

## **An investigation of knowledge management practice and attitudes by information technology departments within organisations.**

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### **ABSTRACT**

*Much research has been conducted on knowledge management (KM) in order to improve how organisations handle this valuable resource. Little is known, however, of how the providers of the knowledge management technologies, the organisation's IT people, handle their own knowledge management. This study has focused on how IT departments and people "practice what they preach" in this area. A survey was conducted among large organisations which reveals there is a recognised need for KM but it is not part of their formal goals. There are many KM technologies in use, however, and a positive attitude exists towards their adoption in the IT departments of these organisations.*

### **INTRODUCTION**

Knowledge is a vital asset to any organisation as it is by using this knowledge that decision-making occurs. Most organisations have recognised the importance of knowledge, yet many do not know how to handle and manage knowledge. Knowledge management research has generally focused on organization-wide issues but not on how knowledge is handled *within* an IT department.

The IT department is an important part of any organisation as it frequently services the organisation-wide needs and requirements, where strategically used technology can bring multiple benefits and provide a competitive edge. IT departments allow the other departments within the organisation to function more efficiently, yet the people within the IT department and their knowledge are often overlooked in relation to other functions of the organisation, as the IT department is usually in a support role as it is used to facilitate the efficient running of other departments.

In a rapidly changing market and technological environment, organisations have found that there is a high turnover of IT staff, with the result of valuable tacit knowledge being incompletely or improperly transferred to the organisation before an employee leaves. There is a potential loss in productivity, time, and resources, caused by having to employ and retrain new staff.

This study examines how knowledge management occurs within the IT departments of public and private sector organisations. This includes looking at whether knowledge management is carried out across multiple IT departments, the knowledge management initiatives that may exist, the knowledge management approaches used, the technologies used to support knowledge management, the behaviours that occur within the IT department, culture of the IT department, reward systems used and the perceived benefits of knowledge management.

## LITERATURE REVIEW

### **Definitions and Concepts**

The various ways of managing knowledge have led to the term 'knowledge management', which encompasses the many different areas of people and technology management. The objective of knowledge management is the creation, transfer, and application of knowledge in organisations. This section will be examine knowledge management and past research conducted in the area.

There are often distinctions made between knowledge, information, and data.

Knowledge can be defined as the experience, concepts, values, or beliefs that increases an individual's capability to take effective action (Lai & Chu 2000).

Knowledge is renewable, reusable, and accumulating information that is combined with experience, context, interpretation, and reflection that provides value to firms (Davenport, et al., 1998). Data refers to the raw numbers and facts while information is processed data. Alavi and Leidner (2001) take the view that information becomes knowledge once it is processed in the mind of the individual. This knowledge is related to facts, procedures, concepts, interpretations, ideas, observations, and judgements.

There are several perspectives of viewing knowledge. The first perspective is to view knowledge as a state of mind. It allows individuals to focus on expanding their knowledge and to apply it to the organisation's need. The second perspective is where knowledge is defined as an object that can be stored and manipulated. Thirdly, knowledge can be perceived as simultaneously processes of knowing and applying this knowledge. The fourth perspective looks at how organisational knowledge is organised to facilitate access to and retrieval of content. Lastly, the fifth perspective is to view knowledge with the capability to affect future decisions (Alavi & Leidner 2001). Different perspectives of viewing knowledge have led to different perceptions of knowledge management.

*Explicit* knowledge refers to knowledge that can be expressed in words and numbers and shared in the form of data, scientific formulae, specifications, manuals, and so on. It can be easily codified and communicated between individuals. *Tacit* knowledge refers to knowledge that is difficult to communicate and share with others due to the high personal and hard to formalise nature of the knowledge. Tacit knowledge is deeply rooted in an individual's actions and experience as well as in the ideals, values, or emotions he or she embraces (Nonaka & Konno 1998).

Knowledge Management refers to the identification and leveraging of the collective knowledge in an organisation to help the organisation use the knowledge effectively (Alavi & Leidner 2001). The usage of knowledge management can allow an organisation to use information for competitive advantage. A company's performance will depend on the ability of managers to turn knowledge resources held by individuals and teams into value-creating activities (Von Krogh 1998).

The culture of the organisation can inhibit or encourage the creation and sharing of knowledge. There is general recognition of the need to encourage and enable people to collaborate with each another, which will result in a more useful collection of knowledge for the organisation. Armbrecht et al (2001) found that organisational culture has a tremendous impact on an organisation's knowledge management efforts. Their survey examined cultural issues such as the inhibitors and facilitators that relate

to knowledge management efforts and identified four categories of knowledge management culture, namely understanding, support, incentives, and interaction.

### **Knowledge Management in the IT department**

Much has been written about knowledge management, but the majority of knowledge management research has focused on what it is how it is utilised in organisations.

Research has focused on various issues that are IT related, but not specific to the IT department. Markus (2001) identifies the importance of information technology in the transfer of knowledge between those who have it, and those who do not, discusses how knowledge can be reused, factors involved in reuse success and the key technologies that are in use to support knowledge reuse, with emphasis on knowledge management repositories.

Oliver (2001) briefly mentions that IT departments are usually stretched in terms of resources as responsibilities include desktop support, network maintenance, the intranet, the extranet, communications technology, and any e-commerce initiatives underway. They state that knowledge management programs which are implemented in the organisation, requires commitment from upper management, as they need to allocate resources accordingly, and consideration has to be given to the IT department, which will have to extend its responsibilities to looking after the system. Drucker (2001) studied knowledge management in an IT organization and found that their users are not interested in reusing old data, but are building systems that connect workers to resident experts on various subjects. He also found that encouraging employee participation is a major challenge that organisations face in engaging in knowledge management. Armbrecht et al (2001) has identified that while IT plays an important role in knowledge management, it *is not* knowledge management. Although this study did not focus specifically on the IT department, it raises various interesting issues in regards to the role of IT within the organisation. IT plays an important role in breaking down infrastructure boundaries and can also assist in knowledge management awareness campaigns.

Bloodgood and Salisbury (2001) examine how information technology can best be used during different types of strategic change and study different combinations of tacit and explicit knowledge that make certain types of IT more appropriate in some situations than in others.

In summary, the literature review reveals that little research has been conducted on how KM is carried out in IT departments and what issues are associated with it. Hence, this study aims to address this gap in relation to the IT department, its approaches, behaviours, people and functions, and leads to the following research questions.

The overall question: *How do organizations utilise knowledge management within (and for) their IT division?*

The leads to sub-questions:

- *Do the IT departments' strategic goals include some form of knowledge management?*
- *Do the IT Managers and senior management recognise the importance of knowledge management in the IT department and if so, what importance do the IT managers place upon the value of a knowledge management system?*
- *What kinds of knowledge management approaches are used within the IT*

*department?*

- *What technologies are used to support knowledge management initiatives?*
- *What reward systems are in place to encourage knowledge sharing?*
- *What kind of behaviours occurs within the IT department, and what do IT managers do to help establish and encourage a supportive knowledge culture?*
- *What are the major benefits of using knowledge management in the IT department, from the IT Managers point of view?*

## **RESEARCH DESIGN**

### **Research Method**

The survey approach was chosen as the primary data collection mechanism for this research because the nature of the research questions required a cross-sectional view of behaviours at a particular point in time from a range of organizations. The target group for the survey was therefore chosen as the largest 1,000 organizations in Australia. It was decided that in order to represent the views of the IT division in these organizations the most appropriate respondent would be the most senior IT person (usually labelled the Chief Information Officer or CIO). Participating organisations for this research were selected from a mailing list of the top 1,000 companies across Australia and New Zealand, which was originally compiled by IBIS World. From this mailing list, all non-Australian companies were removed. Using systematic sampling, with a sampling interval of four, 250 companies were selected for participation in the survey. This was further reduced to 220 after removing subsidiaries, takeovers, and those with an official “no survey” policy.

### **Research Instrument**

The survey instrument constituted thirty-one questions (a mix of open-ended questions, those requiring interval/ratio responses, Likert-scale and nominal data). These questions were divided into five sections, as follows:

- General demographic information about the organisation and the IT department
- The knowledge management goals and initiatives of the IT department
- The technologies used in knowledge management
- The cultural issues involved with knowledge management and any incentives and reward programs that are in use
- The benefits of using knowledge management

A few of the exploratory questions were developed by the researchers, but the majority were derived from recent studies which were focused on these aspects of knowledge management, but not previously directed specifically at the IT department (Rubenstein-Montano et al 2001, Fichman & Kemerer 2001, Markus 2001, Jarvenpaa & Staples 2001).

## **RESULTS**

The survey was distributed to the CIOs of the 220 organisations and, after two rounds of distribution, a total of 41 valid responses were received for an effective response rate of 18.6%. While there may be the potential for non-response bias, 18.6% is a reasonable response rate and the responses were quite consistent across the two rounds.

### **The Organisations**

Organisational size, in terms of the number of employees, varied 8 to 32,000 (mean

2445), of which the average the number of IT employees was 48. Organisational structure was mostly hierarchical (77% vs. 23% flat), centralised (61% vs. 39% decentralised), and divisional/functional (88% vs. 12% cross-functional). The general management style was mostly associated with “formal procedures and rules” 63%, with “fewer rules and greater autonomy for employees” 25%, and “co-operative and group oriented” 12%.

The position of the Head of the IT department relative to the Chief Executive Officer may indicate the importance of the IT department in terms of the overall organisational structure. The lower the number of reporting levels between the Head of the IT department and CEO may also indicate how much “leverage” the IT manager/executive might have in various developments and implementations of key projects. 30% reported a direct link between the Head of the IT department and the CEO, 55% said there was one level between the two positions, and 15% of respondents said that there were two levels. So, on average, the chief IT person was 1.7 levels below the CEO, indicating IT may have a reasonable level of authority. The amount of IS/IT functions that are outsourced may have a bearing on how much knowledge management is carried out within the IT department. Systems development and telecommunications were the two most outsourced functions (each 32% of respondents), then (26%), user support (16%), project management (16%), and IS/IT planning (7%). Some other IS/IT functions were not listed but provided by the respondents. These included the development of web applications (using ASP for example), IT architecture development and web hosting, with outsourcing proportions ranging from 10 to 100%.

### **Performing Knowledge Management**

The most important knowledge carriers in the organization were people (mean of 4.4 on a 1-5 importance scale) databases (mean 3.4), emails (3.1), processes (3.0), and paper (2.5). Other technologies not listed, but provided by the respondents, included the organisation’s intranet and electronic documents. A bivariate correlation analysis between number of IT employees and the important knowledge carriers revealed the number of IT employees and the importance of people as knowledge carriers to be negatively significant at the 0.01 level. This indicates that in larger IT departments people are less important as knowledge carriers and may be substituted by technologies.

The majority (68%) of the respondents answered in the negative when asked if their IT department’s overall strategic goals include knowledge management explicitly. This high percentage may indicate that the participatory IT departments did not utilise knowledge management in a formal manner, or alternatively, knowledge management may be explicitly included in the overall organisation’s strategic goals. Some respondents indicated that although their IT department may not have included knowledge management explicitly in their department’s overall strategic goals, these goals are currently under review and may change in the future to include knowledge management.

An analysis of the effect of organisational structure on formal KM strategies only 26% of those with hierarchical structure formally included KM compared to 50% of flat structured organisations indicating that flatter structured organizations were more aware of KM strategies.

Knowledge management roles suggested by participants include usage of a contractor to handle knowledge management, project team, IS architect, IT manager, whole IT department, services manager, help desk team, network management staff, IS security staff, administration systems staff, process analyst, technical leaders and manager of information delivery. Clearly, some of the organisations have made a conscious effort to implement various knowledge management systems and have assigned a specific job function for knowledge management.

49% of respondents indicate that they have a knowledge management initiative in their department which indicates that although many IT departments have a knowledge management initiative, there are still many that do not, and these results applied across different management structures. However, 60% of organisations with a co-operative and group-oriented management style had an IT knowledge management initiative, which was much higher than the other styles and supports the view that cooperative style provides a much more conducive environment for knowledge sharing to take place.

For the 51% of respondents that did not have a knowledge management initiative in the department, varied reasons included (1) other priorities take precedence, (2) knowledge management is recognised but an initiative is yet to be developed, (3) lack of time and resources, (4) department is currently undergoing system infrastructure overhaul, hence it is currently not possible to have an initiative, (5) the department is struggling with information management, hence is unable to go “a step further” and implement a knowledge management initiative, (6) knowledge management is a global initiative, hence it is not specified for the department, (7) knowledge management is not seen as relevant, or it has low importance, and (8) department has no knowledge about knowledge management.

For those IT departments that had a knowledge management initiative, respondents were asked to describe those initiatives. Responses were categorised into three main groups, which were *technical* initiatives, *processes/procedural/policies* initiatives, and *strategic based* initiatives. Unsurprisingly, the biggest number of knowledge management initiatives existed within the technical group, with a 48% response rate. The results indicate that the existence of technical knowledge management initiatives are inline with an IT department, as it would be expected that an IT department would utilise various technical systems to aid in the creation, storage and dissemination of IT knowledge. The technical knowledge management initiatives, as provided by respondents, include data warehousing, document management systems, issues and risk management systems, systems library, content management, mobile architecture and the Intranet. The technical initiatives were followed by the processes/procedural/policies initiatives, with 45% of responses. These initiatives included work collaboration, the ability to document operations/procedures and workflow, to map and store policies and the usage of a formal methodology or the Systems Development Life Cycle. Strategic knowledge management initiatives formed 7% of the responses. These initiatives include data management strategies and solutions, and ideas database.

The length of time that organisations have had a knowledge management initiative varied between less than a year to four years or more. The majority of the responses, at 65%, indicated that a knowledge management initiative has only existed for less

than a year. Although knowledge management has been around for some years now, the findings show that knowledge management is only starting to be recognised as an important function for the organisation and the IT department, and hence the relatively new implementation of a knowledge management initiative. Correlation between number of employees and IT employees with length of the knowledge management were 0.473 and 0.507 respectively, both significant at the 5% level. Thus, larger organizations are more likely to have a KM initiative in place. Respondents were provided with a list of knowledge management objectives, and asked to determine the importance of knowledge management in their business strategy. Transformation of an individual's knowledge into collective knowledge held the highest importance in the context of the business strategy. Other high importance knowledge management objectives include the standardisation of existing knowledge in the form of procedures/protocols, and the facilitation of the "reuse" and consolidation of knowledge about IT operations. Other knowledge management objectives that had a middle level of importance include the generation of new knowledge inside the organisation, and the combination of customer knowledge and internal know-how. Respondents rated the acquisition of new knowledge from external sources with a relatively low importance. This indicates that the majority of surveyed IT departments believe in creating knowledge internally. A correlation analysis was performed on the number of employees and the knowledge management objectives, within the context of the business strategy. No statistically significant relations exist, which indicates that the results may be applicable across all organisations. But the overall results show that organisations see the primary use of knowledge management is to ensure that individual knowledge is able to be stored and later shared with the result of increasing the value of the organisation's shared knowledge and to minimise knowledge loss through the departure of employees.

**KM Approach Mean St.**

**Dev.**

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Intranets (including groupware)	3.78	1.27	External or internal benchmarking	2.25	1.10
Sharing and combination of knowledge	3.70	1.02	Lessons learned analysis	2.20	1.16
Training and education	3.35	0.95	Best practice inventories	1.97	1.05
Cross-functional teams	3.32	0.97	Research and development centres/labs	1.95	1.15
Documentation and newsletters	3.10	1.10	Lessons learned inventories	1.95	1.09
Manuals and handbooks	3.08	0.96	Explicit learning strategy	1.95	1.01
Communities of practice	2.33	1.13	Yellow pages of (expert groups) expertise/knowledge	1.66	0.97
Storage of customer/stakeholder knowledge	2.26	1.02			

**Table1: Extent of Use of KM Approaches**

A review of the knowledge management literature indicates that there are many knowledge management approaches that can be used. Respondents were provided

with a list of common knowledge management approaches, and were asked to rate the extent of use, from not at all, to extensively (see Table 1). As expected, Intranets were the most common knowledge management approach. Intranets are often the most visible knowledge management approach and hence, the most recognisable “tool” of knowledge management. Other extensively used knowledge management approaches included the sharing and combination of knowledge, training and education of employees, cross-functional teams, manuals and handbooks (which may also be found and accessed via the Intranet) and documentation and newsletters. Sharing and a combination of knowledge, training and education, and cross-functional teams all require people and their ability to work together. This ability is important when it comes to the creation, storage and sharing of knowledge as it requires communication. The extensive use of these KM approaches is a positive sign.

Documentation was the KM practice with the greatest use (mean 3.56), followed by encouraging the generation of new knowledge (3.31). Of some surprise was the lack of use of application or generic software reusable parts since IT departments might be expected to make a library of reusable software components available to programmers.

### **Technological Infrastructure**

All respondents recognised that some form of computer technology is required to support KM initiatives (see Table 2). Email was the most extensively used, followed by the World Wide Web (itself a large knowledge base, content validity aside!), shared documents and products (often access via an intranet), general MIS, and training and education. Less frequently used were performance support systems/DSS, knowledge-based systems, knowledge exchange with clients, gathering and publication of lessons learned/best practice. Rarely used were videoconferencing, best practice/lessons learned databases, simulation, interactive multimedia, and the yellow pages of expertise.

#### **Technology Mean St.Dev. Technology Mean St.Dev.**

E-mail	4.24	0.98	Performance support systems/DSS	2.41	1.17
Shared documents/products	3.51	1.04	Knowledge exchange with clients	2.27	1.07
Knowledge searching on WWW	3.47	1.29	Knowledge-based systems	1.13	1.38
MIS	3.44	1.23	Gathering & publication of lessons learned/best practice	2.16	1.04
Training & education	3.22	0.95	Videoconferencing	2.00	1.23
Business intelligence	2.71	1.09	Best practice/lessons learned database	2.00	1.22
Discussion forums	2.55	1.16	Simulation, interactive multimedia	1.60	0.98
Extracting knowledge from process data to improve operations	2.53	1.20	Yellow pages of expertise	1.54	0.80

## Table 2: Extent of Usage of KM Technologies

Other technologies planned for included content management (22% of respondents), information portals (17%), document management systems (17%), data warehouses (11%), search engines for existing knowledge (11%), while a few proposed vendor ERP systems, Lotus Notes, process modelling and simulation.

### Cultural Aspects of Knowledge Management

The culture of an organisation may either hinder or encourage knowledge creation, storage and sharing. Respondents rated the extent of various behaviours in their IT departments and the results are summarised in Table 3. Information sharing with other departments was the most common behaviour, followed by information using from other departments, sharing the same business objectives, praise for good work, and open attitudes to information in general.

#### Behaviour Mean St.Dev. Behaviour Mean St.Dev.

Work often involves sharing information with other departments	3.95	0.89	Organisation thinks and plans ahead	3.72	0.94
Work often involves using information from other departments	3.90	0.79	Work often completed with staff from other departments	3.59	0.91
Members of department share the same business objective	3.87	0.80	Results of work dependent on the effort of people from other departments	3.56	0.91
Employees told when a good job is done	3.79	0.86	Group takes strong action to address poor performance	3.45	0.86
Attitudes and behaviour relative to information in general (open/closed)	3.74	0.72	Decision making is centralised at the top	3.36	0.93

The level of acceptance of KM was highest among professional and KM workers (who deal with creation, storage and retrieval of knowledge), followed by business analysts, help desk personnel and web designers (whose job functions may require reuse of knowledge), then senior and middle management, with supervisory staff having the lowest level of acceptance.

Aspects of culture that would support KM were suggested by respondents as (1) a shared understanding of working cross-functionally and applying lessons learned, (2) professionalism of staff attitudes, (3) flat organisational structure, (4) strategic plans that incorporate KM, (5) senior management recognition of KM, (6) reward schemes,

and (7) a good IT support structure.

Aspects of organisational culture that were barriers to effective KM included a “knowledge is power” attitude (20% of respondents) – which leads to an unwillingness to share information, negative attitude to KM among management and staff (perhaps due to low awareness of KM potential), resistance to change (since KM implementation may require changes in the way the IT department will be run and the processes involved. An aging workforce may also create this resistant attitude where staff may want to keep to old processes and practices, instead of moving towards a knowledge-based department.

Training programs are one way of supporting KM, as it allows employees to be trained in understanding the importance and value of KM. It also allows employees to gain an understanding of the benefits that the organisation, the department, and the individual, can receive from utilising KM. Some organisations had a “train the trainer” program, which involves an individual or group being trained in a certain area, then, once they have been trained, they can transfer their knowledge to others within the department. Other responses included “on the job” training, where individuals are expected to teach themselves, which often requires much interaction with more senior staff; use of Matrix tools (such as content management and data management), document management training and the use of knowledge-based programs.

### **Reward Systems**

Respondents were asked the extent to which their organisation has taken steps to motivate and reward people and/or teams that support KM. The mean response of 1.70 (where 1 = “not at all” and 5 = “to a very great extent”) reveals there is a distinct lack of reward systems in place for IT staff that support KM. Only 16% of respondents reported any incentives or reward systems that support KM. These few included staff reward and recognition schemes (e.g., Employee of the Month/Year), informal recognition, and payment for further education. Despite incentives and reward systems, sometimes situations may arise where conflict occurs over knowledge ownership. When asked what kinds of incentive mechanism are used to help reduce these conflicts responses included (1) staff are counselled if he/she are not in agreement with the organisation’s policy on knowledge sharing and ownership, (2) an IT steering committee which handled issues such as these, (3) reliance on the staffs’ professional in regards to knowledge ownership, (4) the actual organisational culture – which is supposed to act as a deterrent, and (5) an Information Management Charter, which clearly states the organisation’s policies on issues such as this. These responses revealed more “control” than “incentive”.

### **Knowledge Management Outcomes**

Respondents were invited to indicate the extent to which the new knowledge and knowledge sharing was generated, tracked and measured within the organisation, responses indicate that this is done infrequently. For those departments that already use KM, the extent to which they measured the value-added and cost of KM was also low. These results illustrate that the majority of IT departments do not track or measure knowledge, and hence have very little idea of the value of new and past knowledge. Reported definitions of KM “value-added” and measurement included (1) application support capabilities, (2) the handover of applications/projects from the

development team to the support team, and (3) through Service Level Agreements with clients. Clearly, very little attention is paid to measuring KM and it is little understood.

To learn their views of the benefits that can be derived from KM, respondents were provided a list of differing point of views, and asked to state their views on that benefit. From a strategic point of view, respondents said KM leads to improved decision-making (12%), a common view of priorities and goals within the IT department (9.5%), more efficient use of scarce resources, and the IT department benefiting from past experiences and so providing improved services to clients (internal or external). Other strategic benefits mentioned by respondents include: (1) IT department will have “better” information (i.e. information will be consistent, and less prone to errors), (2) a formalised and better management of collective knowledge, (3) faster development of projects and better support, as there is a reduction in the need to revisit “old grounds”, (4) aids in knowledge creation, (5) provides a competitive advantage, (6) reduces the impact of staff turnover, as key knowledge is stored and available to other staff members, (7) reduces overall departmental costs due to the knowledge that is readily available, which occurs because of the lesser amount of developmental time required for projects, new staff are able to self train themselves from existing knowledge, less support time and costs involved etc, (8) information can be easily analysed for departmental use, (9) best practice transfer, which results in only the useful knowledge that gets pass on, (10) a better “corporate image” due to more confidence in existing data and knowledge, (11) forces a migration to a target architecture, (12) improves overall productivity, (13) IT department will have a better understanding of the market, (14) knowledge is able to be kept in-house, and (15) IT department will be more responsive to change.

From an increased innovation point of view, 12.5% of respondents said that their department would be able to benefit from past experiences. Other responses included (1) assisting knowledge creation, (2) providing competitive advantages through increased innovation, (3) knowledge can be transferred and used from multiple areas within the department, (4) to broaden range of alternative solutions and that (5) as staff become more informed, they become more knowledge driven and vice versa.

From the point of view of practice and process improvement, respondents reported that management would be able to reduce the workload of the department (13%), KM can increase the speed at which practices and processes are improved (13%), and practice and process improvement leads to customer satisfaction (10%). Other reported benefits included (1) a consistent approach in the departmental practices and processes and a consistent base upon which the department can improve, (2) adds to visibility of process improvement, which is important when it comes to informing senior management of the benefits of utilising KM, (3) information developed can be easily shared with other areas, (4) there would be consistency when it comes to problem resolution and employees can avoid the trial and error process, (5) reduces costs and there is better value for information, (6) processes would be in place to ensure easier integration of new staff and (7) provide an effective learning and support framework for IT staff.

In relation to the benefit of to enhanced employee capability and organizational learning, 23% of respondents said that this benefit provides employees with job

enrichment, variety and job satisfaction. Others reported (1) acknowledgement of an employee's ability to add to the business, (2) cross training of employees, (3) increase motivation and morale of IT staff, (4) improved decision making by staff, (5) reduces cost and impact of staff turnover, as there is less reliance on any one employee, (6) removes interpersonal issues which may cause discourage employees from creating and sharing knowledge, and (7) organisation will value internal "know-how".

In relation to improved efficiencies in writing reports and responding to inquiries when using KM 45% response, 33% reported that the greatest benefit is the time savings that they achieve with utilising KM. In regards to the time savings, a parallel benefit is that IT staff has faster access to relevant data. Other responses indicated that the IT department would receive better value for information, increased value of service offerings to clients and that, importantly, clients will receive consistent responses from IT staff. In terms of other benefits that do not come under the previous categories, respondents have mentioned that KM allows for greater controls on knowledge related processes, and it provides the ability to maintain a good knowledge base.

Respondents were provided with the opportunity to give specific KM related examples that they considered to represent their best KM efforts. One example was the retention of knowledge regarding activities that may not be cost effective at that particular time, but was justified at a later stage by considerable cost saving. This indicates that the organisation has come to the understanding that implementing a KM system might not necessarily be cheap initially, but many benefits can be reaped in the future. Another example provided by a respondent was that their best KM effort was the ability to bring about a cultural change within the IT department in regards to how individuals perceive KM. Other examples included (1) KM initiatives were able to be implemented successfully, (2) one department was able to implement an Architecture Repository on the Intranet, (3) creation and implementation of a "self service help desk" on the Intranet, (4) more communication between employees, via workshops and open forums – with a side benefit of being able to overcome "Bureaucracy Alert", as one respondent puts it, (5) the ability to find, share, and apply information regarding the Y2K problem, (6) the implementation of best practices and databases for KM, and (7) the introduction of reusable components in project development.

## **DISCUSSION OF THE FINDINGS AND CONCLUSIONS**

*Do IT departments' strategic goals include some form of knowledge management?*

The findings of the survey indicate that although there is a recognised need for KM to exist in the IT department, it is not common practice as most do not explicitly include KM their department's strategic goals. Although KM may not exist explicitly in the IT department's strategic goals, the research findings indicate that nearly half have an existing KM initiative, usually technical in nature (unsurprising in IT departments), but mostly less than a year old. This indicates that while KM has been around for some time, it is still a relatively new formal concept within the IT department.

The findings indicate that some forms of KM, such as collaboration and data warehousing, are carried out within the IT department, but there is a greater need for more *management* of knowledge. There needs to be a more conscious effort on behalf of the IT departments in regards to how knowledge is captured from strategically important employees, how knowledge is stored and accessed, and how the knowledge

can be easily distributed to key personnel. At present, KM tends to be more implicit in nature. This may be overcome by ensuring that IT departments' strategic goals are reworked to explicitly include some forms of KM.

*What importance do IT managers place upon the value of a knowledge management system?*

The IT managers seem to recognise that KM is important (given the use of various KM technologies), but there is little effort to measure the value of KM, including the measurement and tracking of existing knowledge, and the value of knowledge creation, which is likely to impede the achievement of benefits from KM.

*What kinds of knowledge management approaches are used within the IT department?*

The most common KM approach was the use of an Intranet (unsurprising given that it is so commonly available). The use of this and other approaches indicates that there is some emphasis on the active transmission of knowledge between individuals within the department. The use of documentation demonstrates that there are attempts to record the various processes that the individuals and teams utilise to produce the end result.

*What technologies are used to support knowledge management initiatives?*

In terms of technology, the findings have shown that not only is technology a recognised way of supporting KM initiatives, but it is fairly widely used throughout the IT departments, with the most common technologies being email, the use of an Intranet, Internet and shared documents/products. On the other hand, little use of best practice/lessons learned databases as reported. This could possibly be due to lack of time or lack of rules and procedures that encourages the constant updating and usage of such technologies. Various technologies like these require that the knowledge is kept up to date, else it becomes useless.

*What reward systems are in place to encourage knowledge sharing?*

This study indicates that there are minimal KM rewards systems in place, and those that exist tend to be generally applicable to the organisation as a whole. These include a Staff Reward and Recognition scheme, informal recognition, and payment of educational fees. These reward systems are usually implemented from the top levels of the organisation, as opposed to implementation of a reward program that is specific to the IT department.

*What kind of behaviours occurs within the IT department, and what do IT managers do to help establish and encourage a supportive knowledge culture?*

Culture is an important part in the success of KM. If the "right" culture exists, where the creation, sharing, storing of knowledge is embraced, then this should bring about monetary and personal benefits for employees. Yet as the findings show, there are still many aspects of the culture that are barriers to effective KM. There is much negative behaviour that exists, such as the "knowledge is power" attitude, which inhibits successful KM. A positive factor is that there is acknowledgement of these cultural barriers. The identification of these problems should hence make it easier to break down these barriers to bring about effective KM.

There are many negative aspects of the organisational culture that are barriers to effective KM, which can be generalised across all organisations. The main cultural barrier seems to be the employees' attitudes in regards to knowledge and the sharing

of knowledge. Many IT managers have commented that staff have the attitude where knowledge is power, hence there is a reluctance in sharing knowledge as the individual feels that they are losing their power within the organisation. This is one issue that needs to be addressed by practitioners, as it is the main cultural barrier across all organisations. Other issues of concern are of human interaction problems, where territorial politics may come into play, or individuals have resistance to change, or even job security. If these issues can be addressed, then IT departments will be able to accomplish more effective KM, and hence reap the personal and monetary benefits. *What are the major benefits of using knowledge management in the IT department, from the IT Managers point of view?*

This study reveals that there is a recognised strategic benefit of using KM within the IT department, with the primary benefit being improved decision-making. This is usually due to better information, which comes from a better management of the processes involved with creating, storing, and disseminating the information. IT managers also see that the use of KM may result in competitive advantages due to the efficient management of individual's knowledge and the more efficient use of scarce resources. Other main benefits have been identified from an increased innovation point of view, improved and more efficient practices and processes, and an enhanced employee capability.

IT managers have identified that one of the main benefits of using a KM system is the improved efficiency of the relationships between the client and the IT department. A KM system is able to increase the value of service offered to customers as it provides time savings due to the faster access to *relevant* information. The relevancy of knowledge is important as it is all too easy to store knowledge without checking how relevant the information would be to individuals and to the IT department. The help desks in many organisations often illustrate the benefit of using a KM system in this context. The help desks often utilise various knowledge databases, which enables them to quickly and efficiently access the relevant information for the client. Other important benefits include the enhanced employee capability. A KM system helps employees to make more effective use of resources. It also helps employees in that they have consistent processes and procedures in place that makes it easier for the individuals when it comes to problem resolution. Another key benefit identified in this context is that a KM system provides employees with job enrichment and helps to motivate employees to create and share their knowledge.

The overall goal of this study was "*An investigation of the ways organisations utilise knowledge management within their IT division*".

In summary, the results indicate that KM is a recognised concept which is in use across several IT departments, but it is often not an explicit goal or objective in the IT department and hence the full potential of utilising a KM system is not realised. KM itself is often linked with *technologies*, yet the people who run these technologies may not be "practicing what they preach".

The study also reveals that people have consistently been identified as the most important knowledge carriers in the IT department, yet there are few processes in place to ensure that the tacit knowledge can be transformed into some form which can be easily shared. This in part could be because KM is seldom part of the IT department's overall strategic goals and the lack of KM initiatives in the department.

Granted that KM initiatives are usually carried over from the organisation itself, this still shows a lack of independent initiatives specific to the IT department.

Although there is a general recognition of the importance of KM, there needs to be a higher level of utilisation of KM in IT departments. The study reveals IT managers believe this can bring about significant benefits such as increased innovation, a competitive advantage, less overall development time for IT projects, better decision making, significant improvements in individual's performance, and overall cost saving benefits for the department and the organisation as a whole, due to better management of their important resource of knowledge. The study reveals they are aware of these benefits, yet issues such as lack of resources and time, and other priorities taking place indicate that KM is not a key factor in the department's strategic goals. For IT departments to become more effective, in every sense of that word, they must reprioritise their goals, convince senior management of the importance of KM and help to bring about a cultural change in the way IT people view knowledge management.

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