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Justifying Investments in Electronic Commerce

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Abstract

This paper explores why organizations invest in eCommerce applications and highlights some of the expected returns. A Delphi study was used to determine the underlying benefits of eCommerce investments and several formal financial and non-financial approaches to justification are identified and discussed. A framework is outlined which can be used to select a justification approach based on the aims of the project and the type of values and benefits expected. Attaining competitive advantage and developing new business opportunities were identified as factors that could be best justified using strategic or analytical approaches rather than financial justification.

Keywords

Electronic commerce, benefits, investment justification

INTRODUCTION

A recent article by Goett (2000) compares embarking on an eCommerce (EC) venture with the movie Raiders of the Lost Ark:

> *'Indiana Jones faces an unexplored Inca temple. While he has a map of the temple's location, he has no plan of its interior. No one before him had escaped that temple alive. Indy has to dodge flying spears, falling guillotines, and rolling boulders in his quest for the prize. The remains of his unlucky predecessors give him a clue of their fate, and he uses all his skills as an experienced archaeologist to identify likely traps. He manages to escape with the treasure because he is bold, fearless, and knowledgeable. He is also very, very agile.'*

Today, in uncertain economic times, managers face increased pressures to make sure that eCommerce investments have certain paybacks but in the race to be first to grab the prize they face pitfalls and traps that can mean certain financial death. In the dash to establish dominance in new markets, being first is sometimes seen as more important than doing it well. One CEO of a major corporation recently said that he approved a seven-figure budget request from the firm's Director of eCommerce in less than ten seconds because being first to market in the industry was a non-negotiable imperative. Yet ignoring formal justification of any investment has too often been a recipe for disaster.

Justification forms the basis on which decisions are made. It refers to any financial and non-financial approach, and should be interpreted in the broadest possible context, i.e. any method, process, procedure, technique etc. Remenyi et al (1997) illustrates this by suggesting that justification assists in understanding the impact of the change that an investment has on an organisation. As stated by Silk (1991) 'Managers direct resources to achieve results'. However, the fundamental question is which investment will achieve these goals and how can the outlay be supported by a justification methodology. Organisations need to be able to set aside the hyperbole and consider how an investment will benefit their business processes, and thus determine whether the money spent is actually being wisely spent.

The ultimate question that this paper seeks to consider is why invest in Electronic Commerce and how do you justify these investments? Importantly, the investments that we consider in this paper are the new raft of Web based Electronic Commerce Applications (WBA) that being implemented and how these organisations perceive that this type of electronic commerce improves, changes or impacts on their organisation. Clearly, benefits are ultimately the driving force influencing investments in eCommerce, and as Hares and Royle (1994) imposingly point out, business benefit will always produce financial return, however, a financial return may not always produce business benefit.

Organisations invest in electronic commerce applications for a variety of reasons, many of which relate to competitiveness, consumer satisfaction and corporate image. However, the value of these benefits is weighted differently from organisation to organisation and depending on their size and type, different intangible benefits will be identified. Therefore, a unique approach cannot be developed to suit every organisation. A suitable approach requires flexibility, allowing management to make adjustments according to their requirements.

RESEARCH OBJECTIVES

The main objectives of this research were:

To investigate the perceived *benefits* of investing in EC applications;

To highlight the *justification approaches* that firms best believe capture the issues regarding EC investments.

The first objective examines the various reasons as to why organisations invest in EC, to determine the benefits that they expect to attain and impediments they expect to avoid. These elements lay the foundation for what a justification approach must highlight, that is both tangible and intangible reasons. The second objective was to develop a framework that captures the issues raised in the first part of the study. There are numerous justification techniques that are variations of other techniques, these can be altered to suit varying purposes, yet there is no suggestion of the reliability or suitability of these for justifying EC applications. This aim concentrates on analysing the various approaches and identifying where and how they can be used to justify EC investments.

APPROACHES TO JUSTIFICATION

Approaches to IT investment justification have been proposed by Earl (1989), Irani (1999) and Wen and Sylla (1999). Earl proposed the use of a four-way framework to formulate appraisal techniques for different purposes, as shown in Table 1. The approach addresses organisational intentions and goals to be derived from using IT. The nature and characteristics of these goals are then determined in terms of tangibility, risk, judgement etc. Users are referred to suggested approaches/techniques that can be used to appraise investments.

Aim	Goals	Nature	Approach
Productivity and performance	Efficiency Effectiveness	Tangible benefits Clear argument	Financial Net present value
New ways of managing	Change Flexibility	Radical concept Multi-dimensional	Multi factor Metrics
Competitive advantage	Product-market positioning Competitive disequilibrium	Concrete vision Commercial judgement	Strategic analysis Tests
Developing new business	Diversification Growth	Business venture Risk and uncertainty	Business case Business plan

Table 1: Earl’s four-way framework (Adapted from Earl, 1989)

Wen and Sylla (1999) took a slightly different approach by recognizing opportunities and threats of failure, classifying evaluation methods in terms of tangibility and risk. They argue that benefits are lost through inappropriate management and lack of recognition during planning, thus should be identified and measured prior to selecting a justification approach. Risk should also be taken into consideration to recognise uncertainty of the future. The analysis somewhat reiterates Earl’s four-way framework in that it identifies benefits and links them to the various justification approaches identified. In Irani et al. (1997) a comprehensive analysis of appraisal techniques was undertaken and 65 approaches where identified. Irani (1999) argues that organisations are faced with a changing portfolio of benefits and costs, which differ between each organisational department. This then introduces the difficulty in determining the middle ground and often leads to a simple case of producing information that convinces the person who signs the cheques (Irani 1999). Justification then becomes a matter of manipulating these approaches, hence defeating its purpose. The sheer number of approaches available further complicates the justification process to a point where one must actively study the various techniques and identify which is most appropriate to that particular investment. This poses yet another dilemma whereby comparisons can no longer be made between investments due to the different justification tool utilised. It is no surprise that organisations prefer to use traditional approaches, or rely on an act of faith to avoid the complexity in determining an appropriate justification approach (as suggested by Silk 1991).

Neither Irani, Earl nor Wen and Sylla identify any specific approaches to eCommerce justification so this was one aim of our study.

RESEARCH METHODOLOGY

The Delphi technique (Linstone et al, 1975) was used in this study because of its ability to aggregate individual ideas. Participants were invited to put forward their experience and knowledge anonymously in their own time and benefit from the results. Willingness and motivation to participate was high because organizations have experienced difficulty in justifying their EC applications and were eager to find answers. Delphi sets aside any predetermined thoughts influenced by the literature and seeks to identify results based on what is experienced in the real world. The underlying benefit of the Delphi technique is that both the respondents and the researcher can gain a valuable insight into an issue as it comes to conclusion. A diverse body of knowledge and ideas are independently brought together and analysed by experts whom in turn learn off each other.

The study took place over four months, and consisted of three rounds of questionnaires which can be summarised as follows:

Round 1: Identifying the justification approach(es) used to highlight the issues regarding investments in Web applications.

Round 2: Ranking the justification approach(es) used to highlight the issues regarding investments in Web applications.

Round 3: Seeking consensus on justification approach(es) used to highlight the issues regarding Web investments.

The series of questionnaires began with a fairly broad question concerning problems, objectives, solutions or forecasts. Succeeding questionnaires are then based on the responses of previous questionnaires, and the process continued until a consensus was reached.

The first questionnaire requested a brief description of the reasons why each organisation decided to invest an application on the Web. These factors may be internal and/or external to the organisation, such as to attract customers, improve competitive advantage, improve performance and productivity, for expansion and growth or to improve management. It also requested a brief description of what financial and non-financial techniques were used to show adequate grounds for proceeding with the investment. The intent of the broad scope of the initial questions was to allow participants to respond open-mindedly and respond without prejudice.

The second questionnaire was short enough for the respondents to review, criticize, support, or oppose (Delbecq, *et al* 1975). It was more restricted and asked the participants to review the benefits and techniques identified in the first questionnaire and argue in favour of or against the benefits and approaches identified. The aim was to help participants understand each other's position, introduce different ideas and to move toward accurate judgements concerning the relative importance of the benefits and techniques.

FINDINGS

The selection of participants was based on organizations that were involved in investing in Electronic Commerce applications, from well-developed and fully functional sites to yet to be developed sites. A total of seventy-five organisations from small and large Australian organisations with main offices located in Victoria and New South Wales were invited to participate in the research program. A minimum of two organisations from each industry was selected to overcome problems of diversity. The industries selected were from: Financial Services; Consulting; Media and Entertainment; Local government; Textile / Footwear; Accounting; Veterinary science; Construction / Subcontracting; Education; Legal Practice; Manufacturing and Telecommunications Each organisation was contacted by phone or electronic mail and asked to suggest names and contact numbers of people who could participate in the research or suggest potential participants. The respondents represent organisations investing in WBAs. Therefore the sample size was both large and diverse to minimise distortion in the data.

All participants were able to adequately answer the section regarding the benefits, identifying a total of 31 different benefits. Each participant actively took part in identifying and commenting on the benefits of investing in Electronic Commerce applications. Justification on the other hand was somewhat more complex, emphasizing the difficulty of justification. A total of eight different justification approaches were identified.

Each approach had a varying number of corresponding issues supporting their appropriateness to Electronic Commerce applications. The benefits and approaches are discussed separately and classified according to Earl (1989) and Irani et al. (1997). Appropriate figures (graphs) are also displayed, whereby 'count' refers to the total number of participants that selected each benefit as a top 10 benefit/approach and 'rank' is the total of all rankings (1 to 10).

Main Benefits And Reasons For Investing In Web Applications

A main object of this research is "to investigate the perceived *benefits* of investing in EC applications". These are discussed below in terms of achieving competitive advantage, expansion and growth effects, improving productivity and performance and productivity and performance.

Competitive Advantage

According to the panel of experts, the most significant benefits derived from WBAs were attributed to competitive advantage goals and are presented in Figure 1 and described as follows:

Providing access 24 hours a day, 7 days a week: The main reason influencing organisations to invest in EC applications was perceived to be the ability to provide access to information and service 24 hours a day, 7 days a week. This reason was ranked highly by 80% of participants. Comments suggested that constant accessibility and greater access provided by EC applications assists in achieving customer satisfaction.

Effective promotion of the organisation together with the products and services it produces: The Web was viewed as an 'adjunct to existing marketing', allowing consumers to learn about the organisation at a time that suits them with the 'potential to increase awareness and sales'. This was selected in the top ten by 78% of participants.

Enhance quality and speed of customer service: Deemed important by 67% of participants. The argument put forward was that 'if the customer isn't satisfied with the experience, why do it'. It was also noted that unless it was developed properly it would be detrimental to the organisation.

Create competitive advantage and subsequently avoid competitive disadvantage: Selected by 67% of participants, the argument was that EC applications extend the opportunity to improve competitiveness. Niche markets in particular benefit from such opportunities. One participant raised the issue of there being 'no second places in the WWW world'.

Entice shoppers and encourage customer interaction: EC applications are considered to be an 'adjunct to

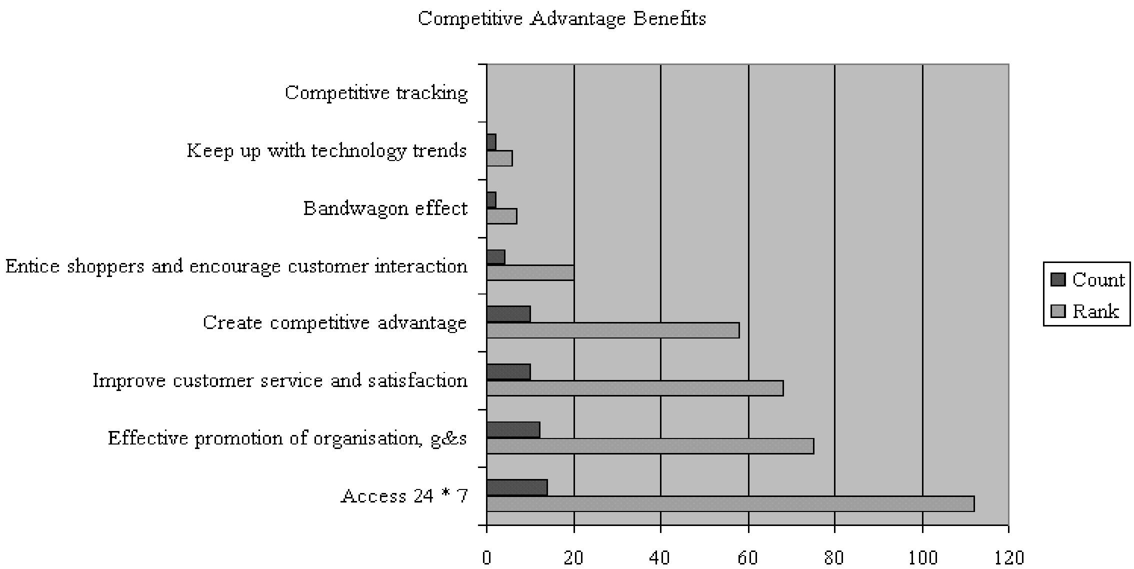

Figure 1: Benefits attributed to aims in competitive advantage

existing marketing', allowing people to anonymously interact with the organisation and potentially increase sales. It also takes a new approach to attracting customers. Other forms of marketing generally search for the customer, whereas with the Web, it is the customer that does the searching.

Bandwagon effect: Although only one participant selected this as most important, it did attract an interesting discussion. One participant felt that although the 'everyone else is doing it argument' is true; it does not allow the organisation to control its future. Other participants felt it was more important for an organisation to 'evaluate whether the company is ready and able to participate', reiterating the importance of justification.

EXPANSION AND GROWTH EFFECTS

Benefits relating to expansion and growth (termed as developing new business by Earl, 1989) appeared equally important as competitive advantage benefits, as shown in Figure 2. The following benefits were identified:

Supporting core business functions which are integral to business strategy and goals: It was suggested that "unless a web presence is part of the strategy, it will be unlikely to survive", which relates back to the importance of selecting an investment supported by strategic thinking. On the other hand, it was argued that "businesses didn't need this integral component 10 years ago", questioning the importance of it at present. Others felt that growth took time whereby investing and refining EC applications led to benefits in future years. One participant raised the issue that that EC applications provide "efficiencies, access and speed" which in the long run lead to increased profits – the ultimate goal of every organisation. Furthermore, it was suggested that information on a WBA should be "based on information that is also used as part of internal functions". Despite the mixture of comments, this benefit was selected by 73% of participants with relatively high rankings ranging from 5 to 10 (10 being the most important).

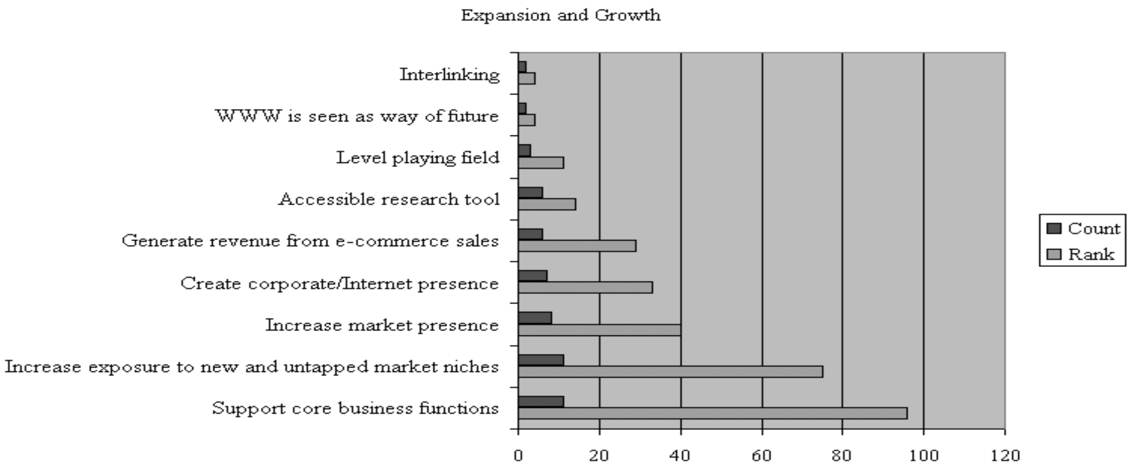

Figure 2: Benefits attributed to aims in expansion and growth

Provide new business opportunities and exposure to new untapped market niches: The argument was clear that EC applications offer the "opportunity to create markets" that are less accessible in the traditional economy. Such opportunities were then related to the issue of potentially increasing profits. This was selected in the top ten by 73% of participants.

Increase market presence: Selected by 53% of participants, increasing market presence was deemed to create awareness of the organisation.

Create a corporate / Internet presence: This simple act of creating a presence was selected by 47% was perceived to "create awareness" of the organisations.

To facilitate on-line purchasing and generate revenue from electronic commerce sales: Perhaps one of the most interesting results was the relatively low ranking of generating more sales. Only 40% of participants regarded this as one of the top 10 benefits, whereby one participant ranked it at 10. Although it was viewed as "an extra revenue stream we never had", it did not appear as important in attracting the customer to the organisation.

Accessible research tool: Selected by 40% of participants, EC applications were regarded as time and money savers in that they assist in doing things quickly, efficiently and at a lower cost. On the other hand it also led to more "educated customers" since the accessibility and ease of use of EC applications, allowed them to study what was on offer. This provided the opportunity to make educated decisions as to what they wanted which reduced time and money spent on having staff reiterate answers to repetitive questions. Hence, in a sense, this was an indirect money saving benefit.

Other benefits relating to expansion and growth that were considered important, yet not selected in the final round, were:

Levelling the playing field, increasing exposure and expanding the marketplace.

Interlinking.

The WWW is seen as the way of the future.

Improving management and business processes

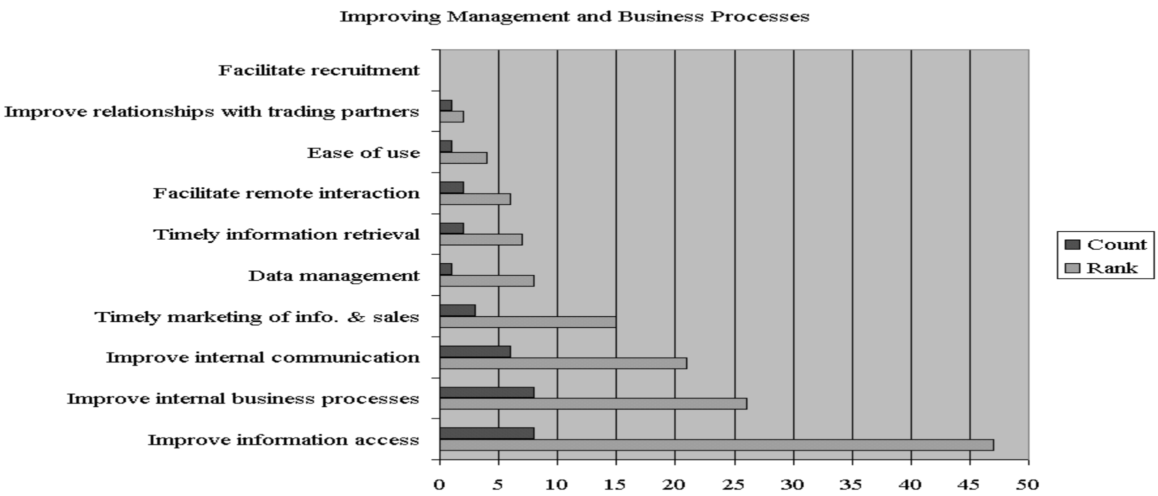

Figure 3: Benefits attributed to aims in improving management and business processes

Although benefits supporting management and business processes were considered relatively important by the participants, it was not as significant as suggested by the literature. Improving internal and external communication and timely access to key stakeholders (i.e. suppliers, customers) and improved internal business processes were the only benefits that were selected by over half of the participants. This is shown in Figure 3. One participant regarded improving business processes as a “critical change catalyst” whilst another felt that the issue was not considered to be as important now as it will be in the future. Improved communication among staff via the Web attracted a mixed response, in that some participants felt that the benefit was “better delivered by the Intranet”. In addition, in order for this to become a benefit all staff would need access and additional skills to achieve efficiencies. The literature regarded this as one of the most common benefits together with timely marketing of information and sales. Creating efficiencies was the focus of this benefit whereby information could be readily updated at a significantly lower cost than alternative marketing methods. Sales turnover was deemed more efficient and effective in that there was no waiting period to order the good/service, receive and record the order before finally sending it to the customer.

Other benefits related to improving management and business processes that were highlighted at the beginning of the study, yet were deemed less important as the research progressed were:

Assists with management and transmission of data whereby the Web acts as a storage archive.

Timely information retrieval and utilisation assisting with accuracy and reliability.

Facilitate remote interaction with video capture interface.

Improve relationships with trading partners.

Facilitate recruitment.

APPROACHES TO JUSTIFYING WEB APPLICATIONS

The approaches to EC justification provided interesting results, particularly when comparisons are made with the literature. The second aim of the research “to highlight the *justification approaches* that firms best believe capture the issues regarding EC investments”. For simplicity the approaches identified have been classified according to Irani et al. (1997) classification.

STRATEGIC APPROACHES - CRITICAL SUCCESS FACTORS, CSF

The initial reaction when asked to suggest justification approaches was to identify organisational factors that were supported by EC applications. Figure 4 illustrates these factors, which are discussed below.

To ensure the organisation can remain competitive: This was the most significant issue to be highlighted in justification in terms of CSF, selected by 87% of participants. The notion was that a justification approach had to demonstrate whether the organisation could continue to remain competitive. Ensuring competitiveness was an issue that "requires attention from all level managers", and technologies such as EC applications help create "efficiencies, which should aid sustainability".

To provide a timely service: Being able to illustrate that a new investment could assist in providing a timely service was considered important by 80% of participants. It was interpreted to lead to gaining customer satisfaction, for it was noted, "giving customers and potential customers access to information may be the competitive advantage required". In addition, it was stated that once a market is gained, it is "necessary to win and secure repeat customer use".

To access markets not normally available: Selected by 80% of participants, it was identified that a justification approach must take into account that new markets will become available. This CSF "opens the opportunity to look at external factors of the organisation such as market structure, customer perceptions and future trends". In turn, this leads to potential sales, hence increasing profits.

To gain greater company exposure: The ability to gain exposure was considered important by 80% of the participants, particularly in the sense that "exposure promotes the brand name, which attracts business". It was also noted that exposure was viewed as a "precursor to obtaining sales".

Need to have presence on WWW: Competition was perceived to constantly force organisations to be "on the ball constantly". The organisation must ensure that it is able to withstand competition and avoid disadvantage. One participant reiterated by stating that the justification approach "must be able to recognise that it opens new opportunities".

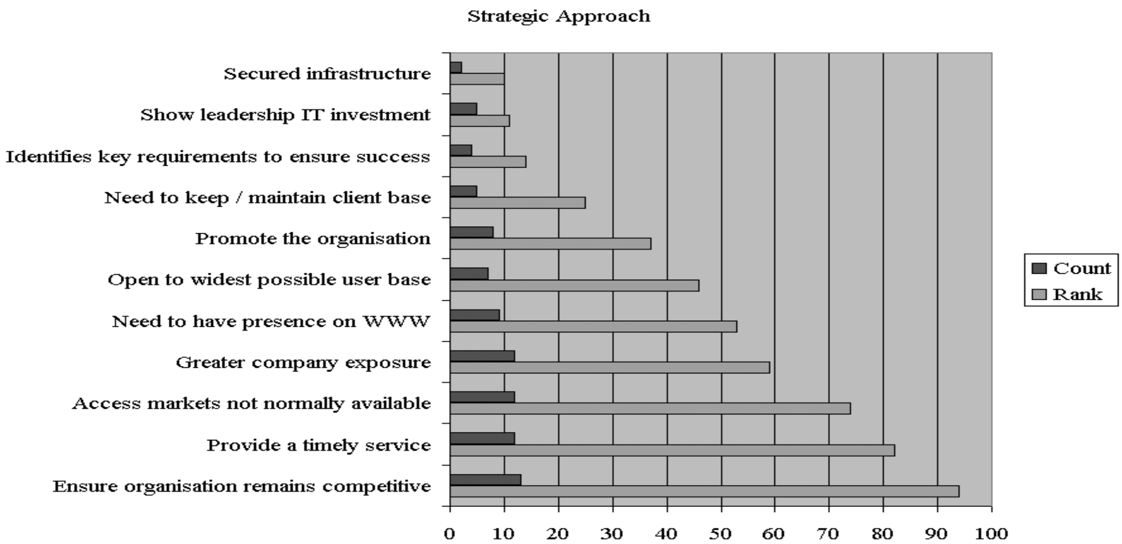

Figure 4: Important strategic approach identified - CSF

Promote the organisation: Promotion was considered important by 53% of participants in that an organisation cannot "cut any strings" in its line of business. Attracting business was said to promote the organisation, hence, it is important for it to be highlighted in the justification.

Open the organisation to the widest possible user base: The Web was deemed to open organisations to the global market and as suggested by one participant, it should be taken advantage of – hence justified. Another participant felt that organisations had "little choice but to use it", suggesting the bandwagon effect whereby organisations feel obligated to invest in a EC applications in order to compete.

Other factors that were identified yet not considered as important as the above were:

Ability to keep and maintain client base.

Show leadership in IT investment.

Ensure transaction confidence with a well-maintained, secure infrastructure.

Identify key requirements to ensure success.

Financial, Integrated and Analytical Justifications for Web Based Applications

Approaches to EC justification identified in the survey provided interesting results, particularly when comparisons are made with the IT literature. The main approaches identified are outlined below.

Financial Approaches

Counter to the surveyed literature, traditional financial techniques highlighted issues relevant to justifying IT investments such as WBAs. The discussions raised and final rankings however, do not appear consistent with the reasons for investing WBAs. The most highly ranked benefits were to attract and satisfy customers not to generate extra revenue and reduce operating costs. Several financial approaches were suggested, one of which scored the highest overall ranking.

Cost Benefit Analysis (CBA): CBA was selected in the top 10 by all but one participant. However, it was suggested that the value of reducing costs and achieving revenue growth changes over time so these aspects are difficult to quantify. At the outset several participants felt that CBA was the most effective justification model but as other models were raised by study participants views changed.

Return on Investment (ROI): ROI analyses tangible benefits minus costs and is based on the assumption that investing today will reap returns over future periods. It was accepted that traditional ROI calculations “may yield simple answers yet create long term problems”. ROI was selected by 60% of participants. However, questions were raised as to how cost savings could be accurately measured using this approach.

Payback Period (PB): PB examines the length of time it takes for an investment to recover the initial outlay. This approach was considered “simple and easy to calculate and understand”, which is why it is readily used. On the other hand, participants felt that highlighting savings that cover set up costs is only a small part of justification and does not accurately reflect long-term investment potential.

Net Present Value (NPV): NPV is used because it compares costs and savings in today’s terms. However, few positive comments were made regarding this approach because it was perceived to be built on “faulty assumptions” such as estimating future profits, taxes, inflation and deciding on which discount rate to use.

Integrated Approaches

Although these were poorly recognised in the research, there were some interesting issues raised by the participants.

Information Economics (IE): IE (Parker *et al*, 1988) emphasizes the necessity of dealing with justification problems by defining the value of information to an organisation. It includes value linking, value restructuring, value acceleration, and innovation evaluation. IE was said to be useful in identifying then evaluating, scoring and ranking all potential positive and negative factors associated with a project and therefore the raising awareness of key stakeholders about issues concerning the evaluation process.

Balanced Scorecard (BS): The BS approach (Kaplan *et al*, 1996) was considered relatively important for communicating vision and strategy (60%) and “supplementing traditional measures” by taking into consideration customers, business processes, learning and growth. It was also suggested that this approach can be used to identify actions an organisation can take to improve performance.

Analytical Approaches

Surprisingly, this was the least selected approach, whereby only one technique was suggested.

Value Analysis (VA): VA assists in judging which intangibles are of greater value to the organisation. Participants using this approach suggest that it ‘improves communication between analysts and users’, when judging what was of value to the organisation. In addition, it was said that due to the ability to change what was meant by ‘value’, justification could be tailored to suit every organization and investment individually.

A CLASSIFICATION SCHEMA

In general, it was found that the justification methods typically fall into four groups. These are:

Strategic techniques which view the long-term impact of the organisation taking into consideration both tangible and intangible factors, which ultimately lead to competitive advantage.

Analytical approaches which are highly structured incorporating risk into the analysis, and relate to developing new businesses with growth and diversification.

Integrated approaches which combine subjectivity with formal structures to integrate financial and non-financial techniques, focusing on the organisation itself in terms of the way it operates.

Financial techniques that relate to structured valuations of tangibles, that in essence have been deemed appropriate to productivity and performance.

Benefits Derived		**Justification Approaches**
Aim: Competitive Advantage	STRATEGIC	***Approach: Critical Success Factors***
Provide 24 hours/day 7 days/week access Effective promotion of organisation, products and services Enhance quality and speed of customer service Create sustainable competitive advantage Entice shoppers and encourage customer interaction Bandwagon effect To keep up with trends in technology		Competitiveness Timely service Greater exposure Access to new markets Need to have a Web presence Creating widest possible user base Promotion
Aim: Expansion & Growth	ANALYTICAL	***Approach: Value Analysis***
Support core business functions / Integral to business strategy, long term vision and goals Provide new business opportunities and exposure to new untapped market niches Increase market presence Creating corporate / Internet presence On-line purchasing / generate revenue from eCommerce sales Accessible research tool Levelling the playing field – globalisation, expand market place The Web is seen as the way of the future Interlinking – providing relevant links to other sites		Assists in judging which intangibles are of greater value to the organisation Emphasises value rather than cost
Aim: Improve management & Business Processors	INTEGRATED	***Approach: Balanced Scorecard***
Improve internal and external communication with key stakeholders Improve internal business processes Improve internal communication by providing organizational information to all staff Timely marketing information and sales Timely information retrieval and utilization (accuracy & reliability) Facilitate remote interaction with video capture interface		Communicates organisational vision and strategy
Aim: Productivity & Performance	FINANCIAL	***Approach: Cost Benefit Analysis***
Reduce operating costs		Illustrates how information and service can reduce delivery time and cost
		Approach: Return on Investment
		Identifies how the use of technology achieves significant cost savings
		Approach: Payback Period
		Illustrates how savings in support costs cover set up costs

Table 2: A Framework for Justifying EC applications (Adapted from Earl (1989) and Irani (1999))

In Table 2, we have classified the types of benefits that organizations have derived from EC applications and compare these against possible justification methods. The framework may not be applicable to all organisations, yet it does give an indication as to what is possible.

CONCLUSIONS

As suggested in the management literature, the main reasons for investing in EC applications can be attributed to gaining intangible benefits. The findings of this survey heavily support these claims given that the main tangible benefit identified related to reducing operational costs such as marketing expenses or transaction fees.

Surprisingly, the majority of reasons for investing in EC applications produced non-quantifiable returns and yet the majority of most appropriate approaches to justification were financial, requiring quantifiable data. It appears that there is a degree of confusion as to whether the financial approaches can be appropriately used to justify EC applications. It was evident in both the literature and the findings that many benefits can be derived from investing in EC applications. The benefits that were identified in the findings emphasised the nature and importance of these benefits. Such benefits were then attributed to Earl's four-way framework that broadly attempts to link organisational aims to justification approaches. The benefits that were considered to be of most importance were those concerned with competitive advantage and expansion and growth of the organisation, in particular, providing information access 24 hours a day 7 days a week and supporting core business functions. Productivity and performance benefits on the other hand appeared to be of least importance.

In terms of the justification approaches, very few approaches were identified in comparison to the extensive range identified in the literature. In particular the traditional cost benefit analysis was by far the most popular as it highlighted how information and service can reduce delivery time and cost. It appears that the most appropriate form of justification is to determine factors deemed essential to the survival of the organisation, which reiterates the importance of strategic thinking. The well known cliché suggesting that one cannot manage what cannot be measured, still demonstrates the importance of understanding where and how money is being used, and what benefits an investment is expected to generate.

REFERENCES

Delbecq, A.L., A.H. Van de Ven and D.H. Gustafson (1975) *Group techniques for program planning: a guide to nominal group and Delphi processes*. Scott, Foresman and Company: Glenview Illinois.

Earl, M.J. (1989) *Management strategies for information technology*. Prentice Hall International: UK.

Goett, P. (2000) 'Indiana Jones and the dread temple of e-commerce', *Journal of Business Strategy*, Vol.21(1), pp.10-12.

Irani, Z., J.N. Ezingeard and R.J. Grieve (1997) "Integrating the costs of a manufacturing IT/IS infrastructure into the investment decision making process" *Technovation*. 17(11/12): 695-706.

Irani, Z. (1999) *IT/IS Investment Barriers to the Decision Making Process*. Seminar presentation. Deakin University, Geelong, Victoria: September 17.

Kaplan, R.S. and Norton, D. P. (1996) 'Using the balanced scorecard as a strategic management system' *Harvard Business Review*. 74(1): 75-85

Linstone, H.A. and M. Turnoff (1975) *The Delphi method: Techniques and applications*. Addison-Wesley Publishing Company: Canada

Parker, M.M. and R.J. Benson. with H.E. Trainor. (1988*) Information Economics: linking business performance to information technology*. Prentice-Hall Incorporated: New Jersey.

Patel, N.V. and Z. Irani (1999) "Evaluating information technology in dynamic environments: a focus on tailor able information systems" *Logistics Information Management*. 12(1/2): 32-39.

Remenyi, D., A. Money and A. Twite (1991) *A guide to measuring and managing IT benefits*. NCC Blackwell Limited: Oxford.

Silk, D.J. (1991) *Planning IT: Creating an information management strategy*. Butterworth-Heinemann Limited: Oxford.

Wen, H. J. C. and Sylla, (1999) In Mahmood, M. A. and Szewczak, E. J. (Ed.) *Measuring information technology payoff: Contemporary approaches*. IDEA Group Publishing: USA.