



# **The Strategic Value of IT Investments**

**White Paper**

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May 2001 (Updated Nov 2009)



## 1.0 Introduction

This paper describes the 'Strategic Value of IT' assessment model and process developed by engage consulting group. General information is presented on the model, why it was developed and the benefits it delivers to organisations in applying it in their business.

## 2.0 IT Strategy and Investment Model

As Information Technology (IT) becomes more powerful and widespread, especially with the continual evolution of the Internet and e-commerce, investment in IT systems continues to rise and evaluating IT investment is becoming more complex. As a result, business executives are demanding not only wise investments in IT but also ways of extracting more value from existing hardware and software infrastructure, Information Systems resources and the ever growing information stored by the organisation.

Research conducted on the topic of how organisations evaluate IT investments shows an apparent lack of suitable business tools to assist Executives in making informed decisions on IT investments. This has caused many IT projects to failure due to a number of reasons including budget and time blowouts, poor use by people and expected benefits not being realised. This is partly due to legacy systems and outdated practices prevailing in many organisations. It is also due to the organisation not extracting the full value from existing infrastructure and resources and poor or non-existent planning processes. There is evidence, based on excellent research highlighting the growing gap between technologists and management.

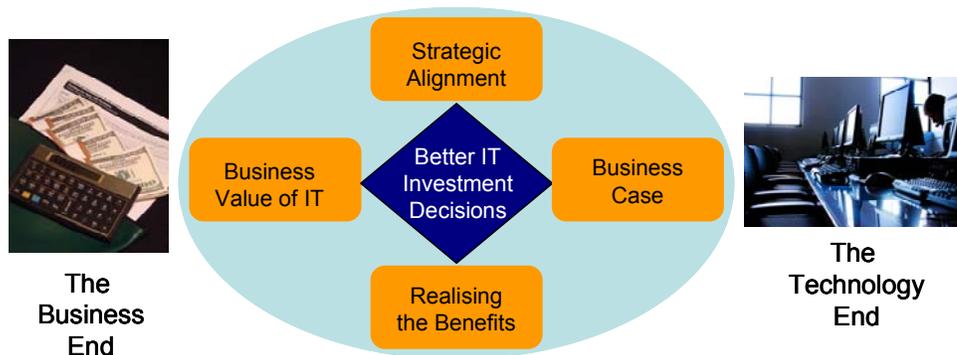
As a result, *engage consulting group*, a boutique Coaching and Advisory Services firm, developed a business process and service offer to enable organisations to conduct a self-assessment to determine how well they developed IT strategies and evaluated their IT investment options. The service is delivered on-line and provides web-enabled management tools to businesses and consultants. The self-assessment is the first step in the process for ensuring the successful outcome of IT investments.

Figure 1 below illustrates the model's four categories that are essential for successful implementation of IT projects.

1. Strategy Alignment (IT and Business)
2. The Business Value of IT
3. Business Case Development
4. Benefits Realisation

The core of the assessment model, its main outcome, is better decision-making.

**Figure 1 – IT Strategy and Investment Model Translating Business Strategy Into IT Solutions**



The assessment is useful in determining how well an organisation believes it carries out the important functions of IT strategy and investment evaluation. The goal is to bridge the gap between technologists and business managers and to translate business strategy into successful IT solutions that deliver a range of business benefits.

Each of the four categories has been broken down into 10 items as follows:

### Category 1 - Strategic Alignment

- 1.1. Evaluation of Environment
- 1.2. Aligning Business and IT Strategies
- 1.3. Strategy Development

## **Category 2 - Business Value of IT**

- 2.1. Value of Information Technology
- 2.2. Linking IT Investment & Business Performance

## **Category 3 - Business Case**

- 3.1. Developing Options & the Decision-Making Process for Investment Selection
- 3.2. Cost Benefit & Risk Analysis

## **Category 4 - Benefits Realisation**

- 4.1. Identify Benefits
- 4.2. Measuring Benefits
- 4.3. Post Implementation Review

The output of the assessment model includes the following:

- A comprehensive report covering strengths and opportunities for improvement
- Debrief for Executives
- Management and sampled employee awareness and learning of IT practices

A summary of each category provides a clear overview of why each item has been chosen. Selected research is referenced to also support each category in the model.

### **2.1. Category 1 - IT Strategy and Business Alignment**

Why is it important to align business and IT strategies? In the early 1990's, research was conducted to demonstrate what organisations should do to resolve the problems being faced with many IT projects. The large research project "Management in the 1990s" conducted by the Alfred P. Sloan School of Management at MIT developed the management concept of alignment between strategy, business structure and information technology.

The study highlighted that one of the main reasons that many IT projects failed was due to the IT and business function not being closely integrated. Many researchers in follow-up studies including Henderson and Venkatraman (1991) and Earl (1993) have verified the outcome of the "Management in the 1990's" project.

Although strategic planning has been applied for some time, research suggests that many organisations do not fully understand the strategic planning process. Mintzberg (1994) stated that strategic planning was not strategic thinking and that it was important for organisations to be able to think strategically in order to develop and implement plans to achieve their corporate goals and objectives. The first category of the model seeks to answer a number of questions on how well the organisation develops its IT strategy. The category includes the following items:

- Evaluate the current environment
- Aligning business and IT strategies
- Developing the IT strategy
- Strategic IT Review
- Strategic Decision Process

The first item seeks to determine how well an organisation evaluates the current environment from a business, environment and technological perspective. This is a crucial step before leading in the alignment of business and IT strategies. Alignment is achieved by reviewing the organisation's business goals, vision and mission. Once there is a clear appreciation and understanding of the business objectives, the IT strategy may be developed. It is important that this process is based on meeting the business needs and that high-level support by executive management is obtained.

The final two items involve a review of the IT strategy to ensure that what has been developed still aligns with the business objectives. Finally, a review of the decision making process for strategy selection is covered.

### **2.2. Category 2 - Business Value of IT**

In this category, two perspectives of the business value of IT are covered. The first is the issue of whether there is a link between the levels of IT investment and business performance. Secondly, how does an organisation value its information technology investments? This is an important question to address since it greatly effects the decision on whether to invest in a particular technology or project. Furthermore, being able to define the business value of IT more completely with solid data, an organisation can use this information in the development of business cases.

#### **2.2.1. IT Investment and Business Performance**

The question of whether there is a link between IT investment and business performance is important when making decisions on IT investments. Hitt and Brynjolfsson (1996), Brown, Gatian and Hicks (1997), Mitra and Chaya (1996) and Mahmood (1993) suggest there is evidence that shows a link does exist and it can be measured. The improvements stated are in the areas of cost reduction, financial

return on assets/equity, sales and some areas of labour productivity. There are differing views from the four research studies, however there is common agreement that IT investments have little positive effect on a firm's profitability.

Hitt and Brynjolfsson's (1996) research attempted to demonstrate three different measures of IT value based on productivity, profitability and consumer surplus. Their research was based on collecting information on 370 firms over a five-year period from 1988 to 1992. Their methodology is based on the application of an economic model, in particular to calculate 'IT Stock' as a direct measure of IT value-add. 'IT Stock' attempts to determine the value that IT contributes to a business based on capital and labour investment.

The result of Hitt and Brynjolfsson's (1996) research found that there was a positive impact on IT investments and productivity. There is an estimated overall increase in productivity for all industries in the sample to be 94.9% over a five-year period.

Strassmann (1997) is critical of this approach and has stated that Hitt and Brynjolfsson's economic model, which is based on the Cobb-Douglas production function equations, is an outdated model limited to calculating all outputs by considering only capital and labour. Strassmann claims that current thinking in evaluating the value of IT should also take into account information and knowledge in the costs of goods and services. The Cobb-Douglas models do not take these factors into consideration.

Brown, Gatian and Hicks (1995) analysed the financial performance of companies based on IT investments from a different perspective – stock market valuation. Their research attempted to determine how the stock market and shareholders would react to announcements that a company either had planned or decided to invest in Strategic Information Systems (SIS). The researchers found that approximately 50% of organisations implement SIS for growth while 20% implement for product differentiation, 15% for cost savings and 11% for innovation.

In conclusion, the research presented above is valid although there are some limitations. These limitations need to be identified and addressed when attempting to link IT investments to business performance.

### **2.2.2. Measuring IT Value**

Dempsey, Dvorak, Holen, Mark and Meehan (1998) state that measuring or determining the absolute value that information technology adds to an organisation is difficult to calculate. There has been a regular and consistent re-occurrence of this theme during the 1990's as stated by Hitt and Brynjolfsson (1996), Langdoc (1996), Semich (1994), Mahmood (1993), Vowler (1992), Smith (1991) and Harvey (1991). More than fifteen years has passed and information technology has become more sophisticated and ingrained into modern businesses. However, there is no widely accepted method that enables organisations to determine the value of IT.

The growth and acceptance of the Internet has added another dimension to the problem of determining how technology adds value to business as outlined by Ghosh (1998) by suggesting that the Internet can be used to create 'Digital Value'. He claims that the Internet is a medium that firms can exploit to distribute information, create new transaction models and deliver new services without incurring the traditional costs of establishing a business.

Researchers claim that IT adds value to business in many ways including enabling of cost-efficient technology to introduce new services (Barua, Kriebel and Mukhopadhyay, 1991) and improvement of quality programs (Sriram, Stump and Banerjee, 1997).

The second category of the assessment model covers the issue of the business value of IT and sets out to determine how or if the organisation has a process to determine the business value of IT. There are two items in this category:

- The Value of IT
- Linking IT investment and business performance

In the assessment model, the first item of this category sets out to determine whether the organisation has a process for determining the value of IT. The questions set out to determine whether the organisation considers opportunity cost and the benefits when evaluating the value of IT. The second item sets out to find out whether the organisation has measures in place to link IT investments with business and operational improvements.

### **2.3. Category 3 - Business Case Development**

The business case is the choice tool of many businesses to determine whether to proceed with an investment or project. Developing an effective business case can minimise the negative consequences of decisions made on an ad-hoc basis.

Part of the IT investment selection process requires clear setting of project and investment priorities. Setting priorities for IT projects that involve a number of options to choose from is critical for the success of IT programs. Ward and Griffiths (1997) suggest that the following issues need to be considered when investment and project priorities are being set:

- The benefits expected to result from the project.
- The probability of project success.
- Availability of skilled resources for the duration of the project.
- The risks of introducing the system into the organisation.

#### **2.3.1. Financial and Accounting Methods**

As part of the cost-benefit analysis, it is important to consider valid methods of financial assessment.

There is considerable research outlining the many shortcomings of current finance and accounting methods used to determine the value of IT. There are a number of emerging financial tools and methods including Activity Based Costing (ABC) and Economic Value-Add (EVA). These techniques attempt to overcome the weaknesses of traditional accounting methods.

Determining the value of IT investments in their own right is a challenging task. Kumar (1996) suggests one approach to determine the value of IT investments by using the options approach. Black and Scholes developed the concept of pricing financial options back in 1937.

One of the limitations of EVA is its inability to determine and measure the value of opportunities. Luehrman (1997) claims that many companies tend to evaluate opportunities formally when they mature to the point where an investment decision can no longer be deferred. At that stage, they join the queue along with many other investments being considered. Therefore, considering the 'options' approach to IT investments may overcome some further weaknesses identified in traditional financial models and also new methods such as EVA. For a detailed discussion on traditional and emerging financial accounting methods, refer to Appendix B of this paper. The business case model developed in category 3 of the "Strategic Value of IT" assessment model includes the following items:

- Develop Options
- Cost Benefit Analysis
- SWOT and Risk Analysis
- IT Investment Selection

The first item poses a number of questions to determine how well an organisation develops a range of feasible IT investment options. The second item of the category seeks to determine the process and financial techniques used by the organisation in conducting cost-benefit analysis. In many cases, organisations use a single financial technique such as Return on Investment or Pay Back period to decide on whether the IT investment is viable. Research suggests that a variety of techniques should be applied including new emerging financial techniques such as Economic Value Add (EVA). Furthermore, questions are posed to determine to what level the organisation considers intangible and non-financial benefits in the cost-benefit analysis.

The final two items cover Strengths, Weaknesses, Opportunities and Threats (SWOT)/Risk Analysis and Investment Selection. In the SWOT/Risk analysis, questions are asked to determine whether the organisation has formal processes and techniques in place to assess, minimise and manage risks as well as assess the viability and impact on the business either proceeding or not proceeding with an IT investment. Investment Selection simply determines whether the organisation has a process for prioritising projects and testing IT investment options with various stakeholders.

### **2.4. Category 4 - Benefits Realisation**

Actually realising the benefits that have been planned for and expected as a result of an IT investment is an important outcome. This is the last category of the Strategic Value of IT assessment model and it builds on the learning's and outcomes of the previous categories while paving the way to conduct Post-project Implementation Reviews.

Farbey, Land and Targett (1995) present a benefits evaluation model. The model represents a ladder where the potential benefits increase as you move up each rung. Moving up the ladder increases project risks and makes it more difficult for IT professionals to communicate the benefits to major stakeholders. Table 1 below combines and aligns the Benefits Ladder presented in Farbey et al. with the top ten benefits highlighted by Mirani and Lederer (1993).

**Table 1. Aligning Benefits Evaluation Ladder with Top 10 IT Benefits  
Adapted from Farbey et al. (1995) and Mirani and Lederer (1993)**

Rung No.	Reason for the IT System	Top 10 Benefits
8	Business Transformation	Organisational change in conducting business
7	Strategic Systems	Enhance competitiveness or create strategic advantage
6	Inter-Organisational Systems	Help establish useful links with other organisations
5	Infrastructure	Allow applications to be developed faster, allow feasible applications to be implemented
4	Management Information System (MIS)	Enable simpler access to information, enable easier retrieval or delivery of information or reports and improve information for management control.
3	Direct Value Added Systems	Organisational change in conducting business
2	Automation	Enhance employee productivity or business efficiency
1	Mandatory Changes	Enable the organisation to respond more quickly to change

Building on the top ten benefits highlighted in the table above, the following list identifies a set of tangible and intangible IT benefits typically expected by organisations:

- Improved market share and performance
- Improved productivity gains
- Gain a competitive advantage
- Improved customer service
- Be seen as a market leader
- Brand value and awareness
- Improved product and service innovation
- Enhance achievement of organisational goals
- Create a high standard work environment to minimise employee turnover.
- Improved access to and the manipulation of information.

#### **2.4.1. Measuring the Benefits**

Measuring tangible and financial benefits is a simple task. This can be achieved by establishing a number of key success factors and observations through data collection prior to and post project implementation.

Measuring intangible benefits requires a qualitative approach. For example, conducting surveys including customer, employee and community before and after system implementation is one method that can be effective.

IT is deeply ingrained and integrated into all parts of organisations. Therefore, attempting to separate out and analyse the value of IT in isolation is a difficult task using traditional measurement and evaluation techniques. Much of the research and business experience shows that IT does and can add value to the organisation in a variety of ways including the introduction of cost-effective technology to automate processes through to improving customer service and delivering new services to the market.

Tangible benefits can be easily measured and have been shown to add real value (mainly financial) while intangible benefits are difficult to measure and are usually non-financial since they add value in a diverse and subtle manner.

Benefits realisation requires analysis of both benefits - tangible and intangible. These must be identified by the organisation before they can be realised in the IT solution(s) that are implemented. The Strategy Value of IT assessment model includes the following items:

- Identify the Benefits
- Measuring the Benefits
- Post Implementation Review

The first item determines to what level an organisation documents the expected benefits from an IT investment and whether they have developed and maintained a "Benefits Register". In addition, questions are asked to ascertain if the organisation categorises benefits in terms of applications and expected outcomes such as productivity increases or market share improvements. The second item determines whether the organisation has existing processes for measuring the benefits expected from an IT investment. The final item probes the organisation to evaluate whether there is a process to allow post implementation reviews.

### 2.4.2 Applying Prior Learning

The Strategic Value of IT assessment model allows organisations to assess how well they have integrated past learning's into current and future projects involving the development of IT strategies and evaluating IT investments. This is an important process since it will enable the organisation to capture and manage the knowledge and experiences of the past.

Many businesses fall into the trap of sweeping failed projects under the carpet hoping to forget the mistakes. And when a project is successful, there is the feeling that reviewing the project is not necessary since everything went so well. This means that important information on what went well with a particular project or IT investment could be lost when the key people involved leave the organisation.

When working towards capturing prior learning and knowledge, it is important to cover the following areas:

- Strategic IT Review – Determine the expected and unexpected benefits identified and realised in past projects and integrate them into the development of future strategies.
- Identify the key success factors and expected benefits in the IT strategy at a high level and at a more detailed level in the Business Cases developed.
- Feed the realised benefits obtained from past IT projects into future business cases.
- Fine tune the strategic decision and IT investment selection process using current knowledge at appropriate stages so that viable and pragmatic investment options are identified and analysed.

### 3.0 Summary and Further Research

The Strategic Value of IT assessment model is based on leading industry research in the field of information technology and will therefore benefit Chief Information Officers, Senior Managers and IT Departments of medium and large organisations that rely heavily on IT.

Implementing our process and methodology can provide organisations with the following benefits:

- Obtain the best possible return from IT investments
- Achieve alignment between business and IT strategies
- Allow better decisions to be made on IT investments
- Determine the true value of IT investments
- Identify, capture and apply past learning's and experiences of successful IT projects
- Education on understanding the importance and relevance of IT to the business

The assessment model alone is not intended to solve the problems inherent in making strategic IT investments. However it does provide a solid framework to allow organisations to assess themselves with best practise in strategic IT investments and provides a basis for moving forward to implement solid systems and processes to assist with determining the Strategic Value of your information systems.

Tried and tested concepts used in other industries may be useful if applied to Strategic IT investments. Two notable examples, of which one has been touched on in this paper, are:

- Applying the Strategic Asset Allocation (SAA) when constructing financial investment portfolios to Strategic IT Investments. The cornerstone of SAA and the first step in the process is to understand the client's 'Risk Profile' or attitude towards risk. Organisations are similar to individuals in that as a collective of individuals operating in the market place, they have a certain appetite for risk. Some are conservative, others aggressive risk takers, while many sit somewhere in between.
- Using an Options approach to IT investments. In financial markets, options are financial derivatives. An option provides the person or entity holding it, the right but not the obligation, to acquire the underlying asset. This type of option is known as the Call Option. The holder of the option pays a premium for the option and there are a set of criteria specified in a contract that both parties must adhere to. The contract specifications include an Expiry Date at some time in the future when the contract must be executed or closed out, a Strike Price which is the value of the underlying investment which is fixed for the term of the contract and the number of units in the contract.

These concepts deserve dedicated discussion and research. While there could be significant complexities to implementing these models, businesses may be able to benefit by making better IT investment decisions.

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## **APPENDIX A – Review of Financial Accounting Methods Introduction**

In this section, the financial analysis methods and traditional accounting practices used to evaluate IT investments and business investments in general are reviewed. The most commonly used techniques are reviewed including Return on investment (ROI), cost-benefit analysis and Net Present Value (NPV) followed by a discussion on emerging accounting standards and practices that can be applied to the information era. Elliott and Jacobson (1991) and Walker and Denna (1997) suggest that new accounting methods need to be developed and adopted. Walker and Denna (1997) argue that a new accounting system is needed to accurately measure the business benefits of information technology. The authors argue that the current accounting practice of double entry bookkeeping, developed more than 500 years ago, should not be the sole instrument of evaluating investments in the current and future business environment.

### **Traditional Accounting Methods**

Elliott and Jacobson (1991) state that current accounting models used by companies is not sufficient for evaluating information-era businesses. This view is supported and expanded in further detail by Walker and Denna (1997). Walker and Denna state that information technology is being under-utilised in many organisations with the accounting system being one of the major barriers. The author's claim that current accounting systems have at least five weaknesses that limit its application to fully measure and evaluate corporate performance of modern information based organisations including:

- A focus on a subset of business events determined by accountants as being accounting transactions. This limited view of business events misses important information such as quality, customer service and supplier relationships (intangible or 'soft' benefits).
- Data is captured and recorded in an untimely manner usually on a monthly basis limiting flexible release of information to meet varying needs of customers and suppliers.
- Limited characteristics are captured about transactions, usually measuring only date, account and amount in dollars.
- Information is stored in duplicate form and is highly summarised therefore limiting alternative uses.
- The process of controlling business and information process risks is defensive and expensive. Internal checks and balances are used to secure companies' assets. However, these controls are implemented by using human information processing.

### **Return on Investment (ROI)**

Rayburn (1993) defines Return on investment (ROI), as the optimum asset investment required, in terms of resources allocated, to achieve a profitable outcome. ROI is also known as return on assets committed (ROAC) within companies. Parker and Benson (1988) claim that one of the down sides of ROI in evaluating IT investments is that the benefits of projects are masked by a 'numbers game' which shields management from understanding the impact of information technology. Strassmann (1997) supports the argument that IT investments evaluated on ROI are insufficient. He suggests that management needs to assess the benefits first. Strassmann states that organisations use ROI incorrectly and as a result inflate the expectations of managers responsible for IT investments. Strassmann (1997) describes the case of a magazine award given to organisations that utilise IT investments shrewdly. K-Mart had won first prize by claiming a 14,659 percent gain by investing \$US2.49 million on a new inventory and sales computer system that reduced costs by \$US365 million. However, K-Mart glossed over the fact that a major re-engineering effort was also implemented that improves sales and inventory processes. It was apparent that K-Mart had been operating inefficiently for many years. The lessons from this case are:

- IT investments should not be counted on their own,
- Computerisation cannot improve processes unless the business processes are improved in the first instance,
- It is necessary to account all the costs of implementing the system not simply the hardware and software costs (the company would have spent significant resources on re-engineering the processes),
- Figures should not be manipulated to suit the singular objective of praising IT.

### **Cost Benefit Analysis (CBA)**

One of the most common methods used to appraise IT investments is the cost-benefit analysis. Other popular methods include the pay back period and break-even time. In general, cost-benefit analysis methods are decision models applied when there is uncertainty about which option should be chosen. Rayburn (1993) dedicated a whole chapter to cost-benefit analysis methods and states that when faced with the challenge of evaluating options to make decisions on organisational benefits, they need to use their initiative, professional knowledge and personal judgement in the decision making process. The process involves the evaluation of hard data and facts along with tangible and intangible benefits that could be obtained from selecting an option. Rayburn presents a number of detailed cost accounting analysis methods, which are mentioned briefly in this paper. The first, differential cost analysis compares the cost differences of two (or more) investment choices. Another method is opportunity cost analysis. Rayburn (1993) states that opportunity cost analysis shows the profit that is lost by the diversion of an input factor from one use to another. In the context of IT investments, the opportunity cost of allocating funds and

resources to an IT project may be seen as diverting funds away from other potential investments such as upgrading manufacturing plant or planning a marketing campaign. The third method is "expected value". Expected value attempts to determine the estimated outcome from an investment decision based on the probability that the organisation will achieve the value, returns and benefits that have been identified. Finally, Rayburn (1993) describes replacement cost analysis as determining the replacement cost of what would have been paid for assets if they were acquired at current prices. Having investigated the cost-benefit analysis, how does it apply to IT investment decision making? According to Parker and Benson (1988), cost-benefit analysis has its shortcomings when applied to IT projects and investment. The two reasons cited are time and intangible benefits. In the first case, the benefits of IT investments are usually derived long after the project has been completed. To overcome this problem, the net present value (NPV) method can be applied to take into account future cash flows.

### **Net Present Value (NPV)**

Wilson and Keers (1987) explain that to determine the present value in today's terms, a series of future cash flows is discounted by an estimated interest rate. Rayburn (1993) supports this definition and also states that net present value assumes a minimum desired rate of return. An investment project is considered acceptable if the present value of its future expected cash inflows equals or exceeds the amount of the initial investment. Dixit and Pindyck (1995) expand on this definition to explain that NPV is the difference between the 'present value' of the expected income from an investment less the 'present value' of the expected costs of the investment over a period of time. NPV is closely related to return on investment from a conceptual perspective. The idea is to quantify an investment in terms of the financial benefits that the organisation will obtain at a future point in time. Therefore, it is susceptible to similar limitations and disadvantages of ROI. Dixit and Pindyck (1995) claim that NPV is simple to apply but is based on the faulty assumption that an investment is irreversible therefore requiring organisations to approach the decision making process on a now-or-never proposition. In this case, it is suggested that an 'options' approach to investment should be applied.

### **Summary**

Given ROI's limitations, it should not be used in isolation. It can be time consuming and prone to misuse by playing with numbers to suit expectations. The Cost-Benefit Analysis improves on ROI since it considers the benefits of solutions and does not recommend a particular financial analysis method. Depending on which financial method is used, CBA suffers from the limitations of time value and does not consider intangible benefits. Applying Net Present Value calculations in CBA overcomes the problem of time value, however this still leaves the limitation of how to consider and evaluate intangible benefits.

### **Emerging Accounting Methods**

As a result of the research conducted, a range of innovative methods of evaluating IT investments has been revealed. Many of the new Accounting methods build on traditional techniques. There is value in determining how IT investments can lower operating costs therefore, traditional accounting methods such as ROI and pay back period are useful tools. Similarly, cost-benefit analysis can be expanded to include intangible benefits and also take time value into consideration by applying the NPV method. Time value is the time taken for the benefits of an IT investment to be realised. The Activity Based Costing (ABC) method is referred to widely in research material. Cooper and Slagmulder (1998), Walker and Denna (1997), Coleman (1994) and Vowler (1992) state that this relatively new method is gaining popularity for organisations since it allows investment decisions to be made between options and not simply on capital. Economic Value-Added (EVA) claims to overcome the limitations of ROI and NPV since it measures the value an investment contributes to an organisation. The following sections review some of the techniques that are emerging and applicable to information era organisations.

### **Activity-Based Costing**

Rayburn (1993) claims traditional methods of allocating overhead costs on a volume-related basis for organisations products or outputs are being challenged and as a result, activity-based costing is an attempt to improve the accuracy of product costs. Krumwiede (1997) states that activity-based costing (ABC) reached its peak adoption rate in the early 1990's. The paper written by Krumwiede is based on a survey conducted by the Institute of Management Accountants that ran between November 1995 and January 1996 followed by a further survey in November 1996. The results of the survey showed that 89% of companies using ABC stated that it was worthwhile in terms of the investments made. The interesting outcome of the survey was that 54% of respondents used ABC for decision making outside of the accounting function. Another finding was that implementation of ABC required a solid IT infrastructure be in place since more detailed information than traditional cost systems. The idea of implementing activity-based costing (ABC) to evaluate IT investments is mentioned by a number of authors in the research conducted including Vowler (1992), Cooper and Slagmulder (1998) and Coleman (1994). Cooper and Slagmulder (1998) propose a methodology that combines the traditional cost-benefit analysis with activity-based costing (ABC). The authors call the method "cascading cost-benefit analysis" and it is based on profitability maps. Profitability maps are useful in pinpointing where further analysis should be conducted.

### **Economic Value-Added (EVA)**

Dierks and Patel (1997) define EVA as a financial measure of performance based on the after tax net operating profit minus a capital charge where capital charge is the cash flow required to be returned to investors for the risk involved in the amount of capital invested. In this context, capital is referred to the money invested by shareholders, not capital invested in company assets. Lehn and Makhija (1996) agree with the above definition of EVA given by Dierks and Patel as does Strassmann (1997) defining it as "...approximately profits minus an amount equal to shareholder equity multiplied by the cost of capital". Lehn and Makhija (1996) state that EVA has an advantage over traditional accounting measures of performance since it attempts to measure the value that firms create or destroy by subtracting a capital charge from the returns they generate on invested capital. Strassmann (1997) suggests that (EVA) is the best way to judge the output of a firm in relation to their IT investments. Without going into the reasons why, Strassmann provides data that shows the number of organisations that achieved positive and negative EVA compared to their IT budgets. The results indicate the number of firms with a negative EVA out number those with a positive result by 257 to 211 (study conducted in 1994).

### **Discussion**

Significant research and articles have been published on the need to change the way IT investments have been traditionally evaluated. Concepts and ideas on how to overcome the disadvantages and limitations of traditional accounting methods used to evaluate IT investments have been discussed in this section. In particular, activity-based costing has been shown to overcome the problem of overlooking or underestimating hidden costs by allocating costs to each activity required to implement an IT system. This addresses only part of the concerns with traditional accounting methods. Applying the Economic Value-Added (EVA) concept to IT can demonstrate the value that the investment will add to the business at a global level. EVA is superior to traditional 'pay back' accounting methods such as ROI and NPV since it attempts to estimate the real cash flow impact on the business of an investment.