



Research on IS/IT Investment Evaluation and Benefits and Realization

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ABSTRACT

It has been shown that IS/IT investments in many organizations are huge and increasing rapidly every year and yet there is still a lack of understanding of the impact of proper IS/IT investment evaluation processes and practices in these organizations. At the same time, the issue of expected and actual benefits realized from IS/IT investments has also generated a significant amount of debate in the IS/IT literature amongst the researchers and practitioners. This paper reviews progress made in research in this area, presents the key findings of a research program in this area and proposes a second research program incorporating surveys and case studies to assess current practice in Taiwanese B2BEC companies. It is anticipated that the results from these two research programs will allow the authors to compare the IS/IT investment evaluation and benefits realization practices between Australian and Taiwanese organizations.

INTRODUCTION

The measurement of the business value of IS/IT investment has been the subject of considerable debate by many academics and practitioners and the term "productivity paradox" arises from studies that reveal static productivity and rising IS/IT expenditure (Hochstrasser, 1993). Despite large investments in IS/IT over many years, it has been difficult to determine where the IS/IT benefits have actually occurred, if indeed there have been any.

IS/IT INVESTMENT EVALUATION: RECENT RESEARCH

In recent years, many senior managers have come to realize that it is increasingly difficult to justify the costs surrounding the purchase, development and use of IS/IT (Fitzgerald, 1998). In fact, according to Hochstrasser and Griffiths (1991), few companies consistently state that IS/IT is indeed value for money.

Globally, it has been estimated that computer and telecommunication investments now amount to half or more of most large organizations' annual capital expenditures (Willcocks and Lester, 1997). Gartner estimates that total spending will rise from US\$2.04 trillion in 2001 to \$2.53 trillion in 2006 (an annual increase of 4.4%) (De Souza et al., 2003).

The expenditure on IS/IT investments by organizations is also large and rising. In Australia, the Federal Government announced that, starting in 1998, it would commit \$1.2 billion over five years to boost the effective use of IS/IT in business and investment industry (Mitchell, 1998). Australian Federal Government continues to invest heavily in IS/IT via key IT programs such as *Networking the Nations* (A\$77 million), *Building on IT Strengths* (A\$2.9 billion), and *Backing Australia's Ability* (A\$464 million) (ALIA, 2003).

Elsewhere in Asia-Pacific region, the IS/IT spending has increased dramatically as well. In Taiwan, the total IS/IT spending in 2001 was

US\$6.6 billion, up from US\$2.7 billion in 1993 (MAIT, 2002). Gartner forecasts that the IS/IT spending in Asia-Pacific region will increase from US\$203 billion to US\$289 billion in 2006 (7.3% increase) (De Souza et al., 2003).

EMERGING PROBLEMS/CHALLENGES

Amid all these IS/IT expenditure increases, several research studies have suggested that at least 20% of the IS/IT expenditure is wasted, and that between 30-40% of IS/IT projects realize no net benefits (Dhillon and Backhouse, 1996). Investigation into the benefits of IS/IT projects have regularly shown that, 60% of the time, IS/IT projects are either discontinued or provide benefits at levels well below those expected (Hochstrasser, 1993).

Ballantine et al. (1996) identified a number of problems that are frequently encountered during evaluation practice. These include difficulty in identifying and subsequently quantifying relevant benefits and costs, and neglecting intangible benefits and costs. These problems in IS/IT evaluation are usually complex and therefore, can affect the determination of the expected IS/IT benefits.

These problems include: (1) the budgeting practice of many organizations often conceals full costs; (2) the traditional financially oriented evaluation techniques (i.e. ROI, NPV, PI, cost/benefits) can be problematic in measuring IS/IT investments; (3) many project managers overstate costs at the feasibility stage, with the express purpose of making sure that they could deliver within time and budget; (4) many organizations have failed to devote sufficient time and effort to IS/IT; and (5) the lack of IS/IT planning and hence the failure to create a strategic climate in which IS/IT investment can be related to organizational direction can lead to measurement problems.

The difficulties in measuring benefits and costs are often the cause for uncertainty about the expected benefits of IT investment and hence are the major constraint to IS/IT investments (Renkema and Berghout, 1997). Hence, evaluation is often ignored or carried out inefficiently or ineffectively because of its elusive and complex nature (Serafeimidis and Smithson, 1996).

RESEARCH SIGNIFICANCE AND OBJECTIVES

Most of the studies that have been done to date have been carried out in UK or the USA. Very little published work has been conducted in Australia or indeed in Asia. 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 organizations is essential. The difficulties of evaluation and benefits realization processes are often the determining factors in the application of any formal methodology, and must be addressed if the processes are to be understood (Symons and Walsham, 1988).

Some of the reasons why it is important to conduct more research in the process of IS/IT investment evaluation in Australian organizations include:

- IS/IT investments in organizations are huge and increasing (Ballantine et al. 1996).
- There is still a lack of understanding of the impact of IS/IT investments evaluation and benefits realization processes in most organizations (Symons and Walsham, 1988).
- IS/IT investments evaluation is often the subject of heated debates amongst the researchers and practitioners over the realization of actual and expected benefits of such investments (Hochstrasser, 1990).
- There is a growing need to evaluate and improve measurement of the benefits of IS/IT investments in organizations (Rai et al., 1997).

To date this research program has been conducted within Australia and has sought to better understand some of the problems in IS/IT investment evaluation and benefits realization as mentioned above. The key objectives of the research program are:

1. to determine current Australian industry and government practices and norms in managing IS/IT benefits and evaluation.
2. to develop an approach, model or framework based on the fit between theory and practice of IS/IT investment evaluation by large Australian organizations.

RESEARCH METHODOLOGIES

The research methods that have been used in this research program are survey and case study. Each research method is related to a single research objective. To satisfy objective 1 above, the survey method has been used as it is considered an appropriate mechanism for gathering this type of information.

Surveys

Specifically, the survey research sought to:

1. determine how benefits from IS/IT investments were identified, evaluated, structured, delivered and realized by organizations.
2. determine what criteria and methodologies were used to evaluate as well as to realize appropriate and adequate benefits by organizations from their IS/IT investments.
3. determine how organizations in Australia attempt to review and improve their current evaluation and benefits realization processes and practices from their IS/IT investments. The results from the questionnaire were used to compare the results from case studies.

Case Studies

In the case studies, a total of 20 interviews were conducted with 19 participants from two Western Australian state government departments (case 1 and case 2) and one or two participants from each of four major external outsourcing contractors. The questions asked during the interview were related to their outsourcing contracts, the contractual relationship with contractors, IS/IT investment evaluation methodology deployed, benefits realization process used, and the management of the contract transition period. All interviews were taped and the transcripts were sent to the interviewees for validation. Other data collected included some of the actual contact documents, planning documents and some minutes of relevant meetings. More than 250 pages of transcripts were coded and analyzed. The analysis was conducted in a cyclical manner and followed guidelines for interpretive research (ie. multiple interpretations) set out by Klein and Meyers (1999). Moreover, this case study drew reference from published literature and linked it with the interview data, contract documents, and other relevant materials.

THE RESULTS

The sections below provide some key results from the survey and case studies.

Survey Results

Some of the key results from the survey are presented below. For full results please refer to Lin and Pervan (2003). The key results are:

- there was a strong emphasis on cost reduction and other benefits, and a reasonable level of confidence in the delivery of these benefits by respondents.
- 65.7% and 32.8% of the survey respondents indicated that they had used IS/IT investment evaluation methodology and IS/IT benefits management methodology, respectively.
- only financial accounting-based measures were used by the respondents to evaluate their IS/IT investments (e.g. NPV, cost/benefits analysis (CBA) and return on investment (ROI)).
- 50% of survey respondents believed that their current project justification process failed to identify all available benefits for a project while 67.2% of the respondents believed that their current process was able to quantify the relevant benefits.

The findings seemed to be inconsistent. On one hand, most respondents claimed that they had used IS/IT investment evaluation and benefits realization methodologies and were able to quantify the relevant benefits. On the other hand, no formal IS/IT investment evaluation and benefits realization methodologies were identified by the respondents and half pointed out that their current project justification process failed to identify all available benefits. These findings pointed to a need to conduct case studies to examine these issues more closely and to address objective (2) of the research program, which was to develop some sort of model of this process.

Case Study Results

A number of issues emerged from the analysis of the data collected and the key issues are presented below. An interpretive analysis of the interviews and other documents revealed that for both cases:

- no formal IS/IT investment evaluation methodology was used.
- an informal IS/IT investment evaluation process was used.
- there was a lack of understanding of the evaluation approach.
- there was a focus on quantitative IS/IT investment evaluation measures.
- there were conflicting motivations for outsourcing.
- there were different perceptions of success of the contracts by stakeholders.
- there was a conflict between motivations and success criteria for outsourcing.
- there was a general lack of commitment by contractors.
- there was a lack of user involvement/participation in contract development.
- there appeared to be an embedded contract mentality.
- they were impeded by restrictive government outsourcing contract guidelines.

The issues identified above were faced by both cases. Neither organization employed a formal IS/IT investment evaluation methodology (although an informal process was used) and had problems of understanding what an IS/IT investment evaluation was. These led to several problems and had affected the performance of the contracts. Firstly, there was a focus on only quantitative measures and almost no qualitative measures were used. Moreover, both organizations and their contractors were unable to point to the exact motivations of the contracts and as a result, they perceived the success of contracts differently. Therefore, it was not surprising that the criteria for measuring the success of the contracts was not linked to the motivation for having the contracts. Without a formal methodology, there was no process to ensure that the users were involved in the entire contract life cycle. The lack of understanding or awareness of the IS/IT investment

evaluation concept had ultimately led to users having embedded contract mentality. This was because there were no other ways for the organizations to measure the performance of the contracts and the contractors. Finally, the restrictive nature of the government outsourcing contract guidelines was also problematic for both organizations as it had contributed, at least partly, to a formal IS/IT investment evaluation methodology not being used.

One matter that set the two organizations apart was that the second organization had used a formal benefits realization methodology. (The first organization did not use a formal or informal IS/IT benefits realization methodology.) Hence the second organization had avoided some problems encountered by the first organization, such as:

- a lack of understanding of benefits management practices.
- an IS/IT skill shortage within the organization.
- complicated contract arrangements.
- over-reliance on a single contractor.
- inability to manage the outsourcing contracts without external influence and assistance.

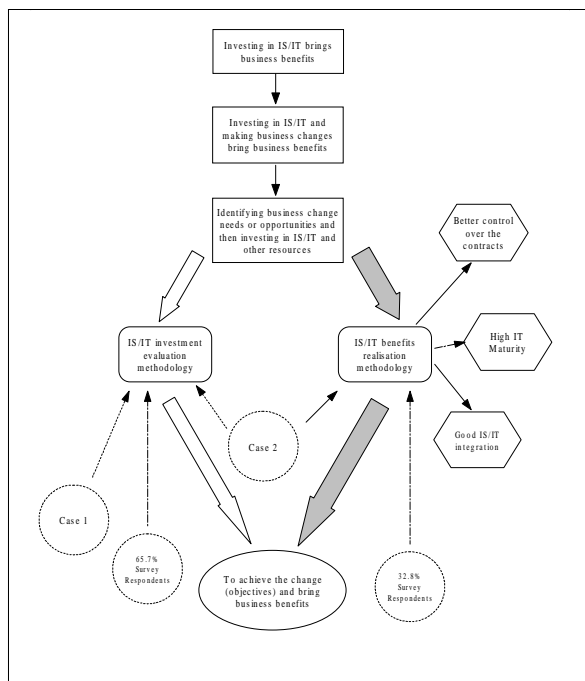
The negative issues shown above indicated weaknesses in the way the first organization dealt with the level of formality in applying the methodologies. The problems mentioned above were mostly caused by the lack of attention to the IS/IT investment evaluation and benefits realization.

For example, if both formal methodologies were adopted by the first organization, more qualitative measures may have been used to evaluate the outsourcing contracts (a focus on quantitative IS/IT investment evaluation measures). This, in turn, may have allowed the first organization to realize some of the problems that existed within the organization (e.g., embedded contract mentality) and invest an appropriate amount of time and effort to reduce or eliminate at least some of these problems.

THE ANALYSIS OF KEY RESULTS

Through further detailed analysis of the data collected via survey and case studies, the authors were able to conclude that those organizations which employed a benefits realization methodology (BRM) were more likely to: (a) use formal processes for their investment evaluation and benefits realization activities; (b) be more confident about what they

Figure 1: Key research findings



do in their IS/IT activities; (c) have better integration of their IS/IT functions; and (d) manage their projects or contracts to achieve better results and with less problems. It could also be that organizations with high IT maturity are more likely to be able to implement a benefits realization methodology while low IT maturity organizations are less likely to be able to implement the methodology.

As indicated by the research results, in order to identify business change needs or opportunities the organizations need to implement IS/IT investment evaluation and benefits realization methodologies. Figure 1 below shows that while most responding organizations had used some sort of IS/IT investment evaluation methodology, only a small percentage of organizations had employed benefits realization methodology. For example, the organization in case 2 which had used a formal benefits realization methodology experienced greater control over its outsourcing contracts and better IS/IT integration within the organization than the organization in case 1 which had no formal or informal benefits realization methodology. Therefore, the usage of IS/IT investment evaluation methodology and/or IS/IT benefits realization methodology would probably increase an organization's IT maturity. It is also possible that organizations with higher IT maturity are more likely to adopt a formal benefits realization methodology. Please note that although part of the diagram (first three boxes) was from Earl (1992), the model represented below in Figure 1 arises substantially from this research.

FUTURE RESEARCH PROGRAM

With the completion of the first research program, the second research program has been initiated. It also includes a questionnaire survey and case studies. The main target of the questionnaire survey is Taiwanese companies involved in business-to-business electronic commerce (B2BEC) activities. The questionnaire is partly based on a previously validated questionnaire conducted by Ward et al. (1996) in the UK. Prior to determining the sample size for the survey, a pilot survey of 10 B2BEC companies in Taiwan was conducted. The purpose of the pilot survey was to test the suitability of the questionnaire. Questionnaires were hand-delivered to the IT managers/CIOs of 10 B2BEC companies for survey review. The response rate for this pilot study was 100% and comments about the questionnaire were all positive. Therefore, the questionnaire was not altered for the main survey.

The second research program complements and extends the first research program by testing the model shown in Figure 1 in the B2BEC environment in Taiwan.

For the main survey, the organizations were selected from a list published by a semi-governmental organization - Institute for Information Industry (III, 2003). Questionnaires were sent to 304 B2BEC organizations in Taiwan in June 2003. So far, questionnaires have been received from 99 B2BEC organizations (response rate is around 33%), which comprised industries from manufacturing, services, electronics, high-tech, information technology, financial services, education, plastics, timber, transportation, hospitality, medical sectors.

The data from the survey is in the process of being analyzed in accordance with objectives stated earlier in the paper. Some pilot interviews will be conducted first to test the suitability of the forthcoming case studies. The case studies will then be carried out in some of these B2BEC companies in Taiwan in order to properly evaluate and compare results from the questionnaire as well as to further test and refine the framework developed in the first research program.

CONCLUSION

Despite large investments in IS/IT over many years, it has been difficult for organizations to determine where the IS/IT benefits have actually occurred, if indeed there have been any. IS/IT investment evaluation practice remains one of the most controversial and debated topics in the IS literature to date. There is still a lot to be learned in the area of processes and practices of IS/IT investment evaluation and benefits management in Australian and Taiwanese organizations. It is the hope of the authors that more studies in the practice of IS/IT investment evaluation will benefit other researchers in this field and the business community as a whole. Through the research programs intro-

duced in this paper it is hoped that better approaches may be made to organizations. However, given the scale of the task it is hoped that other IS/IT researchers may also become involved in sharing results and joint developments.

REFERENCES

- ALIA (2003) *Federal Budget 2002*, ALIA Publishing, Source: [On-Line] <http://www.alia.org.au/publishing/budget.analysis/2002.html>
- Ballantine, J.A., Galliers, R.D., and Stray, S.J. (1996) Information Systems/Technology Evaluation Practices: Evidence from UK Organizations, *Journal of Information Technology*, 11, 129-141.
- De Souza, R., Narisawa, R. Goodwin, R., and Hazra, K. (2003) *IT Business Spending to Recover in Late 2003*, Gartner, 22 January.
- Dhillon, G. and Backhouse, J. (1996) Risks in the Use of Information Technology within Organizations, *International Journal of Information Management*, 16, 1, 65-74.
- Earl, M. J. (1992) Putting IT in Its Place: A Polemic for the Nineties, *Journal of Information Technology*, 7, 100-108.
- Fitzgerald, G. (1998) Evaluating Information Systems Projects: a Multidimensional Approach, *Journal of Information Technology*, 13, 15-27.
- Hochstrasser, B. (1990) Evaluating IT investments - Matching Techniques to Projects, *Journal of Information Technology*, 5, 215-221.
- Hochstrasser, B. (1993) Quality Engineering: A New Framework Applied to Justifying and Prioritising IT Investment, *European Journal of Information Systems*, 2, 3, 211-223.
- Hochstrasser, B. and Griffiths, C. (1991) *Controlling IT Investment: Strategy and Management, 1st Ed*, Chapman & Hall, London.
- III (2003) *Institute for Information Industry (III)*, Source: [On-Line] <http://www.iii.org.tw>.
- Klein, H. K. and Myers, M. D. (1999) A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems, *MIS Quarterly*, 23(1), 67-94.
- Lin, C. and Pervan, G. (2003) The Practice of IS/IT Benefits Management in Large Australian Organizations, *Information and Management*, 41(1), 13-24, October.
- MAIT (2002) *Country Intelligence Report – Taiwan*, Source: [On-Line] <http://www.mait.com>, 1, September.
- Mitchell, S. (1998) Finally, an IT Policy, *Australian Personal Computer*, February, 13-14.
- Rai, A., Patnayakuni, R. and Patnayakuni, N. (1997) Technology Investment and Business Performance, *Communications of the ACM*, 40, 7, July, 89-97.
- Renkema, T.J.W. and Berghout, E.W. (1997) Methodologies for Information Systems Investment Evaluation at the Proposal Stage: A Comparative Review, *Information and Software Technology*, 39, 1-13.
- Serafeimidis, V. and Smithson, S. (1996) The Management of Change for Information Systems Evaluation Practice: Experience from a Case Study, *International Journal of Information Management*, 16, 3, 205-217.
- Symons, V. and Walsham, G. (1988) The Evaluation of Information Systems: A Critique, *Journal of Applied Systems Analysis*, 15, 119-132.
- Ward, J., Taylor, P. and Bond, P. (1996) Evaluation and Realisation of IS/IT Benefits: An Empirical Study of Current Practice, *European Journal of Information Systems*, 4, 214-225.
- Willcocks, L. and Lester, S. (1997) "Assessing IT Productivity: Any Way Out of the Labyrinth?", Ch. 4, in Willcocks, L., Feeny, D.F. & Islei, G. (Eds.), *Managing IT as a Strategic Resource*, McGraw-Hill, London, 64-93.

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