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MEASURING THE CUSTOMER VALUE OF
INFORMATION TECHNOLOGY

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ABSTRACT

Abstract of a dissertation submitted in partial fulfilment of the
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Effective models for the management and evaluation of information technology are developing. However, evidence suggests more emphasis should be placed on customer value. Customer value is the relative significance of the attributes of a given service or product compared to the price. The role of technology has become central to business function in a large number of organisations and the effectiveness of technology in delivering customer value directly impacts on the success of the firm.

To provide a basis for the argument that more consideration should be paid to customer value an outline of the background to technology management is provided. Models and characteristics of information technology are presented to illustrate current issues and thinking.

Competitive pressures require that companies receive maximum value from large-scale investments in information technology. Arguments for considering why customer value should play a role in the management and evaluation of information technology investments are discussed.

Customer value analysis techniques provide valuable insights into the needs and wants of customers and when linked to internal measures can provide powerful management tools. The development of systems that capture customer information is an area of rapid growth as companies seek to improve their customer knowledge.

A case study is used to illustrate the techniques and the application of customer value analysis. The case study illustrates how customer value analysis is used to select among competing IT projects by showing which projects contribute the most to customer value. The case study also shows how customer value is linked to internal systems to facilitate day to day management.

In conclusion important management considerations and potential gains from giving weight to customer value are discussed. Successful management of information technology in an organisation is a driver for ensuring value and effectiveness from investment in technology.

ACKNOWLEDGEMENTS

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1.0 Introduction

1.1 Background

The information technology (IT) profession does not have a very good track record of delivering projects on time and within budget. Cost overruns and time delays are all too common in an industry that often becomes involved with technical detail and ignores business value.

Information technology investment accounts for a substantial portion of capital investment decisions. Given the size of investments and critical importance of information technology function in the operation of many organisations, there is increasing pressure on firms to extract maximum value from these investments.

There is growing awareness among managers of the importance of customer satisfaction as a measure of business success. Many firms have adopted a "customer value" methodology as a focus for management and employees.

This dissertation aims to examine the relationship between customer value and information technology. The basis for this investigation is the basic premise that successful firms must deliver value to customers and information technology is part of the value delivery process.

Notwithstanding the importance of technology, the aim of this research is to investigate the nature of "customer value" with the specific viewpoint of improving the management and evaluation of information technology. Investment in IT is of no use unless it ultimately benefits the customer. Measuring customer value is a means to evaluate the success of IT investment in terms of customer benefits.

1.2 Research question

The purpose of this dissertation is to:

Justify the consideration of customer value in the management and evaluation of information technology.

1.3 Aims and objectives of the research

The principle aim of this research is to examine the management and evaluation of information technology. Specific objectives are as follows:

- Outline current management models for the management of information technology.

- Identify current issues, concepts and methodologies that are useful in understanding current thinking.

- Outline the concepts and develop an understanding of customer value.

- Detail justifications for considering customer value in the management of IT.

- Investigate and outline tools for modelling customer value.

- Illustrate with a case study the application of customer value models in information technology management scenarios.

1.4 Methodology

The methods used in this study include:

- Review of Literature

- Illustration with a case study.

Galliers (1992) outlines case study methodology, including strengths and limitations for information systems research. The case study method is used to describe and interpret relationships that exist in a specific setting. Strengths are noted as being able to "capture" reality and analyse more variables than other approaches.

Weaknesses are noted as restrictions to a single event and difficulties in generalising and accumulating statistically meaningful data. Case studies are subject to the interpretation of the researchers, which may differ.

The case study method has been used in this research to "illustrate" the points that are developed from the literature. Additionally, in order to mitigate the "single organisation" problem, examples from other organisations are also discussed.

Galliers (1992) states case studies are "helpful in developing and refining generalisable concepts and frames of research", which is the primary objective of this discussion.

2.0 IT Management

2.1 What is Information Technology (IT)?

The US Bureau of Economic analysis defines information technology (IT) as "Office, Computing, and Accounting Machinery". A wider more appropriate definition for IT is the "application of appropriate technology to supply an information service". Alternatively information technology may be defined as "all technologies that aid in the collecting, processing, storing and communication of information".

In this "information age" technology plays an increasingly integrated and important role in the economy and in the very fabric of society. A broader definition of information technology encompasses "knowledge" or "information" as a resource and technology as an enabler.

In service organisations, information technology is often the means of production. In many cases technology is a central part of the business process. For example banks or web-based businesses are totally dependent on technology.

Investment in IT involves not only the procurement of hardware as a capital asset but also investment in software, training, maintenance and running costs. A classic example is the cost of time workers spend playing games or "fiddling" with the system. It is estimated that the cost of hardware represents about 12-15% of the cost of ownership for a personal computer (What's IT Worth, 1997). The majority of costs are unseen in terms of direct financial expense.

2.2 Importance of IT

Companies invest substantial sums of money in Information Technology (IT). It has been estimated that over 50% of capital expenditure involves IT (Straussmann, 1997). In the USA over $US500 billion is spent per annum on IT (Straussmann, 1997). In the United Kingdom average annual expenditure on IT exceeds £UK10 billion (Ward et al., 1996). For New Zealand, the figure is estimated at nearly $NZ 3.5 billion (March, 1999).

Given the large amounts invested in IT and the significant role IT plays in generating and delivering value many organisations are reviewing the amounts spent on IT. There is a desire to ensure firms receive a reasonable return for the considerable amounts invested (Straussmann, 1997).

2.3 High failure rate

It is surprising given the large scale of investment and the importance of IT that financial evaluation of the investment is not rated highly (Brancheau et al., 1995). While there are examples of very successful projects, there are large numbers of projects that are subject to cost overruns, delays, and performance problems. La Rooy (1998) refers to USA data that indicates a 53% failure rate, unheard of in any other industry. A recent New Zealand survey reported that only 37% of projects are delivered "on time, on budget" (Pitch, 1998).

In many cases technology is chosen on the basis of technical detail and is not aligned with business value. Many non-IT professions, especially traditional disciplines such as accounting, cannot understand this lack of success. A portion of the blame can be attributed to the computer industry being considered immature (La Rooy, 1998). The danger with a high failure rate is that IT projects are typically expensive and often pose a threat of financial ruin if they do not produce the intended results.

The issue is not about the evidence for returns and productivity from investment in IT (Willcocks &Lester, 1996) but the variability (Brynjolfsson & Hitt, 1998). There is a range of extremes in terms of successful applications of technology. The lack of success in managing information systems has been the subject of considerable research. However universal techniques have not been identified. Information technology managers consider that there are few usable models for evaluating IT investment and success (Lewis, 1999).

2.4 Role of technology

Michael Porter (1985) describes how technology is embodied in every activity in the value chain of a firm. The pervasive nature of technology in one form or another is a principle driver for competition. Porter (1985) notes that the benefits from technology arise not when changes are made for the sake of technology, but when changes affect industry structure and competitive balance. Firms often invest in technology to gain perceived advantage but in many cases investment is required for "competitive necessity", to keep up with others in the market place.

2.5 IT interwoven with business function

There is an increasing emphasis on information systems as an enabler and to provide an infrastructure for activities of a firm. Infrastructure has been rated as one of the most important issues by information system managers (Brancheau et al., 1995). The role of IT as a basic requirement supporting business process suggests that it is often considered an overhead or an unavoidable expense. The focus of many businesses is to view the management of the IT function as an exercise in "cost reduction".

There is a suggestion (Weil & Broadbent, 1998) that to receive value from IT, firms should regard all expenditure on IT function as an investment in capability rather than an "expensed" item. The accounting treatment of software maintenance as an expense rather than a capital asset makes it difficult to place a value on the investment and often the true value of the software is not appreciated. Moreover a substantial portion of IT spending is on services which by their very nature tend to be regarded as an expense.

2.6 Characteristics of information.

Arrow (1984) and Lamberton et al. (1983) outline aspects of information in economic terms with useful perspectives on the issues of the role of information in the economy. Over time economists have developed models that explain economic characteristics associated with the acquisition and distribution of information, the role it plays in markets and the decision making process. In many cases, it has been illustrated how information acquisition increases costs, but does not add any value to the economic output.

Information as capital is similar to investing in training, which raises the overall skill level of the workforce, enabling more productivity. Investment in information raises the skill level of the workforce. However increased skill levels do not necessarily mean increases in production. The difficulty is in realising the capability.

There are important characteristics that distinguish information from other resources.

1. Non appropriability.

If information is sold, the seller retains the knowledge. This leads to the position that the information can be sold on very cheaply so the market price becomes less than the price of production. However if the transmission costs are high, the seller cannot realise the social value of the information. This impacts the firm in that the value of information is not reflected in the cost of producing that information.

2. Indivisibility in production and use.

Information tends to require large investments. Once obtained, it can be applied to all goods across the production process and favours large-scale replications. This tends to encourage large firms (leading to a few large firms such as Microsoft and IBM who dominate the computer industry). Large firms that have a competitive advantage are able to maintain that competitive advantage by virtue of sheer size. This makes it very difficult for smaller firms to gain value from information investment unless they have sufficient resources to dominate the market.

3. Heterogeneity and context independence.

The market for information tends to be very specialised. Information technology can be very specific to a firm. Investments in information may only have value to a firm and not the greater market. The value of the investment in IT is not reflected in its market value.

While the attributes apply to information as an "economic good", elements appear in the application of information technology. These distinguishing characteristics give us insight as to why there are difficulties in evaluating efficient use of technology.

For example:

- If a firm invests in information, the value of the information as determined by the market place may be less than the cost of production.
- Typically the lifetime for IT investments is very short.
- Costs for "First mover" or "early adopters" costs are high.
- Information or knowledge is hard to quantify, capture, manage and is related to personnel. There is considerable risk in developing the "information resource". Often a skill or advantage is dependent on a small number of individuals and IT experts tend to be mobile.

The characteristics of information help explain why the management of information technology is so difficult. Current models that have been developed to manage resources such as capital and land do not work with information technology, largely due to these unique characteristics. The features of information explain why a multi-million dollar investment in IT becomes virtually worthless after twelve months in terms of resale value.

2.7 Productivity and Icarus paradoxes

An illustration of the difficulty in defining returns from IT is shown by the productivity paradox (Brynjolfsson, 1993) and Icarus paradox (Pinsonneault & Rivard, 1998). Further research has answered questions about the productivity paradox (Brynjolfsson & Hitt, 1998) by looking at firm level returns. But the paradox illustrated the general feeling that although there had been considerable investment in IT, and everyone was sure that there is a payoff, there is an acceptance that returns are difficult to identify. Even with evidence of returns to investment in IT there is little indication of how to ensure those returns.

The Icarus paradox (Pinsonneault & Rivard, 1998) also illustrates that although the investment may lead to greater efficiencies, those gains don't necessarily translate into value for the business. The Icarus paradox refers to the fact that managers with access to increased information spend more time looking at the increased amounts of information, and less time getting on with the job. As in Greek mythology Icarus, who flew too close to the sun and melted the wax in his wings, shows that the very tool that offers potential actually results in less productivity.

Both paradoxes demonstrate while it is assumed that there is a payoff from investments in IT, the benefits may be easily lost somewhere along the way. Increasingly managers are no longer accepting that investment in IT automatically results in benefits to the firm. There is a requirement to identify returns from IT investment enabling effective management and efficient application of the IT resource.

2.8 Model of assessment

Given the importance and profile of IT it is not surprising there has been a substantial amount of research into factors that impact on the success of IT implementations. Myers et al., (1997) in an extensive review of literature summarise and present a number of determinants that form the basis for a "Comprehensive" model of assessment (Figure 1).

The authors suggest that IT success can be measured along a number of dimensions. Individual firms will have external and organisational variables that modify the success dimensions. In addition selected projects may have differing determinants.

Notwithstanding the difficulty in selecting appropriate measures, the model forms a basis for evaluating quality and productivity of the investment. Work is required in determining the dimensions and measures for the determinants.
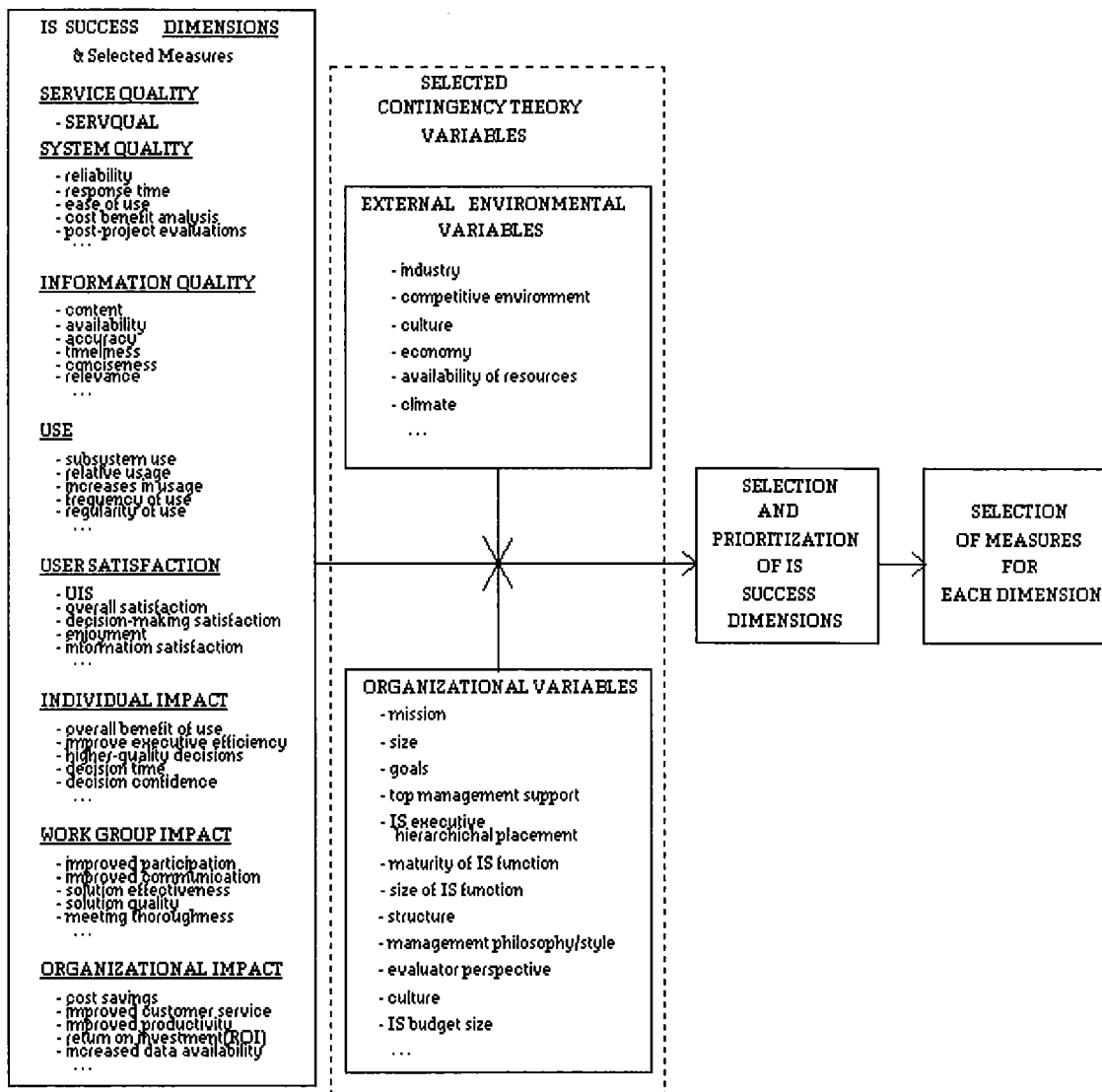
Figure 1. "Comprehensive" model (adapted from Myers et al.,1997)

The "comprehensive" model highlights the large number of possible determinants that affect the success, quality and productivity of information systems function. It identifies the determinants (from previous research) but provides little guidance as to what measures should be used and indeed which variables should be prioritised.

Each of the determinants should be regarded as a necessary but not sufficient condition for success. A technology project may succeed on all but one criteria and yet still fail as a project. For example if a system with the best technical features has a poor user interface, it will not be used. Similarly a system with a good user interface will not be successful if it fails to produce reliable results.

2.9 IT investment types

An alternative method of viewing the problem is to review the types of information technology investment. Weil & Broadbent (1998) developed a model of information systems structure in Figure 2.
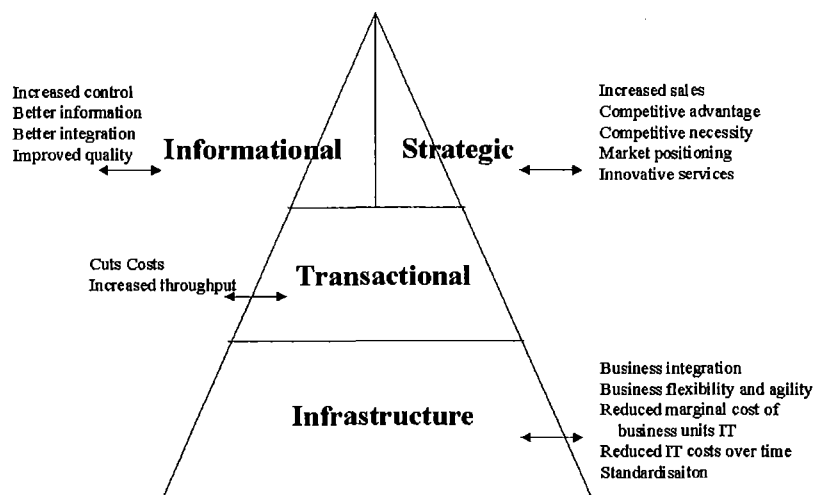
Figure 2. System classification (adapted from Weil & Broadbent, 1998)

The different types of IT investment, classified as infrastructure, transactional, informational and strategic have different investment characteristics summarised in Figure 3. Weil & Broadbent, (1998) argue that they should be evaluated separately as they have different objectives and risk/return profiles.

Type of IT	Risk/Return Characteristics
Strategic	High risk, huge potential upside and 50% failure rate
Infrastructure	Moderate risk due to long life and business and technical uncertainty
Informational	Moderate risk due to difficulty of acting on information to create business value
Transactional	Lowest risk with solid return of 25-40%

Figure 3. Risk return characteristics (adapted from Weil & Broadbent, 1998)

Structured and sound traditional fiscal techniques such as discounted cash flows (DCF) or payback analysis are common techniques for calculating return on investment (ROI). The difficulty is in accurately calculating cash flows. The result is that managers have little confidence in the measures as they are subject to "guesstimates". This subjective analysis leads to a great deal of variation with little emphasis on delivery of the business results.

The view of investment types recognises that there are different types of investment and different risk and return profiles. Some projects by their nature offer easily identifiable returns, for example transaction systems. However other projects, for example strategic systems, are inherently risky and their benefits are not clear-cut. Financial analysis does not provide good models for the evaluation and management of IT due to this difficulty in identifying benefits. Many managers have lost faith in financial models and do not use them to evaluate IT investments (Delone and McLean, 1993).

2.10 Traps and pitfalls.

Management of IT is perceived as a trap (Dvorak et al, 1997). Without due consideration and focus on value, IT operations are notorious for becoming expensive, complex and not particularly effective. Rather than enabling an organisation IT can become a constraint. Inflexible and incompatible systems deny business many opportunities. It is recognised that without a vision computer spending can quickly overtake an organisation. Large sums of money can be invested with little or no return.
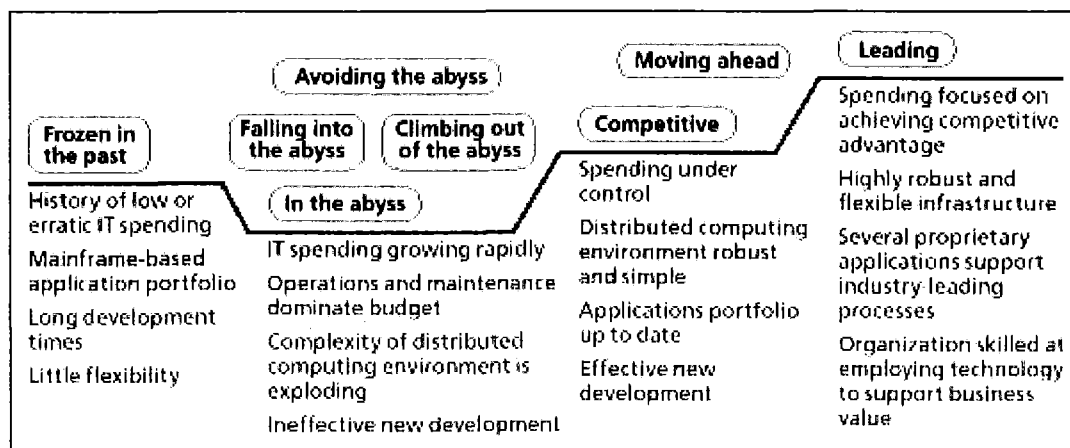
Figure 4. Range of IT performance (adapted from Dvorak et al.,1997)

Care is required to avoid the "abyss" (Figure 4). Firms must have a clear vision and a determination to extract and deliver value from IT investments. There are numerous examples where a firm's IT strategy gets derailed by a number of issues such as politics, technical complexity, poor project management, user dissatisfaction, poor integration, bad system design or plain inexperience (Weil & Broadbent, 1998).

2.11 Alignment with business value

There is a growing understanding that to demonstrate value from investment in IT there must be associated changes in business process, strategies and organisational structure. Computers are a necessary but not sufficient driver for increases in productivity (Brynjsolfsson & Hitt, 1998).

Real productivity improvements do not arise until work processes are redesigned. An analogy can be drawn from the early 1900's when electric motors replaced steam engines in factories. Initially some improvements were gained as electricity is more efficient that steam, however the real gains occurred when work processes were redesigned. Once factory layout was no longer dictated by the location of the power source efficiency of production could be given greater emphasis.

The interrelated nature of IT as an enabler leads to strategic information management (SIM). SIM requires that other factors are considered and the IT function works in conjunction with other processes to deliver value. By aligning investment decisions with the stated direction of the firm, IT investment decisions will take account of business factors and relate to the goals of the firm (Van der Zee, 1996).

Many firms adopt "management by maxim", a method of managing by stating a number of objectives (Weil & Broadbent, 1998). These maxims are used as guiding principles to enable a firm to focus IT delivery in line with business objectives.

2.12 Current position

Information technology management is a complex area and there are many issues with no simple solutions. Information is a unique resource and has several distinguishing characteristics. Traditional management tools have not proved to be especially useful, as evidenced by the difficulty in managing IT.

Given the importance of IT there has been a great deal of research and the "Comprehensive" model illustrates the dimensions that need to be considered. But given the number of dimensions there is no methodology to guide managers as to how to assign priorities. Any factor that is neglected has the potential to derail the entire project.

Different types of IT investment, lack of financial models, technical considerations, and the interrelated nature of IT function and business function, contribute to a complex management dilemma. There is a requirement for guiding principles to guide the decision making and management process.

3.0   Why consider customer value?

Managers of information technology have traditionally had an inward focus and in many cases are preoccupied with technical detail. And while models for the management and evaluation of IT are developing there is growing evidence that suggests the current models need to place more emphasis on customer value.

Customer value is a theme that is recognised in service marketing as an important business driver. There is an increasing amount of literature that illustrates the linkages between customer value and business success and profit. (Heskett et al, 1997; Wyner, 1998). Customer value can be defined as the relative significance of the attributes of a given service or product in terms of price compared to alternatives. (Woodruff, 1997; Higgins, 1998).

Traditionally IT investment has had an inward focus towards improving efficiency within the organisation. Evidence is growing to suggest that firms need to look outside and the IT function needs to place greater emphasis on customers.

Over time there has been a growing awareness of the importance of aligning the IT function with business value. IT business units have seen themselves as independent units, supplying service to the rest of the organisation. As firms face a number of pressures forcing them to be more market focused, it may be appropriate that this view is expanded further to consider customer value to the firm. In other words the IT business unit needs to considers its customers' customers. The IT unit needs to consider external as well as internal customers.

3.1   Consumer surplus

There is support for the proposition that benefits from IT flow to consumers in terms of more features for less cost, rather than to increased business profit or productivity. (Hitt & Brynjolfsson, 1996). The returns from investment do not accrue to the firm but to the consumer in terms of more features or lower price.

In a competitive situation where technology is continually able to offer improvements in value, competition ensures that firms must keep up with technology or lose market share. Continual competitive pressures mean that firms do not profit from investments in technology, instead the benefits of the technology are passed on to the customers.

Indeed (Slater, 1997) takes this proposition further and suggests that a market orientation and the creation of customer value is the primary reason for a firms existence and success. A market orientation must be the primary focus for the firm if it is to survive. The argument is presented that if customer value is the result from technology, more consideration must be given to managing that delivery. The firm must focus on the end results from the perspective of the customer.

There is little point in benefits accruing to customers if they do not value those benefits. For example, a new technology enables a firm to produce a product that has some unique features. But if those unique features are not rated by consumers as important the extra features are worthless. The consumer will not pay for any features they do not perceive as valuable. If there are no additional returns for the feature, there are no returns for the investment in that technology. The technology adds unnecessary costs and reduces profitability.

3.2 Threats of E-commerce

Electronic commerce or E-commerce is having a dramatic effect on many industries. The lowering of barriers to entry and the threat of dis-intermediation is placing increasing focus on customer value (Bloch et al, 1996). Businesses cannot rely on existing markets as traditional boundaries no longer apply.

New entrants

Barriers of entry:
• economies of scale
• capital requirements
• access to distribution channels
• product differentiation
• switching costs
• cost disadvantages (e.g. experience)

Suppliers ⟶ **Industry competitors**

3 generic strategies:
• cost leadership
• differentiation
• focus

⟵ Buyers

dis-intermediation

dis-intermediation

new intermediaries

Substitutes

Figure 5. Porter's model (adapted from Bloch et al., 1996)

On a wider "firm level" Porter's model (Figure 5) provides a framework for analysis and shows the source and effect of competitive threats. Electronic Commerce removes or alters many barriers to entry. Firms are no longer dependant on location or physical infrastructure investments to deliver products and services to customers.

Firms can by-pass intermediaries (dis-intermedation) using a publicly shared infrastructure i.e. the Internet. Essentially the Internet is an extremely cost effective method of information transfer.

Many firms are focussing on the value that can be delivered to the customer and are using that to differentiate themselves. With the development of "intelligent agents" that automatically search web pages, price is no longer a differentiator. Customers are able to search the Internet to locate the "best price". Firms must provide other value in terms of customer service to differentiate their offering.

Competitive pressures serve to make the markets more dynamic. Innovative companies use electronic commerce to be more profitable. Information flows enable firms to better understand their customers. This better understanding fosters better customer relations, enabling firms to deliver better services that are profitable for both customers and producers.

The importance of relationships is illustrated by the often-quoted example of the Internet bookstore "Amazon". The company has no store and no inventory but has developed relationships with suppliers (publishers), customers and the courier company. Although Amazon is not yet profitable the value of the firm is based on the value of the investment in relationships. The value of the investment in IT is captured in the customer base in terms of image, loyalty and brand awareness.

3.3   Internal and external customers

Many firms have adopted a management approach that views IT as a business unit that exists to serve internal customers. Measurement metrics are focused on delivering cost effective and efficient service by concentrating on concepts like "Total cost of ownership" (TCO).
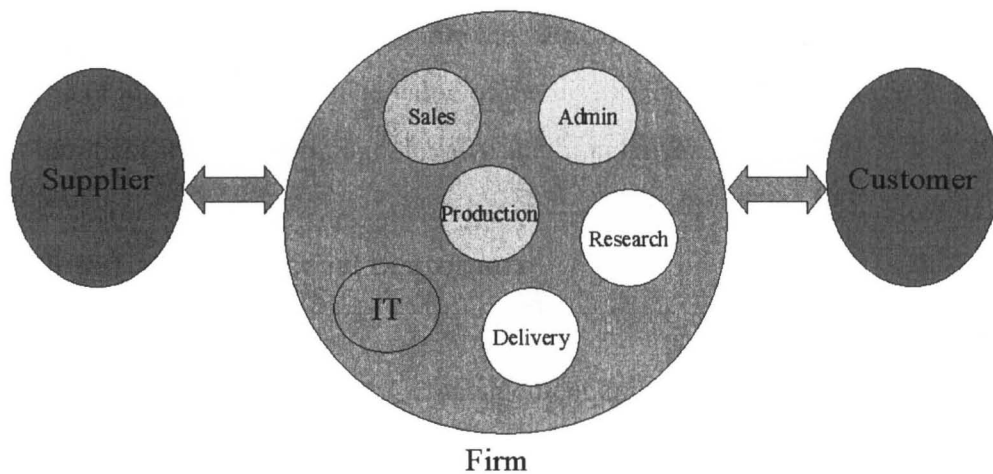
Figure 6. IT and internal customers

In many organisations the IT function is viewed as a separate division. Internal customers buy services from the IT department. The IT department has no direct contact with the customers and is often isolated from the rest of the firm (Figure 6).

Developments such as web sites, extranets, Virtual Private Networks (VPN) and the Internet in general require that IT departments consider more than just the internal business units. Increasingly a firm's suppliers and customers access the communications infrastructure and use applications as interfaces to corporate databases.

IT departments need to pay more attention to the requirements of external customers i.e. the customers of the organisation and not the internal customers within the organisation. Competition means that others in the market place will get the business if a firm is not able to provide efficient and reliable service. Web sites provide a prime example, people have low tolerance for web sites with broken links or pages that load slowly. Consumers will quickly move to a competing site if they experience any problems.

3.4   Service / profit chain

The central thread running through these aspects is an appreciation of customer value. "The service / profit chain" (Heskett et al., 1997) provides a model (Figure 7) that we can use to illustrate the relationship between the forces that influence a firm and customer behaviour. If we have an understanding of customer value we are able to manage the chain.
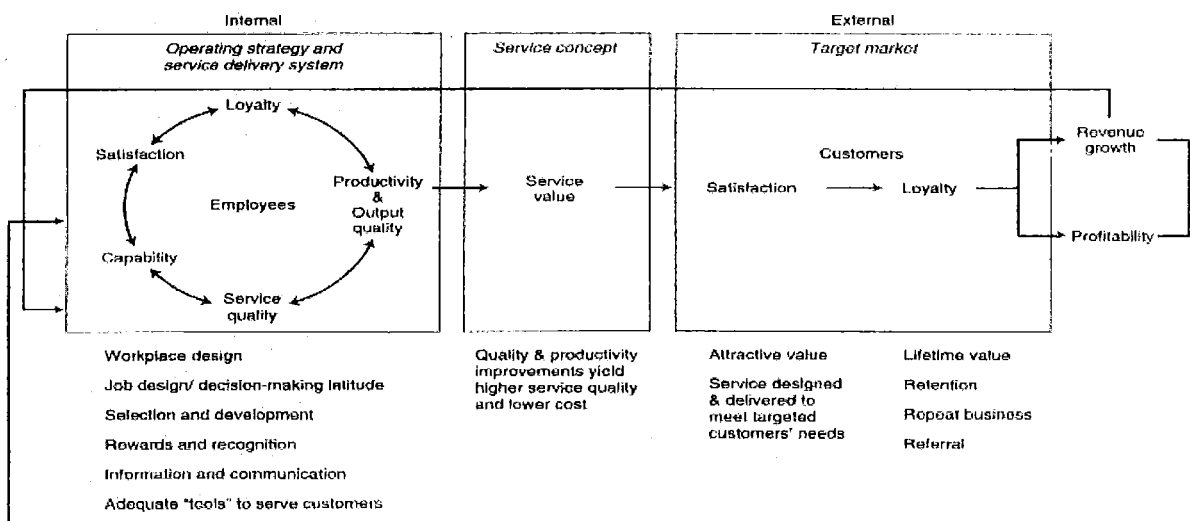
Figure 7. The service / profit chain (adapted from Heskett et al., 1997)

The service / profit chain links the value of goods and services provided by a firm to customer satisfaction. Continued satisfaction will translate into customer loyalty and repeat sales. Increased loyalty returns increased revenue and profits to the firm. If customers are satisfied, employees tend to be satisfied about the work they do. A delivery process that is efficient and productive (with motivated employees) is able to deliver superior quality and service, which in turn delivers customer value.

Customer value plays an integral part of the value chain for a firm. Successful firms are those that have a strong customer focus. Every aspect of the firm's operation needs to consider the impact of the customer value. This is especially important for the IT function as the technology is the enabler and may have an impact at every point along the chain.

There has been a degree of success using user satisfaction as a predictor for information systems success (Delone & McLean, 1992). The service / profit chain links satisfied employees with satisfied customers and the impact of motivated employees is substantial. It can be argued that a system that enables users to get on with their jobs and deliver value will have high levels of user satisfaction and subsequent business success. This demonstrates the importance of customer value and the impact technology has on delivering that value in conjunction with employees.

3.5 Importance of relationships and innovation

Ultimately the long-term aim of any business is profitability. Today's current environment has a number of challenges: increasing pressure from competitors, deregulation, mergers and acquisitions, changing technologies and increasing demands from customers.

Innovation is seen as a key to increasing profits and market share (Innovation in industry, 1999). Increasingly, firms are seeking to find new and innovative delivery processes and ways to produce more for less. With luck they may develop a completely new product or market. This ability to innovate comes from a close relationship with customers. An in-depth understanding of customers' requirements is necessary to enable people to understand the issues and use their expertise to deliver new solutions.

To be profitable businesses must be faster and more responsive than competitors, and look for new ways to serve customers and fill market opportunities before someone else (Kandampully & Duddy, 1999a). Technology cannot provide a long term competitive advantage unless the technology is continually evolving and remains unique to that organisation (Porter, 1985).

The importance of the IT function considering not just the internal customers but all participants in the value chain is highlighted by Kandampully & Duddy (1999b) and illustrated by Figure 8.
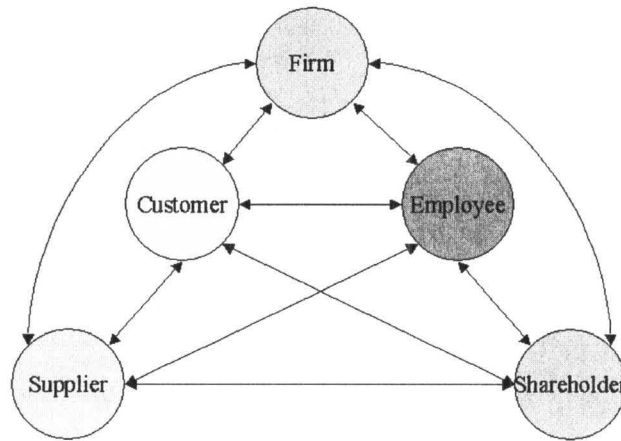
Figure 8. Primary and secondary relationships (adapted from Kandampully & Duddy, 1999b)

The combination of relationships will be unique for each firm and these relationships are very hard to duplicate. It is argued that the relationships may be the only source of sustainable competitive advantage. The relationships are central to the firm being able to offer and gain value (Kandampully & Duddy, 1999b).

Traditional IT divisions cannot ignore these relationships. They must play a central role in understanding, facilitating and participating in both primary and secondary relationships.

In addition IT systems can be used to facilitate the links or communication in the above model. This highlights the importance of customer value information systems, which can become the nervous system of the company.

The competitive advantage is in innovation, the ability to turn customer requirements into deliverables. This is only possible with an in-depth understanding of customer requirements and communication of this understanding to all in the value chain. IT can play an integral part in the capturing, storing, communicating and presentation of this customer knowledge.

3.6 Linking customer value and profitability

Current literature emphases the extremely strong relationship between customer satisfaction and profitability. It is stated (Danaher & Gallagher, 1997 who reference Peterson and Wilson) that in the past twenty years some fifteen thousand articles have been written about customer satisfaction. However the relationship goes beyond customer satisfaction; it is about a deeper understanding of customers' current and future needs and requirements. Satisfaction tends to focus on what has been delivered whereas value encompasses satisfaction and future requirements considering these relative to competitors offerings (Woodruff, 1997). Advantage comes from providing customers with service to satisfy these needs more effectively than alternatives.

Delivering superior customer value has a direct effect on market share and profitability. Research from AT&T (Gale, 1994) has shown that changes in technical quality of products were followed about three months later by changes in customer perception of the quality. Two months later changes were shown in market share. Similarly Sears (Rucci et al., 1998) can show that changes in customer service will lead financial indicators by one quarter. For Federal Express the time lag is 48 hours (Kordupleski et al, 1993), as if they fail to deliver a package on any given day, the customer will not use the service the next day.

3.7 Value payoff

Improving value delivery leads to better firm performance. The most common indicator is in terms of increased revenue and profit. Naumann (1999) describes a value payoff and demonstrates methods of calculating returns from an increased customer base.
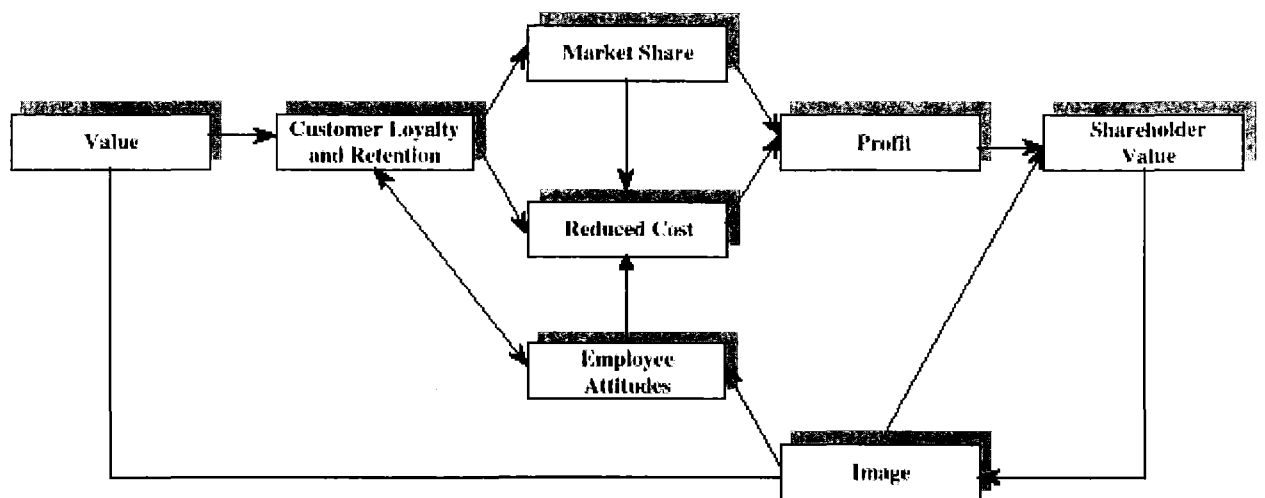
Figure 9. The value payoff (adapted from Naumann, 1999)

Delivering value leads to repeat sales, which reflects on loyalty and customer retention (Figure 9). The impact of "terrorists" or customers who are highly dissatisfied on potential customers is substantial. The existing customer base or market share is directly related to customer value. In addition firms that deliver high value typically have a lower cost structure than competitors. The cost savings are direct results of quality and employee attitudes (Rust et al, 1995; Laitamaki & Kordupleski, 1997).

The importance of motivated employees cannot be stressed enough. The increased profitability of firms that deliver superior customer value is reflected in greater shareholder value. The "successful" image further reinforces the customer value and also employee satisfaction. Naumann (1999) further references research on the stock market that confirms that delivery of value directly leads to improved profits and stock market value.

At an individual firm level, Sears have developed an econometric model that relates each percentage (1%) improvement in customer satisfaction relative to competitors, to more than $200 million in additional sales (Rucci et al., 1998)

3.8 Bank illustration

The banking industry illustrates the effect of benefits flowing to the consumers. In the last ten years we have seen many technology innovations, for example, Automatic Teller Machines (ATM), telephone and Internet banking services. Banking is a very competitive industry. Investment in a technology by a "leader" is quickly followed by other banks, eager not to be left behind. The net result is that benefits flow to consumers in terms of better technology but the banks are no more profitable.

As banks adopt a "me-too" attitude, consumers get new technology but not necessarily better services. In fact customer satisfaction may even decline. However, banks can adopt a "customer value" perspective and view new technology in terms of how it can increase customer satisfaction. The bank is able to offer improved services specially tailored to individual clients. We have seen a growth in "relationship banking" where customers are offered a wider range of services, for example, insurance and investments. Banks are expanding their "share of the customer", increasing revenues and subsequent profit.

3.9 Industry focus

Many industry leaders are beginning to recognise the importance of customer value. James A. Unruh (1997) CIO of Unisys (referring to a survey in Information Week, September 9, 1996), discusses the results of a study of 500 companies on IT and productivity. The findings were that:

- "Customer focus is the best predictor of IT value".

- "The more aggressively a company pursued a customer-focused strategy (in its IT investments), the higher its productivity".

- "In contrast, a simple cost-cutting emphasis appears to do little, on average, for productivity".

Technology must be regarded as an enabler. The real value is the information and the use that is made of that information by the customer.

The challenges that many firms are facing are illustrated by these comments from Scott McNealy (CIO Sun) who summarises the opportunities as:

- "Firms must invent new ways to market themselves".
- "Firms must invent new ways to learn what customers want".
- "Firms must find new ways to forge lasting relationships".

There is no doubt given the increasing competitive pressures and the globalisation of economies that traditional ways of working are changing. The "fifth wave" (Innovation in Industry, 1999) of digital networks, software and new media is well underway. The pace of change is so great the only way for firms to survive is deliver innovative solutions faster than the competition.

A number of companies have recognised the benefits of a value orientation in terms of extracting value from the IT investment and focussing company endeavour. Dwight King, Executive Director of Customer process & innovation for Telstra Corporation suggests "changing the paradigm" from "cutting costs and increasing productivity" to a customer focus that "delivers superior customer and shareholder value" (King, 1999).

3.10 Enable focus

Customers are changing their behaviour and in some cases changing very quickly. Business must have an understanding of customer requirements and a process that is able to track the changes. Many of the changes from business process redesign (BPR) come from the ability to improve and drastically shorten the time to market for new products.

In the same light, IT projects that take more than eighteen months risk being out of date by the time they are implemented as customer requirements change. Projects may have to be broken down into tasks that can be implemented within a maximum of six months.

Many projects become large and take a considerable amount of time. Customers' values constantly change. Although a project, when complete, may deliver the business value that was originally envisaged, customer value has often moved on. Firms need to ensure they keep a good understanding of customer value. The customer value must be linked to business value and directly or indirectly related to IT management.

In the past firms have concentrated on delivering business value. The value to the business is irrelevant however, unless firms look at how it impacts customer value. For example, reducing costs may be of value to the firm. The problem occurs when this impacts on quality and subsequently impacts on customer satisfaction. The customer value lost negates the business value gained.

3.11 Addition to "Comprehensive model"

It is the contention of this article that insufficient weight is given to the role of customer value in the process of managing and investing in IT. Identifying and measuring the impact of customer value is a method that provides an overall guiding focus across all levels of IT investment.

The impact of customer value has very little support in IT management literature. However customer value may be an important factor that explains the wide variation of success among IT projects especially in terms of business value delivery.

In many cases, the IT function is considered a separate business function and other functions in a business (users) are treated as internal customers. Success is evaluated in terms of user satisfaction. There is very little support for evaluating success in terms of the customers' customers.

The impact of customer value is considerable and should not be ignored. To be effective the IT function must look at external customers instead of internal customers. In addition, IT function alone cannot increase customer satisfaction. The entire organisation must strive to deliver customer value.

Threats of e-commerce and consumer requirements for innovation reinforce the need for a focus on customers. The link between business success and profits is significant and generally firms are paying more attention to customer value. IT departments cannot remain isolated and there are compelling arguments as to why managers in general and IT managers specifically need to place even more emphasis on delivering customer value.

4.0   Customer value analysis (CVA)

Considering the importance of customer value it is worthwhile understanding the models and techniques available for displaying customer value.

Woodruff (1997) in a summary of literature explains definitions of value. Value is generally accepted as results for a price, relative to other offerings in the market. (Naumann, 1999; Woodruff,1997; Higgins, 1998). The definitions of results and costs must be expanded to include all results and all costs from the perspective of the customer. For example price must also include costs of acquisition.

4.1   A value model

There is a direct link from delivering customer value to market share. Profit impact of market share (PIMS) studies showed the best predictor of profitability is market share and this ultimately reflects in the stakeholder value. (Heskett et al, 1998)

We can illustrate this and Figure 10 shows the linkage from specific service or product attributes to customer value in terms of results and costs. The linkage is then shown to impact on market share, revenue/profit and finally stakeholder value.
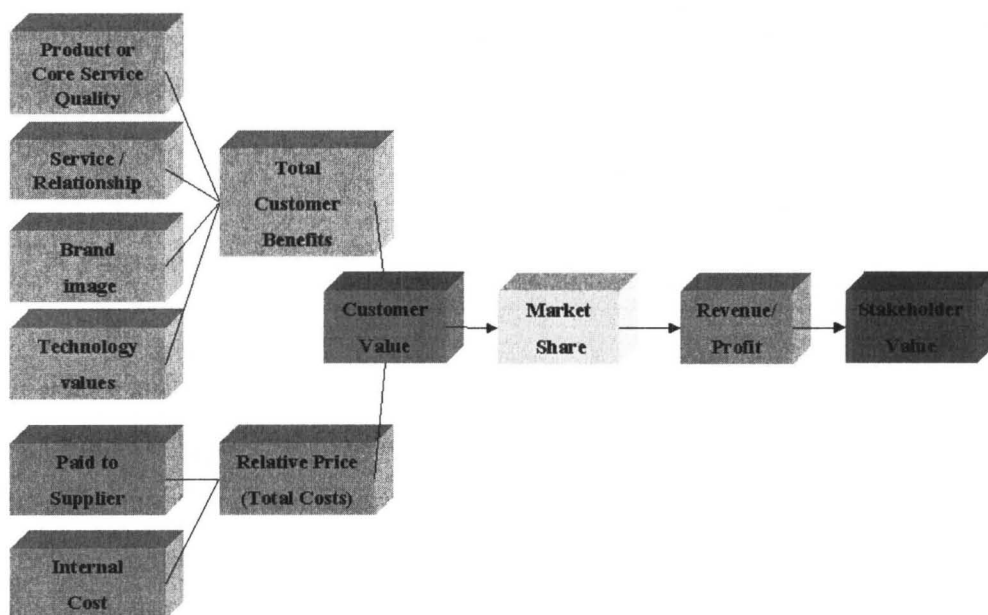
Figure 10. Customer value model (adapted from Hanson, 1998)

Customer value is quite simply a customer's relative perception of the results for the price paid for the product or service. The results include both tangible and intangible attributes. The price includes additional costs to the purchase amount such as time or travel costs.

The attributes reflect essential and separate characteristics or components that distinguish and represent the particular product or service in terms of the results delivered to the customer. The attributes should be unique and unambiguous. They are split into product, relationship, image and technology. Price attributes are split into actual price paid and internal costs of acquisition.

The real benefits arise when the attributes are linked to internal measures. This customer understanding allows us to not only to model customer value but associate this with internal information, which can be managed on a day to day basis.

Quantitative and qualitative testing are used to record detail. As with any survey of customer perceptions care is required to produce valid and consistent results. Gale (1994) uses self-defined weights to rank attributes in terms of relative importance. Alternatively derived weights can be obtained from more advanced statistical analysis including regression analysis, conjoint analysis and other methodologies (Higgins, 1998).

The difficulty is in measuring the absolute values of the qualities as often they will not be equated in quantitative measures. However since value is relative this is not a critical problem.

4.2 Customer value tools

Gale (1994) describes seven tools that can be used to illustrate the customer value. These are described in Figure 11 as:

Tool	Outline
1. Quality profile	Illustrates quality attributes and the relative importance on customer perceptions of value
2. Relative Price profile	Illustrates price attributes and the relative importance on customer perceptions of value
3. Customer value map	Map of relative quality and relative price. Enables comparison with competitors
4. Won/lost analysis	Detailed and methodical recording of reason for failure/success for each customer
5. Head to head area chart of customer value	Graphical comparisons against the main competitor illustrating which value attributes differ.
6. Key events time line	Encourages understanding by detailing market development by recording significant changes.
7. What/who matrix.	Tracks who are responsible for specific elements of customer value. Enables an organisation to focus on ownership of quality.

Figure 11. Seven tools of customer value analysis (adapted from Gale, 1994)

Hanson (1998) clusters these tools into:
- Quality profile, price profile and value map.
- Head to Head analysis, Won Lost analysis.
- Key events timeline, What & Who matrix.

Quality profile and value maps are considered the most valuable tools (Hanson, 1998). The other tools provide additional valuable information as part of a more complete customer value analysis and are used in the development of marketing strategies and product positioning initiatives.

In terms of evaluating information technology investment we are more concerned with identifying the determinants of value and establishing relative measures of importance. For the purposes of illustrating how customer value can be used to manage IT investments, quality profiles and value maps are the focus of this investigation.

Customer value analysis is a new area and techniques are still developing. The creation of a value model is a subtle blend of art and technology. A balance must be struck between producing statistically valid and reliable results and presenting a simple model that is easily understood (Lawerence, 1998).

There are a number of companies that have embraced the process and have demonstrated the benefits. A number of large companies with well defined and mature products have shown remarkable success, for example AT&T. In New Zealand companies that have successfully adopted a customer value methodology include Telecom and Royal Sun Alliance (Goulter, 1998).

4.3   Unique combination

Firms must create their own model as each firm has a unique combination of resources and a unique position in the market place. Depending on a number of internal variables each firm creates value in an individual process. Specific features that offer some differentiation identify the value offered by each firm in comparison to other firms. Based on the specific features customer value analysis will identify distinguishing characteristics.

4.4 Satisfaction and value

A distinction is made between customer satisfaction measurement (CSM) and customer value measurement (CVM). Customer satisfaction reviews specific attributes whereas value considers the purchase decision as a total package relative to other options.

Market research has traditionally tended to focus on past transactions by a firm's customers to measure satisfaction. Customer value research focuses on current customers and potential customers.

Customer Satisfaction Measurement	Customer Value Analysis
Transactions	Market perceptions
User	Decision maker
Your customers	Your customers and competitors customers
Limited to specific experience	Full spectrum of benefits and costs
Recent event driven	Non-event driven

Figure 12. CSM & CVA: Comparisons and contrasts (adapted from Hanson, 1998)

The table (Figure 12) illustrates the differences in perspective needed to research value requirements as compared to calculating customer satisfaction metrics. Customer satisfaction metrics are used as performance indicators whereas customer value allows strategic planning.

4.5 Internal measures

Business Process		Customer Need		Internal Metric
		Reliability	40%	# of Repair Calls
	30% Product	Easy to Use	20%	# of Calls for Help
		Features/Functions	40%	Functional Performance Test
		Knowledge	30%	Supervisor Observations
	20% Sales	Responsive	25%	% Proposal Made On Time
		Follow-Up	10%	% Follow-Up Made
		Delivery Interval Needs Met	30%	Average Order Interval
Overall Quality	15% Installation	Does Not Break	25%	% Repair Reports
		Installed When Promised	10%	% Installed on Due Date
		No Repeat Trouble	30%	% Repeat Reports
	15% Repair	Fixed Fast	25%	Average Speed of Repair
		Kept Informed	10%	% Customers Informed
		Accuracy, No Surprise	45%	% Billing Inquiries
	15% Billing	Resolved on First Call	35%	% Resolved First Calls
		Easy to Understand	10%	% Billing Inquiries

Figure 13. AT&T Value model, illustrating significant internal measures (adapted from Gale, 1994)

Internal measures provide a link to internal process and can be used to manage efficiency. As illustrated in Figure 13, the internal metrics are often easily calculated metrics from internal systems that are used to track how well employees are meeting targets. Measures that are visible and calculated frequently (for example, daily) provide employees with feedback and incentives to make improvements. In addition, metrics that are based on internal systems can be audited and in some cases can be used as performance indicators for remuneration.

The above model illustrates the link from customer satisfaction to the business process and the impact on customer satisfaction. The identification of customer needs that are delivered by the internal process and the link to internal metrics provide a powerful management tool.

As customer satisfaction has strong links to market share and consequently revenue and profit, the model links the entire business process (Gale, 1997; Heskett et al, 1997; Chan Kim & Mauborgne, 1999). Firms managing the internal process will deliver value and returns if those internal processes are focused on delivering customer value. This linkage can be further used to justify investment in systems that produce internal metrics.

4.6 Advantages

Customer value analysis provides a link along the entire value chain. In addition, it recognises the importance of all contributors along that chain. As part of the firms overall business process of delivering value often IT projects only focus on the technical solution. However, to deliver value, consideration must be given to the entire process. The focus on customer value recognises that technical success is a necessary but not sufficient condition for achieving value from the investment in technology.

It is recognised that a key component of successful business is defining and setting goals that enable an organisation to focus. Customer value models serve as a tool to effectively communicate the message and enable the entire firm to prioritise according to customer value. A criticism of IT departments is that they do not always share the same vision as the rest of the company. A customer focussed organisation is one that works together to deliver the customer value.

Well-developed models allow "what-if" analysis. Returns to investment can be justified in terms of value delivered. These models provide a consistent tool for evaluating investment across all departments in an organisation. This serves to ensure businesses receive the best return for investments and are not overtaken by internal politics or individual focus influencing priorities.

5.0 Case Study

An illustration of the application of a customer value analysis is given by the case of ABC company. ABC company has a business unit that sells and supports a comprehensive financial application software package. This analysis demonstrates how CVA is used to:

- Identify determinants of customer value
- Derive relative importance of those determinates.
- Develop internal measures linked to customer value.

Once an understanding is developed of customer value, IT policy can be focused on delivery of that value. The "relative importance" enables management to prioritise and determine which factors have the most influence and therefore the greatest return. Internal measures that are linked to customer value provide feedback mechanisms to ensure the day to day running delivers the desired customer benefits.

5.1 Customer value map

Adopting a customer value analysis methodology, a sample of existing customers was surveyed. A simple questionnaire was developed that measured customer satisfaction on a general level and then measured responses to more detailed aspects of service. The results were tabulated according to the methodology (Gale, 1997) and relative quality and relative price metrics calculated. (See appendix 8.2.5).
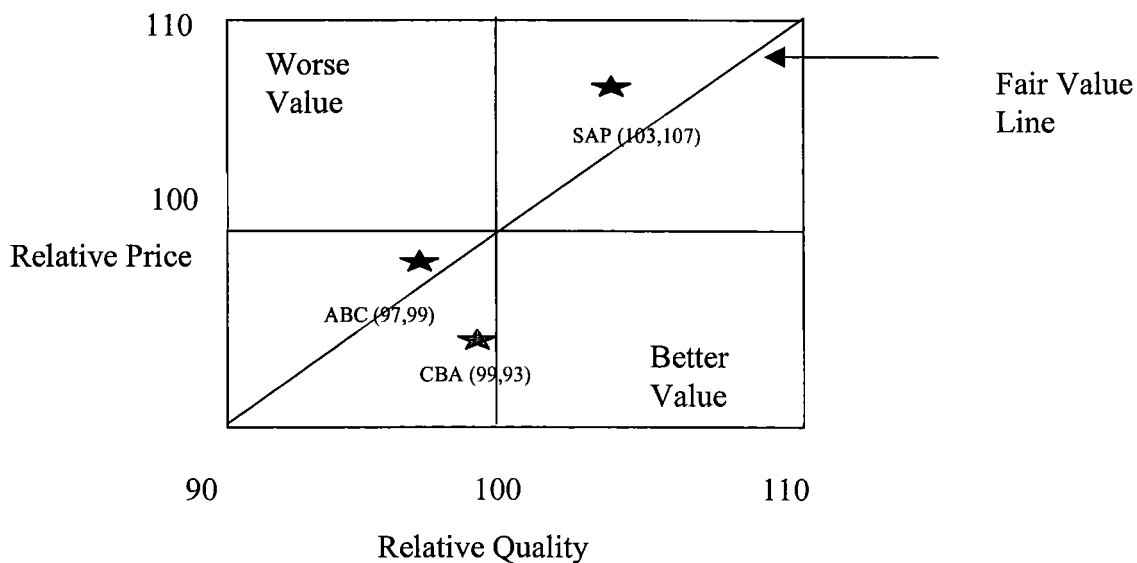
Figure 14. Customer value map

The value map in Figure 14 shows relative positions of players in the market. The ABC company must move towards the lower right quadrant in order to provide better value. In order to provide a differentiation from CBA, the most desirable action is to increase perceived market quality.

The value map must be considered along with actual relative positions. If ABC can show actual lower costs than CBA, then the market perception must be changed. The most desirable action in this case is to correct the imbalance between the perceived and actual prices. Customer value analysis provides a focus that enables strategic decisions to be made with a view to customer value. There would be no point in investing in a technology solution to improve quality if there is no quality difference. There would be no return from that investment in quality.

It is noted that the fair value line is relative. ABC company must improve quality relative to the other players in the market. If all players increase quality there will be no improvement in relative position. This illustrates the effects of general technology improvements. If all players have access to technology there is no improvement in their relative positions. Companies do not benefit and may face increased costs. Customers, however, benefit from increased total levels of quality.

5.2 Customer value tree

The value tree provides insight into which attributes will provide the largest improvement in customer value. This model can be used to determine the expected return from investments in improving customer quality. It is also used to prioritise and rank competing projects based on the contribution to customer value.

```
                                    ┌─────────────────────────────┐
                              ┌─────│ Price                  10%  │
                              │     └─────────────────────────────┘
                              │     ┌─────────────────────────────┐
                              ├─────│ Business Function      26%  │
                              │     └─────────────────────────────┘
┌──────────┐                  │     ┌─────────────────────────────┐
│ Customer │                  ├─────│ Service Delivery       35%  │
│ Value    │──────────────────┤     └─────────────────────────────┘
└──────────┘                  │     ┌─────────────────────────────┐
                              ├─────│ Product                13%  │
                              │     └─────────────────────────────┘
                              │     ┌─────────────────────────────┐
                              └─────│ Image                  16%  │
                                    └─────────────────────────────┘
```
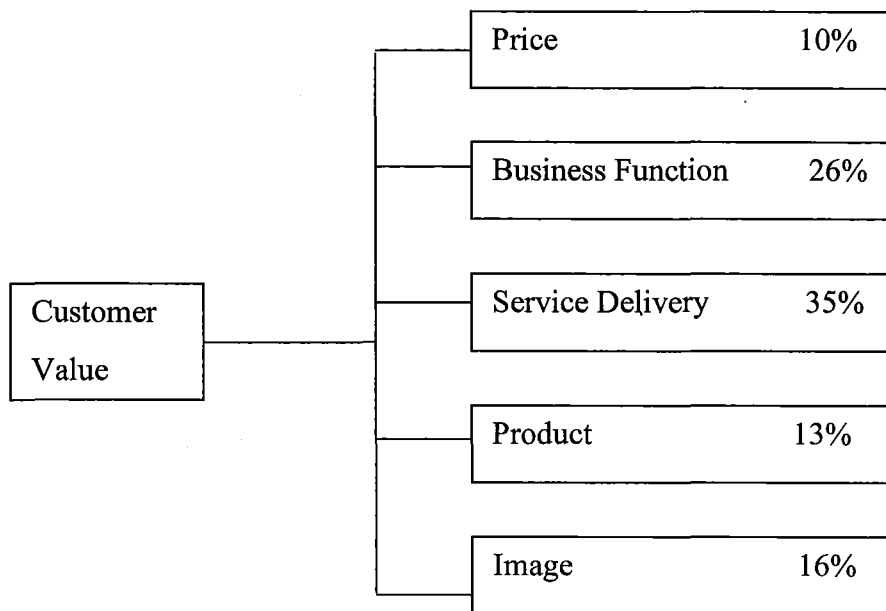
Figure 15. Customer value tree

Statistical analysis enables derived weights to be calculated for the relative attributes. The contribution of individual attributes can be shown for the effect on customer value. For example, it is shown in Figure 15 that "Service Delivery" has almost three times the effect on customer satisfaction as "Product". This suggests that product has relatively little effect on customer value. Customer service is far more important.

It is noted that these derived weights are calculated from the survey data. Relative weights can also be obtained from the customers directly by asking for their perceptions of relative importance. A third source of relative wants comes from within the organisation.

Interesting comparisons can then be made with

1. What the customers say they want.

2. What management thinks the customers want.

3. What customers really want.

It is emphasised that a great deal of care must be taken with customer research to obtain reliable results. As with any research good survey design is critical. The attributes must be unique and ranked relatively with ratio interval scales. (Higgins, 1998). Alternatively, sophisticated econometric analysis is required to identify the principal components (Danaher & Gallagher, 1997).

Customer value analysis enables a link to be made between increased customer satisfaction and profit. (Gale, 1997;Higgins, 1998). There are numerous examples of firms that have developed metrics where increases in customer satisfaction have a definite and measurable effect on revenue. (Rucci et al., 1998)

In this case study, the management of ABC have a general aim to improve customer satisfaction. The overall customer satisfaction was rated at 5.4 out of 10 or 54%, basically a "C." A stated goal is to improve the customer satisfaction to a "B" (better than 65%) within 6 months and long term achieve an "A" (better than 70%). The management of ABC company is confident of the link between improved customer satisfaction, improved employee satisfaction and the flow on effect of increased service revenue.

5.3   Project selection

To achieve an improvement in customer satisfaction, a number of strategic initiatives involving the use of IT were suggested as projects. (For the purposes of this illustration it is assumed the risk and cost of each project is equal and each project is targeted at a specific attribute. Limited resources enable only one project to be implemented).

Determinate	Proposal
Image	Web Site
Service	Help Desk
Product	Product Development – GUI
Business Function	Knowledge Base of Best Practice
Price	Billing. Back office system

Figure 16. Determinates and proposals

The resulting model illustrates the biggest determinant of customer satisfaction is customer service. The customer value analysis model shows that the largest return to investments will be from projects that improve customer service. When the impact of customer value is considered, projects that improve customer service are shown to have the largest impact on customer value.

A help desk is proposed (Figure 16) as an IT project that will have the largest impact on customer value. The help desk system must focus on improving the service delivery to deliver the required benefits. Service level agreements can be used to ensure performance standards are met.

The focus on delivering customer value has a substantial positive side effect as it focuses on delivery of the entire process. The technical implementation of the help desk software alone is necessary but not sufficient to guarantee the success of the project. A number of other important aspects such as business process, training and employees must also be considered for the project to be successful.

5.4   Internal measures

In addition to using the value tree for project selection, internal measures can be used for day to day management to ensure value delivery. "Service Delivery" is made up of a number of components with relative importance. (See Figure 17)

		Competent	7%
Service	35%	Understanding Knowledge	21%
Delivery		On time/Budget	17%
		Integrity Commitment Accountability	23%
		Communication	15%
		Proactive	16%

Figure 17. Relative weights of components

A number of internal measures were developed to track service delivery. These internal measures relate to specific components. The help desk design and implementation should have these as primary design objectives to enable measures to be tracked.

A metric that measures the number of incidents successfully answered in the first call is an example. Queries answered in the first call require staff to have good knowledge. Improvements in staff knowledge through training will result in a greater number of incidents resolved on the first call without the need to call back. This simple metric can be used to track improvements in customer service. It is easily calculated and readily available to staff providing employees with valuable feedback. Goals can be set that enable employees to see improvements.

Care must be taken in selecting metrics. For example, the average length of call can be misleading. Experience has shown where employees are offered incentives for the most number answered, they consequently focused on shortening the call length. Customers felt calls were being rushed through without due care. While call length was decreasing, customer dissatisfaction was increasing (Danaher & Gallagher, 1997).

A help desk project can utilise technology and provide an innovative solution that provides real customer benefits. Technology can be used to bring efficiencies, remove tedium and enable quality systems. Internal measures can be built into the system, calculated and communicated automatically. The potential payoffs are large if the implementation is focused on delivering real customer value.

5.5 Management implications

There is a strong link between customer satisfaction and profit. Returns can be calculated to give expected returns for the investment. In many cases just the fact that customer satisfaction levels are low are sufficient justification for investment.

Improved customer satisfaction also has a direct impact on employee satisfaction.

Delivery of improved customer value can have varying effects depending on the market and strategy. Benefits include:

- Increased "share of customer".
- Greater customer retention.
- Improves relative market profit.
- Attract new customers.
- Improved loyalty.
- Reduce operating costs.
- Better attitudes between customers and employees.

If a project covers a number of attributes, for example a Customer Relationship Management (CRM) system, the effects may be less obvious. The effects on overall satisfaction can be calculated, however, by considering the relative proportions of attributes. For example, a CRM system may be considered to largely affect service delivery but also influence image to some degree.

Customer Value Analysis (CVA) is dynamic and always changing. Customer needs and wants change and the model must allow for this. Frequent contact with customers or "customer relationships" is central to firms maintaining customer knowledge.

CVA provides insight on a number of levels for management. At a high level it provides an overall guiding focus for decision making and at lower levels CVA identifies which projects will add the most customer value. CVA models detail how linkages can be made to internal metrics. The internal metrics provide for solid, dependable, measurable and auditable results that track the entire delivery process. Also a CVA model highlights that it is not technology alone that leads to the delivery of value but the entire process is required to deliver customer value.

While the metrics are important the emphasis is not on calculating an absolute definitive single value but in determining a management direction and focus.

5.6   Further cases

Telecom and Royal Sun Alliance are companies that adopted a customer value approach. All systems, not just IT systems are managed and evaluated in terms of how they meet agreed customer service levels. Both companies have undertaken some quite sophisticated research to determine customer requirements and relative importance of factors (Goulter, 1998; Danaher & Gallagher, 1997)

These companies have shown dramatic improvements that illustrate the advantages of a customer value methodology including:

- IT units now focus on the entire organisation
- IT units have identified what factors are important
- IT units conduct regular checks on performance

Both companies have used customer value models as ongoing research into customer requirements and are using the results to make substantial changes in business operations.

6.0   Conclusions and discussion

There is a story of two people camping in the jungle who suddenly see a tiger approaching. One of them quickly jumps up and puts on running shoes. The other person asks: "Do you really think those shoes will make you run faster than the tiger?" "I don't have to outrun the tiger" comes the reply. "I just have to out run you."

The point is there is no use looking for absolute metrics. Customer values will be constantly changing. A model must be constantly revisited to make sure it depicts an accurate picture of customer values. However the CVA models is a way of focusing on what is important. It is better to spend time understanding the forces that influence business success rather than pursue a fleeting optimum condition.

6.1   Implications

There is no doubt our understanding of information technology is developing. There has been substantial research and there are a number of tools available. At the same time there are a number of issues that need to be considered in what is a complex subject.

At the same time there are increasing pressures on firms to extract value from the investments in IT. Competition and change dictate that firms must constantly seek to improve the way they operate.

Considering customer value offers a perspective that enables firms to prioritise and effectively manage the IT resource in terms of enable the business process. There are a number of tools and methods available to model customer value.

Adoption of a customer value orientation has a number of benefits for the management of firms in general and IT departments in particular which include:

- Allowing focus on delivery of the entire process.
- Providing for payback analysis in terms of market share.
- Providing for project selection in terms of identifying principal satisfaction determinants.
- Providing practical techniques for day to day management with links to internal measures.

- Providing link between customer satisfaction, employee satisfaction and profit.
- Emphasising the value of relationships.
- Highlighting the importance of a culture that fosters innovation.
- Combining resources of the firm in a unique manner to provide value services that offer a competitive advantage.
- Providing models that can cope with the challenges represented by new technologies and paradigms, for example, the Internet and electronic commerce.
- Providing explanations for the "variability" of information systems success.

There is evidence to suggest that customer value is a significant factor and warrants inclusion in the "Comprehensive model". Not only does customer value provide an additional success factor it also enables priorities to be established in terms of the current determinants.

The case study further demonstrated how customer value could be used to:

- Identify what factors are important to customers
- Derive relative weights of the importance of those factors
- Develop internal measures that can be used in day to day management

The results show that customer value models can provide a method to manage service delivery for information technology and offers benefits in terms of effective management of the information technology function. Customer value provides a focus and means to prioritise the dimensions of the "Comprehensive" model. But perhaps the most important facet is the ability of a model to capture, communicate and focus an entire organisation towards the delivery of value for the customer.

6.2 Additional research

To firmly establish the role of customer value more detailed research is required. The difficulty is in identifying firms that have implemented a customer value methodology. A detailed empirical investigation is required to prove the benefits of the methodology.

Customer value models are complex and require considerable effort to construct. Experience and advanced statistical techniques are required for reliable and effective models. Given access to a large number of firms critical success factors could be identified for the construction of CVA models.

In terms of IT management and selection there is a requirement to determine how important the CVA role is in the mix of other variables. There is sufficient evidence to suggest the effect is considerable. A detailed analysis of the "value orientation" of IT firms would be of benefit.

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8.0 Appendix

8.1 Glossary

CEO	Chief executive officer
CIO	Chief information officer
CRM	Customer relationship management
CSM	Customer satisfaction measurement
CVA	Customer value analysis
CVM	Customer value measurement
DCF	Discounted cash flow
ERP	Enterprise resource planning
IT	Information technology
PIMS	Profit impact of market share
ROI	Return on investment
SIM	Strategic information management
TCO	Total cost of ownership
VPN	Virtual private network

8.2 Customer survey

8.2.1 Outline

The case study presented is that of ABC Company (the name has been changed). This company provides software services to a range of medium size businesses both in New Zealand and Australia. The core product is a financial application that provides the basis for additional support services.

The aim of the study was to identify important features in the service and work through how technology might be used to provide better value to customers.

8.2.2 Methodology

A simple survey was conducted using a number of selected New Zealand and Australian clients. The survey was targeted at the business manager or decision-maker rather than technical managers or users. (In some smaller organisations this is the same person). The aim of the survey was to concentrate on the business results rather than technical operation.

The survey is based on face to face interviews and was specifically designed to rate the importance of the factor as well as the actual performance of the factor. From the survey results, weights and scores were calculated for each factor. The relative weights enable a customer value tree to be drawn.

8.2.3 ABC Customer value survey

As part of a continued effort to better understand our customer base we would appreciate your responses to the following questions.

1. Overall does ABC provides value?   (On a scale of 1 to 10)   ____

How important is the factor
in the decision process
(5= Very, 1 = Not important) ?

How well does ABC
deliver this to your business ?
(5 = Excellent, 1 = Poor)

____   1. Value for the initial investment ?   ____
____   2. Maintenance/running costs   ____
____   3. Support costs   ____
____   4. Match with Business processes   ____
____   5. Match with Core competencies   ____
____   6. Quality of product delivered   ____
____   7. Flexibility of the system (Ability to do Modifications)   ____
____   8. Product delivers new technologies   ____
____   9. Competent   ____
____   10. Understanding/Knowledge   ____
____   11. On time/Budget   ____
____   12. Integrity/Commitment/Accountability   ____
____   13. Communication   ____
____   14. Blue chip   ____
____   15. Proactive   ____
____   16. GUI   ____
____   17. Solid/Integrity/Performance   ____
____   18. Ease of operation   ____
____   19. Hardware platform   ____
____   20. Software platform   ____
____   21. Integration. (network and other software)   ____
____   22. Relationship with suppliers   ____
____   23. Reporting   ____
____   24. Ease of use/training requirements   ____
____   25. Market presence   ____
____   26. Location   ____
____   27. Accessibility/Reasonable Costs of upgrades   ____

Thank you for your participation

Geoff McLeod.
ABC Company.

8.2.4 Customer value tree

	Price	10%	Value for the initial investment	0%
			Maintenance/Running Costs	45%
			Support Costs	55%

	Business Function	26%	Match with Business Process	36%
			Match with Core Competencies	17%
			Quality of delivery	17%
			Flexibility of system	2%
			Product delivers new technologies	27%

Value for Money

	Services Delivery	35%	Competent	7%
			Understanding Knowledge	21%
			On time/Budget	17%
			Integrity Commitment Accountability	23%
			Communication	15%
			Proactive	16%

	Product	13%	GUI	6%
			Solid Integrity Performance	1%
			Ease of operation	3%
			Hardware platform	0%
			Software platform	15%
			Integration (Network & Software)	6%
			Reporting	27%
			Accessibility & cost of upgrades	2%
			Ease of use & training	40%

|				
	Organisation	16%	Blue chip	28%
			Relationship with suppliers	5%
			Market presence	42%
			Location	26%

The customer value tree illustrates the relative importance or weights of the factors in the composition of overall customer satisfaction or value. The major components, for example price, are further broken down into sub-components with relative weights (where statistically significant). The model enables relative importance to be illustrated. Gale (1994) outlines the steps involved in developing the model.

The results show that services delivery is the most important factor. The second most important factor is business function. In comparison price and product factors are not rated highly by customers when considering overall value. This indicates customers are more concerned with end results in terms of service and business function than tangibles such as price and product appearance.

8.2.5 Customer value profile

Overall quality	ABC	CBA	SAP	Average	ABC Ratio	CBA Ratio	SAP Ratio	% Wt.	ABC Relative	CBA Relative	SAP Relative	ABC Var
Price	9.3	9.8	9.1	9.4	0.99	1.04	0.97	10%	9.9	10.4	9.7	-0.1
Business Function	7.5	7.2	9.2	8.0	0.94	0.90	1.15	26%	24.5	23.5	30.0	-1.5
Services	8.5	8.3	8.4	8.4	1.01	0.99	1.00	35%	35.3	34.6	35.1	0.3
Product	7.3	8.0	8.5	7.9	0.92	1.01	1.07	13%	12.0	13.1	13.9	-1.0
Organisation	6.4	7.5	6.0	6.6	0.96	1.13	0.90	16%	15.4	18.1	14.5	-0.6
Sum of Weights								100%				
Quality Performance	7.8	8.2	8.2									-2.9
Market Perceived Quality										97.1	99.7	103.1
Market Perceived Price	7.5	7.1	8.1	7.6	0.99	0.94	1.07	0.10	99.1	93.8	107.0
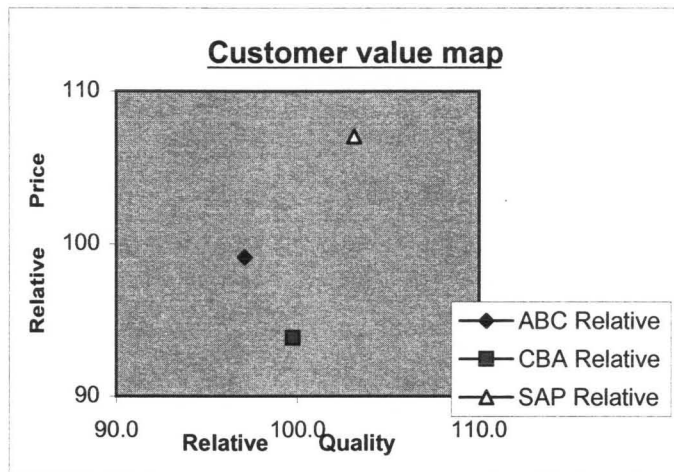
Customer value map

Gale (1997) & Higgins (1998) outline methods to develop a customer value profile. A value profile displays the relative importance of variables in comparison with competitors. The companies are "scored" by their overall quality, the scores determined by subjective assessment. The scores are weighted according to the importance of the relative attributes and the deviation from the average.
This enables a profile to be calculated, both for relative quality and relative price

The market perceives (relative to others) CBA has average quality (99.7) and low price (93.8). ABC company has slightly lower quality (97.1) but average price (99.1). In comparision SAP is perceived as having a high quality (103.1) but a much higher price (107.0). The management of ABC company can now begin to consider if the low quality score is simply perceptions or requires an improvement in the basic product.

8.2.6 Limitations

A survey of 10 customers in Australia and New Zealand was completed. Time and resource constraints limit the results. The results are sufficiently robust to illustrate the procedure. The following limitations are noted:

A larger survey is required to produce sufficient data for detailed statistical analysis.

Attributes should be independent and the survey design could be improved. A desirable aim is a design that effectively captures the essence of each element.

Using a 1-5 "likert" type scale limits the statistical analysis. A ratio scale would be more effective for comparative analysis (Higgins, 1998).

The data analysis used a simple regression analysis. More effort is required identify attributes that are non-overlapping. Advanced technical techniques including co-joint or trade-off analysis is required (Gale, 1997). Alternatively multiple regression analysis with some form of principle component analysis is required to account for the multi-collinearity (Danaher & Gallagher, 1997).

The relative scores for the "competitor" require more detailed analysis. Relative weights have been calculated from an informal survey among industry experts.

For the purposes of this analysis the market positioning relative competitors was considered in very general terms. ABC company develop software and provide services for medium size companies. The software is an integrated financial application that covers back office, accounts payable, accounts receivable, general ledger and inventory as well as job management and manufacturing.

Competition is considered to come from smaller less functional packages, for example CBA and ACCPAC. These packages cater for smaller business with less specialised requirements.

Competition also comes from the high-end Enterprise Resource Planning (ERP) packages, for example BAAN, Peoplesoft and SAP. These solutions are larger in scale and more comprehensive. They require considerable effort in implementation and are considered to be expensive.

ABC company is compared to these solutions and attributes (quality, price and service) have been weighted according to market perceptions of the differences between the various options on the market.

A more detailed analysis would look at competitors in the same market segment as ABC company. Given the complex nature of application software considerable effort is required to research detailed differences between packages.