

Analysing information systems evaluation: another look at an old problem

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Information systems (IS) evaluation is a thorny problem. In this paper we re-examine the area in light of recent developments in the field. Our examination begins with an example of a common contemporary IS assessment problem, viz. evaluating outsourcing. The example highlights the organizational and political issues that make evaluation fraught with difficulties. The paper argues that IS evaluation is a ‘necessary evil’ but the context in which IS are developed and used has become much more demanding and complex. A conceptual framework, first proposed in an earlier paper as a way to classify the literature, is presented and brought up to date. The framework is then used to re-examine the outsourcing example, demonstrating the usefulness of the framework.

Introduction

Some ten years ago (August 1986), we presented a paper on information systems (IS) evaluation (Hirschheim & Smithson, 1988) at the IFIP WG 8.2 Working Conference on Information Systems Assessment. The paper, which critically reviewed the theory and practice of IS evaluation, was used as a platform for exploring the myriad issues surrounding IS evaluation. However, much has changed in ten years: the business environment has become significantly more competitive and considerable changes have occurred in the development, operation, management and institutionalisation of organizational IS. For example, IS managers are now deeply concerned with issues such as outsourcing, re-engineering and electronic commerce. These issues were scarcely a speck on the horizon ten years ago.

Furthermore, research in IS evaluation has advanced with new approaches and techniques appearing in the literature, together with the continued developments of traditional approaches. This research activity, together with the changing context, has rendered the original paper increasingly obsolete and so, ten years on, we decided to take another critical look at the theory and practice of IS evaluation. We resolved to examine the recent developments in the light of our earlier framework, to determine to what extent the analysis and conclusions of ten years ago were still relevant and to make sense of subsequent changes. We did not wish to duplicate the useful and comprehensive reviews of IS evaluation methodologies and approaches that have appeared in recent years (e.g., Powell, 1992a; Farbey *et al.*, 1993). Instead, we shall consider representative developments of the past decade in order to provide an updated analy-

sis of IS evaluation in light of the changing demands on IS functions.

The paper is structured as follows. We first provide an example of a common contemporary problem situation for IS evaluation through a short vignette concerning a company which decided to outsource its IS function. This both demonstrates the need for careful evaluation but also highlights the organizational and political issues that make such an evaluation fraught with problems. This discussion is continued in the next section which argues that IS evaluation is a ‘necessary evil’ but, as the following section argues, the context in which information systems are developed and used has become much more demanding. This firmly locates the IS evaluation problem in current business practice. We then describe a conceptual framework, first proposed in our earlier paper, as a way to classify the literature, and update our previous literature review to include the activity in both research and practice that has taken place over the past ten years. We then use this framework to re-examine the outsourcing case and demonstrate that the use of the framework does serve to clarify the difficult issues surrounding IS evaluation in practice.

An outsourcing vignette

Consider the case of IS outsourcing at a Fortune 500 company (to which we will assign the pseudonym Alpha) which in 1992 made the decision to consider outsourcing its IS function. The outsourcing decision at Alpha might be considered somewhat unusual in that Anthony, the director of advanced technology who investigated outsourcing, admits he performed the exercise largely as a defensive manoeuvre. Anthony was

asked by his IS manager to write a report on outsourcing to present to senior management. The purpose of the report was to enlighten management on the risks of outsourcing IS. A second report, produced by a well-known benchmarking firm, evaluated Alpha's applications development and support functions. Both reports were used to demonstrate to senior management the efficiency of Alpha's computing operations.

Historical background of Alpha

Alpha is less than twenty years old, yet it is one of the largest publicly-held companies in the United States. The company has grown rapidly during the last two decades through an aggressive acquisition strategy. Alpha currently operates 300 companies worldwide and annually generates over \$1 billion in sales. These 300 companies operate autonomously; the corporate office merely sets financial guidelines and provides administrative services. The operating companies are very powerful because Alpha does not replace the management staff of its acquired companies. A main objective of corporate headquarters is to provide cost effective support to its operating companies. There are only 700 people in the central office, a rather small number for a company with over 20 000 employees.

The IS department is headed by Anthony's boss, Jay, Vice President of Administrative Services and Information Systems. Jay operates with a relatively small budget, \$30 million, which represents about 0.05% of revenues. Jay has trouble delivering an effective service with such a small budget. Anthony notes, for example, that when he was hired in 1985, there were no online systems. People in the decentralised offices filled out forms and mailed them to the central office for processing. Since then, several on-line financial systems have been implemented, but the majority of the application portfolio can hardly be considered current. Senior management is unwilling to invest significantly in what is seen as a staff function. Given this environment, Jay is aware that his department is vulnerable to outsourcing.

Alpha's outsourcing decision

In 1992, Jay assigned Anthony to write a report on the current trend in outsourcing and the potential implications for Alpha. The report was presented to senior management in 1993 to educate them on the pros and cons of outsourcing. Anthony begins his story by explaining why his boss wanted to explore the current vogue in IS management:

A lot of the industry is nervous. Industry observers for the last couple of years have been saying, 'If you don't look at outsourcing, somebody will do it for you.' So we have undertaken a review of what the outsourcing market looks like.

Anthony feared that senior management had already considered outsourcing to some extent: 'In fact there has been a rumour that EDS has tried to come in. Whether or not that is entirely true, I don't know.' Anthony also said that a former officer of Alpha now works as a partner in an outsourcing vendor. He notes: 'So we are not unknown to the outsourcing people'.

Anthony's investigation began by referencing current periodicals, online databases, and various consulting reports on outsourcing. He found most of the literature to be overly optimistic. He then consulted an expert in IS outsourcing who warned Anthony about the vendors' present cost structures and savings which may never be realised in the long run. Anthony included several of the consultant's admonishments in his report. He also decided not to consult any outsourcing vendors because: 'I didn't want to get involved in that'. Anthony said the main purpose of his report was to enlighten his senior management. In reality, it focused mostly on outsourcing negatives. He felt that companies outsource out of desperation and that they rarely realise projected savings. Clearly, Anthony and Jay adopted a defensive stance on outsourcing and this backfired when management in 1994 decided to outsource their IS function.

Understanding Alpha's decision

Although Anthony's report was a realistic view of the problems that can occur with outsourcing, senior management had already made up its mind to outsource since it was unconvinced it was 'getting value for money', according to Jay. In so doing, they pointedly ignored an independent benchmarking report which portrayed Alpha's IS function as close to 'best of breed' in their data centre operations, and above average in systems development (a particularly positive evaluation given the low level of investment in this function). Nevertheless, three outsourcing bids were gathered and one was chosen as the winner in 1994. In the three years since the decision, much has happened. Currently, the situation is a tense one, with considerable finger-pointing, angry users, but lower overall IS costs. In evaluating the outcome of Alpha's outsourcing decision, it is clear that depending on the vantage point, very different perceptions about the efficacy of outsourcing are apparent.

Senior management believes it made the right decision because in its mind the IS function was not delivering strategic value. They also questioned why IS costs would not be reduced by outsourcing to a third party provider whose explicit core competence was in the delivery of IS services. After all, the outsourcers were the experts. They purposely discounted the evidence provided by the benchmarking firm, and saw the outsourcing report by Anthony as simply a defensive manoeuvre. When the outsourcing bids came in with lower IS costs, senior management felt vindicated in their beliefs. IS costs have

dropped in the first three years of the contract. So senior management evaluates the deal as positive.

Business unit managers and staff however, have a very different perception. Although costs have gone down, this has come about through reduced levels of service. For example, prior to outsourcing, the IS department at Alpha supported multiple software platforms. Whether an employee used Word 6.0 or WordPerfect 5.1 did not matter, both were supported by internal IS personnel. In the outsourced environment, only Word 6.0 is supported. Similarly, applications support is often done off-site, which means that there are considerable periods of time when there is physically no one around to speak to the users. Moreover, the vendor provides those services, and only those services, specified in the contract. Users typically demand more; more time and more resources from IS. So from the perspective of the business unit managers and staff, outsourcing has been, in their words: 'an unmitigated disaster'.

IS personnel have seen outsourcing as a mixed blessing. Some of those transferred to the vendor are happy working for a 'professional IT company that permits greater skill set development and hence, better career possibilities'. Others felt let down by Alpha, as though they were 'little more than commodities'. The remaining IS staff at Alpha felt as though they were 'caught between a rock and a hard place'. They had to act as intermediaries between senior management who signed the contract (and hence had a vested interest in having the deal seen as 'successful'), the business unit users who had to come to grips with the new reality of reduced IS services (while concomitantly wanting more not less service and support), and the vendor who likely underbid in order to establish the account (and hence was trying to 'cut corners' wherever possible to reduce costs even further).

So was outsourcing successful or unsuccessful at Alpha? What does 'success' mean in this situation? How can one measure success or failure? Just how does one evaluate the outcome? More generally, how does one evaluate the outcome of any IS development and implementation? The answer: with great difficulty, as we explore next. We will return to the Alpha example in the Analysis section of the paper.

Information systems evaluation: a necessary evil?

For the purpose of this paper, as with the earlier one, we take IS evaluation to mean the assessment or appraisal of the value, worth or usefulness of an information system. Traditionally, evaluation has focused on the potential or actual costs and benefits of introducing a new system. However, over the years, there has been an increasing concern that narrow cost benefit studies are too limited and there is a need to develop a wider view of the impact

of a new system. Similarly, within the systems development life cycle, the key evaluation points have traditionally been the feasibility study, where forecasts are made of the likely impact of the new system, and a post-implementation evaluation after the system has been installed to measure the actual impact. However, as we argue below, recent developments have enlarged the scope of IS evaluation such that it is seen to be relevant throughout the life cycle.

Why IS evaluation is important

In our earlier paper, we argued that 'evaluation is endemic to human existence' and hence an automatic response to a changing situation. This is especially the case with IS, given the dramatic organizational changes of recent years associated with IS, not to mention the layers of exaggerated benefits and hype encasing new information technologies. Although we all constantly carry out informal evaluations of phenomena impacting our environment, this is seen as being inadequate and lacking legitimacy in a fast changing organizational context, leading to increased pressures for formal evaluation procedures. Viewed in systems terms, evaluation provides the basic feedback function (Angell & Smithson, 1991) to managers as well as forming a fundamental component of the organizational learning process (Etzerodt & Madsen, 1988; Symons & Walsham, 1991 among others). In terms of its functions, evaluation is seen as essential for problem diagnosis, planning and the reduction of uncertainty (Hawgood & Land, 1988).

As IS expenditure continues to represent a significant proportion of organizations' turnover and investment budgets (Powell, 1992a), the measurement of its value to the organization is a natural concern of managers (Farbey *et al*, 1993). This is especially the case considering the low perceived success rates achieved in the development of new IS, which have been estimated to be as low as 30–40% (Hochstrasser & Griffiths, 1991; Willcocks & Lester, 1993). According to survey evidence, cost containment remains one of the top three concerns of UK IS managers (Price Waterhouse, 1994) and, in this context, some form of reliable evaluation is needed to justify any new IT investment to senior management. This concern can be demonstrated by the following quote from Sir Denys Henderson, Chairman of ICI (Price Waterhouse, 1990):

I still worry enormously, both about the amount we spend on IT and the increasing difficulty of justifying that expense in terms of the bottom line. In the end, I think this will work to the disadvantage of the suppliers of the hardware, software and systems because simply to say, 'Can you afford not to spend when you look at your competitors?' or alternatively, 'There is hidden commercial advantage that is unquantifiable', will quite frankly not be enough in future.

Why evaluation is difficult

IS evaluation has long been recognised as a complex and elusive notion (Land, 1976; Dickson *et al.*, 1988) and various writers have commented on its inherent problems (Blackler & Brown, 1988; Willcocks, 1994). In our earlier paper we emphasised the subjectivity underlying even the most formal approaches to IS evaluation such that the subjective judgements of the people concerned in answering the questions of 'what', 'how' and 'when' to evaluate tend to determine the final result of any evaluation study.

The first problem concerns the level at which the evaluation is performed. We can identify five different levels:

- macro
- sector
- firm
- application
- stakeholder

The macro level refers to a national or international perspective; for example, the general impact of IT on productivity (see, for example, Landauer, 1995). A useful review of these macro issues is provided by Best (1994). The sector level refers to an industrial sector; for example, the impact of factory automation on manufacturing industry. Here, the concern is normally one of the distribution of gains and losses (costs and benefits) among the various market players (e.g., manufacturers, wholesalers, consumers, raw material suppliers). At the third level, the firm level, the focus is usually the impact of a firm's IS on its performance, perhaps compared to other firms. The application level attempts to evaluate the impact of a particular application. This is the focus of most of the literature and is the level at which this paper is mostly concerned. The final level, the stakeholder level, recognises that different stakeholders have different concerns and different value systems which strongly influence their evaluation of a particular IS (Land, 1976). The point here is that different concepts, frames of reference and criteria apply at each level.

Even at the level of the firm, the introduction of a new information system is likely to have consequences in economic terms (e.g., costs, output, turnover), organizational terms (e.g., changes in organizational structure or procedures), social terms (e.g., social interaction, quality of working life, organizational culture), and management terms (e.g., information access and decision making). Any of these aspects may improve or deteriorate and it is often problematic to isolate the factors which cause particular costs and benefits, especially when these factors themselves are highly interdependent. In addition, there are often unplanned consequences from introducing a new system and the business application area concerned may be subject to impacts from planned changes or unforeseen events which are at most only indirectly

linked to the new system (Schafer *et al.*, 1988). It is thus a huge problem deciding 'what' to measure, especially as many of these aspects are highly intangible (Brown, 1994). DeLone and McLean (1992) classify evaluation criteria under six categories: system quality, information quality, use, user satisfaction, individual impact and organizational impact, none of which are free of the measurement problems which have long been recognised as problematic in organizational settings (Mason & Swanson, 1981).

A key problem concerns the often conflicting perceptions of different stakeholder groups such that, as in Alpha's outsourcing example above, evaluation may become a highly political activity (Goddard, 1989; Walsham, 1993). For example, Symons (1991) notes that improved access to headquarters information might be seen as a benefit for those working in the field but as an erosion of the power base of managers at headquarters. While the information itself may have highly political implications in some organizational situations (Davenport *et al.*, 1992), costs and benefits are also frequently politically charged (Lederer *et al.*, 1990) and may be redistributed through political activity such that they become even more difficult to trace (Conrath & duRoare, 1978; Markus, 1983).

The introduction of a new information system is normally expected to improve the productivity of its users. However, the research evidence is very mixed, leading to the 'productivity paradox' debate where in some cases productivity increases, while in others it declines (Strassman, 1990; Hochstrasser & Griffiths, 1991; Roach, 1991; Weill, 1992; Brynjolfsson, 1993). For example Brynjolfsson and Hitt (1996) find positive pay-offs from IT investment, based largely on data from large US firms. On the other hand, Sivula (1990) sees no general improvement in productivity as a result of the introduction of office IS although Panko (1991) is much more optimistic. Some commentators (e.g., Kleinschrod, 1986) have criticised the statistics as too 'sloppy'. At base, this debate founders on the difficulties of conceptualising productivity in the context of administrative (or clerical or knowledge-based) and managerial work (Boddy & Buchanan, 1984; Schafer, 1988; Loveman, 1994). Improved IS may lead to better information that may improve decision-making but this is almost impossible to measure (Farbey *et al.*, 1993).

There are also a host of practical difficulties in evaluating IS. Information systems are social systems (Goldkuhl & Lyytinen, 1982; Land & Hirschheim, 1983) that evolve over time and so deciding when to carry out an evaluation is extremely difficult. Learning difficulties of users mean that there is a lag in delivering benefits (Brynjolfsson, 1993). Willcocks and Lester (1993) point to a number of other inherent problems: the lack of understanding of the human and organizational costs involved, the danger of over and understating costs, the

neglect of intangible benefits and risks, the use of inappropriate measures, and the problems with traditional finance-based evaluation techniques. Ballantine *et al* (1994) highlight the problem of getting the system requirements right in the first place, as well as the identification and quantification of relevant costs and benefits, together with the time taken in carrying out an effective evaluation study. From their survey, Canevet and Smithson (1994) found organizations experiencing difficulties in getting users to participate, choosing appropriate measures, measurement inaccuracy and the acceptability level of the results. Lincoln (1990) argues that IS evaluation is not adequately linked to business performance and so IS contribution to the business is not recognised. Sassone and Schwartz (1986) feel that the difficulty of putting a monetary value on apparently unquantifiable benefits is a major obstacle to future investment in new technology.

Powell (1992a) reminds us that evaluation is equally difficult for other economic and social investments, such as engineering projects and research and development activity (see also Rossi & Williams, 1972). This supports our contention that the introduction of a new information system normally has social, organizational and human impacts and is not just a technological activity. We would however suggest that there are few common or widespread organizational interventions so poorly understood and surrounded by such exaggerated expectations as information technology.

Current practice

Most evidence suggests that organizations normally carry out some form of evaluation as part of a feasibility study or investment appraisal, typically using traditional cost-benefit analysis (Willcocks & Lester, 1993; Ballantine *et al*, 1994). However, the relative balance between formal, quantitative appraisals and more subjective, qualitative ones is unclear. Currie (1989) found that engineering managers disdained accounting based techniques as spurious and ritualistic but felt that these techniques had more legitimacy than their own preferred more qualitative approach. Hochstrasser and Griffiths (1991) found that formal evaluation methods were less likely to be used for IS that were in any way strategic to an organization. They found that 84% of companies did not use systematic methods to calculate the true costs or benefits of such investments. Grindley (1991) found that 83% of cost-benefit analyses used to support IT investment proposals were basically fiction. While Powell (1992b) argues that intangibles are increasingly used to justify a business case for IT investment, Farbey *et al* (1993) found that intangible benefits were not generally acceptable as part of the evaluation procedure in many companies. However, they argued that any organization which claims to apply IT strategically but only considers quantifiable benefits is out of alignment.

Regarding post-implementation evaluations, most evidence (e.g., Blackler & Brown, 1988) suggests that they are rarely carried out while Kumar (1990) found that, where they were carried out, they were largely performed soon after implementation by the system developers purely as a project closure activity—‘pack up and get out’. As a consequence, they were performed superficially and largely from a technologist’s perspective. On the other hand, Canevet and Smithson (1994) found evidence that a cluster of the organizations they surveyed did carry out evaluation fairly consistently throughout the life cycle from feasibility study, through development, post-implementation and system replacement. These ‘comprehensive evaluators’ seemed to adopt a more professional attitude and to have fewer problems with evaluation, although they worried more about inaccuracy and measurement issues.

Powell (1992a) argues that the apparent lack of enthusiasm for formal evaluation studies is not caused by a lack of tools but is more likely to be due to any of a host of other reasons. These include:

- ambiguity concerning organizational goals or system requirements;
- the belief that IT is ‘strategic’ and thus not amenable to formal evaluation;
- situations where either there is no alternative or where cost is unimportant;
- a climate of cynicism and perceived failure due to past IS disasters;
- difficulties in obtaining senior management support for IT projects.

The changing context of IS evaluation

Over the past ten years there have been considerable changes in the business, organizational and technological contexts within which IS evaluation is carried out. These have mostly increased the need for evaluation but at the same time increased the complexity of the process.

Business and organizational context

Markets for many products and services have become considerably more competitive in recent years. Increasing pressures towards the globalisation of markets, resulting from the reduction of trade barriers, the deregulation of markets and opportunities from improved logistics and transport, have meant increased foreign competition in local markets. In many industries, production has also become more global as supply chains stretch across continents and multinational corporations regularly cross national borders as they seek lower cost suppliers or optimum sites for new factories. In addition, the privatisation of functions traditionally carried out within the public sector has extended the arena of market-based competition. These increasing competitive pressures have tended to produce ‘buyers’ markets’,

where success depends on maintaining a lead in the quality and price of products, as well as the range of different models and styles available. In this very difficult trading environment, product life cycles have been drastically shortened and the production technology is also subject to constant change. Increasing product uncertainty can be seen in the abrupt changes in volume, the frequency of redesign, and the sudden, often significant, product innovations. Although we have lived with change for the last few decades, incremental and evolutionary change seems to have given way to a discontinuity (Handy, 1989) that is forcing organizations to re-evaluate totally their processes and structures.

The key requirements for organizations to survive in this harsh environment are flexibility and speed of response to market changes, as well as the ability to innovate, in both product and process. Cost pressure is intense, so that high productivity remains essential and there is a constant need to improve product quality and customer service. Cost pressures have led to an increasing need for a more sophisticated way of identifying and monitoring costs, using techniques such as activity based costing (Morrow, 1992). The pressure to reduce costs has led organizations to consider outsourcing peripheral functions (Apte, 1990; Prahalad & Hamel, 1990; Huber, 1993), creating a need to evaluate the worth or performance of these functions, both before and after outsourcing. Taken together, cost pressures plus outsourcing have led to the downsizing of organizations by removing whole layers of management, such that many managers now have to prove their worth in order to survive.

Pressures to improve customer service and quality have led to a growing enthusiasm for total quality management (Oakland, 1989) where the continuous evaluation of quality is an essential part of the approach. Such evaluation is typically very detailed and involves the comparison of actual quality against very precise, but static, benchmarks. On the other hand, competitive pressures have forced many organizations to consider major changes to their fundamental business processes and structures. Business process re-engineering (Hammer, 1990) claims to involve radical changes to the way organizations have traditionally functioned and clearly should entail high level evaluations before and after such major changes to ensure that the considerable disruption will be/has been worthwhile. Similarly, many organizations have found that the traditional bureaucratic hierarchy is unsuited to today's dynamic and uncertain environment. Such hierarchies are both costly to operate and far too rigid to deliver the flexibility and responsiveness needed and, thus, organizations are actively exploring new organizational structures (Scott Morton, 1991; Applegate, 1994). These structures, such as cross-functional teams, networked organizations and even 'virtual organizations', are characterised by an increased emphasis on coordination, both within organizations and

between trading partners. Again, like business process re-engineering, these major structural changes should entail a significant evaluation effort before and after the change.

Under such pressures, organizations are even more conscious of the 'bottom line' profitability and productivity of their operations and so evaluation is playing an increasingly important role in organizations. However, at the same time, many of the changes are so radical and wide ranging that they are increasingly difficult to justify in advance in accounting terms and many changes are necessarily made on the basis of acts of faith. Organizations may want to evaluate these major changes, either in advance or after the event, but either the tools and techniques are inadequate or the necessary data is not available. The latter is especially the case for ex-ante evaluation where managers are forecasting the future; even if past data is available (and often it is not) such data may not be relevant for future innovations. Estimates of future impacts may have to rely on guesswork, perhaps helped by simulations or experiments. In either case, the quality of the data is almost certainly poor.

Furthermore, notions of quality and value are being increasingly applied through formal evaluations in areas which were previously relatively untouched. For example, in the UK, universities are now subject to research assessment evaluations every five years. These exercises attempt to give a quantitative score, on a scale of 1 to 5, to a university's research performance in a particular discipline. In another evaluation exercise, specially selected teams evaluate the teaching performance of universities through a formal assessment process. In each case, the results are publicised, typically in the form of a 'league table', and may be taken into consideration when the government distributes resources. Similar evaluation activities, often together with their associated league tables, have been introduced for secondary (high) schools (based on examination results), hospitals (bed occupancy statistics) and the police service (crime clear-up rates). These activities are typically associated with specialised quality audit teams, operating according to highly deterministic criteria. This entire evaluation infrastructure represents a considerable expense and commitment from the organizations concerned and has in many cases gained considerable power and legitimacy. In all these cases, while many commentators applaud the publication of the performance of these public sector institutions, there is genuine concern that complex social functions provided by highly trained experts, like education, health and law and order, are being reduced to simplistic numerical scores that have little real meaning.

In emphasising the importance of the changing business context, we are not underestimating the diversity of different business sectors. Certainly, it would be a gross misconception to assume that all sectors have only

recently become subject to radical change. Some sectors have lived with change for the past couple of generations and some may even be more settled than before. Nevertheless, most sectors have been subject to the above recent pressures, to a greater or lesser extent. Furthermore, it could be argued that today's situation is unique because all sectors are facing the phenomenon of technological change, but nevertheless we must be prepared to look beyond technology in order to understand the pressures faced by organizations.

It is clear that the changes in the organizational and social context outlined above indicate an increasing desire and belief in formal evaluation procedures, although Currie (1989) notes that some people feel the need to carry out evaluation rituals even though they may not actually believe in them. Furthermore, many of the changes being evaluated are complex and far-reaching, representing considerable demands on evaluation teams. With organizations facing major changes in their missions, goals, objectives, basic structures and processes, and perhaps their whole organizational culture, relevant evaluation criteria become increasingly difficult to identify. This implies the need for a richer approach to evaluation than a simple summing up of costs and benefits; there is a need to incorporate human, social and organizational aspects.

Information systems context

While the business and organizational environment has certainly become more demanding, from an evaluation perspective, IS themselves and the way that they are operated and managed has also become much more complex. Firstly, the sheer number and sophistication of organizational IS has increased tremendously as the technology has become widely diffused throughout organizations. Not only are there many more systems now but their functionality and scope has increased significantly. Information systems are being used for much more complex and sophisticated tasks than previously. From computer integrated manufacturing systems controlling whole production lines to financial systems which support derivatives trading on the financial markets, the complexity has increased by leaps and bounds. Furthermore, systems are much more frequently integrated together, resulting in complex interlocking administrative and manufacturing systems (cf. the SAP software system). This makes it more difficult to disentangle a single system for evaluation. It may be meaningless to draw boundaries around individual systems for the purposes of evaluation. As Symons (1991) argues:

Developments in evaluation methods have not kept pace with the shifts in use of information systems which over time have widened the scope of their effects.

Secondly, IS are often much more part of an information and communications infrastructure instead of supporting an individual business function. Systems based on networks, like electronic mail and computer supported cooperative work systems, may be highly costly to install and may produce few direct benefits but indirectly they may form a key part of the organization's backbone. Again this produces problems with traditional approaches to IS evaluation. Belcher and Watson (1993) show that the evaluation of an executive information system, which can be considered part of a firm's infrastructure, can be feasible and very useful but they warn that it often is not possible to 'prove' these benefits quantitatively. This infrastructure is increasingly becoming not just an internal one but an external one as well, as inter-organizational systems such as electronic data interchange (EDI) link organizations together in complex production networks and electronic markets (Scott Morton, 1991; Green, 1993). Through a longitudinal study of the Chrysler Corporation, Mukhopadhyay *et al* (1995) show how the use of EDI can be evaluated, producing an estimated cost saving of \$160 per vehicle. However, they pointedly avoid addressing the distribution of these benefits. And yet, because of the asymmetrical power and dependence relationships between trading partners, the costs and benefits, in both financial and strategic terms, are typically shared inequitably (Reekers & Smithson, 1996), posing severe problems for any IS evaluation.

Thirdly, while some IS have become part of the infrastructure, others have become essential components of a product or service, rather than just a support mechanism. Examples here include the huge number of ATM machines in banks and the well established airline seat reservation systems. In many ways, it is meaningless employing traditional methods to evaluate the information system separately from the rest of the product or service because the organization may have no alternative if it wishes to continue providing the product or service.

Fourthly, the notion of using IS strategically to gain a competitive advantage (Ives & Learmonth, 1984; Porter & Millar, 1985) has created problems for IS evaluation. Such investments are inherently difficult to assess in advance as there is normally a strong element of risk and uncertainty regarding the final outcome and either senior managers just take a chance and 'bite the bullet' or else go through complex and often meaningless forecasting procedures in the face of an unknown future. In the late 1980s and early 1990s many organizations invested large amounts of scarce capital in such strategic systems and many either failed to gain any competitive advantage or else failed to gain a sustainable advantage. This disenchantment has tended to make senior managers more concerned with evaluating future investments in IS much more carefully. Although such investments are very difficult to evaluate, both before

and after the event, Clemons (1991) argues that such evaluation is essential and, furthermore, that it requires different skills from those traditionally associated with IS management. Such calculations and considerations go way beyond traditional cost benefit analysis.

Fifthly, IS are in the forefront of the major organizational changes mentioned in the previous section. They frequently figure as part of a major business transformation, through business process re-engineering (Hammer, 1990; Davenport, 1993). IT is just one part, although often a major component, of a wide-ranging, radical transformation of the traditional processes and structures of a business. 'Measurement' of existing processes is the third step of Davenport and Short's (1990) five steps to business process redesign. Evaluation then is essential, but clearly very difficult.

Similarly, as in the Alpha example, many organizations have followed the widely publicised success of Kodak Eastman and outsourced the IS function to third party suppliers. This is often done for reasons of cost and performance and it is essential that these can be measured to determine whether a system should be outsourced at all and if so to which supplier and how the terms of the contract should be formulated. Once a system has been outsourced, the client organization must monitor (and evaluate) the supplier's performance to determine whether it is meeting its contractual obligations and whether the whole scheme is working to the client organization's advantage (Lacity & Hirschheim, 1993; Willcocks & Fitzgerald, 1994). This propels IS evaluation into the forefront of organizational IS issues.

Finally, in the past, IS evaluation has been discussed as part of a simple systems life cycle, with some form of evaluation as part of the feasibility study and perhaps a post-implementation evaluation after the system had been installed. The implicit assumption was that the original system was a manual one. However, the days of 'greenfield sites' have long since past in most organizations. Rather, it is a case of organizations operating legacy systems which may be mainframe-based and up to twenty years old or more. Organizations are thus evaluating existing systems as part of the maintenance and replacement process. In other words, an evaluation is required to determine whether it is better to continue updating an old (and perhaps increasingly creaking) system or whether to scrap it altogether and start again. Evaluation is essential here but it is different to the traditional form of IS evaluation (Farbey *et al.*, 1993).

One of the key results of these changes, as far as IS evaluation is concerned, relates to the people involved in evaluation. In the early days of IT, evaluation was mostly focused on technical performance issues and the evaluators were technical specialists from the IS department. The increasing investment in IS and its increasing penetration into the business has meant that accountants, planners, middle managers and users of many types are

now involved. In some organizations we have worked with, this has meant that the main responsibility for evaluation has been taken out of the hands of the IS manager. Instead, it may rest with a headquarters group responsible for planning, which may be part of the finance division. However, IS managers are still called upon to provide advice and much of the basic data. Thus, the problem has not gone away, it may instead just have changed hands.

Thus, the changes in the IS context are sufficiently complex and indeterminate that the traditional technical-economic approaches to evaluation are likely to be inadequate. There is a need to understand and interpret complex socio-technical situations. As a step towards clarifying the important yet difficult field of IS evaluation, in the next section we offer a framework which attempts to put some structure on the slippery aspects of evaluation.

Information systems evaluation: a framework for analysis

In our earlier paper, we proposed a framework to classify the literature on IS evaluation, an updated form of which is shown in Figure 1. The horizontal axis of the framework depicts the origin of the various approaches which have been imported into the IS field from other disciplines. These include notions of software quality (from total quality management in manufacturing), financial approaches, such as information economics (from cost benefit analysis in economics and accounting), and user satisfaction (from job satisfaction analysis in the management literature). This mapping provides some useful insight as any approach typically brings with it characteristics inherited from its parent discipline.

The second dimension seeks to locate evaluation approaches based on their underlying assumptions. This dimension stretches between two poles: 'hard' objective/rational assumptions akin to engineering at one extreme and 'soft' subjective/political assumptions more related to social science at the other.

Along this dimension we identified three zones. The first zone, efficiency, is characterised by fairly objective/rational assumptions regarding the nature of evaluation. The key idea here is evaluating performance (or quality) compared to fairly detailed low-level specifications or benchmarks. Thus, operational performance can be measured using hardware and software monitors or simulation techniques. This is a relatively non-controversial area where the evaluation criteria and specifications are normally accepted without question. The second zone, effectiveness, is more concerned with 'doing the right things' rather than the efficiency view of 'doing things right' (Drucker, 1971). In this zone evaluation (and its criteria) is less clear-cut, and here we located utilisation, cost-benefit analysis, comparison with objectives and user satisfaction studies. Evaluation

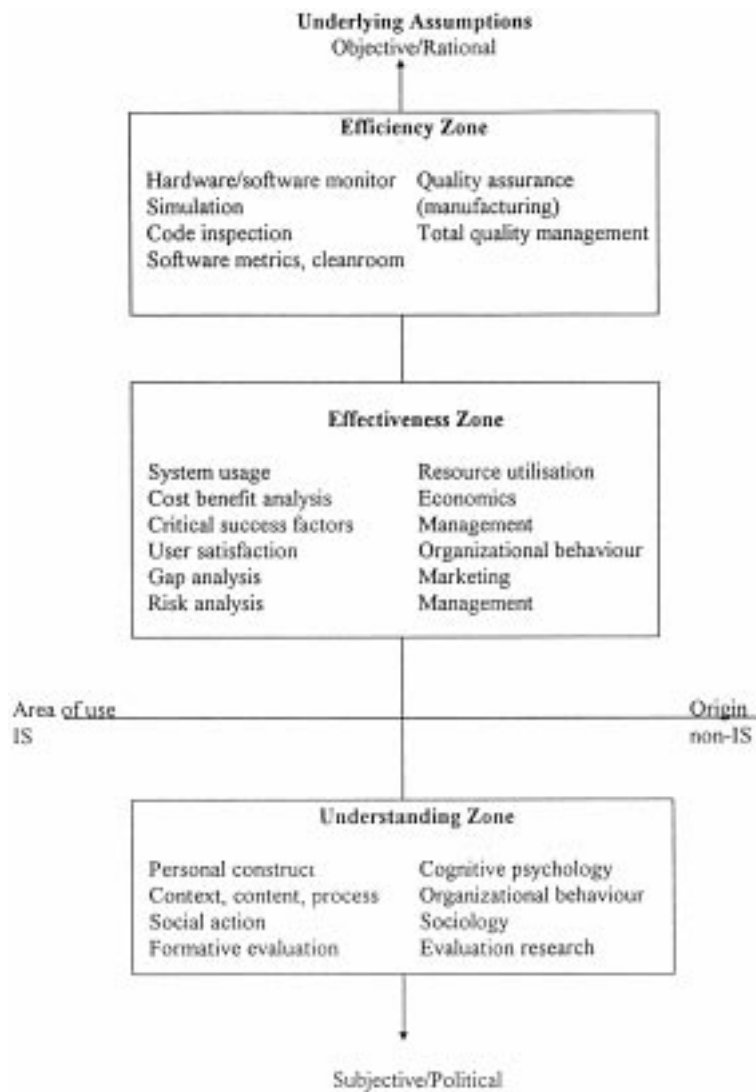


Figure 1 Literature framework.

in this zone, while not as non-controversial as in the efficiency zone, still embraced mechanisms that were generally accepted as legitimate. The third zone, the understanding zone, regards evaluation as problematic and seeks to understand more about evaluation within the particular organizational context. For example, personal construct theory, from cognitive psychology, attempts to explain how people use binary constructs to evaluate artefacts and situations. Evaluation in this zone is controversial with generally accepted mechanisms hard to find. Ten years ago, we noted considerable activity within the efficiency and effectiveness zones from both researchers and practitioners but very little activity in the understanding zone.

We shall now update the earlier literature review, using the original framework, in order to comment on recent developments in IS evaluation. As noted in the introduction above, rather than attempting a comprehensive survey, we have chosen particular approaches and

techniques that we feel are representative of the overall direction of IS evaluation.

Efficiency

In the same way that the notions of quality and quality control first gripped manufacturing industry and then percolated to much of the services sector, it can also be seen as prevalent within the software engineering literature (e.g., Gilb, 1988; Zultner, 1993) where the aim is to make the software as 'reliable' as the underlying hardware (Poore *et al*, 1993). Bitter experience has shown that programming can be a highly unreliable process and considerable efforts are expended in systematically testing program code in order to trace errors and inefficiencies. This may involve the use of rigorous inspection techniques (e.g., Knight & Myers, 1993) using ideas that can be traced back to Fagan (1976). Some IS departments have set up separate quality assurance teams, and there is claimed to be much interest in automated testing

tools, statistical process control, software metrics and 'cleanroom' techniques (e.g., Mills *et al.*, 1987; Swanson *et al.*, 1991; Grady, 1993). However, in practice, many of these techniques are only heavily used by relatively few software development organizations.

Various quality management standards, both international (e.g., ISO 9000/9001) and national (e.g., BS 5750) have been set up or adapted for software production (Finkelstein, 1989; Jones 1990). Some organizations have expended considerable effort and resources in implementing detailed quality assurance procedures in order to secure accreditation to these standards. However, most notions of correctness that such techniques rigorously and systematically employ, are related to systems specifications which, in this context, are regarded as being absolute and non-controversial. Yet, in practice, these specifications may well be obsolete or misleading due to changes in the user requirements resulting from changes in the dynamic business and organizational environment.

Effectiveness

Most current approaches in this zone are developments of traditional cost-benefit analysis (Sassone 1988; Powell, 1992a). For example, authors such as Earl (1992) argue that IS evaluations should focus more on the impact on business and should thus consider business goals and critical success factors, rather than 'pure' costs and benefits. Thus it may be more meaningful to evaluate measures such as delivery time, sales targets, or time to market for new products. Earl argues that it is much easier to justify IS investments in terms of business plans because senior management are likely to accept/understand them and the particular IT investment can be built into the business strategy and operating plans. In their information economics method, Parker *et al.* (1998) relate IS to specific business goals, as well as attempting to overcome the problems traditional cost-benefit analysis has in dealing with intangible benefits and the time value of benefits. Lincoln's (1988) SES-AME tries to identify all the costs and benefits and compares the computer system with a manual alternative but his results have been criticised by Powell (1992a).

A variant of cost-benefit analysis that seems to be particularly relevant for evaluating investment proposals for IS infrastructure projects is based on option pricing. Various authors (Kambil *et al.*, 1993; Dos Santos, 1994; Kumar, 1996) argue that investment decisions are strategic and thus need to take account of the opportunities created (and the associated risks). However, there is inevitably considerable uncertainty surrounding such projects and the techniques offered, although helpful, should not be treated as panaceas.

The superficiality of much cost-benefit analysis can be seen in the surprisingly cursory attention given to the identification and management of benefits (Peters, 1990; Ward *et al.*, 1995). The only attention many organiza-

tions seem to give to benefits is to list them during the feasibility study and then promptly forget them thereafter. These authors argue that much greater care should be taken in ensuring that the planned benefits are actually achieved. They argue that, without some form of planning and regular evaluation, potential benefits can easily evaporate as investments slip out of control.

In this zone, there is a temptation to try to reduce voluminous cost-benefit analyses to simple single figures. Thus, Strassman's (1990) return on management tries to determine the increase in management productivity (or value-added by management) as being a meaningful yet easily calculated statistic. However, the assumption that the management process is directly responsible for the financial residue remaining, after the cost of labour and capital has been subtracted from the firm's revenue, is difficult to sustain as it takes no account of environmental effects such as changes in fashion or economic climate. Some organizations evaluate their IS function by comparing particular cost-performance ratios (e.g., IT expenditure against turnover) with industry benchmarks (Bendell *et al.*, 1993; Bullard, 1994). However, such comparisons should be treated with great care as they ignore contextual information and assume that the ratios are in fact comparable when the calculations behind the figures may diverge significantly.

There is a danger that finance-based techniques will favour a very short term view that is incompatible with investments that are expected to form part of a long-lasting infrastructure and other approaches have tried to step outside these limitations. Schafer *et al.*'s (1988) benefit analysis within the Functional Analysis of Office Requirements (FAOR) project views evaluation as a continuous process within organizational change. Other researchers have experimented with service quality gap analysis (e.g., Pitt *et al.*, 1995), a technique from the field of marketing (Parasuraman *et al.*, 1985) which tries to identify and measure gaps between the expectations of users and developers and the actual performance. Although this technique is useful in identifying large gaps for particular performance criteria (e.g., the users' expected response time compared to their perceptions of the actual response time), these gaps still need to be weighted somehow in order to determine their real significance. Research has continued to try to improve the measurement of user satisfaction, typically using the instrument of Ives *et al.* (1983) as a starting point, but there has been considerable criticism both of the underlying theory that user satisfaction is a good indicator of IS effectiveness (Melone, 1990) and the methodology of measurement (Doll & Torkzadeh, 1988; Galletta & Lederer, 1989).

At the level of the individual user, there has been a considerable amount of work done in the field of human computer interaction concerning the usability of computer-based systems (Bennett, 1984; Shackel, 1990).

This is based on the notion that 'any system designed for people to use should be easy to learn (and remember), useful, that is contain functions people really need in their work, and be easy and pleasant to use' (Gould & Lewis, 1985, p 300). Researchers, such as Tyl-desley (1988), have developed metrics to measure this usability. His schema comprises 22 criteria, including time to complete a task, percentage number of errors, number of commands used, and number of times the user expresses frustration or satisfaction. Like most of the effectiveness measures, usability criteria can be expressed quantitatively but there remains an underlying subjectivity regarding which measure to use and how to apply it.

There is much risk and uncertainty in IS development; ranging from the risk that a system may not meet its requirements (which themselves may have changed during the development process) to risks of security breaches and other serious failures. This has sparked an interest in risk analysis for IS, with Boehm's (1988) spiral model of software development emphasising regular risk analysis. There are clearly many different types of risk (Parker *et al.*, 1988; Clemons, 1991; Coleman & Jamieson, 1994) from high level commercial risk to initial system/project risk. Willcocks and Margetts (1994) propose a framework for examining risk based on the content, context and process approach (see below) extended to include a project's external business context, internal organizational context, the process by which the project is carried out, the content of the project (e.g., size, complexity) and the project outcomes (e.g., cost, time, impact on the business). However, Baskerville (1991) argues, in connection with IS security risks, that much risk analysis lacks formal statistical rigour and its inherent subjectivity makes it open to organizational misuse, such that the analysis can be fixed to give the desired result. Baskerville, does however, recognise its value as a communication technique to increase the awareness of decision-makers of the existence of particular risks.

Increasing concerns regarding the effectiveness of (large scale) IS investment have meant that there has been more interest in evaluation approaches from this zone over the past decade. In general, except for high performance networks or transaction processing systems, most organizations have shifted their attention away from the efficiency aspects of the technology towards its effectiveness in terms of business value. However, as we have argued above, there remain serious problems in trying to assess, objectively and quantitatively, the business value of IS.

Understanding

In our earlier paper, we noted much research activity in the efficiency and effectiveness zones and this seems to have continued over the last ten years. However, back

in 1986, there appeared to be very little interest in the understanding zone but this seems to have changed somewhat over the last ten years.

An important step towards understanding evaluation is the recognition that an organization typically uses a wide range of IS with different functions and objectives and so different evaluations may be required; i.e., there is no 'one best method' suitable for all situations. Thus, an evaluation approach which suits a simple structured payroll system is unlikely to be appropriate for a strategic high profile marketing system or a groupware support tool. The literature offers various classification schemas although Willcocks (1994) advises organizations to develop their own classification based on their own goals, objectives and characteristics of their particular industry. Parker *et al.* (1988) distinguish between substitutive, complementary and innovative applications, depending upon the ease with which the benefits can be quantified. Ward (1990) extends this analysis by adding McFarlan's (1984) strategic grid. Hochstrasser's (1990) classification uses the system's objectives and its impact on the organization to create a somewhat different schema. Farbey *et al.* (1993) argue that the following factors are important in deciding which evaluation approach to adopt: the role of the evaluation, the decision environment, system characteristics, organization characteristics, and the cause and effect relationships between the investment and its benefits.

Farbey *et al.* (1993) offer a benefits evaluation ladder with eight rungs to classify different types of project according to the difficulty of evaluation. Moving up the ladder generally leads to increasing benefits but also increasing risk and uncertainty, as well as increasing complexity in carrying out the evaluation. This ranges from the first 'rung', mandatory changes, where the function of evaluation is to compare the technical and cost aspects of alternative solutions for a change that has to take place, to the top rung, business transformation, where IT needs to be evaluated as part of an entire major change initiative. The full classification is as follows, from top to bottom rung:

- business transformation
- strategic systems
- interorganizational systems
- infrastructure
- management information systems and decision support systems
- direct value added systems
- automation
- mandatory changes

The authors conclude by offering a method to match evaluation approaches to particular contexts, which also takes into account the role of the evaluation, the decision environment, characteristics of both the organization and the system, and the specificity of cause and effect

relationships in this particular context (Farbey *et al.*, 1993, Chap. 11).

Gregory and Jackson (1992) consider evaluation methodologies as goal-based (or functionalist), systems-resource based (concerned with adaptation to environment), culture-based (organizational culture), or multi-actor based (political analysis). They then relate this classification to the evaluation team (or 'evaluation party') based on the team's approach to organizations (objective or subjective) and their internal 'variety' (range of available perspectives—Ashby, 1956). Thus, they argue that a goal-based approach would suit an evaluation team with an objectivist approach and low variety, while a multi-actor approach would work better with an evaluation team characterised by a subjectivist approach and high variety. Although this classification provides insight, in practice much depends upon the precise role and organizational 'weight' (or political power) of the team.

As well as recognising the need for different evaluation approaches for different types of system, authors such as Farbey *et al.* (1993) recognise that evaluation stretches over the entire systems life cycle. However its nature changes over the life cycle such that the early stages (strategy selection, problem identification and feasibility study) are characterised by senior management activities such as defining strategy and high level goals, identifying constraints, and interpreting costs and benefits. In the later development stages, project managers are concerned with evaluating progress against detailed plans and precise specifications through project control and acceptance testing. After implementation, an evaluation team may identify costs incurred and benefits achieved, and the extent to which these resulted from the IT intervention.

Another useful way of trying to understand an evaluation and its context is in terms of content, context and process (Symons, 1991). This is based on the contextualism of Pettigrew (1985). Content is concerned with 'what' is to be measured and evaluated and involves the selection of relevant criteria and values. This is likely to stretch beyond narrow costs and benefits. Notions of risk and links to the organization's strategy can be considered here. Process involves the 'how' of evaluation; i.e., the way it is carried out, when, how often and how the results are to be made available. This is linked to the notion of organizational learning. The context involves the consideration of the questions of 'why' the evaluation is to be carried out and 'who' is to do it. Considerations of context may involve the external organizational context (e.g., aspects of the business environment) and/or the internal context (e.g., the structure or culture of the organization). As well as the breadth offered by this approach, Symons (1991) emphasises the need to consider interaction between the layers. For example, the content-context link includes the need to relate IS evalu-

ation to organizational goals and strategies, as well as the need to consider the implementation process. The context-process link implies the need to consider the (process of) evaluation along the whole of the development life cycle.

Walsham (1993) uses the content, context, process (CCP) approach in a detailed analysis of three case studies. He concludes that 'the process of IS evaluation involves a discourse, often mediated by formal procedures, but in the context of informal stakeholder assessments' (p 179). He notes that the evaluation process has both overt and covert functions and in some organizations, it may be seen as largely a ritual. However, its outcome provides an interpretative scheme, incorporating certain norms and values, although these may not be accepted completely by all the stakeholders concerned. The importance of discourse as part of an evaluation exercise can be linked to the work of Lyytinen *et al.* (1991) who use a social action perspective to derive nine different effectiveness measures for office IS. They relate four types of social action (instrumental, strategic, communicative and discursive) to three contexts (technology, language and organization) to give a much broader picture of effectiveness than is normally presented.

As well as breadth of understanding, the CCP framework also lends itself to the use of rather different tools to those of narrow cost-benefit analysis. These include stakeholder maps (Gilbert *et al.*, 1988) to identify the various stakeholders (e.g., users, developers, senior and middle managers, customers and trade associations) and multi-objective, multi-criteria analysis (Farbey *et al.*, 1993). The latter, together with value analysis, prototyping, simulation, and game/role playing, is classed as an exploratory or experimental technique by Farbey *et al.* (1993). Furthermore, Serafeimidis and Smithson (1994) use the CCP framework as a foundation for their conceptual model of evaluation which underpins their discussion of software support for the evaluation process. They argue that evaluation is an information intensive activity, with a need to store highly heterogeneous information (hard historical accounting and statistical performance data as well as informal qualitative information) so that it is available to the various stakeholders for the different evaluations over the whole system's life cycle.

Related software tools and environments include Lee and Gough's (1993) system to support IS planning, Santhanam and Schniederjans' (1993) proposal for a knowledge-based system to select feasible IS projects, and Agarwal *et al.*'s (1992) system to rank projects based on both qualitative and quantitative criteria. Lederer and Prasad (1993) offer a tool to support the estimation of software development costs. [1]

Analysis

Having discussed our framework, which was originally proposed as a way of classifying the research literature, the reader is entitled to ask 'what value does the framework have for IS evaluation?' 'Do these three zones really add any insight for understanding how one can sensibly evaluate IS?' It is our belief that the framework does add to our understanding of evaluation and we now return to our outsourcing example, provided at the beginning of the paper, to suggest how.

It may be recalled that Alpha had outsourced its IS in 1994, which resulted in lower corporate IS costs but also reduced IS service to the users. Senior management felt the exercise was successful because costs had dropped; business unit staff felt outsourcing was unsuccessful because they were no longer receiving the superior degree of service they were accustomed to. Different stakeholders held different views about the value of outsourcing. But evaluating outsourcing could be made more coherent and transparent. It is our belief that the framework could help in developing a broad comprehension of the evaluation process. In trying to come to grips with evaluating outsourcing, one could conceptualise evaluation measures in each zone of the framework.

For example, in the 'efficiency zone' outsourcing evaluation metrics would focus on the lower level metrics associated with meeting objective measures on the productiveness of the outsourcing arrangement. The metrics would likely be similar to those used in assessing other IS applications. Such measures might involve the collection of statistics on number and frequency of abends (abnormal terminations of operating software), percentage of up-time *vs* down-time, lines of code/function points delivered, number of security breaches, cost per transaction, number of MIPS (processing capability) available at any given instant, and vendor IT skill sets available. Metrics in this zone fundamentally deal with objective criteria associated with the outsourcing vendor's capability of delivering services, and in particular, vendor costs. In the case of Alpha, it seems that these low-level productivity metrics did show an improvement following outsourcing.

In the 'effectiveness zone', outsourcing evaluation would likely involve assessing how well the arrangement is meeting expectations; e.g., is the vendor 'doing the right things'. Such metrics might involve service level agreements (how well the vendor is meeting or exceeding the service levels specified in the contract), budgetary monitoring (how close to the budget are the vendor's accumulated charges), user satisfaction levels (how satisfied the customers are with the products and services provided), and performance charting (how high/low the hardware/software performance levels are). Metrics in this zone fundamentally deal with both objective and subjective criteria measuring how well the con-

ditions set out in the contract are being met. Outsourcing evaluation in this zone would probably also include the decision making on whether outsourcing, insourcing or some combination of both would best meet the requirements of the organization for IS services. In other words, it seeks to answer the question: 'why, where, what, and how can a firm take advantage of the rapidly developing market of IS service providers?' Here a firm thinks about business opportunities involving co-sourcing, alliances, partnerships and equity holding deals with outside vendors. Such considerations are more complex and difficult to assess than conventional outsourcing contracts (Lacity & Hirschheim, 1997).

In terms of effectiveness metrics, the success of outsourcing at Alpha is less clear-cut. While service level agreements and budgetary constraints may have been met, the satisfaction levels of some users and some IS personnel have clearly fallen. Other stakeholders, most noticeably senior managers, are evidently highly satisfied with the new arrangements.

In the 'understanding zone', outsourcing evaluation would likely involve relationship measures – how well the outsourcing arrangement is working for example. On the vendor's side there is likely to be an 'account executive' (or 'project executive') who would work with the client to make sure expectations are being met. On the client side, there might be a 'contract manager' whose job it is to liaise with the vendor's account executive sorting out misunderstandings and ambiguities in the contract/relationship to pre-empt any serious blow ups. The contract manager would also have to interact with the business users to make sure they understood the services that are to be provided and that those products and services are acceptable to them. Similarly, the account executive has to manage the performance of the products and services delivered to the client by the vendors' staff. 'Understanding' in this case, relates to the mutual respect and interaction between the account executive and the contract manager. Measures in such a relationship might involve the number of times disagreements are sent up the management hierarchy (i.e., cannot be resolved at the contract manager-account executive level), the degree of harmonious interaction between client and vendor (i.e., the number of times the contract is actually consulted), and the mutual respect accorded each member in the relationship (discussions associated with a continuation of the contract, further business, etc). The measures would also have to take into account the different stakeholder viewpoints. Metrics in this zone fundamentally deal with how well the 'spirit' of the outsourcing agreement is being met and is inextricably linked with the social construction of reality.

At Alpha, the question of relationships presents a mixed picture. Senior managers seem to regard Alpha's relationship with its service supplier as a useful alliance while Alpha's users and user managers see evident short-

comings in the relationship. Some of Alpha's IS staff who transferred to the supplier regard the relationship with their new employer in terms of improved career prospects while others have experienced a reduction in their feelings of loyalty and belongingness. The IS staff remaining within Alpha probably regard the relationship as verging on the fraudulent when they complain of the supplier cutting corners.

Following on from how different sets of stakeholders view outsourcing, it is important to understand what outsourcing is trying to accomplish for each of them. For example, from an accounting perspective, outsourcing could be seen as an investment. The client organization invests in a vendor to deliver IS services more cost effectively. This is a strategic investment because if the outsourcing vendor goes bankrupt, the client could be critically impaired. It is not a decision to be taken lightly. From the business unit users' perspective, outsourcing is a vehicle to get work done. The IS services provided by the vendor are a critical tool for undertaking the activities and tasks that must be done to ensure the company delivers its products and services. From the IS staff perspective, outsourcing offers the potential for enhanced skill sets. Their IS careers could be progressed or regressed depending on how the vendor uses them; for example, continuing to support the client organization, or using them to sell new business to other companies in that industry. Senior management might see outsourcing as a way to run the organization effectively. It could provide a more efficient mechanism to supply data, technology, and services for managing the people and processes of the organization. Lastly, board-level executives could see outsourcing as an opportunity to move the organization in a new direction. The staff might be switched to perform new functions or get involved with new business ventures now that the vendor has taken over a number of so-called 'non-core functions'. New business opportunities might arise through an alliance with the outsourcing vendor.

Each of these different organizational stakeholders can be seen to have very different goals and reasons for outsourcing (or not outsourcing). And each of the different stakeholder's goals might be evaluated using metrics reflecting the three zones of our framework. (Articulating the possible measures in each zone for the different stakeholders however must wait for another paper).

From this outsourcing example, it is clear that evaluation is difficult, but not impossible. We see that there are metrics and measures that can be used, but they are neither simple nor obvious. The same is true with IS evaluation. It is our belief that the framework provided offers a useful conceptual lens by which to consider outsourcing. Given that outsourcing is simply an instance, an example, of IS implementation, the lessons learned from attempting to evaluate outsourcing, also apply in

the general sense to IS. There are different stakeholders likely to have different views about what should be the outcome of IS, and how well these outcomes are met. Who the different stakeholders are similarly need to be identified. Their goals and objectives must also be articulated. Once this is done, metrics in each of the three zones can hopefully be identified and applied.

Conclusions

In conclusion, IS evaluation clearly remains a thorny problem. We have argued that the long-standing pressures on managers to evaluate new IS, both before and after their introduction, have been exacerbated by an environment that is steadily increasing in complexity. Developments in both the business and organizational context, and the IS context itself, have made IS evaluation even more necessary and, yet, even more difficult. In other words, we believe that the IS evaluation 'stakes have been raised'.

In this paper, we returned to a framework, first developed ten years ago, and applied this framework to recent literature on IS evaluation. We note that the field has advanced over the past ten years in its awareness of the broad issues of evaluation. There is a recognition that evaluation should be concerned with more than just simple 'efficiency' metrics (such as software metrics), as discussed in our earlier paper. Within many organizations, considerable sophistication has been achieved in the application of 'effectiveness' metrics (including developments in cost-benefit analysis). Meanwhile, in academia, researchers have employed concepts from organizational behaviour and cognitive science to make progress in 'understanding' the phenomenon of IS evaluation in context. However, their techniques and constructs have yet to be widely adopted by practitioners.

Using a brief vignette, we have shown that the tools and practices of IS evaluation are highly relevant to the decisions concerning outsourcing that organizations are increasingly facing. In particular, we have used the example to demonstrate that the application of the evaluation framework, proposed earlier, can provide managers with useful insight into problem situations concerning IS outsourcing.

As in the case of Alpha, the failure to understand IS evaluation, and adopt appropriate evaluation practices, can lead to misconceived decisions with deleterious consequences for users and developers alike.

Note

[1] All these tools and techniques seem to be well-founded academically but there appears to be little enthusiasm from organizations for their adoption in practice. Within 'this understanding zone, there seems to be a significant gap between theory and practice. While an

increasing number of academics are exploring interpretive approaches to IS evaluation, practitioners seem to be resolutely concentrating on effectiveness, despite its limitations. In our earlier paper, we argued for the need for a paradigm shift within the academic community towards interpretivism and away from positivism. There seem to be signs that this is beginning to take place while in the practical domain positivism remains entrenched. Certainly practitioners are more answerable to managers and shareholders who presumably see the

quantitative certainty offered by positivistic approaches as being closer to the 'bottom line' profitability of industry. It will be interesting to see whether a similar paradigm shift can occur in industry.

Acknowledgements – This paper has benefited from the constructive criticisms of four anonymous reviewers. We wish to thank them sincerely for their efforts as their input has markedly improved the paper. We would like to also thank Mary Lacity for her assistance in collecting and helping analyse the Alpha example.

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