# DOCUMENTATION TECHNOLOGIES
# DOCUMENT MANAGEMENT, WORKFLOW AND IMAGING
# ARE WE READY?

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**The authors of "Mastering Information In The Next Century"[1] talk about the need from information specialists. These specialists will bridge the gap when management generalists need information that only a specialist can locate efficiently. They will help in choosing the appropriate databases and formulating queries. As databases proliferate, it is already become impossible for anyone to master the entire universe of the emerging digital world and the powerful information and communication infrastructure. Inevitably, the information profession must become almost as subdivided as the professions with which they work. What does this say about librarians, archivists and documentalists**

**While the career speciality described by Cetron and Davies is only one aspect of what is happening in the field of information management, it does illustrate the need to focus on information, rather than technology; the bias has been to much towards technology in various countries in the mid-nineties. In the same light, there has been to much emphasis on the individual information professions and their subgroups and not enough on the current and emerging needs of the various information users. These kinds of significant changes in individual and group characteristics - for example, management and employee readiness to use information, and a better understanding of information flow - is criticai.[2] It is well documented that government agencies and organisations who use information will tend to do better in various fíelds.**

**This paper will look at the emerging technologies of document management, workflow and imaging and relate them to information professions such as librarians, archivists and documentalists and how they are using or not using these technologies either individually or as a group. Various international examples will**

[1] Marvin J Cetron and Owen Davies, Mastering Information in the New Century, Special Libraries Association, Washington DC, 1994.
[2] Mary Feeney and Maureen Grieves, Changing Information Technologies. BowkerSaur, London, 1994.

**be given. The objective of the paper is to determine how best these disciplines could and should work together. Conclusions clearly indicated that a merger, or, at least, a very strong relationship among these disciplines is essential.**

## COMPLETE PAPER

**As we look at Documentation technologies, this paper will be presented from a South East Asian context, after first reviewing what has happen on a global levei. No real attention has been given to the recent economic and currency problems that have affected most of the countries in this region. This has only served to emphasis the needs and to slow down the more expensive applications. These events will pass and the region will be stronger because of them, and technology needs will only accelerate.**

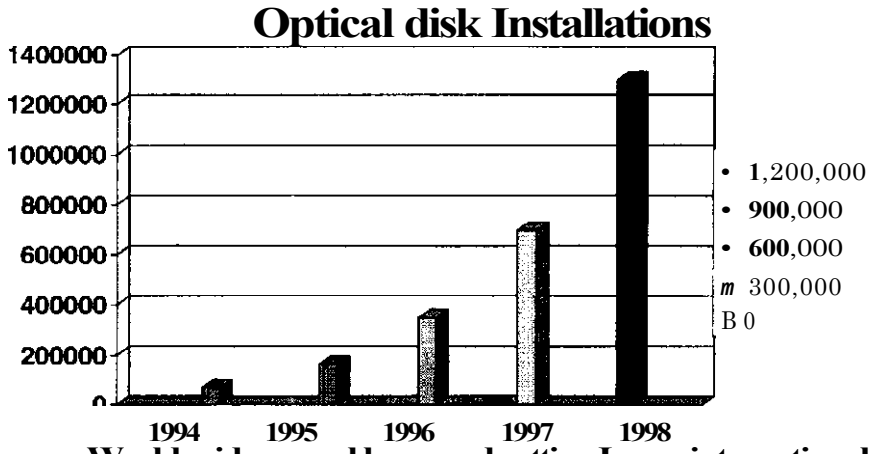
**Even now, press reviews in the vendor and industry newsletters continue, after reading many of these articles, most people are still surprised to know that imaging technology is over 25 years old. It started off in the days when Xerox held the patents for plain-paper copying and most businesses used carbon paper for creating duplicates of their work on their IBM Selectric typewriters. It was brought to the region by international companies as users and was later continued to develop because much of the hardware components are manufactured in many of the Southeast Asia countries.**

**In the late 1970s and early 1980s, imaging technology was new. Business had little comprehension of how this technology could help them. Most were perfectly content in letting the large government agencies such as the US military and the Library of Congress develop the applications. Equipment was bulky and software was slow and complex and both were very expensive. High end imaging systems cost over a million US dollars. Paper and microfilm was the media of choice of business. It was the professionals in the facsimile industry creating the need for this new automation process.[3] Training for users was limited to the technology types and most of it was vendor controlled and proprietary in nature.**

**In the mid-1980s the PC was entering into the market, scanners and faxes were being used on a larger scale. Prices for imaging applications were in the 250,000 dollar range. Large insurance, leasing companies and banks were looking seriously at the technology. Businesses were moving away from keypunching to key entry technology. Training was starting to be introduced in the office administration and secretarial programs. Public seminars and workshops in this career field were being offered by the various professional associations. Unfortunately, records programs, libraries and archives were still focused on paper and microforms.**

[3] Lynne Leahy, "Is the imaging market **Finally exploding", Imaging World, September 25, 1996.**

**Today, a short 10 years later, we have moved away from proprietary software and hardware. The PC and Storage industries present a simpler, faster technology and have created a new industry. The industry of** *document management, workflow and imaging.* **This market exploded when the PC/Storage combination was easy-to-use for non-technical users and affordable. As indicated earlier, imaging technology has been available for many years, but until recently it was mostly large scale imaging and has been relegated by design and price to the high-end users; those with criticai and pressing problems with paper and those with significant archival needs. Document management began with indexing systems for storage of inactive records off site in boxes. It was developed as a subsystem of record centre's customer billing systems. It went from the box to the file folder to the document. More recently, index software allow topic and word searches within documents. Workflow and COLD are the newest products in the market and will be a major force in electronic information management. Workflow automation involves the pro-active co-ordination of business processes. Much more advanced and flexible than the engineering workflow used in the manufacturing area where it was first used. COLD combines data storage and output format effíciently. It is a good vehicle for entry into electronic document management arena. <u>These and other recently significant new developments will pave the wav for document management, workflow and imaging management to become a mainstream application.</u>**

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**corporations - and some singularly focused start-up as well - are delivering simple-to-use, turnkey document management and imaging systems to users through the larger and more typical channels, the vendors, VAR's consultants and system integrators. The market is just beginning, but if you were in attendance at the BTA (Business Technology Association), AIIM (Association for Information and Image Management), RMAA (Records Management Association of Austrália), FID (International Federation for Information and Documentation, ARMA (Association of Records Managers and Administrators) and National Conference of Librarians, Archivists and Documentalists shows this year, you could not miss the interest and excitement generated by the various business records management and imaging**

**displays. This may have been a slow-starting business, but the "deep pockets" of this industry are sure to have a big impact on delivering document management, workflow, COLD and imaging technology to the everyday office user. See the figure preceding page which projects that there will be over a million installations by the end of this year.[4]**

**Other trends maturing this year are the availability of easy-to-use, shrink-wrapped products and inexpensive scanners. This will be a major force in putting document management, workflow, COLD and imaging technology on every PC in South East Asia and other parts of the world. These products work. They are designed, as spreadsheet software, for the average non-technical user. You see document management migrating into desktop applications like Office 97 and Lotus Notes. People are beginning to borrow, steal and copy from different technologies. While nothing is carved in stone, indicators show an document/imaging management world that is growing and maturing. It is coming into the mainstream of computer capabilities and uses; and despite different emphases and nuances, imaging and document management are core technologies that will co-exist and integrate with departmental and enterprise systems and vital application solutions.**

**Electronic information is a fact. The challenge is for the Records Managers, Librarians, Archivist and Information Technology people to deal with it. Today with the convergence of technologies and disciplines, we are forced to cross the boundaries into other disciplines, to implement effective records management programs. The people at the 6th Congress of BAD should be working with vendors of hardware and software to ensure that long term storage of electronic information is guaranteed. We need the ability to migrate at affordable rates, to have backward compatibility, and the ability to retrieve information in a usable form.**

## LACK OF FUNDAMENTALS

**If there is a weakness in the application of this technology in South East Asia, it is the scarcity of trained records personal and the lack of understanding on the part of higher administration and managers about what is needed to implement the new technology. It is not just a matter of throwing dollars and technology at it. It is not a matter of iust asking the "techies" on the staff and vendors in the field. This short coming stems from the traditionally weak company and institutional manual and paper information systems and the low esteem and funding provided by management for staffing these functions. It is only in the past decade that the various countries have come to realise that (Business) information has taken on a new character, that it has passed from being an instrument through which we acquire and manage other (Business) assets to being a primary *asset* itself.**

[4] Project Optical Disk Installations. Imaging World, **1995,** Volume **4, Issue 10 October**

**And not ali the countries are at the same levei of realisation or are progressing at the same rate.**

**Currently it has been estimated that 50 percent of the Singapore work force now processes or manipulates information rather than producing materiais goods. As more and more industries are upgraded and/or move to neighbouring non-ASEAN countries in search of cheap labour, the percentage will increase By 2000, that will grow to seventy out of every one hundred employed Singapore's and some neighbouring countries will contribute in some capacity to the information industry. This is already true in the HRD, Finance and other service departments. They have become a group of document collectors - gathers of information.**

**Unfortunately, much of this work is still done with paper, pencils and pendaflex hanging folders (forty year old technology) in three and four drawer vertical file cabinets (takes up 60% more space than necessary and 105 year old technology) with locks on every file cabinet (mega concern for confldentiality). Until recently secretaries and clerks have determined the business records systems. They either continue the system in place, replicate what their previously employer used or buy a system from the local stationary store without any thought to what is needed to support the type of business in which they work. Traditionally, business offices have tolerated office equipment and maintenance as a necessary expense; managers devote as little capital investment as possible to supporting administrative and clerical operations. In most cases, the functions are relegated to entry levei positions that have high turn over and require minimum qualifícations. In summary, in most retail and manufacturing companies information (records & documents) management in business is probably one of the most important, but still poorly understood and least appreciated of the many management functions.**

**Even though most of the gurus of management have indicated that this is the information age and the companies that survive and are successful in the next millennium will be the ones that understand this need and take the right action to support information management. This includes people like, Michael Porter, Tom Peters, Charles Nesbitt, Michael Hammer, Charles Handy, Stephen R Covey and Peter Drucker. The goal is to provide the right information to the right person at the right time, right place in the right format with minimum storage and handling cost. There are serious financial and legal implications with regard to subsidiary files and business records management, but this function is typically under funded, understaffed and under-valued on the table of organisation.**

**In many cases business managers themselves cannot agree as to whom the records actually belong, much less the extent of their liability in terms of storage requirements. It is certainly understandable that records managers struggle with these problems. Defini tive leadership is needed in business information and records management, but access to the complex body of knowledge necessary to make positive decisions is allusive. So far it is only with outside expert cônsul tants to**

**confirm or guide policy, procedural and even purchasing decisions that any real progress has been made. The worry is that this poor foundation and uninformed thinking is being carried over to the new technology. Knowledge, information, records, documents and/or data and files, whichever term you are most comfortable using. The sefection of paper, microforms, optical disc and electron media, makes only a secondary difference. Writing, typing, key entry or scanning are some of the methods that can be used to collect the data but these are only tools for the process. The point being made is that information system 's fundamentais are the same and they must be in place for a strong foundation … before the technology is selected.**[5]

## PARALLEL ACTIVITIES

**Development of two other activities have been happening along side the recent changes in technology which have helped this rapid development. Country and International standards are being considered and approved. Austrália has developed the *Australian Standard*, called AS 4390 - 1996. This standard is being considered by several other countries to incorporate or use as a basis for a local standard. ISO 9000 is becoming a significant requirement for business and industry. Built into the certification process is a very strong record keeping requirement and record staffing designation and position.**

## FOCUS ON WORKFLOW SOLUTIONS TO PROCESS KNOWLEDGE

**The popularity of reengineering and TQM have encouraged the use of workflow and groupware solutions. Medicai claims and Bank loan applications seem to have worked well and have had significant media coverage. A recent web surf identified numerous sites containing workflow and groupware product information. The overview included 63 different products.**

**Workflow automation can involves the active co-ordination of several business processes. Because of the complexity of global business organisations and the boarderless society, even the simplest business processes require much flexibility and the need to adapt to changing conditions. While comprehensive workflow solutions, such as one of these workflow software products, can provide the means of easily and graphically designing, testing, simulating, implementing, monitoring and measuring any business process with the flexibility necessary to deal with organisational complexity.[6] Or so the vendors say. But experience has show that this process is not for the impatient or the poor. When evaluating workflow automation solutions, most users under-estimate the complexity of reengineering the process and implementing the replacement solutions.**

[5] Some of this information was in an article for STRADA.

[6] "100 Essential Feature of Workflow Automation," Website: www.uktumus **1** .com/ultwhite/u 100feat.htm, 12February 1998.

From this list of vendors, some have been pursuing workflow as the Holy Grail for automating complex business processes and storing process logic. But the list of vendors has changed over a four to six year period, with many giving up in failure and others with various leveis of unsuccessfulness. Gaga Vice President Connie Moore[7] maintains that the end of workflow as we know it, does not mean the death of workflow. While many standalone workflow products have not succeeded, workflow as a technology is changing, making its way into business solutions and becoming an integral part of IT infrastructures.

Ms Moore, Giga's top workflow and knowledge management analyst says we have learned much from the workflow experience, which helped educate us about processes in an organisation. These insights have served to open a new era that is called 'Process Knowledge'. Process Knowledge refers to a company's collective knowledge about works or doesn't work inside the enterprise.

## RISK AVERSION IN TECHNOLOGY DECISIONS

Recent research indicates several factors that would prevent or slow down the adoption of new technology.[8] Two major factors stand out and are also significant in Southeast Asia. These are:

1. Organisational culture may prevent the rapid adoption of anything including technology. This can be attributed to the kind of business you are in, the way you do business and leadership factors.
2. Past experience with technology change. If the past few changeovers went poorly (lack of training, lack of support, software operation doesn't match best business practices, etc.) then the next technological change is not viewed with great anticipation.

There are at least fifteen different cultures in Asia and therefore at least fifteen different business environments. Also, there are significant differences in cultures, and therefore business styles, within the boarders of the larger countries. Business style in Shenzhen in the south of China is very different from that of Harbin in the north. We can't assume that because a certain technology was accepted by Korean associates reasonably well, that knowledge of this experience will be useful when doing business with Indonesians.

Because many of the manual information systems are so poorly documented and antiquated, the transition to automation is significant. Also, many of the initial vendors were not experienced not only with the client needs but also in many aspects of their own products. So they promised things that could not be

[7] Moore, Connie, Presentation at 10* Business Process and Knowledge Management Conference, March 8-12, 1998, Orlando, Florida

[8] Feeney, Silvia Pierotti, "Human and Cultural Issues in Implementing New Technologies", Wizdom systems, Inc., Naperville, IL.

**done. This resulted in many cases of significant spending with limited or no results. To often the decision makers did not stick around long enough to judge the fruits of their decisions. This has meant that the next generation of decision makers are very cautious and reluctant to move speedily on high cost technology.**

## INDUSTRY CONSOLIDATIONS AND REALIGNMENTS

**In the early years most of the software was properiority in nature and sold by the vendor representatives. But this is a very dynamic market and some of those initial big vendors went bankrupt and/or got out of this aspect of the business. Twenty-three companies touted by Delloite, Haskins and Sell are listed below. Eleven, marked by one asterisk are no longer in this business. Two marked, by double asterisks are discontinued their products. And one, marked by triple asterisks, declared chapter 11 bankruptcy. Some of these companies got back in the business by acquisition more recently.**

| | | | |
|---|---|---|---|
| **3M**** | **Acctex*** | **Alpharel**** | **Aquidneck***** |
| **Bell & Howell** | **Cannon** | **DISCORP*** | **Eastek*** |
| **Filenet** | **IA** | **IMS*** | **Interfile*** |
| **Kodak** | **Laserdata** | **Micromedia*** | **Minolta** |
| **Panafax*** | **Plexus** | **Racal*** | **Summit*** |
| **TAB*** | **Wang**** | **Westinghouse *** | |

**Within the past few years several imaging companies have been buying and selling other companies at a rapid pace. Filenet bought Watermark for image movement and Saros for its Document Management capabilities and Greenbar. Kodak purchased Wang (which has a strategic alliance with Microsoft), Sigma and Avan. IBM purchased Lotus and Optika purchased Teamworks and has a strategic alliance with Does Open.**

**In today's technology business companies are evaluating their core competency.[9] As a result, strategic partnerships are being formed that give companies advantage in the imaging market. For example, Oracle is partnering with Netscape, Cornerstone and Adobe. Paper Clip was sold to Access. Documentum and Consenys merged their products. If companies aren't buying each other out they are working on integrating with other products. Raf Technology plugs into Cornerstone's Input Accel and is available as an add-on to Mitek with plans for IBM and Filenet. Terra Forms plugs into Cornerstone's Input Accel and Datacap.**

[9] Webpage: http:shrike.depaul.edu/-spleczko/market.html

## PRICES ARE DECREASING

Es ti mates for growth rate of electronic records range from 20 to 60 percent per year. While the cost of media is declining, the cost of managing the network on which electronic records reside is not. As more storage is on- or near-line, the cost of managing electronic information can be expected to increase[10] The cost of magnetic disk storage has dropped by a factor of about 1-million-to-l over the last twenty-five years. Even easier to calculate, over the last twenty-five years, the cost of RAM (Random Access Memory) has dropped from about one US dollar per byte to about one US dollar per megabyte, also a factor of 1-million-tol.

The rate of cost reduction has actually been exceeded by the reduction in physical size. Sending information over the Internet is free. Information technology has maintained steep price reductions trends over long periods of time.[11]

## ENTERPRISE -WIDE SOLUTIONS

These tend to be the easiest to justify but the hardiest to implement. With the Global Society and Boarderless Countries, we have more and more multi-national companies which have information needs never considered before. We are talking about amounts of information, speed of change and complexity of communication never before even considered. This says nothing about the language or culture differences.

## PAPER , MICROFORMS AND DIGITAL

For years, the rule of thumb was that paper held over 90% of the workPs information. Trends showed electronic going from 1 % to 5 % and microforms going from 4 % to 3%. It is only recently that these projects have shown any significant change with paper dropping and digital going as high as 70% by the year 2004. There are four reasons for this:

1. Information is slowly being converted to digital (imaging market).
2. Today, much of the new information is going directly to digital.
3. The trend for information to go directly digital is on the rapid increase.
4. Customer want ali this data on/near-line.

But don't give up on paper yet, while the percentage of information being printed on paper is going down compared to digital, because information growth is 25-50 per cent a year, the amount of paper being used is doubling every 3 to 7 years.

[10] Balough Ann, "Cost of Information Management," The Records & Retrieval Report, December 1997

[11] Preserving Information Forever and a Cali for Emulators, Paper by Steve Gilheany, March 1998.

## CONCLUSION

**It is expected that South East Asia and other countries businesses and governments will continue to move toward using imaging/document management technology for storage applications and knowledge systems. As image and document management software changes to reflect new business paradigms and restructured organisations, the number of users will continue to go up dramatically. The trend toward client/server architecture, graphical user interfaces (GUIs), múltiplo database access, and the use of PC LAN-base networks will continue, requiring open, flexible, scaleable products. This will only make the technology more easier to use for non-technical users and affordable.**

**While some enterprises may leverage alternative storage technologies to delay or avoid purchasing today's optical storage products thus avoiding possible platter migration, density increase-base obsolescence, standards battle and vendor upheaval. The technology has become mainstream application for production office workers and has been extended to previously unreachable parts of the enterprise.**[12]

**The lines between the document image, document management and workflow management markets will continue blurring. Increasingly, documents will become objects that are "intelligent information containers" driving business applications.**[13]

## SUMMARY

**By now the laws relating to evidence and records in most countries have changed and companies, institutions and government agencies are on "information overload", management is wanting to be able to find the correct information to make the necessary decisions for success. Many times it is vital and very expensive not to be able to have ali the information needed to make a deal, decision or sale. This not only applies to current records retrieval but to earlier and archival information going back for unlimited years. Terms like bridging, converting and connecting are becoming part of the information vernacular and management is looking beyond engineers and IT staff to find employees with training and expertise in the information management field. Because of this there is one development that is present that could evolve into a big negative and cause significant problems for business and companies in the future. This is the lack of trained records management personnel with enough creditability or stature to stand up against the incredible influence of the MIS and Computer Systems managers. Too often MIS directors do not even include information managers (librarians, archivist and documentaliss) in the development of these new systems thinking that technology will overcome ali obstacles and problems. This is especially true in the**

[12] J. Popkin, "Optical Gcneration Skip", Gartner Group, **December** 1996.

[13] Karen M. Shegda, "Image and Document Management Application: An Eye to the Future", Datapro Information Services Group, 1996.

**development of imaging and document management systems. Management"s attitude toward the various support áreas does not help information managers either. CEOs and general managers often seem more interested in being able to say that their company uses the latest technology than solving problems and providing solutions for the long range. Even if high technology is the proper solution, the approaches and training is not though out and user participation is almost not existent at the decision levei. What is most disturbing about this is that IT and MIS administrators are such a large group, so well represented in the organisation and getting such a head start at effecting change in the information management process that it is only through major failures, that these circumstances will change. Unfortunately, most such people don't have a clue what is missing and the damage they may be doing to their company or organisation. In September of last year, Richard E. Barry, a world class MIS director, while speaking at a records management conference in Austrália, warned the computer/technical section that they need to include trained information managers on their team when applying new technology or when they are re-engineering current information systems. To do otherwise is to generate failure and waste of large amounts of organisational resources.**