Measuring the Business Value of IS Investments: A Pilot Survey of Industry Attitudes and Practices

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MEASURING THE BUSINESS VALUE OF IS INVESTMENTS:

A PILOT SURVEY OF INDUSTRY ATTITUDES AND PRACTICES

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ABSTRACT

Information technology (IT) has been in use in organisations for many years but there is a growing concern that the massive investments made in this area have failed to produce the expected economic benefits. Traditionally, cost benefit analysis has been used to aid the decision making process when a new IT project is proposed, but there are strong arguments that indicate that this well-accepted approach is inappropriate for the evaluation of IT investments. Although much theoretical work has been done on alternative approaches, there is no documented evidence of the techniques currently being applied in industry. A small survey, which was conducted to obtain a preliminary view of the attitudes of some organisations to the evaluation of IT and to identify the techniques that were used, is described. The survey indicated that the measurement of the business value of IT investments was of concern to organisations, particularly those where IT played a strategic role and organisations were generally concerned about the current approaches to the measurement of the intangible benefits of projects. However, a high degree of satisfaction was expressed with approaches that linked the measurement of intangible benefits directly to the corporate strategic goals.

Introduction

Information technology (IT) has been in use in organisations for up to about thirty years but there is a growing concern that the massive investments made in this area have failed to produce the expected economic benefits. Traditionally, cost benefit analysis has been used to aid the decision making process when a new IT project is proposed, but there are strong arguments that indicate that this well-accepted approach is inappropriate for the evaluation of IT investments. This paper reviews some alternative approaches suggested in the literature and identifies the paucity of knowledge of the techniques currently being applied in industry to the evaluation of IT projects. A small survey, which was conducted to obtain a preliminary view of the attitudes of some organisations to the evaluation of IT and to identify the techniques that were used, is described.

Description of the Problem

Although organisations are continuing to invest many millions of dollars in information technology (IT), management is no longer satisfied by the technical arguments for investment in IT or promises of future benefits, but increasingly is demanding evidence that every dollar invested in IT should 'pay its way'. (Australian, 22/5/90).

The Datamation survey of Information Systems (IS) budgets showed that organisations expected that their IS budgets for 1991 would increase by an average of only 3.4% compared with those of the previous year. After accounting for inflation, this would imply that little, if any, growth was expected. (Datamation 15/4/91). In such an economic climate, when IT has to compete with other parts of the organisation for its share of resources, it is essential that the benefits resulting from the investment in IT can be clearly demonstrated. In addition to the current economic uncertainty and effects of corporate decentralisation, the Datamation survey cited "a rising tide of upper management scepticism over the real benefits of IT investments" as a major factor contributing to the reduction in the growth of IS investment.

Justifying the IS Project

Cost benefit analysis (CBA) has traditionally been used as a major justification for the investment of resources in an IT project and in the days when information systems were directed towards cost displacement this was a fairly satisfactory tool. However, Knutsen and Nolan (1974) were probably the first to suggest that cost savings or return on investment (ROI) should not be the only consideration. They pointed out that computer systems are agents of change and benefits of all types should be considered, not just those that can be quantified. Knutsen and Nolan identified that investment in IT should be directed towards the mainstream business (e.g. marketing, production control) but warned that it was much easier to quantify the benefits of automating clerical accounting systems. Keen (1975) also identified

that it was increasingly difficult to apply CBA to systems concerned with aiding management decisions and that the problem of assessing the qualitative benefits of a system must be addressed.

Many authors since then have discussed the disadvantages of using CBA - some have suggested enhancements to the technique and others, alternatives. Lay (1985) pointed out that if the result of the CBA is to be of value, the costs and benefits must be estimated with reasonable accuracy. There are some difficulties in estimating the costs but considerably greater ones in estimating the intangible benefits. For example, how would one include in a CBA the use of an IS to keep up with competitors?

An additional concern is that the result of a CBA is often given undue weight in the decision-making process. It is a concept which is easily understood and managers feel comfortable making decisions based on quantified costs and benefits (Parker and Benson, 1988). Litecky (1981) proposed an enhancement to the traditional CBA technique which caused management to focus attention on the intangible benefits and, having guessed or estimated a value for each, assign probabilities to their attainment.

As organisations direct the thrust of their investment in IT beyond the earlier cost displacement systems and towards systems which provide benefits such as better information, better customer service and closer relationships with suppliers, the benefits become increasingly difficult to measure. Such systems, in addition to providing benefits that are difficult to measure, carry a much greater degree of uncertainty than traditional DP projects. The benefits are unpredictable and there is significant liklihood that there will be no benefits at all (Gremillion and Pyburn, 1985). If we continue to rely on the traditional techniques such as CBA to justify these projects, it is likely that management will select the alternative that offers a more predictable return on investment and there is the danger that significant opportunities may be missed. Parker and Benson (1988) cite an example in which a number of projects are ranked using both traditional ROI and according to their value as seen by the business. A Customer/Sales Profile system was evaluated by the business management as having the greatest potential effect on business performance but obtained the lowest ROI value because it did not directly reduce other costs or contribute short-term incremental revenues. If an investment decision is based solely on the traditional ROI and other non-financial business objectives ignored, systems that are of strategic importance to an organisation may be given low priority for development.

A number of sources suggest using a portfolio approach to investment in IT projects. One approach suggested in IS Analyser (1987) is to categorise the systems which are candidates for development according to their cost and degree of certainty - producing a 2 x 2 matrix. A portfolio of systems is then selected with members from each cell. In a round table discussion reported in Datamation (1/4/87), Robert Regazzi, vice-president of IS at Schering-Plough Corporation, was asked how his organisation justified their IT development costs. He described how different types of systems (operational, tactical and strategic) required different measurements of

contribution. For strategic systems, he said that organisations were making bets on obtaining a high return on their investments and some kind of block funding was required to spread the risk over a number of these projects.

Gremillion and Pyburn (1985) also suggested the use of the portfolio approach when organisations are planning to implement Management Support Systems (MSS) which they defined as systems which focus on making managers and professionals more productive and effective. The uncertainty of the outcome from these systems could deter management from supporting them, but adopting a portfolio of MSS projects, each with a relatively small chance of the "big pay off", increased the chance of the overall investment providing a significant payback. They likened this approach to supporting a portfolio of research and development projects and they suggested that the portfolio of projects be configured such that:

1. Projects with very uncertain pay offs (high risk) are kept as small as possible until more is known about the outcome;

2. Some "sure winners" are included, even if their pay off is not likely to be large;

3. Projects will be scrapped when their "risk/reward" profile is found to be out of balance.

The introduction of Office Automation (OA) systems has highlighted the need to measure the benefits that such systems produce. In attempting to determine the value of OA systems, measurement techniques have generally focused on increases in efficiency but the greatest pay off is caused by the effect OA has on the jobs of office workers. They do not necessarily do more or do it faster, but the nature of their work is changed. OA leads to increased effectiveness (I/S Analyser 1987).

Sassone and Schwartz (1986) addressed this issue by using a two part procedure called Work Profile Analysis. This is performed at the department level. Employees are classified into groups (managers, senior professional, junior professional, administration assistants and technicians, secretaries) and the main activities performed are identified. Logs are used to determine the percentage of time spent on each type of activity by the five groups of employees. Managers then predict the expected shift in time allocation resulting from the introduction of the OA system. Then, based on the average salaries of the five groups, it is possible to calculate the value to the organisation of that shift using the Hedonic wage model (a technique which recognises that jobs have identifiable components with different implicit values). This is a measure of the expected increase in effectiveness of the work group.

Parker and Benson (1988), suggested that the value of an information system to the business unit should be the focus of attention. They defined value as "the effect information technology has on overall performance of the firm" and cost reduction and revenue production (the traditional benefits) are only two components of value.

They emphasised that all the tangible benefits should be included in a CBA, including benefits due to:

> Value Linking - the ripple effect of the changes due to the new system throughout the organisation.
>
> Value Acceleration - the time dependant issues i.e. the earlier achievement of a result can itself provide an economic benefit.
>
> Value Restructuring - the productivity increase achieved by moving the efforts of a department to higher value activities (using the Hedonic Wage Model suggested by Sassone and Schwartz).

Having identified all the economic benefits, this technique also included important intangible factors, in particular, the extent to which a system supported the overall corporate objectives. It also identified IS benefits such as a system supporting the IS strategic architecture and some intangible aspects of risk such as technical uncertainty. A weighted score was then calculated based on all the benefits, both tangible and intangible, and this enabled different types of systems to be ranked according to their overall value to the organisation.

Using The Experience Of Organisations

Thus there are a number of suggestions in the literature on how the benefits, particularly the intangible benefits, resulting from a proposed information system may be specified, but there is very little information available on how organisations actually decide whether the investment in a particular IT project is justified. The research to date has focused on the measurement of business value of IT investments from a theoretical viewpoint. The knowledge and experience of practitioners in organisations has not been included. Benbasat et al.(1987) suggested that, in IS, researchers investigating managerial rather than technical questions, often find themselves trailing behind practitioners and

> "Researchers usually learn by studying the innovations put in place by practitioners, rather than providing the initial wisdom for these novel ideas."

The authors used the management of end user computing (EUC) as an example. In the late 1970s and early 1980s, as organisations were experiencing a rapid growth in the use of EUC, academics were not able to provide guidelines as to how this new phenomenum could be effectively managed. It was not until Rockart and Flannery (1983) conducted a comprehensive study of how organisations were actually managing the situation that a useful set of guidelines was produced.

Objective of this Study

The nature of the benefits resulting from the use of IS will depend upon the type of system. For example, some systems will have a direct impact on the "bottom line" figures such as sales, market share or profit margins and others should be treated as

foundation systems - necessary to the operation of the organisation but generally only indirectly impacting the strategic or competitive position of the organisation. It is likely that the processes required to determine the value to the business of these two types of systems would be quite different.

The perception of value of an information system is also subjective. Hawgood and Land (1988) identified a number of stakeholders. A system's sponsor, users, builders and operators will each have different expectations of a system and will identify different qualities as being important. In addition, stakeholders outside the organisation who are affected by the new system and who may be the main target will expect perhaps an improved service or range of products. Thus an evaluation of the benefits of an information system should encompass the perceptions of all stakeholders.

The aim of this research is to determine how organisations evaluate their investment in IT. The substantial work done on the theoretical aspects of evaluation lacks the complementary knowledge gained by organisations which are now facing the challenge of evaluating their IT investments. This research therefore aims to bring together the knowledge of theoreticians and practitioners, compare the approaches suggested by the researchers with those actually being used and develop a practical framework for the evaluation of the business value of IT investments.

The research approach includes two stages of information gathering. A pilot survey to determine some indications of attitudes and approaches to the evaluation of IT will be followed by a more detailed study of organisations in a limited number of industry areas.

The Pilot Survey

Graduate students taking the unit Systems Project Management in the Business Faculty of Swinburne Institute of Technology sought responses to the questionnaire from the companies with which they were employed. No attempt was made to select organisations in a structured or random way, but it was considered that this means of obtaining information was appropriate for a preliminary study that would be used mainly to obtain an indication of some industry attitudes and practices. The results of this small survey can therefore not be extrapolated to form conclusions about organisations in general. The students who collated the response from their organisation sought the required information from whomever they considered to be the most appropriate person. Thus no control was placed over the actual respondents to the questions and it is likely that this would introduce some bias into the results as the position of the respondent in the organisation would influence the response to some questions.

Although this method of data collection has some deficiencies, it is expected that the results will nevertheless provide some indication of the situation in industry and will possibly suggest areas which should be examined in more detail in the later part of the study.

The test instrument covered three main areas.

a) Organisational profile

This section sought to obtain information about the organisations participating in the survey and in particular the extent of their experience with information systems and the commitment of their senior management to IS. An indication of the strength of the linkage between the development of their IS strategy and the business strategy was also sought. The linkage between the stategic planning processes of the business and IS functions can range from non-existent, when the IS function will react in an unplanned way to business needs, to a fully integrated business and IS strategic plan. Wysocki and Young (1990) suggested that organisations in which the main objective of the IS department is cost reduction are likely to use standalone planning whereas organisations that expect their IS to affect their stategic direction will have a strong link between the IS and business planning process.

b) Organisational policy on IS investment decisions

This section covered the policies that organisations had in place to direct and control the decision-making process for IS investments and also sought to determine how important the measurement of the value obtained from IS investments was to the organisations. Respondents were asked to provide information about cost justification procedures, guidelines available for determining the benefits, post implementation reviews and the degree of satisfaction with the methods used to measure the benefits.

c) Assessing the business value obtained from individual projects

Respondents were then asked to provide information on three projects either in progress or completed up to eighteen months previously. They were asked to select projects that were typical of the range of projects undertaken by the organisation and it was hoped that information on a wide range of projects would be provided. Details of the overall objectives and costs of the project were requested and respondents were asked to categorise the project according to whether the system was seen as transactional, informational or strategic - a well accepted taxonomy based on the categories of management and planning and control defined by Anthony. Parker and Benson also identified the need for the additional category of foundation systems which do not provide a direct benefit themselves but are essential if other systems which do provide a direct benefit are to be implemented. Examples of such foundation systems are upgrading to a relational corporate database or establishing a corporate communications network.

Respondents were asked to indicate the method used to justify the cost of the project and to list the main benefits that were cited in the project proposal. Each benefit was classified as providing increased efficiency, increased effectiveness or competitive advantage. One system usually has multiple benefits and even though a system may, for example, be classified as principally a transactional system, it may

provide additional benefits that do not lead directly to increased efficiency but perhaps provide the organisation with some competitive advantage. Thus it is likely that the individual benefits of a project will need to be measured in different ways. Respondents were therefore asked whether and how each benefit was measured and their degree of satisfaction with the methods of measurement.

Finally, information about the post implementation review of individual projects was sought.

Result of the Pilot Survey

The Sample Organisations

The pilot survey covered 9 organisations which represented a range of types of organisation:

2 financial institutions
1 statutory authority
1 local government authority
1 primary industry agency
1 hospital
1 manufacturing company
1 distribution organisation
1 IT company, affiliated to a large national organisation

The organisations were generally very experienced in the use of information systems. The three least experienced each had between eight and ten years experience in IS and five organisations had been using information technology for more than twenty five years.

Their senior manangement generally recognised the importance of IS to the organisation with seven out of the nine organisations being classified by the respondents as having senior management who were extremely committed to IS.

All organisations in the survey were described as having an IS strategy that had explicit linkage to business functional needs and in four organisations the IS strategy was not developed solely in reaction to business needs but by joint proactive participation of IS and the business units, indicating that these organisations expected IS to affect their strategic direction.

Thus the sample used in this pilot survey covered organisations that were substantial in nature, well experienced in the use of IS and whose senior management were generally strongly committed to the use of IS. In addition the organisations demonstrated sophistication in their IS planning, with strong linkages between IS and business strategies.

Organisational Policy on IS Investment Decisions

The next section of the questionnaire dealt with the policies that organisations had in place to direct and control the decision-making process for investment in IS. It also attempted to determine the importance ascribed to measuring the value obtained from IS investments.

Six of the nine organisations required that all IS projects submitted for approval include a formal cost justification and two further organisations required a formal cost justification for all projects over $50,000. Only the manufacturing company did not expect IS investment decisions to be formally cost justified (although this was expected of investment decisions relating to factory equipment) and a more informal approach was used.

However, only two organisations provided a clearly specified procedure for determining the benefits resulting from IS investments and three others gave some guidance with an overall procedure but details of its implementation could vary between projects. Four organisations, although requiring formal cost justifications, gave no guidance at all on how the benefits should be measured. Thus, despite the organisations being strongly committed to the idea and process of formal cost justification for IS projects, often the project team, who were not necessarily experienced in the economics of investments, were expected to develop a cost justification with little guidance on how an estimate of the expected benefits should be determined.

With such a strong commitment to the inclusion of a formal cost justification in the project submission, it would be expected that management would also require that the project be reviewed after implementation to determine whether the expected benefits had materialised. In fact, only three of the nine organisations had a policy that such a review should take place. For some organisations it depended on the type of system and others had no policy of reviewing projects after implementation. In some cases it was stated that the development of new projects always seemed to take priority over the review of existing projects and one organisation only reviewed a project if there were substantial complaints about its development or performance.

The attitude of organisations towards the measurement of the business value that results from investments in IS projects varied considerably. Two organisations rated this as not very important, five as average or fairly important and three as extremely important. It was interesting to note that attitudes towards the importance of measuring business value seemed to be strongly related to the commitment of senior management to IS. Both organisations that rated the measurement of business value as not very important had management that was perceived as having only an average commitment to IS whereas all three organisations that rated the measurement of business value as extremely important also had management who were perceived as being extremely committed to IS. Also these three organisations had an IS strategy that was developed by joint proactive participation of IS and business units, indicating that IS was seen to be of strategic value.

A comparison of the attitudes to the measurement of business value by type of business provided an interesting picture. Both the organisations rating this as not important were government or government agency organisations, but the statutory authority, which is shortly to be exposed to commercial competition, rated it as extremely important. The two financial institutions differed in their attitudes, one considering measurement of business value to be extremely important, the other giving it an average rating. The third organisation that rated the measurement of business value as extremely important was the IT company affiliated to a large national organisation but which now operated independently.

Not one of the organisations surveyed indicated that they were very satisfied with the methods used to measure the value obtained from their investment in IS, although the manufacturing company was fairly satisfied with the informal procedures that they used. Two of the three organisations who indicated that measurement of business value was extremely important to them were not satisfied with the current methods and were reviewing the techniques that were used. Other organisations commented that they found difficulty in defining meaningful measures of business value beyond the immediate cost savings generated by the system.

Thus although most organisations expected a formal cost justification to be included in all IS project submissions, generally little guidance was provided on the methods to be used for measuring the benefits and only a minority of organisations had a policy of following up with a review of whether the predicted benefits materialised after implementation. The attitude of organisations towards the measurement of business value appeared to be strongly linked to the perceived role of the IS function. Organisations with senior management demonstrating a high commitment to IS and with an expectation that IS was of strategic value considered it to be extremely important. Generally organisations were not very satisfied with the methods used to measure business value and two were currently reviewing their processes. Measuring the benefits, other than those that were directly financial, was considered to be a difficult problem.

Assessing the Business Value of Individual IS Projects

Respondents were then asked to provide details about individual projects, either in progress or completed up to eighteen months ago. Details of the cost justification process, the benefits of each project, the methods used to measure these benefits and the degree of satisfaction with the methods used were sought. Altogether, information on sixteen separate projects was provided.

The following table, which shows the total development costs and includes both capital and revenue (i.e. expense) costs, indicates the range of project size in the sample.

Total Development Cost	# of Projects
Up to $50,000	2
$50,000 - $100,000	1
$100,000 - $500,000	1
$500,000 - $1M	3
Over $1m	5
No Cost Given	5
Total	16

The systems were also categorised according to the overall objectives of the system using the taxonomy of transactional, informational and strategic and foundation systems.

	Type of System	Number
Transactional	Processess the transactions of the organisation, usually cuts costs by substituting capital for labour	10
Informational	Provides the information infrastructure to support management control, planning, communications, accounting and other management functions	6
Strategic	Often to gain competitive advantage and increase market share	6
Foundation	Required as a prerequisite for systems that directly support corporate goals	2

(Note - the total is greater than the number of projects as some systems were considered to serve multiple management objectives.)

Some kind of cost benefit analysis (CBA) was used to justify the development of 12 out of the 16 projects. Of those remaining, one project was considered essential (one of the "foundation" systems) and so was not required to pass a cost benefits test and one was less than $50,000 and so a formal cost justification was not required under their corporate policy. Most of the projects which used CBA supplemented the strict quantitative approach with some qualitative judgement, indicating that they had been unable to express all the benefits of the system in financial terms. The benefits of three systems, which were described as being justified using CBA with some qualitative judgement, in fact had not been quantified at all and so it seemed that only the costs had been quantified and the benefits had been evaluated entirely in qualitative terms.

The individual benefits of each project were then classified according to the following taxonomy, based on the suggestions of Banker and Kaufman, Strassman and Carlson.

Type I - Increased efficiency leading to cost avoidance or reduction.

Type II - Increased effectiveness, for example, better information for management decision making.

Type III - Competitive advantage, for example, the increased market derived from better product differentiation or the creation of entry barriers.

Quantifying the Benefits

Benefits were categorised in this way and the methods used to measure the benefits were analysed. The degree of satisfaction with the process used was also evaluated.

Firstly, an overview of the extent to which benefits were quantified (but not necessarily in financial terms) was obtained.

Type of Benefit	Business Value	
	Quantified	Not Quantified
I - Increased efficiency	15	3
II -Increased effectiveness	5	11
III - Strategic	4	6
	24	20

The great majority of benefits which increased the efficiency of the organisation and were expected to reduce or avoid costs were quantified but organisations found it much more difficult to quantify benefits which led to increased effectiveness. Factors such as accuracy of information and timeliness of reporting are seen to be important to management effectiveness but it is extremely difficult to measure the contributions of such factors in financial terms. It may seem surprising that so many of the benefits that were seen as strategic were able to be quantified. In fact these were all measured by some sort of customer survey, to identify the importance of these particular services to the customer. Improving customer service was a strategic objective for the businesses concerned and so these benefits were measured by the extent to which they contributed to that strategic goal, rather than by financial considerations.

a) Type I Benefits

These benefits leading to increased efficiency were generally quantified without too much difficulty and included savings due to reduced staff costs, avoiding costs to external agents, reduced network costs, reduced stock levels and reduced disk space

requirements. There was generally a high degree of satisfaction with the methods used to measure these benefits and no major problems were perceived, although inadequate historical records were of concern in one organisation.

b) Type II Benefits

Only 5 out of the 16 benefits leading to increased effectiveness were quantified and the method used depended on the particular benefit.

Benefit	Measurement Method	Degree of Satisfaction
Better auditing	Increased cost recoveries	4
Information enabling better customer service	Feedback from counter staff	2
Improved functionality	Internal research	3
Ease of use	Feedback from users	4
Faster processing	Lower interest penalties	5

The degree of satisfaction with the method of measurement was rated on a scale of 1 to 5 (1 = very dissatisfied, 5 = very satisfied).

Again there was a high degree of satisfaction with the measurement of benefits that could be quantified directly in financial terms. Direct feedback from the users was also considered fairly effective but indirect feedback on customers' perceptions through the medium of counter staff was not seen as a satisfactory measure of the expected benefit.

c) Type III Benefits

The strategic benefits which were considered to be quantifiable all related to improving customer service which was a strategic corporate goal in the two organisations concerned. The impact of the individual system features was assessed by surveys of customers and this was considered to be a most satisfactory method of measuring their business value.

Benefits which were not quantified

The benefits which were identified but were not quantified were then analysed with reference to the same classification of benefits.

Type I Benefits

Only 3 of the 18 benefits in this category were not quantified, in two cases because this was not required. The hospital in the survey was not required to measure

expected benefits because of the budgetary process used and the manufacturing company did not require formal cost justification for IS projects.

b) Type II Benefits

Benefits such as providing better advice, enabling better decision making, improved reporting, better management information and improved management control were cited, but these clear benefits were not quantified in 11 out of the 16 instances. Reasons given included:

- no organisational measurement policy
- project proceeded for political reasons
- considered too difficult to measure

Three projects were cost justified on the basis of savings resulting from increased efficiency and it was not considered necessary to quantify this additional type of benefit. The main benefit of one project, however, was improved reporting (with some additional benefits providing some cost savings) but the measurement of this most important benefit was considered to be too difficult. This case highlights the possibility of projects which provide important intangible benefits being rejected if the decision is based entirely on quantified financial benefits.

A benefit of one project was seen to be better decision making. Although the value of this was not quantified, it was assessed by the development of a prototype and the success of the prototype contributed to the justification for the development of the system.

In general, there was a much lower degree of satisfaction with the measurement techniques for this type of benefit.

c) Type III Benefits

Of these 10 benefits classified as being strategic, 6 were not measured in any way. The reasons given were similar to those for the Type II benefits.

Benefit	Reason not Quantified	Degree of Satisfaction
Better allocation of funds	Relied on Type I benefits to justify the project	3
Improved quality of Australian product	Other more specific benefits were measurable	-
Maintain market position	Subjective assessment accepted	1
Better customer service	Considered too difficult	3
Better customer service	Comparison with competitors	3
Customer received funds earlier	Qualitative feedback from customers	5

Again there was a lower degree of satisfaction with the measures, if any, used and the only example of a high level of satisfaction was when the value of a benefit was assessed by direct feedback from the customer, although it was not in a quantified form.

In summary, the organisations involved in this survey were generally satisfied with the methods they used to evaluate the benefits that led to increased efficiency. These benefits were usually measured in direct financial terms by the expected cost savings resulting from reductions in staff, stock levels or payments to outside agencies. The benefits due to increased effectiveness and strategic benefits were generally treated similarly and the same difficulties were experienced with measuring both types of benefit. Again, those benefits which could be measured in direct financial terms (for example, better information leading to improved auditing and increased cost recoveries) allowed measurement methods which were seen to be the most satisfactory. Customer surveys were also considered a successful means of measuring benefits that were aimed at improving customer service.

However, only 9 out of the 26 Type II and Type III benefits were quantified in some way. The majority were not measured, either because this was considered to be too difficult or it was not considered necessary, either due to organisational policy or, more frequently, because the project had already been justified on the basis of other more easily measured benefits. One case in particular confirmed cautions raised many times in the literature; if the value of the major benefits of the project cannot be measured, there is a danger that important projects are rejected because they do not provide sufficient quantified benefits to justify the development costs. However, many organisations were prepared to suppplement the results of a conventional cost benefit analysis with qualitative judgement which would incorporate the value of these intangible benefits.

Post Implementation Reviews

Kumar, in a survey of 92 Canadian organisations, discovered a great variation in the incidence of post implementation reviews (PIR). 79.1% of organisations evaluated at least some of their computer based information systems after implementation but only 29.7% evaluated more than threequarters of their systems. However, most evaluations were performed just before or just after system cutover and assessing the impact of the system on the organisation and the economic benefit were given a low priority.

In the pilot survey, all projects that had been completed at the time of the survey (10 out of 16) had been subjected to some kind of review, although details of the topics covered were often not provided. Some indicated that the financial benefits had been achieved and for two projects it was considered too early for the Type II and Type III benefits to have materialised. For one project there was also an unexpected benefit as copies of the software were sold to other organisations with similar requirements.

Conclusions

This pilot survey, although it covered only nine organisations, supported some theories in the literature and raised additional issues.

- Attitudes of organisations to the measurement of the business value resulting from IS investments seemed to be strongly related to the role of the IS function. Organisations which expected IS to be of strategic value and whose senior management were strongly committed to IS considered the measurement of business value to be extremely important.

- Most organisations expected a formal cost justification to be included in IS project submissions although in practice the conventional cost benefit analysis was generally supplemented by other information which led to the investment decision being based to varying degrees on qualitative judgement.

- Generally the organisations were not satisfied with the methods used to measure the business value of their IS systems and two organisations were currently reviewing the techniques used.

- The measurement of benefits leading to increased effectiveness was generally considered to be highly satisfactory only if the value could be measured in direct financial terms.

- Two thirds of the benefits which led to increased effectiveness or were of strategic value were not measured and organisations were generally not satisfied with this situation. The use of surveys to measure the reaction of customers to benefits which were intended to improve customer service was seen as a highly satisfactory measure in organisations where the improvement of customer service was a strategic corporate goal.

This pilot survey therefore confirmed the value of the current research approach. The measurement of the business value of IS investments was of concern to organisations, particularly those where IS played a strategic role and organisations were generally concerned about the current approaches to the measurement of the intangible benefits of projects. However, a high degree of satisfaction was expressed with approaches that linked the measurement of intangible benefits directly to the corporate strategic goals.

Future Directions

This pilot survey has also served a valuable purpose in indicating areas for more detailed study. In particular

- The factor "commitment of senior management" will be examined more rigourously (using Raymond's example) as this appears to be a significant issue.

- The responses to some questions are subjective and will depend on the respondent's position in the organisation. Therefore responses to these questions will be sought from both the IS and business areas. It may also be appropriate to include the opinions of the financial manager.

- The outcomes that are of value to an organisation will be determined by its corporate culture and business objectives. Therefore details of the organisations' mission statements and strategic corporate goals will be sought.

- Documents which describe the guidelines and recommended procedures for measuring the benefits of IS projects will be sought.

- More information on the conduct of post implementation reviews will be sought, particularly when they took place and to what extent the realisation of the individual benefits was reviewed.

The more detailed survey instrument will then be applied to the target organisations to gain a clearer understanding of the attitudes and approaches of some Australian organisations to the measurement of the value that business derives from their information systems.

Detailed studies will also be made of the techniques used in some of the organisations which indicate a strong interest in the measurement of the business value of IS projects. These organisations might have developed some useful and practical approaches to handling the measurement of intangible benefits and it is hoped that from these organisations we will learn how industry tackles this difficult problem. This will be related to the approaches suggested in the literature and a practical framework for the measurement of business value which is based on the experiences of IS practitioners and which encompasses all types of benefits will be developed.

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