



Information Technology Investment and Measuring IT/IS Efficiency in the Australian Utility Industry 1999

*"Evaluation and management of
information systems/technology
investments."*

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Information Technology Investment and Measuring IT/IS Efficiency in the Australian Utility Industry 1999

Information systems/technology investments

1. Introduction

The focus on IT investment is put down to Steven Roach, a Chief economist for Morgan Stanley. He started alarms bells ringing ten years ago, when he determined the large mismatch between huge increases in computer power per white collar workers and the near-zero productivity gains for those workers. His paper "American Technology Dilemma", (cited in Young, 1999, p42), described how the productivity in the US service sector only increased 0.7 per cent even though \$US862 billion IT investment during the 1970's and 80's.

Different views exist on whether the research was right or wrong or even still valid, but that fact is the belief is widely held that IT is expensive and very seldom delivers the promised benefits.

A research project was conducted in 1999 to determine the level of investment and the methods used to manage the investments in the Australian Utility Community. Large Information Technology (IT) investments have been made by Companies, Government (Local and State) within the in the last number of years.

The intent of the study was to identify perceived business benefits and the realisation of those benefits, by industry group and the comparison between groups is of particular interest. This could not be achieved as the type and diversity of the organisations who responded would not allow comparison in many areas.

Gartner reported (cited in Prodromou, 1999, p.26) the CIO's top 10 management of technology issues for 1999. The issues are depicted in Table 1, below.

Table 1: Gartner's CIO's Top 10 Management issues for 1999. (Cited in Prodromou, 1999 p. 26)

Technology Issue	Ranking (1 Highest)		
	Australasia	US/ Canada	Study
Solving year 2000 problems	1	3	✓
IT and business strategic planning	2	1	✓
Aligning IT and business goals	3	2	✓
Reducing IT costs	4	7	✓
Measuring IT/IS efficiency	5	5	✓
Demonstrating business value of IT	6	8	✓
Recruiting and retaining IT staff	7	7	
Reorganising IS	8		
Outsourcing	9		✓
Building IS and business partnerships	10		
Utilising IT for competitive breakthroughs		6	✓
Developing an IT architecture		9	
Improving project delivery		10	✓

Control of IT investment to ensure value for money is currently an issue of major concern to most businesses. In today's increasingly competitive business climate, there is a growing requirement for stricter cost control and a demand for higher returns while minimising risk in all investments. Recognition of the potential impact of IT systems on the strategic position of companies and increasing levels of IT spent have made the control and justification of IT investment a critically important issue. At the same time there has been and still is widespread doubt concerning the suitability of traditional methods of investment appraisal for the evaluation of IT proposals.

This paper deals with measuring IT/IS efficiency.

2. Methodology

The methodology of the study was based on research, a questionnaire and analysis of the results.

The types of Utilities targeted for the research project can be summarised as follows:

- Electricity 20
- Gas 9
- Local Council 34
- Water 51

- Gas & Electricity 1
- Electricity & Water 1

34 Local Councils were included as they provide their communities with water and treat wastewater as part of their service.

Of the 117 questionnaires sent out, 44 were returned in a completed format. This represented 37% of total number sent out.

2.1 Respondent details

44 responses were collated and analysed. The majority of the responses were from IT managers. This is illustrated in Figure 1, below.

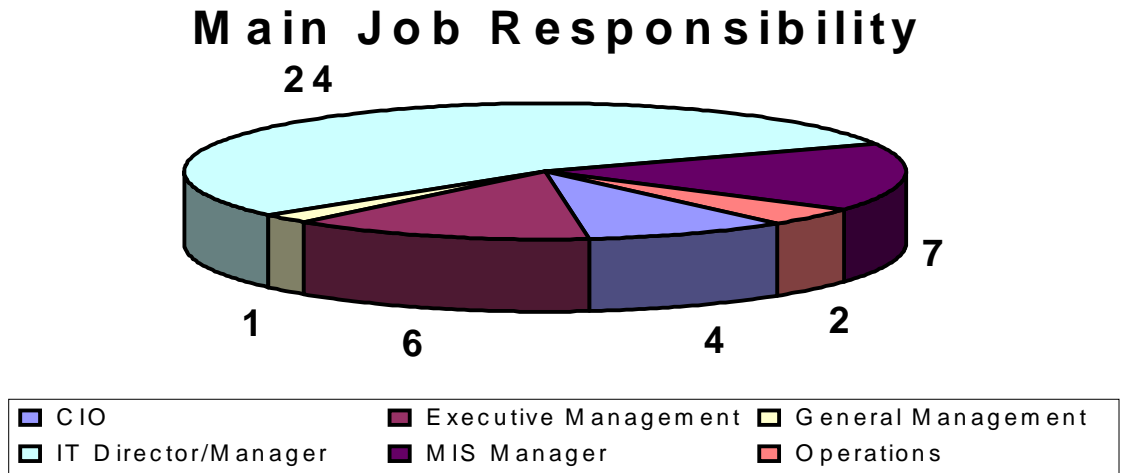


Figure 1: Main Job Responsibility

These people in general reported to either a Corporate Service Director, Chief Financial Officer or a General Manager. 7 of the responses reported directly to a Board or a Minister of the Government.

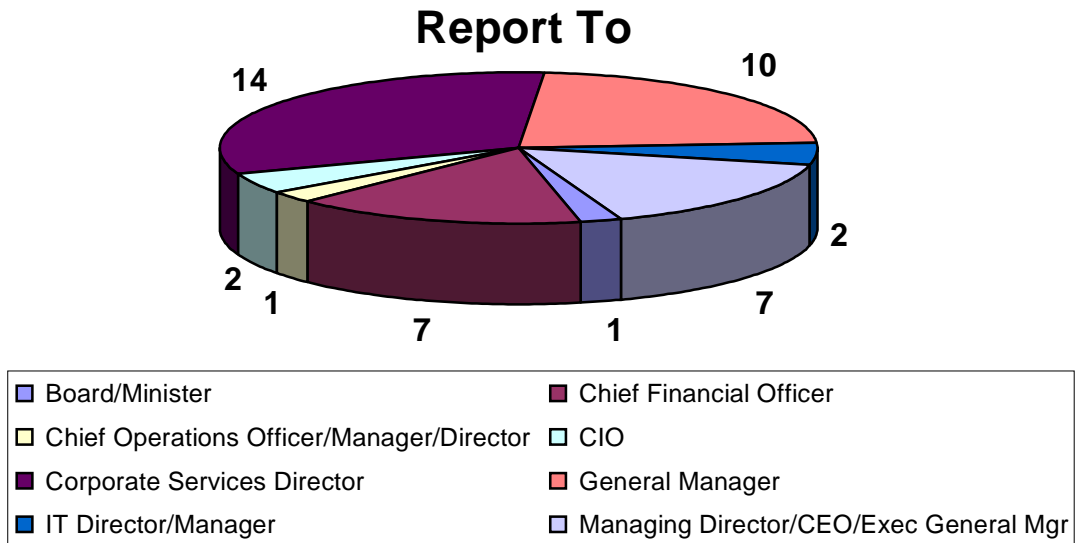


Figure 2: Survey Respondents Manager or direct report.

Four Chief Information Officer's (CIO) answered the questionnaire and two of the respondents reported to a Chief Information Officer (CIO) The role of the CIO is not prevalent in the utility industry and in general IT management does not appear to be considered very highly. It appears still to be a subservient position to the Financial Managers in most organisations.

This appears to go against national trends. International Market Assessment (IMA) produced a report "Making Your IT Investment Pay", (cited in IMA, 1998, p21), where their research indicated that over half of the most senior IT managers directly report to the CEO. They also discovered that given the increasing recognition of the importance of IT, in just over 20% of the companies they surveyed the most senior IT manager also sits on the board of the company.

2.2 Organisation details

To try and analyse the responses in some meaningful way, some form of data grouping was necessary.

The majority of the organisations surveyed had a turnover over \$100M. Turnover in general did not appear to influence any particular area and it was decided to report the data based on this criteria.

The majority of the organisations surveyed had a turnover over \$100M. The breakdown is illustrated in Figure 3. Turnover in general did not appear to influence any particular area and it was decided to further investigate this as a possible method of grouping data for like utilities.

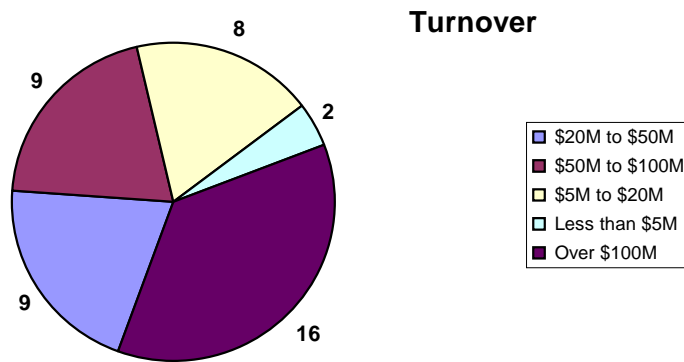


Figure 3: Turnover of Organisations

It is important to look at the roles of the respondents using this criteria. Figure 4 illustrates the percentage of the roles representing each turnover group. This grouping also allows us to conclude that most of the respondents in each area are either Executive Management or IT Management, ie. they are either CIOs, or IT Directors or Managers.

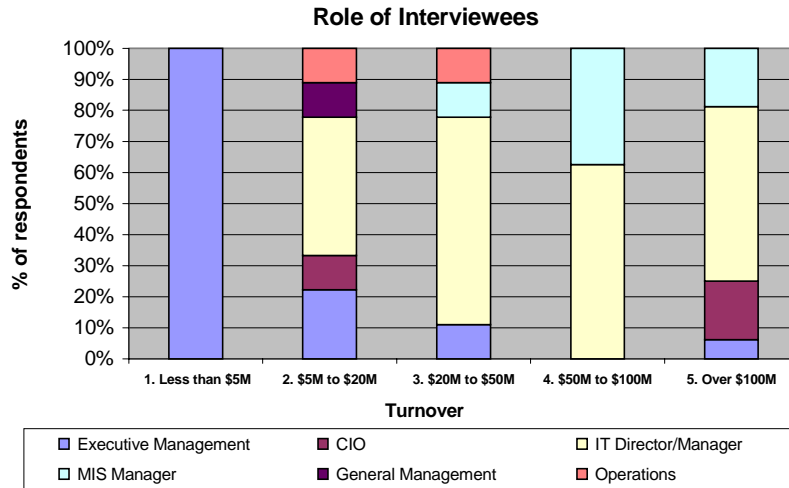


Figure 4: Role against Turnover

As already mentioned the majority of respondents represented the Water and Waste Utility portion of the utility industry. This is clearly illustrated in Figure 5, below. Using Utility type as a method to classify like data is not acceptable as the results would always be skewed to Water and Wastewater.

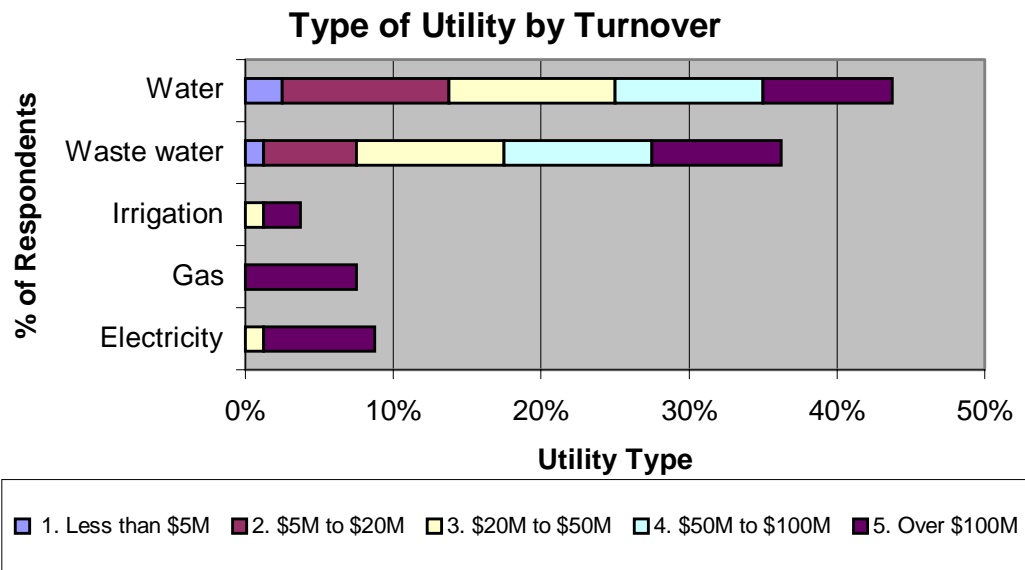


Figure 5: Turnover by Utility type

2.2.1 Type of Systems

A large percentage the systems managed by the participants in all "Turnover" groups was classified as Business Systems and voice and data communications. Process control and decision support systems were not evident in the group with a turnover of less than \$5M.

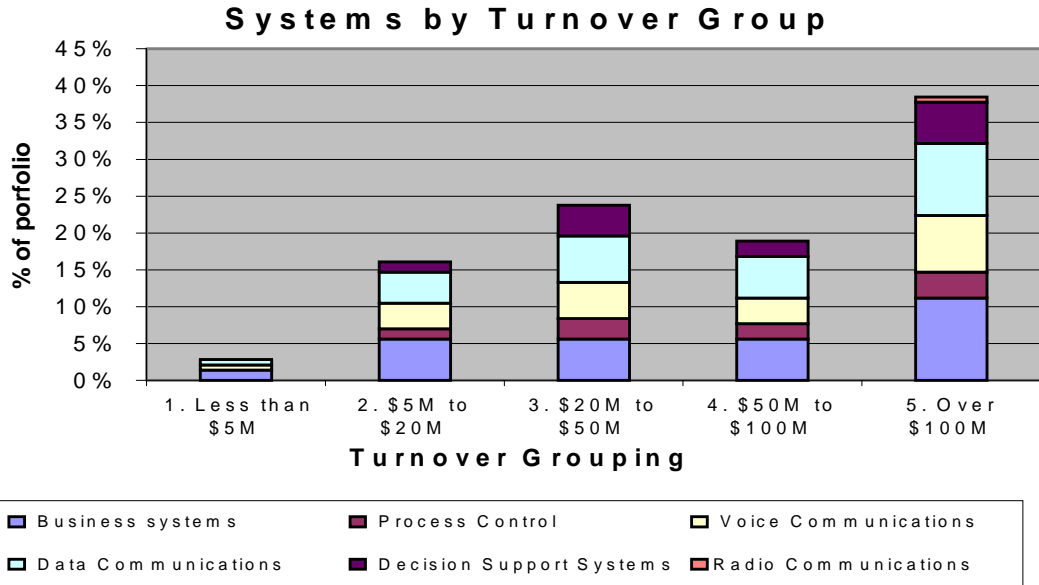


Figure 6: Systems by Turnover

When analysing the data by Utility, Figure 7 below, illustrates the same data but classifies the data by Utility type.

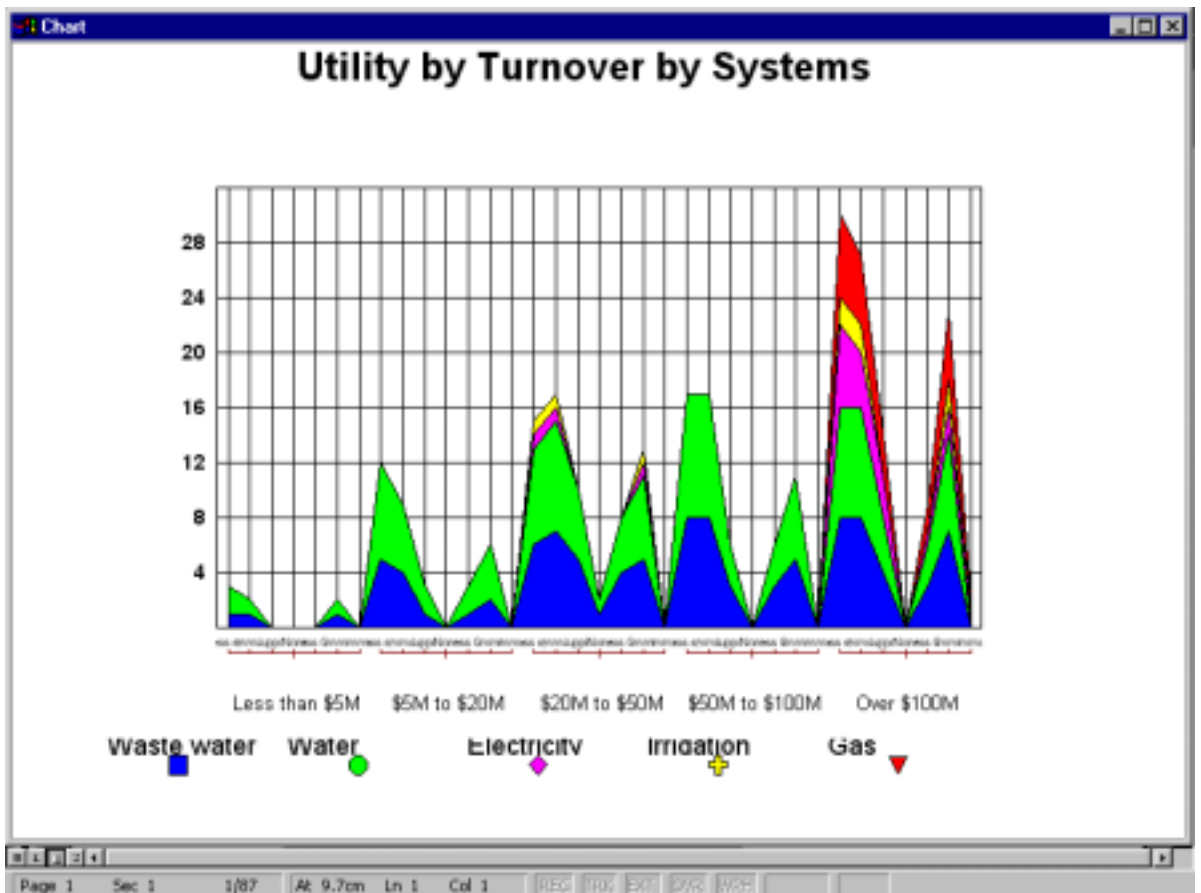


Figure 7: Systems grouped by Turnover for each Utility Type.

2.3 Current IT Budget

It is important to understand the budget for each of the organisations that responded to the survey. Figure 8 illustrates the percentage of expenditure for each group. In the majority of cases, as turnover increases so did expenditure.

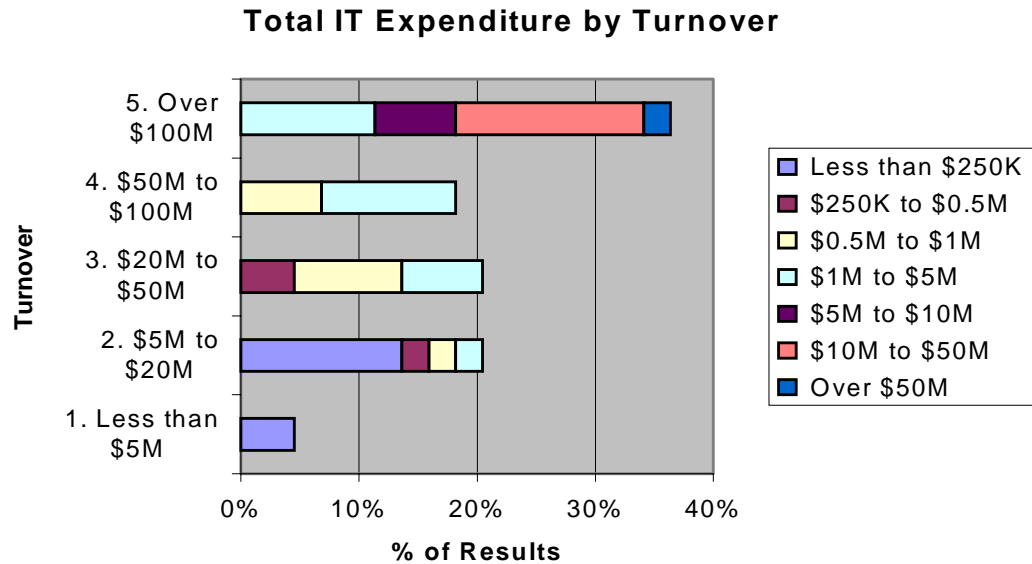


Figure 8: Total IT Expenditure by Turnover

Figure 9, indicates that the percentage increase in each budget over the different turnover groups.

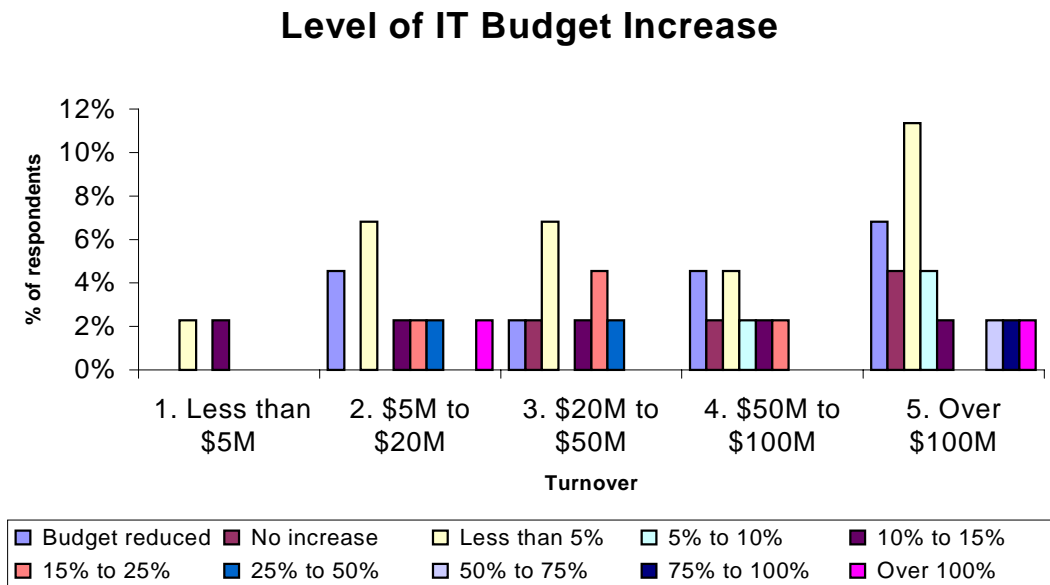


Figure 9: Level of IT Budget Increase

Eight of the respondent reported that their budget was reduced from the previous year's budget, four had no increase at all and fourteen had less than 5% increase. This

represented 59% of the organisations surveyed. There was no significant increase in the IT budget.

When asked what the reason for the change most indicated that the change was meeting their Year 2000 (Y2K) compliance obligations (Figure 10). It would appear that most organisations had either completed their Year 2000 projects or were winding them up.

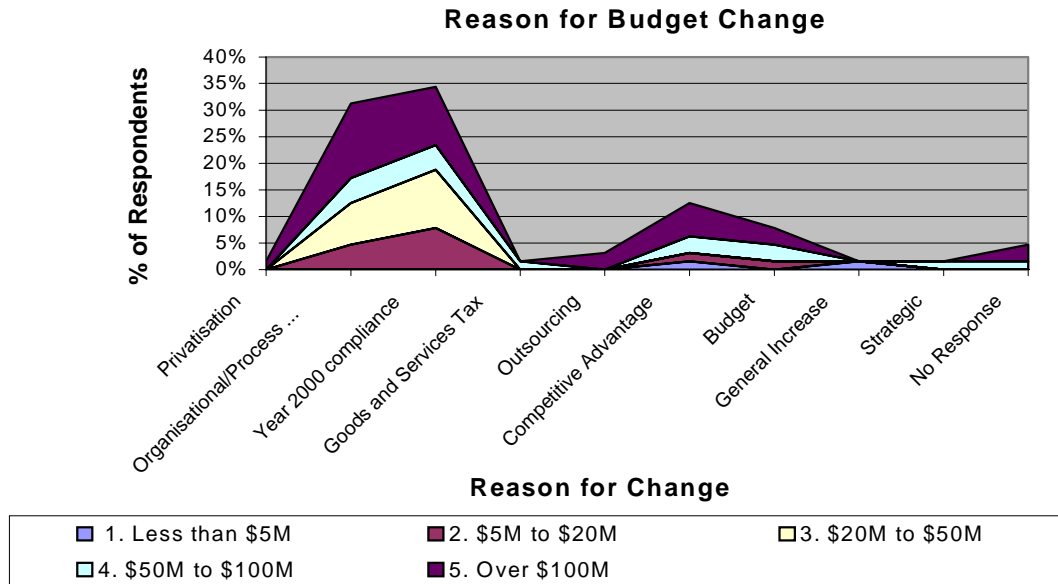


Figure 10: Reason for Change in IT Budget

3. The IS/IT Management Cycle

Before identifying the issues that effect the measurement of IT investments you need to first understand how the management process works.

Carlson and McNurlin (1992) found that executives need to be shown and frequently reminded that uncovering IT payoffs requires careful study of five different sources of value in a formal framework. These are:

- Technical
 - * efficiency of IS activities
 - * effectiveness of IS management to handle new demands
- Business
 - * efficiency of operations
 - * effectiveness of business units in remaining competitive and gaining market share
- Company wide programs

The key to success lies in creating a reporting system that covers each of the five areas of the framework and educating management on their needs. But are Utilities

reviewing their investment against their business needs, priorities and strategic direction?

3.1 IT Investment Review

When asked if the organisation has conducted a review of its current IT spending portfolio to assess alignment with business mission needs, priorities, strategic direction, or major process re-engineering, 60% said yes that they did. (Figure 11)

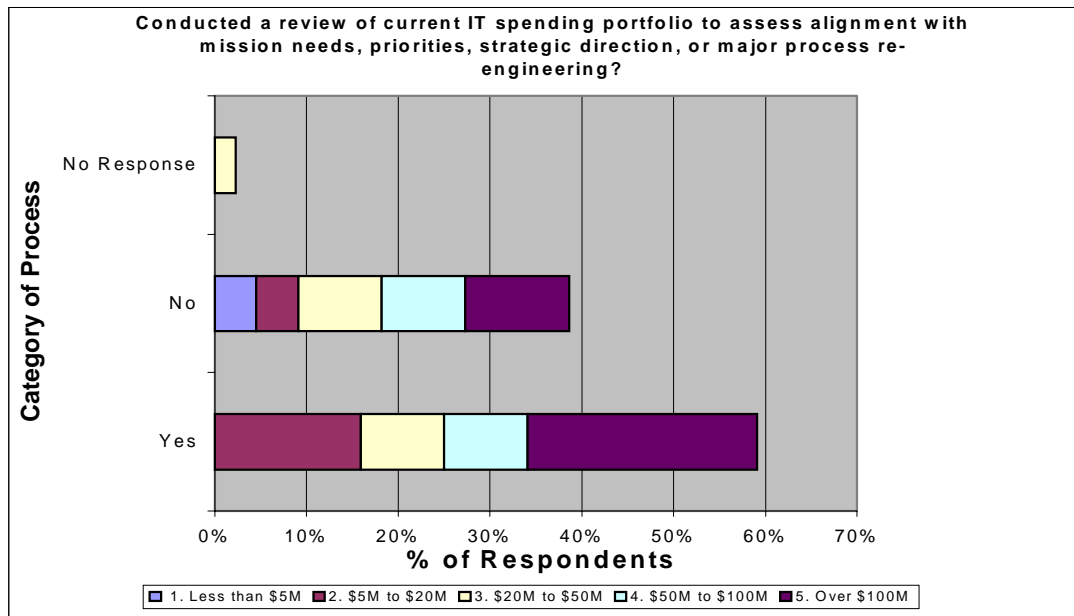


Figure 11: Reviews of Current IT Spending

When asked if the management review group scored the strengths and weaknesses of each approach, 70% said that they didn't. (Figure 12).

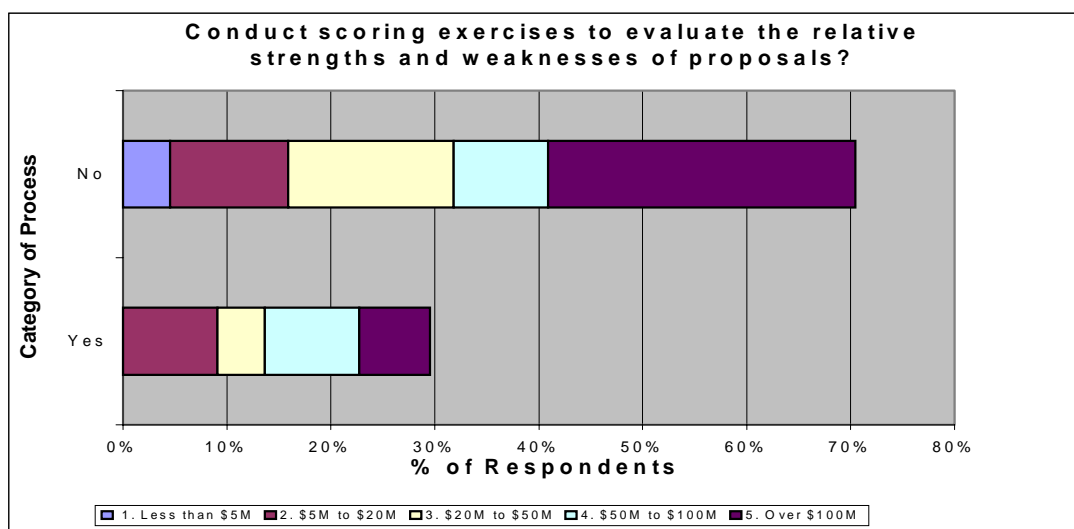


Figure 12: Use of Scoring Exercises to Evaluate Proposals

When asked if they had a process for evaluating current decision-making processes and methods for suggesting changes to these processes based on lessons that are learned from investment control reviews, 70 % said no. (Figure 13).

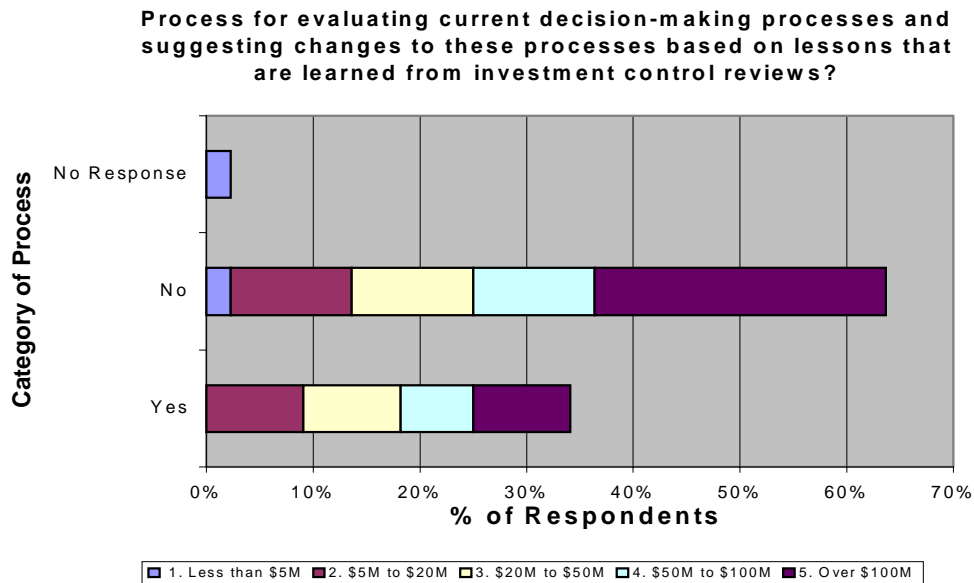


Figure 13: Evaluation Process for Current Decision-Making Processes

Over 60% of the organisations that responded to the survey said that they did not have a process for evaluating current decision-making processes or ways to suggest changes to these processes based on lessons that are learned from previous reviews. (Figure 14)

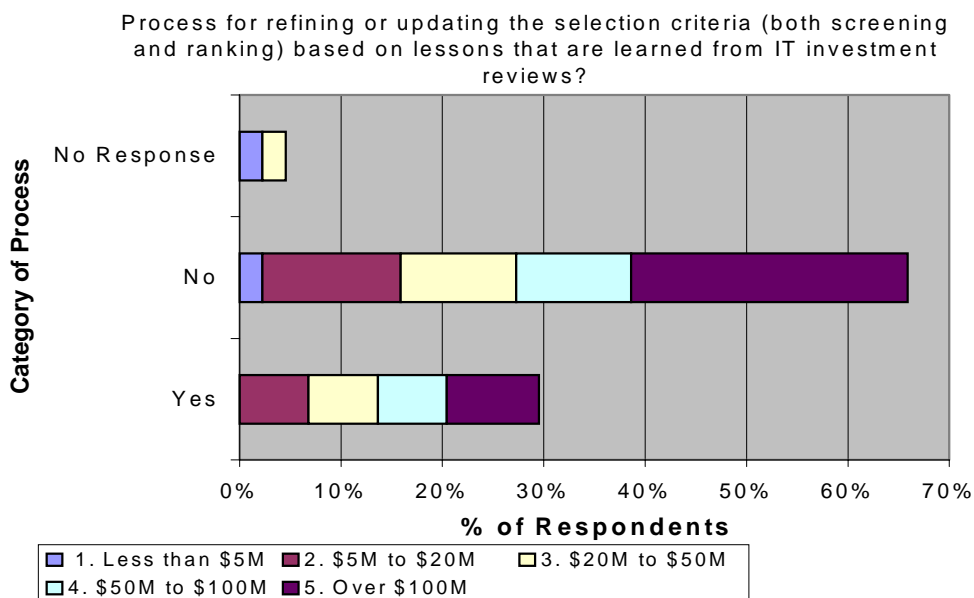


Figure 14: Process for Refining or Updating Selection Criteria

When asked if the organisations they represent have a process for refining or updating the selection criteria (both screening and ranking) based on lessons that are learned from IT investment reviews, more than 60% of the respondents said no. (Figure 14).

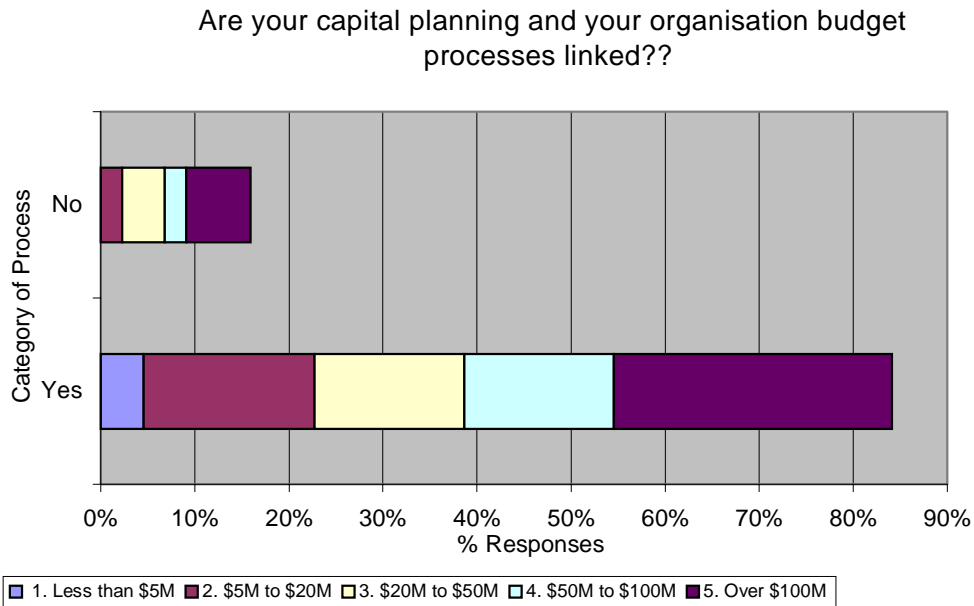


Figure 15: Linking of capital Planning and Organisation Budget Processes

Over 80% of the respondents stated that their Planning and Organisation budget process were linked. The results are illustrated in Figure 15, above.

The comments of one respondent summaries the results.

The Annual (3year) operation plan is linked to the corporate (strategic) plan and the annual plan and budget includes capital and operational review items. The key is the level of depth and quality of the processes which enable the organisation to meet its goals.

What appears to be evident is that even though budgetary review is performed, Figure 11 page 9) most organisations are not mature enough to improve from the experience when an IT investment fails/succeeds, ie. They don't learn. This conclusion was reached by the following facts:

- Nearly 60% of the organisations surveyed review IT spending (Figure 11);
- But, 70 % don't score the strengths and weaknesses of each review(Figure 12);
- and, 70 % don't have a process for evaluating current decision-making processes and methods learned from investment control reviews, (Figure 13);
- and, 60% of the organisations don't have a process based on lessons that are learnt from previous reviews. (Figure 14)

Most of the organisations appear to operate under good be good engineering practices, eg. the linking of the capital budgets to the IT budgets, as they understand the management and investment process for large scale assets. (Figure 15) But the evidence indicates they attempt to use this process to manage the IT asset and it is not effective. A more IT specific process is required.

Willcocks (1996) in the book “Investing in Information Systems: Evaluation and Management”, believes that a management cycle is what is important in the evaluation process. Table 2, below, contains a suggested process for measuring IT investment.

Table 2 Process for IS/IT evaluation Willcocks (1996)

Step	Process
1	Identify the net benefits through strategic alignment and prioritisation
2	Identifying types of generic benefit and matching these to assessment techniques
3	Developing a family of measures based on financial, service, delivery, learning and technical criteria
4	Linking these measures to particular measures needed for development, implementation and post implementation phases.
5	Ensuring each set of measures run from strategic to the operational level.
6	Establishing responsibility for tracking these measures, and regularly reviewing results.
7	Regularly reviewing the existing portfolio, and relating this to the business direction and performance objectives.

To improve their organisations, utilities could use the above steps to put in place an IT evaluation process.

What is not evident is what metrics are collected to measure the benefits and at what time.

3.2 It Investment management

Over 70% of the organisations surveyed had some form of investment review committee. In more than 65% of cases this committee reviewed all capital expenditure (Figure 16 and Figure 17 refer).

Executive Management Involved in Investment Review Committee

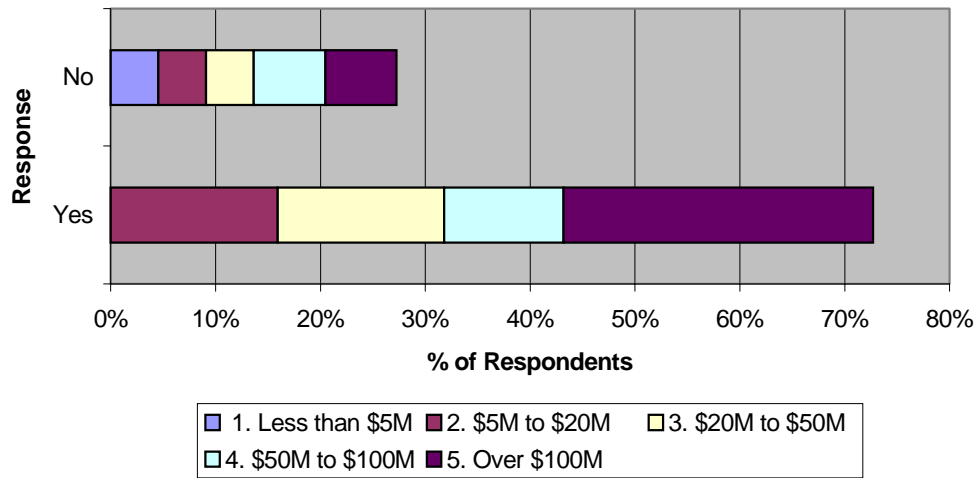


Figure 16: Executive Level involved in Review process

Capital Expenditure and IT Investment treated the same

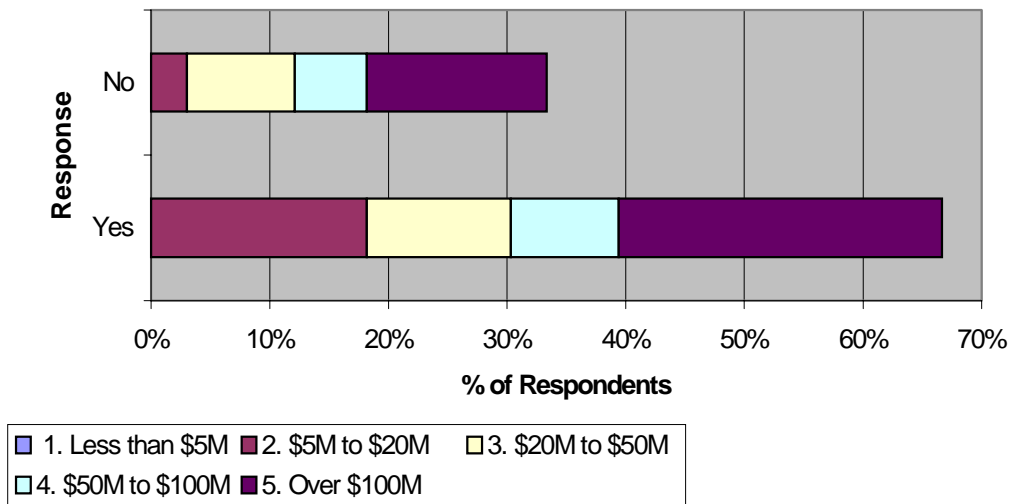


Figure 17: Capital Expenditure and IT Investment treated the same in approval and review process

27, or 61%, of the organisations also define how the investment is to be monitored and this appears to be generally monitored monthly. (Figure 18 and Figure 19 refer).

Procedures monitor IT Expenditure?

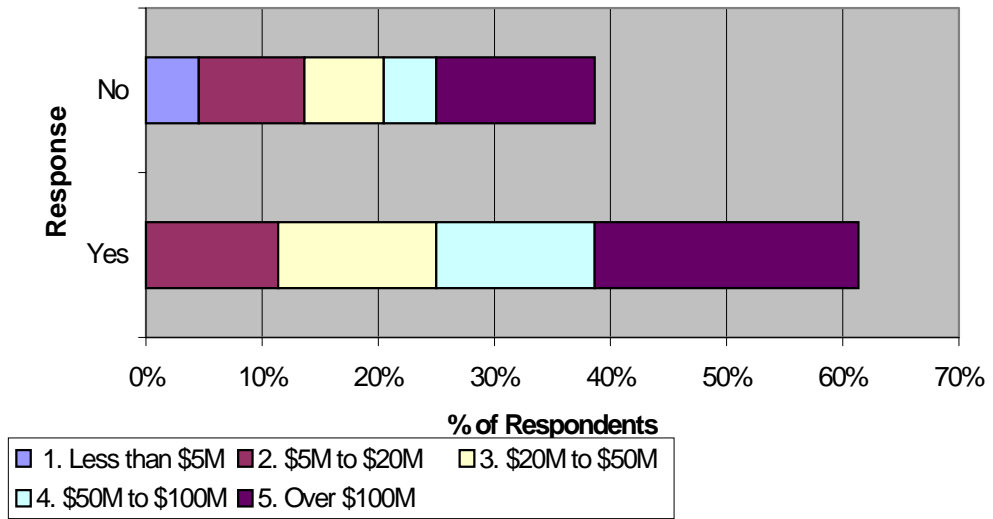


Figure 18: Organisations with Procedures to Monitor IT Expenditure

Frequency IT Investment Management Committee Meets

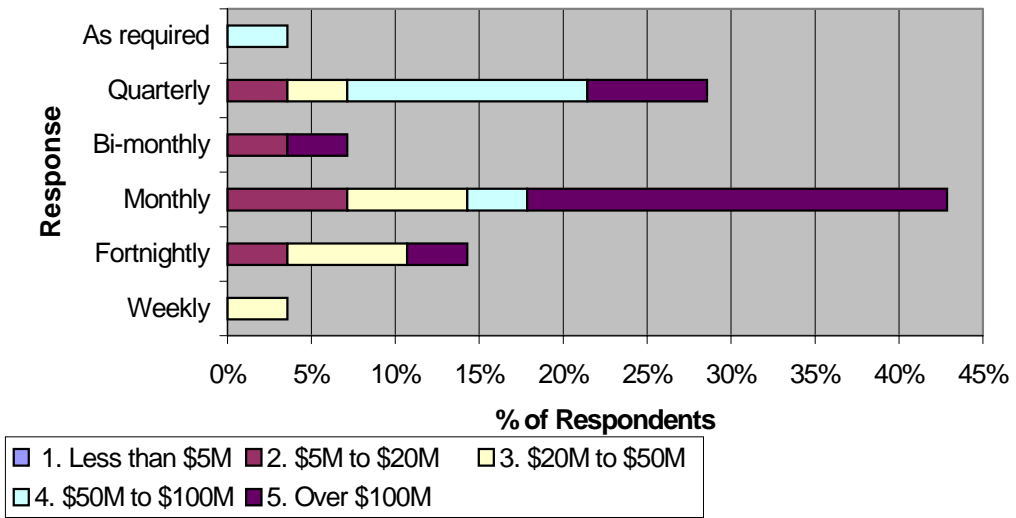


Figure 19: The Frequency of IT Investment Management Committee Meetings

3.3 Methods used by Utilities

Table 3: Evaluation method

Method Class	Type of Method	# of responses
Modern	Earned Value	2
	Holistic approach	11
	Value Analysis	6
Traditional	Cost Benefit Analysis	27
	Net Present Value (NPV)	13
	Return on Investment (ROI)	17

The methods used by the organisations surveyed for measuring IT investment were predominantly the traditional type. The methods used are classified in Table 3, above, and illustrated below by organisational turnover in Figure 20.

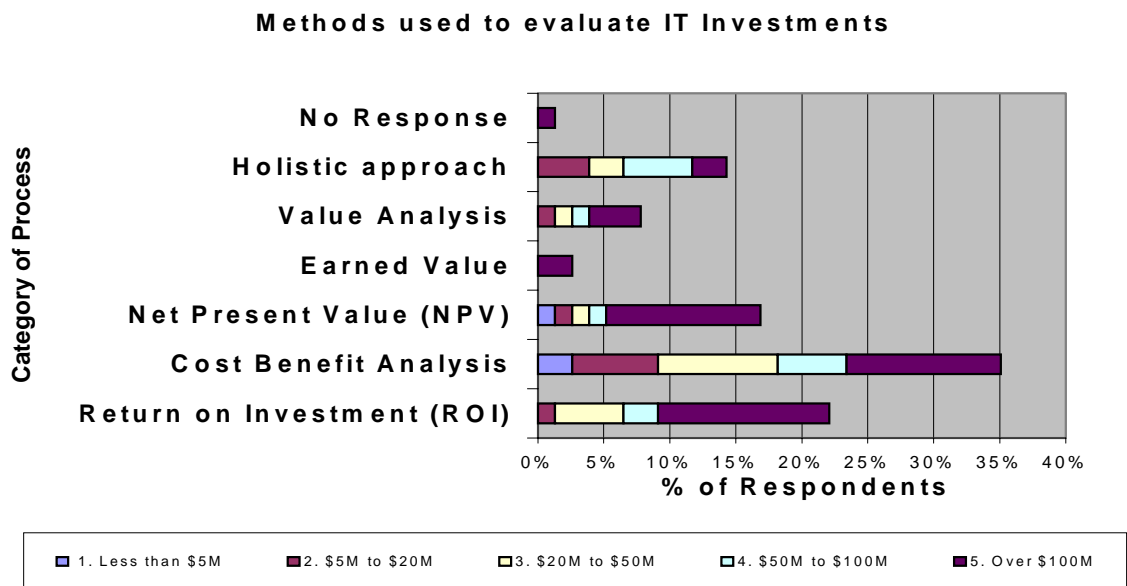


Figure 20: Methods Used to Evaluate IT Investments

4. Review Process

Discovering where IT investments are paying off is receiving more management attention than ever before. Past efforts to give realistic and provable answers to the pay-off question have concentrated on each organisations need to satisfy it's own management. No framework has been accepted for providing standardised value assessments across firms. Carlson and MCNurlin (1992)

Given the quote by Carlson and McNurlin (1992) we need to understand how new proposal are initiated, how and what is required and who is responsible.

4.1 Reviews

Only organisations with a turnover of less than \$5M did not review new IT proposals.

In Figure 21, below, the most popular method of review is ad hoc for the organisations surveyed. This form of review was used by more than 35% of the organisations surveyed for reviewing new IT proposals. This was for all the different groupings of organisations surveyed.

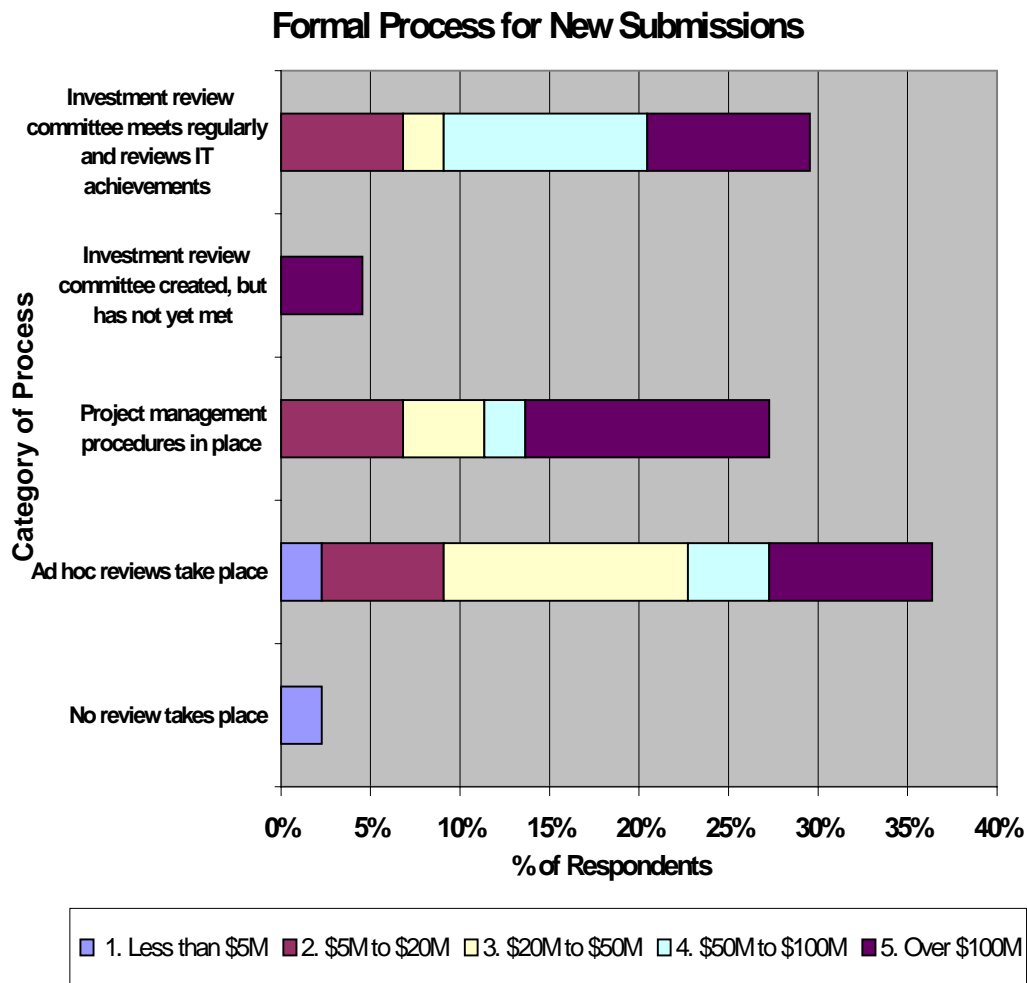


Figure 21: Formal Process for New Submissions

The next most popular method was formal reviews. Organisations with less than \$5M of turnover did not use this form of review. They also did not include reviews through Project Management procedures. One organisation, with a turnover of more than \$100M did have an investment review committee but it had not met.

Over 70% of organisations track data on their IT spending by some other method. The results are illustrated in Figure 22, below.

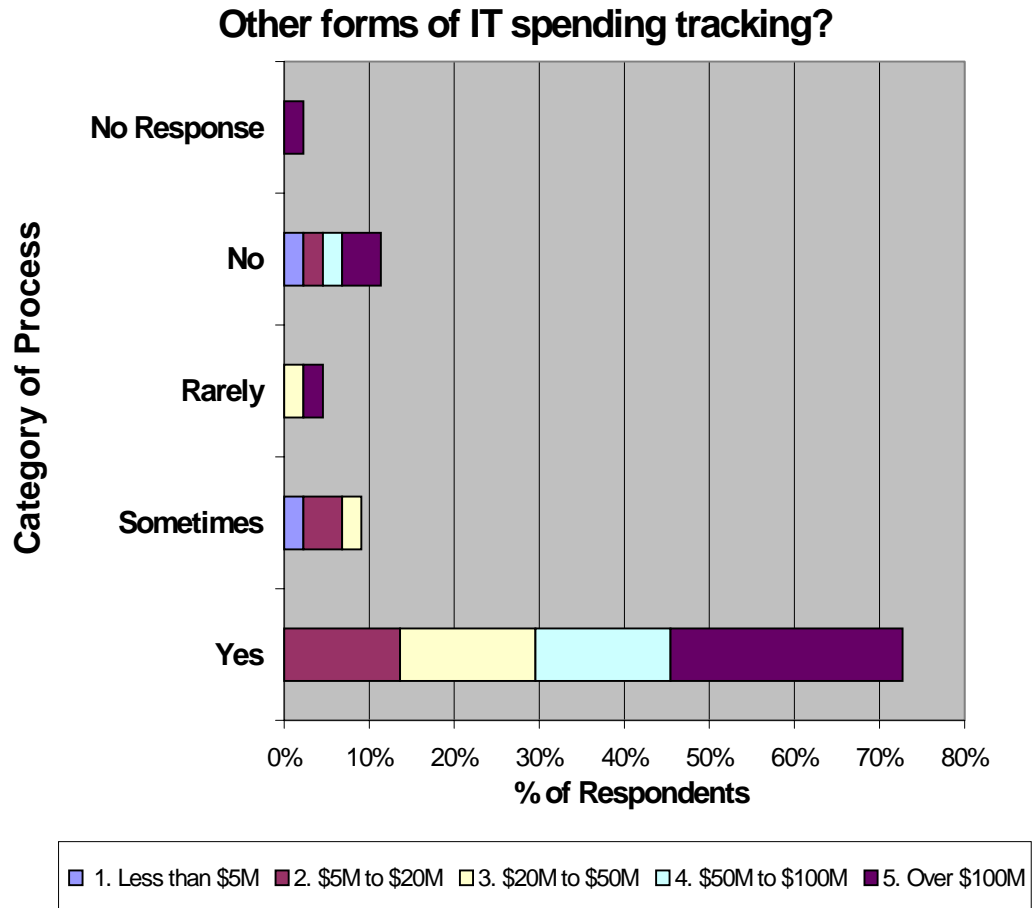


Figure 22: Project Performance Tracking

Figure 23, below, illustrates that nearly 60% of the organisations surveyed have a documented procedure for determining priorities and making funding decisions. Once again the organisations with a turnover of less than \$5M did not.

One organisation, with a turnover of more than \$100M did not have a formal process for determining priorities.

Broadbent and Weill (1998), classified IT investments into four main categories. These were:

- Transactional (cost cutting);
- Infrastructure (a base set of IT services);
- Informational (improving quality of service, information flow); and
- Strategic (gaining competitive advantage).

Broadbent and Weill (1998) suggest that IT investments be managed like asset classes in financial portfolios. A similar concept was put forward by Willcocks (1996), Carlson, Silk (1992) and McNurlin (1992). They named the concept "System Portfolios" and suggested that each portfolio class be managed differently.

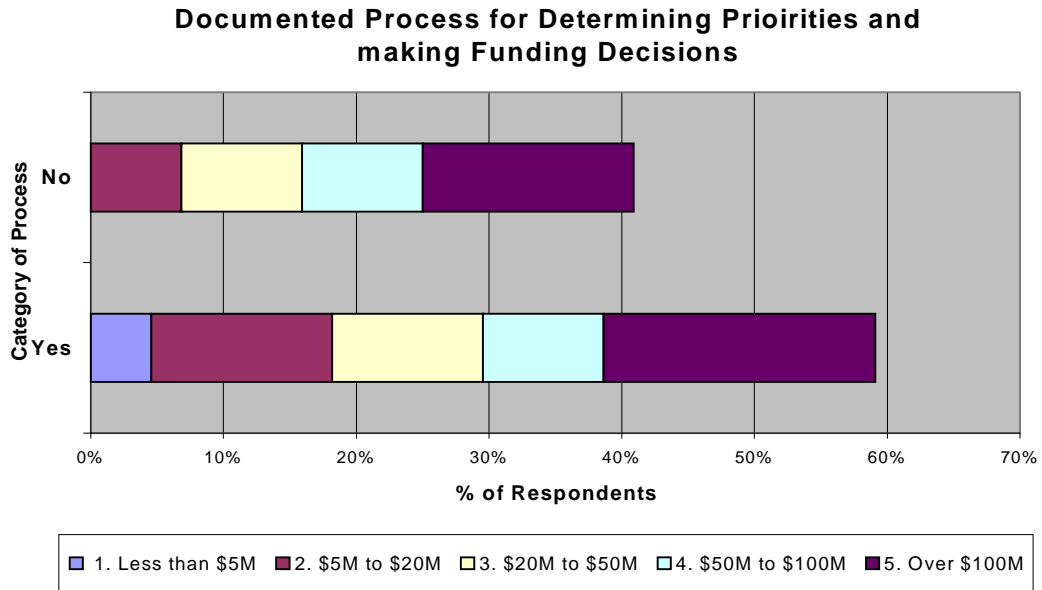


Figure 23: Documented Process for Determining Priorities and Making Funding Decisions

Figure 24, below, indicates that even though procedures are available for most organisations, no published guidelines are available on where data of IT expenditure will be maintained for over 50% of the organisations surveyed.

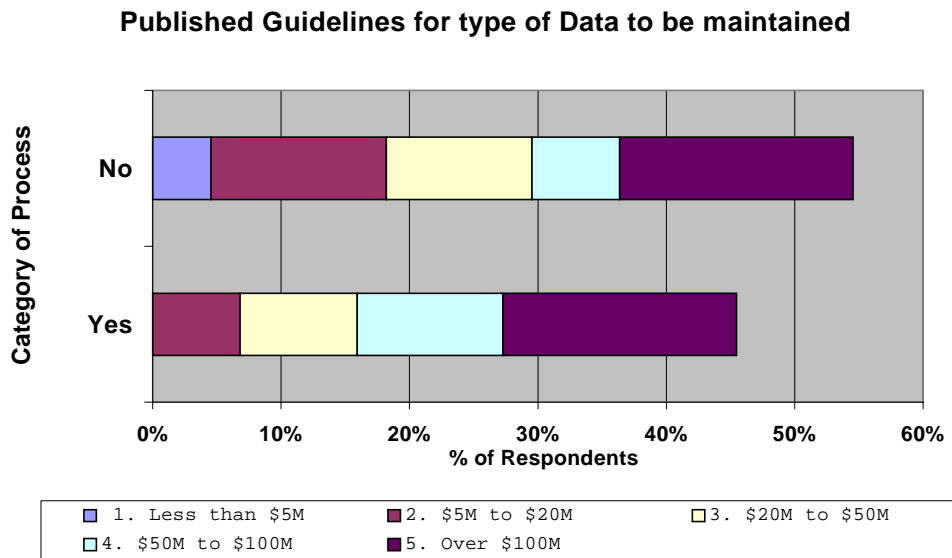


Figure 24: Published Guidelines Available for the Type of Data to be maintained

Figure 25, below, illustrates for those organisations that have published guidelines the type and level of compliance.

Of interest was that 22 organisations (not included in the above results) answered that they do not have published guidelines for where data will be maintained but they follow them.

Clearly the 20 organisation that have published guidelines do use them.

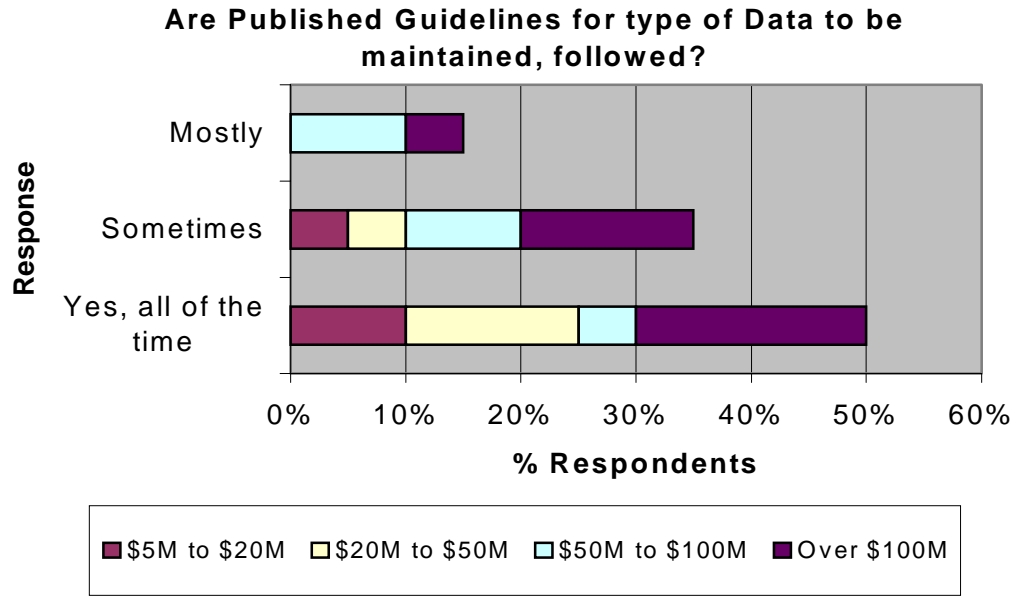


Figure 25: Are Published Guidelines for Type of Data to be Maintained Followed

When asked if they used a process for realising benefits through IT investments throughout the whole organisation only 18% of the organisations surveyed responded affirmatively, although a further 41% responded "Sometimes". This is illustrated in Figure 26, below.

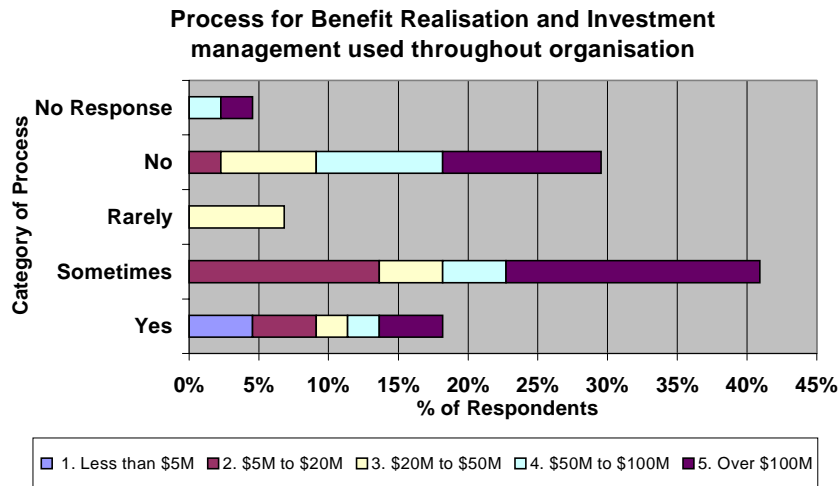


Figure 26: Process for Benefit Realisation and Investment Management Used throughout the Organisation

4.2 Data Requirements

When asked what type of data was required for IT investment proposals? 40% stated benefits and ongoing costs were used by most organisations. This was closely followed by the development costs and then immediate benefits (39%).

The risks associated with the IT Investment proposal was next with 10% of the organisations requesting them.

Manhours to be used, Function points, Customer Service Improvements and Links to Business Objectives were used by less than 5% of the organisations surveyed as a type of data required for IT investment proposals. This is more clearly illustrated in Table 4 and Figure 27, below.

Table 4: Prerequisite data for IT Investment proposals

Prerequisite data	Count of Organisations by Turnover					Grand Total
	< \$5M	\$5M - \$20M	\$20M - \$50M	\$50M - \$100M	> \$100M	
Ongoing benefits	1	5	4	4	8	22
Ongoing Costs	1	4	4	3	9	22
Development Costs	1	4	4	3	8	20
Immediate Benefits	1	4	4	2	7	18
Risks	1	1	2	1	5	10
Manhours		1	1	1	3	5
Function Points		1	1		1	2
Customer Service Improvement				1		1
Link to Business Objectives					1	1
Total	6	20	19	13	41	100

When analysing this and asking if there are documented exceptions to these criteria, 30% said "Yes" with the majority being in the \$100M turnover group. This is illustrated in Figure 28.

Prerequisite data for IT Investment Proposals

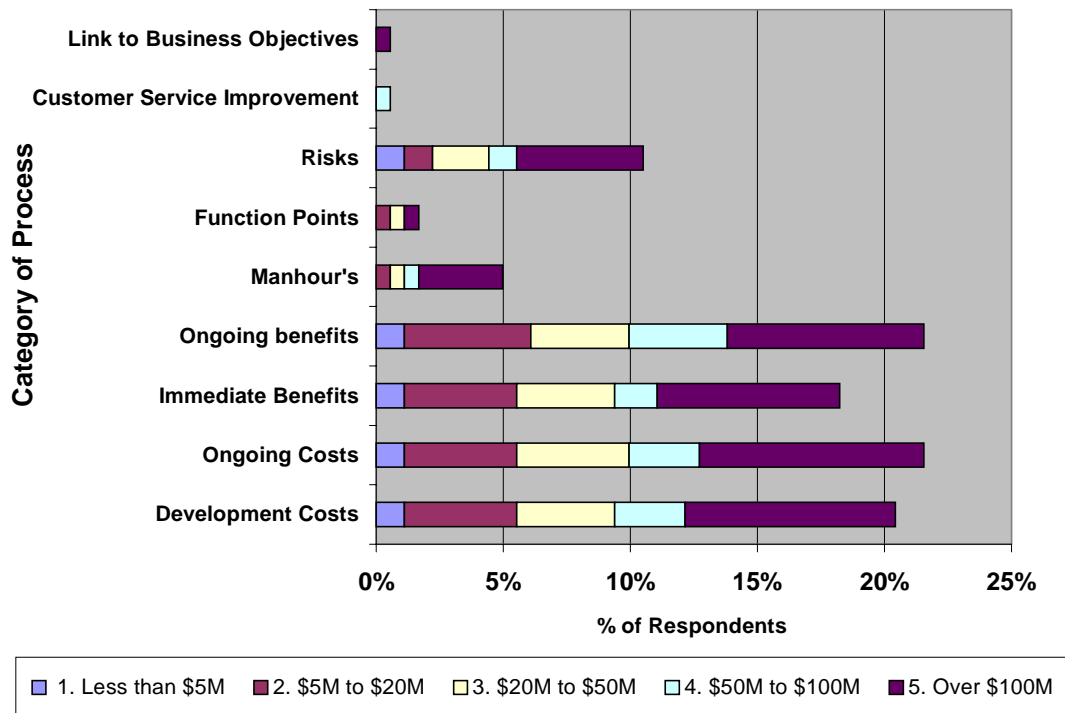


Figure 27: Prerequisite Data for IT Investment Proposals

Are Exceptions Documented?

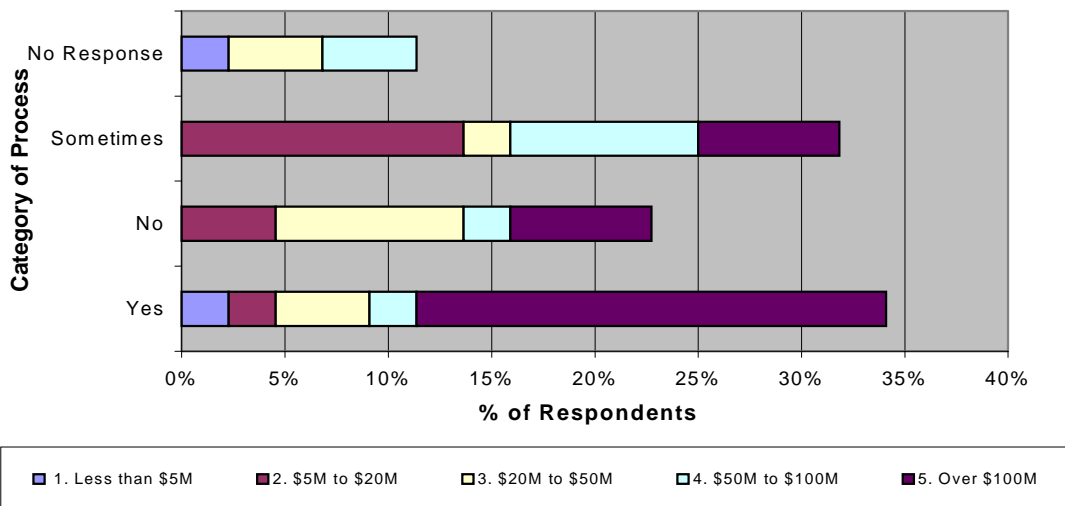


Figure 28: Are Exceptions Documented

Given that less than 35% of the organisations who responded to the survey documented exceptions and 18% have a formal process for formally following up benefits this appears to be the norm. Steve Moir (cited in Young, 1999, p. 42), is KPMG's associate director of world-class IT. He believes that there is a widespread lack of organisational follow-through to crystallise the benefits of technology projects. He states,

One of our client's spent millions of dollars building a system to provide better service for their clients. But the system that came out at the end of the project didn't meet their functional needs and was never put into practice.

A post-mortem showed the demand -side- that is, the business users - didn't take the organisational responsibility needed to ensure that at every step along the way during the life of the project the decisions were made that would deliver the benefits needed."

4.3 Responsibility for Process

It is important that understand if everyone knows who is responsible for making the final funding decision when investing in IT.

Only one of the organisations surveyed stated that they hadn't determined who was responsible for making the final decision when funding an IT investment. In the rest the Executive Management Team were responsible 38% of the time.

22% of the respondents stated that the responsibility equally fell on the IT manager/CIO or the Managing Director with the Financial Manager responsible in 10% of those organisations surveyed.

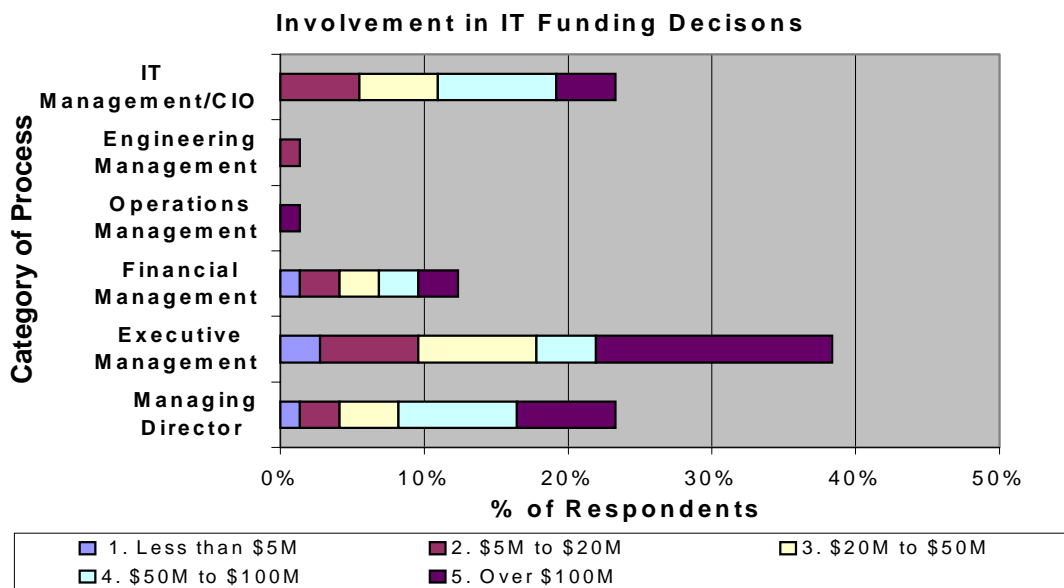


Figure 29: Management involved in IT Funding decision

Looking at a more fundamental decision process, are IT projects suspended if expected key deliverable's are either not going to be achieved or if costs are exceeded? Apart from three organisations that didn't answer the question the majority said no, they are not stopped. The results are illustrated in Figure 30, below.

Are IT Projects Suspended if they are not going to deliver key benefits or Costs Exceeded?

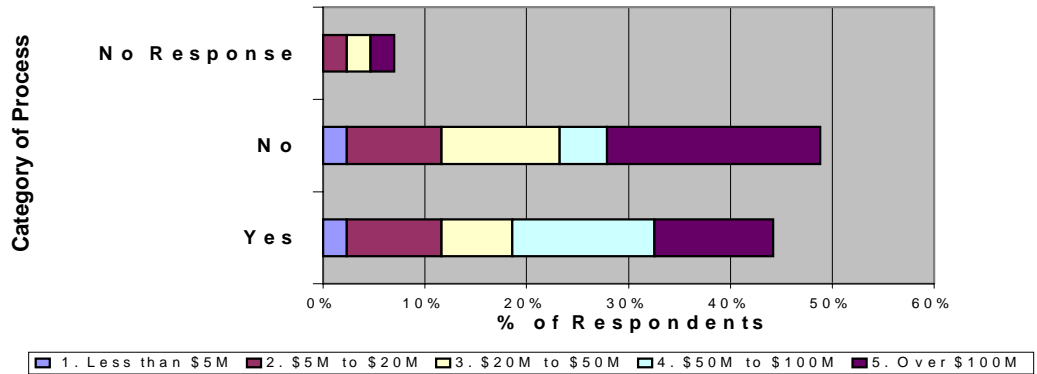


Figure 30: Suspension of IT Projects not Delivering Key Benefits or Exceeding Costs

It is suggested that the main reason is that in the majority of cases, over 50% (Figure 24), don't have any published guidelines for the data to be collected. If you don't know what and how much the benefits or costs are going to be how can you know that you not getting them. Don't record it, can't track it!

Figure 31, below, illustrates that for those organisations that do have published guidelines that have projects that either go over costs or aren't going to deliver the expected benefits are stopped in 70% of the time.

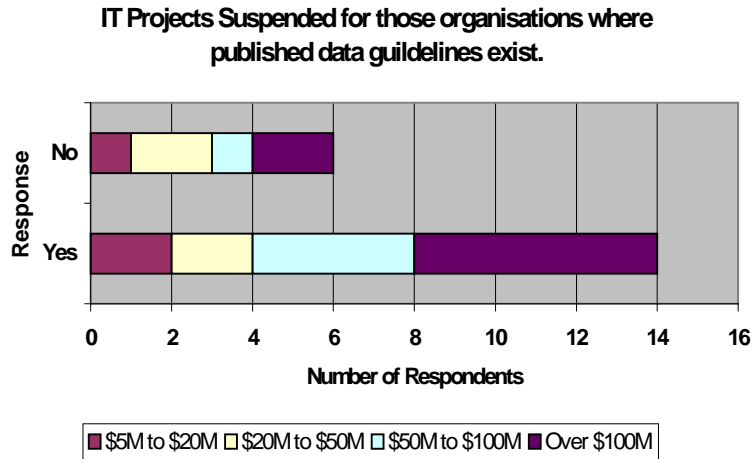


Figure 31: IT Projects Suspended for those organisations where published data guidelines exist.

Turning it around and looking at these organisations by the type of review process they have in place it is interesting to note that no specific trend appears, ie. Organisations with formal committees also don't stop projects if they are running over budget or are not going to deliver the projected benefits.

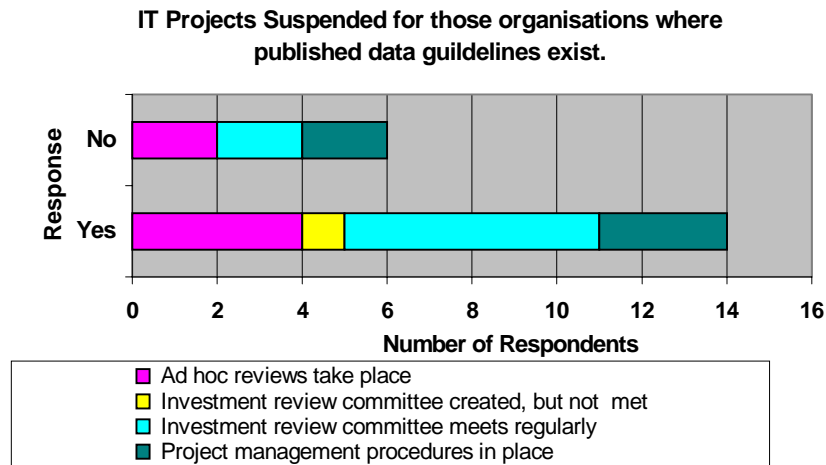


Figure 32: IT Projects Suspended for those organisations where published data guidelines exist by Review Committee type

The key to effective management is having an effective measurement process. Carlson W & McNurlin (1992) state that their research indicated that IT managers learn quickly that to explain to business executives they have to speak in simple numbers based on analysis of proven relationships.

Carlson W & McNurlin (1992) also state that no single measure is the answer either. Organisations need to use many different measures that are either tied to the business or are understood by other business management.

Over the years many many people have spent a large part of their time enforcing the KISS (Keep it Simple) principle, but is there a simple answer to quantifying the benefits from using IT?

Before we answer that question we should first look at the benefits realised by the organisations surveyed.

5. Benefit Realisation

Following on from the theme of documented processes, nearly 70% of the organisations surveyed did not have procedures for tracking costs and benefits attributable to IT. This is illustrated in Figure 33, below.

Procedures for Tracking IT Related Costs and Benefits

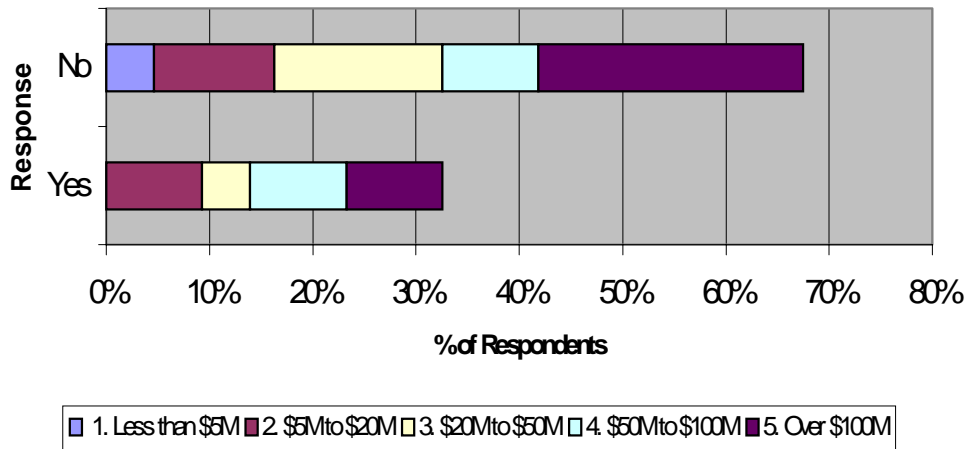


Figure 33: Procedures for Tracking IT Related Costs and Benefits

This percentage appears very high and as can be seen in the graph the results are consistent across all organisations in the utility sector.

When asked if senior management are informed of differences between estimates and actuals, 65% of the organisations said yes, they do, with another 25 % responding sometimes. That represents 90% of the organisations that responded to the survey. Figure 34 (below) refers.

Strange isn't it. How can you advise management of changes when you have no formal procedures?

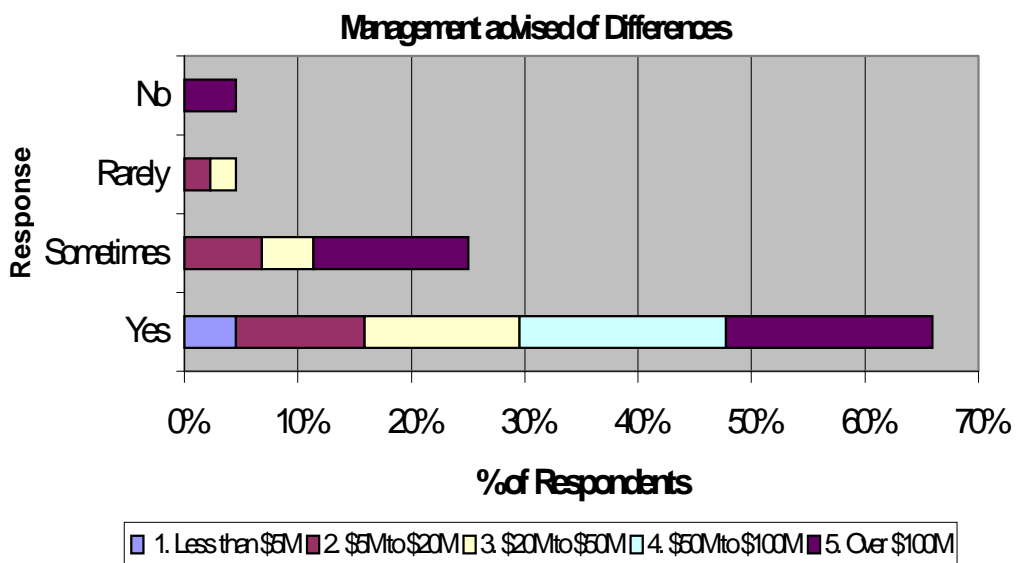


Figure 34: Senior Management Advised of Differences

Another interesting result was how many organisations update their business cases to reflect the current status.

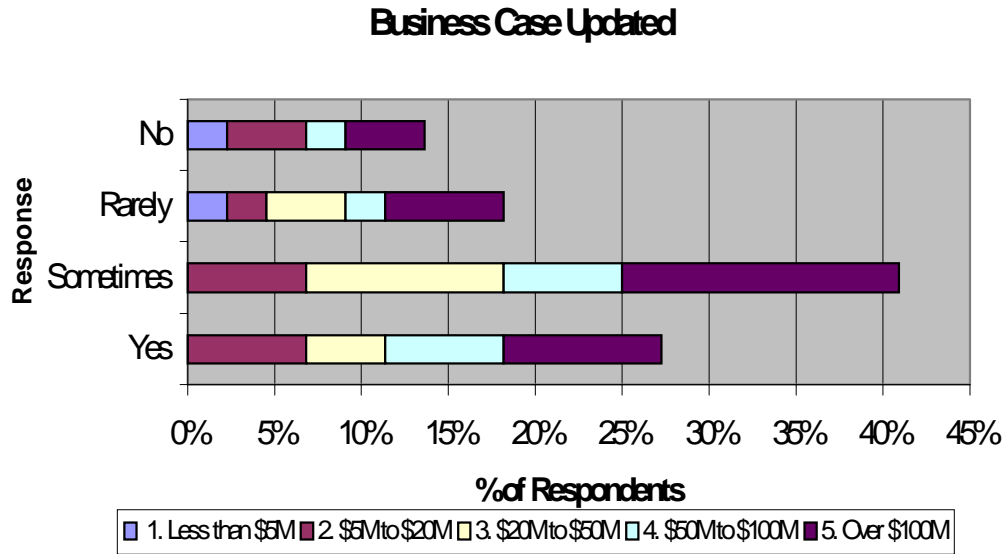


Figure 35: Business Case Updated

Figure 35, above, illustrates that 27% of the organisations surveyed do update their business case. This corresponds more to the result of 31% of the organisations having procedures for tracking IT related costs and benefits.

Even though 12 organisations responded that they updated their business cases, with 18 saying "sometimes", 36 organisations provided information on the type of Senior Management involvement in IT Investment Reviews. The results are illustrated in Figure 36, below.

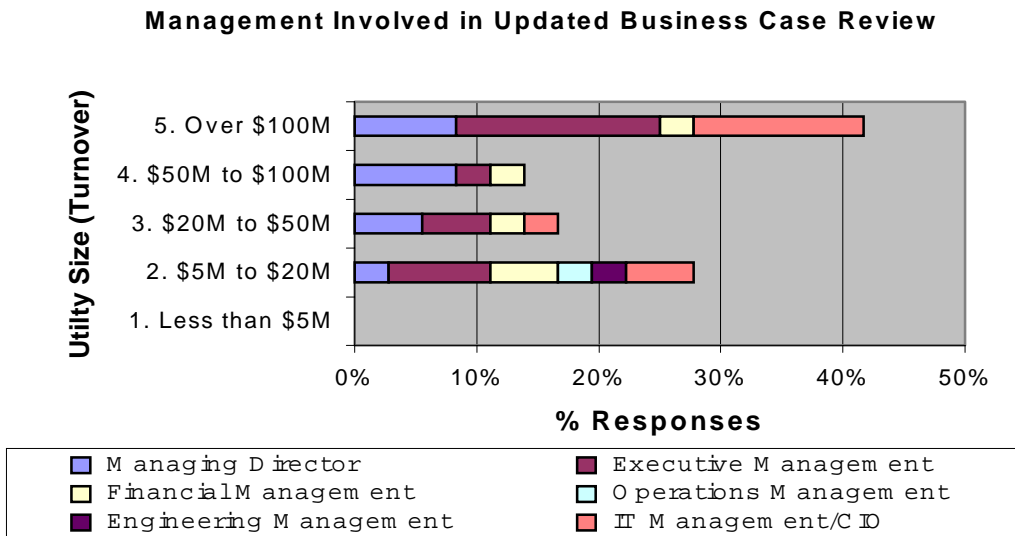


Figure 36: Management Involved in Updated Business Case Review

Although the results are abnormal, ie. I expected only 12 - 30 responses, the respondents felt that this information was important. Please note that no one responded where the organisation turnover is less than \$5M.

The common management involvement across all organisations appears to be:

- Managing Directors;
- Executive Management; and
- Financial Management.

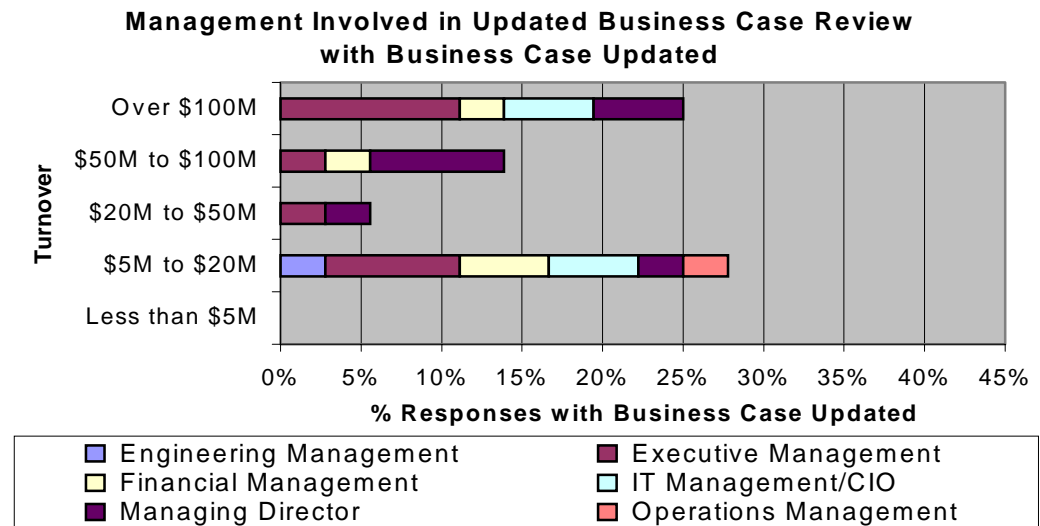


Figure 37: Management Involved in Updated Business Case Review where Business Case is updated

Figure 37, above, and Figure 38, below, illustrate the results when two filters are applied to the data. Figure 37 is adding the criteria for those organisations that update their business cases and Figure 38 is extended further for those organisations that have procedures for tracking IT costs and benefits.

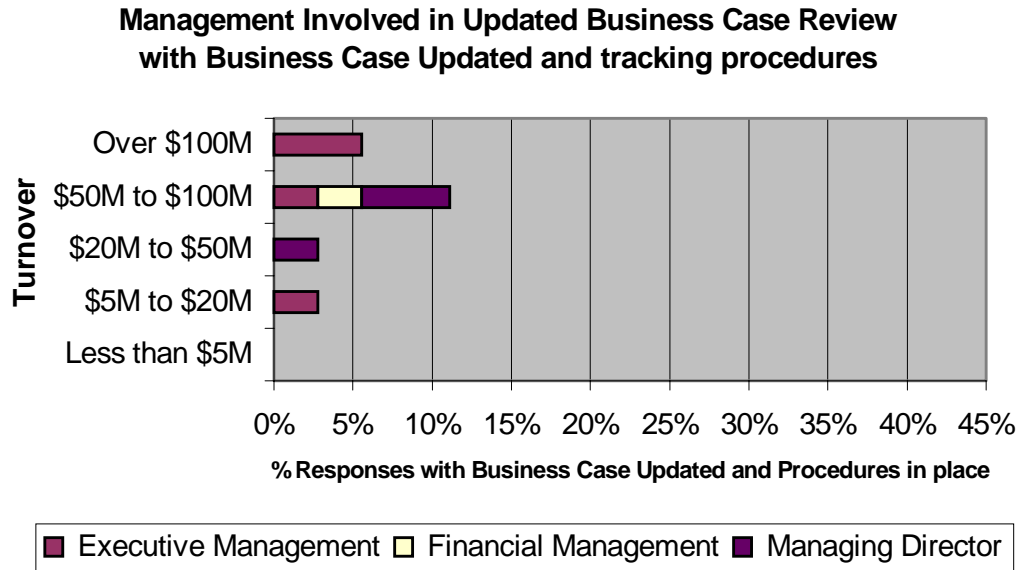


Figure 38: Management Involved in Updated Business Case Review where Business Case is updated and tracking procedures exist

When reviewing IT costs and benefits the consistent level of involvement for reviewing IT benefits appears to be only from Executive Management, although it is interesting that Operational Management and IT management disappear once formal processes are put in place.

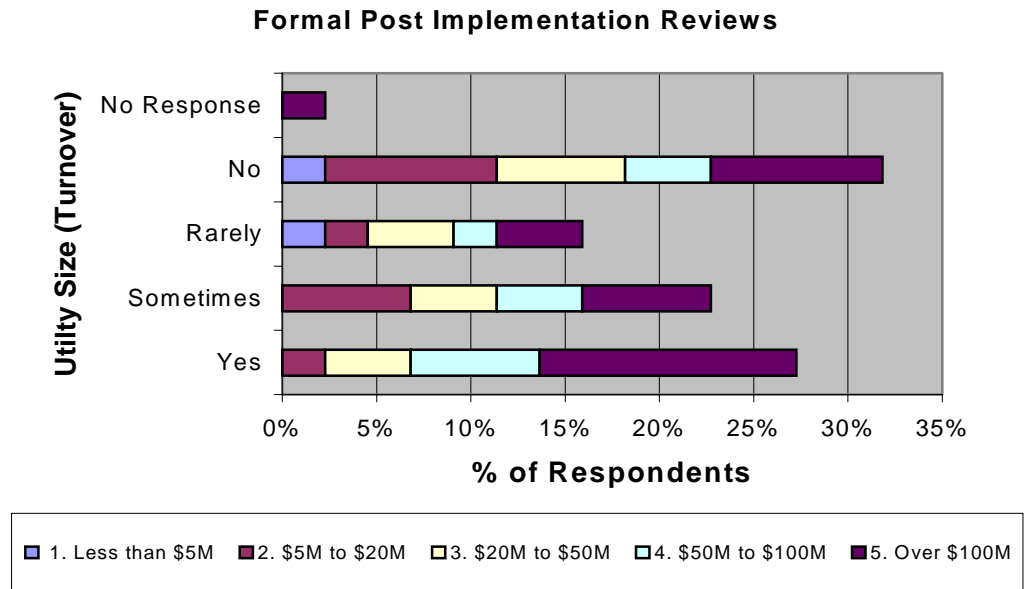


Figure 39: Formal Post Implementation Reviews

Formal Post Implementation Reviews (PIR) appear to occur in less than 30% of the organisations surveyed. This is illustrated in Figure 39, above. 23 % of the organisations undertake Post Implementation reviews "sometimes" with 32% of organisation not performing formal Post Implementation Reviews.

Of those organisations that conduct post implementation reviews all 12 organisations explain the PIR process and communicate the results. Of the 10 organisations that "sometimes" conduct PIR's two do not explain the process.

Willcocks (1996) states that when Post Implementation Reviews are conducted, the most common practice is for users to take responsibility for benefits, and for the IT department to take responsibility for the costs. Subsequently, system development costs are rigorously monitored and controlled but not the benefits.

The reasons Willcocks puts forward for this failure to monitor whether the projected benefits of IT were being achieved, were as follows:

- "It is too difficult". Benefits can be hard to assess after a project has been implemented, because many systems are used by several businesses or functional areas. Once a project is completed the costs of the system can be assessed fairly accurately, but the benefits that accrue, over the different areas, over a period of time, are often tangled in the general business results of those areas and are not easily identifiable.
- "It is not necessary". Some companies appear to adopt the view that if the investment appraisal has been undertaken correctly in the first place and the project implemented according to plan, there can be no need to check for benefits. By definition they must accrue.
- "It is too costly". Undertaking proper post-implementation reviews can be costly and consume resources that may be better deployed on more pressing management problems. A balance must be struck between the need to monitor the achievement of benefits and the costs of undertaking the review.
- "It is against our culture". Many IT departments have worked hard at promoting their role with the rest of the organisation, as a function providing a service. Acting as a watchdog to check on the delivery of business benefits is appropriate for user management, or an internal audit function, but not for a provider of professional services.

The problem that companies fear when assigning user and IT staff to review projects is bias. Indeed, even internal auditors must be responsive to some degree to the desires of top management. For any player in the management game, it is difficult to be, and to be seen to be, impartial.

As Ian Mackay (cited in Young, 1999, p.43) states

"The key element of business process change is the commitment of senior managers to what IT infrastructure is capable of delivering...A project may be capable of delivering productivity improvements, but if the business manager doesn't choose to exploit those capabilities, they will be wasted."

Silk (1991) like Broadbent and Weill (1998), claim that the classification of the project determines the most suitable method of Review, ie. not all projects can be treated the same way. Norris (cited in Willcocks, 1998, pp. 198 - 199) gives three category examples. These are:

- Mandatory projects – these are where applications that had to be done, eg. to meet statutory obligations- - GST. Meticulous cost-benefit assessments are unlikely to be conducted. There tends to be a decision between two choices: do what you must at least cost and in the least time.
- Performance projects – here a cost-benefit analysis of the proposed efficiency gains should be carried out. These calculations can then be used to compare with the actuals. It should be possible to link these types of investments to the business strategy, ie. What competitive advantage was offered, and or how it would increase profitability of market share? Norris states that it is not unusual that tangible benefits are much less than the costs for these type of projects and that the final decision is business judgement.
- Infrastructure projects – these Norris states are difficult to assess. By definition, these investments have no direct application, and the benefits accrue over a relatively long period of time by enabling other investments to proceed. Many companies duck any post-investment appraisal with claims of ‘strategic importance’. Norris claims that most cases should be looked at from the opportunity cost of doing nothing.

5.1 Benefits

Over 80% of the organisations that responded to the survey stated that they have realised quantifiable benefits from IT systems implemented in the last 12 months. (Figure 40)

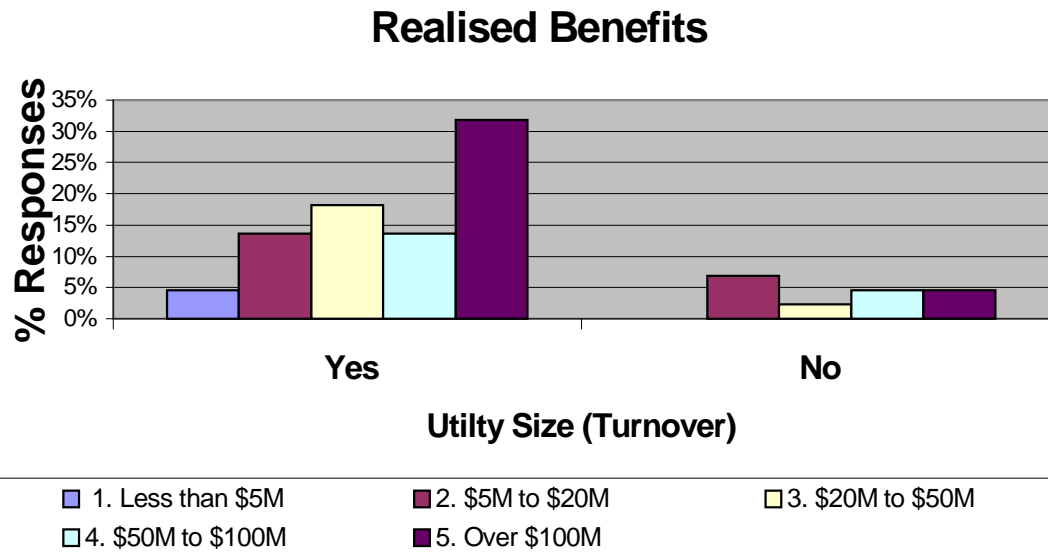


Figure 40: Realised Benefits from IT Systems implemented in the last 12 months

The areas where a benefit was expected are illustrated in Figure 41, below. The top ten ranked areas where most benefits were expected were:

- Financial Management (22)
- Productivity improvements (20)
- Customer Service/Billing (19)
- Faster debt recovery (15)
- IT Costs reduction (13)
- Maintenance (13)
- Inventory (9)
- Order management/Cycle time (8)
- Procurement (8)
- Quality management (6)

The number in brackets is the number of organisations who reported this as an expected benefit area.

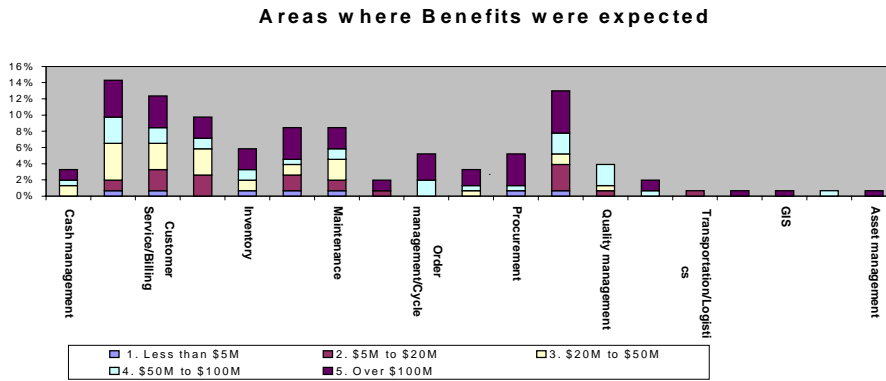


Figure 41: Areas Where Benefits Were Expected

The top 10 areas where benefits were realised were:

- Financial Management (18)
- Productivity improvements (18)
- Customer Service/Billing (14)
- Faster debt recovery (10)
- IT Costs reduction (9)
- Maintenance (8)
- Inventory (7)
- Quality management (6)
- Procurement (5)
- Cash management (4)
- Order management/Cycle time (3)
- Personnel reductions (3)

The number in brackets is the number of organisations who reported this as a realised benefit area.

The realised benefits are also illustrated in Figure 42, below.

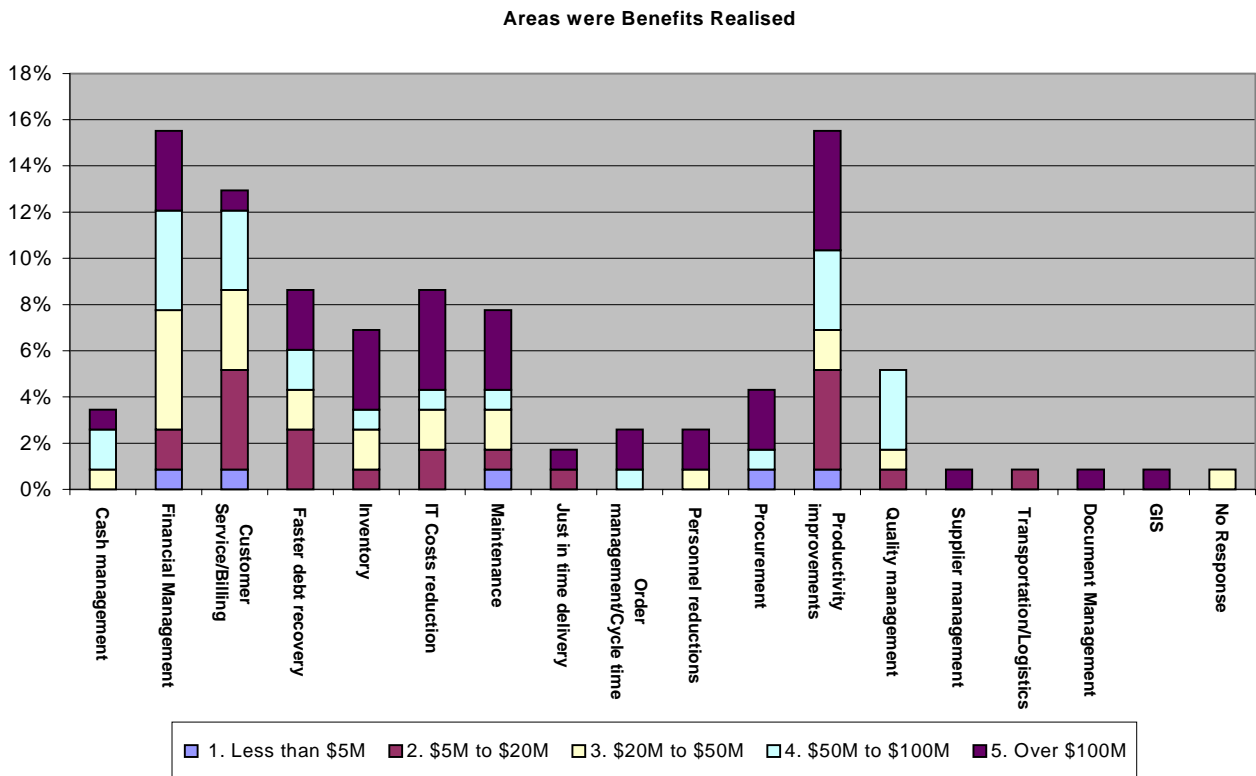


Figure 42: Areas Where Benefits were realised

Comparing the expected against actual is illustrated in Figure 43, below. As can be seen the level of the expected benefit was not met in a number of areas.

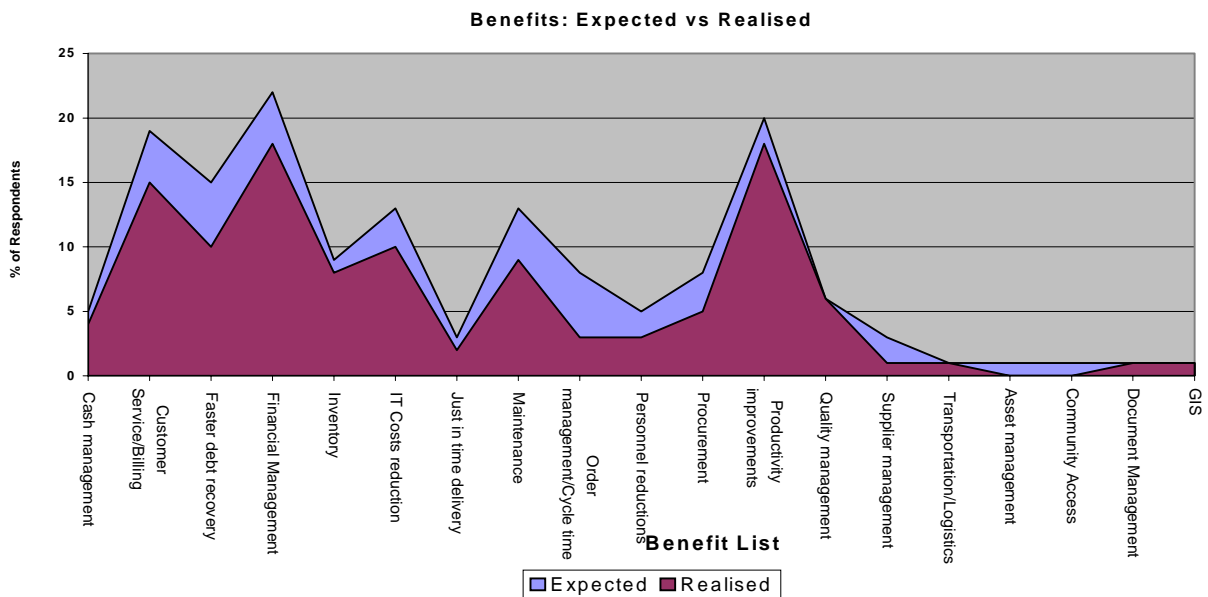
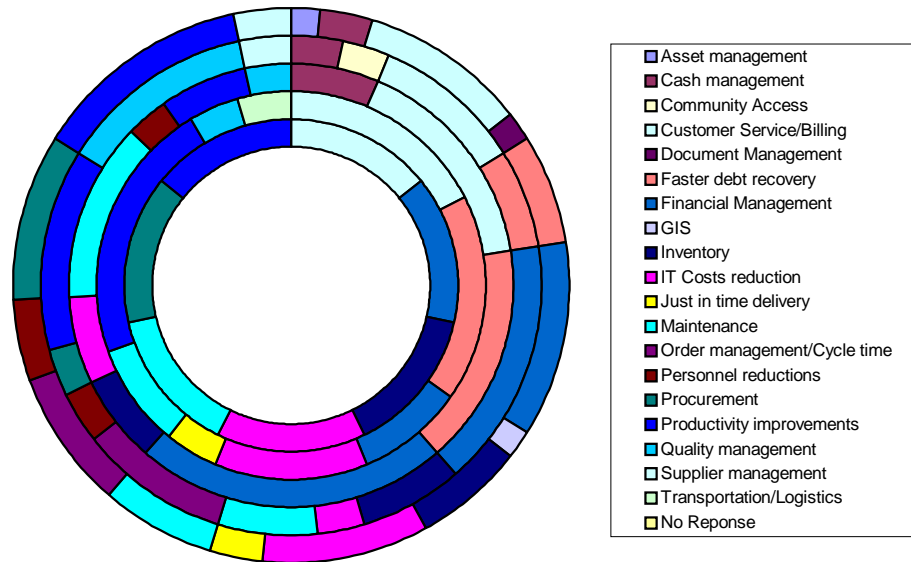


Figure 43: Comparison of Benefits expected against those Realised

Analysing the expected versus realised benefits more closely it becomes evident that it not possible to determine specific causes. But if one takes a more holistic approach some conclusions can be drawn. Figure 44 and Figure 45, below, represent this.

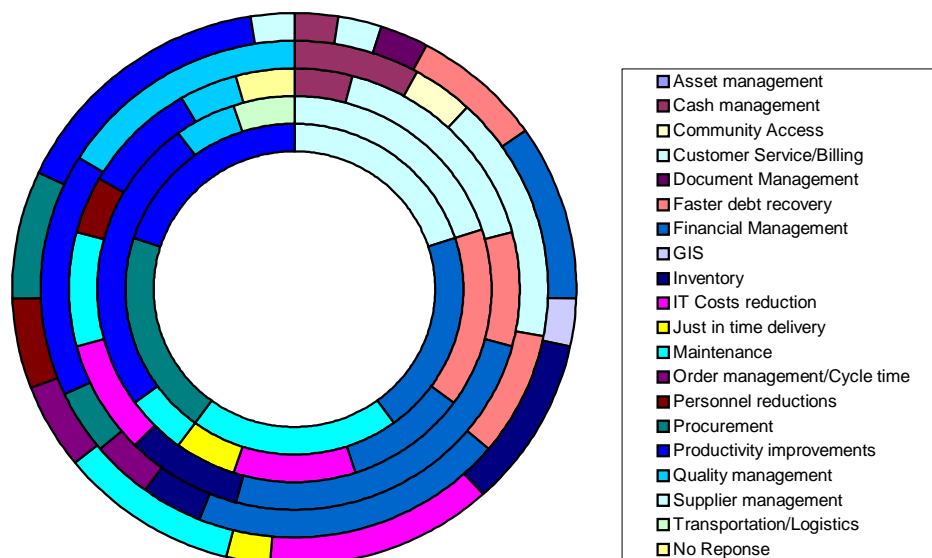
Expected Benefits



Turnover < \$5M (Inner Circle), \$5M - \$ 20M, \$20M - \$50M, \$50M - \$ 100M, Over \$100M (Outer Circle)

Figure 44: Doughnut Graph showing expected benefits by turnover (Inner circle Under \$5M, Out Over \$100M)

Realised Benefits



Turnover < \$5M (Inner Circle), \$5M - \$ 20M, \$20M - \$50M, \$50M - \$ 100M, Over

Figure 45: Doughnut Graph showing Realised benefits by Turnover (Inner circle Under \$5M, Out Over \$100M)

The areas where benefits were expected and not fully realised were:

- Customer Service/Billing
- Faster debt recovery
- Maintenance
- Order management/Cycle time
- Financial Management
- IT Costs reduction
- Procurement
- Inventory
- Personnel reductions
- Productivity improvements
- Supplier management

To take each benefit area individually and analyse the best approach would take far more time than allocated to this research project.

The fundamental theme, in the majority of cases, is direct or indirect cost reductions are important benefits to achieve from the introduction of computer systems. The trick is to extend cost reduction benefits to include a wider definition of the business value that IT can generate.

Table 5, below, illustrates that by classifying different IT investments different approaches to the evaluation and review of an IT investment.

Table 5: Types of IT investment (Norris, cited in Willcocks, 1998, p200)

Type	Purpose	Benefits	Aids to Evaluation	Importance of Business Judgement	Main Issues
Mandatory	For commercial or statutory reasons	Satisfy minimum legal requirements	Analysis of costs	Low	Fitness of system to purpose and capability of ITD to maintain
		Keep up with the competition	Analysis of costs to achieve parity and marginal cost to differentiate service from rivals	Medium	Competitive need Effect on market and rivals Ability to sustain advantage

Type	Purpose	Benefits	Aids to Evaluation	Importance of Business Judgement	Main Issues
Efficiency	To do the same job better	Cost saving	Cost-benefit analysis Customer service survey Staff motivation analysis	Low/medium	Validity of assumptions behind the case Morale and service-level effect
Effectiveness	To do a better job	Increase revenue	Cost-benefit analysis Assessment of hard-to-quantify benefits Prototypes and pilot systems to demonstrate value	Medium	Validity of assumptions Business value of claimed benefits Risks involved
Infrastructure	To support present and future systems	Enable the benefits of other applications to be realised	Analysis of costs Performance standards Aggregate of benefits	Medium/high	Corporate need Benefits in both short and long term
Research	To be prepared for the future	To know applicability of new ideas to the company	Setting objectives within cost limits	Medium	Long-term corporate benefit Amount of money allocated
Business Redesign	To change the business	Achieve a competitive edge	Full analysis of all types of costs, benefits and risks	High	Business scenarios and aim of the system Impact on the market and company Risks

6. Findings

These findings are a summary of the report. The primary findings are an attempt to try and relate some observations made in this report with the recently published Gartner's CIO's Top 10 Management Issues for 1999. (Cited in Prodromou, 1999 p. 26) in Table 1, page 2.

The secondary findings are the remainder of the findings from this report. They are by no means less significant than the primary findings. They just cannot be directly related to the Gartner Top 10 CIO issues for 1999.

6.1 Primary

- The role of the CIO is not prevalent in the utility industry. IT management is not considered to be of such importance to have a senior role in the organisation and this appears to go against national trends.
- Most recent IT changes have occurred to meet Year 2000 (Y2K) compliance. All Utility organisations have either completed their Y2K projects or were winding them up. They are confident that their Y2K programs will be successful. Most organisations spent more on replacing affected IT items (software and hardware) rather than repairing them.
- The process to manage the IT asset is not effective. A more IT specific process is required, 60% of the organisations claim they matched their current IT spending portfolio with business mission needs, priorities, strategic direction, or major process re-engineering, but did not manage or follow up on the process.
- 70% of the organisations surveyed did not have procedures for tracking costs and benefits attributable to IT. This percentage appears very high and is consistent across all organisations in the utility sector. When asked if senior management are informed of differences between estimates and actual's, 65% of the organisations said yes, they do, with another 25 % responding sometimes. That represents 90% of the organisations that responded to the survey. Strange isn't it! How can you advise management of changes when you have no formal procedures?
- There was no significant increase in the 1999/2000 IT budget's but most organisations have reported increases in next year's budget.
- Over 80% of the organisations that responded to the survey stated that they have realised quantifiable benefits from IT systems implemented in the last 12 months. The areas where benefits were expected and not fully realised were:
 - Customer Service/Billing
 - Faster debt recovery
 - Maintenance
 - Order management/Cycle time
 - Financial Management

- IT Costs reduction
 - Procurement
 - Inventory
 - Personnel reductions
 - Productivity improvements
 - Supplier management
- The methods used by the organisations surveyed for measuring IT investment were predominantly the traditional type. The most popular method of review is ad hoc.
 - 93% of utilities use external service providers, although only two organisations, with a turnover over \$100M, had all of their IT services completely outsourced. These \$100M turnover organisations also use performance-based payments. 34% of external services are provided by companies that are either Multinational or are registered in Australia but have an overseas parent. Performance based payment agreements are mainly entered into by Australian owned organisations.
 - IT is seen as a competitive "tool" in most industries, but this does not appear to be the case in the Australian Utility Industry with 72% reporting that they spend less than 10% of their IT budgets on Competitive Advantage.
 - The majority of organisations do not stop or suspended IT Projects if expected key deliverable's are either not going to be achieved or if costs are exceeded. The main reason is that in the majority of cases, over 50% (Figure 24), don't have any published guidelines for the data to be collected. If you don't know what and how much the benefits or costs are going to be how can you know that you not getting them. Don't record it, can't track it!
 - Consistent level of involvement for reviewing IT benefits appears to be only from Executive Management. Operational Management and IT management disappear once formal processes are put in place.

6.2 Secondary

- In a recent article by Mason & David (1999) more than half of IT managers surveyed in a straw poll were yet to determine the impacts of the GST on their infrastructure purchasing budgets. This was confirmed in the survey with over 50% of the organisations reporting they had not considered the GST as part of their 2000 IT Budget. The impact of the GST does not appear to have been fully considered by most IT organisation in the Australia Utility Industry. Almost 50% of the organisations have considered the impact of the GST on their IT program while 30% of these attempted to address the GST during their Y2K program.
- 41% of the organisations who responded to the survey spend less than 10% of their IT budget of improving Customer Service.
- Organisations pay nearly 50% of their services as fixed price or performance based but only 25% of those organisations have totally autonomy. Most

organisations see some form of involvement by their suppliers in their IT business, be it as an information provider or as a partner but external organisations are not permitted to represent their partnership organisation.

- Formal Post Implementation Reviews (PIR) appear to occur in less than 30% of the organisations surveyed. Of those organisations that conduct post implementation reviews, all 12 organisations explain the PIR process and communicate the results. Of the 10 organisations that "sometimes" conduct PIR's two do not explain the process. Willcocks (1996) states that when Post Implementation Reviews are conducted, the most common practice is for users to take responsibility for benefits, and for the IT department to take responsibility for the costs. Subsequently, system development costs are rigorously monitored and controlled but not the benefits.
- Manhour's to be used, Function points, Customer Service Improvements and Links to Business Objectives are metrics that are less likely to be used as a type of supporting data to be provided for IT investment proposals (less than 5 %).

7. Conclusion

Willcocks (1996) and Berger (1992) both speak of the need for business and IT to be partners for any business to improve. This partnership is a strange one. It is full of conflicts and contradictions

Some managers would agree that IT has penetrated their businesses but find it hard to justify any further expense!

Some businesses have had IT become such an integral part of the business that it was fundamental to the way everyday business activities were conducted.

Business use IT for competitive reasons and therefore to either stay ahead or just to compete with the competition the business could simply not afford NOT to invest.

With IT being such an integrated part of business, Management finds or is finding it increasingly difficult to separate technology savings and IT benefits from normal business benefits.

The fundamental problem is that management in business does not see IT as a Capital Asset. Typically software is only seen as an expense or overhead. Failure to appreciate the size of this investment leads to IS/IT being under managed, a lack of serious attention to IS evaluation and control, and also a lack of concern for discovering ways of utilising this IT asset base to its full potential. The IT department take responsibility for the costs but do not controll the benefits.

If you look at who is the “management” they are typically accountants or engineers. These two disciplines deal with numbers or values. To communicate effectively and to understand the problem a value measurement system is essential. But how?

Financial reports usually reduce performance to a single number, such as return on assets or gross profit. Human resource reports present such numbers as employee turnover or hours lost per month from accidents. IT reporting should be simple and numeric.

Glen Peters (1996) summarised the IT management issues affecting business today. He looked at what made a good company. He found that the Companies that succeeded had positive attitudes and had the following qualities.

- Had Steering committees (or project boards)
- Members followed project from start to post implementation
- Members were accountable or took responsibility for benefits
- All benefits were measurable variables
- Not necessarily costs term's eg.. sales calls per day
- Steering committees regularly reviewed for benefits
- concentrated on finding benefits missed in original study

All of the Projects have to have clearly defined responsibilities and criteria that was measurable.

Peters (1996) stated that where specific criteria was used the project typically *over performed* their original criteria.

All of these projects had four basic qualities. They are:

1. That evaluation criteria has to be measurable (or quantifiable)
2. It should be clearly stated at the beginning of the project and continually reviewed during the lifecycle.
3. Many different criteria should be used.
4. Formal methods should be used. These may be traditional or modern, but they must be consistent across the whole organisation (e. Kodak and Federal Express)

Management issues in IT are no different to any other business. They require the involvement and backing of senior management in all aspects of a project, not simply the initial stages.

Management involves the review of the process and the inspection of the final product. IT unlike most products requires a discipline to formulate various metrics to measure its success or failure.

In Berger's (1992) article "Critical Issues in IS" (Information Systems), he states that:

"Businesses are refocussing on bottom-line costs, customers and quality to increase financial performance and better compete. Competitive advantage always has been and always will be the Holy Grail of business.

Tighter, flatter organisations, calling for greater accountability, are having a greater impact on IS as they push to downsize, outsource and consolidate capital-intensive mainframe systems.

Keeping up with technology alone is a full-time job. He goes further in the article by stating that management responsibility is no longer measured by the amount of budget and people one directly controls, but it is measured by the impact one plays in creating competitive advantage from the use of IT delivering solutions in a reasonable time frame and managing the cost of doing so. It is measured by the effective management of the outsourcing and downsizing teams.

This places extreme pressure on the IT department, it's staff and management.

Cutting costs while still delivering value is one of the greatest challenges facing any business let alone an information systems / technology business. But what misses out or gets put off to next year?

Berger (1992) points out that IS technological challenges are also becoming more complex. Control and ease of use conflict. This is seen in the emerging technologies such as distributed environments and e-commerce. Keeping up with technology alone is a full-time job without having to manage the business as well.

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