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THE ROLE AND IMPACT OF INFORMATION TECHNOLOGY IN AUSTRALIAN BUSINESSES

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ABSTRACT

This paper reports the results of a study of the top 530 organisations in Australia which was conducted to determine whether organisations use IT as a strategic tool to meet competitive issues. Significantly this research addresses the following questions:

- How well organisations matched their IT investment plans with their strategic planning.
- How well IT strategies were formulated.
- How well IT systems were implemented and what were the critical success factors and impediments.
- Whether organisations were truly getting value from their IT investment.

The findings have shown the causes of misused IT in some organisations, such as IT strategy not closely aligned with business strategy, no change of historical IT structure, lack of understanding of the potential of IT, lack of CEO and senior management support and awareness of IT's potential, impediments to IT development and implementation. Although, in many organisations the role of IT department has become proactive and strategic to gain competitive advantage through primary and support activities, it has still not unleashed IT's full potential.

KEYWORDS

Information Technology, Competitive Advantage, Survey, Australia.

THE ROLE AND IMPACT OF INFORMATION TECHNOLOGY IN AUSTRALIAN BUSINESSES

1. INTRODUCTION

Information Technology (IT) is changing at a rapid pace and given the growing strategic impact of IT, the need to manage it successfully is felt with urgency (Benamati, Lederer and Singh, 1997). An important concern is understanding the role of IT in strategy formulation and its impact on organisational performance.

According to Powell and Dent-Micallef (1997), the literature on this subject "is fragmented and far-flung, and - despite some recent advances - weights heavily towards case studies, anecdotes, and conceptual frameworks, with insufficient empirical work and minimal synthesis of findings." The authors go onto say that "IT researchers advocated tight IT-strategy linkages, asserting that IT affects firm strategies, that strategies have IT implications, and that firms must somehow integrate strategic thrusts with IT capabilities."

Powell and Dent-Micallef (1997) provide a concise review of earlier research relating to IT and competitive advantage and report on the results of their empirical study in the retail industry which investigated linkages between IT and firm performance. Their findings showed that "ITs alone have not produced sustainable performance advantages in the retail industry, but that some firms have gained advantages by using ITs to leverage intangible, complementary human and business resources such as flexible culture, strategic planning-IT integration and supplier relationships."

Raymond, Pare, and Bergeron (1995, pp.3-16), report the result of an empirical study of 108 small and medium size manufacturing firms, using an extensive instrument to measure overall IT sophistication along two dimensions, namely IT usage and IT management. Taking organisation size and environmental uncertainty into account, it was found that IT usage is positively related to organisational performance, and the relationship between IT management and structural sophistication is stronger among the better performing firms than among the worst performing firms.

Clearly there is a need for more empirical research as more and more organisations are demanding greater value from their IT investment. In response to ever growing global competition, the business needs to use IT to build, sustain, and extend competitive advantage. Managers need more efficiency and effectiveness in their organisations to satisfy customer needs. Most major strategic thrusts require the crafted use of IT to succeed.

This paper adds to the empirically-based literature in this area by reporting the findings from a study which addressed the importance of IT in Australian organisations. Specifically, the aim of this research project was to analyse how organisations in Australia use IT as a strategic tool to meet their competitive challenges in term of:

- How well organisations matched their IT investment plans with their strategic planning;
- How well IT strategies were formulated;
- How well IT systems were implemented and what were the critical success factors and impediments; and
- Whether organisations were truly getting value from their IT investment.

The paper is structured as follows. The next section (Section 2) provides a brief review of the IT literature. Section 3 describes the research methodology and respondent profile. The results of the analysis carried out on the data is presented in Section 4. The final section (Section 5) presents our conclusions and recommendations.

2. OVERVIEW OF IT

According to Daniels (1994, p.36), IT is the application of technology to business processes, gathering data and creating information that is valuable to managers who make business decisions. IT translates symbols into a useable form. Lai and Mahapatra (1997) define the term IT in a broad sense as "technologies dedicated to information storage, processing and communication." These authors go on to say that "this notion of IT focuses on the hardware, software, telecommunication, and office equipment that transform raw data to useful information, adding new value in the process."

According to Sriram, Stump and Banerjee (1997) "while there are many inconsistent definitions of what constitutes IT, a growing consensus argues that IT should be defined broadly to encompass hardware, software, telecommunications (including voice, facsimile and e-mail), as well as the personnel and resources dedicated to supporting IT." IT, then, is a capability or a process not bounded by the immediate definition of the boxes and switches, but a challenge to managers with insight.

IT has changed the business world dramatically by changing the ways in which organisations perform their operations and design and market their products and services. IT is particularly pervasive in the primary activities and support activities in the value chains, which is forging the linkages among the activities of all types of organisations and is disseminating information among departments without boundary inside organisation. The rapid technological change of information systems is having a profound impact on competition and competitive advantage because of the pervasive role of information.

Newcomb (1995, p.166), says that "New idea for using technology may originate in the business units and flow up to the company's senior management or vice versa. In either case, I expect managers to use business criteria to assess technology." All people in an organisation participate to access new technology with integrative communications. Since ITs are changing so rapidly, many organisations find it difficult to keep pace with new developments. Therefore, before investing in IT, an organisation should carefully evaluate its entire implementation plan and the availability of appropriate IT in the marketplace. An understanding of what IT can and cannot do is necessary to avoid buying an outdated or obsolete hardware and software. Otherwise, IT investment may become disasters for the organisations (Farbey, Land and Targett, 1993, ch.1).

Over the past decade a number of authors have examined the adoption of IT in different functions, industries and countries. Weill (1992), for example, examined the relationship between IT investments and firm performance in the US valve manufacturing industry whilst Sriram *et al* (1997) examined IT investments in the purchasing function. Their sampling frame consisted of the membership list of the National Association of Purchasing in the USA.

A recent study by Lai and Mohapatra (1997) explored the intellectual development and evolution of IT implementation research through a meta-analysis of published MIS research. They identified seventy-one articles pertaining to IT implementation through a search of the literature between the period 1976 - 1995 from nine leading journals in the area. Their analysis showed that empirical research methods are more popular in IT implementation research than non-empirical methods, with case study and field study being the predominant methodologies. The results also showed that IT implementation research is sensitive to the evolving role of IT in organisations and that there is a shift in emphasis from studying individual IT to organisational and inter-organisational IT.

Traditionally, IT has been used to reduce costs in organisations. Nowadays, the role of IT has changed to more pervasive and proactive one to assist organisations to gain competitive advantage in a quest for greater efficiency of business. IT is an enabler for process innovation through which competitive advantage can be derived (Davenport, 1993, ch.3). Therefore, production flexibility, product modularity, and a direct communications link between customers and organisations are all prerequisites for organisations' success in the future.

Table 1 shows how IT has changed the business environment. For example, experts system consists of knowledge about a particular domain, understanding of domain problems, and skill at solving some of these problems. A generalist can solve complex problem (Medical Diagnosis) by using expert system (MYCIN[1]) without physical assistance from an expert (Doctor).

Table 1: A summarised table from (Hammer and Champy, 1993, ch.5) to show how IT changes the world effectively.

Old Rule	Disruptive Technology	New Rule
Information can appear in only one place at one time	Shared databases	Information can appear simultaneously in as many places as it needed
Only experts can perform complex work	Expert systems	A generalist can do the work of an expert
Businesses must choose between centralisation and decentralisation	Telecommunication networks	Businesses can simultaneously reap the benefits of centralisation and decentralisation
Managers make all decisions	Decision support tools (database access, modelling software)	Decision-making is part of everyone's job
Field personnel need offices where they can receive, store, retrieve, and transmit information	Wireless data communication and portable computers	Field personnel can send and receive information wherever they are
The best contact with a potential buyer is personal contact	Interactive videodisk	The best contact with a potential buyers is effective contact
You have to find out where things are	Automatic identification and tracking technology	Things tell you where they are
Plans get revised periodically	High performance computing	Plans get revised instantaneously

The use of IT in the business environment relies on how people understand the nature of and the trend of IT. Otherwise, the misused IT can block the business. Some organisations may align organisation structure to co-operate with the implementation of IT strategy, but inadequate fit between external (business strategy and information technology strategy) and internal (organisational infrastructure and processes, and information systems infrastructure and processes) orientations of IT is a major reason for failure to derive benefits from IT investment (Venkatraman, Henderson and Oldach, 1993, pp.139-148).

In manufacturing industry, Goldhar and Lei, (1995, pp.73-86) state that organisations are integrating new technology with innovative and more flexible organisation designs to create sustainable competitive advantage. IT will have a high payoff in productivity, as IT flattens out the organisation structure (Parker, 1994, pp.69-73).

Tapscott and Caston (1993, p.10) state that "The traditional, hierarchical organisation is in deep trouble. The reason is that the old enterprise is poorly equipped to respond to the new business needs." And many organisations have begun a transition to the new enterprise (see Table 2). New technology to deliver the new structure did not really exist. Entering a second era of information technology in which the business applications of computers, the nature of the technology itself and the leadership for use of technology are all

[1] An expert system for consultation in the diagnosis and treatment of glaucoma in 1979.

going through profound change. Organisations that cannot understand the new era and navigate a path through the transition are vulnerable and will be bypassed.

Table 2: The open networked organisation (Topscott, and Carston, 1993, p.11)

	Closed Hierarchy	**Open Networked Organisation**
Structure	Hierarchical	Networked
Scope	Internal/closed	External/open
Resource focus	Capital	Human, information
Personnel/focus	Static, stable	Dynamic, changing
Key drivers	Reward and punishment	Commitment
Direction	Management commands	Self-management
Basis of action	Control	Empowerment to act
Individual motivation	Satisfy superiors	Achieve team goals
Learning	specific skills	Broader competencies
Basis for compensation	Position in hierarchy	Accomplishment, competence level
Relationships	Competitive (my turf)	Co-operative (our challenge)
Employee attitude	Detachment (it's a job)	Identification (It's my company)
Dominant requirements	Sound management	Leadership

In many organisations, the IT department will eventually be reporting to top management or the CEO instead of reporting to the financial function. The top management and the CEO must have technological IT knowledge and provide an appropriate decision as technological issues and business strategy are involved, evolving to one of the structure of IT function (Topscott and Caston, 1993, pp.231-312).

Applegate, McFarlan and McKenney (1996, p,15) cite three general categories of IT issues:

a) IT plays very different strategic roles in different organisations:- These strategic roles significantly influence the planning systems and structures and it's interconnection to the corporate strategy and formulation processes. "In firms where new IT developments are critical to the introduction of new products and the achievement of major efficiencies or accelerated competitive response times, senior management must spend more time overseeing IT strategy and operations than in firms where this is not the case".

b) IT and user familiarity with the nuances of the specific technologies being examined:- To IT and the users, newer technologies pose very different problems. Therefore, the strategy formulation task is very complicated due to the mix of older and new technologies.

c) Specific corporate culture:- "the formality versus informality of organisational decision making and planning and the geographic and organisational distance of IT management from senior management ..... IT planning, as important as it is, must be evolutionary and highly individualistic to fit different corporations".

It is clear from the above that IT presents many challenges as well as opportunities. Many of the challenges and issues discussed above are addressed in our research. Specifically, we attempt to answer the question: Do Australian organisations strategically respond to the IT challenge actively or passively?

3. RESEARCH METHODOLOGY AND RESPONDENT PROFILE

In developing the questionnaire for this study, in-depth interviews were initially conducted with the head of IT department of a large manufacturing organisation and a retailing organisation in October 1996. These interviews generated some constructive ideas for the issues to be explored through the questionnaire survey. A draft questionnaire was then prepared and circulated to a number of IT professionals for proof reading and comments. Based on the feedback received, some questions were deleted or modified accordingly.

The sampling frame used for data gathering was Australia's top 500 organisations as reported by Dunn and Bradstreet (1996). An extra 30 questionnaires were sent out to companies that are wholly owned subsidiaries or divisions of the top 500 companies. Our research objective was to answer the question: Do Australian organisations strategically respond to the IT challenge actively or passively? It is argued that if the top Australian companies do not respond strategically to the IT challenge, then it is unlikely that other companies will do so as effectively as the top companies.

The head of IT department of the selected 530 Australian companies were chosen as respondents for this research. The questionnaire, accompanied by a covering letter to explain briefly the purpose and aim of the survey and a reply-paid return envelope, were mailed out in November 1996.

By the end of January 1997, 76 completed questionnaires were received and 11 questionnaires were returned undelivered giving a net response rate of 14.64%. A reminder was then mailed out in order to improve the response rate. By the end February 1997, a total of 81 completed questionnaires had been received, giving a net response rate of 15.61%. This response rate is comparable to other similar studies conducted recently [e.g. a useable response rate of 14% achieved by Sriram *et al.* (1997) in their study of IT investments in purchasing].

The responses were input into a statistics package (SPSS) and graphic presentation software (Microsoft PowerPoint). The comments from the survey were recorded verbatim and used for analysis.

The limitations in the research methodology are well recognised. That is, that the views expressed in the questionnaire are of a single individual from the responding company and only those interested in the research topic are likely to complete and return the questionnaire. These limitations have been recognised by other researchers who have conducted similar research (see for example, Galliers, Merali and Spearing, 1994).

The 81 respondents to the questionnaire survey held various positions in their organisation. Nearly ninety per cent of the respondents were directly associated with the IT function (70.3% were IT/MIS Managers and 17.2% were General Managers of IT). Financial Directors (3.1%), Financial Managers (4.7%) and others (4.7%) made up the remainder of the sample.

Just over one-half (51.9%) of the respondents represented a group, 29.1% a division or subsidiary, 17.7% an independent company and 1.3% a department. Seventy percent (69.9%) of the responding organisations were Australian-owned with the remaining made up of US-owned (9.9%), Asian-owned (8.5%), European-owned (8.5%) and others (4.2%). As shown in Figure 1, the majority of respondents represented manufacturing, organisations, accounting for nearly 30% of the sample. Wholesaling and retailing organisations accounted for just over 20% of the sample and banking/finance and insurance sectors accounted for 17.8%.

Figure 1: Primary Activity Of Respondents

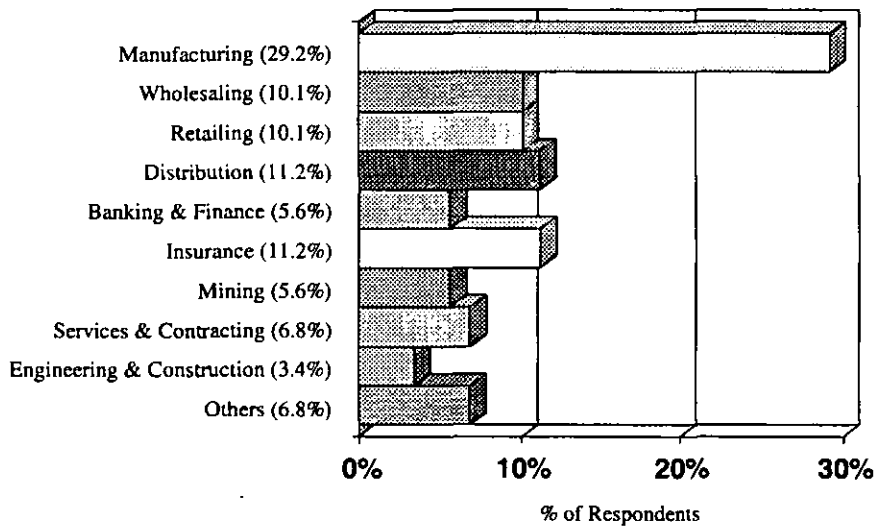
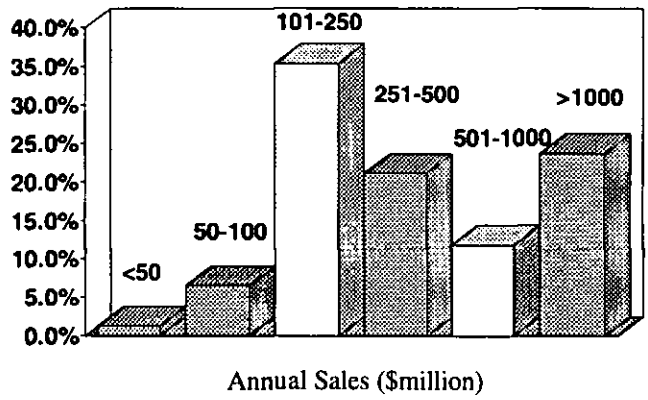
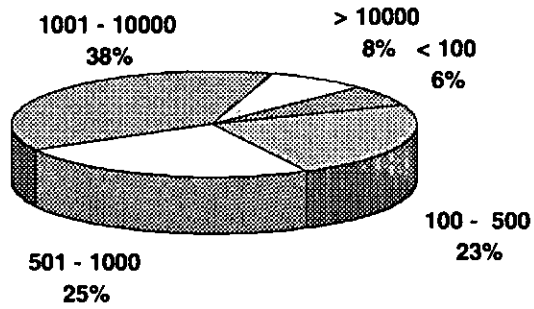


Figure 2: Respondents Classified by Annual Sales Turnover



Almost one-quarter (23.7%) of the respondents worked in organisations with over A$1 billion in annual sales revenue (see Figure 2) whilst 11.8% worked in organisations with annual sales revenue between A$1/2 and A$1 billion. Over one-half (56.6%) had sales revenue between A$100 and A$500 million. In terms of the number of employees, responding organisations employed between 10 persons and 57000 persons, with major concentration of organisations in the 501 to 1000 employees range, as shown in Figure 3.

Figure 3: Respondents Classified by Company Size (Number of Employees)

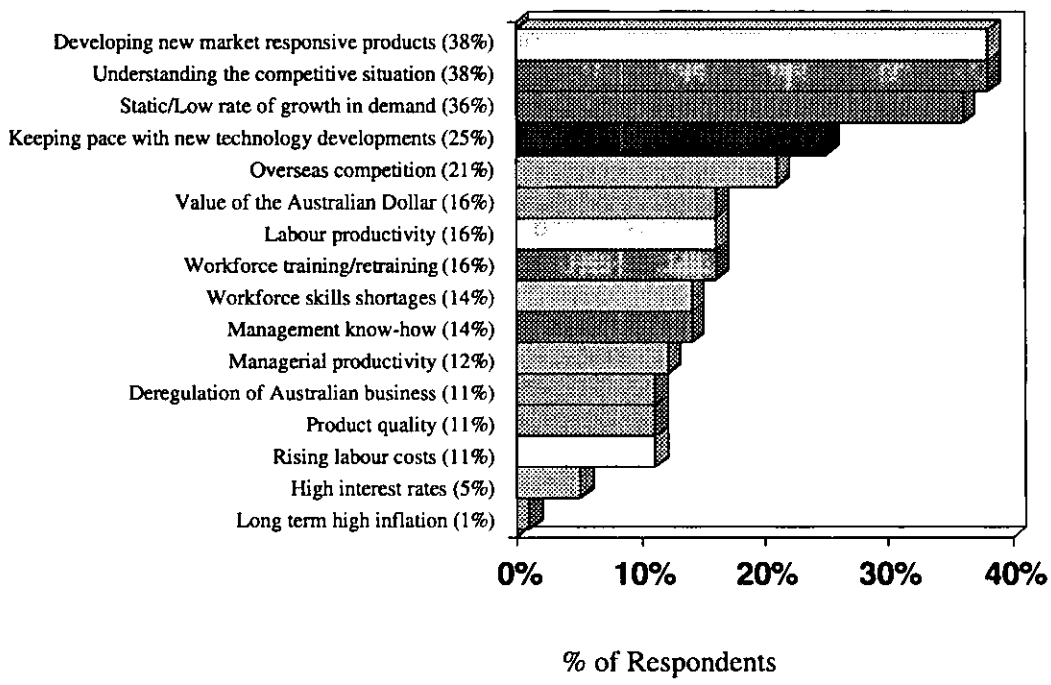


4. SURVEY RESULTS

Organisational Level Strategic Issues

Respondents were asked to identify the three major challenges which they considered to be critical to their industry. Sixteen possible responses were listed in the questionnaire (see Figure 4). The three major challenges faced by Australian businesses today are developing new market responsive products (38%), understanding the competitive situation (38%) and static/low rate of growth in demand (36%). Keeping pace with new technology developments was also identified by 25% of the respondents as a major challenge. It is interesting to note that only around ten per cent of the respondents identified product quality as a major challenge. Australian organisations have made substantial improvements in both quality and productivity as shown by other recent Australian studies (Terziovski, Sohal and Samson, 1996).

Figure 4: Major Challenges Facing Australian Organisations



Other challenges mentioned by respondents included inappropriate government regulation; rising labour and materials costs; local competition; uncertainty of title/land rights and meeting political imperatives to relocate services.

Corporate Strategy & IT Strategy

Table 3 shows that 84.0% of respondent organisations had a formal corporate strategy and 67.9% had a formal IT strategy. However, only 60.5% of respondents had both a formal corporate strategy and a formal IT strategy. Almost one-third of the respondents indicated that their organisations did not develop a formal IT strategy.

Table 3: Possession Of Formal IT Strategy/Corporate Business Strategy

		Possession of formal corporate business strategy	
		Yes	**No**
Possession of formal IT strategy	**Yes**	60.5%	7.4%
	No	23.5%	8.6%

Respondents were asked to indicate whether or not IT had been considered when developing their corporate strategy. The results show that 43.9% of the respondents considered IT is an enabling tool to developing the corporate strategy, 27.3% considered IT is an integral component of the corporate strategy and 27.3% considered IT is a key resource in implementation of the corporate strategy. A small proportion (7.6%) of respondents considered IT as irrelevant to developing the corporate strategy.

In terms of the different industry sectors, respondents from the banking and finance and insurance groups considered IT either as an enabling tool to the strategy or as an integral component of the strategy. "Enabling" can have both positive and negative implications; as a process can be enabled or disabled by a particular tool. IT can provide opportunities for and impose constraints on process design. Opportunities involve using technology in ways new to the organisation to achieve process innovations. The methodology to use IT is very important to develop the corporate strategy and new market responsive products and services.

A high proportion (83.9%) of respondents said that their IT department viewed its strategic role in the wider organisation as important (48.1%) or as very important (35.8%). 7.4% said the IT department's role was neutral whilst the remainder indicated their role as of little importance or no importance (7.4% and 1.2% respectively).

It is important that an IT strategy is updated as market conditions change and new opportunities and threats emerge. With updates less frequent than every two years, an organisation is unlikely to have a swift IT response to any competitive threat. Respondents were asked to indicate how often their IT strategy was updated or revised. The responses show that 1.2% of respondents had never updated and 3.7% had rarely updated their IT strategy. Almost one-third (30.9%) of the respondents indicated that their IT strategy was updated every year whilst 16% indicated that their IT strategy was updated more frequently as required and 14.8% indicated that it was updated every two to three years.

Spending on IT, as a percentage of sales turnover, ranged from 0.01% to 15%, with 49% spending between 0.01% and 1.0% and 27% spending between 1.1% and 2.0%. These figures indicate that these organisations are very conservative in using IT to improve their business operations and to reducing costs. In our definition, IT spending included the cost of hardware, software, staff and other external costs such as consultancy and outsourcing.

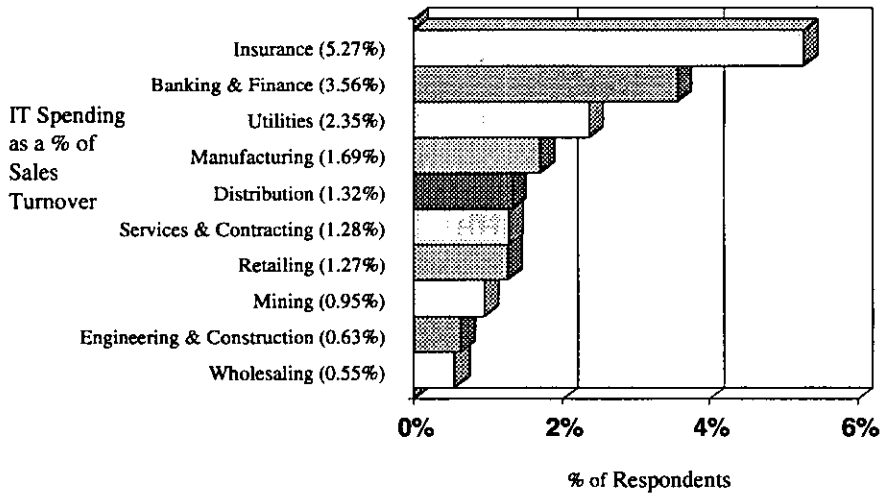
Fifteen per cent of the organisations spent between 2.1% and 5% of sales revenue on IT (six per cent spending between 2.1%-3.0%, six per cent spending between 3.1%-4.0% and three per cent spending

between 4.1%-5.0% of sales revenue), five per cent spent between 5.1% and 10.0% and four per cent spent between 10.1% and 15.0% of annual sales on IT. These organisations are using IT extensively to operate their business and striving to gain a competitive advantage through IT.

Figure 5 shows that the average IT spending of Insurance (5.27%) and Banking & Finance (3.56%) industry groups surpass about 2 to 9 times over other industry groups. They focus more on the provisions of high quality customer services and creating a competitive advantages through IT.

The most popular technologies used by IT departments for improving their productivity are DataBase Management System[2] (23.15%), which has been widely used since the mainframe era; followed by Open Systems (17.59%); Client Server Technology (16.67%); Object Oriented Programming (16.2%); Case Tools (13.43%) and 4/5th Generation Language (12.9.

Figure 5: Average IT Spending by Industries as a % of Annual Sales Turnover



Competitive Advantage Through IT

Can IT enable an organisation to sustain a competitive advantage? The connectivity and compatibility of hardware and software standards are the basic requirements by users so that they can communicate with other users throughout an organisation and across organisations with compatible protocols. Even though, they do not have the same type of software and hardware. Since most companies have access to the same or similar hardware and software, "people" become to key factor in developing a sustainable competitive advantage.

Every retailer and distributor, for example, can use Electronic Data Interchange (EDI), sharing the same EDI service, says EDI*EXPRESS[3], for sending and receiving EDI to and from suppliers and customers in order to reduce administration costs and to increase number of orders with smaller quantities of goods for Just-in-Time deliveries. The business objective being to use EDI without any kind of errors or always better than the average error rate of its competitors in the industry. Thus the organisation can sustain a competitive advantage through IT but this requires good IT management, logistics management and senior management support to create a synergy to achieve the same goal and to align IT strategy with the business objectives.

Figure 6 shows that the responding organisations gained competitive advantage through automated links with either or both customers and suppliers in order to initially "lock-in" supply and reduce cost of services.

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[2] In a data base system, translation between the global view of the data in the data base and the local view expected by each application program is performed by a generalised software interface.

[3] EDI networked-based service by General Electric Information Services

A small proportion of respondents to the survey (3.9%) indicated that they had gained no competitive advantage through IT. Commonly, they had difficulty in achieving product differentiation due to lack of research and development (R&D), lack of understanding of market trends and low utilisation of IT.

Over one-half (56.4%) of respondents did not have awareness of their competitors' IT capability. This implies that they had not understood the importance of competitive issues in the environment and had not conducted any benchmarking to know what was their latest competitive position in the industry. In this case, it is impossible that they can outpace their competitors through IT.

Figure 6: Competitive Advantage Through IT

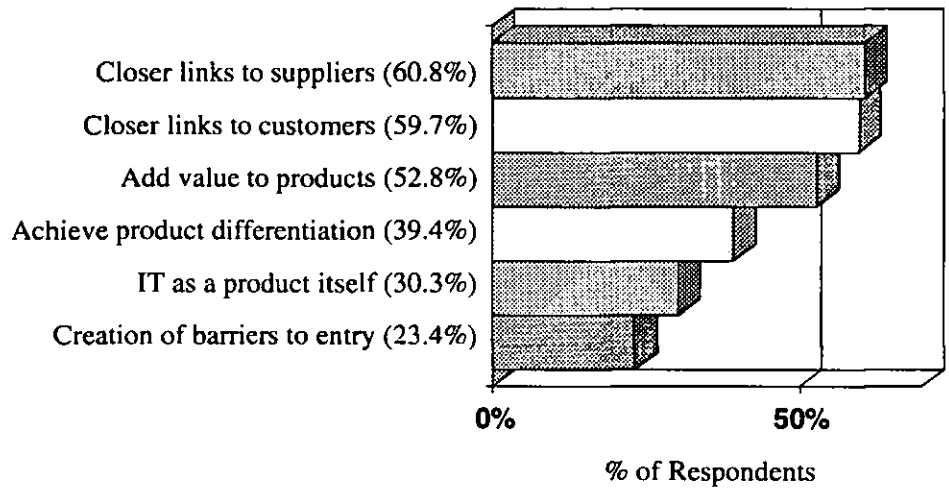


Figure 7: Reasons for Lack of Competitive Advantage

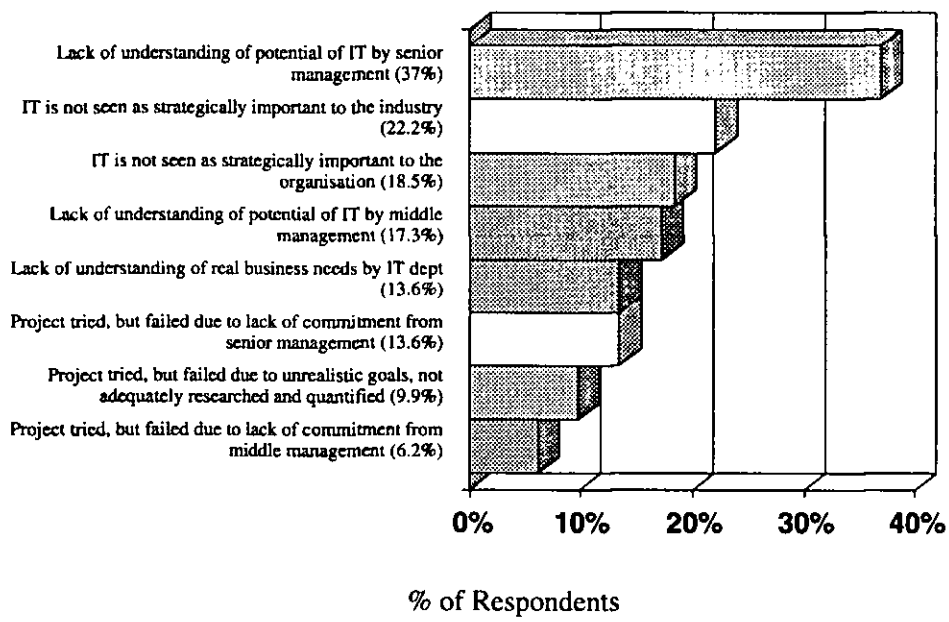


Figure 7 shows that the major reason of not gaining a competitive advantage was lack of understanding of IT potential by senior management, mentioned by 37% of the respondents. This means that in these companies the IT strategy did not always align with business objectives. If the senior management do not understand the potential and the benefits of IT, it is obvious that they cannot contribute to the formulation of an effective IT strategy. Therefore, it is almost impossible to utilise IT's full potential and capability throughout an organisation without senior management support.

"IT is not seen as strategically important to the industry" (mentioned by 22.2% of respondents) and "IT is not seen as strategically important to the organisations" (mentioned by 18.5% of respondents) were other major reasons given for not gaining a competitive advantage. These results indicate that senior managers do not disseminate the importance of IT concepts and benefits throughout the organisation. "Lack of understanding of real business needs by IT department" (13.6% of respondents) is another reason given for not gaining a competitive advantage from IT. This is basically caused by the organisational structure where IT department may be placed under the financial department or report to the financial function. As discussed later, few IT managers are involved in high level strategic decision making. Therefore, IT departments have little support and resources to understand real business needs.

"Project tried, but failed due to lack of commitment from senior management" (13.6% of respondents) and "Project tried, but failed due to lack of commitment from middle management" (6.2% of respondents), are caused by the culture of the organisation. If management commitment to business is strong and managers keep their promises, these two causes can be avoided. Other reasons mentioned by respondents included poor project management, high costs of implementation and lack of implementation skills.

IT Department Structure and Contribution

The position of the IT department within the organisational structure determines both the functionality and the importance of IT in satisfying organisational objectives. The position of the IT manager can also influence the level of involvement in business strategic planning and the power and political status of the IT department itself.

The results show that in 47.5% of responding organisations, the reporting line for IT/MIS managers is directly to the financial and administration directors, and in 27.5% of organisations it is directly to the MD/CEO. This historical situation has not changed since the computerisation of the first systems which were generally financial in nature. It is most likely that the business strategy is financially related and IT is only a part of the support activities to align with business objectives. In the remainder of the organisations, IT/MIS managers reported to company secretary (5.0%), general managers (5.0%), operations general managers (5.0%), and others (11.3%).

Overall the IT department structure is flat with 54% of organisations having only one (19%) or two (35%) levels between the programmer and the IT manager. In 30% of the organisations there were three levels, in 12% of the organisations there were four level and in 4% of the organisations there were five or six levels between the programmer and the IT manager.

IT structure also depends upon the nature of the business. Table 4 shows that in Manufacturing (67%) and Wholesaling (60%) industry groups, the most senior IT/MIS manager is reporting to the Finance & Administration Director, but in Banking & Finance (60%) and Insurance (60%) industry groups the most senior IT/MIS manager is reporting to the MD/CEO. It also indicates that the Manufacturing and Wholesaling industries are even more conservative as the role of IT is a support activity of secondary importance to the organisation. On the other hand, in Banking & Finance and Insurance industries, the MD/CEO has more involvement in IT strategic decision making and uses IT as a primary enabler.

Table 4: Business Activity and Reporting Lines

Primary Activities	Total Frequency	Report to MD/CEO	Percent	Report to Finance & Administration	Percent
Manufacturing	21	5	24%	14	67%
Wholesaling	5	1	20%	3	60%
Retailing	5	0	0%	2	40%
Distribution	5	2	40%	1	20%
Banking & Finance	5	3	60%	1	20%
Insurance	10	6	60%	1	10%
Mining	5	0	0%	1	20%
Services & Contracting	3	0	0%	0	0%
Engineering & Construction	5	1	20%	1	20%
Total	64	18		24	

In terms of IT department contribution to the organisation, two questions were asked. The first examined the extent to which the IT department in the organisation contributed to strategic planning. Respondents were asked to indicate whether they had partly or fully contributed to a number of strategic planning activities. The results are presented in Figure 8. The second question examined the extent to which the IT department performed, partly or fully, a number of strategic tasks. The responses to this question are presented in Figure 9.

Figure 8: IT Department Contribution To Organisational Strategic Planning

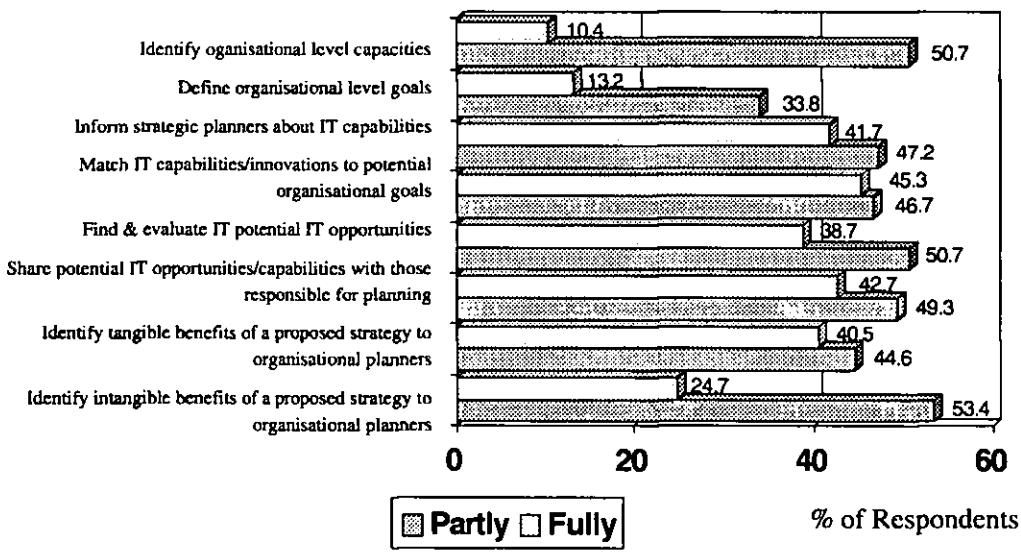
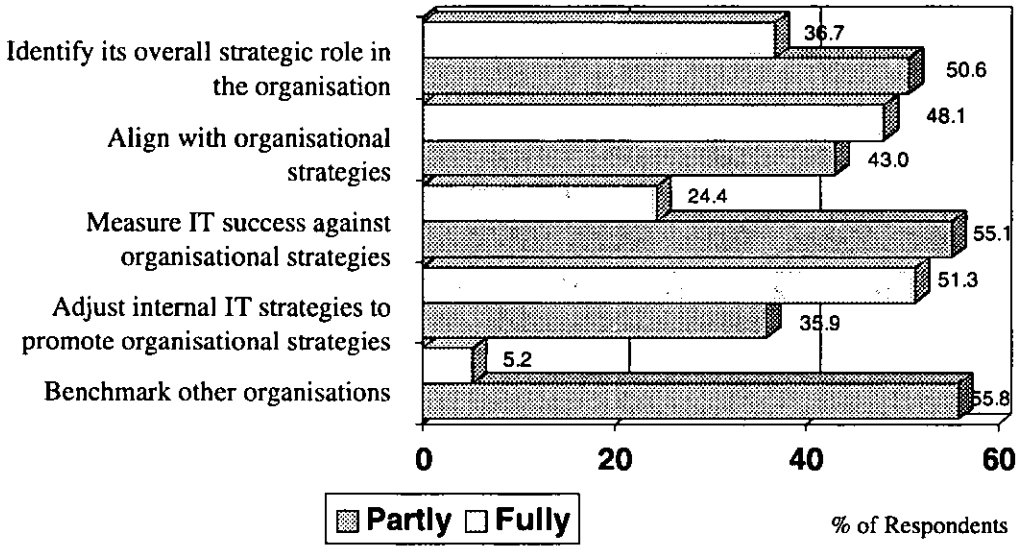


Figure 9: Tasks Of IT Department



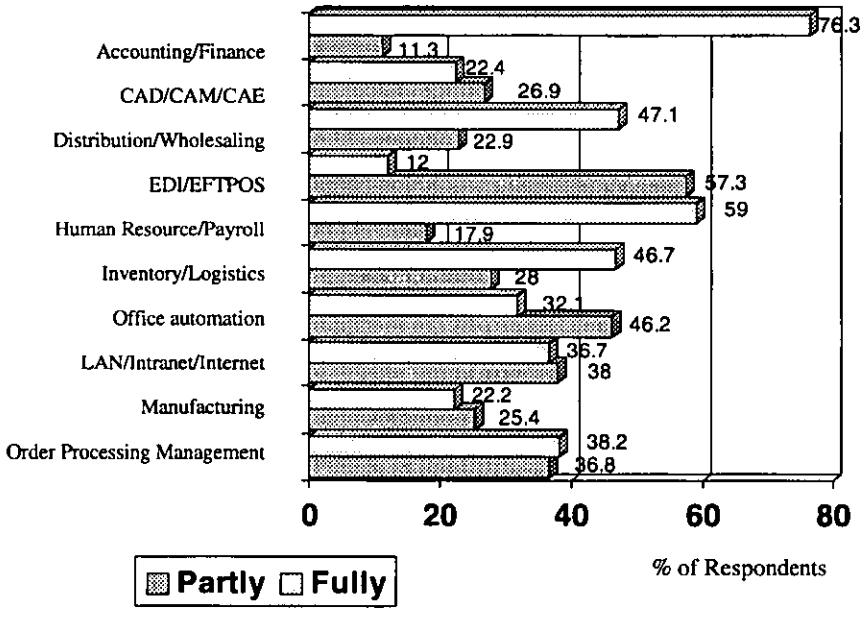
Between 85% and 92 % of the IT departments contributed partly or fully to a number of strategic planning activities. These included "Informing strategic planners about IT capability", "Matching IT capabilities/innovations to potential organisational goals", "Finding and evaluating potential IT opportunities", "Sharing potential IT opportunities/capabilities with those responsible for planning", and "Identifying tangible benefits of a proposed strategy to organisational planners". Activities where IT departments can further improve their contribution includes "Identifying intangible benefits of a proposed strategy to organisational planners" and "Identifying organisational level capabilities".

In terms of the IT departments performing (partly or fully) specific strategic tasks, a high proportion (between 79% and 91%) identify their overall strategic role in the organisation, align with organisational strategies, measure IT success against organisational strategies, and adjust internal IT strategies to promote organisational strategies (see Figure 9). Benchmarking was not widely practised, with only 60% of the organisations conducting this fully (55.8%) or partly (5.2%).

IT Applications and Issues

Respondents were asked to indicate the extent to which various systems/functions had been computerised within the last three years. Just over three-quarters (76.3%) of responding organisations indicated that ITs were being used to the full extent in the accounting and finance function (see Figure 10) whilst 11.3% indicated that ITs were being used partly in this area. The full utilisation of IT applications is lower than expected, particularly in Distribution/Wholesaling, EDI/EFT/POS, Inventory/Logistics, LAN/Intranet/Internet, Manufacturing and Order Processing Management where less than 50% of companies had full computerisation. Developments of EDI/EFTPOS systems are the most efficient way to provide linkages between customers and suppliers. The accounting/finance and human resource/payroll systems were the traditional application developments in late 1970's and the early 1980's. It appears that IT applications in many areas in Australian industry are stagnated.

Figure 10: IT Applications in Use

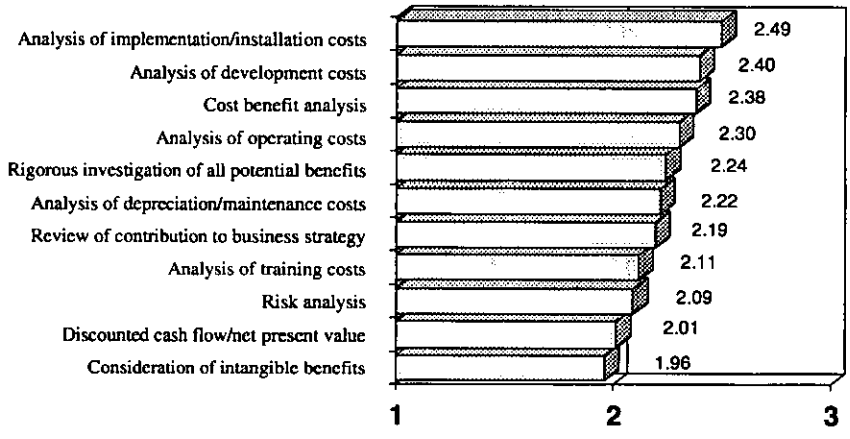


Overall only one-half of respondents from the manufacturing industry groups were fully using CAD/CAM/CAE systems. Mining, Sales/Marketing, Executive Information Systems (EIS), Energy Tracking, Experts Systems, Contract Management and Job Control system are being considered by individual respondents. Some advanced applications, such as Experts Systems, Energy Tracking, and EIS, are the most advanced concepts with artificial intelligence and rule-based process systems in order to assist management to solve complex problems. These have the ability to provide recommendations to senior executives in making decisions in a very swift manner. If successfully implemented, these can provide significant benefits to an organisation.

In planning the adoption of ITs, an organisation needs to carryout detailed analysis of various costs, benefits and risks involved. Respondents were asked to indicate the extent to which they had conducted these analyses and the results are shown in Figure 11. The responses suggests that much of the analysis conducted is financially related and that analysis related to strategic fit, training needs and risk analysis does not received sufficient attention. The intangible benefits of ITs received little or no attention, largely because senior management do not realise that intangible benefits of ITs can be quantified.

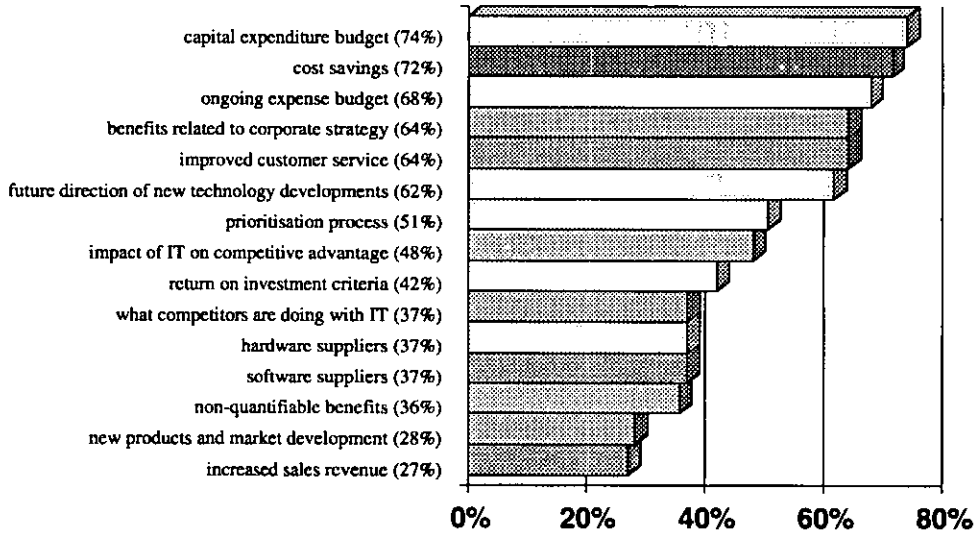
Figure 12 shows the extent to which various issues are addressed within the IT strategy of the responding organisations. The results indicate that in many organisations the IT strategy is developed around a specific expenditure budget (74% of the respondents) or around an on-going expense budget (68% of respondents) rather than on the consideration of the impact of IT on competitive advantage (48%) or on developing new products and markets (28%). Appropriate ITs can provide superior capability in terms of market access. Without an appropriate IT process and capability, an organisation can rarely sustain a competitive advantage through IT.

Figure 11: Extent of IT Investment Analysis



1=Little, 2=Some, 3=Extensive

Figure 12: Issues Addressed in IT Strategy



% of Respondents

The IT decision making approach used by the executives of the responding organisations was also investigated. Almost three-quarters (72%) of the companies involved outside consultants, although on a part time basics. Around one-quarter of the companies' executives had "full" consultation with their IT departments (23%) and the IT user departments (27.9%). A large number of organisations concentrate on their core business rather than on IT development. In this case some IT projects and developments are outsourced, releasing managers from the need to keep pace with rapidly changing and increasingly complex technologies required by their organisation.

Generally speaking, the CEO/MD has less involvement in the development of the IT strategy and prioritisation of opportunities, and with very little input from the Board. The advantage is that IT/MIS manager has been empowered. The disadvantage is that IT development becomes second priority from the management point of view and a lack of high level management input will not provide a broad picture of external strategic and competitive objectives of the organisation as a whole.

Table 5 shows the extent to which senior managers are involved in developing and implementing the IT strategy. In the high level decision making situation, top management (CEO/MD and finance director) have

had high involvement and strong influence in the review and approval phase and in the major capital investment decisions phase. It is surprising to find that top management do not consider the realisation of expected benefits from IT of significant importance, leaving this largely to the IT/MIS managers and IT/MIS departments. Overall the figures shown in Table 5 suggests that the IT/MIS manager has been empowered to control IT projects and has less influence from senior management.

Table 5: Senior Management Involvement In IT Projects (% of Respondents)

	Board	CEO/ MD	Finance Director	IT/MIS Mgr	User Dept Mgr	Others
Development of the IT strategy	4	16.7	21.7	***34.9***	18.7	4
Prioritisation of opportunities	4	18.6	19.2	***349***	19.8	3.5
Review & approve	9	***26.4***	22.4	23.8	16.4	2
Major capital investment decisions	19.8	***26.6***	24	19.2	7.8	2.6
Managing or controlling the project	0.7	3.7	9.6	***52.6***	26.7	6.7
Realisation of expected benefits	3.7	11.1	24.7	***32.1***	24.7	3.7

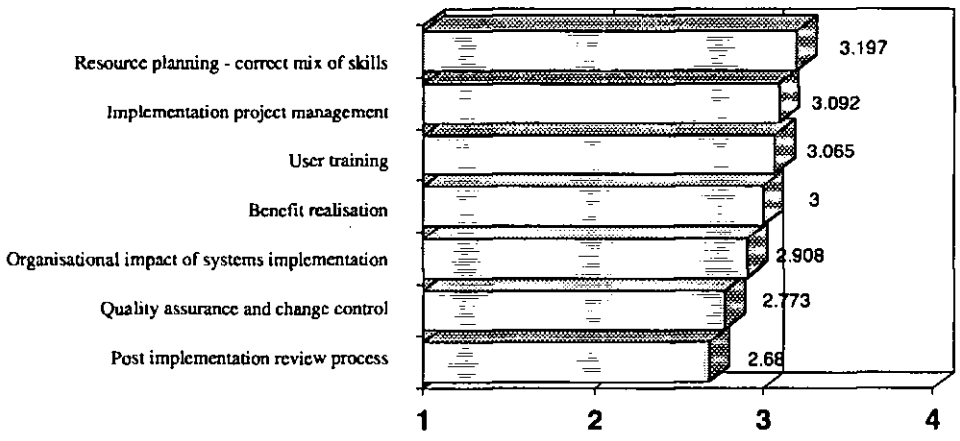
IT Implementation Issues

Implementation is perhaps the most critical stage in implementing IT projects. Extensive testing, which disrupts normal business operations, must be performed; training is required; work procedures and communication patterns are disrupted. Often, achievement of the benefits from the system is dependent on the learning ability of individuals and groups on how to use the information from the system to make better decisions and add value to the business. The most critical part is the need to carefully define the activities that are required to ensure that the benefits of the project are achieved and documented.

Once an IT application has been developed to fulfil specific strategic requirements it then must be successfully implemented within the organisation. Respondent were asked to indicate the extent to which a number of implementation issues were addressed in the IT strategy. The responses are presented in Figure 13 which shows the mean scores calculated from the responses provided on a 4-point scale and suggest that improvements can still be made by the organisations in adequately addressing the various issues. After an IT application has been developed to fulfil specific requirements it may be necessary to make major or minor modifications due to unpredictable change of business practices and processes over a period of time. Otherwise the IT application cannot be properly functioning to meet the business needs. The business cannot allow an IT application to have bugs to hinder its operations, which will cause dissatisfaction from customers and lose revenues. Therefore, an IT application has to be assured of its quality, reliability, responsiveness and flexibility to meet changing requirements.

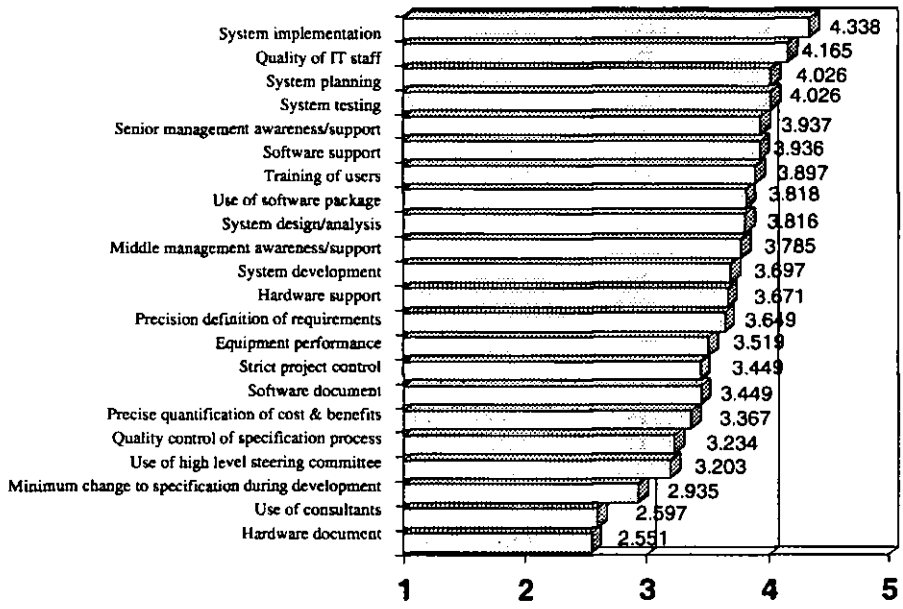
Using a 5-point scale (1=not important to 5=very important) respondents were asked to identify the importance of a number of factors which they considered were critical to the successful adoption of IT. The results, presented in Figure 14 as mean scores, indicate that system implementation, quality of IT staff, system planning and system testing are the most important success factors. Although 72% of the organisations involved outside consultants, their use was not considered as important. Hardware and software documentation and the use of high level steering committees were also not considered very important as success factors.

Figure 13: The Implementation Issues (Mean Scores)



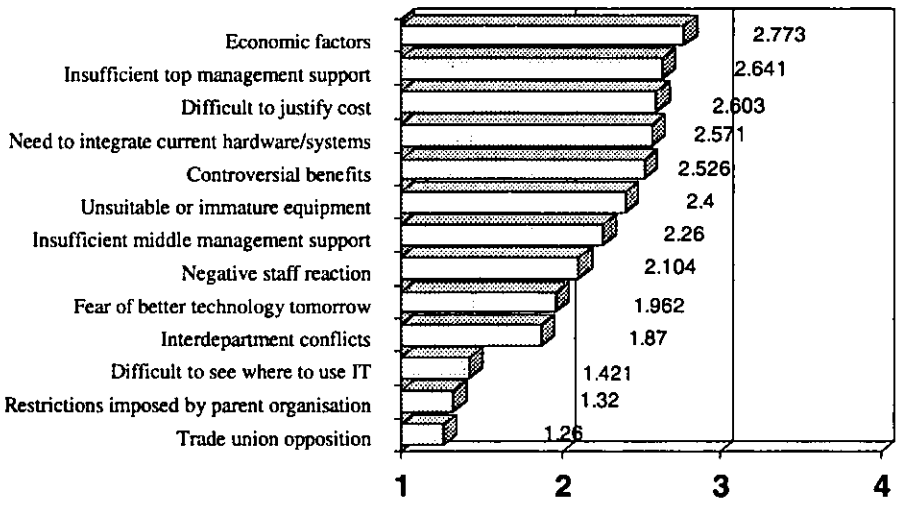
1=None, 2=Little, 3=Somewhat, 4=Extensively

Figure 14: Successful Factors To Implementation (Mean Scores)



1=Not important, 2=Somewhat important, 3=Moderately important, 4=Important, 5=Very important

Figure 15: The Impediments to Successful IT Implementation (Mean Scores)

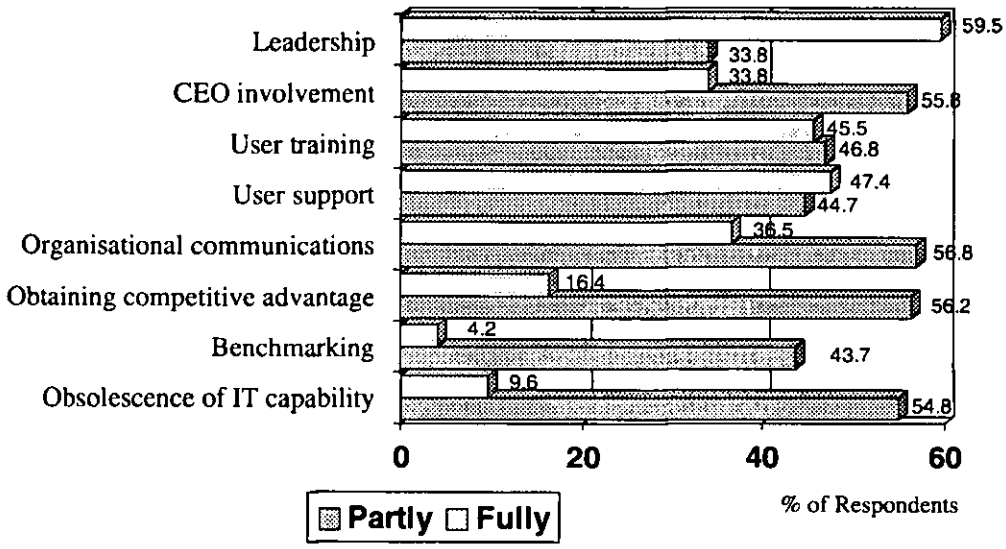


1=Not a constraint, 2=Minor constraint, 3=Moderate constraint, 4=Major constraint

Figure 15 shows the mean scores for the impediments to implementation identified by survey respondents. The top constraint identified is "economic factors" which includes external factors such as low rate of growth in demand and high interest rate. These impact on sales turnover and costs. The second most important impediment identified is insufficient top management support which has a profound impact on IT development. Basically, the potential of IT has rarely been demonstrated to top management and it has only been used to reduce costs. These findings are very negative and impact on achieving the full potential of IT. Other impediments mentioned by respondents included responses such as "So much to Do", and "Culture/Resistance to change.

In addition to investigating the successful factors to implementation, respondents were also asked to indicate the importance of a number of factors to successful adoption of strategic IT in the organisation. The responses are presented in Figure 16 and shows that leadership and CEO involvement are both important factors to influence the successful adoption of strategic IT in the organisation. Effective organisational communication is also a critical success factor with better results in a "flat" structured organisation.

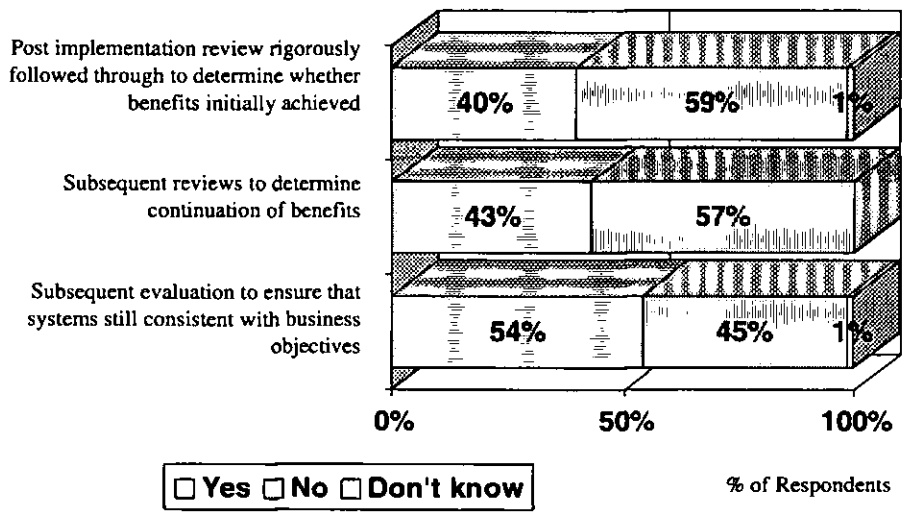
Figure 16: Impact of Factors on Successful Adoption Of Strategic IT



Assessment Of Benefits

The findings on Post Implementation Reviews are very negative as shown in Figure 17. Nearly one-half (45%) of responding organisations do not evaluate whether IT systems are still consistent with business objectives and 59% do not determine whether expected benefits are being achieved. It is disturbing to find that in many organisations the stakeholders have little or no indication as to whether or not the effort and time they have put into IT investments have provided strategic benefits.

Figure 17: Post Implementation Reviews



A post implementation review process must be conducted to ensure that systems are still appropriate to meet the business needs and that benefits have been obtained. This information can be used for benchmarking future developments and implementation processes. Many of the business challenges are related with internal and external issues, such as new product development, competitive situation and the economy. IT plays an important role to providing both the means and the information to enhance product differentiation, to address and measure productivity improvements, and to assist and enrich decision making processes.

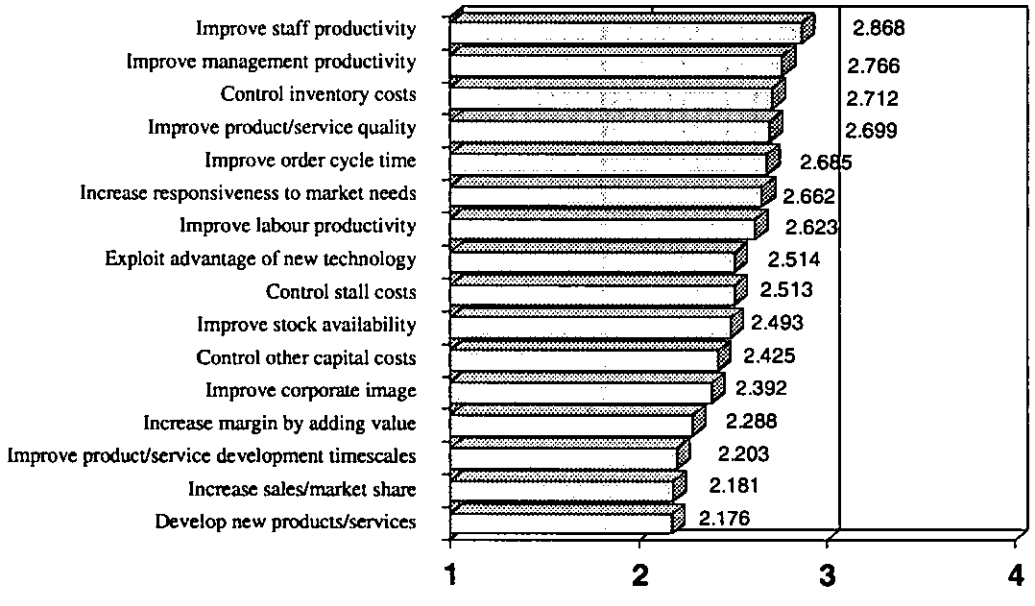
In assessing the benefits of IT, two questions were asked. First, respondents were asked to indicate, using a 4-point scale, the extent to which IT benefits organisational objectives. The results, presented in Figure 18 as mean scores, indicate that organisations are achieving only minimal benefits from their IT investments

and the role of IT has not been considered as a strategic tool to align with the business objectives. Generally, the responding organisations use IT to improve staff/labour productivity, to improve management productivity and to control various costs, i.e. mainly focusing on improving productivity and reducing costs.

Secondly, respondents were asked to indicate if IT goals had been met partly or fully. The responses are presented in Figure 19. Almost all the respondents indicated that their systems were being used by their intended users with few problems (98.7% indicating fully or partly) and users were satisfied (98.7% indicating fully or partly). A high proportion also indicated that high quality IT services are provided (93.2% indicating fully or partly) and that organisational communication goals had been met (91.2% indicating fully or partly). Between one-quarter and one-third of the companies did not define or track efficiency, effectiveness or competitiveness resulting from IT activity and a similar proportion did not achieve their goals in terms of qualitative returns or financial bottom line returns.

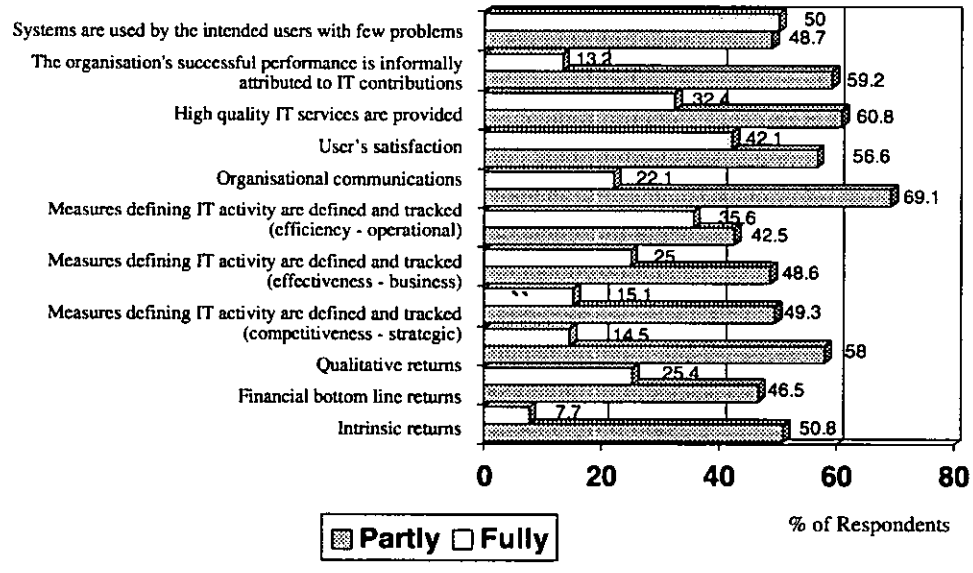
The above results suggest that in most companies the users are well prepared to use the IT implemented, resulting in many operational improvements internally. However, the IT investment has failed to provide a strategic advantage for the organisation. It would appear that the problem lies in strategic planning and IT investment planning rather than with IT itself.

Figure 18: IT Benefits to Business Objectives (Mean Scores)



1=Not applicable, 2=Minimal, 3=Good, 4=Extensive

Figure 19: Extent to Which IT Goals Have Been Met



5. CONCLUSIONS AND RECOMMENDATIONS

This article has reported the results of a survey which addressed the importance of IT as a strategic tool. The majority of the 81 respondents were from manufacturing, banking and finance and insurance industries. The major challenges faced by Australian businesses currently are developing new market responsive products/services, understanding the competitive situation and static/low rate of growth in demand. They thrive to overcome those challenges nationally and break through the competition barrier internationally as well.

In general, the organisational structure has not changed since the early days of IT, with the largest majority (especially in the manufacturing sector) reporting to administration and finance directors. This has a profound impact on the IT department being able to directly demonstrate IT capabilities to the CEO, who has strong influence but less involvement in IT strategy. The results also show that senior management lacks understanding of IT's potential and has little awareness of IT's real power. In many businesses IT is used as a cost reduction tool rather than as a strategic tool. The major impediments to IT development and implementation are firstly economic factors, secondly insufficient top management support and thirdly lack of strong leadership. The critical success factors to IT implementation are system implementation, quality of IT staff and senior management awareness and support.

With regards to economic factors mentioned above, we refer to the ability of the company to fund the IT investment. The recession in Australia over the period 1990 to 1994 had a major impact on almost every organisation in terms of reduced sales revenues and profitability, and hence the availability of funds for investing in technology and other innovations.

Well equipped IT departments stand by to be used as an enabling tool to deal with complex problems and competitive issues and IT is not being considered as the core competence in the organisation. Many organisations have difficulty in responding to the rapidly changing technology and market needs. The role of IT department is a catalyst in developing a number of advanced applications to solve complex problems and to provide recommendations to senior executives in making effective decisions.

The IT strategy is at present incorporated within the formal corporate strategy in a large number of organisations, but not closely aligned with business objectives. Companies are not using IT to obtain a competitive advantage from closer links to customers and suppliers, neither adding value to products nor achieving product differentiation. The priority of addressing the competitive challenges is not in line with management actions. IT is used to address second priority challenges.

Overall, the potential of IT has not been utilised to meet the competitive challenges due to:

- IT strategy not closely aligned with business objectives
- Very little or no change of historical IT structure within the company
- Insufficient CEO and senior management support and awareness of the potential of IT
- Most of the IT management staff not key decisions makers in respect of IT investments
- IT still used for cost reduction only and not for obtaining competitive advantage for the company
- Little or no business vision on IT by the firm and hence IT investments not considered in a strategic manner
- Economic factors and financial functions dominating IT usage and planning, again resulting in a lack of strategic focus on IT
- Inadequate and inappropriate appraisals/evaluation of the proposed IT investments
- No support for post implementation review process by management.

The importance of carrying out a through IT investment appraisal/evaluation can not be stated enough. A considerable amount of attention has been focused on this issue by researchers in recent years. For example, Ballantine, Galliers and Stray (1996) studied IS/IT project evaluation practices of a sample of the Times top 1000 companies in the UK. The authors found that evaluation was "associated with larger IS/IT budgets, large companies in terms of levels and larger projects when measured as a percentage of the IS/IT budget." This study highlighted a lack of formal evaluation procedures within organisation.

Elliott and Melhuish (1995) provide a practical methodology which can be used by management to evaluate an IT and to determine its apparent suitability for their business. The objective of this methodology is to reduce the risk of implementing technology by providing a standardised approach to the process of evaluation. The three major steps involved in this methodology are: (i) Analyse the business situation, (ii) Determine the IT contribution, and (iii) Recommendation.

Clearly, managers must develop a vision of how to change their business by using IT for improving quality and adding value to products or services. Gaining experience is vital and this can be achieved by first developing a pilot project which is easily manageable and which can quickly deliver both tangible and intangible benefits. Strong support from the CEO and senior management is absolutely essential to demonstrate to everyone in the organisation that IT can be used to gain a competitive advantage.

The findings of our research suggest that a number of key steps need to be undertaken in Australian businesses if the potential of IT for business advantage is to be realised. These findings underscore similar claims and findings in the broader international literature. The seventy-one articles on IT implementation included in the meta-analysis by Lai and Mohapatra (1997) provides a good coverage of many of the issues listed below:

- IT function representation at senior management and executive board level;
- Prioritisation of the IT process, based upon business needs, in which the sequence of development and implementation is agreed by senior management;
- Nurturing of IT staff with business skills in addition to technical skills;
- Applying appropriate appraisal and evaluation methods which take account of both tangible and intangible/strategic benefits of IT adoption;
- Restructuring the IT department to so that it reports directly to top management;
- Promoting a better image of the IT function throughout the organisation;
- Setting up of a steering committee including IT and senior management staff to monitor the alignment of IT strategy and business strategy;

- Establishing a post implementation review process for measuring IT's benefits and for future IT development and implementation; and
- Quantifying IT's benefits into a corporate accounting standard.

The above actions will create the environment where IT is seen as a strategic tool creating and sustaining a competitive advantage for the business.

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