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The Investigation of the Processes of IS/IT Investment Evaluation and Benefits Realization in B2B-EC Organizations

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Abstract

IS/IT investments in B2B-EC are used by organizations, as part of their business strategies, to assist in the inter-organization acquisition of goods into the value chain and to provide interfaces between customers, vendors, suppliers and sellers. However, the issue of expected and actual benefits realized from IS/IT investments in B2B-EC has generated a significant amount of debate in the IS/IT literature amongst researchers and practitioners. This research study showed that organizational satisfaction of B2B-EC usage had a direct relationship with the adoption of the IS/IT investment evaluation methodology. There was also a tendency for organizations to evaluate less when their organizational constraints were high. Additionally, there appeared to be a direct relationship between the evaluation constraints and use of both methodologies. Finally, the level of evaluation benefits depends on the use of either or both methodologies.

Keywords

E-Commerce, IS/IT investment evaluation, IS/IT benefits realization, B2B-EC, constraints, benefits

1. Introduction

Electronic commerce is becoming increasingly imperative for companies aiming at improving their competitiveness and this has led to much of research and new IS/IT investments (Raisinghani et al., 2005). One of the electronic commerce business models, business-to-business e-commerce (B2B-EC), deals with Internet-supported commercial activities between two or more different companies (Laudon and Traver, 2004). Its growth outpaced all of other forms of

electronic commerce (McGaughey, 2002). Teo and Ranganathan (2004) have defined it as the "use of the Internet and Web-technologies for conducting inter-organizational business transactions." IS/IT investments in B2B-EC are used to assist in the inter-organization acquisition of goods into the value chain and to provide interfaces between customers, vendors, suppliers and sellers (Kleist, 2003). It is facilitated by internets, intranets, extranets, private exchanges, and even neutral electronic market exchange mechanisms through linking suppliers, partners and customers across the public networks of the web, using servers, routers and facilities belonging to a variety of owners and investors (Turban et al., 2004).

B2B-EC trade represents the largest growth sector - that is, 80% of revenues - in e-commerce (Pires and Aisbett, 2003). Forrester Research forecasts that both B2B and B2C will hit US\$6.8 trillion in 2004, a big increase on the US\$43 billion of 1998 (Greenberg, 2000). By 2005, it is forecasted that the global B2B-EC market may reach US\$7 to US\$10 trillion (Turban et al., 2004). According to the IDC report, Australian B2B-EC spending reached A\$11.83 billion in 2001 (Pearce, 2002). IDC predicts that it will grow at 70% annually and is likely to reach A\$166.25 billion by 2006 (Pearce, 2002). It is estimated that B2B-EC can increase the level of output in the developed economies by an average of 5% cent over time (McIvor and Humphreys, 2004).

Currently, the most popular electronic commerce applications used by organizations in their B2B relationships are EDI, web-forms, XML, and other varieties of Internet initiatives such as electronic marketplace and B2B portals (Chan and Swatman, 2003). In the competition of the global marketplace, it is no longer organizations that compete. It is networks

such as B2B-EC that compete and the competitive advantage depends on the ability of organizations to forge relationships with external partners across the globe (Kandampully, 2003). B2B-EC allows organizations' business partners to access their internal business systems via the Internet. Some of the major benefits of B2B-EC are as follows:

- It increases competitiveness in the marketplace (du Plessis and Boon, 2004);
- It can reduce an organization's costs such as procurement costs and search costs (McIvor and Humphreys, 2004);
- It provides an efficient and effective channel for information exchange and sharing (Raisinghani et al, 2005);
- It enables organizations to trade on a 24x7x365 basis, and enhances coordination and collaboration among them (Laudon and Laudon, 2004);
- It increases productivity of employees dealing with buying and/or selling (Turban et al., 2004);
- It reduces errors and improves quality of services (Laudon and Traver, 2004);
- It facilitates mass customization (Turban et al., 2004); and
- It helps to build global relationship with partners, suppliers and customers (du Plessis and Boon, 2004).

However, the potential for realizing significant benefits for implementation of B2B-EC does not appear to have been enough to provide impetus for extensive adoption by organizations (Power, 2004). There are several challenges faced by organizations (Laudon and Laudon, 2004): (1) many new B2B-EC business models are difficult to evaluate and therefore, have yet to prove enduring sources of profit; (2) Web-enabling business processes for B2B-EC requires far-reaching organizational change; (3) the legal environment for B2B-EC has not yet solidified and organizations must be vigilant about establishing trust, security and consumer privacy. In particular, organizations often take the short-term view of evaluating their electronic commerce success by only looking at the potential advantages of IT use while at the same time are unaware of the factors that may hinder the benefits attainment in the long term.

While organizations continue to invest heavily in IS/IT, research studies and practitioner surveys report contradictory findings on the effect of the expenditures on organizational productivity (Thatcher and Pingry, 2004). Therefore, it is not difficult to see that the measurement of the business value of IT investment

has been the subject of considerable debate by many academics and practitioners (Sugumaran and Arogyaswamy, 2004). Although some IT productivity studies have produced inconclusive and negative results, or the interpretation of results may depend on many factors (Brynjolfsson and Hitt, 1998), many research indicated that spending in IT is directly related to organizational performance (eg. Serafeimidis and Smithson, 2003). In fact, effective leverage and evaluation of IS/IT investments can result in improved organizational performance (Melville et al., 2004).

Given the complexity of the decisions and the large expenditure involved, better understanding of the basis and practice of IS/IT investment and evaluation in large Australian B2B-EC organizations is essential. Therefore, the aims of this paper are to undertake an exploratory and descriptive study that attempts to investigate the current practices, norms, and difficulties in managing IS/IT benefits and evaluation by B2B-EC companies in Australia as well as the relationships between the use of IS/IT investment evaluation and benefits realization methodologies and the organizational benefits and constraints.

2. IS/IT Investment Evaluation and Benefits Realization

As mentioned earlier, the evaluation of these IS/IT investments is a complex tangle of financial, organizational, social, procedural and technical threads, many of which are currently either avoided or dealt with ineffectively (Mirtidis and Serafeimidis, 1994). Many IS/IT projects fail to deliver what is expected of them because most organizations focus on implementing the technology rather than the adoption of the tools necessary to help to track and measure the IT projects (Hilam and Edwards, 2001). There was some evidence to suggest that the recent project failure ranged between 30% to 70% (Doherty and King, 2001). For example, Renkema (1998) revealed that around 70% of all IT investments are claimed to give no adequate return on investment.

Investigation by Sohal and Ng (1998) found that in large Australian organizations the potential of IS/IT has not been utilized to meet the competitive challenges due to inadequate and inappropriate appraisals/evaluation of the proposed IS/IT investment projects. Moreover, they reported that 45% of the responding organizations did not evaluate whether IS/IT systems were still consistent with business objectives and 59% did not determine whether

expected benefits were being achieved. Recent research on IS/IT investments in electronic commerce initiatives by Australian organizations by Marshall and McKay (2002) indicate that nearly half of the respondents had no measures of success and most did not carry out post-implementation reviews for their investments. It appears that our current understanding of IS/IT evaluation has little impact on organizational practice, and factors such as power and politics which greatly affect the evaluation process are extremely difficult to identify and measure (Howcroft and McDonald, 2004).

Thus, failure to plan for and, derive the benefits from an IS/IT investment can have detrimental consequences on organizational performance. Some of the major problems associated with IS/IT investment evaluation are:

- Organizations often fail to measure their IS/IT investments and identify relevant risks, costs, and benefits (Lin and Pervan, 2003).
- Traditional financially oriented evaluation methods (e.g. ROI, NPV) can be problematic in measuring IS/IT investments and quantifying relevant benefits and costs (Sugumaran and Arogyaswamy, 2004).
- Organizations often have neglected to devote appropriate evaluation time and effort to IS/IT as well as to deal with the extended investment time frame. Organizations have failed to understand that IS/IT investments require richer evaluation approaches than mono-dimensional cost-benefit analysis (Stamoulis et al., 2002).
- The nature of electronic commerce technology makes it harder for organizations to allocate and assign costs and benefits to IS/IT projects, further blurring the lines of capital investment and return from IS/IT spending in the B2B channel (Subramani, 2004).
- It is very difficult to evaluate intangibles and make relationship between IS/IT and profitability explicit (Straub et al., 2002;).

Indeed, many organizations have found that these IT project costs and benefits can be difficult to estimate and control (Giaglis et al., 1999). For instance, many organizations face a challenge of measuring and monitoring the performance of the specific contribution of inputs in generating outputs as well as its associated Internet channels (Kim and Umanath, 2005). Moreover, other less quantifiable items such as loyalty, trust, knowledge, brand awareness, relationships, the boundaries of inter-organizational networks, value creation and customer satisfaction all makes the

evaluation even more difficult (Subramani, 2004). Some new and old measures need to be differentially applied for evaluating phenomena such as electronic commerce and the Internet (Straub et al., 2002).

Furthermore, while IS/IT investment evaluations are important, they are insufficient in terms of ensuring that the benefits identified and expected by organizations are realized and delivered (Ward and Griffiths, 1996). This is because IS/IT is just one enabler of process change (Grover et al., 1998) and it only enables or creates a capability to derive benefits. The objective of benefits realization is to plan and manage so that the expected benefits arising from the use of IS/IT can actually be realized. However, assessing the effective delivery of benefits from these services is very difficult (Ward et al., 1996). Research by Seddon et al. (2002) indicate that identifying and measuring benefits as the most difficult issue in evaluating IS/IT.

3. Research Objectives and Methodologies

Despite the growing popularity of B2B-EC and its numerous benefits, there is very limited research on the effects of organizational benefits and constraints on evaluation in Australia. Therefore, there is a need to conduct more research on the process of IS/IT investment evaluation and benefits realization in Australian organizations involved in B2B-EC activities. The key objective of this exploratory research into IS/IT investment evaluation and benefits realization is to establish current practices and norms in managing IS/IT benefits and evaluation by B2B-EC companies in Australia. Four research questions are proposed:

1. organizations which had high usage of evaluation methodologies or processes were more satisfied about their B2B-EC activities, than those which had adopted little or no evaluation methodologies or processes.
2. organizations which had a high level of organizational constraints tended to evaluate less than those organizations which had a low level of organizational constraints.
3. organizations which had adopted both evaluation and benefits realization methodologies had encountered less constraints in relation to the evaluation of B2B-EC than those organizations which did not adopt any of the methodology.
4. organizations which had adopted both evaluation and benefits realization methodologies had encountered more benefits in relation to the evaluation

of B2B-EC than those organizations which did not adopt any of the methodology.

In an attempt to answer the above four research questions, 30 mini-case studies on large Australian organizations were conducted by the authors (two mini-cases were not included due to the fact that these two organizations did not have any B2B-EC systems in place). The case study was chosen because it enabled the researcher to evaluate and compare results from the survey, clarified doubts, ensured that the responses were properly understood by repeating or rephrasing the questions, and gain in-depth understanding of the issues arising from the survey. This reasoning has been supported by Rouse and Dick (1994) who have stated that many information systems practices are difficult to investigate using only positivist approaches and this difficulty has been recognized in other disciplines that are concerned with social behavior.

IS/IT procurement executives from 28 large Australian organizations (see Table 1) were interviewed in 2004. All of these organizations have been trading for many years and are among the top 500 Australian organizations. The questions asked during the interviews were related to these organizations' B2B-EC usage and types, organizational benefits and constraints, reasons for evaluation, and their evaluation and benefits realization practices. Other data collected for this research included company documents and annual reports. Qualitative content analysis by Miles and Huberman (1994) was used to analyze the data from the case study. The analysis of the case study results was conducted in a cyclical manner and the results were checked by other experts in the field. Finally, the guidelines set out by Klein and Myers (1999) for conducting and evaluating interpretive field studies in information systems were also followed in an attempt to improve the quality of this research by minimizing some of the case study's main weaknesses mentioned above (e.g. human subjectivity and inexperienced researcher).

4. Research Findings

A number of interesting issues and results emerged from the analysis of the text data and the key issues are presented below in some detail. Some of the results listed below were consistent with the findings in the literature and others were not mentioned in the literature.

Table 1. Organizations interviewed

Organizations interviewed	
1. Agribusiness Co.	16. Mining Co.
2. Hospital	17. Food Co.
3. Primary Industry Association	18. Power Co.
4. Entertainment Co.	19. Soft Drink Co.
5. Construction Co.	20. State Health Services
6. Services Co.	21. Tobacco Co.
7. Religion Community Service	22. Engineering Co.
8. Water Co.	23. Snack Co.
9. Beverage Co.	24. National Mining Co.
10. Transportation Co.	25. Department Store
11. Wholesale Co.	26. Retail Co.
12. University	27. State Education & Welfare Agency
13. Bakery Chain	29. Sporting Gears Co.
15. Local Council	30. Toy Retail Co.

4.1. Research Question One

The first research question relates to the use of IS/IT investment evaluation methodology and satisfaction of using B2B-EC systems (please refer to Figure 1). The interview data indicated that organizations which had high usage of evaluation methodologies or processes were more satisfied about their B2B-EC activities. Most of the organizations interviewed agreed that there was a direct relationship between the satisfaction of using B2B-EC and the use of IS/IT investment evaluation methodology (please refer to Figure 1 below). Generally speaking, those organizations which had adopted an IS/IT investment evaluation methodology were at least somewhat satisfied with their use of B2B-EC. Furthermore, those organizations which had adopted little or no evaluation methodologies or processes had low satisfaction in their use of B2B-EC systems. Finally, no direct relationship between the satisfaction of using B2B-EC and the use of IS/IT benefits realization methodology was found in this research.

Satisfaction of Using B2B-EC High Medium Low	High Usage	10, 12, 23 27, 34	12, 28 12, 28	30
	Medium Usage	4, 8	7, 11, 15, 16, 17 24, 25	
	Low Usage		22	18, 19, 22
		High Usage	Medium Usage	Low/No Usage
IS/IT Investment Evaluation Methodology				

Figure 1. The use of IS/IT Investment Evaluation Methodology vs B2B-EC Satisfaction

4.2. Research Question Two

The second research question relates to the use of IS/IT investment evaluation and benefits realization methodologies and their relationship with organizational constraints (please refer to Figure 2). The data collected for this research suggested that organizations which had a high level of organizational constraints tended to evaluate less than those organizations which had a low level of organizational constraints. There appeared to be a direct relationship between the organizational constraints and the use of IS/IT investment evaluation methodology.

Organizational Constraints High Medium Low	High Usage		9, 16	18
	Medium Usage	4, 10, 11, 15	7, 17, 22, 24, 25	4, 6, 15, 21, 30
	Low Usage	1, 3, 23	2, 4, 12, 13, 27 28, 29	
		High Usage	Medium Usage	Low/No Usage
IS/IT Investment Evaluation Methodology				

Figure 2. IS/IT investment evaluation methodology vs organizational constraints

4.3. Research Question Three

The fourth research question relates to the use of IS/IT investment evaluation methodology (IEM) and benefits realization methodology (BRM) and their relationship with evaluation constraints (please refer to Figure 3). In this case, there appeared to have a direct relationship between the evaluation constraints and use of both IS/IT investment evaluation methodology and IS/IT benefits realization methodology. Those organizations which had adopted both evaluation and benefits realization methodologies tended to have low constraints in relation to the evaluation of B2B-EC. It

is arguable that organizations that had adopted both methodologies were only able to do so because of low evaluation constraints. Those organizations which had medium or high evaluation constraints were not able to implement both methodologies together.

Evaluation Constraints High Medium Low	High Usage	9, 11, 16		
	Medium Usage	10, 13, 18, 23 24, 25, 27		2, 3, 18, 31
	Low Usage	4, 6, 12, 26	1, 4, 6, 15	19, 30
		IEM	IEM & BRM	None
Use of IS/IT Evaluation Methodologies				

Figure 3: IS/IT evaluation methodologies vs evaluation constraints

4.4. Research Question Four

The fourth research question relates to the use of IS/IT investment evaluation and benefits realization methodologies and their relationship with evaluation benefits (please refer to Figure 4). There appeared to have a direct relationship between the evaluation benefits and use of IS/IT investment evaluation methodology and/or IS/IT benefits realization methodology. Those organizations which had adopted any evaluation methodology tended to have medium or high evaluation benefits in relation to the evaluation of B2B-EC. Those organizations which had low evaluation benefits did not evaluate. In addition, most of organizations which had adopted IS/IT investment evaluation methodology despite low evaluation benefits did so because of company policy or government regulation.

Evaluation Benefits High Medium Low	High Usage	9, 10, 11, 16, 24 27, 28, 29	12, 28	19
	Medium Usage	4, 7, 27	4, 6	
	Low Usage	5, 10, 11, 12, 24		2, 3, 18, 21, 30
		IEM only	IEM & BRM	None
Use of IS/IT Evaluation Methodologies				

Figure 4: IS/IT evaluation methodologies vs evaluation benefits

5. Discussion and Conclusions

Several interesting findings were presented in this paper. Firstly, the paper has established that organizational satisfaction of B2B-EC usage had a direct relationship with the adoption of the IS/IT investment evaluation methodology. Similarly, those organizations that did not use the methodology tended to be unsatisfied with their B2B-EC usage. Secondly, there was a tendency for organizations to evaluate less when their organizational constraints were high. Those organizations which had lower organizational constraints tended to evaluate more as well as to make sure that the expected benefits were delivered.

Finally, there appeared to have a direct relationship between the evaluation benefits and the use of either or both methodologies. Almost every single organization which had medium or high level of evaluation benefits was able to adopt at least one of the methodologies. Furthermore, most organizations were still using EDI as their primary B2B-EC system. Extranet, electronic marketplace and other systems were not widely used by most organizations. Their primary B2B-EC system was being used as a system that provided key operational process, had strategic importance, and would perhaps become important in the future for the organizations.

When considering the wider significance of this study it must be remembered that the success of a B2B-EC initiative is dependent on a wide range of managerial issues such as IS/IT investment evaluation, benefits realization and management of organizational constraints. While the establishment of an effective evaluation has been shown to play an important role in the successful deployment and operation of B2B-EC, it cannot, alone, guarantee the successful outcome of e-business initiatives, as the organizations' expected benefits have to be managed carefully and delivered.

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