E-Procurement: Non-Production Purchase
An Industry Analysis & an Implementation Plan

by

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B.S., Electrical Engineering, Concentration in Electronics (1988)

Submitted to the Alfred P. Sloan School of Management and the School of Engineering
in Partial Fulfillment of the Requirements for the Degree of

Master of Science in Management of Technology

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Signature of Author:
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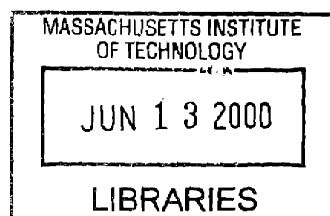MIT Alfred P. Sloan School of Management
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ABSTRACT

My thesis covers the electronic procurement currently existing, mainly the non-production purchase part of it. Since all companies make non-production purchase, this thesis reaches different sectors of the industry. Non-production procurement includes maintenance, repair, and operation, common called MRO, as well as service and outsource purchase.

This work is also recommended for those who are interested in a general e-procurement, in an integrated supply-chain management over the Internet, in a Just in Time application, in a vertical and virtual integration, and in a business-to-business e-commerce application.

My main goal is to help those who are interested in using e-procurement understand what the industry is doing, what kind of technology is available, and provide a model for implementation. In order to achieve those goals this work is divided into two main parts: **An Industry Analysis and an Implementation Plan.**

The industry analysis covers the three major software providers in the actual US market: Ariba, Commerce One, and Oracle. The work is illustrated with a case study in order to provide a better understanding of the benefits and challenges faced by those who are deploying e-procurement.

The implementation plan focuses on a strategy to be followed in order to install e-procurement in the service industry. A Brazilian bank, Itau, is used as an example to develop the plan, since Itau is a large corporation with national presence in South America.

Thesis Supervisor: Prof. Henry Birdseye Weil
Title: Senior Lecturer

DEDICATION

To my beloved wife and son, Renata and Rodrigo, for their patience with my absence as husband and father in order to accomplish my master degree, where this thesis was the last milestone on this way.

To my parents for the opportunity of life and access to education that made part of this accomplishment possible.

To all my professors that during my life helped me with my intellectual and maturity growth. Especially to my master, Dr. Celso, that opened my eyes and mind to a better understanding of the reason of my life.

ACKNOWLEDGMENTS

Many people helped me to accomplish this thesis, and consequently my graduation. This thesis was the last milestone in a long process that started three years ago. The recession and problems that my country has been facing made me go after better alternatives for my personal development. My main goal was to get a master from a well-known international institute, such as MIT. Frankly speaking, MIT was a dream and an almost impossible goal to be reached.

I knew that I couldn't afford this personal project without a sponsorship. So, my first and most difficult step was to convince the company that I work for to pay for my studies. My direct boss, Luiz Antonio, and my director, Jaime, believed in my potential and convinced the organization to invest in my training. I am thankful for Itau's attitude in sponsoring me here at MIT.

My advisor, Henry Weil, played the most important role in this thesis process. He helped me with deep insights, with patience and understanding of our culture differences. With few contacts, I could realize how knowledgeable he is not only in the service industry, but also in my own culture.

Throughout this year, I made some unforgettable friends in an amazing environment that is MIT. I am deeply thankful to my classmates for the opportunity that we, together, had in growing, learning, and sharing experiences.

The lasts, but not the least in importance are David Weber and Jennifer Mapes, the MOT Director and his Director Assistant. They managed us with a skillful mastery. Knowing that we, MOTs, are grown up children that weren't used to being students anymore, they put us in our new reality and helped to smooth the entire process.

CONTENTS

INTRODUCTION

Enterprise Resource Planing (ERP) system is a powerful tool to integrate different departments within the same company. This kind of system has been used in global companies and started in the manufacturing industry. Also popular in the chemical industry, ERP systems have a module that covers basically the production part of procurement. The most popular ERP is SAP, which has a production procurement module based on EDI.

EDI is a protocol used, primarily by the car and food industries, for production procurement. EDI is costly and complex, thus the required investment in this technology is only affordable by large companies. The cost effectiveness of EDI is reached with large amounts of purchasing from large suppliers that can afford high investment costs. Some experts believe that EDI's days are numbered[1].

The Internet is now changing the format of procurement. The cost to integrate the buyer and supplier is now much cheaper. The software and infrastructure required to link the supplier and buyer with different systems over the Internet, is now affordable. Virtually any supplier can provide services through the Internet, using just a modem and an Internet Service Provider (ISP).

The necessity to be locked with a few suppliers will end. The Internet will reach more suppliers, and even small ones will be able to compete. The same environment for raw material and office supply purchases can be established, with a broadened perspective that can include not only purchasing but also service.

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[1] Corporate Finance # 177, 21-22 Aug. 1999 - E-procurement can save your time and money, by Jonathan Turton.

Introduction

There is a strong tendency to migrate existing services to an Internet platform and to transform the industry using models and tools applicable to an Internet environment.

Despite the retail segment being more commented on currently, business to business is the most promissory one. Forrester Research forecasted, in 1999, a hyper-growth from $4.3 billion in 1998 to $ 1.3 trillion in 2003, compared with $ 8 billion to $108 billion forecast for business to consumer over the same period[2].

The US is the major country driving this change in business to business e-commerce. Forrester forecast UK and Germany to achieve the same stage of America's growth two years later. The same growth is expected to reach Japan, France, and Italy four years after America's growth. Similar to countries that will achieve hyper-growth in different periods of time, industry segments will also achieve it in different phases. Computer and electronics are two segments that are advanced in their investment in business to business e-commerce. A large portion of the business to business segment is in the electronic procurement area. It is more natural that companies start changing existing systems into Internet based ones.

Considering that the market is not mature yet, those segment and countries that are behind can learn using the mistakes and successes achieved by the leaders. This information can be used to forecast the possible problems that they will face in implementing their e-procurement. The belief in this statement made me use US market as a guide to forecast new opportunities to my country, Brazil.

Procurement can be divided in two large groups: production and non-production. This work focus on the non-production purchase, this type of e-procurement can be implemented in any kind of industry. Companies from the service industry have all their

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[2] Business and the Internet - source: The Economist June 26th 1999

procurement made in the non-productive sector. In spite of being less representative, indirect procurement account for 30 - 60 % of the total spending of an production organization, in US this is a $ 400 bill market[3].

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[3] Source: Profit - The Oracle Application Magazine, Volume 4 - Number 2, May 1999

PART - I

INDUSTRY ANALYSIS

INDUSTRY ANALYSIS

INTRODUCTION

This part covers the major service providers in the software industry for e-procurement. I will present here not only an analysis of each software provider, but also a case study. Case studies are good examples to analyze practices that are being used, what kind of returns we can expect from e-procurement systems, and learn with others experiences in order to avoid the same mistakes made by first movers. This section's goal is to have an idea of what kind of tools exist in the market in order to select the best partner, Service Provider, and then apply the concepts covered in this part of the work to develop a plan in order to implant e-procurement in a large corporation.

BUSINESS APPLICATION MARKET

One of the most important parts of e-procurement over an Internet platform is the software part; the other one is the business model to be followed. The market for specialized applications contains few suppliers. The most important ones are Ariba, Commerce One, and Oracle. There are other suppliers with few market shares such as those listed in Table-1, but they won't be covered in this work.

This market developed mainly because the traditional ERP systems couldn't provide e-procurement over the Internet as a fast solution to the growing Internet market. Small companies, playing in the business-to-business segment, made their first move towards an e-procurement over the Internet. Moreover, today there is a pressure to integrate those new e-procurement systems with existent ERPs. ERPs are basically represented by SAP, J.D. Edwards, PeopleSoft, Oracle and Baan. Oracle is the only company that is playing on both sides, see Table - 1.

E-Procurement Systems Over an Internet Platform	ERP Systems
Ariba	
Commerce One	J.D. Edwards
Oracle	Baan
Clarus	Oracle
Tradex	SAP
Intelisys	PeopleSoft
Connect	
Actra	
Concur	
Elcom	
Agentics	

Table - 1[4]

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[4] Source: A.T. Kearney Research, Assessment on Excellence in Procurement, February 1999

Forrester Research predict that " US business apps licenses will growth from $ 8.5 billion in 1998 to $ 20.8 billion in 2003, a CAGR of 19.5%"[5], those numbers represent just the revenue with licenses and not with consulting hours, meaning that the market is much larger than it seems. Forrester segments the market in eight categories indicating examples of companies in each category, see Table - 2 below:

Package Applications		
Segment	Description	Example of Companies
Finance and Accounting	Including general ledger, accounts receivable, and accounts payable.	J. D. Edwards, Oracle, PeopleSoft, SAP, SSA
Human Resources	Including payroll, benefits, and skills and training management.	J. D. Edwards, Lawson, Oracle, PeopleSoft, SAP
Customer Management	Including sales force automation, marketing, and customer service.	Clarify, Oracle, PeopleSoft, Siebel, Vantive, SAP
Manufacturing and Logistics	Including factory automation, warehouse management, and logistic execution.	Aspen Technology, EXE, IMI, USDATA, Wonderware
Supply Chain Planning	Including creation of plans to match supply and demand throughout the supply chain.	i2, Manugistic, PeopleSoft, SynQuest
Product Development	Including applications that manage component specifications and development plans.	Aspect Development, Parametric Technologies
E-Commerce	Including applications for the selling and procurement processes	Ariba, Commerce One, Inter World, Open Market
Industry-Specific	Addressing the unique needs of industries like health care and insurance.	Cerner, McKesson HBOC, Medaphis, Policy Management Systems

Table - 2[5]

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[5] Source: Forrester Research - The Apps Market: 1998 - 2003, April 1999

As you can see, we are talking about just one category, "E-Commerce", of the entire business application market. However, e-commerce is the most commented segment currently existing.

Inside of the e-commerce segment, we have applications for a broad range of processes, such as: supply chain management, e-procurement, customer management, catalog content management, and so on.

Concluding, this work covers just one area of the business application market, e-procurement, which is classified as one of the e-commerce applications available today.

E-MARKETPLACES

1. INTRODUCTION

Another interesting market niche is the e-catalog content. In order to make the e-procurement systems work, it is necessary to have suppliers providing their products and keeping their price list updated. This necessity made first movers, such as General Electric (GE), develop their own e-marketplace[6]. However, such effort involves extra costs to maintain this e-catalog, to update and to run it with the buyer's resources, software, hardware, people, and money.

The difficulty in managing the e-catalogs made the software providers partner with third party companies that could create an electronic market; where buyers and sellers can make their transactions freely. The catalog management companies are partners of the software suppliers, such as TPN Register and Requisite Technology that are linked with Oracle. The software providers may have their own catalog management market to provide service for their clients, such as Ariba and Commerce One.

The potential of catalog management can make a difference in the market for the e-procurement software providers who are trying to improve their solutions. The more options the buyers have from the management catalog companies with well know brands, the better solutions the software providers can offer to their customers. This will make their solutions more attractive.

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[6] GE's TPN: Business Buying and Selling via the Web – June 24, 1999

Forrester Research predicts that e-marketplaces will account for 53% of the $2.7 trillion of B2B e-commerce in 2004, meaning that e-marketplace will propel B2B e-commerce[7].

See Table - 3 of some catalog content management companies in the US market.

Catalog Content Management E-Marketplace
Aspect[8]
Requisite Technology[8]
Harbinger[8]
D&B[8]
TPN Register[8]
FreeMarkets (Production Materials)
Auto Xchange (Ford)
GM Trade Xchange
e-Steel
MetalSite
PlasticsNet.com
Yet2.com
Pl-x.com
Patentauction.com

Table - 3[8]

Electronic catalog content can be handled in two ways. First, some large companies are forcing their suppliers to provide services and to place bids in its own environment, usually over the buyer's Extranet, creating a Proprietary Market (PM). Second, a third-

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[7] Source: Forrester Report, E-Marketplace Boost B2B Trade, February 2000
[8] Part of the table was extracted from: A.T. Kearney Research, Assessment on Excellence in Procurement, February 1999

part company is responsible to keep the market running, forming a Third Part

Administrated Market (TPA-Market) functioning as an intermediary.

2. PROPRIETARY MARKETS

Proprietary Markets (PM) are sustainable only by large corporations. In order to create new markets, some companies are supporting the development of PM and are forcing their suppliers to join them, using buyers' IT infrastructure to do so. For large corporations that already have a good IT infrastructure, and Internet experience, market creation requires basically software and resources.

Companies can have problems with PM management. Not only because of the amount of money involved, but also because of the quality of the procurement personnel required. The new procurement expert needs to be IT knowledgeable.

Recently, Ford partnered with Oracle to create AutoXchage, an automotive electronic marketplace. Ford will force its 30,000 production suppliers to join its e-marketplace, meaning that at least $80 million will go though it since Ford expend that amount annually with its production purchase. Ford intends to also open the market for other car manufactures, targeting the $ 300 billion automotive supply chain market. GM is not behind, since it is partnering with Commerce One to create its own automotive e-marketplace, GM TradeXchange[9].

Proprietary Markets are inefficient due to the fact that the number of buyers and suppliers could be limited. Even with Ford's effort, it will be difficult to attract car manufactures to AutoXchange. PM can have more than one company in the buyer side but probably they will belong to the same corporation, moreover only one buyer will support the entire operational cost. On the other hand, this kind of market increases security because

[9] Source: Information Week Online - Exchanges Get Into Gear, November 8, 1999

usually the environment is created in the buyers' Extranet. On the supply side, PM will increase suppliers' tasks if they need to keep updated lists in every PM that they operate.

3. THIRD PART ADMINISTRATED MARKETS

There are some Third Part Administrated Markets (TPA-Market). The number of supplier and buyers are greater than that in Proprietary Markets (PM), which cause the TPA model to be more efficient because it stimulate competition among greater number of supplier. On the supply side, TPA-Market increases attractiveness due to larger number of potential clients.

One revenue model for TPA -Market is charging buyers an annual fee to use the system. So, TPA would be free for suppliers for instance TPN - Register. Another revenue model is the administrator can charge a transactional fee, Ford will implement such model. However, in both models the administrator should qualify its suppliers in order to guarantee a certain required level of quality, and this act increases administrative cost.

GE has a good example of e-procurement. Using an Internet platform GE started both types of markets. GE first started creating an electronic market where GE forced its suppliers to use its own system (PM). GE developed an electronic procurement system that grew quickly. Foreseeing many advantages to having more suppliers and buyers in the market, GE spun off the system to a third part administrator, creating a TPA - Market[10].

TPN-Register is a new virtual marketplace developed by GE and maintained by an autonomous administrator. TPN-Register is a good example of TPA-Market implementation. This new market has the advantage of reducing transactional cost and final price. In my opinion, TPA or PM markets are a natural evolution of some existing systems, as I said before, EDI is a typical example. EDI is an electronic purchasing process based on a proprietary protocol. TPA or PM is cheaper and with a newer

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[10] GE's TPN: Business Buying and Selling via the Web – June 24, 1999

technology based on an open architecture. As it uses an Internet platform, it can reach smaller suppliers; virtually any one can become a supplier in this kind of environment. However, the technology has pros and cons in both supplier and buyer sides.

4. JOINING E-MARKETPLACES

Usually companies have two sides regarding procurement, they can act as a supplier and as a buyer. Joining e-markets as a supplier involves changes in how companies market and sell goods to their customers. Joining e-markets as a buyer involves changes in how companies find suppliers and purchase goods from them. Companies will have the option to do either one or the other, or both.

A good model to be followed is the one adopted by Meta Group Inc, a research consulting company in IT and e-commerce. Meta Group advices its clients to implant different systems for procurement if they are playing as a buyer and seller over the net. This is a good idea because you need to see buy and sell sides as different business units. Joining them in order to save cost will kill important features. See their graphics below of the different applications required for each side, Figure - 1 and Figure - 2.

Figure - 1 Sell-Side[11].

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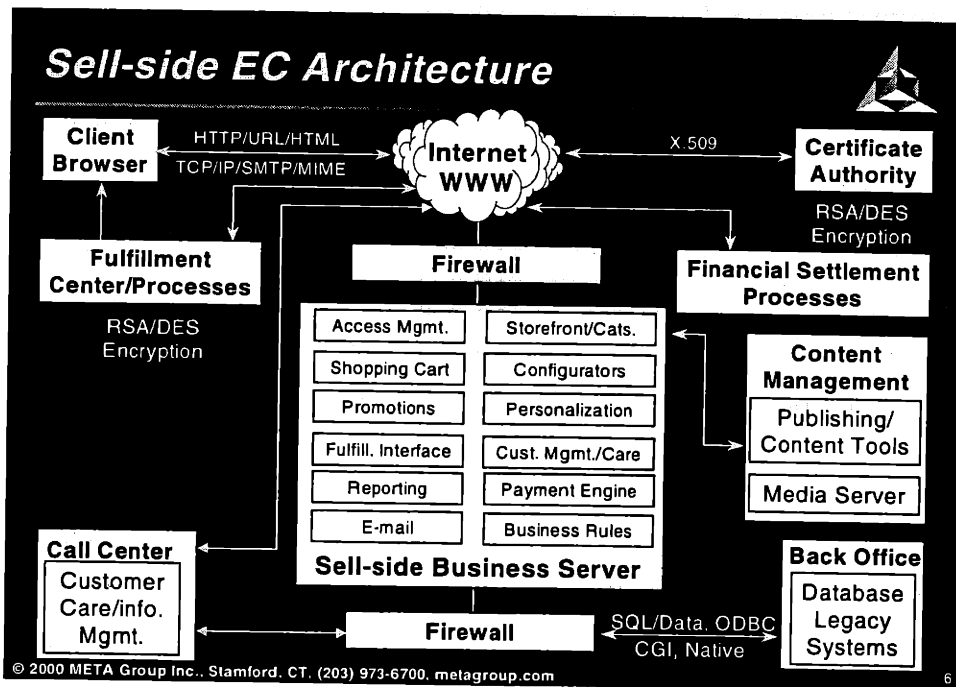
[11] Source: © 2000 Meta Group Inc, slide extracted from Mr Carl Lehmann presentation in 02/25/00 and posted in 15.568 - Management Information System course web page at MIT.

Figure - 2 Buy-Side[12].

Buy-side Architecture
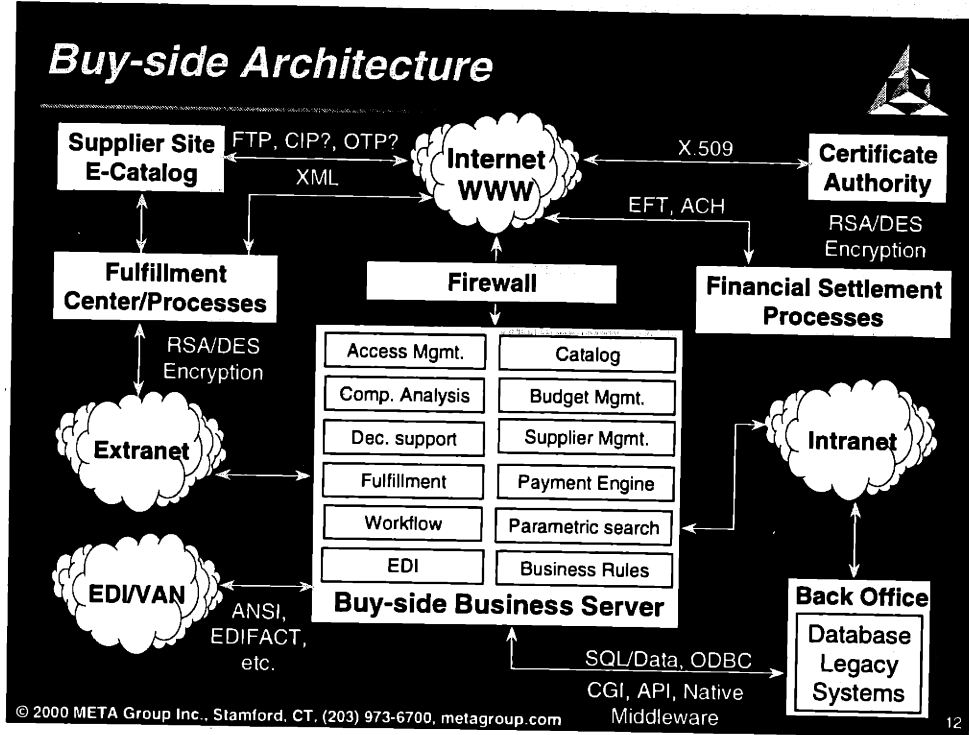
If a company's strategy is to differentiate its products and services, and to deal direct with customers and consumers, this kind of strategy is not aligned with e-market appeal. In an e-market environment, the differentiation is undermined and supplanted by a predominant price competition. In this early stage that e-market business model is not well developed. For instance, United Technologies has achieved an amazing 43% reduction in one of its bidding using e-procurement, compared to the average 5-10% reduction of the traditional bidding[13].

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[12] Source: © 2000 Meta Group Inc, slide extracted from Mr Carl Lehmann presentation in 02/25/00 and posted in 15.568 - Management Information System course web page at MIT.
[13] Source: Fortune, The Auction Economy by Shawn Tully, March 20, 2000

The appeal to use e-market as a buyer is very high for every company. Moreover, for those companies that have been using EDI. The basic infrastructure for this migration, and the way of working in an automated environment are already in place. So, for those that have been using EDI the migration will save costs for both buyers and suppliers.

Buyers should take some precautions. They should know if their suppliers will change, or if there are other suppliers in the e-marketplace that can sell the same kind of products. If there isn't any supplier for the same material, probably the existing ones will not agree to change. This is because they are locked in a more expensive platform, EDI, which from the point of the supplier enables them restrict competition. This statement is related to production procurement, since non-production procurement is not common over EDI protocol.

Those companies that already use web sites to sell their products will probably have less restriction from the supplier side to join an e-marketplace. This is because they are using a web base platform already, and sometimes there is no fee for supplier to join an e-marketplace. The fee is just for the buyer, at least in the TPN-Register example. Moreover, as suppliers have been working with electronic catalogs in the Internet, they are more familiar with the skills and tools required for catalog management over the Net.

For those companies that have being using just phone-fax-mail as a tool for its procurement department, the migration to an e-marketplace will require an investment in business process reeducation, and in setting up the system. This fact is not critical for most companies that have a good IT infrastructure to support migration. The cost reduction will be grater than that achievable by companies that already have some automation, such as legacy and ERP systems.

Worldwide corporations usually have different systems and procedures, regarding procurement. Sometimes, even local procurement areas, in different factories of the same

corporation, adopt different procedures and different suppliers. Companies can use the adoption of an e-procurement to enforce consolidation in the way that their subsidiaries make their purchasing. It will probably be helpful for large corporations to have a common procedure in all divisions, not only for direct materials, but also for non-direct ones such as office supplies.

The perspective of evolution and investments in business to business e-commerce is amazing. During a presentation at Sloan, Intel's VP told the audience that his company spent $20 millions last year with Internet solutions. E-Procurement in an Internet platform is a brand new product, and will definitively count with the largest share of the business to business e-commerce pie.

Two business models exist today, regarding e-marketplaces, Third Part Administrated Market and Private Market. There are some variations in the bidding process as well, such as Dutch, English, Japanese, Open, and Sealed bidding approaches. This is an emerging market trying to establish new models. The first movers will support the costs for evolution and for creating new business models. The current phase is trying to establish a "dominant design"[14] for this industry. Some new players, such as Ariba and Commerce One, are locking big customers into their own systems trying to achieve the first move advantage.

I agree with Forrester Research when they say that e-marketplaces have great potential and will drive B2B e-commerce[15]. Just to give an example of this potential, Ariba bought Tradex for $ 1.86 billion, a small software company specialist in building digital marketplaces[16].

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[14] Mastering the Dynamics of Innovation, James M. Utterback
[15] Source: Forrester Report, E-Marketplace Boost B2B Trade, February 2000
[16] Source: Forrester Brief, Ariba Plays Catch-up with Tradex Acquisition, December 16,1999

Another example is the auto industry that doesn't want to give away part of this cost reduction attainability to the solution software providers. For example GM, Chrysler, and Ford intend to make their own e-marketplace, it can be together or not. This is a indication that some leaders in their industry segment can join each other in common e-marketplaces divided by industry. This is a trend that will continue to grow in the future.

The initial cost advantage for e-procurement will be achieved not only by leveraging contracts with suppliers, using strategic procurement, but also reducing transactional costs. However, e-procurement over the Internet will open more doors than just the ones that reduce costs, the space for automation, for time reducing, and for performance improvements is tremendous.

ORACLE

1. INTRODUCTION

Oracle has an ERP system (Enterprise Resource Planing) as well as a procurement system called Oracle Strategy Procurement (OSP)[17]. OSP can be linked with Oracle's ERP or with other ERP systems, including SAP R3.

In the perspective of global companies, Oracle can be a good option since it has a strong international presence compared with its major competitors. I see the necessity for any e-procurement system to be able to integrate with existing ERPs. As a large corporation usually has an ERP, and SAP is the leading in this area, the ability to integrate with SAP is a competitive advantage for those that can do so. Of course, there will be a tendency to integrate ERP systems with any kind of e-procurement systems.

Oracle has a broad variety of solutions to e-procurement, from software to services including consulting. See Table - 4 of products below:

Oracle Products and Implementation Tools For Internet Procurement Solution	
Oracle Database Oracle Application Server Oracle Purchasing Oracle Self-Service Purchasing Oracle Web Supplier Oracle Supplier Scheduling Oracle Workflow	Oracle EDI Gateway Oracle Payables Purchasing Intelligence Oracle Purchasing Connect for TPN Register Requisite Technology Catalog Title Subscriptions

Table - 4[18]

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[17] Source: Aberdeen Group - Strategic Procurement: The next wave of Automation, July 1999
[18] Source: Oracle web page - Oracle Internet Procurement Consulting
www.oracle.com/appliations/internetprocurement/procurement_consulting.html

As you can see, Oracle has a comprehensive line of products for e-commerce, including business-to-business e-procurement. Oracle's advantages come from their strong presence in the software market for Internet. From a data base management company to everything that you need to use in an Internet environment, Oracle has transformed itself in the second largest software company in the world, after Microsoft.

2. ORACLE SERVICES

Regarding e-procurement, there are basically two kinds of services provided by Oracle. First, a business-to-business online marketplace called Oracle Exchange. This electronic market is a place where companies can buy business goods and services from each other over Oracle's secure marketplace. Second, a consulting group provides a broad line of Internet procurement solutions from fixed scope functionality to customized solutions that delivers the maximum value to clients.

2.1. ORACLE EXCHANGE[19]

Oracle Exchange is an online marketplace with a group of suppliers and services providers that are integrated through Oracle Procurement applications. The network supplier list has more than 260 companies, including Ford's Auto-Xchange marketplace.

Auto-Xchange is forecasted to be the largest marketplace, mainly for buyers and seller in the automobile industry. Ford plans to conduct transactions with 30,000 production suppliers, meaning $ 80 billion annually, and it also plans to put the entire automotive market in the Auto-Xchange, which is $300 billion market[20]. Ford's partnership with Oracle in the electronic marketplace has marked a change in Oracle strategy, because Oracle is going in the same direction as Commerce One, providing services. Probably the future of the market will go in that direction, because Ariba is also trying to steer itself towards this business model, which is to provide services through electronic marketplaces.

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[19] Oracle Magazine Volume XIII / Number 6 - November/December 1999 "Product News - Oracle Exchange" pg. 28
[20] Source: Information Week Online - Exchanges Get Into Gear, November 8, 1999

The key services of Oracle Exchange are listed below (this information was extracted from the Oracle Exchange Web Page[21]):

Catalog Hosting services: "Allows suppliers to edit, review and publish their catalog content to the Exchange hosted catalog."

Spot Purchasing: "Allows buyers to search the Exchange hosted catalog and compare the goods and service offered by multiple suppliers". It also works as cart purchase web site, such as Amazon, where you can select the item and put it into your cart paying for it when you check out. Suppliers are automatically notified when this happens.

Buyer Auction: "Allows buyers to create and publish an auction for goods and services that they intend to purchase. Bids from multiple suppliers can then be compared to make an awarded decision. In this way, buyers can quickly identify new sources of supply and manage unexpected changes in demand".

Seller Auctions: "Allows sellers to create and publish an auction for goods or services that they intend to sell".

Transaction Delivery Service: "Allows buyers and suppliers to connect seamlessly to Oracle Exchange to send and receive purchasing transactions securely over the Internet."

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[21] http://www.oracleexchange.com/solutions/welcome.html

2.2. ORACLE CONSULTING INTERNET PROCUREMENT SOLUTIONS[22]

Oracle Consulting provides professional service to implement Internet Procurement solutions for production and non-production purchasing. Oracle experience will help companies to implant their systems faster making sure that it will integrate with other systems in the company such as existing ERPs. Oracle Consulting provide the following services (this information was extracted from Oracle's web page www.oracle.com/appliations/internetprocurement/procurement_consulting.html):

Prioritize Business Needs: Conduct Executive Workshops in order to evaluate business needs, to design organizational and technical processes in order to implement Internet Procurement.

Quantify Business Benefits: Conduct an economic analysis associated with implementing an Internet Procurement solution, calculating the return on investment (ROI).

Plan Internet Procurement Implementation: Evaluates the existing architecture to determine technical requirements.

Create a Rapid Prototype: The prototype is a powerful tool to be deployed before a broad installation takes place in order to test the system and gain a consensus.

Implement Internet Procurement Solution: Includes infrastructure implementation, operation training / support, and integration with existing systems.

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[22] Oracle Consulting is a service mark of © Oracle Corporation.

3. ORACLE APPLICATIONS

Last year, Aberdeen Group researched[23] and concluded that Oracle Strategic Procurement **(OSP)** is the best option for what they called "the next wave of Internet Procurement". The application covers both self-service production and non-production procurement, as well as, catalog management, sophisticated reporting and analysis, supporting for strategic sourcing activities, and support for supply chain management. The basic functions are described below:

Procurement Automation: OSP enable end-users to place requisitions from their PC using standard browsers, to root requisition to approval, to transform the requisition in order and to send them to suppliers through major communication protocols including EDI, XML, and OBI. Then OSP is able to accept advanced shipping notices (ASN) from suppliers to alert requisitioners or managers about the order status. The system also supports order receiving management through barcode scanner generating automatic payment.

Strategic Sourcing: OSP provides tools for analysis of the data-warehouse created by the system. Such tools provide fast manipulation and interpretation of large amount of data, which is a critical part of the strategic procurement.

Supply Chain Management: OSP provides tools required facilitating system-to-system and system-to-person communication across the supply chain.

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[23] Source: Aberdeen Group - Strategic Procurement: The next wave of Automation, July 1999

3.1. ORACLE INTERNET PROCUREMENT FOR MIDDLE MARKET FASTFORWARD PROCUREMENT[24]

Oracle extracted the core parts of its Strategic Purchasing Planing to create a package for small to middle market companies. FastForward Procurement is part of Oracle's FastForward packages for mid-size companies, which can include core financial, manufacturing, human resources, and Internet solutions.

Under the FastForward Internet solutions, FastForward Procurement empowers end-users to place requisitions of goods and services through a web-based interface. Items are found in an e-catalog provided by Requisite Technology. The complete cycle from placing a requisition, approving it, placing an order, checking the receivement, and paying is supported by FastForward procurement.

The total package includes the following items for the approximated cost of $237,000:

Oracle Application Module for up to 500 users: Oracle Self-Service Purchasing, Oracle Purchasing, Oracle Payables, Oracle Application Server - Enterprise Edition.
Requisite Technology: Two supplier subscriptions.
Implementation Services: Including 60 days of consulting.
Customer Support: One year of Oracle Support Services
Oracle Education: Four days of training.

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[24] Source: Aberdeen Group - Strategic Procurement: The next wave of Automation, July 1999

There is a possibility to expand the package including extra features and modules, but the ones described above are in the basic module.

ARIBA

1. INTRODUCTION

The Leader in application sales for e-procurement solutions, Ariba, has a good selection of products with the ability to link with ERP systems, including SAP R3. The US market has been using Ariba for e-procurement, for Application Software Provider (ASP), for auctions, and for creating, as well as, operating electronic marketplaces.

Regarding the e-marketplace, Ariba recently bought a $1.86 billion software company that develops e-marketplace software for market makers. This action took place after loosing the contracts for powering Ford's e-marketplace, AutoXchange, to Oracle, and GM's e-marketplace, GMXchange, to Commerce One[25]. Despite that purchase, Ariba already had products that create and operate electronic marketplaces, being the application for market makers Ariba's first goal.

Ariba primarily market is U.S., since its presence in other countries is made through partners that work as Ariba's agents. Unfortunately, I couldn't find further information about this issue.

Ariba's e-commerce solution is based on five different products: Ariba ORMS application, Ariba ORMX application, the Ariba Network platform, and two net market deployment solutions - Ariba Internet Business Exchange and Ariba Market Suite[26].

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[25] Source: Forrester Brief, Ariba Plays Catch-up with Tradex Acquisition, December 16,1999
[26] Source: Ariba's web page, Ariba Solutions Overview
http://www.ariba.com/corp/AribaSolutions/overview.asp

The Ariba ORMS Application - is an electronic procurement solution that enables buyers to get goods and services that they need to do their job. The application also provides content access, routing, approvals, and ERP integration.

The Ariba ORMX Application - is a version of the ORMS to be used by Application Software Provider (ASP).

The Ariba Network Platform - This is Ariba's e-marketplace, where buyers and suppliers can leverage their activities using an already made e-marketplace. This platform reduces barriers to entry for those companies that want to deploy quickly e-procurement solutions.

The Ariba Internet Business Exchange Service and *The Ariba Market Suite* - These tools are suited for market makers who want to implement an e-marketplace in order to link buyers and suppliers over the same web platform.

2. THE ARIBA MARKET SUITE[27]

The Ariba Market Suite was built to meet the requirements of business-to-business trading. It is a powerful tool for those who wants to create their own electronic marketplace where the administrator can hold auctions, trading, and exchanges. The Ariba Market Suite is basically made of three applications:

Ariba Auction - For markets with one seller and many buyers. Auction is a tool to be used for liquidating excess inventory, for allocating scarce resources, for selling perishable goods, or for performing price discovery in new markets.

Ariba Exchange - For bid/ask markets with multiple buyers and sellers. Ariba Exchange is suited for standardized goods and commodities, where multiple buyers and sellers compete for the same kind of products.

Ariba Reverse Auction - For markets with one buyer and many sellers. Reverse Auction should be used for services or custom-made goods, this is similar to "request for quotation" (RFQ).

See figure - 3 below representing the three possible types of trading with Ariba Market Suite.

A r i b a   M a r k e t   S u i t e

Figure - 3[27]

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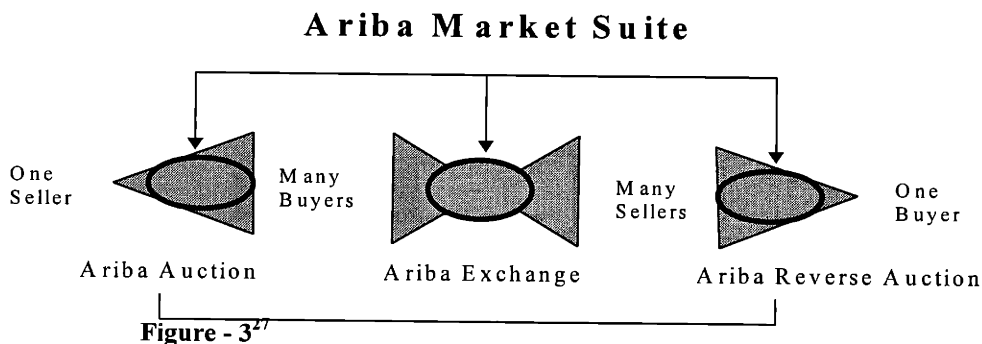
[27] Source: Ariba Market Suite Product Overview, © 2000 Ariba, Inc.

Ariba's solution to deploy business-to-business trading is based on the assumption that the three forms of trading, described above, cover the major requirements for business-to-business trading. Ariba implemented a broad set of parameters that can customize each of those applications for the specific needs of each customer. Ariba claims that these three applications were developed over high performance Java software components. They also claim that and much of the development of these components came from research done in the field of computer science and economics at Stanford University and the University of Michigan.

2.1. ARIBA AUCTION AND ARIBA REVERSE AUCTION

From a logic standpoint Auction and Reverse Auction are symmetric, so they can have the same operation and configuration. Then, the same market rules, market types, and business rules are applicable for both types, Auction and Reverse Auction.

There are four types of auctions that can be implemented for both single-winner (single-quantity/lot) or multiple-winner (divisible quantities) markets. Described below are the four possible types of auctions supported by Ariba Auction and Ariba Reverse Auction[28]. The description is directed related to Auction since the Reverse Auction is made by simply reversing the operation. (The descriptions below were extracted from **Ariba Market Suite Product Overview**[28])

English: "Participants bid up the price in an open outcry. In a single winner format the highest bidder wins the unit/lot. In the multi-winner format, bidders specify both price and quantity, and the list of winners is determined by allocating the total available quantity among the highest bidders."

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[28] Source: Ariba Market Suite Product Overview, © 2000 Ariba, Inc.

Dutch: "In a single winner format, the system initially offers the good at a very high price, and then reduces it at some constant rate. For example the bidding might start at $100, and the price might decrease by $10 every five minutes. The first bidder to jump in wins the auction. In a multiple-winner format, participants bid the quantity they desire at the current price, until no unit remains."

Japanese: "The system starts at a low price and all participants indicate whether they are willing to buy the good at this price. The system increases the price at some regular interval until only one bidder remains. In real-world form, bidders who indicate that they were still in at the current price by holding up their hand - the last hand up would win the auction. In a multi-winner format, bidders indicate the quantity they would like at the current price. As the price increases, quantity bids are decreased until the total quantity of all bids is less than or equal to the total quantity of goods available."

Sealed-bid: "Participants are given a single opportunity to bid on the good, and, in a single-winner format, the highest bidder wins, paying either the highest or second-highest price(configured as a market rule). In its multi-winner form, two kinds of bidding are supported: bidders specify the quantity they desire at a single price, or they submit a bid schedule by specifying a list of price/quantity bids (e.g. 'I'll take 10 units at $ 25 each, or 20 units at $ 15 each, or 30 at $10 each, etc.'), and the system's clearing algorithms optimize the allocation."

The four types of auctions above described can be tuned to meet particular needs of business-to-business trading situations. For instance, Dutch-style is suited for quick, scheduled action where everyone participates simultaneously. If the goal is to maximize price then sealed bid auction is the best option.

Ariba Market Suite permits that users configure twenty individual market parameters. These parameters are divided in six different groups, which are described below[29]:

Time & Repetition: " This determines when an auction starts and ends. Auctions can be specified to end after a fixed elapsed time, after a certain period of inactivity (no bidding), or at the earlier or later of some combination of the two. An auction can also be set to end whenever a certain price or price/quantity bid is reached."

Bidding Rules: "These parameters control bidding rules such as whether proxy bidding is allowed, whether bids can be withdrawn and/or replaced, whether quantity bids are divisible into smaller or partial bids, and whether bids can have expiration times. Minimum bid increments can also be set for price, and if applicable, quantity-either as an absolute minimum or as some percentage of the current price or quantity. Minimum bid increments can also be set so that they automatically become smaller as bid activity decreases, allowing the bid price to be finely tuned as the auction comes to an end."

Clearing Rules: " This group of parameters determines how the auction winners are determined and what price they pay. For example, multi-winner auctions can be configured such as each winner pays what they bid, or whether all bidders pay the same price. If they all pay the same price, the auction can be configured such as the price is the lowest successful bid, the highest unsuccessful bid (sometimes called second price), or some average of the two values. Parameters for settling ties can also be configured based on either the earlier bid or the larger quantity."

Permissions: "This specifies which users or groups of users are allowed (or not allowed) to participate in an auction."

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[29] Source: Ariba Market Suite Product Overview, © 2000 Ariba, Inc.

Information Disclosure: "Parameters can be set to control every aspect of information release for a market including: the identities of bidders and winners, the number of bids, the number of units, the time of the most recent bid, who has dropped out of a market, and how much is available for sale. In each case, information can be revealed to no one, everyone or individual participants or groups."

Market Flow: "These control options for Dutch and Japanese auctions, where prices are driven by the system. The starting price and quantity, and the rate at which the price changes is specified by these parameters."

2.2. ARIBA EXCHANGE

Ariba Exchange is suited for trading between multiple buyers and sellers for the same kind of goods. It is made for trading commodities in highly fragmented market, where there are many buyers posting RFQ for the same kind of products, and many sellers posting their bidding.

One common application of Ariba Exchange is production purchase where commodities like: chemicals, plastics, coal, lumber, or steel are openly traded over an e-marketplace.

Ariba Exchange is basically suited for two kinds of market[30]:

Continuously Clearing: Where buyers and sellers are continuously matched, as long as the market is open. This is compared to stock market where every time a bid is made a search for an opposite match is performed and if it is matched the transactional is cleared.

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[30] Source: Ariba Market Suite Product Overview, © 2000 Ariba, Inc.

Periodic Clearing or 'Call' Market: "In this kind of exchange, bids from buyers and sellers are aggregated over some predefined period of time, and then optimally matched at the end. In low liquidity markets a periodic clear can increase market efficiency by comparing and matching a larger number of buy and sell bids."

There are five groups where the Ariba Exchange application can also be tuned to match business needs, these parameters are described below[31]:

Timing & Repetition: "This determines what time an exchange starts and ends. It could be configured to run for certain hours of the day, or indefinitely. Like auctions, an exchange can be setup to run once or repeated at some specified intervals (every day, weak, etc.)"

Bidding Rules: "These parameters controls bidding rules such as whether bids can be withdrawn and/or replaced, if quantity bids are divisible into smaller or partial bids, and if bids can have expiration times. Quantity maximums for both buy and sell side bids can also be specified."

Clearing Rules: "This group of parameters determines how the exchange winers are determined and what price they pay. In a periodically clearing market there will be a range of prices that can clear a market, ranging from the highest buy bid to the lowest sell bid. Ariba Exchange includes a set of parameters to set where in this range the clearing price can fall-thus affecting whether the clearing price favors buyers or sellers, or somewhere in between."

Permission: "This specifies which users or groups of users are allowed to sell in this exchange, and which users or group of users are allowed to buy in this exchange. Using

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[31] Source: Ariba Market Suite Product Overview, © 2000 Ariba, Inc.

separate permissions for both sellers and buyers can help to discourage speculative, secondary markets: sell-side participation can be limited to only primary manufacturers, and buy-side markets can be limited to only non-manufacturers."

Information Disclosure: "Parameters can be set to control every aspects of information release for a market. The list of configurable parameters includes the identities of bidders and winners; the number of current buy bids; the number of current sell bids; the number of units available at both the current bid and ask price; and the time of the most recent bid. In each case, information can be revealed to no one, everyone or individual participants or groups"

2.3. WEB INTERFACES

The three applications of the Ariba Market Suite (Auction, Exchange and Reverse Auction) share a common set of four web interfaces: Trade, Designer, Operator, and Analyst[32].

The **Trader** interface is the window into the marketplace that the application provides for buyers and sellers in order to search for offerings, to make bids, and to close deals. The Trader interface provide the following features[33]:

Category-base Navigation - This feature, together with direct text search, optimizes users searching time.

Attribute-based Filtering - To narrow down users search basic in specific features.

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[32] Source: Ariba Market Suite Product Overview, © 2000 Ariba, Inc.
[33] Source: Ariba Market Suite User Interface,
http://www.ariba.com/corp/AribaSolutions/ariba_market_suite_ui.asp

Real Time Market Information - On-line and real-time information of price and bidding activity without the need of manually refreshing the screen.

Personalization Options - "Like my web page" feature, users can customize their view of the marketplace focusing in their activity.

E-mail and On-line Notification - This feature helps users to monitor their trading position without constantly coming back to check a specific change or auction.

Rich Product and Market Information - This is supposed to be common for all e-marketplaces. However, Ariba claims that its application provides a better tool to describe products and rules.

On-line Help - Teaches users how to use Ariba solutions.

The **Designer** interface is a tool for customizing auctions, reverse auctions, and exchanges for each specific situation. This is the interface where the administrator configures and sets the rules of the marketplace. The Designer interface has the following sets of features[34]:

Step-by-step Process - Ease the implementation because they lead the user through a series of questions that need to be answered in order to set the parameters and rules for each auction or exchange.

Reusable Templates - With this feature, a change in the type of market that will be running on the client site would only require a change in the template. Therefore, reprogramming the software is not needed.

Market Launch Capability - Enables users configure and launch specific auctions.

The **Analyst** interface provides reports of marketing activities and historical trends. This is a managerial tool that the administrator uses to better understand the market, and to

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[34] Source: Ariba Market Suite User Interface,
http://www.ariba.com/corp/AribaSolutions/ariba_market_suite_ui.asp

tune his work as manager. The common administrative tools are supported by this interface, where users can not only print the default reports, but also customize new ones.

The **Operator** is the interface for remote system administration, where the administrator starts and stops each marketplace, creates user groups, categorize products and so on. This is the interface from where the administrator operates the electronic market.

2.4. SUMMARY - ARIBA MARKET SUITE

The Ariba Market Suite is a perfect package to create and operate electronic marketplaces. The solution is composed by three applications: Ariba Auction, Ariba Reverse Auction, and Ariba Exchange. All of them can be customized and tailored for each specific business needs. In order to operate the Ariba Market Suite, Ariba has four common interfaces for those three applications: the Trader Interface, the Designer Interface, the Operator Interface, and the Analyst Interface.

Considering that more than 50% of the money value of B2B e-commerce will be in e-marketplace, Ariba is well positioned to support a company's desire in creating and operating its own electronic marketplace.

3. THE ARIBA ORMS APPLICATION[35]

The Ariba ORMS application provides solutions that enable organizations to manage not only procurement, but also, other business areas. Ariba ORM is composed of a series of applications such as Ariba Services, Ariba Capital Equipment, Ariba MRO (maintenance, repair, and operation), and Ariba Travel and Expense. They enable organizations to streamline their procurement processes, automating the requisitions and PO processes.

As a powerful tool, the ability to connect Ariba ORMS to Ariba Network enhance the users capabilities. It provides access to a variety of suppliers and services providers, thereby reducing the burdens for new entries. Ariba Network is the Ariba's e-marketplace. Any e-procurement software provider needs to have their software linked with some e-marketplace, this link is a must for the industry. For instance, Oracle works with three e-marketplaces, Oracle Exchange, TPN-Register, and Electronic Requisition. The more complete the marketplace is and more an e-procurement software provider offers, the more appealing the deployment is that it provides.

Ariba ORMS application has five main features[36]:

Intuitive User Interface - The Ariba wizard-based user interface enables less experienced users to go through the entire purchase process. It also, enables more experienced ones to customize the application in order to be more productive.
Flexible Business Modeling - The Ariba ORMS provides flexible business modeling that enables companies to adjust, change, and adapt its own approval flow for requisitions and process orders.

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[35] Source: Ariba ORMS Overview, http://www.ariba.com/corp/AribaSolutions/ariba_orms.asp
[36] Source: Ariba ORMS Features, http://www.ariba.com/corp/AribaSolutions/ariba_orms_features.asp

Enterprise Integration - This feature is also a mandatory one, for e-procurement software providers, because it enables Ariba to integrate with ERP and Human Resource Management Systems (such as J.D. Edwards, Oracle, People Soft, SAP, and others). The System is also able to integrate with e-mail and directory service systems.

Information Access - The reporting tools provide analysis resources to users, which is an important feature to evaluate expenditures and renegotiate contracts with suppliers based on historical purchase records.

E-commerce Integration - Through the Ariba Network, ORMS application enables users to immediately start transactions.

Ariba is also playing in the ASP arena. The Ariba ORMX[37] is the Ariba ORMS's version of Application Service Provider (ASP). It has the same scalability and subscription features, as well as, services. This is a solution for middle-size enterprises that want to reduce the up front IT investments.

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[37] Source: Ariba ORMX, http://www.ariba.com/corp/AribaSolutions/ariba_ormx.asp

3.1. SUMMARY - THE ARIBA ORMS APPLICATION

The Ariba ORMS application is a complete package to deploy e-procurement, it can be linked with other ERP and HRMS systems. The package contains applications that enable whole business solution. This solution automates the entire purchase process from requisition to payment, including service, MRO, capital equipment, and travel / expenses.

The user interface is simple and powerful, which provides a fast learning with high productivity. Considering that each employee will have the interface in its own PC, at least to place requisitions, the user-friendly interface speeds up the startup and reduces implementation cost.

The gate for e-marketplace, Ariba Network, enables users to streamline procurement since the beginning. Moreover, the flexibility that users have to design its workflow and automate the whole process, from place the requisition and orders to make payments, is one of the items that made Ariba the market leader.

Ariba ORMX is the ASP version for Ariba ORMS that enables small and middle size companies to use Ariba's solutions, reducing IT expenditure.

4. THE ARIBA NETWORK[38]

The Ariba Network is a marketplace where buyers, suppliers, value-added service providers, and Net market makers can find each other to make transactions over an opened, global, and distributed platform.

Ariba Network provides catalog content management, supplier directories, supplier catalog, secure transaction routing, and multi-protocol support. Moreover, Ariba Network provides services such as e-payment, logistic integration, and all kinds of dynamic prices (auction, reverse auction and exchange).

In order to provide scalability and easily implement, Ariba Network is based on several Internet commerce models, such as:

Indexing - A robust comprehensive search tool, Ariba Network index is a highly scalabilite approach for content management.

Multiple content models - Ariba's users have the option to approach supplier's catalog content by two ways: using Ariba's index or accessing direct suppliers web sites.

Multi-protocol support for transactions - Ariba Network is able to support multiple transaction standers, the so called protocols, such as: XML, EDI, cXML, VAN Based EDI, Open Buying in the Internet (OBI), secure HTML, e-mail, auto-fax, and Catalog Interchange Format (CIF). This flexibility allows buyers to perform transactions over the Net independent of the infrastructure used by suppliers.

Content Specialists - From Ariba Network platform, users can access content from others marketplaces, reaching a network of 10.1 million items from 84,700 suppliers.

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[38] Source: Ariba Network, http://www.ariba.com/corp/AribaSolutions/ariba_network.asp

4.1. THE ARIBA INTERNET BUSINESS EXCHANGE (IBX)[39]

The Ariba Internet Business Exchange (Ariba IBX) is part of Ariba Network, where companies and market makers can quickly create an e-marketplace over Ariba Network without having their own e-commerce infrastructure.

Ariba IBX is suited to small and middle size organizations. These organizations want to use e-procurement solution without having to invest in software, hardware, and management to create and maintain their own e-marketplace. A simple browse and a self-registration procedure enable users to construct their own Net market and to start procurement, this simple way of link gives access to what Ariba calls "the world largest e-commerce network"[39].

Ariba Internet Business Exchange service has the following features:

- *The Ariba Network Functionality* - IBX has the same functionality of the Ariba Network, using a common platform that enables access from suppliers' directories to dynamic pricing.

- *Browse Access* - IBX enables users to access its services from standard browsers.

- *User Self-registration* - Users can self-register and immediately start to make transactions. It is an easy process.

- *Reports* - IBX can provide reports of the transactions on batch basis.

- *Content Aggregation* - Users can make their own content aggregation generating a sub-set of the catalog content available.

- *Searching Tools* - IBX has an easy-to-use searching and sourcing tools available to its customers.

- *Approval Routing*- IBX has an e-mail-based approval routing feature.

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[39] Source: Ariba IBX, http://www.ariba.com/corp/AribaSolutions/ariba_ibx.asp

- ***Supplier Invitation*** - IBX enables buyers to invite new supplier to join the marketplace.

4.2. SUMMARY - THE ARIBA NETWORK & INTERNET BUSINESS EXCHANGE

The Ariba Network is an e-marketplace that integrate buyers, suppliers, value-added service providers, and Net market makers over a flexible, scalable, and open net work platform.

The Ariba Business Exchange is a service that provides small and mid-size companies the ability to create e-marketplaces over the Ariba Network, without the necessity of an up front investment in hardware, software and supplier management.

COMMERCE ONE

1. INTRODUCTION

Some experts usually say that Commerce One steered its direction from an e-procurement software provider to powering and operating e-marketplaces. Commerce One also says that they have the largest e-marketplace, which is sometimes accepted by the press[40].

Commerce One applications are based on two well-known technology, Oracle and Microsoft. Despite of the fact that it is using technology from its competitor, Commerce One has a strong solution, regarding global e-procurement application, among the three software providers covered by this thesis. A point needs to be made here: Based on the data and research made, I conclude that Commerce One has the best package, software & e-marketplace, for e-procurement in a service organization. This is not necessary true if we consider different needs based on company sizes, and local versus international market targets, further details will be covered in the Industry Analysis Conclusions.

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[40] Source: Information Week Online, New Market Makers - March 13,2000

2. BUYSITE 6.0[41]

Buysite 6.0 is Commerce One's e-procurement solution. The application can automate the entire cycle from requisition to payment, as well as provide access to global e-marketplaces. Therefore, Buysite 6.0 enables global companies to make their procurement using the same application in different parts of the world, including local taxation rules, different currencies, and multi-languages support.

With links to ERP systems and Commerce One marketplaces, Buysite 6.0 is the most complete application for e-procurement, at least compared with the other two applications from Ariba and Oracle.

2.1. ENABLING GLOBAL E-PROCUREMENT

The application, Buysite 6.0, was designed to be a global e-procurement solution for complex organizations, offering the following capabilities[41]:

- *Ease-to-use Graphic Interface* - This is a common and required feature for any web base application.
- *Link with a Global E-marketplace (Global Trading Web)* - BuySite real links itself with global e-marketplaces. Commerce One also says that this e-marketplace is the largest in the world[41].
- *Fast Deployable and Scalable Solution* - BuySite 6.0 enables fast implementation with a flexible modularity.

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[41] Source: Accelerating Global Electronic Procurement with Commerce One® Buysite 6.0™, 2000 Commerce One, Inc.

- *Flexible architecture* - BuySite is able to be adapted in any enterprise structure.

- *International System Support* - The system is able to support multiple languages, currencies, dates, number, address formats, and international tax requirements.

Buysite 6.0 provides a dynamic marketplace solution that supports auction, reverse auctions, and exchange. It, also, provides a link to the Global Trading Web (GTW), which is made by local marketplaces around the world. These marketplaces are linked together to form a global marketplace, including the following marketplaces[42]:

- *British Telecom MarketSite in UK.*

- *Singapore Telecom in Southeast Asia (SESAMi.net)*

- *Nippon Telephone and Telegraph in Japan (NTT MarketSite)*

- *Optus MarketSite in Australia-New Zealand region (Cable and Wireless Optus)*

- *Banacci MarketSite in Latin and South America.*

- *TD MarketSite in Canada (Toronto Dominion Bank)*

- *MarketSite in South Africa (eMediate Consortium)*

2.2. COMPREHENSIVE PROCUREMENT FUNCTIONALITY

BuySite is a comprehensive tool that automates the full cycle of procurement, from requisition to payment. It includes the following features[42]:

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[42] Source: Accelerating Global Electronic Procurement with Commerce One® Buysite 6.0™, 2000 Commerce One, Inc.

Global Link Management Program

The Global Link content program enables organizations to acquire goods and services, through content that is approved by the company to be purchased by employees. The content is available to users by three formats[43]:

1. "Managed content via buyer-managed, multi-supplier catalog", including the following features:
   - *"Catalogs resides in company's firewall",*
   - *"Restrict catalog access based on user's profiles such as commodity and supplier restrictions",*
   - *"Support for contract pricing, and time-sensitive pricing".*

2. "Request for ordering off-catalog of one-time purchases", with the following features:
   - *"Special request if item is not found",*
   - *"Specify supplier, description, and other details about desired item",*
   - *"Route to buyer for quick sourcing and PO creation".*

3. "RoundTrip services for ordering or configuring items from supplier website", including the following items:
   - *"Seamlessly link from BuySite to a catalog in the supplier's website",*
   - *"Bring selected items into BuySite for automatic addition to a requisition".*

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[43] Source: Accelerating Global Electronic Procurement with Commerce One® Buysite 6.0™, 2000 Commerce One, Inc.

Creation and Management of Requisitions

Easy to build, requisitions can be created from latest information on hand (price and quantity). Professional buyers can interact with requisitions made by employees in order to manage procurement (track, source, and redirect). Described below are some key features included in the requisition module[44]:

- *Real time connectivity* - The link between the supplier's inventory system and BuySite system enables users to check quantity availability and real-time prices.
- *Attachment feature* - Users can better express their ideas making use of attachments.
- *Tax calculation* - Each requisition is subject of taxation that varies from country to country, via TaxWare, BuySite enables global users see the total amount of each requisition.
- *Price Comparison* - BuySite has features to enable price comparison among similar products from different suppliers.
- *Requisition templates* - Requisition templates enable end-users create and save frequently used requisitions, such as new employee kits or standard computer desktops.
- *'Cart' and 'Checkout' Model* - Similar to Amazon checkout process, BuySite uses cart idea to process its checkout, which is also similar to most business to consumer e-commerce checkout process.
- *Ability to Cancel and Change Requisitions* - If users want to step back after sending a requisition, BuySite enables the cancellation of requisitions that have been submitted.

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[44] Source: Accelerating Global Electronic Procurement with Commerce One® Buysite 6.0™, 2000 Commerce One, Inc.

Approvals and Workflow

The application, BuySite 6.0 Enterprise Edition, has a robust workflow module to support internal approval process. It works in every kind of organization, from the simple to the most complex ones. The following key features are included[45]:

- *Workflow Triggers* - BuySite enables users set up "out-of-the-box" triggers to route requisitions and purchase orders, depending on spending limits, commodity types, cost centers, suppliers, and so on.

- **Serial or Parallel Routing Approval** - Each organization can work with either parallel or serial routing approval. Some flexibility to work with both is also supported by BuySite.

- *Graphic View* - BuySite enables approvers and requisitioners to graphically view their approval sequence.

- *Approvals* - BuySite has the ability to give approval delegation, as well as, to add 'on-the-fly' approvers.

- *E-mail Notification-* The ability to notify users, administrative personnel, and suppliers through e-mails is a well come feature supported by the system.

- *Reviewers* - BuySite has the ability to assign reviewers to requisitions, however reviewers can't approve requisitions if they don't have level to do so.

- *Approval Inbox Remove* - BuySite has the ability to automatically remove requisitions from the Inboxes if they have been canceled or rejected.

  Commerce One claims that BuySite 6.0 has the most robust workflow available for e-procurement application. Anyway, both Commerce One and Ariba seem to be strong in this particular item.

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[45] Source: Accelerating Global Electronic Procurement with Commerce One® Buysite 6.0™, 2000 Commerce One, Inc.

Purchase Order Creation[46]

After the approval process, purchase orders can be automatically routed to suppliers for fulfillment. POs can be submitted to suppliers electronically (e-mail or XML transaction) as well as conventionally by fax.

Status - BuySite provides users the ability to check status of their purchase orders in real-time, direct from suppliers. It, also, enables users to check the status of their requisitions in the approval workflow process.

Receiving - Users can receive goods and services at their desks, or at a centralized point, or dock, or mail room. The system can be configured to confirm the delivery at any point in order to provide information about supplier performance, and to enable strategic procurement.

Payment and Reconciliation - To complete the cycle, BuySite enables payment and reconciliation options. Users can choose among payment methods during the fulfillment of the PO (invoice, procurement card, etc.), then the payment is made through the Global Trading Web. The reconciliation feature assures that invoices from issuing banks or suppliers can be imported and automatically reconciled to the correspondent PO.

Reporting - One of the major benefits is that the purchasing data can be centralized for expenditure analysis and purchasing planning. It is used during the contract re-negotiations in order to leverage discounts based on historical records. So, BuySite has the ability to provide standards reports, as well as, customized ones.

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[46] Source: Accelerating Global Electronic Procurement with Commerce One® Buysite 6.0™, 2000 Commerce One, Inc.

2.3. MAPS TO ANY ORGANIZATION STRUCTURE[47]

Global enterprises usually have different e-procurement systems due to the need of different purchase habits, suppliers, catalogs, currencies, taxation, legacy systems, etc. Rolling out many disparate procurement systems involves a lot of effort and cost money. Commerce One has a clever solution to this problem. BuySite enables the configurations of multiple Buying Organizations and sub-organizations (subsidiaries), where each site can be a different organization. Each one has specific rules and workflow approvals, including the following entire unique set of attributes: suppliers, catalogs, workflow rules, accounts, cost centers, and integration to ERP or legacy systems.

2.4. SUPPORT FOR GLOBAL CAPABILITIES[47]

The feature of different Buy Organizations is fundamental to implement e-procurement in global enterprises. This ability, together with the support for different currencies and taxation, really puts Commerce One ahead of their competitors in solution for global enterprises. Described below are some of the global features provided by BuySite 6.0:

- *Multiple Languages* - BuySite 6.0 will provide support for 12 different languages by the end of 2000.

- *Multiple currency* - Buyers and suppliers can receive and generate orders and requisitions in any specific currency. This is a move towards breaking down global barriers since the supplier, the requisitioner, and the approver can be from different countries. So, each one (requisitioner, approver, and supplier) will see the prices in their own currency, which would make it more meaningful for them.

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[47] Source: Accelerating Global Electronic Procurement with Commerce One® Buysite 6.0™, 2000 Commerce One, Inc.

- *International Formats Support* - Users can see information in their local formats and standards. For instance, the application supports different dates, numbers, and addresses formats.

- *Support for International Tax Standards* - Different tax standards and cross country taxation can be a impediment in implementing global e-procurement. BuySite integrates with WORDLTAX, developed by Taxware, in order to comply with tax requirements such as sales tax, VAT, GST, and etc.

2.5. BUSINESS SERVICES THROUGH MARKETSITE[48]

MarketSite is Commerce One's marketplace, as well as, a link to other marketplaces around the world through the Global Trading Web. It is an open marketplace with entry in US, supporting a wide range of applications, including BuySite 6.0.

There are some features that can be extracted from the linked solution. Those include business-to-business auctions, request for quotation, exchanges, payment services, including credit card authorization and logistics.

Some direct services can be obtained from key partners, such as Sabre, for travel planning.

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[48] Source: Accelerating Global Electronic Procurement with Commerce One® Buysite 6.0™, 2000 Commerce One, Inc.

2.6. SUMMARY - COMMERCE ONE BUYSITE 6.0

With an integrate global solution, Commerce One has one of the best applications for deploying e-procurement in the world enterprises. BuySite 6.0 has not only a powerful workflow configuration, but also, supports multiple sites around the globe. It, even, is capable of configuring different languages, currencies, and taxation requirements.

Commerce One leverages its solution by linking BuySite with other ERP systems, as well as, with different marketplaces. MarketSite is Commerce One's e-marketplace and the entry to US market. Moreover, MarketSite is part of the Global Trading Web (GTW) that has local marketplaces in five regions of the globe: Asia, Australia, Americas (North and South), and Europe. The ability to integrate BuySite with these global links of e-marketplaces gives Commerce One a competitive advantage regarding global e-procurement.

BuySite 6.0 has a clever solution to customize different plants and subsidiaries in order to utilize a unique solution. This fact can save time and money for those who are deploying it.

XEROX CORPORATION[49] - CASE

1. INTRODUCTION

Xerox is a typical example of large corporation with a global presence. It is good to look at Xerox as a model to follow in order to implement e-procurement in large corporations with international presence. Xerox's innovative solution to link its international sites created a "global data warehouse". Each international site could feed its purchasing data into Oracle's application. This "global data warehouse" feature was late incorporated into Oracle's software. See Table - 5 about Xerox international sites.

Xerox Locations Supported by Non-Production E-Procurement
U.S Purchasing (2 sites)   Dutch Operating Company (Amstelveen Holland)   French Operating Company   Venray Holland Manufacturing   Brazil (Sao Paulo)   Canadian Operating Manufacturing *   Italian Operating Company *   Southern California Manufacturing *   Canada Manufacturing *   England Manufacturing (Mitcheldean) *   * Supposed to be operational by the end of 1999

Table - 5

Xerox is also a typical example for most companies that don't have ERP systems installed. With the majority of its procurement made manually or with little automation.

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[49] Oracle Laureates Case Study - Xerox Corporation: Non-Production Purchasing, April 5, 1999

This case focuses in the non-production purchasing part of Xerox organization, which is responsible for purchasing everything from paper clips to airplanes. As with most large corporations, Xerox spends billions of dollars annually in non-productive purchasing (about $ 6 billions)[50], including goods and services.

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[50] Oracle Laureates Case Study - Xerox Corporation: Non-Production Purchasing, April 5, 1999

2. BEFORE E-PROCUREMENT

Xerox procurement process was manual and fragmented. As stated in a Fortune article[51]: "Xerox corporation managers realized that they had more than 50 strategy systems, 100 planning systems, 100 different supplier acquisition systems, 50 building systems, 50 configure systems, 50 inventory systems and 150 material move systems". This is an amazing IT legacy, it was difficult to consolidate corporate expenditure in order to make purchase planing. This extreme situation is not different from what other global companies have been facing. This is a good reason to have an ERP system with an well-implemented procurement module. It would be a good practice if companies could have their non-productive procurement systems as part of their ERPs, or integrated with them.

Another major problem with Xerox's old non-production procurement was that 70 % of the expenses, which accounted for 90% of the transactions, were made outside the traditional process. This outside process was a "maverick", since it was usually made by non-credential contractors and it didn't keep transactional records. So, company's purchasing personal couldn't leverage contracts with their suppliers, since they didn't have volume history records to negotiate with contractors.

The new market for contractors, in procurement arena, is based on companies being able to pressure suppliers with documented spending history, which was one of Xerox goals. It is past, the old way that companies base their power on the relationship with sales agents. To leverage contracts with their suppliers, companies need to relay on their Procurement Systems in order to analyze spending habits and to understand where it is

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[51] Fortune - Special Advertisement Section, Reprinted from the may 24th 1999 issue.

worth to cut costs. Purchase planing has an important role for cost analysis during executives corporate strategy meetings.

The necessity of global data analysis guided Xerox to a global solution for its non-production purchasing. A global expense data center would have powered Xerox with the right purchasing planning tolls to pressure Xerox's global suppliers. Purchase planing is fundamentally based on purchase history records, and Xerox didn't have the ability to do it locally or globally.

Xerox used an approach of redesigning its non-production purchase process. Every item related to the purchase of good or services was rethought, including order approval, order placement, receipt, and payment. In my opinion, this is a fundamental approach that companies should use to implement e-procurement.

The transactional cost was high due to the inefficient processes, which were manually and paper-driven with long cycle times. The reliability was low, with extra time added by approval cycles and to confirm received items. Employees were used to make work-around alternatives to proceed with purchasing processes, this fact "caused 90% of the transactions to be made outside the regular process"[52]. This kind of situation easily increased expenditure driving costs up, since it enabled employees to buy from non-selected vendors.

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[52] Oracle Laureates Case Study - Xerox Corporation: Non-Production Purchasing, April 5, 1999

3. NEW PROCUREMENT

Xerox adopted an intelligent approach of implementing an "plain vanilla" solution, using an "off the shelf" software, Xerox implanted Oracle Strategy Procurement. This is a good way to proceed when the change requires a remodeling of the business process. Another intelligent strategy, also adopted by Xerox, was the implementation of a prototype in one of their sites.

The "plain vanilla" solution together with a prototype could help Xerox expedite its system implementation. Further features could also be added after the success of the first step, such as the "global warehouse". These kinds of approach enable companies to minimize the burdens of change.

This was a four-year project forecasted to finish in the end of 1999, and Xerox approached it dividing the implementation in three different phases:

1) Converting legacy systems and manual operations into Oracle software.
2) Putting the requisition through Oracle system by dedicated requisitioners - people whose job was to place orders.
3) Enabling end-users to place order through an Internet based requisitioning application.

With thirteen global purchasing sites accounting for 80% of the total expenses in non-production purchasing, Xerox needed to enforce an infrastructure based on standard components. This infrastructure would enable integration among international facilities and forbid local customizations. Having common standards and "plain vanilla" solutions would also facilitate future software upgrades.

Corporate Strategic Services would pay for installation and training, but the Xerox Purchasing sites could decide if they want to implement the system or not. If so they couldn't do any customization. Having sites with uniform standards, Xerox could assure that a single data warehouse would be enough to share information globally. Eleven of the thirteen sites subscribed to the system.

One of the key elements was the vendor choice. Xerox chose Oracle thinking not only of the technical aspects of the system, but also in the ability to provide consulting and development. An example of the development achieved by Oracle and Xerox partnership was the global warehouse that Oracle implemented with Xerox. This feature was later incorporated into Oracle's product. Another benefit was that Oracle has a global presence and global partners in many locations. These partners could help to setup the system in different international Xerox's sites. Concluding, Oracle was chosen as a partner for a 10-year relationship.

Xerox planned to use Oracle's partners in order to add functionality to the system. First, Sterling Commerce would facilitate the backend of the order cycle. Next, TPN Register would provide solutions to catalog content. Sterling Commerce would provide Xerox with the ability to send orders to its worldwide suppliers over the Net.

Cultural issues were the major obstacles to the team. Every system that changes business process will face this issue. People that are used to doing the same job for 20 years now need to change their process in order to comply with the new one. The change is more fundamental that it seems. Electronic procurement will require Internet knowledgeable workers, and new processes will create new ways of dealing with suppliers.

4. BENEFITS

Xerox process approximately one million transactions annually for non-production purchases. In a special advertising section of Fortune, there is a table stating that Xerox transactional cost was reduced from $ 150 to $ 25 per order[53]. Saving $ 125 per transaction means that Xerox could save $ 125 millions per year just in transaction costs. Another measurable savings came from global contract negotiation. Xerox could achieve $60 million in savings, 1% of the total expenses with non-production purchasing. I am not sure if all of those figures were achieved yet, since when the case was written Xerox was still implanting the system - April 1999.

Some other savings, more difficult to transform in economic value, are listed below:

- Cycle times from request to payment were shortened from days and weeks to hours.
- Order accuracy was improved from less than 50% to greater than 99%.
- 30% of orders placed with approved contractors were increased to more than 80%.

The global market competition together with the necessity to cut costs and improve quality drove Xerox to implant a new IT system. This reduced spending for non-production purchasing by 20%. The new system ultimately generated an internal rate over 400%. This is noteworthy from an economic standpoint, and also puts the company in an Internet age enabling Xerox to use a business-to-business e-commerce solution.

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[53] Fortune - Special Advertisement Section, Reprinted from the may 24th 1999 issue.

INDUSTRY ANALYSIS CONCLUSIONS

1. INTRODUCTION

It is not the goal of this conclusion to indicate which one of the three software providers is the best option, or rank them in any way. Even for the last part of this thesis, an Implementation Plan, it is not my goal to choose a partner or indicate one of them as the best option to implement e-procurement. However, I intend to analyze in this Industry Analysis Conclusions some trends and core competence that each company has (Ariba, Commerce One, and Oracle), and the kind of market that they are going after.

Moreover, I intend to analyze what is happening with e-marketplace and e-procurement applications. In this chapter I also intend to raise some issues regarding the characteristics that need to be considered in order to install e-procurement. This is a kick off to the Implementation Plan, since those characteristics must be considered in that section.

It seems that one e-procurement solution provider had realized what Forrester Research is forecasting to be the most valuable market in the coming years, **e-marketplaces**. Commerce One steered its direction from e-procurement application to e-marketplace service provider[54]. However, Commerce One still sells e-procurement applications, and the solution is very appealing from a global organization point of view.

The shift in direction was a clever move, since Commerce One was able to find its niche market. Commerce One's application is powered by technology from the two most powerful software companies in the world, Microsoft and Oracle. Oracle was coming after the same kind of market that Commerce One was before the shift. This supports my statement that Commerce One made a clever move.

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[54] Source: Information Week Online, New Market Makers - March 13,2000

Oracle is a large software company with not only strong database solutions but also e-commerce ones. Oracle could catch up Commerce One in a development race for e-procurement applications. However, Oracle's core competence is not in procurement service or in e-marketplace administration. For Oracle there is no competitive advantage in managing its own marketplace. For this reason Oracle has partner with other companies that can do it for them such as, TPN-Register and Requisition Technology. Both are powered with Oracle technology. Moreover, Oracle is claming that it will be the leader in tools for e-marketplace makers by the end of this year.

The industry seems to not have matured yet, and a lot of partnerships and consolidations have been taking place lately. IBM, Ariba, and i2 Technology have recently joined efforts for e-marketplace solutions[55]. Oracle and Commerce One are not behind, Oracle announced partnership with Chevron Corp. and Wal-Mart Stores Inc. in order to create vertical marketplaces. Commerce One, the leader in marketplace segment, gave 20 % of its share option to GM to get their contract for GM TradeXchange.

Ariba claims to have an advanced technology, developed by computer science and economics personnel from Stanford University and the University of Michigan. However, Ariba is trying to catch up after loosing the race for the auto-industry contracts. The niche market that Ariba is going after is applications to market makers as well as ASP. This is also a distinction from the other two competitors; despite of the fact that Oracle also can make ASP in the procurement arena. Last January, in a presentation made by Oracle's e-commerce VP, he told the audience that Oracle strategy is to stop license software and start to work with ASP solutions.

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[55] Source: Information Week Online, New Market Makers - March 13,2000

All the three software providers have e-procurement applications. Ariba is the leader in sales, followed by Commerce One and Oracle respectively. However, it seems that the one giving more attention to its e-procurement application is Oracle. Commerce One is stressing the fact that it has a global e-procurement solution, and Ariba is focusing in e-marketplace makers.

Ariba's international focus is weak. Oracle has an advantage in this area since its global presence and partners around the world are able to leverage Oracle solutions, as in the Xerox example. Commerce One has a strong foot in Europe, and a powerful solution to deal with different currencies, taxation rules, and languages. However Commerce One is not getting more than US and Europe markets, despite of the fact that they announced that they have local e-marketplace partners on six continents, I wouldn't bet beyond of that two.

Oracle has a tool for strategic procurement planning. The ability to better integrate with other systems, including ERPs, is a competitive advantage for them. Oracle has a complete solution for e-commerce and other packages such as: ERP, e-procurement, Finance and Accounting, Human Resources, Customer Management, Supply Chain Management, and etc..

2. E-MARKETPLACES

E-marketplaces have amazing benefit potential for companies. Some companies, with no relation to dot com, which spend a lot of money in procurement, found in the creation of e-marketplace a way to relate their name with B2B e-commerce. This is not only an advantage for their stock prices but also a possible new venture with a new form of cost reduction[56].

Actually, marketplaces are being confused by software applications themselves. This fact is not difficult to understand since some e-marketplaces enable certain kinds of purchase without being powered by any specific application other than a browser, vide Ariba IBX. You can register you company in an e-marketplace, give your corporate credit card and start to make transactions. This is more similar to business to consumer transactions, but this kind of procedure is not efficient since it doesn't have automation behind it.

The ideal world would be if any browser could reach any e-marketplace independently of the technology that is behind the scene and still keep the benefit of the full automation. Moreover, automation is required if a company wants to really get benefits from e-procurement. To have the entire purchase process over the Net (Internet, Intranet or Extranet), from end-user requisitions to automatically payments and reconciliation.

The link between two different marketplaces can be difficult if they are powered by different technologies. Looking at the auto-industry example where the new venture including GM, Ford and DM Chrysler are powered by different service providers. Oracle and Commerce One are powering Ford and GM respectively. The new company hired a system integrator in order to make the three different technologies work[57].

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[56] Source: Fortune, Above the Crowd by J. William Gurley, April 3, 2000
[57] Source: Fortune, Above the Crowd by J. William Gurley, April 3, 2000

There is a certain division in the e-marketplace. E-marketplaces are specialist in certain kind of industries, such as: raw material, aerospace, office supply, automotive, and so on. It doesn't mean that some of them have just one focus, they can be vertical or horizontal e-marketplaces. But the amazing ones are the new e-marketplaces specialist in knowledge trading (Yet2.com, pl-x.com, and Patentauction.com). Since the beginning of the year some e-marketplaces emerged selling intellectual properties and helping companies, like Du Pont, post their patented technology to others that want to use and commercialize[58].

Some e-marketplaces are providing services in order to differentiate themselves. They are helping their clients to get the best value from auctions that are held in their e-marketplaces. For instance, FreeMarkets Inc., an e-marketplace for production materials, prepares auctions for its clients including the preparation of RFQs, finding and screening suppliers with finances and equipment surveys. Usually those auctions involve large amount of money and large effort to prepare. FreeMarkets charges a fee and a commission over the cost reduction achieved compared with previous benchmarks. There is a funny story behind FreeMarket, their second large customer, which was GM, after achieving some benefits gave up FreeMarket services to start they own e-marketplace becoming a FreeMarket competitor[59].

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[58] Source: Fortune, "The New Online Marketplace of Ideas", by Tyler Maroney, April 17 2000.
[59] Source: Fortune, The Auction Economy by Shawn Tully, March 20, 2000

Choosing the right solution includes picking an e-procurement application that can be hooked up in a value added e-marketplace. So, e-marketplace is a fundamental item in the decision making process for implement e-procurement.

3. E-PROCUREMENT APPLICATION

Regarding applications, we need to make a distinction among the different kinds of applications related to purchasing activities. There are some overlaps among them since some common functions can be deployed in more than one type.

First, applications to power e-marketplace are suited for market makers and administrators. Ariba Market Suite is a typical example of applications for market makers, since it enables auctions, reverse auctions, and exchanges.

Second, application for sales over the Net, which provide management content, resources for online payment, order status, stock availability, call center support, and so on. The e-procurement applications provide order status and stock availability as well, the sell side application is responsible to provide this kind of information.

Finally, e-procurement applications responsible to support: RFQ, end-user requisitioner, requisition flow approval, electronic PO transmission, order and requisition check status, receive confirmation, payment and reconciliation, expenditure analysis and purchasing planing based on historical records.

There one more kind of application that comes over the buy and sell applications, supply chain management. These kinds of application use resources of the other two, buy & sell sides, to help the buyer company control its suppliers, linking suppliers with company's production schedule. It becomes clear that supply chain management applications are suited for production purchase, which is not the main goal covered by this thesis.

In order to be consistent, we need to look for the kind of organization that will implant e-procurement, and then choose the right sets of features. There are specific e-procurement solutions for different market segments, for instance: Oracle FastForward is suited for

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middle market companies, Commerce One BuySite is for global organizations that make purchase all over the world, and the Ariba ORMX is an ASP solution suited for small companies.

My model is the second largest Brazilian Group with operations focused in the domestic market. In spite of the fact that this organization has some international sites and operations they are not significant from a purchasing standpoint. In this case a global procurement feature would be desirable but not essential. Describe below are some key features that should be considered important to have in order to implement e-procurement in such a company:

- *Linking with ERP and legacy systems,*
- *Central database,*
- *Broad support of different protocols, such as XML, EDI, OBI,*
- *Entire automated cycle form requisition to payment,*
- *Online and real-time information (price & quantity),*
- *Linking to e-marketplaces,*
- *User-friend interface,*
- *Flexible approval flow for requisitions and PO,*
- *Flexible architecture suited for any enterprise structure,*
- *Global procurement support including different languages, currencies, numbers, dates, addresses, and taxation (this feature is not required but desired),*

These required features will be further discussed in the next chapter, which aims to cover a strategy to choose and implement e-procurement in a Brazilian bank.

PART II

AN IMPLEMENTATION PLAN

IMPLEMENTATION PLAN

1. INTRODUCTION

It is my view that companies should rethink their purchase process before implement e-procurement. The new way of doing business, through the Net, requires new approach as well as new skills. The industry is not yet mature to have a defined business model for e-procurement. In one hand, some initial research showed that there is a lot of "fat" that can be extracted from the chain, where just automating the purchase process can be enough to achieve good cost reduction. On the other hand, some companies are not achieving the proposed results, since they are struggling with the implementation process and with the new way of doing e-business[60].

Executives should consider that e-procurement is not only automatize the entire cycle, from end-user requisitions to automatic payment and reconciliation. In order to leverage the benefits, e-procurement should be thought as "a strategic purchase planing", where strategic procurement based on historic purchase records will make the difference in cost savings and contract agreements.

This chapter is based on some issues related to the strategy of implanting e-procurement in a service organization. In order to develop this strategy, I am presenting some issues concerning today's enterprises. My first goal is to describe the possible measurable and non-measurable benefits that we can expect in deploying e-procurement. I also, intend to

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[60] Source: Forrester Report, "Hands Free Procurement" by Laurie M. Orlov, January 2000.

further analyze some key characteristics of the system, and then propose a strategy to implement it.

There is an enormous wave towards B2B e-commerce today, and e-procurement is a big chunk of this movement. In order to better understand what I am saying, consider what Deloitte Consulting LLC is estimating - "91% of U.S. businesses will do their procurement over the Net by the end of the next year, about 31% do so now. "[61] So, it is time to rethink purchase procedures and start planning the next system to be deployed "**e-procurement**".

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[61] Source: Business Week, B2B: The Hottest Net Bet Yet? By Laura Cohn, Diane Brady, and David Welch-January 17,2000

2. BENEFITS

Not every company makes production purchase but everyone makes non-production, the so-called MRO, which are maintenance, repair, and operating supplies. Adding that three the ability to contract services and your e-procurement system will be complete. It is not quite that simple, since it is missing the integration part of it, integration with legacy systems, with ERP systems, and of course the most important part, the integration with suppliers.

A system that can't integrate with suppliers is worthless. This is quite obvious but be aware that different technologies do not "talk" very well with each other. As I mentioned before, the three automakers, Ford, GM, and Chrysler, contracted a specialist company to make their e-marketplace works. I am stressing this point because integration can account for a big part of the implementation cost. There is a study conduct by Forrester Research that estimate 1/3 of IT development budget, in large corporations, goes to integration projects.

Another key point that needs to be clear is the cost reduction attainability, since it depends on which automation stage that the organization actually has. A full manually paper-base process will achieve much more results, from a transactional cost point of view, than an organization that already has some procurement systems.

The transactional cost in U.S. is much higher than that in developing countries, such as Brazil where the work force is much cheaper. On the other hand, the hardware and software part of the system will be more expensive due to import taxation. This is a warning to the possible huge discrepancy in the transactional cost among different countries.

It is not the goal of this work to make an investment analysis, although, I am presenting a framework for those who want to make it for your own project.

2.1. DIRECT BENEFITS

Some articles that I've read mention not only the cost saving advantage that e-procurement can bring to the table, but also the impact that it has in the bottom line of the income statement. It compares cost saving to increasing in revenues. For example, making a comparison that $10 million reduction in procurement costs increases profits by the correspondent amount. On the other hand, in a company that has 10% of profit margin needs to boost its sales to $100 million to achieve the same figure. Moreover, Aberdeen Group, Inc. says that 55 cents of every dollar earned in revenue accounts for purchase of products and services. [62]

An area to improve procurement is the off-contract expenditure, the so-called "maverick", since it increases material costs and reduces possible negotiation leverage based on historical volume. Some articles mention that almost one third of non-production purchase are made outside of formal purchase process with work-around alternatives. Fact that increases product costs by 15% to 27% on average, according to the National Association of Purchasing Managers.[62]

There are other articles that mention the advantage of having a Supply Chain Management System linked with e-procurement, fact that would reduce inventory costs from 25% to 50%[62]. It is my opinion that Supply Chain Management System is beneficial to production and not to non-production purchase. So, if you intend to make an investment analysis, don't use those figures for non-production materials, and of course, don't use them if you do not intend to have a Supply Chain Management System.

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[62] Source: Aberdeen Group - Strategic Procurement: The next wave of Automation, July 1999

The most significant cost reduction is in the transactional cost area. Some experts mention that you can reduce one order of magnitude and others mention 70% of cost reduction per transaction. Being 70% or 90% depends on how your procurement is made, whether you have some kind of automation[63]. If so, you've already cut out some fat from your process.

Cycle time reduction will free your work force to do other activities or to reduce heads in your procurement department. It is hard to quantify it now, since it varies from one organization to another; the bottom line is that it will reduce your operation cost and your working capital requirements. There is a research done by Taylor Nelson Sofres Intersearch Corporation that estimates reducing cycle times with electronic trading systems that will lower operational costs by 45%[64]. Moreover, savings in inaccurate orders and delays are, also, items related to cycle time reduction.

Part of the cost reduction from product costs can be achieved because companies have a huge number of suppliers, the number of suppliers can be reduced by 90%. The goal is to have just few suppliers where they can provide better services and the product prices. They can be reduced annually based on historical purchase records, as well as, buyer-supplier integration. A company can make contracts, with its suppliers, based on a 3% cost reduction per year for the first two years[63]. This potential reduction usually comes from automating the purchase cycle, and also, from the supply side. Since suppliers will achieve cost reduction per transaction, they will receive orders, send invoices, and receive payments electronically.

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[63] Source: Forrester Report, "Reining In Online suppliers", by W. Daniel Garretson, January 2000
[64] Source: Profit the Oracle Applications Magazine, "Strategic Procurement Purchase Power", by David Baum, May 1999

The table below represents a summary about the possible areas where an e-procurement system can achieve economic benefits. The figures can vary, depending on each situation, but it will help those that want to do an investment analysis.

Description	Benefit
Transactional Cost	70% - 90 % reduction per transaction[65]
Off-Contract Expenditure - "Maverick"	15% - 27% reduction in product cost[66]
* Inventory	25% - 50% reduction in inventory cost[66]
Operational Costs	45 % reduction[67]
Contracts	3% per year in the first 2 years[65]

Table - 6

* This benefit should be considered if e-procurement is integrated with a Supply Chain Management System.

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[65] Source: Forrester Report, "Reining In Online suppliers", by W. Daniel Garretson, January 2000
[66] Source: Aberdeen Group - Strategic Procurement: The next wave of Automation, July 1999
[67] Source: Profit the Oracle Applications Magazine, "Strategic Procurement Purchase Power", by David Baum, May 1999

2.2. INDIRECT BENEFITS

Some benefits are measurable and others aren't; some of these indirect benefits we can predict and others we will discover throughout the process.

I read a nice comment about contracts over the Net. This comment represents the potential dangerous flaw that we can find in contract agreements with suppliers. "If the items in the electronic catalogue have been poorly negotiated, an e-procurement system will simply allow user to execute bad deals more easily." [68] So, sometimes it is dangerous to take for grant that we are really achieving an indirect benefit.

The most important indirect benefit is the ability to respond to the changing market demand. The reduction in cycle times enables companies to be more responsive in these changing times. This responsiveness to customer necessity is a competitive advantage for those that are using e-procurement.

Described below are some other indirect benefits that an e-procurement system can provide:

- *Increase Accuracy* - Increases order and billing accuracy, increase purchase under approved contracts, and reduce handling delays,
- *Increase Global View* - Enables companies to track suppliers' efficiency such as, on-time delivery, best quality, and lowest cost.

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[68] Source: Supply Management, "Revolution or E-volution ?" by Conrad Nowikow, Sep. 23, 1999

- ***Improve Management Control*** - Offers better control of employee, department, and company expenditure. It reduces time to track orders, and provides capability to analyze trends and buyer workload.

3. STRATEGY

I consider that to really get the most possible benefits from an e-procurement system, organizations should divide the implementation in two distinct phases. The first one is a hands-free phase where the total automation should be the first goal to increase efficiency and reduce cycle times. The second distinct one is the so-called Strategic Procurement. In this phase, companies, after having installed an e-procurement system, should start attacking expenditures strategically, planing global purchase, and negotiating with suppliers.

Of course, before implementing these two phases, we need to specify the system that we want to implement and choose our partners the solution software provider, and the e-marketplace that we will hook up with our system.

I need to clarify an important fact about the choice of an e-marketplace as a partner. It is my opinion that a third part administrated marketplace is more efficient and better suited for companies, when their core competencies are not e-marketplaces, and they don't intend to be market makers. However, in new markets, outside U.S., this service is not easily available, at least not yet. So, some large corporations should take the role of e-marketplace administrator in order to start the system, playing the role that GE played with TPN-Register. GE started its own e-marketplace, forced its suppliers to trade over it, and after the market matured GE spin-off it, partnering with an external company.

In order to better understand the proposed strategy, I divided the implementation plan in the following four distinct steps:

1. *System Specification*
2. *Choosing the Right Partners*
3. *Automating Procurement*
4. *Strategic Procurement*

3.1. SYSTEM SPECIFICATION

It is not the goal of this thesis recommend a software specification for any kind of system. However, I intend to describe some key features that an e-procurement system should have, some of those features were described in the Industry Analysis part. Now I intend to cover them further in order to give a better understanding about the potential of this technology.

Described below are the important features to be considered in the specification of an e-procurement system:

- *Linking with ERP and Legacy Systems* - This is one of the most important features, if you already have something installed in your company.
- *Central Database* - In order to enable strategic purchasing planning, the system needs to have information centralized, and the management tools to extract this information.
- *Broad Support of Different Protocols* - Protocols such as XML, EDI, and OBI leverage the ability to integrate with different suppliers.
- *Automate the Entire Purchase Cycle* - Automation is another key feature, and the goal should be set to automate the entire procure to pay cycle.
- *Online and real-time information* - The back-end and front-end of your supplier's systems should be linked and enable end-user requisitioners to see updated data online, such as price and quantity.
- *Linking to E-marketplaces* - The ability to link with not only one but multiple e-marketplaces is a boost in the system potential.
- *User-friend Interface* - The interface needs to be simple and easy to use. A good approach is to make a distinction between experienced and beginner users.
- *Flexible Flow Approval* - Organizations usually have different structure and multiple purchasing sites. In order to fulfill this different requirements the system needs to have flexible workflow capabilities to routing POs and requisitions.

- *Flexible Architecture* - The more set up parameters and flexible the system is, the better suited for multiple enterprise structures it will be.

- *Global Procurement Support* - If you are looking for a global procurement system, you should pay attention to different format supports, such as: languages, currencies, numbers, dates, addresses, and taxation requirements.

- *Reusable Templates for Requisitions* - The system needs to have the ability to create requisition kits, to save most frequently used requisitions or any other template.

- *E-mails and online Notifications* - Some form of communication between end-users and management team or suppliers is required, e-mail and online notifications are the right approach for an electronic system.

- *Allow Buyer Management Content* - Management content should be included in buyer's firewall, catalog access restriction based on user's profile, and support for contract pricing.

- *Ability to include Attachments* - Attachments to requisitions and POs are a powerful tool in order to better express user's ideas, mainly if you need to send specifications and designs attached to RFQs.

- *Ability to Change or Cancel any Requisition or PO that Has Been Submitted* - An e-procurement system should have the ability to automatically delete requisitions and POs from sent inboxes, the ability to automatically create notice to suppliers, and the ability to automatically remove from the approval inbox requisitions and POs that have been rejected.

- *Workflow Triggers* - Automatic triggers for predefined sets of rules such as: spend limits, commodities, or cost-centers that can be setup for routing.

- *Approvals* - Some form of approval delegation and approval escalation would enhance system's potential, as well as, the ability to add "on-the-fly" approvers.

- *Reviewers* - The system should support the ability to add reviewers to requisitions, and POs.

3.2. CHOOSING THE RIGHT PARTNERS

There are two partners to be considered in order to wisely implement e-procurement. One is the software solution provider and the other is the e-marketplace to link the system.

Partnership with the software solution provider is a long-term relationship, since upgrades and future integration with other applications will probably occur throughout the system life. One common example is the necessity to integrate with ERP and legacy systems. From a global enterprise point of view, the ability to give assistance in the companies' international sites can be a tremendous advantage.

Necessary costs associated with operational procedures may vary from one system to another. This operational cost can have a real impact in the long run. I have a personal experience in Building Management Systems where the maintenance costs from one system to the other varied 50%, so in a ten-year investment the highest initial price was preferred over the lowest one. Due to this fact, it is important to include operational cost for each solution that is being considered.

Considering that you have to decide among different software provided solutions, and there are some pre-made infrastructures that are not 100% compatible with each e-procurement technology. Each application can have different infrastructure requirements and they will impact your investments in different ways. If this is the case, investments in infrastructure should be considered with the implementation plan.

The second most important partner is the e-marketplace administrator. It is important to analyze the solution that the e-marketplace can bring to the table as well as the additional costs that the company will have. Described below are some of these issues:

- *The necessity to be locked in the e-marketplace* - Does the system you are buying just link with the software provider's e-marketplace or can you link it with others?

- *Necessity to create its own marketplace* - Will you need to create your own e-marketplace and then have to deal with the operational costs of managing it? Or do you have one ready that meets your needs?

- *Security issues* - Is it necessary to bring your suppliers online in your own firewall? What are the backup & recovery features in the e-marketplace that you are considering?

- *Screening and supply qualification* - Are there any supplier qualification? If so, are these procedures aligned with your company requirements?

- *Exit cost* - What are the exit procedures and costs to change an e-marketplace service provider?

- *Banking Services* - Are there any financial institution that can help with on-line payments, finance purchasing, and insurance transactions?

- *Transparency* - How does the e-marketplace company deal with issues regarding taxation and periodical audits?

These are common issues to have in mind when analyzing e-marketplace service providers. However, the most important one is to be sure that you can find suppliers that can fulfill your company's procurement necessities at reasonable prices.

3.3. AUTOMATING PROCUREMENT

After choosing the right partners, it is time to plan the new system installation. The amount of required work depends on the size and the structure of the company. The system should be divided in parts to minimize risk.

Some IT experts believe that a prototype is the right way to go, since it tests not only the software but also the end-user acceptability. If you can make a scalable prototype to test the software and user reactions, then you will be better positioned to forecast future problems. You can also make necessary adjustments with less impact than you would have if you had to make changes in the final version.

Standards features and of-the-shelf solutions are the right choices to begin with. Similar to our Xerox case, which adopted the plain vanilla solution, an e-procurement system will cause profound transformation in the procurement personnel and end-users, so cultural issues can be the major problem to overcome. There is nothing wrong with customization, but it is better avoid it, at least in the beginning phase of the implementation process. The "plain vanilla solution" is the right choice until the company can reach full operation.

The importance in this phase is to achieve ful automation, making it possible to transform procurement in a hands-free process. Automating just part of the purchase cycle is the major threat of this phase. Companies can be trapped in the system complexity and postpone some automation. This is the worst thing that can happen because the major cost benefit depends on the automation that can be achieved. The automation reduces cycle times impacting transaction costs.

The implementation plan can be subdivided in other phases. One common distinction is to first make procurement personnel place requisitions through the new system and then make it available to the end-user, following the Xerox example. However, the scalability that the prototype approach can provide, together with "the plan vanilla solution", are the most important features to be considered in this stage.

3.4. STRATEGIC PROCUREMENT

After installing and running the system for a while, it is time to start the last step, the strategic procurement. This is the step that will require the most different skills from the commonly known procurement that we have today.

New abilities and managerial approaches will be necessary to achieve good results. The new purchase personnel should be IT knowledgeable and be able to realize where there are bottlenecks. In order to do so, employees and managers need to understand the integration between suppliers' and their own systems. Only with the total vision, will they be able to push the right parts to improve bottlenecks.

For instance, if there is a problem with some articles in the e-catalog that was recently negotiated, and it is not posted, the new staff should be able to figure out if the problem comes from their system, from the supplier's, or from the link. Sometimes the link is provided by a third part company, if so, we will have three different companies together to form one system. So, those professionals don't need to know how to solve every problem, but they need to know whom they should call for solving specific problems.

This kind of situation is typical in today's integrated systems. An administrator needs to be an outside role, since if the problem is serious and could involve three different parts, they can blame each other. Someone that understands how the system works is a must and needs to be involved in the daily operation. Forrester has a report where they comment on the necessity of this kind of professional. Forrester is saying that he or she needs to have finance or purchasing management experience and detailed understand of online transactions[69].

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[69] Source: Forrester Report, "Reining In Online suppliers", by W. Daniel Garretson, January 2000

This phase is characterized by incremental improvements over time. Companies need to build a business practice over time to achieve further results. The new kind of relationship with suppliers will be based on incremental and continuous management requirements. New standards and benchmarks to compare supply performances will be in place since the system can monitor supplier's quality.

New methodology to screen and qualify supplier will be used in order to leverage Internet potential. Through the Net, companies can have more supplier alternatives and push their existent ones to provide better services. The cost to change suppliers is now much cheaper than before. Choosing the right supplier is not only picking the cheapest one, some extra services should be considered:

- *Buyer and Seller System Integration* - How does your system integrates with the supplier's in question? If the fully integration is not possible yet, consider whether the new supplier is willing to make changes in order to make it possible.

- *Extra Service* - Are there any extra service provided? For instance, Dell has a specific service for their premium corporation accounts; they provide customized web page for pre-agreed items, and some extra services.

- *Updated Information* - Is there an updated information about price and quantity available online? Does your supplier have a front-end and back-end linked systems?

- *Online Track Order Status* - Does your system track online orders? Is there any ability to alter the deliver schedule (date & time)? These are two features that would be welcomed by end-users.

- *Electronic Interaction* - Is there any open channel accessible through e-mail or telephone numbers to interact with suppliers?

To extract the most dollar value from your procurement system, you should be able to reach a stage where you can do a "Strategic Procurement". It is not easy to reach this

stage, since it is an incremental and continuous effort that requires strong IT & management capabilities.

4. CONCLUSION

The Internet has changed procurement forever. The ability to direct link suppliers with employees using just a browser from anywhere in the world, and the ability to reduce cycle times automating the entire purchasing process are the main steps of this revolution. A revolution that is transforming the way companies do business. Nowadays, business to business e-commerce is the new wave and **e-procurement** is in the top of this wave.

I am optimistic with this new technology that is creating a new business process. However, I know that implement e-procurement in large organizations that have been working with the old process for years is a challenge. My technical background together with my experience in automating systems makes me believe that culture and the scarcity of a knowledgeable workforce will be the main problems in deploying e-procurement.

It is proved that e-procurement is feasible and can extract greater cost savings than the existing purchase process. How companies will manage this transition is what will make the difference in the competition. Managers and IT personnel have the responsibility to wisely steer this direction and make e-procurement come true.

There is a strong relation between technology and management in this topic. This relation together with the fancy buzzword "B2B", which is the new Internet wave today, made me choose **e-procurement** to write about, since **Management of Technology** is the degree that I am pursuing here at **MIT**.

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