



WHITE PAPER

KNOWLEDGE MANAGEMENT – THE NEXT CHALLENGE

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Knowledge

"It has to be created, captured, and processed. It needs to be leveraged, managed, and audited. It's useless if it is hoarded, valuable if it is shared, essential for keeping the competitive edge. Knowledge, suddenly, is a hot commodity."

"We're overloaded with information, stressed out by a smorgasbord of material, and feeling more than a little dehumanised by e-mails and voice mails, faxes and the faceless Internet. We surf scores of cable TV channels, get beeped by our pagers, and called on cellular phones, anytime and anywhere. Everybody, corporate CEOs included, is looking for a lifeboat before they drown in data."

Mary Leonard, Boston Sunday Globe.

The University of California at Berkeley, with a \$1 million donation from Xerox Corp., earlier this year named the USA's first distinguished professor in knowledge.

More than 40 per cent of the USA's Fortune 1,000 companies have named knowledge management officers or have put knowledge management programs in place over the last eighteen months.

- What is all the fuss about?
- What is this knowledge management revolution?
- Why haven't we had it before?

The Promise Versus the Reality

The Promise

Since the beginning of the modern IT revolution, which commenced with the advent of the desktop PC in the early 1980s, business has been inundated with promises of reduced costs, increased productivity and increased profits via desktop technology. Sadly, very few of these promises have been met.

Any analysis of white collar productivity over the last 15 years would be lucky to conclude anything more than a marginal increase in productivity, perhaps two or three per cent. Yet, in the same time frame, businesses have spent countless billions installing sophisticated office technology.

What Went Wrong?

Certainly, Mr Gates and his team of Redmond techno-children bear a great deal of the blame. Coincident with the arrival of every new release of a Microsoft desktop operating system or application comes a mini dark age. We are plagued with expensive staff re-training and pain and suffering because of non compatibility with other applications and hardware. We also suffer expensive and frustrating delays because of the need to upgrade hardware. Worst of all, we suffer through a long and counter productive learning curve as managers, clerks and directors struggle with new or changed technology in their role as highly paid word processor operators.

So, What is the Problem?

The first problem is that the software is too complex and has far too many features. It is too difficult to use and requires the long suffering end user to adapt to it rather than the other way around. The software and technology are 'Non-User Sensitive'. The grim reality is that in this highly competitive software development industry no one cares about the end user. No one gives any thought to the impact on the end user of difficult to use, expensive and rapidly changing technology. No one cares about the massive cost to business.

We now tend to view promises about productivity gains from computer suppliers, (both hardware and software), in the same way we view promises from politicians in an election year. That is, we simply don't believe them and we have ample evidence to support our case.

The second problem is that existing computer systems provide us with masses of information that then needs analysis, dissection and refining before we find the knowledge we actually need. We have to resort to complex techniques such as data mining in order to eke out a few glimmers of gold in a mountain of information.

In a nutshell, the key problems have been:

- Increased complexity;
- A proliferation of new, (mostly useless), features; and
- A requirement for the end user to spend many hours, days or weeks 'learning' the new system.

Despite the fact that the cost of computer hardware is decreasing in real terms about 50% per annum, we still spend the same amount of dollars every year to do the same work. Every new release of an operating system or office suite seems to be twice as big and half as fast. It seems to me that the hardware manufacturers owe their very existence to the major software suppliers who ensure that we need an expensive hardware upgrade at least once every eighteen months.

The Win95 Example

No one example better illustrates this phenomenon than Win95, the Windows 3.1 and Windows for Workgroups 3.11 replacement operating system from Microsoft. Very few people (outside of Microsoft) will argue that most users needed to add hardware and go through an extensive learning process in order to make effective use of Win95. In addition, all existing applications had to change to become Win95 compatible, further exacerbating the learning process. Some old (Windows) applications did not work, (either reliably or at all), and many organisations were forced to run mixed environments.

Worse still, some users were forced to run both operating systems, 're-booting' between old and new applications. Networking, TSR dependent applications, communications, some hardware devices and home grown applications were most affected. Win95's 'Plug and Play' did little for existing hardware and software because corresponding Plug and Play functionality needs to be built into both hardware and software for it to work properly with Win95.

All of the above significantly reduced productivity as users spent more time trying to learn and fix their 'tools' rather than doing the job they were hired for. If we were able to plot the effect of Win95 on business productivity we would probably see a massive fall off co-incident with the first release. Productivity would then slowly rise as users, organisations and software developers come to grips with the new environment. A year or two later, (after much cost, suffering and pain), most attained pre-Win95 levels of productivity. Note, not increased productivity, merely the same as under Windows 3.11.

This is not to say that Win95 is a bad thing, it is a good thing. God bless Bill Gates. An improved Windows operating system was sorely needed. Windows with its archaic DOS slab was way beyond its use by date. It did not provide the stable, mission critical platform required by today's enterprise users. Microsoft are to be applauded for investing the huge sums they have in this new operating system. However, as they say in the gym, 'no pain, no gain'.

The Reality

Massive changes in functionality and massive investments in new technology do not guarantee improvements in productivity and do not guarantee more efficient access to knowledge.

The Paperless Office

The great myth of the last ten years. The rallying cry of the imaging industry. The sad truth is that there is no such thing as a paperless office and we unlikely to see one for at least another five years.

However, we can have and do have many offices where nearly all information is provided electronically, where the desktop is the information delivery mechanism rather than file folders and paper. But, even in these offices, vast amounts of paper still exist, albeit, out of sight and only referenced occasionally.

In order to have a paperless office, we would need major legislative changes as well as major paradigm changes in the way people communicate and the way all business is done. We would also need to destroy all fax machines, laser printers and copying machines.

Imagine a company telling its clients that it will no longer accept communication via paper, that every item of communication, from a service complaint letter to an order for goods, must be communicated electronically. It will eventually happen and it will probably begin with government agencies (who don't fear competition) but it is a long way off for the general business community.

Info-Famine or Info-Gorge?

In an article adapted from the Gartner Group Research Notes (July 1995) and published in the Fuji Xerox newsletter of Autumn 1996, we are introduced to the concepts of 'Info-Famine' and 'Info-Gorge'. According to the Gartner Group, Info-Gorge will occur when:

"the floodgates to information are opened, without evolving the document in a way that reduces the number of document containers. Users and processors will have access to too many containers without good content access - they will 'drown' in information."

Similarly, the Gartner Group defines Info-Famine as a situation when:

"information access is too restricted by an adequate document management system, or when the organisation stops trying to access the overwhelming amounts of information and containers available. Users and processors are 'starved' of information."

Virtually every organisation today suffers from these two problems. Every organisation has filing cabinets, both physical and electronic, 'crammed' with data yet most are patently unable to convert that data into information and have virtually no tools to convert the available information into knowledge.

They are swamped with data and starved of knowledge.

The Lesson - Not User Sensitive

Software developers have to allow each and every user to 'rebuild' the product in a shape most suited to his or her needs. Developers need to build behind a User Sensitive Interface (USI) that allows the user to modify the application in order to do his or her job easier and faster.

The application has to bend to the unique requirements of each user. Rather than providing a plethora of features, developers have to allow the user to easily and quickly 'cull' out everything that is not required to get the job done. They have to deliver application software that does not require the user to keep a 600 page manual next to the PC.

Fundamentally, there is nothing wrong with today's hardware. You could literally put a rocket on the moon using a Pentium 100 processor. It is absurd to think that a Pentium 100 with 16MB of memory and a 400MB hard disk cannot run four or five applications and yet that is increasingly the case. The problem is not with the hardware, it is with the software.

It therefore behoves software developers to rethink the whole process of software development. Give the end users what they need and what they are asking for instead of letting the 'kids' get their kicks building more and more fancy new features. Eight thousand programmers and an unlimited budget do not a better word processing package make! The end users want stability and a feature set that empowers them to do their job better and faster!

We desperately need a new paradigm where the software adapts to the needs of the user rather than the present model where the user has to adapt to the needs of the software.

Too often, the term 'Business Process Re-engineering' (BPR) has been used (or should we say abused) to describe a costly and disruptive process whereby staff are forced to change the way they work to suit the requirements of a suite of application software. Wrong, wrong, wrong!

The software has to bend to suit the user, not the other way around. This is what we mean by a USI. Without a USI, there can never be any significant productivity gains. This is a lesson the software industry simply has to learn.

The Vision

Now let's talk concepts, ideas. What are we trying to achieve? What will our new knowledge application evolve into? What will it do for you and how will it do it? How will it incorporate the concept of User Sensitivity?

Software developers have to push the software design envelope. They have to be brave and innovative, (but they have to get it right, neither they nor their customers can afford a major wrong turn). They have to change the design of their products until they are User Sensitive. Their products have to 'melt' into your work environment. As well as having the specific set of features you require, they have to be so easy to use that you actually look forward to turning on your PC in the morning.

What business needs is an enterprise-wide Knowledge Management System (KMS) as the knowledge backbone of the organisation. It will be User Sensitive. You will be able to 'mould' the user interface and function set to your specific requirements. Each individual user will have their preferences recorded. Every time they run the software, it will remember their preferences, it will look and work the way they want it to look and work. It will be their 'tailored' window into all knowledge in the enterprise.

More specifically:

- It will manage documents of all types; file covers, paper, faxes, e-mail, voice mail, images, videos, information from corporate databases and information from the Internet.
- It will manage all work associated with documents.
- You will be able to ask it 'what work do I have today?', and immediately see your work-in-progress and commitments, including work assigned to you by other people.
- It will 'intercept' all paper, faxes, e-mail, Voice mail, etc., and deliver them to you in an easy to process and organised fashion.
- It will make it easy for you to do your work and to answer the bulk of your 'mail'.
- It will make it easy for you to find any document, no matter what form it is in and no matter where it is stored.
- You will be able to tell it what functions you want to see, and then see only those functions.

- You will be able to tell it what data (fields on screens) you wish to see, and then see only that data.
- You will be able to tell it how you wish to view that data, and then have the data presented in the way you prefer.
- You will be able to 'tell' the system exactly what you are interested in and then have it 'deliver' this knowledge at precisely the time you require it.
- It will have standard links into the desktop software you use, i.e., Word, WordPerfect, Excel, etc. It will not duplicate the work of the popular desktop applications, it will simply provide a 'seamless', easy to use, non invasive way to capture, manage and instantly find a corporate record (document) no matter what form it is in, no matter where the original is stored.
- It will share data with any other application. It will support all of the popular 'data exchange' methodologies such as DDE, OLE, Microsoft Exchange, etc.
- It will present all data in a form most suitable for it to be used as 'Knowledge'.
- It will work on most popular server operating system platforms, i.e., Novell, NT and UNIX.

This new knowledge application will blend with your work environment and will bend to your needs and preferences. It will learn from you and be your servant, not the other way around.

It will make your work easier and faster. It will enable you to either work shorter hours or empower you to do much more in your normal working day.

Data, Information or Knowledge?

As well as designing 'User Sensitive' solutions, developers also need to design their applications to provide 'knowledge' rather than data (elements of information) or information.

Data to Information

In the IT industry we think of data as:

elements of information;

and information as either:

the results derived from the processing of data according to programmed instructions,
or

an organised collection of data.

Information Management Systems

Some twenty to thirty years ago, EDP managers implemented Information Management Systems (IMS). If you were a senior manager that usually meant that every Monday morning you received a foot high printout from the mainframe line printer. The EDP Manager then thought that he/she had solved all of life's problems and that a big bonus and early retirement to the Gold Coast were on the cards.

Of course they had not solved any problems. They had simply given you an unmanageable amount of information that was impossible to read, digest and understand. The information you wanted was probably in there somewhere but it was disjointed, spread across several sections and was not in the form you needed.

Their mistake was in giving a manager everything instead of just those things he/she needed at a particular point in time. Managers do not need masses of information that they then have to sift through and analyse. They need knowledge.

The mistake was in giving a manager everything instead of just those things he/she was interested in at a particular point in time.

- The IT specialists made the job harder, not easier.
- The IT specialists made the picture murkier, not clearer.

In today's world, business operates at an incredible speed. In addition, the rate of change is increasing.

Managers do not need masses of information that they then have to sift through and analyse. They need knowledge. It is the job of the IT specialists to provide them with precisely what they need, when they need it and in the form they want.

Very little has changed since those heady days in the sixties.

Now let's discuss some of the software applications used to manage information in today's business world.

Today's 'Almost' Knowledge Management Solutions

What is Corporate Records Management?

Records are defined as (quoting from AS4390.1, the new Australian standard for records management):

"recorded information, in any form, including data in computer systems, created or received and maintained by an organisation or person in the transaction of business or the conduct of affairs and kept as evidence of such activity."

A record is therefore evidence of a business activity and it can be a file folder, paper, electronic document, image, E-mail, fax or whatever.

The process of managing records is called records management. Records management can be defined as (again quoting from AS 4390.1):

*"the discipline and organisational function of managing records to meet operational needs, accountability requirements and community expectations", and further, "systematic control over the creation, handling, processing, filing, storage, retrieval and disposal of records." Records Management Systems (RMS) manage corporate **'records'**.*

What is Electronic Document Management?

Document Management Systems capture, manage and control electronic documents such as faxes, e-mail, word processing files and spreadsheet files. DMS control what goes in to the 'corporate store' and use features such as version control to ensure that a valid and auditable record of all changes is maintained.

Document Management Systems (DMS) manage corporate **'documents'**.

You will note that there appears to be a confusion of roles between electronic records management and electronic document management. That is because both classes of product have extended their areas of interest in recent years.

Originally, records management systems managed only physical data, that is, file folders and paper, and document management systems managed only electronic documents. If you wanted a one hundred per cent solution, you had to install both classes of system and then 'integrate' them.

Today, the more advanced records management systems manage both physical and electronic data (as they must to do their job of managing all corporate records) and document management systems now register and track physical files as well as electronic ones.

The '**records**' of the records management world now include electronic documents and the '**documents**' of the electronic document management world now include physical documents. This means that for our purposes, '**documents**' and '**records**' are synonyms. This also means that there is now a significant overlap in functionality between these two applications, DMS and RMS.

What is Workflow?

In an excellent article on workflow in the March 1996 Computer Journal, Peter Karr defines workflow automation software as:

"a toolset for developing applications to manage, measure and revise work processes that span the efforts of multiple workers and applications. It is about building systems that relay work between people."

Mr Karr also says that, "In today's highly competitive world, where the window of time for market advantage is very short, the answer is workflow, and enabling technology that allows companies to automate manual processes, reduce cost and increase efficiency, thereby improving competitive advantage."

Workflow is the processing and delivery mechanism for information. It is the glue and the transport mechanism to tie together work processes and information. The challenge for all workflow products is to go the next step and convert information to the knowledge required by each and every user's profile.

Most organisations today use one or more of the above applications (records management, electronic document management, workflow) in an attempt to more effectively manage an explosion of information. However, none of the above can be described as a knowledge management system.

What is a Knowledge Management System?

Information specialists used to go to great lengths to explain the difference between 'data' and 'information'. Basically, data is unstructured and of little use. It is not in the form or order you require. Information is structured, that is, in the form and order you require. Knowledge is having exactly the information you need at precisely the time you want it.

Data becomes information, which then becomes knowledge.

"A knowledge management system provides the user with the explicit information required, in exactly the form specified, at precisely the time the user needs it." Frank McKenna

Current software systems, including those described above, manage data to provide information. Knowledge is the next stage.

We process data to produce information and then process information to produce knowledge.

Push versus Pull

The two most common paradigms of knowledge management systems are the 'Push' and 'Pull' models. Simply speaking, the Pull paradigm applies when the user has to request the information from the system. The Push paradigm applies when the system 'knows about' the requirements of

the user and provides information automatically. However, before we can provide knowledge to each individual in an organisation, we need to know precisely what it is they need.

There are two ways to do this.

1. Ask everyone, every minute of every day; or
2. Let users 'tell' the system themselves.

Most sensible software designers choose the second route and in order to do this they must adopt the concept of a 'User Profile'.

A user profile is an electronic 'imprint' of the user's preferences and work habits. It would typically be built by the end user using an easy-to-use question and answer program provided by the vendor. The user profile then 'learns' as the user interfaces with the software and adapts dynamically to reflect the user's changing work habits. It is impossible to have a user sensitive interface or implement the 'Push' paradigm without a user profile.

In a knowledge management system, it is the user profile that tells the system what the user is interested in, what the user wants to see and when the user wants the system to 'deliver' a particular item of knowledge.

Overlapping Systems

In most organisations today, we see an ad hoc mix and match between workflow systems, electronic document management systems, records management systems, image management systems and corporate applications. All of these systems overlap in functionality because they are all addressing the same corporate data store. In a more advanced organisation, this overlap is actually designed and constructed as an 'integration'. This is an old fashioned and imperfect model that needs constant work and maintenance to keep it upright and it provides information, not knowledge, (see following diagram).

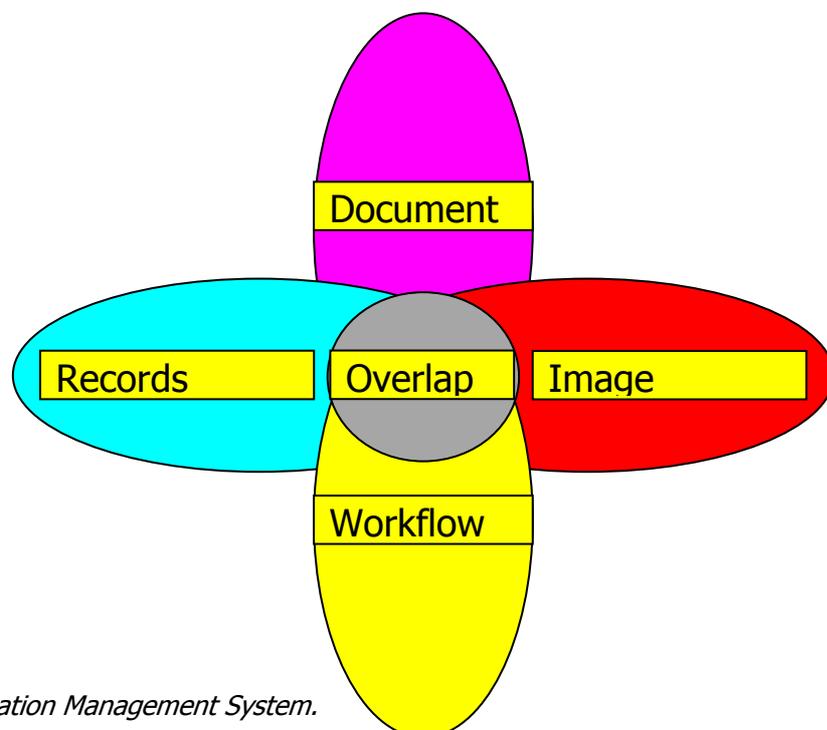


Diagram 1: Overlapping Information Management System.

A Knowledge management System is not any one of these overlapping systems. A Knowledge Management System is however, one that must incorporate elements of imaging, records management, workflow and electronic document management to do the job it needs to do because knowledge comes in many forms.

A Knowledge Management System will be the desktop from which the user can search for and display file folder information, loose paper information, electronic documents, images, e-mail, faxes, sound files, video files, etc.

Our knowledge management system 'sits over' all physical and electronic information, whatever the form or location, and builds a virtual model of an organisation's scattered and varied information resources as if they were a neatly ordered, homogeneous collection. It also applies an enterprise wide classification system to all information, electronic and physical, such that a search on any topic will return all items regardless of form or location.

To the end user, our knowledge management system looks as follows:

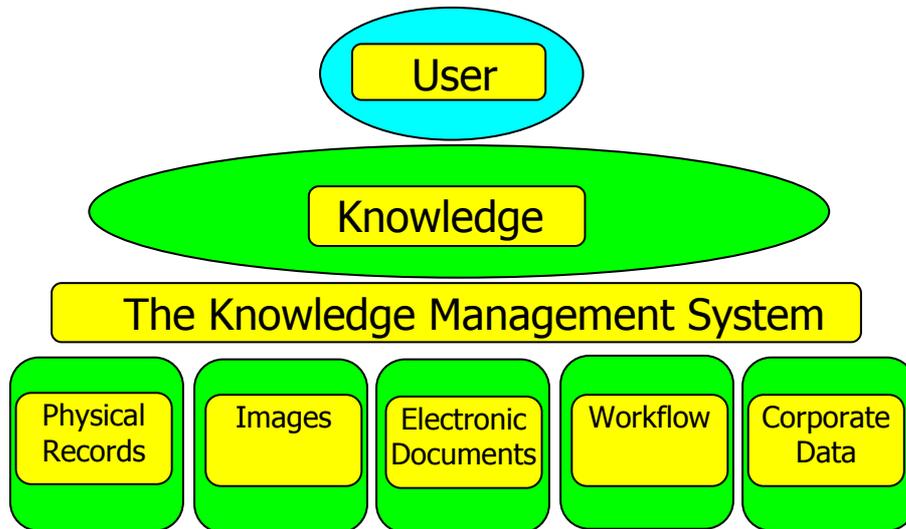


Diagram 2: Knowledge Management System

What can't a Knowledge Management System do?

Quoting Stephen Manes, Computerweek, June 6 1997

"Some simple, routine decisions can certainly be mechanised. But most decisions still rely on human beings who weigh information well or poorly. Companies may depend on their computerised nervous systems, but they survive and thrive with their all-too-human brains."

A knowledge management system cannot run your business and it should not be expected to make decisions for your business. A knowledge management system is a decision support system. Its role is to assist humans to make better decisions by making humans better informed.

Conclusion

Knowledge management will be the major requirement of all successful organisations over the next few years. The information management era is over and the knowledge management era is upon us. Within two to three years, any organisation that has not implemented a knowledge management system will fall behind those that have. Knowledge management systems will finally provide the productivity gains the IT industry has been promising for the last 30 years and has failed to deliver.

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