

# *ELECTRONIC PROCUREMENT SYSTEM SUCCESS IN AUSTRALIA*

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## **Abstract**

E-procurement system contributes significantly to national productivity growth through the removal of non-value added activities in procurement process. However, the adoption has been slow in Australia and there is still a lack of studies assessing the impact of e-procurement. This study aims to explore the impact of e-procurement adoption in Australia and to understand the meaning of e-procurement success, how and why success is achieved. Insights that will be obtained from systematic evaluations regarding the impact of e-procurement systems on 20 Australian organizations using the proposed research framework will be used to develop an instrument to measure success, identify barriers to achieving success and establish a framework to promote success.

*Keywords: e-procurement, technology adoption, IS success.*

## **1 INTRODUCTION**

Businesses face many challenges in today's fast-changing uncertain global climate (Lee and Gebauer, 2006). Many organizations have turned their attention to Electronic Commerce (eCommerce/EC) technologies to improve the efficiency of their business processes. The most prominent form of e-commerce system concerning interactions between businesses (Business-to-Business /B2B eCommerce) that has recently received attention in the literature is called electronic procurement (e-procurement) system (Hawking and Stein 2004). It automates an organization's purchasing process, reduces transaction costs, improves inter-organizational coordination within the supply chain, improves relationships with business partners and offers competitive sourcing opportunities for the buyer organizations (Subramaniam and Shaw 2002). The widespread adoption of e-procurement systems by organizations in both private and public sectors will lead to national performance improvement and productivity growth and it has the potential to increase the gross domestic products (GDP) significantly (Hawking and Stein 2004).

However, the adoption rate of e-procurement systems has been much lower than the initial prediction (Forrester Research 2000; Da Vila et al. 2003). In Australia, for example, only 10% of large Australian businesses are trading through some form of e-procurement systems (Stein and Hawking 2004). At the moment, there has been little evidence on the realization of e-procurement benefits since the involvement of multiple parties/stakeholders in e-procurement systems presents challenges in measuring the impact (Subramaniam and Shaw 2002). In

addition, the meaning of success in the context of e-procurement is different from other contexts and, therefore, requires a unique measure which is not yet available (Seddon et al. 1999; Chua et al. 2005). As introduction of e-procurement systems requires significant investment to replace existing technologies, without clear evidence on the impact, many organizations are not motivated to adopt e-procurement systems (Subramaniam and Shaw 2002; De Vila et al. 2003).

This study is, therefore, designed to understand the meaning of success, how and why success is achieved in the context of e-procurement systems in Australia. Based on the understanding obtained from the evaluations regarding the impacts of e-procurement systems, a practical instrument that can be used to measure e-procurement success objectively will be developed as one of the outcomes of this study. Such an instrument can also be used to identify areas for improvements so that success can be promoted. More specifically, the aims of this study are:

- To systematically assess the impact of B2B e-procurement system on Australian organizations at individual and organizational levels.
- To understand ‘what’ constitutes success in the context of e-procurement system
- To understand ‘how’ and ‘why’ e-procurement system success has (not) been achieved.
- To develop a practical instrument to measure success of e-procurement systems.

This is theory building and empirical research that extends the previous studies in exploring the adoption of B2B eCommerce to improve supply chain management in Australia. A combination of a multiple case study and a survey study will be used in this study. At this stage, a preliminary investigation has been conducted with three organizations to explore the impact of e-procurement adoption, but the data analysis has not been completed. In this paper, we only discuss the conceptual model used in the study, the overall methodology and briefly describe what has been done so far.

In the next section, we present a brief literature review on e-procurement systems and their importance for organizations. Some issues related to evaluating e-procurement success are also outlined. Then the proposed framework for evaluating e-procurement system in order to develop an instrument to measure e-procurement success is presented, followed by a discussion on the research methodology. Finally, we described the progress so far and conclude the paper by outlining some potential contributions to theory and practice.

## **2. THE IMPORTANCE OF E-PROCUREMENT SYSTEM**

Among various categories of eCommerce, B2B eCommerce is the most important one as it accounts for the majority of electronic transactions in the business world and, therefore, has enjoyed a rapid progress in the last decade in terms of applications development and the adoption rate (Forrester Research 2000). One of the relatively recent B2B eCommerce applications developed in the past decade is e-procurement system. Through the utilization of the Internet, e-procurement system improves the efficiency in various stages of procurement process including searching for sellers, processing (product request, approval and order generation), controlling procurement process and coordinating the exchange of information internally and externally with trading partners. As a result, cost savings can be obtained through lower transaction cost, increased procurement process quality (accuracy), shorter cycle time, better inventory management, while relationships with trading partners can be

enhanced, risk can be better controlled and strategic sourcing can be exploited (Subramaniam and Shaw 2002; Da Vila 2003; Muffatto and Payaro 2004).

Many organizations are seeking new ways to reduce procurement costs which typically represent the largest cost item in business operations (Vaidya et al. 2006; Da Vila et al 2003). According to industry sources, the indirect procurement expenditure in Australia is about AU\$150 billion per annum and each procurement process incurs about A\$125 per transaction (Neef, 2001). Most of the costs incurred are due to non-value added activities such as manual data re-entry, fixing errors, premium buys due to the inability to find competitive suppliers, inefficient search and evaluation of suppliers and their product offerings and the long process in reaching an agreement and obtaining approval before orders can be placed (Muffatto and Payaro 2004; Turban et al. 2006). E-procurement system, therefore, has attracted organizations' attention particularly in the last few years and it has the potential to improve national productivity growth of any countries (Hawking and Stein 2004).

At this stage, very little rigorous research has been put into evaluating e-procurement systems including the use, impact and the realization of benefits and, hence, there is a lack of information that can be used as a basis for assessing costs and benefits involved (Subramaniam and Shaw 2002; Da Vila et al. 2003; Tonkin 2003). Most benefits of e-procurement systems have only been qualitatively expressed without a systematic analysis, because measuring the impact of IT, especially when the impacts created are beyond the organizational boundaries as in the case of e-procurement systems, has proved to be difficult (Martinsons and Chong 1999; Mollah and Licker 2001; Pather et al., 2003; Khalifa and Liu 2004). As a consequence, many organizations are still reluctant to adopt e-procurement systems, since an e-procurement system requires significant investment in infrastructure, technology, integration and expertise (Hawking and Stein. 2004).

A framework is, therefore, necessary to guide researchers and practitioners to systematically assess e-procurement systems, which assists in developing better understanding and gaining rich insights into the use and impact of e-procurement systems. In addition, an instrument that can be used by organizations to measure success of e-procurement systems and to identify areas for improvement will be valuable for practice. The proposed research framework for evaluating e-procurement systems and the arguments on why existing success models cannot be applied in the context of e-procurement systems are discussed in the next section.

### **3. RESEARCH FRAMEWORK FOR EVALUATING E-PROCUREMENT SYSTEMS**

The measurement of success has long been a key concern in Information System (IS)/Information Technology (IT) adoption research and practice (Seddon 1997; Pather et al., 2003). However, measuring IS success is a difficult exercise because: a) success is multi-dimensional in nature and involves inter-related variables, and b) there is still a lack of agreement on what constitutes success in the IS discipline (Martinsons and Chong 1999; Seddon et al. 1999). As a result, various researchers have proposed a number of surrogate measures for IS success. Constructs such as system use, satisfaction, individual/organizational impact, system quality, information quality, system development quality, to name a few, have been used as success measures (McLean and DeLone 1992; Drury and Farhoomand 1998). However, a number of scholars have pointed out that not all success measures used in the past studies are appropriate to measure IS success (Hwang et al 2000; Khalifa and Liu 2004). For example, when use is mandatory, system use is not a valid measure of success. Another problem is that some of the constructs suggested in the literature are actually factors affecting the achievement of success (Khalifa and Liu 2004). For instance, measures related to system's

characteristics such as system quality cannot be considered to reflect system success; it is more accurate to treat systems quality to be a factor affecting use. Only satisfaction has been reported to have a consistently high face and convergent validity among other commonly used measures of systems success (Hwang et al 2000), and hence is included as a dependent variable in the proposed framework on e-procurement systems evaluations as a means to identify success measures.

The need for identifying specific success measures for e-procurement systems is in line with the argument made by Seddon et al. (1999) that the type of IS and the stakeholders are two important dimensions which at least need to be considered in measuring IS success. According to these authors, different measures are necessary to measure success in different contexts and, therefore, the existing IS success models which are claimed to be generic (for example, DeLone and McLean (1992; 2003)'s model) cannot simply be applied in any contexts, including in the context of e-procurement system as an example of a B2B eCommerce technology. Specifically, unlike other systems assessed in the literature on IS success, e-procurement systems are inter-organisational system, which requires cooperation from trading partners and competitors (in some case) in using the system (Subramaniam and Shaw 2002). Thus, there are multiple parties or stakeholders involved in the use of the systems, who typically have conflicting interests and objectives. Seddon et al. (1999) further argue that different success measures are required for different stakeholders because the impacts are likely to be different. Therefore, measuring success of e-procurements systems is expected to be more complex than other systems that involve fewer stakeholders, which partly explains why no systematic evaluation of e-procurement systems have been done in the past.

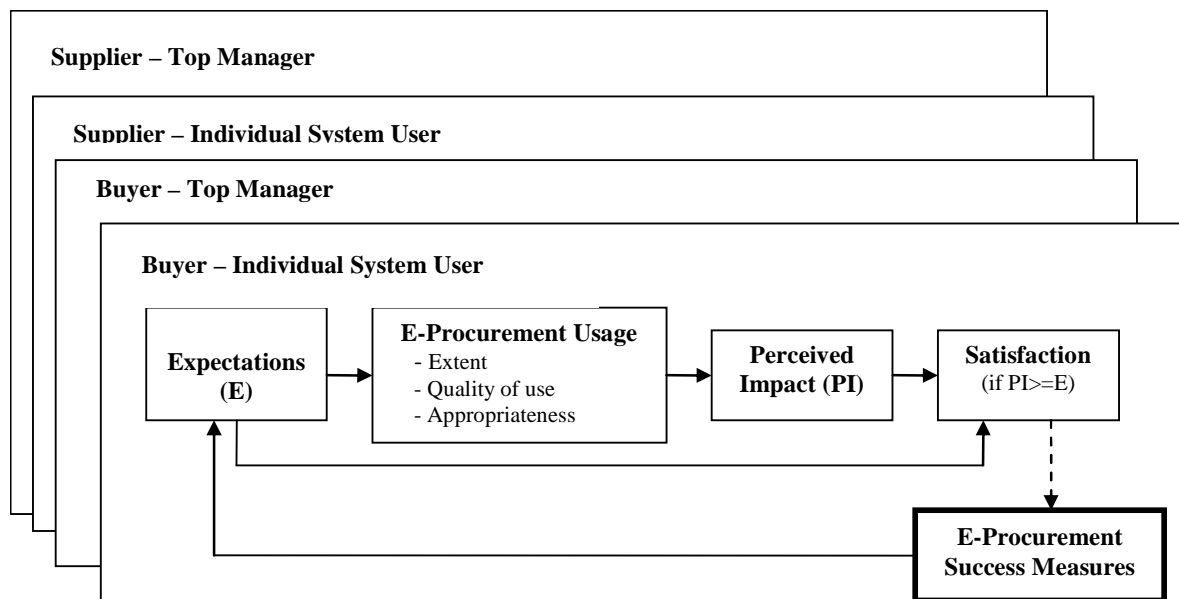


Figure 1. Research Framework to Evaluate e-Procurement Systems

Figure 1 depicts the research framework used in this study to evaluate e-procurement system, which was developed based on some previous studies (DeLone and McLean 1999; 2003;

Seddon 1999; Seddon et al. 1999; Chin and Lee 2000; Khalifa and Liu 2004; Chua et al. 2005). As shown in the figure, in order to develop an objective instrument to measure e-procurement systems success from this study, perceptual data regarding the use, expectations and impacts of e-procurement systems from various stakeholders will be first obtained. The stakeholders to be involved in this study include:

- The individual system users of the purchasing company (buyer).
- The top managers of the purchasing company to represent the purchasing company.
- The individual system users of the supplier
- The top managers of the supplier to represent the company.

System use is then examined in terms of the extent, quality and appropriateness of use from the perspective of each stakeholder. System use leads to impacts as perceived by each stakeholder, which will be assessed based on the cost improvement (transaction costs, inventory holding costs, product price), procurement process quality (accuracy), system responsiveness (cycle time), internal coordination, decision making process, trading partner relationship and risk control (Subramaniam and Sham 2002; Hawking and Stein 2004). Thus, in evaluating each e-procurement system in this study, we will also consider the procurement process itself as the work system supported by the e-procurement systems, as perceived by various stakeholders (Alter 2000).

The satisfaction at both individual and organizational levels is then measured by the gap between perceived impact and expectations (Chin and Lee 2000; Khalifa and Liu 2004). If the perceived impacts meet or exceed the expectation, satisfaction will be obtained. From the perceptual data collected from various organizations to understand why satisfaction has (not) been achieved and how it is (not) achieved, a rich understanding will be obtained regarding what constitutes success in the context of e-procurement. Based on this understanding, we will then identify appropriate and objective success measures for each stakeholder involved in the use of e-procurement system. This is indicated by the dotted arrow in Figure 1. The success measures can then be used to better manage expectations of various stakeholders in the context of e-procurement systems, which, in turn, should improve the level of satisfaction of stakeholders over time. Insights gained from the evaluation will also enable the identification of barriers and ways to promote success in e-procurement systems use.

#### **4. RESEARCH METHODOLOGY**

To achieve the objectives of this study, a combination of a multiple case study and a survey will be used. In the first phase, multiple in-depth case studies will be conducted with various individuals and managers involved in the use of e-procurement systems in 20 Australian organizations (10 pairs of buyer and supplier) from various industries, both private and public sectors, in order to assess the impact of e-procurement systems as well as to explore what constitutes success in this context and to evaluate if success has been obtained and how/why it has been obtained. The proposed research framework (Figure 1) will guide this phase. From the insights obtained from the case studies, e-procurement success measures will be identified and an instrument to measure success objectively will be developed. In phase 2, the success measure instrument will be validated through a survey study involving 200 pairs of buyer and supplier organizations.

## 5. PROGRESS SO FAR

A preliminary investigation involving e-procurement adoption, usage, and perceived impact has been undertaken in three city councils located in greater Melbourne, Australia. A total of nine face-to face interviews with IT managers, business analysts, and procurement managers have been conducted. In addition, the e-procurement vendor representative who was involved in helping the introduction of e-procurement solution in those city councils was also consulted. In addition, several procurement solutions related documents were also collected from the participating councils and the e-procurement solution provider. The interview transcripts are currently being analyzed. However, an initial review of the data collected from the interview and documentary sources indicate that the adoption of e-procurement is primarily driven by efficiency gains through the reduction in transaction costs and elimination of maverick purchasing practices. There is evidence that city council staff who initially resisted to the use of the system now appreciate the value of the system. However, relationship with suppliers has not been affected much by the introduction of the e-procurement system. Further data collection and analysis is required to better understand the impact of e-procurement system on the relationship between city councils and their suppliers and to determine the degree of employee satisfaction with the e-procurement systems. More case studies will also be conducted to further explore the e-procurement system adoption experience of various Australian organizations before success measures can be identified.

## 6. CONCLUSIONS

From the understanding that will be obtained from this study regarding the meaning of e-procurement success and how success can be gained, a practical instrument that can assist organizations to measure e-procurement success will be developed. This instrument will help organizations to assess the impact of e-procurement systems systematically and identify ways to improve the chance of success. Thus, this study offers potential contributions to both theory and practice. Firstly, the proposed e-procurement evaluation framework helps researchers explore and assess the e-procurement impacts systematically. In addition, the results of this study will provide concrete evidence of the importance to consider the type of system and the stakeholders in measuring the system success. Hence it will contribute to the IS discipline significantly since measuring IS success has been widely based on some existing IS models that are mistakenly believed to be applicable in any contexts. For practice, the results of the e-procurement system evaluations will be valuable for other organizations considering implementing the system and, therefore, more organizations will be motivated to implement e-procurement systems to improve supply chain efficiency. Finally, lessons learned from case participants regarding how and why success is (not) achieved will help other organizations to increase the likelihood of success.

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