for essential foundation for better management with the help of measurement and analysis.

### *4.5.2 B. Compliance Benefits*

Compliance and autonomous spending are big issues in many cases within a company or firm and this can potentially happen due to lack of awareness. So, with the proper use of e-procurement, these issues can be solved through tools like catalogues and standard order processing as well as approval processes. An organization can achieve compliance due to a simple and quick requisition to payment process which has a user friendly interface and pre sourced catalogues customized to fulfill the requirements of each user, a simple strategic sourcing process having standard tools and procurement processes in addition to having easily accessible information, and the electronic procurement system, which is the only available purchasing mechanism.

#### *4.5.3 C. Management Information Benefits*

Maximizing the financial benefits and strategic sourcing is highly important. Therefore, if e-procurement is implemented successfully and appropriately, this will lead to high quality detailed management information resulting in neutralizing the requirements not only for data warehousing, but also for resource-heavy data mining.

#### *4.5.4 D. Price Benefits*

When an organization has the ability to prove to its suppliers that e-procurement is used as a tool to ensure end users honor their contract status, this will enable the company to negotiate down prices through greater enhanced capture, reliability of spending information, and increased confidence guaranteeing spending volumes from increased compliance with the system, which will allow volume price breaks and discounts to be obtained.

#### *4.5.5 E. Payment Benefits*

Electronic invoice payments will be enabled with the successful and proper operation of the first four benefits mentioned above leading to better controlling the business cash flow and managing the efficient payment because of smooth procurement processes which give more on time and accurate information to the accounts payable department. In this case, a company can achieve potential benefits of reduced manpower and reduced expenditures on postage and stationery. In addition, suppliers are given the prompt payment guarantee during the negotiations and also there are lots of benefits in terms of the electronic invoicing that is often not assessed or ignored.

McCrea (2013) quotes in her article from Bill Michel, president of ADR North America and senior vice president of Institute for Supply Management say that there are different approaches for buyers to better leverage web to minimize costs associated with procurement processes by giving examples of five useful ways:

- Suppliers should be hold accountable with using structured e-procurement templates and in this case, a company's suppliers should answer specific questions and write the information in the company's preferred format. This will help a company to save time allowing them to make a quick and accurate bid analysis.
- E-procurement will remove the wiggle room of traditional bidding by structuring RFPs in a way that removes any doubt of wiggle room on the suppliers' end.
- With e-procurement, a company can easily and simply consolidate the supply base, which of course helps tremendously in cutting costs.
- Use e-auction, which is really useful for commodity products and this will result in saving companies a lot of money. One might be familiar with e-auction, it an online bidding where suppliers log in and bid against each other in real time.
- Utilize global scenario planning. Electronics buyers are able to develop effective and efficient what if scenarios using the data which is generated by their e-procurement systems, this will help buyers to make purchasing decisions efficiently and effectively.

Most of the e-procurement programs contain multilingual currency capabilities which can be used for global purchasing, which can possibly help a company to save time and energy, so extra time can be used for other improvements or tasks.

#### 4.6 Reducing Costs and Increasing Value

Our findings and the result of our comprehensive literature review could drive easily towards collecting satisfactory information and data on how e-procurement systems can help organizations and firms reduce their costs associated with purchasing processes and the same time increasing and creating value in the supply chain, from which both the company and the suppliers can acquire profits. Thus, as far as answering the second thesis questions is concerned, once again, articles from different supply chain management professionals and authors were reviewed collecting enough data in order to provide reasonable answer to the second thesis questions in addition to presenting sufficient information about the cost reduction and value creation impact of e-procurement.

The articles, which were used to answer the second thesis questions originated from different countries. Out of 21 articles, utilized to provide answers to the second thesis question, 15 articles are written by authors in the USA, 4 in UK, one in Portugal, and one in Netherlands. However, one of the articles is jointly written by a Chinese and a USA authors. When it comes to the dates and times of written articles, the articles were written in different dates and times. As for the provision of information for answering the research questions are concerned, the articles are randomly distributed that means some of the articles have been used to provide comprehensive answers to both thesis questions while some other articles answer only one of the two research questions. Some of the articles go back to the years of 1975, 1987 and forward, however, all of them give a clear picture of recent years to some extent in terms of discussing the cost reduction and value creation impacts of e-procurement systems. Point to be noted that our results are more based on recent articles, covering recent technologies and developments in the area of e-procurement.

Table V. Articles used to elaborate the answer to research question two.

Author	Cost reduction and value creation	Method	Country	Date
<b>William D. Presutti Jr.</b>	<ul style="list-style-type: none"> <li>-Value Added Networks (VANs),a proprietary technology ties buyer and seller , real time information is shared to avoid unnecessary complexity in designing products leading to cost reduction</li> <li>-Collaborative design of products, information sharing shortens the life cycle of products</li> <li>-Leverage the ability of shorter time-to-market</li> <li>-Improving the performance of a supply chain contributes to greater value creation for the customer, tangible (e.g. cost) and intangible (e.g.</li> </ul>	Research paper	USA	2003

	capacity utilization) factors			
<b>Chang, H.H., Tsai, Y.C., &amp; Hsu, C.H.</b>	<ul style="list-style-type: none"> <li>-Innovation of implementing e-procurement systems can create value for enterprises through utilizing IT enabled resources</li> <li>-One way of improving the performance, is adopting joint-learning strategy which focuses on know-how collaboration and mutual competency creation</li> <li>-Performance is increased due to better inventory management and partner relationship having cost reduction effect</li> <li>-Chain integration activities enhance product quality and customer service performance</li> <li>-Information sharing decreases OPC by reducing the transaction cost as, improving in managing and controlling the supply chain</li> <li>-Value creation perspective is pivotal in enhancing supply chain performance quoted from Wiengarten et al, 2010.</li> </ul>	Research paper	USA	2013
<b>Lonsdale and Cox</b>	-Reduction in DIR and shifting the fixed cost to variable cost are the drivers of outsourcing strategy	Research paper	UK	1993
<b>Davenport T.H</b>	-Use of IT for innovation is the main factor for outsourcing	Research paper	USA	1998
<b>Soares-Aguiar &amp; Palma dos Reis</b>	<ul style="list-style-type: none"> <li>-Automation of requisition generation bears the most cost saving effect,</li> <li>-Increasing sale</li> </ul>	Empirical studies	Portugal	2008

<b>Lamming, R. C. and Hines, P.</b>	-Transparency of the information gained by e-procurement having direct effect on moving the profile of procurement towards strategic status	Research paper	UK	1993 , 1994
<b>Dong et al</b>	-Enterprises can extract value through deployment of IT based resources	Research paper	China, USA	2009
<b>Eng, T. Y.</b>	-The integration of the processes in the supply chain -Integration resulting in the reduction of time and cost in designing and developing products collaboratively by partners of enterprises on a strategic level -Improving the performance of a supply chain contributes to greater value creation for the customer, tangible (e.g. cost) and intangible (e.g. capacity utilization) factors	Research paper	UK	2004
<b>Turban, Lee, King, &amp; Chung</b>	-TPN also processes the transactions automatically leading to reduction of OPC -Oracle claiming a 10–20% of total purchasing costs reduction -GE's Trading Process Network (TPN) helped reduction in material costs by finding new supplier that earned GE 5% to 20% cost reduction -Benefit of the TPN is the reduction of sourcing cycle time by 25 to 30%, shrinking time-to-market by 10 to 15% -Reduction of time-to-market leads to the reduction of inventory and trapped capital asset related costs like storage costs, tax, etc.	Book	USA	2000
<b>Dave Nelson, Patricia E. Moody, &amp; Jonathan Stegner</b>	-Managing supply chain strategically through e-procurement will yield more potential and capability for the creation of more values	Book	USA	2002

<b>Hau L. Lee, Seungjin Whang</b>	-Information sharing among partners in the supply chain , a fundamental agent in achieving higher levels of coordination	Research paper	USA	2000
<b>Simon R. Croom</b>	<ul style="list-style-type: none"> <li>-Leveraging purchasing power of low-value, high-variety goods and services</li> <li>-E-procurement of MRO items (non-core products and services i.e. maintenance, repair, and operating resources) yields a significant reduction in costs</li> <li>-The inter-organizational networks impact the efficiency of order processing leading to reduction of OPC</li> <li>-Reduces costs of inventory management by use of just-in-time method</li> <li>-Operational and strategic benefits</li> <li>-Reduction of administrative costs and improved audit trails of transactions, operational benefits</li> <li>-No cost for transaction in a marketplace</li> <li>-Costs of coordination relate to the planning, control, management, and administration of economic activity</li> <li>-Impact on better managing the total supply base</li> <li>-Transparency e-procurement offers in MRO transactions enhance the audit trail</li> <li>-Reduce the supply base in MRO procurement</li> <li>-Automation of procurement processes ,the vital factors for increasing process efficiency</li> <li>-Decrease in TPC</li> </ul>	Research paper	UK	2000 , 2001
<b>Rajkumar, T. M.</b>	<ul style="list-style-type: none"> <li>-Minimized costs, increased efficiency</li> <li>-A greater degree of accuracy, and speedier processing and delivery</li> <li>-Strategic benefits</li> </ul>	Research paper	USA	2001

<b>Malone et al</b>	-Electronic communication connections decreases the costs of coordinating economic transitions and coordinating production's costs	Research paper	USA	1987
<b>Kambil, A., Henderson, J.C. &amp; Mohsenzadeh, H</b>	-More capital investment in IT results in spreading the value adding activities outside of the companies -Raising the profile of procurement to a strategic level	Research paper	USA	1991
<b>Michael Dell</b>	-Linkage between updated daily demand and inbound flow of supply is crucial for the success of the company -Replacing inventory with information virtual integration through Internet	Case studies	USA	1999
<b>Johnston, R., &amp; Vitale</b>	-Raise the tactical performance decreasing TPC	Research paper	USA	1988
<b>Williamson</b>	-E-trading affects transaction costs -Reduction of OPC	Research paper	USA	1975
<b>Kekre, S. &amp; Mudhopadhyay, T.</b>	-Applications of EDI a strategic move towards supply base reduction -Improvement in the quality and efficiency of the purchasing function -Supply base reduction, in the line with strategic procurement system management	Research paper	USA	1992
<b>Boer, Harink, &amp; Heijboer</b>	-Net reduction in the sum of OPC, TPC, SPC, DIR and NPR positively affects the total profit -Better deals (lower DIR and NPR) -Improvement in Cost Benefit (CB) and Revenue Benefit (RB)	Empirical Research	Netherlands	2001

<b>Cash, J.I., &amp; Konsynski, B.R.</b>	<ul style="list-style-type: none"> <li>-Lifts the profile of purchasing function , contribution to internal customer service and cost reduction</li> <li>-Inventory reduction by JIT can have CB and RB</li> <li>-Cost of capital decreases significantly</li> <li>-Better utilization of capital</li> <li>-Greater ability of customization of products and services</li> </ul>	Research paper	USA	1985
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## 4.7 E-procurement Costs

The purchasing activities costs are categorized into five areas. The costs are either concrete in nature (DIR and NPR) or employees' and management's salaries (OPC, TPC, SPC).

### 4.7.1 Direct (DIR)

The price paid for the items and or services to the supplier. It also includes the money invested in the supplier's technology and education of the staff of the supplier (Boer, Harink & Heijboer 2001). Note that DIR and NPR comprise actual expenditures while OPC, TPC and SPC are the costs accruing from time spent by the firm's employees and management (Boer, Harink & Heijboer 2001). A short description of each cost according to Bore et al. (2001) is as follows.

### 4.7.2 Non Product Related (NPR)

These are the cost related to the non-operational activities spent so the focal firm can provide the products and or services to its customers.

### 4.7.3 Operational Purchasing Cost (OPC)

The costs of executing operational purchasing activities i.e. the dollar value of putting an order on the supplier.

### 4.7.4 Tactical Purchasing Cost (TPC)

The costs of executing tactical purchasing activities i.e. the money spent on selecting a supplier and contracting and negotiating with the supplier.

### 4.7.5 Strategic Purchasing Cost (SPC)

The costs of executing strategic purchasing activities i.e. money spent managing suppliers and their relationship with the company and also the cost of running spend analysis.



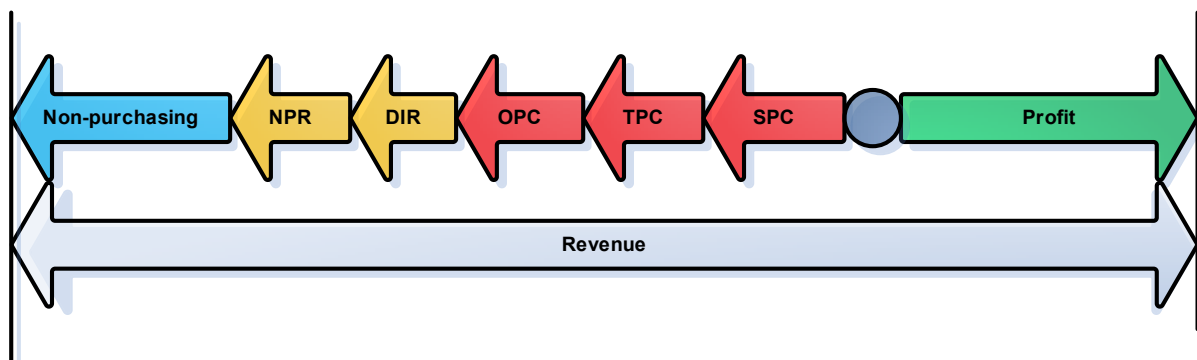
#### 4.8 Cost Reduction and Value Creation

Total administrative costs (Soares-Aguiar & Palma-dos-Reis 2008) for firms using EPSs account for only 33.2% of the costs of the same organization in its traditional system using paper-based processes. Automation of requisition generation bears the most cost saving effect, which touches upon organization's net income directly. The significance of the cost reduction can be seen when organizations wish to have the same financial impact on the net income by increasing sale. This requires a great effort to increase the sale while accepting the fact that this increase leads to increase in costs. So investment in e-procurement has a sound grounding.

E-procurement has a direct effect on the depth and frequency of the procurement processes after adoption of the e-procurement. The net reduction in the sum of OPC, TPC, SPC, DIR and NPR positively affects the total profit (Boer, Harink & Heijboer 2001).

The increase in depth and frequency of the processes in e-procurement needs a different kind of management as for the increase in depth and frequency can no longer be managed in the traditional format. The reasons behind this different management need are abundant. We can state a few such as, cost structure, profit contribution, degree of market segmentation, etc. Today many organizations tend to develop plans in order to integrate some sort of electronic commerce into their supply chain management operational practices that can possibly allow them to develop and maintain a competitive advantage. The advantages can be in the form of minimized costs, increased efficiency, a greater degree of accuracy, and speedier processing and delivery (Rajkumar 2001).

Figure 6 below depicts dissection of the revenue into different costs and the profit of a company.



*Figure 6 Dissection of the revenue. Adopted from (Boer et al.2001)*

Considering the tactical activities i.e. specification, selection and contracting we can expect an increase in frequency in tendering as a result of decrease in the cost of selection in search for better deals (lower DIR and NPR) and improvement in Cost Benefit (CB) and Revenue Benefit (RB). But this may mean that investing and managing more suppliers which in turn results in a reduction in CB and RB (Boer, Harink & Heijboer. 2001).

Better information processing capability deployed by means of e-commerce, and in particular web-based procurement, will have significant cost reduction. In addition, a more strategic approach to management of procurement enables leveraging purchasing power of low-value,

high-variety goods and services which encompasses the main category of MRO items. E-procurement of MRO items (non-core products and services i.e. maintenance, repair, and operating resources) likely yields a significant reduction in costs (Croom 2000).

Cash and Konsynski (1985), Johnston and Vitale (1988) regard that adoption of e-procurement lifts the profile of purchasing function because of its contribution to internal customer service and cost reduction (Cash et al. 1985). This is in line with the movement towards the strategic role for the procurement.

The inter-organizational networks impact the efficiency of order processing that leads to reduction of OPC. It also reduces costs of inventory management by use of just-in-time method (Croom 2000).

Inventory reduction by JIT can have CB and RB for the company. The cost of capital decreases significantly and this leads to better utilization of capital. Greater ability of customization of products and services due to information made available by transactions carried by the network suggested by Cash and Konsynski 1985; Johnston and Vitale 1988 can raise the tactical performance so decrease in TPC can be expected.

Williamson (1975) states that adoption of e-trading, affects transaction costs because of transition in governance structures. So reduction of OPC is in line with this transition.

Kekre and Mudhopadhyay (1992) view the applications of EDI a strategic move towards supply base reduction in addition to improvement in the quality and efficiency of the purchasing function all around. Supply base reduction also is in line with strategic procurement system management.

A prominent aftereffect of the increase in use of web-based procurement and e-commerce systems is their effect on the form of governance structure that is used for managing transactions. It is a prevailing belief amongst economists that markets would, in general, be more effective and useful mechanisms for manufacturing rather than hierarchies if it was not for the costs of coordination (Croom 2000) i.e. there is no cost for transaction in a marketplace. These costs of coordination relate to the planning, control, management, and administration of economic activity.

Williamson (1975) claims that because of the additional search in identifying right suppliers, specifying and putting into practice contracts, and the administration of the financial settlement can result in an increase in the costs of coordination which in turn leads to a rise in purchasing goods and services on the open market (Williamson. 1975) so an increase in DIR and NPR occurs. Malone together with his colleagues (1987) stated the argument, using the value chain as the framework, that the use of electronic communication connections would be able to decrease the costs of coordinating economic transitions and coordinating production's costs. Both kinds of communication compounds communicating and processing information. Since modern IT lowers the costs of both communication and information processing, Malone believes that an increase in the portion of economic activity that is coordinated by markets is expected if other factors being intact (Croom 2000). That is to say outsourcing is fostered (Malone 1987; Malone et al. 1987; Malone et al., 1989). An overlook at the industry shows that as investment in IT shrinks the size of the firms and it also increase the number of the firms in the field (Brynjolfsson, Malone, Gurbaxani & Kambil 1993). Kambil (1991) points out that more capital investment in IT results in spreading the value adding activities outside

of the companies; as a result, it lifts the profile of procurement to a strategic level, cited Croom (2001).

Croom (2000) categorizes the phases of electronic B2B commerce into three main groups since the advent of computer. First, Electronic Data Interchange (EDI) paves the way for the transfer of transactions between business organizations through the integration of databases with standardized format in order to make purchase orders and other activities in the procurement transaction, then the area networks like Value Added Networks (VANs) which is a proprietary technology to tie buyer and seller together so real time information is shared to avoid unnecessary complexity in designing products which leads to cost reduction (Presutti Jr 2003). In addition to collaborative design of products, information sharing shortens the life cycle of products so to leverage the ability of shorter time-to-market. The last phase (Croom 2000) is the internet. What makes the internet stand out as a medium in e-commerce over the two former ones is its ubiquity.

Davenport (1993) suggests that the use of IT for innovation is the main factor for outsourcing. While Lonsdale and Cox (1998) maintain that reduction in DIR and shifting the fixed cost to variable cost are the drivers of outsourcing strategy. This can result in speeding up innovation so as to benefit from being the first one in the market (Croom 2000).

Croom (2000) estimates a reduction of OPC by two third of the traditional costs of the whole procurement processes as well as ease of auditing any transaction in the undertaking procurement. He also believes that e-procurement has an impact on better managing the total supply base since a higher level of status for procurement has achieved.

The transparency e-procurement offers in MRO transactions enhance the audit trail and helps to reduce the supply base in MRO procurement. E-procurement brings in the consolidation, categorization, and real-time data of suppliers, services, and MRO goods which give a professional role to MRO procurement while keeping the same level of service to different functions in an organization. E-procurement system provides a comprehensive supplier catalog so supply base reduction strategy can be applied which is in line with efficient principles of supplier management. Consequently, this leads to a decrease in TPC because of fewer suppliers to manage. Segmentation of suppliers achieved by means of visibility of information about the procurement expenditure and categories of MRO items, cost, range and usage of MRO items can be used to manage the purchasing power of the firm by using the procurement matrix. Any electronic MRO system contains a central supply database with information about supplier details, product/service details, etc. training the staff to work with the EPS at first results in an increase in DIR/NPR (Croom 2000).

Lamming (1993) and Hines (1994) stand the notion that transparency of the information gained by e-procurement has a direct effect on moving the profile of procurement towards strategic status. The distinction of the benefits of e-procurement on operational and strategic domains can be the basis of decision-making in the adoption of e-commerce. Croom (2000) draws a line between operational and strategic benefits of deploying e-commerce for buying MRO items. Reduction of administrative costs and improved audit trails of transactions are the operational benefits. Strategic benefits of using e-commerce in procurement of MRO items are the elevation of status of procurement and better handling of spend (Rajkumar 2001).

Dong et al. (2009) believe enterprises can extract value through deployment of IT based resources. The innovation of implementing e-procurement systems can create value for enterprises through utilizing IT enabled resources (Chang, H. H., Tsai, Y. C., & Hsu, C. H 2013).

Improving the performance of a supply chain contributes to greater value creation for the customer, and includes both tangible (e.g. cost) and intangible (e.g. capacity utilization) factors (Croom & Johnson 2003, Eng 2004, Presutti 2003, & Tan et al. 2002). So a value creation perspective is pivotal in enhancing supply chain performance cited from Wiengarten et al (2010). One way of improving the performance according to Walters (2008) is adopting joint-learning strategy which focuses on know-how collaboration and mutual competency creation (Chang, H. H., Tsai, Y. C., & Hsu, C. H 2013).

Eng (2004) believes information sharing and partner relationships are two other key factors in enhancing the performance of the supply chain functions. Information sharing can decrease OPC by reducing the transaction cost as well as improving in managing and controlling the supply chain (Chang, H. H., Tsai, Y. C., & Hsu, C. H 2013). Lin et al. (2002) maintain information sharing decrease the extent of uncertainty and this leads to increase in performance (Chang, H. H., Tsai, Y. C., & Hsu, C. H. 2013), while Yu et al. (2001) believe that the increase in performance because of information sharing is due to increase in trust between partners. He also suggests that the performance is increased due to better inventory management and partner relationship that have cost reduction effect (Chang, H. H., Tsai, Y. C., & Hsu, C. H 2013).

Another factor having a substantial impact on the performance of the supply chain according to Eng (2004) is the integration of the processes in the supply chain. This integration can result in the reduction of time and cost in designing and developing products collaboratively by partners of enterprises on a strategic level (Eng 2004). Chang, H. H., Tsai, Y. C., & Hsu, C. H (2013) cites from Tan et al (2002) that supply chain integration activities will enhance product quality and customer service performance.

Croom (2000) believes that an automation of procurement processes is one of the vital factors for increasing process efficiency. Lee and Whang (2000) view information sharing among partners in the supply chain as a fundamental agent in achieving higher levels of coordination. Croom concludes that information sharing is mainly influenced by e-sourcing; partner relationships are mainly influenced by e-negotiation; supply chain integration is mainly influenced by e-evaluation. This implies that e-procurement dimensions complement each other in terms of the benefits for supply chain management” (Croom 2000).

Chang, H. H., Tsai, Y. C., & Hsu, C. H. (2013) offer four managerial implications to improve performance in a nutshell that are as follows.

1. Initially, through an e-procurement system, partners should collaborate and document their enterprises’ know-how.
2. In order to obtain a mutual goal, supply chain members could have the chance of integrating their business activities through the application of e-procurement systems.
3. Whilst procurement system could be subject to outsourcing for the purpose of reducing costs (Parry et al. 2006), the implementation of e-procurement systems should be considered as a helpful tool because it will lead to achieving benefits of simplifying the process and reducing procurement costs (Puschmann & Alt 2005).

4. Recent studies suggests in consistency with previous findings, according to Angeles and Nath (2007), up on the evaluation of the implementation of e-procurement systems, the issues of end user resistance, partner relations, system integration, information infrastructure and standardization should be totally taken into account so as to achieve better supply chain performance.

It is believed that utterly 70 percent of the revenue of the organization is averagely spent on supply chain related activities. These activities include material purchases, distributions, services related to finished products to the end customer etc. As a company tends to move towards more outsourcing, almost 76 percent of chief executive officers have high expectations from supply management to contribute to shareholder value (Nelson et al. 2002). Averagely a manufacturing company spends almost 50 percent of its sales income on purchasing products and services required in order to produce its final products (Presutti Jr 2003). The supply management's new basics and fundamentals urge that supply managers have a strategic view of everything they carry out. The aforementioned new basics encompass holistic understanding of the target costing, supplier development, value creation, and e-procurement (Nelson et al. 2002). It is an obvious fact and has been proved empirically that if companies manage supply chain strategically; this will yield more potential and capability for the creation of more values.

General Electric's (GE's) Trading Process Network (TPN) is a good example of cost reduction by employing e-sourcing. Purchasing department asks for proposal on the internet from suppliers which have been prequalified beforehand then suppliers bid. After analyzing the responses, the buyer negotiates and places an order with the chosen supplier. TPN also processes the transactions automatically so the operational processes are taken care of automatically (Turban, Lee, King, & Chung 2000) which lead to reduction of OPC. Turban E, Lee J, King D, Chung MH believe TPN affect the supplier selection and the components of contract agreement of the purchasing process (Turban, Lee, King, and Chung 2000). ERP software providers added e-procurement capabilities to their systems now that they have recognized the benefits of e-procurement.

For example, Oracle Corporation has attached "procure-to-pay" which handles the whole procurement cycle from spend analysis to payment automatically. Oracle claims a 10–20% of total purchasing costs reduction (Turban, Lee, King, & Chung, 2000). General Electric's (GE's) Trading Process Network (TPN) helped reduction in material costs by finding new supplier that earned GE 5% to 20% cost reduction. Another benefit of the TPN is the reduction of sourcing cycle time by 25 to 30% that shrinks time-to-market by 10 to 15%. The result of this reduction of time-to-market leads to the reduction of inventory and trapped capital asset related costs like storage costs, tax, etc. Dell states that linkage between updated daily demand and inbound flow of supply is crucial for the success of the company i.e. replacing inventory with information "virtual integration" (Dell 1999). The vehicle that facilitates virtual integration is the Internet (Prober 2000).

Performance of EPS value can be measured by some theoretical bases. Among those measures the resource-based view (RBV) gauges organizational resources and capabilities exploitation (Soares-Aguia & Palma-dos-Reis 2008) which was developed from yet another measuring system DCP that scale the dynamic capabilities of any organization in markets with high velocity and rapid technological change in adopting new technological, organizational and managerial resources (Teece, Pisano & Shuen 1997). Another framework

for measuring the performance of EPSs is the technology–organization–environment framework (Tornatzky & Fleischer 1990) which measures adoption of technological innovations and calculate three aspect of the organization that are affected by the adoption: the organizational, the technological, and the environmental aspects. The organizational perspective is thought to deal with the firm's size, institutionalization, centralization, the human resources' quality and the amount of slack resources that are found or expected to be on hand internally. The technological measures are the internal and external technologies pertaining to the organization's affair. The environmental aspect deals with the environment the organization works and competes in.

#### **4.9 Some Empirical Cases**

In 2000 a company based in Netherlands in the transportation industry wished to adopt e-MRO. The company worked on the project of adopting e-MRO by making a business case and a profound analytical study of the matter. The result of this adoption was an astonishing success. The company announced that standardization of purchasing processes saved a sum of € 5 million. This cost reduction was due to the fact that the company used too many different procedures in procuring the MRO items. The Dutch company also saved € 2 million by means of increased process efficiency. Last but not least, it was the cost reduction of € 4 million through improving the purchasing control. So the total cost reduction in these three areas summed up to € 11 million. It is quite obvious that the cost reduction benefit is quite substantial. NPR of the company plummeted. But for the OPC because of the policy of lay-off remained the same. The reduction of OPC is a natural consequence in normal conditions. A reduction of SPC is expected in the long term. We should consider the hidden costs too. The Dutch company bought the software for €1.5 million with the amortization factor of 20% so €300000 to pay each year. The natural consequence of this is an increase in NPR. The increase in NPR because of the purchase of the software to implement e-MRO is considerably lower than the decrease because of the adoption of e-MRO (Boer, Harink & Heijboer 2001).

A marketplace situated in Europe holds e-reverse auctions for its customers. A sample of 200 auctions reveals the following information. Since the preparation of any e-auction takes four to six weeks for the buying organizations an increase in TPC was observed. On the other hand, DIR and NPR decreased due to the fact that the reverse auction reduced the prices from 10 to 15%. Since the participant in the reverse auction had to pay some fee (€2500 to €8000) NPR increased a little (Boer, Harink & Heijboer 2001).

Four main factors that must be considered while purchasing the e-procurement system are functionality, technical architecture, cost, service and Support (Rajkumar 2001).

##### *4.9.1 E-procurement Contribution in Cost Savings*

Sprague (2000) writes and gives an example of Anderson Consulting, which has experienced the implementation of e-procurement and the executives at the company have been surprised by the savings that can be achieved through the implementation of e-procurement. E-procurement is considered to be a useful tool with which a company can consolidate and unite internal demand management and purchasing power in order to produce impressive and satisfactory results. Apart from cost savings or its cost saving strategy, organizations can think about the strategic role of e-procurement.

Cost savings, value creation to customers, being able to cross-sell additional products and services, delivering similar savings to customers and driving client retention and integration with suppliers are some of the key factors that make organizations and firms decide to adopt e-procurement solutions. Alcoa Inc, one of the world's third largest producers of aluminum (Sprague 2000) decided to adopt e-procurement in 1999 and therefore signed an agreement with Ariba Inc, software and information technology services company, in order to utilize the Ariba's B2B e-commerce solution for the purpose of being able to reduce cost associated with purchased operating resource costs throughout the organization in addition to planning to integrate with its suppliers and integrate its financial systems. It is quite clear that operating resources are necessary goods and services to operate a company and operating resource expenditures can cover the largest portion of corporate costs. With the help of Intranet and internet as a business communication solution platform, enterprise-wide and inter-organizational business activities can be automated with the help of operating resource management solutions.

An organization can obtain significant reduced costs of operating resources, improved control, minimized cycle times, and increased end user satisfaction by focusing on operating resource management, which obviously results in increasing corporate profitability and of course survival (Sprague 2000).

Cost saving can be counted as one of the main objectives of every organization and firm, which leads to increasing the revenue. Billinge (2000) exemplifies the bank of Ireland, which took the lead on e-procurement by one million Irish Pounds in one year upon implementing full e-procurement initiatives including vendor rationalization programs, process improvement and system implementation. The bank of Ireland took this decision after finding out that its suppliers had not been rationalized in many years and had some 37 standalone purchasing systems plus procurement processes. For purchasing operating resource management (ORM) materials, the bank of Ireland normally spend an average of 330 million Irish Pounds every year. The company reported saving 30% in one year. So, attaining a great deal of cost savings can definitely be a great achievement for any company.

Another good example is Microsoft, according to Neef (2000) Microsoft uses intranet based corporate procurement application named as MS Market, which can allow its employees with tools for the purpose of placing an order when purchasing products or services very efficiently and simply from the comfort of their desks. It is directly connected with Microsoft ERP systems. With the help of MS Market, order processing is streamlined, efficient billing is facilitated and administrative costs or overhead is reduced. MS Market simplifies corporate procurement processing of Microsoft, contributing to reducing per order processing costs from 60 to 5 dollars, which results in helping the company to save 7.3 million dollars each year.

#### *4.9.2 E-procurement Initiative in Scotland*

This point shall be noted that in this part, we have given an example of business to government (B2G) since we thought it was really interesting when it comes to the importance of using e-procurement applications in different sectors and describing how it played a vital role in reducing costs.

Australian Government Information Management Office (AGIMO), currently a business group with the Department of Finance and Administration in Australia (Finance 2005) asked SIRCA, which provides online services in terms of supporting finance and research at universities, or government and financial market participants around the world, to review the implementation of e- procurement in five public sectors in Italy, New Zealand, Scotland, New South Wales and Western Australia. The review covered e-procurement activities, background on they made such a decision to adopt e-procurement, how the decisions were put into practice and what types of e-procurement activities are for the time being getting utilized coming up with massive common learning and challenges, but as a whole, the five case studies illustrated the fact that e-procurement can be successful in different institutional and socio-technical environments.

Briefly, the review of e-procurement activities in Scotland is presented here out of all five case studies as a unique example. As per the review, in January 2000 following devolution in 1999 in Scotland, the Government of Scotland reviewed public procurement issues coming to this conclusion and recognizing the potential cost reduction in terms of e-procurement adoption and implementation. They proposed a strategy that comprised of the entire Scottish public sectors. They launched the program in early 2002 calling it Professional Electronic Commerce Online System (PECOS) subsequently placing the first order in March 2002. By utilizing this program, the Scottish Executive was looking forward to achieving a 2- 4% savings on procurement each year as the expenditure of public procurement was estimated to be 5 billion per year. The importance of the program increased and in July 2004, they announced new initiatives for the purpose of improving its efficiency and enabling public sector to save 500 million by 2007 and 2008 and 1 billion by the year 2009 and 2010. E-tendering was also part of this program and in one successful auction run by the Scottish Executive, this first reverse auction saved an estimated 250000 Pounds.

In addition, after analyzing in details, the purchase to pay processes and transaction costs, cost reduction in a number of areas was identified including online auctions. Comparison of cost reduction is illustrated below.

- Purchase to pay process using purchase or single paper invoice through Scottish Executive Accounting System: 10.28£.
- Purchase to pay process using purchase or single paper invoice through Easybuy: 1.28£.
- E-commerce solution combination CXML based purchase orders and automatic payment using virtual procurement card through Easybuy: 0.11£.

Upon the introduction of Visa GPC, administrative overheads were also dropped off. Since then it was introduced, travel related invoices had been reduced from 16000 in 2003-2004 to 52 in 2004 and 2005.



## 5. Discussions

As far as supply chain management (SCM) is concerned, according to our literature review e-procurement has a great impact on supply chain management and it is considered a major enabler of effectiveness in supply chains. E-procurement systems have vertical and horizontal impacts on supply chain networks. Horizontally, it affects and influences transactions, purchasing management, and marketing; on the other hand, vertically, it contributes to the management of demand for inbound outbound sides plus inter-organizational modules. In particular, KPIs that will be more affected are speed, productivity, real time monitoring and visibility, security, transparency, costs and ease of use. Another benefit of E-procurement in supply chain management is buyer's hitting the target which is agreed upon during the sourcing project, leading to reduced processing and transaction costs at the same time resulting in increasing efficiency and affectivity. It will, for example, pave the way for greater speed in purchasing products and services meanwhile reducing expenditure because of the choices and completions which increase.

It is an obvious fact that prior of adopting and implementing any new technologies, putting into practice any initiatives or making any new changes, organizations figure out reasons for using and implementing initiatives or changes. When it comes to adopting e-procurement systems or electronic solutions, first of all, companies will consider requirements of the company and reasons for adopting e-procurement. They make sure that new technologies are compatible with the existing companies' technologies and ensure that new technologies will pave the way for more benefits and value creation. Nevertheless, everything has its own risks and drawbacks besides having plenty of advantages, profits and benefits. For sure, e-procurement systems or electronic solutions can be providers of numerous benefits and profits to an organization, there is, however, certain amount of risks related to implementing e-procurement.

These risks might be considered and viewed as negative factors that could possibly affect the proper implementation of e-procurement systems or hinder organizations from adopting e-procurement fearing they will encounter with unbearable loss. However, some people believe that when you don't take risks, you will not go ahead in your life achieving your goals. Prior to adopting or implementing e-procurement systems, it is strongly advised and suggested that a firm must begin benchmarking all its procurement activities and processes since it enables the company to find out about its non-value added processes which have to be eliminated before implementing e-procurement initiatives. The company should know how much they spend on what products and with which suppliers, and devise a comprehensive plan for e-procurement adoption as well as making a clear goal and milestones for constant improvements. Organization can take any necessary measures to find out whether it is profitable to adopt e-procurement avoiding any misunderstanding and filling all the gaps.

Some of the most common categories of risks are identified so far associated with e-procurement implementation. These risks are internal business risks, external business risks, technology related risks and e-procurement process risks. When it comes to internal business risks, some organizations are unsure whether they have enough appropriate resources in order for the company to implement e-procurement system successfully. In this case, this point should be taken into account that an organization make sure if their existing information technology infrastructures are compatible with new e-procurement applications and it is

possible to integrate them. Certainly, implementing e-procurement needs that the system itself carries out properly and successfully all the processes related to procurement. In addition, e-procurement solutions require integration with the company's existing IT systems.

Another risk concerns external parties like suppliers or customers which means that e-procurement systems should be integrated with both internal information systems and also with external information systems of the suppliers or customers. In most cases, suppliers shall develop internal systems for the purpose of communicating via electronic means. This requires investment in technologies and also motivations. The reason why suppliers must be accessible through internet medium is one of the requirements of e-procurement to work successfully, so in this case, suppliers can easily provide enough catalogs of their products to their customers satisfying their requirements. However, supplier with low margin will not be able accept such requirements or demand and these suppliers will ask for guarantee.

Technology risk is another factor which organization consider prior to adopting e-procurement systems and solutions. Some organizations are not sure which e-procurement technology is suitable and meets the requirements of the company in addition to fearing the lack of globally accepted standard. This factor requires for clear standards that could pave the way for e-procurement systems to function properly in the inter-organizational level. This point should be taken into account that e-procurement systems adoption will not give a positive result, will be slow and finally will not succeed in delivering benefits if there are no widely accepted standards for coding, and process specifications as well as technical specifications.

The risks, related to the security and control of the e-procurement process, are e-procurement process risks. A company should make sure that it works well without creating any security risks to the company when performing activities with e-procurement technologies. In this case, an organization must be certain and fully confident that unauthorized actions are not going to create any disruption to manufacturing or production activities and also they will not hinder supply chain activities. It is believed that small company can be concerned about the security and control issues of e-procurement technologies; however, large organizations are not worried about the security related issues upon carrying out business activities through e-procurement technologies.

Through our literature review, we found out that the convenience of investing in an e-procurement system is widely accepted already throughout the world and is appealing by attracting the attention of more organizations and firms to adopt e-procurement systems and solutions. Companies have grasped the tangible and intangible benefits of e-procurement and know the importance of e-procurement solutions in terms of value creations. It is quite clear that benefits of e-procurement are far more than its risks. When it comes to the risks related to adopting e-procurement, these risks can be dealt with if everything is carried out according to master plan of a company prior to adoption and implementation.

When an organization makes sure, after taking certain measures to discover how well e-procurement will benefit the company and how to avoid risks associated with e-procurement implementation, that everything is ready for a change and it is proper time for adopting e-procurement systems and solutions, they can start investing in adopting and implementing e-procurement systems. It is almost crystal clear to most of the organizations that e-procurement solutions can bear plenty of benefits, and will be a good tool to produce more profits through

appropriately implementing e-procurement system and measuring its activities and outcome on the regular basis. Numerous benefits can be obtained through proper utilization of e-procurement; for example, we can name some of the benefits like transaction benefits, compliance benefits, management information benefits, price benefits, payment benefits and so on. These are some of the most significant benefits, but there might be some other benefits and value creation facilities that can be noticed when everything goes smoothly well and according to the expectations of the company.

When it comes to the costs and expenses related to adopting e-procurement and its implementation, the cost of adopting factor should be considered very carefully since the cost of adopting e-procurement is huge at the beginning, but its profitability and benefits will emerge later turning out to be extremely useful if properly managed and utilized. Some other costs related to the adoption of e-procurement like staff training, consultant fees and etc must be analyzed, planned prior to taking a step towards adopting and implanting e-procurement systems and solutions. It is merit mentioning that small companies can use cheaper e-procurement system if they cannot afford highly advanced ones.

Investing in e-procurement adoption will be considered the first step towards feeling the value that can be brought along with e-procurement solutions, but in some case, it might be achieved earlier or later by the passage of time. In this case, companies should not worry about it, they should make sure everything is running properly and wait until the real time for creation of value and cost reduction come forward. Certainly, e-procurement will generate benefits like value creation and cost reduction. Companies will definitely realize that some benefits appear; however, other significant benefits seem difficult to be measured and can only be based on the perception of procurement managers and procurement department. Some strategic benefits like reduced costs, increased efficiency, greater accuracy and faster processing and delivery of products and services should definitely pop up soon after the proper implementation of e-procurement. It is quite clear that these benefits can be achieved when procurement managers and employees show their commitments to carrying out the systems accordingly ensuring that there is no issue or obstacle. Furthermore, top management supports and collaboration can make the things work well, and their involvement is extremely crucial and key to success of e-procurement solutions.

With e-procurement systems organizations including the suppliers, can share real time information that is considered extremely vital for both the company and the suppliers. Because real time information sharing will result in avoiding unnecessary complexity in designing products, this will lead to cost reduction and value creation. This is something which every company is looking for and striving to achieve. This suggests that collaborative design of products and information sharing can shorten the life cycle of products leveraging the ability of shorter time to market. Companies can introduce innovative design and features to the market, which can be deemed a great strategy in controlling the marketplace, so when the market is in your hand, the company can increase its productivity and profitability leading to increasing in profit margins. On the other hand, e-procurement will improve the performance of the supply chain resulting in contributing to more and greater value creation in terms of tangible benefits and intangible benefits. Tangible benefits like costs reduction and intangible benefits like capacity utilization. It is true that process integration in the supply chain is very essential since integration of processes will result in shortening the time and reducing the costs of designing and developing products together with partner enterprises on the strategic level. In this case organizations should make sure that their e-procurement systems are

compatible with the systems that suppliers operate because systems integration is highly required for the success of the e-procurement in order to deliver value. Integrating the supply chain activities enhance the quality of a product and improve the performance of the customer service as well.

Value creation perspective through cost reduction is fundamental in improving and enhancing the performance of the supply chain, so performance of the supply chain is increased as a consequence of better inventory management and partner relationships. This will have a strong impact on reducing more costs and creating value. Proper utilization of information technology enabled resources can create greater value for the organizations and one way of improving the performance is devising joint learning strategy that concentrates on collaboration and mutual competency creation. This information sharing and collaborative partnership can reduce operational processing costs through minimizing transactional costs leading to enhancing and controlling the supply chain. This point is of extreme importance that using information technology for innovation is the major factor for outsourcing, so outsourcing can perform better and give better result with the proper utilization of information technology. So information technology based resources can pave the way for organizations to extract more value and achieve more benefits. Transparency and accountability in the procurement process using e-procurement can limit maverick purchasing which contributes plenty of benefits to both the company and the suppliers.

E-procurement can bear plenty of cost reducing benefits, one of which can be automation of creating requisitions that can produce the most cost saving impact. Through e-procurement new suppliers can be found very easily which has cost saving effect. Reducing sourcing cycle time and shrinking time to market lead to decreasing inventory resulting in reducing storage related costs. In addition, e-procurement will help companies significantly reduce costs when purchasing items for maintenance, repair and operating resources. Reduction of administrative costs is considered another great benefit of implementing e-procurement. To cut a long story short, we can dare say that there are lot of other benefits in terms of cost reduction and value creation when using e-procurement and most of those benefits can be based on the perception of the supply chain and procurement managers.

In the long run, as far as our findings are concerned, the results of our literature review are mostly based on the articles written in the USA, UK. And of course, we have decided to base our results and findings on recent articles, which mean that the results of our thesis are based on the articles written in recent years, like 2008 to 2013. We went through two phases when writing our thesis work. In the first phase, we built the conceptual framework for the thesis report and in the second phase, the results of the literature review was categorized in a way which could clearly illustrate which articles answer research questions one and which articles provide answers to the research question two.

## **6. Conclusions**

Supply chain management has been facilitated greatly by information technology during the last two decades. E-commerce has gone through three different phases (EDI, VAN, and Internet). All is an effort to achieve a competitive edge to compete in an ever changing market. Our literature review unveils that e-procurement solutions have improved the performance of supply chain management in terms of value creation, efficiency and transparency allowing companies to simplify their procurement processes and reduce their overheads and costs associated with purchasing process.

### **6.1 What are the reasons for adopting and implementing e-procurement systems?**

Prior to emergence and origination of e-procurement, organizations used to spend too much on their supply chain management, so e-procurement has significantly changed this attitude supporting the whole process of supply chain ranging from reducing the procurement overheads to value creation and overall efficiency and effectiveness. The necessity or significance of adopting e-procurement is tremendously high since adoption of e-procurement will result in reduced administrative costs, price reduction, shorter process cycle times, enhanced contract compliance, boosted inventory management, minimized operation and inventory costs, improved decision making, reduced negotiation unit costs, enhanced market intelligence, easy sourcing of products, services or suppliers from the ideal place for the reasonable or lowest possible price and etc. E-procurement can also help improve visibility of customer demands, enhance visibility of supply chain capacity and increase accuracy of the production capacity.

Some disadvantages of traditional procurement process, such as complex error prone purchasing processes, administrative costs, expensive human resources etc can be avoided with adopting e-procurement systems and methods. Moreover, enterprises can achieve the benefit of performing easily most of the sourcing activities, rapid flow of data between suppliers and purchasers in addition to increasing the transparency and enhancing cycle time of the over-all process. E-procurement allows on time interaction and communication between all sourcing project resources and knowledge and suggestion sharing from the previous participants of sourcing project. Therefore, we can simply say that e-procurement creates improved process transparency, efficiency and compliance.

In addition, any organization can attain numerous benefits and advantages through the proper utilization of e-procurement, for instance, transactional benefits, compliance benefits, management information benefits, price benefits, payment benefits and so on. It is merit mentioning that such benefits will definitely contribute hugely in improving profitability, productivity and efficiency.

### **6.2 How does e-procurement reduce cost and create value in the supply chain?**

E-procurement increases efficiency in the supply chain process through time management which means the accomplishment of the needed order in time not too early and not too late. This can help avoiding inventory storage and costs associated with it and also prevent from affecting production process in case of too late delivery. Since the processes of placing an

order will be carried out online together with the transactional negotiations, this will for sure result in reducing procurement overheads and proper inventory management throughout the supply chain. Moreover, e-procurement can contribute to increasing control over the supply chain, managing pro-actively key procurement data, and making higher quality purchasing decisions within a company, which enhances effectiveness and creates value not only for an organization but for the suppliers as well in the entire supply chain networks. And also through market intelligence which is provided by e-procurement, companies can significantly achieve the benefit of supplier selection and transaction from the comfort of their desks.

In fact, business to business e-commerce has dramatically changed purchasing behavior of both private and public organizations allowing them to adapt their strategic thinking in order to reduce costs, quicken turnaround times, track orders on real time, minimize inventory level using JIT, improve transparency, forecast and anticipate upcoming demands better, upgrade systems on the regular basis and make a perfect plan for maintenance and services.

Previous studies have proved that the correct adoption of e-procurement can yield substantial benefits of direct and indirect nature. E-procurement saved millions of dollars for firms who adopted it properly. Obviously, e-procurement, like all other methods and solutions, comes with its streamlined efficiencies and potential challenges. Any un-analytical adoption may result in a devastating loss because these solutions cost millions. E-procurement participates in modern intelligent procurement in gaining a strong strategic profile for the procurement in supply chain management. The cost saving role of e-procurement is the most prominent trait that gains it the attention of any forward thinking supply chain manager.

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