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Justification of Investment in IT systems

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Abstract

For a company, capital investment of any sort is weighed up before a decision is made to invest. It is true that the vast majority of investments for companies can be quantified financially. Investment in Information Technology (IT) and Information Systems (IS) however has proved more complex than other investments as there are a large amount of intangible and non-financial benefits associated with this area of expenditure. Investments are traditionally rationalised by outweighing the costs and the benefits. The indirect costs associated with the deployment of IT/IS are equally difficult to put a measure on and hence the traditional methods of appraising IT/IS investments have proved to be inappropriate in this capacity. This paper details the lack of commitment by companies to fully justify their investment in IT/IS due to the apparent problems associated with measuring costs and benefits. After researching the areas of costs, benefits, risks, valuation and evaluation techniques, this paper provides a new framework for justifying investment in IT/IS. The framework proposes extensions to the current processes used by decision makers when justifying investment in IT/IS and may provide an additional tool to justify investment more accurately in this area.

Keywords: justification, investment, expenditure, benefits, decisions, information systems, information technology.

1 Introduction

Changes in technology have affected the environment in which organisations operate dramatically over the last few years. Technology has also changed the way organisations use IT/IS, (Irani, 1999). A globalised market and the influence of the Internet change the way organisations do business. This is changing the way people access information, communicate, shop and entertain themselves. This also changes the way businesses compete and operate, (Wessels, 2003). Decisions have to be made between modifying current systems and replacing existing systems with newer, more up to date technologies (Irani, 1999). Users in organisations are demanding that their information systems be more efficient and effective. With this, organisations are forced to invest heavily in information technology deployment and maintenance in order to obtain value and benefit and to stay competitive in this new fast paced, global environment. Therefore investment decision makers must acknowledge this change.

Although many IT/IS expenditure is regarded as costly and risky, many information systems investments go ahead without the use of formal investment appraisals or risk management techniques (Ward *et al.* 1996). Some organisations justify heavy investment in IT systems as an 'act of faith', where they have 'a gut feel' or assume that IT always pays off (Wessels, 2003). This is based on estimation and assumptions. The aim of this paper is to introduce and explain why traditional appraisal techniques used to justify investments in information technology and information systems are not suitable for this type of investment appraisal. Secondly, it aims to provide possible solutions to improve investment decisions by providing better information on how to identify and measure, more precisely, the costs and the benefits of information systems

to the decision-makers on IT/IS investment panels. Section 2 introduces the associated problems with justifying investment in IT/IS and its effects on the decision-making process and decision-makers. Section 3 provides an in depth look at the shortcomings of traditional methods when identifying and quantifying costs. It analyses methods of appraising the true costs and benefits of an IT/IS investment and looks at emerging valuation measures for justifying investment in IT systems. Section 4 outlines a new justification investment model or framework suited to information technology and information system expenditure, which may aid decision-makers justifying an investment in an information system. Section 5 offers some concluding comments.

2 Investing in information systems

Traditionally in business, capital expenditure has always been formally justified by means of appraising the benefits of the investment to the organisation. Capital investment can be purchasing a new fleet of vehicles for a delivery company or installing a new information system into a recruitment company. A traditional capital appraisal involves a statement of initial cost of the investment, the ongoing costs, the anticipated benefits and a calculation of suitable key performance indicators (KPI) or statistics (Wessels, 2003). Prior to the early 1990's, investment appraisal techniques were applied with relative ease, however with the changing nature of investment in information systems and the changing nature of the economic situation, management were finding it more difficult to apply these techniques to investing in IT/IS, (Wessels, 2003).

2.1 Associated problems

Organisations are currently finding it more difficult to justify the present levels of expenditure on information systems with many organisations not performing evaluations or cost benefit analysis (CBA) on their information systems at all. The fact that the benefits of IT systems are hard to quantify and are considered non-financial, those who do perform evaluations or (CBAs) sometimes report mixed or confused results (Remenyi, *et al.*, 1995). To justify an information system and show that it is appropriate for a particular business context, it must first be evaluated and then justified (Remenyi *et al.* 1995). This simple form of justification however cannot be applied to justifying an investment in information systems (Ward *et al.*, 1996). Investment in information systems is much more complex. Both the benefits and the costs of IT/IS are too complex to simply put down on paper due to their intangible and non-financial nature. It is hard to put customer satisfaction or improved workforce effectiveness on paper or in figures. The impact of IT/IS cannot easily be quantified in terms of benefits financially, which is the traditional medium to record both benefits and costs. Benefits are both tangible and intangible. Costs are both direct and indirect. As a direct result of this, most companies do not formally evaluate their investment in information systems. (Hochstrasser, 1992) reported that only 16% of companies used '*rigorous methods to evaluate and prioritise their IS investment*'. Further research from Hochstrasser found that, where investment appraisal of IS did take

place, it was usually based on financial techniques specifically designed to assess financial impact in terms of cost. In recent research about the justification of investing in information technology and information systems four issues have been identified as the core issues that prevent the practical application of appraisal techniques identified (Wessels, 2003). They are:

- The inability to clearly quantify the value from investing in a new information system.
- The complexity of models and methods suggested for solutions. They are too difficult to apply in practice.
- The process of human decision-making.
- The reach and range of information systems in the organisation.

There have always been problems to date over the ability to clearly articulate and quantify value. Volume and spending are easy to identify, unlike measuring value, which is much harder to define. Investment decisions are based on the human perception of value, however measured. The specification and implementation of information systems is often left to IT professionals themselves. There tends to be little or no involvement from managers or the users, which (Sauer, 1993) believes is the cause of many of the ineffective or failed information systems. (Earl, 1996) goes one step further and suggests that if information systems implementations are left to IT professionals and users alone, the investment is rarely recouped. This emphasises that management should be the ones who implement a new investment as they do so more efficiently and effectively.

The complexity of models and methods suggested in the past, have proved too difficult to apply in practice. Research by (Fitzgerald, 1998) shows that many companies define the costs associated with information technology in a narrow way. His study shows that they only include hardware and software. Organisations appear hesitant to include other costs in order to avoid putting further responsibility on a department. Costs on IT consumables such as paper, ink cartridges and disks are considered department costs and not IT costs. There were no Return on Investment (ROI) calculations on the IT investments because people believed them too difficult to carry out.

Decision-making process

As with all capital and large investments, management must make the decision to invest in an area of information technology or in an information system. (Simon, 1960) breaks the decision making process into different stages:

- Problem recognition
- Problem definition and structuring
- Identifying alternative courses of action

- Making and communicating the decision
- Monitoring the effects of the decision.

This model can be applied to making the decision on whether to invest in the information system or not. The decision point illustrated in the center of Figure 1 is the point at which management will decide to invest or not. Up to this point, the decision maker or decision makers will have to obtain as much information about the specific investment as possible in order to make the correct decision (Simon, 1960). The advantage of using this model is, it can illustrate the potential effects of an investment on the future of the organisation before a decision is made and hence reduce the risks of investing heavily in a system that may have little or no benefits to the company. The future of the organisation is influenced by the decision to invest or not to invest. Investment will either have a positive effect, no effect or a negative effect (Wessels, 2003). In order to aid the decision makers, the risk of investing and not investing are quantified. Different types of investments such as capital, revenue and strategic are analysed, evaluated and justified using different techniques, developed by professionals such as business analysts (Wessels, 2003). It is these techniques that have proved problematic for the area of information technology and information systems.

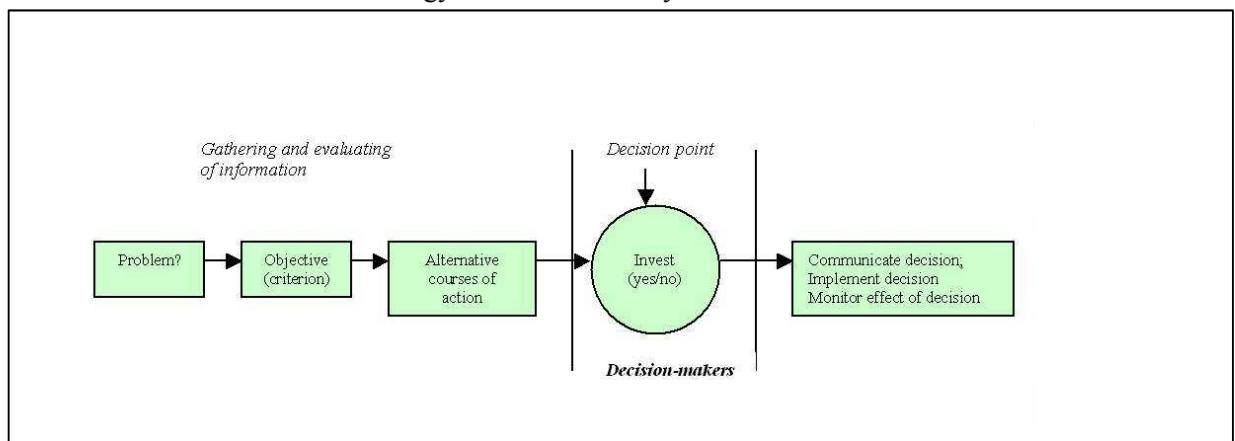


Figure 1: Decision-making process (Wessels, 2003).

The decision point, illustrated in figure 1 is the single most important moment of the decision making process (Wessels, 2003). The outcome of this decision point is affected by the amount of investigation and evaluation of the potential outcome of the investment by the organisation. The amount of research carried out has proved to differ vastly between the organisations, investments and decision makers. The investment techniques adopted by the decision makers are a primary tool used by decision makers to reach an investment decision. The decision to invest has to be made and it's effects monitored on a continuous basis. This makes it possible for the decision-maker to judge if their decision resulted in the expected and desired effect (Kelly, 2003). In the next section, the techniques that have proved successful for decision

makers are analysed for their value to decision makers investing in information technology and information systems.

3 Solutions to justifying an investment

The use of traditional appraisal techniques to justify investments in information technology and information systems area has received a lot of attention (Irani, 1999). The reason for this growing interest is due to the vast sums of money being spent on information systems and on the increasing need to justify this significant capital expenditure (Irani, 1999). Traditional appraisal techniques are a mixture of financial ones and strategic management ones. In the list of techniques below there are six, which are financial and have a monetary value. The last three are intangible but have been accepted in business management as techniques to appraise information systems investment. For this reason I have included them as traditional techniques.

- Cost Benefit Analysis (CBA)
- Return on Investment (ROI)
- Return on Capital Employed (ROCE)
- Payback
- Net Present Value (NPV)
- Internal Rate of Return (IRR)
- Compliance to Standards
- Risk Avoidance
- Scare Tactics

Over reliance on these traditional methods may lead to an excessively conservative IT portfolio and in turn a loss of competitiveness (Wessels, 2003). There are many reasons why these techniques are inadequate for appraising investment in complex information systems. Considering most IT/IS investments offer long-term strategic benefits, the focus of these techniques on the short term is one of the reasons for their inadequacy (Lefley, 1994). Organisations investing in information systems are usually replacing or adding to current systems, which are no longer appropriate for the tasks, the current business environment (described in section 1) demands. Some common reasons why organisations invest heavily in information technology and information systems include: (Defensive strategy)

- Changes in the business environment
- Risk avoidance e.g. keeping up with competing organisations
- Functionality problems with the current information system
- Technical limitations with systems
- Compliance with standards e.g. website accessibility for the visually impaired

- Scare tactics e.g. “if we don’t upgrade we’ll have serious problems in the future”

The other side of investing is more of an (Offensive Strategy), where an organisation aims to improve its efficiency, effectiveness and competitiveness. The justification in investing in a new information system would therefore not only include cost issues but also functionality, alignment with its particular business processes, opinions of users and compatibility with current technology (Wessels, 2003). All of these must be right before investing in a new information system. The following sections analyse the various areas, which are core to justifying an investment. These sections offer solutions in the form of reference tables to better appraise true costs, strategies to identify possible benefits and merging techniques to evaluate these more accurate costs against benefits. The result of this analysis is brought together in the form of a justification investment framework in section 4.

Appraising the true costs

IT/IS deployment can often be divided into direct and indirect costs (Hochstrasser, 1992). The following section will address both types and identify some important tangible and intangible costs, which are often overlooked. Tables 1, 2 and 3 offer solutions to these overlooked costs and can be used as reference lists when identifying costs in the future. They are represented in the investment justification framework under ‘identify costs’.

Direct project costs

Direct costs are those costs, which can easily be associated with the implementation or operation of information technology or information systems. Senior management often make decisions on what the projects budget should be and the ultimate investment decision based on what they think the project costs are. The reality is that direct project costs are often underestimated (Hochstrasser, 1992). The costs go far beyond the typical hardware, software and installation costs. Installation and configuration costs, which take in consultancy fees, installation engineers and networking hardware/software, are also classified as direct costs (Irani *et al.*, 1998). Direct costs can include unexpected additional hardware accessories, which typically happen when implementing new information systems on old hardware. Increases in processing power, memory and storage are not uncommon. Table 1 shows the direct project costs and some examples associated with IT/IS implementation, which should be used to improve the accuracy of identifying direct costs in the investment justification framework.

Direct project costs associated with IT/IS implementation	Examples of direct project costs associated with IT/IS implementation
Environmental operating costs	Air-conditioning facilities Uninterruptable power supply Computer furniture
Initial hardware costs	File server Terminals and Network printer
Initial software costs	Software packages and Networking software Operating system
Installation and configuration costs	Management consultancy support Installation engineers Network wiring, junctions and connectors
System development costs	External customising time, In-house customising time
Project overheads	Running costs: electricity, space Networking costs: telecommunication time, Rises in insurance premiums
Training costs	Vendor software familiarisation courses Software upgrade training courses
Maintenance costs	Yearly service contracts
Unexpected hardware costs	Secondary data and storage devices Upgrades in processing power
Unexpected software costs	Vendor module software upgrades Operating systems upgrades
Security costs	Protection against viruses and abuse
Consumables	Print cartridges/ribbons, disks and paper

Table 1: Direct project costs (Irani et al., 1998).

After looking at the issue of direct costs and the solutions reference table for direct costs, which may be overlooked when justifying investment, the next section looks at even more significant costs. Those costs, which are easier to overlook, are indirect costs associated with an IT/IS investment. (Hochstrasser, 1992) suggests that indirect cost may be up to four times greater than direct costs of the same project. These indirect costs can be divided into human and organisational.

Indirect human project costs

The single largest human cost is management time. (Irani *et al.*, 1998) This is specifically associated with integrating new systems into the organisations current work practices. One of the results of an organisation investing in a new information system will be the time management spend revising, approving and amending IT/IS related strategies (Irani *et al.*, 1998). Management will also investigate the potential of the new information system by experimenting with information flows and information reports. Example: The Human Resources department of an organisation implements a new information system. The administrative staff need time to absorb new operational work practices. The management of the administrative staff will require time to absorb new managerial work practices. During this period both parties will have developed new skills. Employees may seek salary increases or

benefits as a result of making themselves flexible to this new system and for learning new skills in the process. Any pay awards associated with the implementation of this new HR system, cost implications of increases of staff turnover will therefore be an indirect human project cost and should be into the justification criterion under costs. Table 2 below provides a solution to identifying some commonly underestimated or overlooked indirect human project costs, associated with the adoption of IT/IS.

Indirect human costs associated with IT/IS implementation	Examples of indirect human costs associated with IT/IS implementation
Management/staff resources	Integrating new systems into new/ revised work practices
Management time	Devising, approving and amending IT and manufacturing strategies
Management effort and dedication	Exploring the potential of the system
Employee time	Absorbing the transition from traditional to new work practices
Employee training	Being trained and training others
Employee motivation	Interest in IT/IS reduces as time passes
Changes in salaries and structures	Promotion and pay increases based on improved employee flexibility
Staff turnover	Increases in recruitment costs: interview, induction and training costs

Table 2: Indirect human costs (Irani et al., 1998).

Indirect organisational project costs

Indirect project costs also effect the organisation, with new work practices emerging with the introduction of the new information system. At first, a temporary loss in productivity may be experienced, due to the employees going through a learning curve (Hochstrasser, 1992). Management may attempt to exploit the new system to its full potential in a strategic level and in turn additional organisational costs will incur. Example: An organisation set up an Electronic Data Interchange (EDI) link between a customer and a supplier. The implementation of this system will have knock on technology and cost factors. The cost factors will be both direct and indirect. The most important aspect of indirect organisational costs occurs when such a knock on project reduces the number of management levels it has. This is typical of companies with extensive IT/IS installations, which often leads to a changing of the corporate shape (Hochstrasser, 1992). The cost of restructuring an organisation is considered very high particularly where groups within resist change and are unwilling to make the transition. These indirect costs should therefore be built into the justification for any new IT/IS investment. Table 3 provides a list of indirect organisational cost associated with an IT/IS investment.

Indirect organisational costs associated with IT/IS implementation	Examples of indirect organisational costs associated with IT/IS implementation
Losses in organisational productivity	Developing and adapting to new systems, procedures and guidelines
Strains on organisational resource	Maximising the potential of the new technology through integrating information flows and increasing information availability
Business process re-engineering (BPR)	The redesign of organisational functions
Organisational restructuring	Covert resistance to change

Table 3: Indirect organisational costs (Irani et al., 1998).

Taking into account all three areas of costs, these three tables provide a comprehensive reference point for organisations that wish to eliminate underestimated and overlooked costs, associated with their IT/IS investment.

Appraising the true benefits

The benefits of information systems are a portfolio of tangible and intangible benefits. Tangible benefits are those, which can be quantified or assigned a financial value while intangible are much more complex. Intangible benefits cannot be assigned a monetary value. An example of common benefits from an investment, which offers intangible benefits would include a more efficient customer service or enhanced decision-making (Laudon & Laudon, 2000). This section represents possible solutions to the problem of identifying true benefits of investing in IT/IS systems. It analyses competitive advantage and the discipline of benefits realisation management in a bid to help identify benefits of IS investments more accurately. This section of the paper is identified in the investment justification framework in section 4 under 'identify benefits'.

Competitive advantage as a benefit

Measuring the benefits of IT alone has been one of the major areas of research over the last 15 years (Davis *et al.*, 2003). It is accepted that IT does not pay off in the same way that traditional investment do. It is too difficult for management of an organisation to measure the return of an information systems investment. However management have always believed that IT/IS has the potential to provide them with a competitive advantage (Davis *et al.*, 2003). A competitive advantage is a business terminology used to define the position of one company performing better than rival companies. Competitive advantages are found by benchmarking one company's performance to a competitor's in the same industry. A competitive advantage provided by an investment in IT is yet another intangible benefit. It is difficult to financially

calculate having superior performance over competitors in any industry. When an organisation takes strategic actions, the performance relative to competitors is a measure of whether a competitive advantage was achieved or not. Traditional accounting techniques for measuring the performance of a competitor were popular in that accounting measures were publicly available for many companies (Davis *et al.*, 2003). This proved to be a useful tool in capturing information on competing companies operations.

Benefits realisation/management

Benefits management is the process of organising and managing such that the potential benefits arising from the use of IT are actually realised (Bennington, 2003). It is a management process not to be confused with cost/benefit methodologies. It is important to note that IT/IS alone do not create business benefits for an organisation. Benefits flow from using IT/IS. People in turn are enabled to work more effectively and efficiently and it is these actions that actually produce the benefits (Kelly, 2003). One of the problems with justifying investment in IT/IS is that the benefits are intangible and non-financial therefore they are hard to document. For this reason, a management process has to be put in place to identify the benefits with an investment otherwise they will not appear (Bennington, 2003). The result of IT/IS investment can be turned into a benefit using strategic management. This benefit can then be used in the decision-making process when justifying the investment. The benefits management process has five sub-processes and derives from the business strategies and plans.

How to identify and structure benefits

Step one from the benefits management process is identifying and structuring the benefits associated with investing in this new IT/IS venture. (Bennington, 2003) describes the typical key benefits of IT investments as enhanced employee productivity/efficiency, saved money or reduced costs, improved accuracy/presentation of information and compliance with legislation/regulations. But one of the problems faced by decision makers is in itself identifying the benefits of IT/IS investment. Benefits are complex, they evolve overtime, they are intangible and hard to measure. So how are benefits measured in benefits management? (Bennington 2003) identifies interviewing key stakeholders in workshop environments and examining the project objectives and deliverables as two ways.

Workshops are used to bring together all the key stakeholders to agree on the benefits that are required from the IT investment. Depending on the level of investment, it may be necessary to have a break down of different benefits and designate a separate workshop for each benefit. As the benefits are broken down, individuals are assigned benefits to strategically manage and

produce. Benefits management focuses on who is responsible and when will the benefits be achieved (Kelly, 2003). Key performance indicators (KPIs) are necessary to benchmark the process of whether an organisation has benefited in some way from the investment. They identify benefits to be measured, determine if benefits have been delivered, assign accountability to individuals or individual departments and allow management to make strategic decisions based on these key performance indicators.

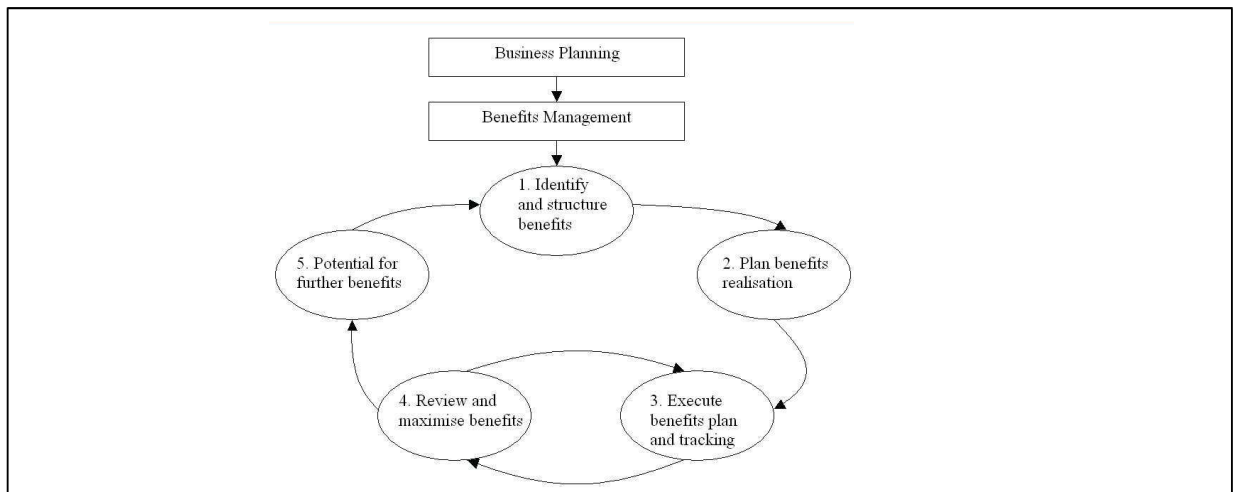


Figure 2: The benefits management process (Kelly, 2003).

Plan benefits realisation

The problem with benefits in relation to investing in IT is that they are difficult to identify and measure when outweighing with costs. To plan benefits realisation, structures must be put in place to help identify categories of benefits to help bring all benefits to the decision-maker's attention. There are three categories that benefits can be broken down into (Kelly, 2003). They are as follows:

- Financial – where financial value can be measured.
- Objective – where a percentage or number is most appropriate or a certain
- Criteria has been met which previously was not e.g. legislation compliance.
- Observable – where a financial or objective benefit cannot be found but where an individual may interpret a benefit has occurred e.g. customer satisfaction, image, good will and good name.

Execute benefits plan and tracking

The benefits being planned for must be executed and tracked. The important questions to answer in step three are where the benefits will occur, who will be responsible for them, who

receives the benefit, when will the benefit be realised, what action will the organisation have to take to deliver the benefit and how is it linked to output? (Kelly, 2003).

Review and maximise benefits

Project managers do not monitor benefits because they focus on managing the deliverables (Bennington 2003). In step three, persons within the organisation are assigned a benefit or benefits to plan and track. They must review these benefits with a view to maximising the benefit's value to the project.

Why realise benefits and the potential for further benefits?

It is valuable to an organisation to know what benefits they have achieved and not achieved. That way they can weigh up the benefits in reality against costs as opposed to comparing potential benefits and costs. A more realistic picture is painted for the decision-makers with actual benefits realised. These benefits will also be documented for future investment projects. It is recognised that those responsible for the realisation of a benefit remain accountable for that benefit. Benefits management is an appropriate process to use when justifying investment in IT/IS which can bring benefits to the attention of the decision-makers which otherwise have not been identified. Reasons why organisations do not identify benefits include pressure to deliver other projects, many of the IT/IS benefits are intangible or it is either too difficult or too costly to do so (Bennington, 2003). With this in mind here are some final points, which identify why benefits management could help decision-makers trying to justify investment in IT/IS:

- Senior management has doubts IT delivers real business benefits
- Benefits are often overstated to gain project approval (Kelly, 2003)
- It's difficult to predict benefits in advance.

Emerging IT/IS valuation measures

As discussed above, by far the most popular way of measuring performance is traditional accounting measures, easily applied to investments which have definite costs and whose benefits can be measured accurately. However, there are emerging IT/IS valuation measures, which can help to justify investment in IT/IS more easily and more accurately (Davis *et al.*, 2003). These valuation measures are not dependant on just tangible costs or benefits like the traditional techniques of Return on Investment (ROI) and Payback. Below is a list of the valuation techniques and a brief description of how they overcome the shortcomings of the more traditional valuation techniques. These merging valuation techniques are solutions to the problem of justifying the investment where the benefits of the investment appear to be

intangible and hard to quantify. The following section is represented in the investment justification framework in section four under 'justify – emerging valuation techniques'.

- **Balanced scorecard**

Integrates traditional financial measures described above with three key performance indicators (kpi's), (Davis *et al.*, 2003). They are customer view, internal business processes and organisational growth, learning and innovation.

- **Portfolio investment management**

By calculating risks, yields and benefits, this measure manages the IT assets from an investment perspective (Kelly, 2003).

- **Total Cost of Ownership (TCO) and Benchmarking**

The purpose of benchmarking is to gain sustainable competitive advantage. IT benchmarking is more of a concept. What is more recognisable may be the concept of Total Cost of Ownership (TCO), which compares the fully loaded cost per PC of an organisation to the same measure in other organisations (Kelly, 2003). TCO is just one component within the context of IT benchmarking.

- **Applied information economics**

Uses scientific and mathematical methods to evaluate the IT/IS investment process (Davis *et al.*, 2003).

- **Economic value added**

Is concerned with the true economic profit of an investment (Davis *et al.*, 2003). It is calculated by measuring the net operating profit and deducting the cost of all capital invested in the enterprise including technology.

- **Economic value sourced**

Calculates risk and time in monetary form and in turn adds these to the overall valuation equation (Davis *et al.*, 2003).

- **Real option valuation**

Values the flexibility of the organisation, tracking assets in place and growth options. This presents a wide variety of possibilities for the organisation in the future (Davis *et al.*, 2003).

- **Benefits Management/Realisation**

The process of organising and managing such that the potential benefits arising from the investment in IT/IS, is actually realised (Bennington, 2003).

4 Investment justification framework

The following section outlines some ways to improve the traditional techniques of justifying investment in information technology and information systems. This investment justification

framework does not supplement or replace the past techniques but is more of an extra measure to improve the accuracy of traditional techniques which have proved ineffective for justifying IT/IS investments. The framework was derived from the research carried out in this paper, looking into ways to identify, measure and track the benefits and the costs of IT investments. Section 3.1 looked at solutions to appraising true costs of an investment through reference tables of commonly overlooked costs and provided examples of such costs. They are represented in the first phase of the framework under 'identify costs'. Section 3.2 looked at benefits realisation management and competitive advantage as a solution to identifying true benefits of an IT investment. These solutions are also represented in the first phase of the framework under 'identify benefits'.

Moving from left to right, after the cost and benefits have been ascertained, the second phase of the framework justifies the investment through traditional financial techniques discussed in section 2 where suitable. It also justifies the investment through emerging valuation techniques discussed in section 3 as solutions to the problems arising from the more traditional financial techniques. If investing in an IT system is justified, the third phase of the framework is used. This section of the model recommends the use of management to implement the investment, as opposed to ICT professionals. This will help ensure a more successful project.

- **Identify all three costs brackets**

In order to fully identify all costs, direct costs, indirect human costs and indirect organisational costs should be identified and measured. The tables identifying these costs in section 3.1 provide a solution in the form of reference tables to identify areas overlooked by management previously.

- **Carry out benefits management/realisation**

Section 3.2 analyses competitive advantage and benefits realisation management as solutions to appraising true benefits of an IT investment. Realising the potential benefits and not just financial benefits, available in organisational figures, is an important way to bring out intangible benefits, which may otherwise go undetected.

- **Justify the costs versus the benefits using traditional financial methods**

The more traditional financial methods identified in section 2 should still be used in conjunction with the emerging valuation techniques, particularly to outweigh the more tangible costs and benefits.

- **Justify the costs versus the benefits using emerging IT valuation measures**

The new and emerging IT valuation measures analysed in section 3.4 should be used for intangible costs and benefits. The intangible nature of IT costs and benefits has proved to be the primary problem in justifying IT/IS investments with any great accuracy.

- **Ensure management in the implement the IT/IS investment**

Management must specify and implement any investment in IT/IS, as ICT professionals can be the cause of many ineffective or failed investments. (Earl, 1996) goes as far as saying that in a lot of cases the investment is not recouped.

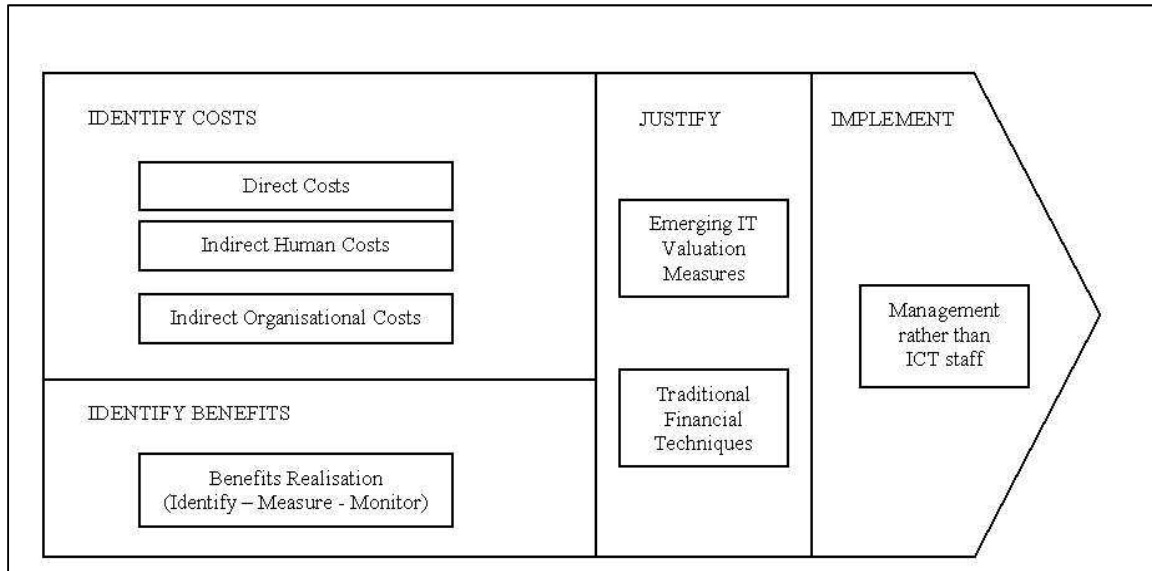


Figure 3: An investment justification framework (Author, 2003).

This model improves greatly on past techniques and other models, as it is not as complex as past models created to justify IT investment. It is developed as a left to right, linear model, which does not support traversing back once a phase is reached. This indicates that if an investment is not justified and will be not implemented, the decision-makers can not return to try and identify further benefits in order to force the justification of the investment to management. This would defeat the purpose of determining if an IT project investment offers a return. This framework is a useful aid to decision-makers justifying an investment in the area of IT systems. It offers a framework that is well-structured and not as complex as more traditional investment justification models detailed in section 2.1.

5 Conclusion

This paper has showed that the changes in technology in the last decade have affected the way organisations invest in IT/IS. In a global market driven by the Internet, organisations are forced to invest heavily in information technology deployment. If they are to obtain value and to stay competitive in this new global environment, they must begin to invest wisely. Section two has shown that the traditional justification techniques are not suitable for evaluating the intangible and non-financial costs and benefits, which are associated with IT/IS investments. These approaches have been shown to focus on short-term, non-strategic and tangible benefits. In a time when management are under mounting pressure to produce financial savings, there is a

possibility that IT/IS projects with a long-term focus could be excluded due to their intangible, non-financial benefits. The organisations, which reject the 'act of faith' policy and decide to justify the investment in IT/IS solely on financial/accounting strategies, will be faced with unrealistic costs and benefits. (Irani, 1998) provides numerous examples of the direct costs, indirect human costs and indirect organisational costs often overlooked by decision-makers. The benefits of IT/IS, which have always proved the hardest aspect of justifying IT expenditure, are realised more easily with the use of benefits management/realisation. Realising the potential benefits of investing in an information system will become an essential part of the justification process as it becomes more accepted at strategic management level. As it becomes clear that the traditional justification techniques are ineffective for IT/IS, new, emerging valuation measures will be used in justifying benefits and costs. The suggested justification framework in figure 3 incorporates these three aspects and concludes by identifying the problem with IT professionals specifying and implementing the investment. This should be left up to management as professionals rarely recoup the investment.

Many companies investing in IT/IS do so at great risk of failure. Organisations fail to see that IT is a long-term investment with intangible and non-financial costs and benefits. Companies fail to see that because of this, their accounting and financial techniques for justifying investment such as Cost Benefit Analysis (CBA), are not appropriate. As a result, there is an assumption that decisions are still being made on purely technical rational grounds. The investment justification model or framework could be used to improve an organisation's IT/IS investment justification strategy, identifying costs and benefits more accurately than the more complex models and formulae. It could also bring some issues like who should implement the information system if they are to invest, to the attention of decision-makers. The emerging IT valuation measures and the idea of benefits management/realisation are prominently put forward in the framework modeling it to be an up to date and useful tool in justifying investment in the IT area. This framework could easily be interpreted for investment in new web based media and evolving technologies such as mobile solutions. There is also scope to build upon this framework using more complicated justification techniques, incorporating formulae and statistics. Future research is necessary to show the success or failure of this newly proposed framework. A field study should be carried out, in order to obtain evidence to show its success or failure. This field study would involve applying an organisations IT/IS investment to this framework in order to come up with results for the different phases of the framework and hence prove how useful the framework is to this field of research.

6 References

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