Problems and Issues Relating to IT Investment Appraisal: Experiences from Scottish and Benelux Studies

Egon Berghout[*], Kevin Grant[**] and Mark Stansfield[***]

[*] Department of Business & ICT, University of Groningen, The Netherlands,
e.w.berghout@eco.rug.nl.
[**] Division of Business Information Management, Glasgow Caledonian University,
Kevin.Grant@gcal.ac.uk.
[***] School of Information & Communication Technologies, University of Paisley,
stan-ci0@wpmail.paisley.ac.uk

Abstract

Despite the growing number of IT investment appraisal methods and approaches, many organizations are still experiencing difficulties with this complex and sophisticated area. Within an environment of increasing competitiveness, pressures to reduce overheads as well as the introduction of new working practices, companies are turning to new IT investments in order to survive in uncertain and volatile markets. One sector that is experiencing such pressures is the financial services sector that is undergoing fundamental changes in terms of its structure, products and working practices, in which the investment in new IT has been a key enabling factor.

This paper will report on initial findings from on-going research that has been conducted within the Benelux and Scottish financial service sectors in which the process of IT investment appraisal was critically evaluated from the perspectives of: key stakeholders, appraisal processes, appraisal criteria and project descriptions and champions. A comparison between the Benelux and Scottish financial sectors is made.

The research confirms earlier research results regarding requirements to appraisal methods; however, it also identifies the concept of 'power' and power behaviour as a dominant factor regarding the actual use of appraisal methods. Capturing the concept of power in rational decision-making is identified as the next challenge in IT appraisal research.

1. Introduction

As a result of rapid developments in IT, particularly in areas such as the internet, e-business and groupware, the investment in IT is viewed by many organisations as a vital means of reducing their overheads and saving money. In addition, investment in IT is viewed as increasing their flexibility in terms of how products and services are produced and delivered, as well as how they interact with customers and clients, thus, increasing their competitiveness within the marketplace. However, despite decades of research into IT investment appraisal, the relationship between IT investment and organizational performance still remains poorly understood in which investing in IT does not guarantee business success.

Fitzgerald (1998) notes that investment in IT is often based on a belief or faith that benefits will accrue as opposed to being based on actual attempts to measure the benefits. When attempts are made to measure the benefits of IT investments, they are often based on strict quantifiable, financial based criteria as used in techniques such as cost-benefit analysis and return on investment. When such criteria are used there may be issues relating to the source and the validity of the data that can be manipulated to promote either a favourable or unfavourable view of the situation. However, this

focus on quantifiable criteria, tends to overlook the more qualitative, intangible benefits that can accrue from IT investment such as the image of the organization, customer and media perceptions, staff morale, the working environment etc. It is difficult to be able to place exact figures as to the value of these areas regarding the long-term success of an organisation. As a result there are a number of important problems and issues relating to IT investment appraisal that need to be addressed in order to provide a more balanced view of the appraisal process.

2. Problems and issues relating to the process of IT investment appraisal

One of the problems relating to the process of IT investment appraisal concerns the huge array of techniques and approaches that exist. A study by Renkema and Berghout (1997) found that there are more than sixty IT investment appraisal methods comprising four main categories of financial, multi-criteria, ratio and portfolio approaches. Traditional financial based methods such as return on investment, net present value, internal rate of return, and payback period provide a narrow, monetary based view of the decision-making process in which many of the predictions could be argued to be rarely achieved (Fitzgerald, 1998). In addition, many important non-financial criteria are often overlooked in the decision-making process.

Multi-criteria methods have an advantage over financial based methods in that they combine qualitative and quantitative criteria within the decision-making process. An example of a widely used multi-criteria method is the Information Economics approach (Parker *et al*., 1988). However, Information Economics has been criticised on the grounds that it may be over-mechanistic and time consuming (Willcocks, 1992).

The ratio approach utilises a number of ratios that have been proposed to assist in the IT appraisal process (Farby *et al*., 1993), with examples of financial ratios being IT expenditures against total turnover and the yieldings that can be attributed to IT investments against total profits. Another relatively well-known ratio is Return on Management (ROM) (Strassmann, 1990) in which value added by management is related to the costs of management. However this approach has been criticised on the grounds of its usability and the difficulties in producing the figures (Willcocks, 1992). Within the portfolio approach several investment proposals are plotted against decision-making criteria that are used not so much to calculate but to illustrate the problems at hand. The number of appraisal criteria is generally less than in multi-criteria methods, however, the result may often be more informative

One of the main problems of the four categories of IT investment appraisal methods are that they are largely based on a rational view of decision-making. This usually consists of a careful analysis of the problem, followed by a systematic analysis of alternatives, and finally, a choice for the optimal solution and an implementation and evaluation. However, within organisations, managers at all levels are not always faced with problems situations that are clear, easily defined, well structured and easily solved using pre-defined solutions. More than often they are faced with problem situations that involve people that may be 'messy', subjective in nature, ill-structured and cannot be solved in a conventional engineering or scientific sense.

The 'investment iceberg' analogy as used by Kaye *et al*. (1995) highlights the hidden elements within investments in IT as well as the flaws with current appraisal practice. The visible, tangible

benefits and costs (the tip of the iceberg) can be represented by the more traditional IT investment appraisal techniques encapsulate only part of the overall range of elements that may influence the process of IT investment. There may be a significant number of elements that can be viewed as being invisible and intangible and thus lying outside the scope of many current appraisal methods (Maanen and Berghout, 2002). Such invisible and intangible elements within the IT investment process might include internal politics, balances of power and organisational culture. Since IT, for most organisations, is viewed as such a valuable strategic resource (Ballantine *et al*., 1996), the area of IT investment is becoming increasingly associated with 'soft', intangible elements within the appraisal process.

Ballantine *et al*. (1996, p.130) state that *"…despite the existence of an extensive literature, the IS community appears to be no nearer a solution to the problems of IS/IT appraisal"*. Some of the main issues that appear to be highlighted within the literature include:

- Problems in the identification and quantification of relevant benefits and costs (Ballantine *et al*., 1996; Fitzgerald, 1998);
- A lack of interest in the appraisal process (Ballantine *et al*., 1996);
- A lack of formal appraisal procedures (Willcocks, 1992; Ballantine *et al*., 1996);
- A need for the perspectives of a wider range of stakeholders concerning their involvement and satisfaction with the appraisal process (Willcocks, 1992; Ballantine *et al*., 1996);
- Most appraisal methods are unable to take account of intangible benefits (Willcocks, 1992; Kaye *et al*., 1995; Ward *et al*., 1996);
- A need for organisations to question their appraisal practices concerning its purpose and how it is conducted within the organisational context (Ballantine and Stray, 1998).

These issues formed the basis of further research into the IT investment appraisal process that will be described in the following sections, in which a number of Benelux and Scottish organisations were studied in order to determine the importance of such problems. In addition, the studies also explored ways in which such problems associated with the appraisal process might be addressed in an effective manner.

3. Background to research studies

The Scottish study comprised an investigation into IT investment appraisal within the Scottish financial sector. The Scottish financial sector is very competitive and is undergoing something of a significant change as a result of takeovers and mergers as well as significant investment in IT in order to reduce overheads and increase competitiveness. The changes have resulted in large-scale organisational restructuring, diversification and transformation within many financial services companies, which have led to a large reduction of staff. The increase in IT investment can be highlighted by the increase in internet banking services and facilities.

The project methodology for the Scottish study comprised an investigation into five large Scottish financial companies using a semi structured interview questionnaire. The questionnaire mainly comprised closed questions although there were a number of open-ended questions through which the participants could elaborate upon issues of particular importance. All of the companies who participated in the study had recently completed some major IT investment project which either

supported existing products or was aimed at promoting and supporting new financial products that had been recently launched.

Seven key staff members were selected from each of the five organisations and each took part in a two-hour interview session. The roles of the participants included Chief Executive Officer, Head of Accounting, Head of Information Technology, Head of Corporate Planning and Customer Relationship Managers. The interview sessions took place between 1998 and 1999 with all of the participants being contacted before the study in order to secure their interest and commitment to the study.

The project methodology for the Benelux study comprised an investigation into ten large financial companies in the Netherlands and Belgium also using a semi structured interview questionnaire. The questionnaire mainly comprised closed questions although there were a number of open-ended questions through which the participants could elaborate upon issues of particular importance. All of the companies who participated continuously evaluate major IT investment project which either supported existing products or was aimed at promoting and supporting new financial products that had been recently launched. Three interviews per organisation were held comprising the board member responsible for IT, Head of Information Technology and a business manager. The Benelux study comprised more elements of IT management than investment appraisal alone, however, this is alone reported in this study.

The main objectives of the study were:

- To critically investigate the appraisal process within each of the companies in terms of the methods used, as well as when and how the appraisal was conducted;
- To evaluate the importance of the stakeholders in terms of identifying who they were and what role they played within the appraisal process;
- To evaluate the role of the project champion in terms of what role they played within the decision-making and appraisal process;
- To identify what role 'soft', intangible factors played within the decision-making and appraisal process, what the factors were and whether they were addressed or not.

4. Main findings from research studies

This section will highlight some of the main lessons learnt from the Scottish and Benelux studies. The lessons will be addressed under four main headings, namely: the appraisal process, the role of the stakeholders, the role of the project champion and the role of 'soft', non-financial factors.

4.1 Appraisal process

For the Scottish study, in all five of the companies who participated in the research, the appraisal process was dominated by the use of traditional financial based appraisal methods such as net present value, payback method, internal rate of return, cost benefit analysis etc. The main reason given for this emphasis on traditional financial-based methods was due to historical reasons in terms of it had always been carried out that way and it was expected of them to use these methods.

The majority of the participants (65%) considered that the decision-making and appraisal process could be improved if it covered a wider range of variables to include more business-related issues and variables. This appeared to relate to the situation that over 40% of the participants considered the appraisal process took place with little consideration to strategic considerations such as corporate strategy as well as business plans and objectives. Nearly half of the participants considered the appraisal process to be dominated by technical issues relating to hardware and software selection rather than relating the IT to the business strategy.

Very few of the participants were aware of methods and frameworks that focus on strategic issues within organisations in terms of relating IS strategy to business strategy. Nearly 20% of the participants considered that operational issues relating to the IT project were more important and did not see strategic issues as an important concern, since they were more interested in 'getting the job done'. Many of the participants stated that they would be interested in learning about more current methods, in particular, those that could provide a broader view of the overall situation, however they would be reluctant to use them for fear of failure. It should be noted that the interview sessions took place at a rather tense period within the financial services sector in which many companies were operating within a climate of mergers, and thus job security and the stability of the companies was an important issue.

Experiences from the Benelux studies found a consideration of non-financial factors in all appraisals. Except for two organisations the investment criteria were, however, not fixed. The investment decisions were made in a relatively early life cycle stage of the project. At this stage in most cases the project is little more than an idea and, for example, the technology necessary to build the information system was unclear. Consequently, in most cases there was insufficient information to even determine the order of magnitude of the cost and benefits of the project. Few organisations considered implementation and run-time cost. Only two organisations evaluated their investment decision after completion of the project. In these evaluations the actual implementation is compared to the initial objectives. Other evaluation activities that take place concern benchmark tests of the overall information function or system development activity (for example using CMM (SEI, 1995).

4.2 Role of the stakeholders

In terms of the Scottish study, one important theme that was identified by the majority of the participants was that it was considered that the interests of the end users had not been evaluated adequately. Much of the power tended to rest in the hands of the accounting and the IT departments who tended to be the most influential in the decision-making process, mainly through the involvement of middle managers. Senior management tended to be involved at the beginning of the project and to a very limited extent at the end. Customers and users had some involvement via the use of focus groups, however, this tended to be at a fairly low level of consultation. In all of the companies, the role of the Trade unions was largely ignored.

There tended to be very little open and detailed discussion that was compounded by poor lines of communication. Over 65% of the participants considered that the decision-making process should be more transparent so that the thinking and reasoning behind decisions can be better understood and challenged if appropriate. Over 60% of the participants stated that there tended to be many

meetings regarding the appraisal of an IT project but there appeared to be very little positive actions arising from the meetings.

Over 35% of the participants considered that there was a lack of empowerment at lower levels of the management structure. They considered that the decision-making process should be more prevalent at lower levels of the organisational hierarchy to include more business users and lower management.

Again these findings are somehow in contrast to the Benelux findings. In the Benelux studies all organisations placed considerable effort to allocate the investment initiative to business management. However, due to the required coordination effort with IT investments and number of 'must do' investments, the actual power is regarded to be with IT management. The quality of investment decisions appeared to depend on whether typical *stakeholder categories* were involved in the *decision-making* process. These stakeholder categories were;

- *General management*, those who 'pay' for the information system;
- *Business management*, those whose work processes are supported by the information system;
- *IT Development*, those who plan, design and implement information systems;
- *IT Operations*, those who maintain operational information systems.

4.3 Role of the project champion

The project champion played an important role within all of the companies that comprised the Scottish study. In all of the companies there was a tendency to allow the people who championed the project to evaluate its success that often raised the issue whether the appraisal process would be conducted at all. In addition, this raises the issue of bias in terms of the extent to which the project champion might evaluate the project objectively without attempting to focus on the benefits whilst ignoring or playing down the eventual costs or the adverse consequences of the project. All of the organisations highlighted the point that in terms of post-implementation evaluation, the original objectives of the project are often overlooked or re-interpreted to allow a more favourable picture of the IT project to emerge.

All of the participants highlighted the importance of political issues within the appraisal process in terms of how much power and influence the project champion had within the organisation which affected the decision-making process. Over 50% of the participants raised the point that it was often the project champions who had the highest profile as well as the most influential connections within the company tended to achieve the most success getting their projects approved and implemented. Over 50% of the participants highlighted the issue of 'pet project syndrome' in which projects could be 'fast tracked' through the appraisal process depending on the status of the project champion. One of the organisations raised the issue of the persistence and commitment of the project champion as playing an important role in the appraisal process, since they routinely reject 85% of all proposals and will only consider them in more depth once they have been reworked. The thinking behind this strategy was that if 'if the project is needed, it will re-emerge'. This was one way of assessing the commitment of the project champion, in that if the IT project is that important, they will fight for it and pursue it despite obstacles being placed in their way.

In the Benelux study comparable results were reported. In most cases it appeared to be possible to identify a champion. However, identifying the influence of this person on the outcome of the decision was not possible, given the fact that the decision could not be retaken with another champion and organisation tend to give only rational justifications of their decisions.

4.4 Role of 'soft', intangible factors

All of the participants who took part in the Scottish study recognised the role of 'softer', non-financial factors and issues within the appraisal process such as change, culture, political and power aspects, however these tended to be overlooked. All of the participants found difficulties in being able to identify the extent to which 'softer' intangible issues influenced the appraisal process and their own decision-making. Over 50% of the participants noted that 'gut feeling' sometimes affected their decision-making process but this was not conveyed to others in a formal sense. It was felt that it would be difficult to convey and convince others of the 'softer', intangible factors within the context of formal meetings. The reason for not being able to utilise the 'softer', intangible elements was that the current methods employed by the companies could not adequately recognise and address such intangible elements that comprised the appraisal process.

Another issue that was highlighted was how to recognise and make sense of the various viewpoints from the stakeholders with regard to the appraisal process. All the participants recognised that existence of different viewpoints and concerns regarding IT appraisal, however, there appeared to be no effective mechanism for learning about and acting upon these views and concerns. Finally, there appeared to be very little reflection taking place within the companies once the appraisal process had taken place so that valuable lessons could be learnt. This is a concern since valuable lessons may be being overlooked and ignored, thus, important opportunities are being missed that might enhance the appraisal process and methods used within the companies.

In the Benelux studies, as stated before, all organisations considered non-financial factors in all appraisals. The non-financial factors that were considered were limited to the following categories (Berghout, 1997):

- Customer perspective;
- Internal perspective;
- Technology perspective;
- Knowledge perspective.

These categories are similar to those of the 'balanced scorecard', however, a Technology perspective appeared to be required. Those organisations that did not consider technology appeared to have more misjudgments in that area.

5. Areas of future research - towards an interpretive approach for IT investment appraisal

One particular methodology that was developed to learn about complex, ill defined, subjective people problems that nearly all managers at some time have to address is Soft Systems Methodology (SSM). SSM has been developed primarily by Checkland and Wilson (e.g.

Checkland, 1981; Wilson, 1984; Checkland and Scholes, 1990; Checkland and Holwell, 1998) along with researchers at Lancaster University for thirty years. The application of SSM has been described by Checkland and Holwell (1998, p.12) as being conducted in *"… the messy real-world problem situations in which managers of all kinds and at all levels try to cope with the complexity of 'life's rich pageant'…"* The work carried out was aimed at dealing holistically with such problem situations through systems thinking. A plethora of methods exists (Renkema and Berghout, 1997), however, there seems to be little understanding of *how* IT investment appraisal actually takes place in organizations (Farbey, et al., 1999; Powell, 1992).

Certain elements associated with SSM may be able to contribute to the process of learning and reflection that companies should experience when undertaking IT investment appraisal (Farbey *et al.* 1999). There are a number of issues that companies need to address, namely:

- What are the viewpoints and issues of the stakeholders who should be involved in the appraisal process?
- How can these views and issues be recognised and addressed?
- What are the main activities that need to take place to enhance the appraisal process and does this differ from current practice?
- On what basis are appraisal methods and approaches chosen?

Within SSM, there appear to be a number of elements that can be applied to learning about the appraisal process. One of these areas is the notion of 'relevant systems' that are used in SSM as a means of investigating problem themes and issues. A range of stakeholders who are affected by an IT project could identify a range of problem themes and issues relating to the appraisal process.

CATWOE elements as used in SSM could be used to identify relevant people, resources and constraints that might be associated with a particular theme/issue within the appraisal process. CATWOE comprises the elements of (C)usomers (who are the main people affected by the issue/theme?), (A)ctors (who are the main people involved in undertaking the theme/issue?), (T)ranformation process (what are the main inputs and outputs?), (W)orldview (what is the viewpoint that makes this issue/theme important?), (O)wners (who are the people who have control and responsibility for this issue/theme?) and (E)nvironmental constraints (what are the constraints that affect this theme/issue?). Within the context of IT appraisal, the CATWOE elements could be used at two levels, one set of CATWOE elements could be identified for an issue/theme in terms of what *currently* happens, and a second set of CATWOE elements could be identified for what *should* happen. The comparison between the two sets could be used a means of generating a debate and learning more about the situation.

The next stage of SSM when applied in a conventional sense is to identify the main activities that take place in order to transform the inputs into outputs as identified by the (T) of CATWOE by means of a conceptual model. Within the context of IT appraisal, the conceptual model could be again used at two levels, namely one model that represents the main activities that *currently* take place within the appraisal process, and another model could be used to represent the activities that *should* be taking place.

A comparison table as used in SSM could be used as a means of debating the extent to which each of the activities that should take place actually do take place, as well as identifying relevant people, resources and appraisal methods that might be appropriate in operationalising the activities identified in the conceptual model. The role of 'soft', intangible elements could be identified within each of the activities in which their importance and means of addressing them could be explored.

The outcome of using the comparison table would be a set of recommendations outlining areas for change within the appraisal process that is based upon the process of learning that has taken place using elements associated with SSM. This may provide an organisational context within which to place possible changes aimed at a more effective appraisal strategy, as well as involving a wider number of stakeholders in the process of organisational learning and IT appraisal. In addition, such an approach may provide more of a holistic view with regard to issues and themes relating to the appraisal process. Thus, an organisation's choice of appraisal methods is guided by actual learning experiences, rather than by historical reasons, ignorance or apathy.

6. Conclusion

The main lessons derived from the Scottish study appear to confirm research reported in the literature by other authors relating to the main problems and issues facing organisations with regard to IT appraisal. This was particularly the case in areas such as a need for the perspectives of a wider range of stakeholders, a lack of understanding concerning the identification and quantification of benefits and costs, appraisal methods being unable to take account of intangible factors and a lack reflection concerning how the appraisal process is conducted within a wider strategic, organisational context.

The use of elements relating to SSM as a possible means of promoting organisational learning within the context of IT appraisal could be argued to be time consuming, but it could be argued that there are no 'magic wands' or 'instant solutions' to the issues and problems associated with IT appraisal. There may be an issue with regard to power structures in terms of the most powerful and influential stakeholders within an organisation exerting pressure on other stakeholders concerning the identification of issues/themes, as well as in implementing recommendations. Clearly, more work needs to be carried out in applying and developing further a possible interpretive approach that may aid organisations in formulating, implementing and reflecting upon their appraisal strategies.

There is a significant difference between IT appraisal in Scottish organisations and in the Benelux. This difference concerns the emphasis on financial methods and apparently less-participatory form of appraisal in Scottish organisations. Many hypotheses can be formulated to explain this difference and this will be subject of further study.

We anticipate that the differences in research results are primarily caused by cultural differences in organisations. A multi-cultural study, as described in this paper, therefore seems to be an efficient methodology to identify variables in appraisal research.

References

Ballantine, J.A., Galliers, R.D. and Stray, S.J. (1996). Information Systems/Technology Evaluation Practices: Evidence from UK Organizations, *Journal of Information Technology*, Vol.11, pp129-141.

Ballantine, J.A. and Stray, S.J. (1998). Financial Appraisal and the IS/IT Investment Decision-Making Process, *Journal of Information Technology*, Vol.13, pp3-14.

Berghout, E.W. (1997). *Evaluation of information system proposals: design of a decision support method*, Thesis Delft University of Technology, Delft.

Checkland, P.B. (1981). *Systems Thinking, Systems Practice*, Wiley, Chichester.

Checkland, P.B. and Scholes, J. (1990). *Soft Systems Methodology in Action,* Wiley, Chichester.

Checkland, P.B. and Holwell, S. (1998). *Information, Systems and Information Systems*, Wiley, Chichester.

Farby, B., Land, F. and Targett, D. (1993). *How to Assess Your IT Investments – A Study of Methods and Practice*, Butterworth-Heinemann Ltd, London.

Farby, B., Land, F. and Targett, D. (1999). Moving IS evaluation forward: learning themes and research issues, *Journal of Strategic Information* Systems, 8, p.189-207.

Fitzgerald, G. (1998). Evaluating information Systems projects: A Multidimensional Approach, *Journal of Information Technology*, Vol.13, pp15-27.

Kaye, R.G., Hinton, C.M and Armstrong, S. (1995). The Hidden Investment in IT: Dependency, Legacy and Heritage, *2nd European Conference on Information Technology Investment Evaluation*, Henley Management College, Henley-on-Thames, 11 - 12 July 1995.

Maanen, H. and Berghout, E. (2002). Cost management of IT beyond cost of ownership models: a state of the art overview of the Dutch financial services industry, *Evaluation and Program Planning*, 25, p.167-173.

Parker, M.M., Benson, R.J. and Trainor, H.E. (1988). *Information Economics*, Prentice Hall, London.

Powell, P. (1992). Information technology evaluation: is it different?, *Journal of the Operational Research Society*, Vol. 31, No. 1, pp.29-42.

SEI (Software Engineering Institute) (1995). *The capability maturity model: guidelines for improving the software process*, Addison-Wesley.

Renkema, T.J.W., and Berghout, E.W. (1997). Methodologies for information system investment evaluation at the proposal stage: a comparative view, *Information and Software Technology*, Vol. 39, No. 1, pp 1-13.

Strassmann, P. (1990). *The Business Value of Computers*, The Information Economics Press, New Canaan, CI.

Vickers, G. (1965). *The Art of Judgement: A Study of Policy Making*, Chapman and Hall, London.

Ward, J., Taylor, P. and Bond, P. (1996). Evaluation and Realisation of IS/IT Benefits: An Empirical Study of Current Practice, *European Journal of Information Systems*, Vol.4, pp214-225.

Willcocks, L. (1992). Evaluating Information Technology Investments: Research Findings and Reappraisal, *Journal of Information Systems*, Vol.2, pp243-268.

Wilson, B. (1984). *Systems: Concepts, Methodologies and Applications, Wiley*, Chichester.