Strategic Implementation of E-Procurement: A Case Study of an Australian Firm

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Abstract

The rapid development of Internet technology has made inter-organisation connectivity much easier and cheaper than ever before, hereby providing an opportunity for companies, both large and small, to realise the true value of the Internet. Despite the huge investment and complexity of implementing e-procurement, there is little empirical research to provide managerial guidelines for developing effective procurement strategies and for successfully implementing e-procurement. This paper attempts to fill this gap by reporting an Australian case study on the adoption of e-procurement. The findings offer detailed, varied and practical strategic insights into organisational redesign, critical factors, and challenges. The implications are also offered.

1. Introduction

Using e-business to enhance an organization's channel has been considered as a starting point for implementing e-business for many organizations in a business-to-business context [3]. The rapid developments in Internet technology have made the inter-organization connectivity much easier and cheaper than ever before, thereby providing opportunities for many companies, large and small, to real the real value of the Internet.

Implementing e-procurement is of strategic, rather than tactical, importance. It should be regarded as an integrated part of an organization's overall e-business strategy because of its enormous expenditure and potential savings. Many companies spend as much as 30 per cent of their revenue for indirect procurement, that is, non-production materials and services [3, 5]. Traditionally, indirect procurement is a costly pen and paper process that may require more than $100 dollars just to issue a purchase order. Further, decisions of purchasing many moderated-price goods and services have been at the discretion of individual employees. Finally, as business environment become increasingly competitive, many companies are striving to improve their profitability. Every cent saved in procurement goes straight to the bottom line.

Many organisations, both public or private, are adopting e-procurement programs to reap the benefits of Internet technologies. A recent survey of more than 500 managers in six West European countries by IDC [4] found that 38 per cent of businesses have used the Internet for procurement.

Despite its huge investment, complex implementation *process*, and the involvement of multiple functions and departments, little empirical research has been conducted to provide managerial guidelines on developing effective procurement strategies and to successfully implement e-procurement. This paper attempts to fill this gap by presenting a case study of an Australian organization. Specifically, it aims to address the following questions:

1) How does it successfully implement e-procurement in order to fully tap the potential of the Internet technology and the emergence of e-marketplace?

2) What benefits does the organisation attempt to reap from e-procurement?

3) What are the critical factors in implementing e-procurement? and

4) What challenges does the organisation face in implementing e-procurement?

2. Literature Review

2.1 What is E-Procurement

The meaning of procurement is much broader than purchase. Conceptually, it includes such *activities* as purchasing, transportation, warehousing, and inbound receiving [5].

Functionally, e-procurement can have three approaches: e-procuring non-production goods and services, *e-sourcing* and *e-auction* [3]. The non-production goods and services procured are variously known as operating [2], or indirect materials [7]. They can further be broken down into three categories: office and computer supplies, or ORM (Operating Resource Management, mainly office products), maintenance, repairs, and operations (MRO) supplies; and travel and accommodation [5]. MRO is the most important of these three categories one. Because MRO typically includes mission critical overhaul and maintenance, its procurement processes usually involve much higher levels of complexity, cost and volume than ORM and travel and accommodation [7].

Table 1 A Brief Summary of Benefits in Implementing E-Procurement

Studies	Benefits
[3]	Eemployees compliance with pre-negotiated contracts; Improved leverage with suppliers, and Process improvement
[5]	Efficiency improvement, including: • low procurement costs, • faster cycle times, • reduced maverick or unauthorized buying, • more highly organized information, • tighter integration of the procurement function with key back-office systems. Effectiveness enhancement, including • increased control over the supply chain • proactive management of key procurement data, and • higher-quality purchasing decisions within organizations
[2]	Operational benefits: • reducing the administrative costs of the whole procurement process by two third. • improved expenditure control. Strategic benefits: • increased procurement control (better coordination between users and purchasers and greater control over sources of supply, purchase price, and inventory policy from adopting a centralized purchasing function), • better supplier management (reducing supply base and thus increasing leverage over suppliers)

2.2 Benefits and challenges in implementing e-procurement

Many publications have reported the potential benefits of implementing e-procurement. Some are summarised in Table 1.

The level of saving possible in implementing e-procurement partly depends on the amount of indirect spending that is e-procurable [3]. For example, service is hard to purchase online.

While the benefits to procurers have been well identified and documented, only several publications have reported how suppliers can benefit from e-procurement from a descriptive perspective. By participating in e-supply, suppliers can have several benefits, including sales increase, expansion of market reach, reduction of costs for sales and marketing activities, shorter selling cycle, improved sales productivity, and streamlined bidding process [2, 3, 9].

2.3 Challenges in implementing e-procurement

Given the level of complexity in redesigning procurement processes, integrating multiple functions within the organization, and engaging key suppliers in participating in e-supply, several challenges have been identified and described. In a recent survey of procurement managers in 13 European countries, IDC [4] has reported a number of challenges in implementing e-procurement, including internal resistance to change (27%), system too difficult to use/understand (11%), e-procurement system integration with existing IT systems (11%), employee training (11%), and supplier migration to the Internet (11%).

Croom [2] reported that management has three major concerns in implementing e-procurement: concern for the management of service supply, such as facilities services, e.g., clearing and catering, particularly with its quality measurement because services are hard to e-procure; concern for security, particularly payment; and concern for supply database maintenance, which may involve a central supply database containing information about process concerns (authority levels for order-placers, supplier details, product/service details), and pricing scheme. The questions are where is this database located and who should be responsible for maintenance.

2.4 The evolution and implementation processes of e-procurement

The development of e-procurement has so far undergone three stages [1]: 1) large companies such as General Motors and Wal-Mart established Internet buying hubs for reducing costs and speeding supply; 2) independent firms created third party exchanges that attempt to bring many buyers and sellers in e-marketplace; and 3) horizontally dominant industry players joined in e-procurement consortiums, such as Covisint in the automobile industry.

With regard to the e-procurement implementation processes, Kalakota & Robinson [5] suggested that a seven-step guideline. These seven steps are to: 1) clarify the company's e-procurement chain goals. Such goals may include automating the selection and purchase of goods, cutting costs, reporting companywide purchasing patterns timely and accurately, or eliminating purchasing by unauthorized employees; 2) conduct a procurement process audit; 3) establish a business case for e-procurement; 4) develop a supplier integration matrix, which helps determine the best type of individual vendor relationship. The type of individual vendor relationship depends on the uniqueness and scarcity of the products or services procured; 5) select an e-procurement application; 6) integrate e-procurement with other applications; and 7) train employees involved.

3. Research Methodology

Research design. Case study as a research method has been increasingly accepted in social sciences and management studies. Yin [10] has defined case study as "an empirical inquiry that investigate a contemporary phenomenon with its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used" (p. 23). Many e-business applications are still new and not well researched. Therefore, case study is considered to be very appropriate for this stage of e-business application development.

Case selection. Many companies use e-procurement based on Internet technologies as a strategy to improve competitive advantages. Therefore, it is expected that the decision to adopt e-procurement is made at head office given the quantity of money invested and the number of functions and departments involved. Moreover, the potential significant benefits that can be reaped from implementing e-procurement often dictate that large manufacturing firms are more likely at the forefront of companies rushing to exploit e-procurement. Thus, these companies tend to be large and in manufacturing sector, and they are targeted for this study.

Woodside, a large Australian oil and gas exploration company, has some characteristics that apply to an e-procurement study. First, Woodside has learnt much from Shell, its significant shareholder and an early adopter, in implementing e-procurement through their close relationship. Therefore, what Woodside has done in implementing e-procurement could be more solid than that of early adopters. This means it can offer a good pathway to e-procurement for other companies.

Second, Woodside is a major player in the Australian oil and gas industry. It not only can exercise considerable power in engaging suppliers in e-supply,

which is crucial to the success of e-procurement, but also is able to initiate other e-procurement programs, such as e-sourcing and e-auction, for its industry. Hence, this case study can also shed light on how e-procurement impact on the firms involved and the whole industry.

Finally, Woodside not only has large procurement expenditure (about A$1.3 billion annually) and many supply chains, but also has many geographically dispersed plants and groups. This requires effort in coordinating a range of activities other than mere procurement, such as transportation, warehousing and inbound receiving. All these can provide a large and complete picture about e-procurement at the organizational level.

Data collection and analysis. Multiple sources wee used to collect data, including interview with two senior procurement managers, compilation of information from the company's Web site and media reports, and collection of the materials and booklet about e-procurement at Woodside and Shell during the interview. The interview was conducted at Woodside headquarters in Perth using a semi-structured approach. Specifically, a list of questions was prepared based on literature review. These questions covered four major areas: the implementation processes, benefits and challenges, integration of e-business applications and other IT-related issues, and critical factors. However, we also kept an open minds during the interview to ensure that other important issues would be captured. The "funnelling approach", as suggested by Minichiello *et al* [6], was used. The interview lasted about two and half hours and was tape-recorded. The recorded tape was then transcribed. Although several computer software packages, such as NUDIST or Nvivo, developed by Qualitative Solutions and Research Pty Ltd [8] could be used to facilitate qualitative data analysis, we have decided to analyse the data manually for two reasons. First, most of these software packages for qualitative data analysis require much time and effort to set up the project. Second, this research only involved one case.

The information and materials collected from the company's Web site, promotional materials, and media reports were used to further complement or triangulate the findings from the interview.

4. Background Information of the Company

Based on Perth, Woodside Energy is a leading Australian resources company. Its main business is in the exploration, development, and production of hydrocarbon products, such as oil and natural gas.

Woodside was founded in 1954 to search for oil. Its major expansion came in 1963 when it secured exploration permits over 367,000 square kilometres off

the Western Australian coast. In the early 1970s, it successfully discovered the several gas fields in Western Australia's harsh Pilbara region. These fields were eventually to form the basis of Australia's biggest energy resource development: the North West Shelf Venture, which is the biggest and one of the most important natural resource developments ever undertaken in Australia.

Delivery of North West Shelf natural gas to customers in Western Australia (WA) began in 1984. With deregulation of the domestic gas market in WA, it now sells directly to major energy consumers in WA.

Another Woodside product is condensate, a light oil produced in association with gas. The first crude oil development was produced in the late 1980s. Production from the Floating Production, Storage and Offtake facility (FPSO) began in 1995. The following month it also began exporting Liquefied Petroleum Gas (LPG). In late 1999, under Woodside's operatorship, the Northern Endeavour FPSO began producing oil in the Timor Sea. This was its first operations outside the North West Shelf Venture.

Woodside is also actively exploring for oil and gas in WA, Victoria, the Timor Sea, and several overseas sites. In 1999, Woodside has implemented ERP developed by a Tier One ERP developer.

In 2001, Woodside production included 7.2 million barrels of crude oil and 1.25 tons of liquefied natural gas. It employed about 2500 people and generated annual revenue of A$2.34 billion. The annual procurement expenditure is about A$ 1.3 billion. There were approximately 9000 procurement invoices to process per month.

5. Implementing E-procurement at Woodside

5.1 Redesign organizational structure based on the product and service market

The e-procurement program was initialed on 1st April 2000. As the first step, a new division, Shared Services, was established based on a detailed analysis of the goods and services it procures, its procurement spending, and existing procurement processes. The two guiding principles used for this organizational restructuring are market of goods and services procured, and e-procurement process. This division now covers most important functions and activities involved in the procurement processes. It employs 90 people and consists of nine teams or groups.

The first team, Business Development, is responsible for research and development in procurement. Its specific tasks include redesigning the e-procurement processes, monitoring new development,

and planning the directions for e-procurement. Another important task for this team is to communicate with suppliers and to get them involved in e-supply.

The second team is Communication and IT. It controls expenditure in telecommunications and other IT related areas, such as the purchase of software and hardware, and license and contract management in IT areas. The company has 1500 personal computers. So its expenditure in communication and IT is very substantial.

Another team is Contracts and Services. It responsibilities cover legal, insurance, financial, and logistic issues in dealing with suppliers. This team manages all the contracts and services required to sustain other parts of the Shared Services division.

The next group is Plant that is physically located in a natural gas treatment plant that is about 1,300 kilometres away from Perth. This is essentially a virtual team. The team's tasks include the procurement of MRO for the plant, management of a warehouse, and logistics and inventory management.

Topsides is another team. It provides all of the support in procuring goods and services for the company's entire offshore asset, mainly the platforms and the Floating Production and Storage Offload Facility (FPSOs). These goods and services include a maintenance contract, paints, and any spare parts for rotating equipment and inventory management.

Procurement Support Group deals with two major functions: Account Payable Management and Cataloguing. Accounts Payable was part of the company's finance organization before implementing e-procurement. When the e-procurement management team mapped out the supply chain, they suddenly realised that accounts payable is the back end of its supply chain because any relationships associated with vendors and contractors can be impacted by the lack of payment of their invoices. Therefore, Accounts Payable was included in the Shared Services division. According to the interviewees, this has so far worked very well because it facilitates the communication between account payable and procurement. The Catalogue team is mainly responsible for maintaining and updating the catalogue centrally. It also requires some research effort to ensure that the new items added will fit the technical specifications and safety requirements. There are now about 8000 line items in the company's catalogue. Another important task for Cataloguing team is to search for Original Equipment Manufacturers (OEM) in purchasing MRO to cut off the middlemen, or dis- intermediate channels, in order to drive the costs down.

The Drilling team (exploration), as its name indicates, is the team that supports the well engineering

part of the company's businesses. Drill has to be made through the sea-bed in order to find gas or oil. The goods this team procures include drill bits, casting, modules, all the chemicals associated with drilling, and the mobile drilling rigs that are used to charter in to initiate the drilling.

The last group within Shared Services division is sub-sea and exploration group. In order for the company to initiate drilling, a 3D or 2D seismic survey of the sea-bed need to conducted to determine whether the geographic strata of the sea-bed lends itself to a drilling program. The Group manages all MRO for all sub-surface needs, including all chartering seismic vessels, and the sub-sea components.

5.2 Intended benefits for implementing e-procurement

After conducting business analyses, Woodside considers that it can benefit from implementing e-procurement in the following five ways:

Capturing and reducing rogue spending. By 'rogue spending", it means that those spending is outside of its procurement contracts. As the manager of the Shared Services Division pointed out that there are many people, particularly when they weren't associated with a central group, were actually spending money outside of contracts. This problem has been addressed by implementing e-procurement.

Better analysis, better spending tracking, and better contracting prices. The implementation of e-procurement can facilitate the collection and analysis of spending data. This can ensure better tracking of procurement spending. Thus, company can consolidate spending and leverage such aggregated purchase volume to get a better deal from the suppliers. This can enable the company to have more robust contracts. Therefore, the bottom line of the company can be improved by extracting much overheads out of its procured goods and services through e-procurement.

Cutting out distributors to drive down prices. Another benefit the company expects from implementing e-procurement is to lower the prices of goods purchased by cutting out some of its distributors and the middle men. E-procurement provides opportunities for the company to go straight to the source of manufacture. Currently, it is unable to do that and many of the suppliers force it to go through an agent who typically "puts on his 10% or his 15%". Because e-procurement doesn't recognise any international boundaries, it enables the company to go right back to the source of the manufacturer and to negotiate better prices by cutting out some of the middle people

Optimising logistics to reduce transportation costs. Before implementing e-procurement, the company was able to rely upon a network that funnelled everything through to its distribution depot. Because of implementation of e-procurement, a layer of middlemen or distributor has been taken out. Hence its distribution channel could become wider. This seems to create challenges for the company to coordinate its procurement activities. However, the logistics aggregation can be made within the terms and conditions of the purchase order that e-procurement can send out electronically. Although the logistic carriers the company used would still be the same and the method of delivery or transportation would not be changed, the company could simply optimise it. This could leverage the movement of the materials purchased and thus reduce the logistics costs.

Logistics costs can also be further reduced by collaborating with other companies, particularly those that have branches located in the same remote areas. For example, Woodside has developed some sharing agreements with BHP, another Australian major player in oil and mineral industry. Because both companies work in the same industry and need to transport goods procured to the same remote areas, aggregating materials procured for transportation can make Woodside to get an economy of scale. The implementation of e-procurement can make such inter-firm collaboration much easier, particularly with the recent establishment of the online industry's supplier database, Supplybase Vendor Registration System (www.supplybase.com.au), where Woodside is a major player.

Facilitating advanced planing for maintenance by integrating e-procurement with ERP ad other e-business applications. With the installation of ERP and PM (preventive maintenance) within the company, the installation of e-procurement software EBP (Enterprise Buyer Professional) can enable the company to undertake advanced planning and maintenance. With the plant maintenance module, it can plan plant maintenance and shutdown anywhere up to 7 years in advance. The integration of e-procurement with ERP and PM enables the company to automatically place the orders and generate requests on suppliers or vendors for the goods and parts, particularly critical items. One advantage for having one integrated system is in the plant maintenance. The system can facilitate planning, calculate the lead-time, and flag the critical items for maintenance.

5.3 Critical factors in implementing e-procurement

Having implementing e-procurement for nearly two years, Woodside has identified some critical factors as follows.

1. Ensuring e-procurement is compatible with the back end ERP system, including the maintenance system. Woodside is a manufacturing firm and the maintenance of its operation and exploration is critical to its success. Therefore, it is crucial that the e-procurement package should be compatible and complementary to its ERP system.

2. The second critical factor, as the interviewee stressed, is good preparation and active monitoring and learning. As he stated that " you should allow yourself plenty of time and to move around the world and see how it is going in other parts of the world. So that you can bring in the lessons learnt." This is very important, particularly in selecting the software for e-procurement.

3. Undertaking a good detailed analysis of procurement spending is another critical factor. It is not good jumping on the e-procurement bandwagon if it is not going to deliver the benefits. Only after a detailed spend analysis, can the benefits of implementing e-procurement be determined.

4. Communicating both internally and externally is also a critical factor for successfully implementing e-procurement. Also, competent people are needed who can implement the process.

5. The last, but not least, critical factor is to adopt a gradual approach. Start small and then make big. Because implementing e-procurement is a complex process, such a gradual implementation process can ensure that project can be properly controlled and lesson can be learned quickly. At the beginning, it is better to involve four or five key suppliers in e-supply.

5.4 Challenges in implementing e-procurement

Several challenges have been also identified in implementing e-procurement at Woodside, including issues in human resource management, technology integration, and supplier's involvement.

One challenge in implementing e-procurement is the redeployment and training of employees. Because e-procurement can automate significantly many processes, some existing employees have to be redeployed. Also the skills required for its employees need to be changed, specifically, from putting together purchase orders to putting procurement deals together. This shift in skill requirements demands employees equip with more negotiation skills.

Revamping IT system and integrating IT with other applications, such as ERP, and Preventive Maintenance are also challenges the company face. The compatibility, or interoperability, of various e-business applications is a problem for the company. Although the company purchased all the software (ERP, PM, EBP) from the same software developer, they were not compatible in data communication in their standalone package. The software developer has been working for solving this problem. Nevertheless, it had presented as a stumbling block and the project had to be delayed until EBP is installed and tested.

Finally, how to involve its suppliers in e-supply is another challenge. The manager is cognizant of this issue and intends to adopt a staged approach to engaging suppliers in this area. Several large hardware suppliers who the company has already dealt with in e-procurement in other parts of Australia would be selected first. Then each quarter the number of suppliers will be increased until it has achieved what it believes the critical mass in terms of its high-volume and low value spend.

6. Summary and Implications

This paper attempts to explore several important issues in implementing e-procurement. To do so, a case study on the e-procurement implementation practice in an Australian organization was conducted. This has shed much light into several strategic issues and provided guidelines for other firms that wish to implement e-procurement in their own organizations. Several important results have been presented in this paper and can be briefly summarized as follows.

First, implementing e-procurement may need to redesign organization. Such organizational restructure should be based on the e-procurement processes. It also needs to ensure avoiding the overlapping of functions. The overall objectives are to simplify the e-procurement process and to provide "total" services both to the organization itself and the suppliers involved. In doing so, Woodside has established a new division, Shared Services that includes all important functions in procurement. The division itself has been structured based on the market of goods and services procured.

There are four areas that the company can potentially reap the benefits in implementing e-procurement. They are: 1) making employees comply with the prenegotiated contracts to improve procurement effectiveness; 2) leveraging the consolidated spend data to get better prices from suppliers; 3) dis-intermediating distribution channels to cut out middlemen, thereby lowering the prices of goods purchased; and 4) collaborating with other

players in aggregating goods procured to drive down logistics costs.

Like other e-business application, implementing e-procurement entails challenges. For Woodside, it faced three challenges: employee redeployment and training, integration of e-procurement with other e-business applications, and supplier involvement.

Finally, conducting a detailed business case analysis of procurement spending, well preparation, gradual implementation, and internal and external dialogue can pay off in implementing e-procurement.

The above findings have a number of important implications for managers. First, implementing e-procurement is very complex and can involve many functions and departments within the company, such as IT, HR, Finance, and Legal Services. Therefore, securing commitment from top management can be very important for successfully implementing e-procurement.

The second implication is that compatibility of various e-business applications should be considered thoroughly. It is a strategic issue given the amount of investment in these applications. Many firms may want to adopt a staged approach in implementing e-business applications. However, a critical question to ask in selecting a software package is: Can it inter-operate with other e-business applications that are potentially adopted by our organization in the future?

The findings in this paper also imply that e-procurement should be considered in a broad sense in order to fully tap its potentials. E-procurement involves much more functions than simply purchasing, including warehousing and transportation. Thus, in conducting business case analysis for e-procurement and redesigning organization structure, activities and benefits or costs incurred from these functions should be considered for streamlining e-procurement processes and generate a more 'realistic picture' about the consequences or outcomes of e-procurement.

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