Factors Affecting Benefits Of E-Procurement Systems: Experience Of An Australian City Council

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ABSTRACT

Despite years of research into e-business systems, still little is reported on how various factors affect the ways local government councils experience benefits from e-procurement systems. We thus present the experience of a Melbourne-based council that has been using an e-procurement system for some time, and discuss the factors that the council perceives to have influenced the benefits arising from the use of that system. Senior management support, presence of e-catalogues, employee training in e-procurement systems, and willingness of suppliers to participate in council's e-procurement implementation initiative, are found to be key factors. The implications of these factors are outlined.

Keywords: e-procurement, e-business, benefits, factors, local government

INTRODUCTION

During the past decade, many organisations have implemented various types of web-enabled e-procurement systems. When successfully implemented, these systems have the potential to provide organisations with operational and strategic benefits alike [8, 18, 26]. However, the findings of the existing e-procurement literature about the attainment of benefits are mixed. It is not clearly known why a variation in experiencing e-procurement systems benefits is observed [10]. We argue that the presence of a range of factors may influence the benefits arising from the implementation of e-procurement systems. Little empirical studies are however reported that discuss how various organisational, supply chain oriented, and technological factors play an important role in influencing the ways e-procurement systems could provide benefits to buying organisations which implement these systems. This is particularly true for the local government sector for which there is now a growing call for enforcing increased transparency and accountability through automation of procurement function [20]. Against this backdrop, in this article we report the findings of an exploratory case study that was initiated within a large Melbourne-based city council to find out how it perceived the influence of various factors affecting its experience of benefits from the implementation of an e-procurement system. We argue that understanding these factors is useful to the local government sector which may benefit from the lessons learned from this council. The findings are also valuable to the broader e-business researcher community who may like to formulate a more comprehensive model for making predictions of e-procurement systems benefits for the public sector.

BACKGROUND LITERATURE

E-procurement systems: In its simple terms, e-procurement refers to the application of e-commerce technologies in support of an organisation's purchasing activities [7]. It involves the use of integrated (commonly web-based) communication systems for the conduct of part or all the purchasing process; a process that may incorporate stages from the initial need identification by employees, through search, sourcing, negotiation, ordering, receipt and post purchase review [4]. Some popular examples of e-procurement systems include SAP EBP, Straightbuy and Oracle iProcurement, among others.

E-procurement systems benefits: E-procurement systems have the potential to offer both operational and strategic benefits [26]. A summary of benefits is shown in Table1. Operational benefits are internal focused and can help organisations to gain immediate short term benefits. Typical examples include reduced transaction costs, shorter order cycle, reduced inventory, and less maverick buying practices. In contrast, strategic benefits are often intangible in nature and take considerable time to achieve. They include such benefits as greater choice of suppliers and increased understanding of procurement needs.

Operational benefits: E-procurement systems can contribute to a)reduced transaction costs [3, 6] because various forms (e.g. requisition, purchase orders) are replaced by electronic documents. Purchase orders are sent to the authorised

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suppliers electronically which brings a savings in paper and postage costs. Furthermore, e-invoices received from suppliers results in fewer phone calls which in turn reduce transaction costs. E-procurement systems can even help in significantly b)shortening order cycle by reducing delays [27]. There is no more waiting time wasted in the in-trays or out-trays. Documents travel directly to the right people electronically. Requisition approvals are obtained much faster because a series of purchasing policies are built-in the system [23]. Furthermore, employees need not spend time to call up procurement staff as all available items are organised in electronic catalogues which can be accessed from desktops [21]. E-procurement systems can also help reduce c)maverick purchasing practices [25]. Employees can only choose those items that are supported by the e-catalogues from the qualified suppliers [17; 25]. This prevents employees to choose goods from not approved suppliers [6]. Moreover, when an employee adds the selected item into a shopping cart, the system checks if he/she has the authority to buy the item based on the built-in purchasing policies [23]. Furthermore, greater selection of suppliers results in d)increased competitions; this puts pressure on suppliers as they are required to provide better quality of products at a competitive price with enhanced delivery services [1]. One of the outcomes is the increasing urge of suppliers to deliver goods on time. Therefore, inventory stock levels are decreased [4].

Table 1. E-procurement benefits: A summary

Types of benefits	Literature Sources
Operational benefits	
Reduced transaction cost	3,6
Shorter order cycle	27,23
Reduced maverick buying	25,17
Strategic benefits	
Finding appropriate strategic suppliers	16,12,14,1
Better understanding of organisations purchasing needs	22
Increased competition	1

Strategic benefits: E-procurement systems enable organisations to find suppliers globally (16). Due to the commercialisation of the Internet, suppliers appear online [12]. This opens a new era for organisations because e-procurement systems enable buying organisations to visit the websites of suppliers and allow punch-out practices even though the suppliers are located in different parts of globe [14]. As a consequence, finding the right suppliers to suit an organisation's needs is no longer a problem [1]. In addition, the reporting

function of the e-procurement system assists managers to better understand their organisation's purchasing needs [22]. Typical reports highlight an organisation's purchasing patterns and budgetary controls, among others.

Factors affecting benefits: We argue that the benefits (discussed above) are not automatically experienced by organisations upon implementation of their e-procurement systems. We suggest that these benefits are more likely to be achieved when a set of facilitating factors are present in organisations. According to John and Michael [11], factors represent those "few key areas where things must go right for the business to flourish." Drawing on a synthesis of the existing e-procurement literature, we have identified 4 factors which managers should consider for wanting to experience benefits from the implementation of e-procurement systems. These are briefly discussed below.

Factor 1: *Senior management support*: Without senior management support, an e-procurement system will find it difficult to survive in the procuring process of an organisation [2]. Introducing e-procurement systems can improve budget controls in organisations. However, if departmental mangers are afraid that their departmental budgets are going to be cut down in the next financial period due to the reports generated from the data collected by the e-procurement systems, they are unlikely to support these systems [4]. Moreover, many managers are still concerned about the Internet security regarding the online payments to their suppliers [5]. Therefore, they might hesitate to render support to the integration of the system with suppliers which may in turn affect the realisation of benefits.

Factor 2: *Employee training*: Employee training helps improve their confidence and reduce resistance by addressing their fear for perceived needs for high learning skills, management monitoring, and job loss [18]. Training can also motivate employees to prepare purchase orders in compliance with new organisational polices enforced through e-catalogueues supported by e-procurement systems. Training can help employees learn how to prepare appropriate reports from the e-procurement systems which aim to offer better understanding of their and their department's purchasing needs and patterns.

Factor 3: *E-catalogues*: Another factor that can influence the realisation of e-procurement benefits is the presence of e-catalogues. Current generation of e-catalogues contain attractive graphics/pictures, and even sound effects [12]. The presence of such catalogues help ensure the employees of the buying organisations can place correct purchase orders (POs) for the approved products supported by management. Such

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catalogues also help reduce maverick buying practices [19]. The use of e-catalogues further helps reduce PO transaction costs by minimising product search time [24].

Factor 4: *Willingness of suppliers*: Yet another key factor that may affect e-procurement benefits is the willingness of suppliers to participate into the integration process of linking supply chain members. Connecting with suppliers can eliminate paper invoices which greatly reduces the inefficiency of the procurement process by avoiding a conflict between purchase orders and invoices [23]. The suppliers can make sales prediction because of the availability of information that is provided by the e-procurement systems [12].

Literature gaps: Even though there exists a rich body of literature on e-procurement benefits and some fragmented discussion on factors affecting those benefits, to the best of our knowledge we are not aware of any empirical work that investigates how benefits from e-procurement systems implementation are influenced by various factors in general and for the local government context in particular. Our research reported in this article seeks to address this gap in the literature.

RESEARCH APPROACH

An exploratory case study research approach was chosen for two reasons: a) this research is a theory building exercise [29] as we intend to develop a preliminary factor-based model by drawing on the actual experience of the participating city council and key observations from the past literature analysis, b) our purpose is to explore the possible existence of a set of factors that may influence the attainment of e-procurement benefits for the Australian local government context. This particular aspect has not been investigated systematically. According to [15], case study is suitable for exploratory and theory building kind of research. The unit of analysis, in our research, is an individual organisation because one single e-procurement system is adequate to address organisation wide indirect procurement process. Data was gathered from multiple sources, including formal interviews with key informants, internal documents, and city council website. A semi-structured interview protocol was developed to guide interviews. A total of six in-depth interviews were arranged with three types of managers: Purchasing Administrator, IT manager, and several business managers (e.g. Corporate Service Manager, various business managers) who are active users of e-procurement system. Data collected from the interviewees were analysed using the pattern matching logic described by [29]. This technique compares an empirically derived pattern with the predicted one. Data analysis was conducted manually by

developing a coding scheme based on which each interview transcript was transcribed and coded for pattern matching. Based on the suggestions of [29], reliability was addressed by developing a case study protocol and a summary of definitions concerning e-procurement factors and benefits. The protocol and the summary of definitions were both sent to the participating interviewees prior to the actual interviews. On the other hand, validity was addressed using data collected from multiple sources and having interviewees reviewed their own interview transcripts.

CASE DESCRIPTION

A large local council located in the city of Melbourne was chosen as a case site because it is a pioneer in introducing an e-procurement system within the Victorian local government sector, and that it agreed to share its e-procurement experience with us. The council offers over 100 types of services to about 150,000 residents. Its annual expenditure was A\$60 million (A\$1 = US\$1.05). On an average, the council produces 20,000 purchase orders (POs) and receives about 60,000 invoices per annum. In 2005, the council introduced Trans AXS e-procurement system from a US-based vendor. Figure 1 illustrates a graphical representation of high level architecture of the operation of the e-procurement system running in the city council.
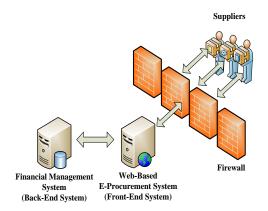

Figure 1: A high level operation of e-procurement system used in the city council

The system is integrated with its back-end financial management system. Currently, information about 2500 suppliers is stored in the e-procurement system which sends purchase orders electronically in three different formats: internet-fax, e-mail, and XML. With most suppliers, the e-procurement system sends purchase order via e-mail because these suppliers are small companies and lack IT sophistication and financial capability to be fully integrated through XML technology. However, the council interacts in XML format with a major office supplies provider. At present, about 180

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employees use the e-procurement system.

EMPIRICAL FINDINGS

Drawing on the views expressed by the participating managers, a summary is prepared (Table 2) that highlights the key benefits experienced by the council. The empirical evidence suggests that the council has primarily experienced operational benefits (e.g. lower transaction costs and less maverick buying). A majority of the managers agreed that a reduction in transaction costs was a major benefit as a result of using the e-procurement system at the city council. These managers further suggested that the introduction of the e-procurement system helped the council in bringing a reduction in its maverick buying practice. Two reasons were cited. First, the e-procurement system contains information about those suppliers who have been pre-qualified. This means that even if a council staff receives an approval order, that order cannot be sent to any supplier other than the pre-qualified ones. However, no evidence was found in support of shorter order cycle at the council. Another observation is that limited strategic benefits were perceived by the council. For example, there is a mixed opinion concerning the effect of the e-procurement system on improved understanding purchasing needs of the city council, while no evidence was found in support of obtaining greater choice of suppliers.

Table 2:   Responses of managers about e-procurement benefits at the council

Benefits	Interviewees*						Remarks
	A	B	C	D	E	F	
Lower transaction costs	✓	✓	✓	✓	✗	✓	Consistent with the literature
Shorter order cycle	✗	✗	✗	✗	✗	✗	Different from the literature
Provide greater choice of suppliers	✗	✗	✗	✗	✗	✗	Different from the literature
Less maverick buying	✓	✓	✗	✓	✓	✓	Consistent with the literature
Improved understanding purchasing needs	✓	✓	✗	✗	✗	✓	Some support for the literature

*Note: A: IT manager, B: corporate service manager, D: purchasing administrator, C, E & F: business managers

Drawing on the responses from the participating

managers, another summary is prepared (Table 2) which indicates the presence/absence of influence of factors on e-procurement benefits perceived by the city council. The ticks indicate a positive influence while crosses show no influence of the factors at all.

Table 3: Responses of managers about the influence factors affecting e-procurement benefits

Key Factors	Interviewees*					
	A	B	C	D	E	F
Senior management support	✓	✓	✓	✓	✗	✓
Employee training	✓	✓	✓	✓	✓	✓
Presence of e-catalogs	✓	✓	✓	✗		✓
Willingness of suppliers	✓	✓	✓	✓	✓	✓

*Note: A: IT manager, B: corporate service manager, D: purchasing administrator, C, E & F: business managers

Most participating managers confirmed a positive influence of senior management support on the benefits experienced from the e-procurement system. A discussion with the managers revealed that senior management support affected all the 3 key benefits (listed in Table 1) of the e-procurement system. They did not indicate whether a particular benefit was more influenced than others due to senior management support. According to the Purchasing Administrator (D):

"*With e-procurement systems, unless you got that management support, no matter how good the system is, it won't work and won't yield any meaningful benefits. So e-procurement, yes, at the city council it certainly has management behind it.*"

Another business manager (C) provided rich insights into how senior management support affected benefits. According to this manager, senior management support was needed to put new procedures in place and to make improvements in the procurement process. In summary, without senior management involvement, benefits from the e-procurement system could not emerge.

All participating managers confirmed that employee training was an essential factor which positively influenced the realisation of benefits arising from the e-procurement system. The importance of e-procurement training on the realisation of the benefits was manifested when Corporate Service Manager (B) stated that

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without training, employees could easily make mistakes during the use of the e-procurement system. As such, more problems would be created for other people. When mistakes are made, this will delay the realisation of benefits. The Purchasing Administrator (D) expressed that without training, employees would not accept the e-procurement system. Therefore, no benefits could emerge when employees do not accept the system in the first place. Furthermore, two business managers (E & F) reasoned that training helped council employees learn how to use the system quickly and overcome some difficulties in using the e-procurement system. These difficulties were associated with unfriendliness of the system. Consequently, training assisted in increasing council employees' confidence and satisfaction with using the e-procurement system which in turn lead to their appreciation of the benefits that were gained from e-procurement system use at the council. According to the IT manager (A):

"*Training is very important. If you don't arrange proper training for the employees, you won't get the maximum benefit out of the product. That way, I think the employee training is the most important thing, and it increases their efficiency.*"

Four out of six participating managers agreed that the presence of e-catalogues was an influential factor in helping the city council realise the benefits from the e-procurement system. One business manager (C) expressed some appealing views on how the presence of e-catalogues affected the benefits of e-procurement system. According to this manager:

"*Yes, e-catalogues make it very efficient for the person if he/she orders anything, he/she can physically see what shape, size and color that might most suit his/her needs and budget.*"

A similar view was shared by Corporate Service Manager (B). She mentioned that the presence of e-catalogues provided much useful information for employees when they were making purchases. One example is a product code number. Once the product code number was known, an employee could input it into the e-procurement system and quickly order the required item. Consequently, the presence of e-catalogues made council's purchasing process more efficient.

All the managers considered the willingness of suppliers to participate in their council's e-procurement systems initiative to be a major factor which positively influenced the benefits arising from that system. However, there were no indications about whether a particular benefit was more influenced than others because of the suppliers' willingness. This was confirmed by a business manager (C) when she expressed:

"*When our suppliers come on board with it and be willing to try the e-procurement system, then it makes more efficient to use the system.*"

The Purchasing Administrator (D) confirmed the importance of suppliers and indicated that they must be willing to participate in order to better integrate with the city council's e-procurement system. Consequently, purchasing efficiency was greatly enhanced by having prompt access to more up-to-date information about the available products, prices, and availability. According to the Purchasing Administrator (D):

"*If suppliers are more than willing to join, I think that procurement process becomes much more time efficient.*"

DISCUSSION

During the past decade, many organisations have implemented various types of web-enabled e-procurement systems. When successfully implemented, these systems have the potential to provide organisations with operational and strategic benefits alike [8, 19, 26]. However, the findings of the existing e-procurement literature about the attainment of benefits are mixed. It is not clearly known why a variation in experiencing e-procurement systems benefits is observed [10]. We argue that the presence of a range of factors may influence the benefits arising from the implementation of e-procurement systems. Regrettably, little empirical studies are reported that discuss how various organisational, supply chain oriented, and technological factors play an important role in influencing the ways e-procurement systems could provide benefits to buying organisations which implement these systems. This is particularly true for the local government sector for which there is now a growing call for enforcing increased transparency and accountability through automation of procurement function [19]. Against this backdrop, in this article we report the findings of an exploratory case study that was initiated within a large Melbourne-based city council to find out how it perceived the influence of various factors affecting its experience of benefits from the implementation of an e-procurement system. We argue that understanding these factors is useful to other councils and public agencies alike which may benefit from the lessons learned from this council. The findings are also valuable to the broader e-business researcher community who may like to formulate a more comprehensive model for making predictions of e-procurement systems benefits for the public sector.

The experience of the city council in receiving some operational and limited strategic benefits is not entirely surprising given the fact that several scholars (e.g. [4], [9]) who have reported the tendency of the local government sector to introduce ICT in a superficial manner. According to Kuk (13), the local government sector usually

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lags behind the private sector in terms of capabilities and ICT infrastructure. It is, thus, not surprising that the participating city experienced limited strategic benefits. Another observation is that none of the participating managers discussed the role of e-procurement systems to advance transparency and accountability issues of the council's procurement practices.

On the matter of factors affecting e-procurement benefits, the experience of the city council in relation to senior management support is consistent with the views expressed in the broader e-business literature [4,5]. The participating managers confirm that without support from senior management, making improvements in the procurement process is difficult. They further indicate that putting new procedures to make procurement effective could not happen without senior management support. These managers even point out that absence of senior management support would have resulted in insufficient funding for sponsoring training. This could in turn increase the possibility of inviting implementation failure. Consequently, the benefits could not emerge without council's management support.

E-business literature also mentions employee training to be a critical factor that could influence the realisation of e-procurement benefits [28]. For the participating council context, if employees do not accept and use the e-procurement system (due to lack of training), it would be impossible to recognise the benefits that the system could offer to the council. Employee resistance was eased through training. This view is fully supported by the city council's e-procurement experience. The participating managers consider training to be important as they suggest that training facilitated the adoption of the e-procurement system by council employees. This view is supported by Rahim [18] who found training to facilitate employee acceptance of e-procurement systems. With proper training, unnecessary mistakes are significantly reduced and employees' time is saved. As a result, the overall productivity has been improved.

According to Schneider [24], the presence of e-catalogues is another important factor to influence e-procurement benefits. Besides, offering assistance to reducing maverick buying, e-catalogues also provide more flexibility to organisations. Such flexibility makes communication between buying organisations and suppliers more effective and purchasing efficient. The empirical evidence collected from the managers supports this claim. Most managers suggest that the presence of e-catalogues encourages council employees to benefit from their use of e-procurement system. This is because e-catalogues provide plenty of useful information which aids council employees' purchasing

decision making. Moreover, with the e-catalogues, council employees are able to see what they are actually ordering. This makes purchasing more time efficient.

E-procurement literature indicates that in order to fully benefit from the e-procurement systems, a complete integration is necessary [23]. However, this will not happen when suppliers are reluctant to participate. For the participating council context, many managers believe that if more suppliers are willing to try the e-procurement system with the city council, more benefits will be experienced, and they are happy to see more suppliers to join the city council's e-procurement system. For example, suppliers now can receive payments from the city council via the e-procurement system. This view is highlighted by the Purchasing Administrator (D) who remarked:

"*Unless suppliers are willing to adopt this new way of purchasing, then the benefits are actually going to be reduced, if at all obtained.*"

We however believe that the influence of 3 (i.e. senior management support, e-catalogues, employee training) factors (out of the above mentioned 4 factors) on the realisation of benefits from e-procurement systems use at the council are also relevant for the private sector. We further argue that supplier willingness (Factor 4) may have different implications depending on the context (public or private) within which an organisation (which uses e-procurement system) operates. For example, for the local government context, city councils are often required to have business with SME's located within the councils' geographical jurisdiction to promote local economy. Hence, the councils are still required to electronically trade with their suppliers regardless of their degree of e-business capabilities. On the other hand, private sector organisations (which introduce e-procurement systems) are not guided by the government policy of buying from local SME's to promote local economy. They have more liberty to choose their suppliers regardless of geographical locations. As such, they may decide to electronically trade with those suppliers only which demonstrate both willingness and capabilities to establish electronic relationships with the private sector organisations. This is a key interpretation of our research findings which suggests that the influence of factors may vary depending on the context of the client organisations. We therefore argue that the influence of the factors identified in this study cannot be generalised across both public and private organisations.

CONCLUSION

E-procurement systems represent a mature aspect of B2B e-business initiative and are slowly

gaining acceptance in the local government sector. However, few studies are reported in the literature about how the Australian local government authorities are experiencing benefits from the implementation of these systems and in what ways various factors affect the realisation of those benefits. Our research, reported in this article, addresses this concern by undertaking an exploratory case study at a large city council in the state of Victoria, Australia. Our case study findings suggest that some operational benefits and limited strategic benefits are experienced by the council and that a total of four major factors (i.e. senior management support, employee training, presence of e-catalogues, and willingness of suppliers) affect these benefits. Therefore, one implication is that senior management of those councils which are contemplating possible introduction of e-procurement systems should guide their implementation strategy to ensure the presence of these factors because mere introduction of these systems would not automatically translate into realised benefits. Another implication is that managers responsible for preparing e-procurement business cases must regard the lack of these factors as hurdles, which if not addressed by management, could risk e-procurement systems success. Knowledge of these factors is thus useful to e-business researchers and practitioners alike. Researchers may incorporate these factors in developing a more comprehensive model for making predictions about how e-procurement systems may generate benefits. Knowing these factors is also valuable to the local government management because it can guide them for strategic planning in relation to introducing e-procurement systems by better preparing business cases and implementation strategies.

Despite these contributions, the findings reported in this article cannot be generalised across the entire local government sector of Australia. Hence, further studies are required to investigate e-procurement systems benefits across multiple local government agencies from each state of Australia. In addition, in-depth multiple case studies are needed to find out the role of organisational culture (which is in turn is shaped by national culture) for comparing e-procurement benefits in the local government bodies operating across various regions (e.g. European Union and Australasian region). Future research is also needed to examine how e-procurement systems may affect business relationships between councils and their suppliers and whether changes in relationships in turn affect the realisation of e-procurement benefits. This particular aspect has not been investigated in our study. Finally, research in the form of surveys is needed to produce statistically generalisable findings.

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