APPENDIX

APPENDIX

A. 1 Knowledge Audit Interview

PART A : KNOWLEDGE MANAGEMENT

1. a. Do you believe that there is a significant difference between information and knowledge?

☐ Yes ☐ No ☐ Unsure

b. If yes, how would you define the difference?

Information is _____

_____

_____

Knowledge is _____

_____

_____

2. In your opinion what knowledge assets exists in the organisation?

_____

_____

_____

_____

_____

3. Where are the sources of these knowledge assets situated?

_____

_____

_____

_____

_____

4. What tools enable employees to identify the sources of knowledge within the organisation?

5. Is your organisation creating new knowledge? How? Is it being capture and shared?

6. Is your organisation systematically transferring knowledge inside the organisation? How?

7. Is your organisation systematically acquiring knowledge from outside the organisation? How? From whom? Is it being used?

8. Is your organisation leveraging its knowledge? How?

9. What do you understand by the term "knowledge retention"?

10. Does your organisation have a strategy for retain knowledge? (Explain)

11. Are you and other employees encouraged to share knowledge? Why?

12. Does senior management understand and support the management of knowledge as a business strategy?

PART B : METHODS AND TOOLS USED TO PRESERVE KNOWLEDGE

1 What methods or tools are used for the following:

Capture knowledge (within the organisation) _____

_____

Access, search and find organisational knowledge _____

_____

Distributing relevant knowledge in the format that the user require _____

_____

Maintain the organisations knowledge sources _____

_____

Protect knowledge assets of the organisation _____

_____

2 Does your organisation make use of restraints of trade as a means to protect organisational knowledge from being used by competitors, explain?

_____

_____

_____

_____

_____

PART C : KNOWLEDGE MEASUREMENTS

1 Are there formal procedures/methods for measuring knowledge within your organisation? (Explain)

2 How does the organisation measure the return on the investment made in knowledge?

3 Does the organisation measure the competence of the employees?

4 Does the organisation measure the organisations intellectual property?

5 Does the organisation measure their image in and relationship with the market?

6 Does the organisation measure their effectiveness of their culture and infrastructure in terms of knowledge creation and retention?

PART D : THE FUTURE

1 Do you think that a lack of knowledge management contains high risk for the organisation? (Explain)

2 In your opinion what are the opportunities and threats facing the organisation in terms of knowledge management in the future?

3 What changes, if any, would you suggest, in terms of knowledge management, to survive into the new millennium?

A. 2 Knowledge Audit Questionniare / Survey

PART A : PRESERVATION OF KNOWLEDGE ASSETS

Please indicate which of the following knowledge assets are being MANAGED within your organisation.

KNOWLEDGE ASSET	MANAGED ?	
A1. Trademarks	Y	N
A2. Patents	Y	N
A3. Copyrights	Y	N
A4. Trade secrets	Y	N
A5. Organisational policy	Y	N
A6. Organisational procedures	Y	N
A7. Organisational standards	Y	N
A8. Operating guidelines	Y	N
A9. Business plans	Y	N
A10. Organisational strategies	Y	N
A11. Industry profiles	Y	N
A12. Client profiles	Y	N
A13. Competitor profiles	Y	N
A14. Expertise profiles (expert networks)	Y	N
A15. Skills profiles	Y	N
A16. Experience (lessons learned)	Y	N
A17. Methodologies and consulting practices	Y	N
A18. Project specific details	Y	N
A19. Project designs and plans	Y	N
A20. Tenders	Y	N
A21. Proposals	Y	N
A22. Presentation	Y	N
A23. Documents	Y	N
A24. Training material	Y	N
A25. Best practices and benchmarks	Y	N

Please list any other knowledge assets which are being managed and not included in the list above.

PART B : METHODS AND TOOLS USED TO PRESERVE KNOWLEDGE

How *IMPORTANT* you perceive the item to be in preserving your organisation's knowledge on the following scale:

1 = very unimportant *2 = important* *3 = very important*

How *EFFECTIVE* you believe the item to be in preserving your organisation's knowledge on the following scale:

1 = extremely ineffective *2 = very ineffective* *3 = effective*

4 = very effective *5 = extremely effective*

IMPORTANCE			METHODS/TOOLS	EFFECTIVENESS				
1	2	3	B1. Knowledge consultant resource pool	1	2	3	4	5
1	2	3	B2. Knowledge champions/Chief Knowledge Officer	1	2	3	4	5
1	2	3	B3. Role models	1	2	3	4	5
1	2	3	B4. "Knowledge" based job functions e.g. knowledge manager, knowledge network facilitator	1	2	3	4	5
1	2	3	B5. Coaches and mentors	1	2	3	4	5
1	2	3	B6. Knowledge bases	1	2	3	4	5
1	2	3	B7. Corporate Knowledge maps and knowledge inventories	1	2	3	4	5
1	2	3	B8. GroupWare	1	2	3	4	5
1	2	3	B9. Intranet and Internet	1	2	3	4	5
1	2	3	B10. Expert systems	1	2	3	4	5
1	2	3	B11. Knowledge navigation tools	1	2	3	4	5
1	2	3	B12. Knowledge sharing system	1	2	3	4	5
1	2	3	B13. Document repositories	1	2	3	4	5
1	2	3	B14. Training programs	1	2	3	4	5
1	2	3	B15. Enterprise wide lessons learned program	1	2	3	4	5
1	2	3	B16. Mentoring and coaching programs	1	2	3	4	5
1	2	3	B17. Special focus meetings	1	2	3	4	5
1	2	3	B18. Knowledge related incentive schemes	1	2	3	4	5
1	2	3	B19. Funds for conferences and consultant meetings	1	2	3	4	5
1	2	3	B20. Cross functional execution of business initiatives	1	2	3	4	5

Please add any additional methods or tools which are being used within your organisation, and which have not been identified above

3	2	1		1	2	3	4	5
3	2	1		1	2	3	4	5
3	2	1		1	2	3	4	5
3	2	1		1	2	3	4	5

PART C : CRITICAL SUCCESS FACTORS FOR KNOWLEDGE MANAGEMENT

How *IMPORTANT* you perceive the factor to be for the success of knowledge preservation within your organisation, rated on the following scale:

1 = extremely unimportant *2 = very unimportant* *3= important*

4 = very important *5 = extremely important*

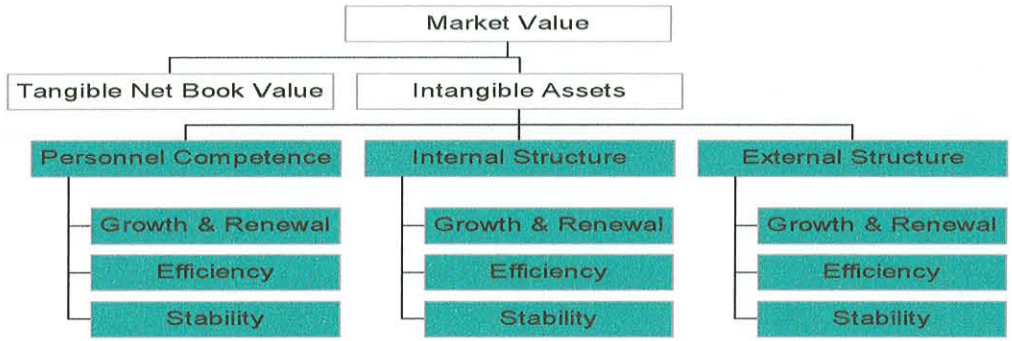
CRITICAL SUCCESS FACTOR	IMPORTANCE				
C1. Alignment of knowledge management to the organisational strategy	1	2	3	4	5
C2. Linking the organisation's knowledge assets to organisational economic performance	1	2	3	4	5
C3. Support of knowledge management by senior management	1	2	3	4	5
C4. Implementing knowledge management enabling technologies and processes	1	2	3	4	5
C5. Implementation of measures of the knowledge assets	1	2	3	4	5
C6. Adoption of a knowledge-sharing culture	1	2	3	4	5
C7. Use of multiple channels for knowledge transferal	1	2	3	4	5

Please add any additional factors which you perceive to be critical to the success of knowledge preservation within your organisation, and which are not listed above.

	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5

A. 3 Intellectual Capital Measures [1]

This section gives an example of the Intangible Asset Monitor, as proposed by Sveiby, which is used to measure intangible assets:



Dimension	Measure	Purpose	Formula	Unit
COMPETENCE OF PERSONNEL / HUMAN CAPITAL [2] / LEARNING & GROWTH PERSPECTIVE [3]				
Growth / Renewal	Number of Years in the Profession	Indicates the average number of years that the consultants have worked in their profession and the level of skill and experience of consultants	(Total # of Consultant Years) / (# of Consultants)	Avg. # of years

[1] Sveiby, Karl Erik, "*The New Organizational Wealth – Managing & Measuring Knowledge-Based Assets*", Berret-Koehler Publishers, Inc., USA, 1997

[2] Edvinsson & Malone, "*Intellectual Capital – Realizing your company's true value by finding its hidden brainpower*", Harper Collins, New York, 1997

[3] Kaplan & Norton, "*The Balanced Score Card*", HBS Press, Boston, 1996

Dimension	Measure	Purpose	Formula	Unit
	Level of Education	Consider the level of formal education of the organisation's knowledge workers, their learning capacity and their flexibility	(Total # of Education Years) / (# of Consultants)	Avg. # of years
	Training and Education Cost	Measure the formal investment in the competency development of personnel	(Training cost + cost of time spent) / Turnover * 100	% of turnover
	Grading	An indicator of the competence of consultants is to grade individuals on a five point scale in terms of their competence and to analyse results across the various fields of the organisation and to evaluate the impact of personnel turnover on these levels	(# of competency grades) / (# of consultants)	Avg. grade (out of 5)
	Competence Turnover	Indicates the difference between competency lost due to personnel leaving the company and the competency gained due to replacements and recruitment	((Years of experience gained) – (Years of experience lost)) / (Total # employees) *100	% loss / gained competence
	Competence-Enhancing Customers	Measure the proportion of customer projects that contribute to the competency development of the employees	(Revenue of competence development customers) / (Total Revenue) * 100	% of revenue
Efficiency	Proportion of Consultants in the Company	Gives an indication of the proportion of consultants to other employees in the organisation	(# of Consultants) / (# of Employees) * 100	% of employees
	Value Added per Consultant	Because the consultants' salaries are usually the largest cost item on the budget, one needs to measure the value produced by them	(Profit before depreciation and interest + salary + wages + all fringe benefits) / (# of consultants)	Currency Value compared to previous years
Stability	Average Age	This measure indicates the balance between seniority that older consultants ensure vs. the dynamics and drive that the younger employees guarantee	(Total of employees' ages) / (Total # of employees)	Avg. age
	Seniority	This indicates the number of years that employees have been employed by the same organisation and of the stability of competence	(Total # of years employed) / (Total # of consultants)	Avg. period of employment
	Relative Pay / Position	Index of the relative salary paid to employees compared to the competition and indicates weather employees are likely to look for work elsewhere	Salaries compared to Industry standards	Index Value

Dimension	Measure	Purpose	Formula	Unit
	Consultant Turnover Rate	A low turnover of consultant staff indicates a stable yet static situation whereas a high turnover indicates dissatisfaction among employees. The company needs to establish a balance	(# of employees that left the organisation) / (Total # of employees in the beginning of that period) *100	% turnover of consultant staff
INTERNAL STRUCTURE / ORGANISATIONAL CAPITAL / INTERNAL PROCESSES PERSPECTIVE				
Growth / Renewal	Investment in Internal Structure (R&D)	Investments in new subsystems and methods are considered as costs but serve as an investment in the internal structures of the organisation	(Total investment in organisation) / (Total value of sales (or value added) * 100	% investment
	Investment in Information Processing Systems	The investment in IT influences the effectiveness and efficiency of the internal operations of the organisation and indicates progress and development	(IT investment) / (Total value of sales) * 100	% investment
	Customer Contribution to Internal Structure	The proportion of customer projects that is innovative, allow large teams for tacit knowledge sharing and learning and contributes to the development of the organisation's internal structure is an indicator of internal growth	(Total revenue of organisation development customers) / (Total revenue)	% of revenue
	Gross Margin from New Products vs. Old Products	This measure shows the level of innovation taking place in the organisation	(Profit generated from new products) / (Total profit) * 100	% of profit
Efficiency	Proportion of Support Staff	The efficiency of the internal structure is reflected in the proportion of support staff relative to the total number of staff employed	(# of support staff) / (Total # of personnel employed) * 100	% of employees
	Sales per Support Person	Another efficiency indicator is the relation of sales volume to the number of internal staff that is needed to process it	Change in (Total revenue) / (Avg. number of admin staff)	% change from previous year
	Values and Attitude Measurement	The measure of the 'esprit de corps' and corporate culture of the organisation shows the conscious and unconscious attitudes of the employees towards the company among the customer	Employee morale / attitude survey	Employee Satisfaction Index
Stability	Support Staff Turnover	The support staff and management of the organisation provide the backbone of the internal structure and should reflect a low turnover rate	(# of admin staff that left the organisation) / (Total # of admin staff in the beginning of that period) *100	% turnover of support staff

Dimension	Measure	Purpose	Formula	Unit
	Rookie Ratio	The number of personnel with less than two years experience is called the rookies and usually maintains a high turnover, is inexperienced and requires a high investment in training. A high rookie ratio indicates less effectiveness and stability	(# of rookies in the organisation) / (Total # of employees) * 100	% of employees
EXTERNAL STRUCTURES / CUSTOMER CAPITAL / CUSTOMER PERSPECTIVE				
Growth / Renewal	Profitability per Customer	This measurement that compares the cost vs. the revenues of each customer should be monitored frequently	((Customer revenue) – (Customer expenses)) / (Customer revenue * 100	% profitability vs. revenue
	Organic Volume Growth	An indicator of the growth and success rate of the organisation as well as the market acceptance of the business concept (disregarding any growth due to acquisitions)	((Current revenue) – (Previous revenue)) / (Previous revenue) * 100	% growth in revenue
	Growth in Market Share	Indicates weather the organisation is growing in terms of the market growth and in terms of its competition	((Current market share) – (Previous market share)) / (Previous market share) * 100	% growth in market share
	Image-enhancing customers	Customers that contribute to the image of the organisation are usually large, well-known corporations, with high potential growth rate and this metrics indicates the percentage of revenue generated by type of customers	(Revenue of image-enhancing customers) / (Total revenue) * 100	% of revenue
Efficiency	Customer Satisfaction Index	The measure of the customers' satisfaction indicates the perception and attitude of the customer towards the company	Customer perception on quality and attitudes survey	Customer Satisfaction Index
	Win / Loss Index	If the organisation's business is generated through a tendering process, the success rate of submitted tenders gives an indication of various aspects, e.g. the organisations market knowledge, pricing strategies, market image, etc.	(Number of successful bids) / (Total number of bids) * 100	% success rate
	Sales per Customer	This metric shows the increase / decrease in sales generated per customer and the effectiveness of the current customer base. It also encourages on-sale opportunities because selling to the same client is usually less costly and easier	Change in (Total revenue) / (Avg. # of customers) * 100	% change in sales per client
	Sales per Consultant	The revenue generated per consultant in the organisation gives an indication of their efficiency and effectiveness	Change in (Total revenue) / (Avg. # of consultants) * 100	% change in sales per consultant

Dimension	Measure	Purpose	Formula	Unit
Stability	Proportion of Big Customers	There is a risk factor in being dependant on a few large customers and the organisation needs to address it	(Revenue generated from the five biggest customers) / (Total revenue) * 100	% business dependant on 5 big customers
	Age Structure	The customer longevity suggests a certain level of relationship, and probability of retention. Unfortunately the measure doesn't change frequently	(Total accumulated relationship period with clients) / (# of clients)	Avg. client relationship period
	Frequency of Repeated Orders	The number of repeated orders with a customer indicates customer satisfaction and loyalty, high perceived quality, the right customer base and higher profitability because it is less costly to sell to new than to old customers	(Total revenue of Old customers [4]) / (Total revenue) * 100	% repeated orders vs. new orders

[4] An old customer is a customer that has given at least one previous assignment

A. 4 Knowledge Management Case-Studies

The following is an extract from an article that discusses knowledge management initiatives at British Petroleum, Ernst & Young, Xerox and the World Bank.[5]

BRITISH PETROLEUM

Philosophy: Every knowledge initiative must be targeted at a real business need and aim to improved business performance.

Practise: Knowledge managers seek out and codify lessons learned in their business units. A community of practise distills these lessons on the corporate intranet.

Benefits: Significant cost savings in site constructions and improved efficiency in oilfield drilling and other projects

British Petroleum, among other oil and gas companies, is one of the most advanced practitioners of knowledge management in the world. The practice has resulted in significant business improvements. According to Kent Greenes, head of knowledge management, the amount of added value that can be attributed directely to the initiative is around $600 million.

One example is the reduced cost of constructing European retail sites. By sharing knowledge among project engineers in Europe, a joint venture with Bovis ended up saving $74 million. This knowledge is now being leveraged on a global scale by project engineers in the new market of Venezuela and Japan. Similar increased in performance can be found in BP's business restructuring, oilfield drilling, polyethylene production and more. The company estimates that its ongoing knowledge management efforts will add another $400 million in value to sustainable projects.

Greenes explains that these positive returns are a result of clear corporate strategy, with each knowledge management initiative targeted at a real business need. The clearly defined objectives have made the measurement of results much easier, which in turn helps convince senior management of the benefits of knowledge management

[5] Wah, L., "*Behind the Buzz*", Management Review (MRV), Vol. 88, No. 4, p.17-19, 24-26, April 1999

initiatives. Keeping track of the outcomes is extremely important in their pursuit. As Greenes puts it, "If you can't measure it, it's not worth doing it."

BP's knowledge management started in 1994 as an informal program, called "virtual teamwork," which followed on the heels of a restructuring of the organisation into smaller, more autonomous units. Under the visionary lead of top management, the program evolved into a formal one. The objectives is to make the reuse of existing knowledge a routine way of doing work, and to create new knowledge to radically improve business performance.

The company's knowledge management approach has a simple framework, encompassing a cycle of learning processes "before," "during" and "after" any event. When the learning processes result in business lessons, peers in communities of practices distill them and define the best practice. Finally, both specific and generic lessons are incorporated into "knowledge assets" on the corporate intranet.

In addition, an employee-driven yellow pages on the corporate intranet now contains information about 10000 employees, enabling everyone to find out "who knows how." Some 1500 people also have video-conferencing and application-sharing technologies on their desks to exchange knowledge with other BP associates, partners and suppliers. More than 20 of the 100 business units of the BP/Amoco merger are using these processes and tools on a regular basis. And about a quarter of BP's business units now have "knowledge guardians" who help their business teams harvest newly created knowledge.

ERNST & YOUNG

Philosophy: Existing expert knowledge should be captured and disseminated across the organisation world-wide to avoid reinventing the wheel.

Practise: Communities of interest publish best practices in "knowledge containers" for others to learn and apply

Benefits: Consultants are able to accelerate problem-solving and get results to clients faster.

Consultant services firms are another group that has gained much insight about knowledge management. Ernst & Young and Arthur Andersen are some of the

leading consulting firms that leverage their own knowledge in this are to help client companies implement the practice.

At Ernst & Young, knowledge management as an internal practice now has a dedicated team of about 300 world-wide. Meanwhile, different practice areas in the firm have started to offer knowledge management services. The knowledge-based business solution practice, for example, provides consulting services to knowledge-intensive businesses and companies that want to engage in e-commerce.

Within Ernst & Young, the management consulting practice has led the way in the firm's own knowledge management initiative, according to Ralph Poole, a director of Ernst & Young's Centre for Business Knowledge. For about six years now, it has actively engaged in experience sharing, in which consultants leverage what others learn from an engagement and apply that knowledge to the problems of other clients.

For example, after a SAP implementation in a client company, a community of interest (COIN) would look at what was learned and pick the most relevant issues to be published into "PowerPacks," a container of knowledge that has everything a practitioner would need to know to execute the work. This way, when consultant face a similar problem or work in a similar industry , they can accelerate the implementation process.

There are 30 COINs made up of teams from different industry lines and business process solutions. These are people who determine the actual content of the PowerPacks.

Over the years, knowledge sharing has been the unsung hero of much of the firm's improved business performance. From 1993 to 1998, for example, the management consulting practice grew more than 300 percent in revenues. During the same period, the head count increased only 200 percent. According to Poole, the gap represents increasing productivity: " We can at least attribute a portion of that to knowledge management – we are getting more efficient over time."

XEROX

Philosophy: It is crucial to leverage the know-how accumulated in employees' heads because the company's core business is to provide support services to customers.

Practise: Service reps contribute electronic tips on a standard knowledge-sharing platform used across the world.

Benefits: Useful tips help save the company cost in labor and parts.

At Xerox Corp., knowledge management isn't all about machines and technology, as one might expect. It's 90 percent social process and 10 percent infrastructure. According to Holtshouse, Xerox's knowledge management initiative aims to use technologies to improve service quality and productivity.

To support that objective, the company launched Eureka, a "social tactical system," in 1996. The system links 25000 field service representitives with laptops and the Internet, using a common documentation method, to facilitate lateral communication.

Eureka was developed as a result of 18 month's study by anthropologists, behavioral scientists and engineers, and the system was actually inspired by the way technicians interact with each other to share their knowledge. A study at the Xerox Palo Alto Research Centre (PARC) showed that these technicians use "war stories" to teach each other to diagnose and fix machines. Drawing on that same concept, Eureka supports Xerox's technicians in sharing their stories in the form of electronic tips.

What's unique about the system, says Holtshouse, is that it does not need a dedicated staff to collect information and write up stories or scripts – a time-consuming effort. Eureka is self-sustaining; the field service reps create and maintain the knowledge base by contributing and renewing all the tips on how to fix machines. Formal review committees then validate the tips.

The tangible results of the lateral communication made possible by Eureka include a 5 percent saving in both parts and labor. Service reps access more than 5000 tips a month and new tips are generated at the rate of about one per 1000 service calls.

What makes the system self-sustaining is the recognition employees receives for participating in the process. Each time a rep contributes a tip, his or her name goes on the system. This motivates people to take responsibility for building the common knowledge base. "Understanding what motivates them was key to get the right things going," Holtshouse says. "Money was one of the considerations, but recognition seems to [work] the best."

WORLD BANK

Philosophy: The sharing of development expertise around the globe should be boundless. The aim is to achieve the mission of alleviating poverty in developing nations faster.

Practise: Experts and task managers around the world use the Internet to share knowledge and experience in solving development problems.

Benefits: Accelerated problem-solving helps developing nations to overcome crises much faster than before.

The benefits of knowledge sharing aren't limited to the private business terrain. Non-profit organisations also can use it in achieving their missions. The World Bank, for example, is leveraging global knowledge sharing to attain its goal of becoming a clearinghouse for expertise on sustainable development.

Stephen Denning, program director of knowledge management, says, "The mission of the World Bank is to alleviate poverty and improve the living standard of the poor countries of the world. Knowledge management is helping us to accomplish the mission."

One example occurred last August, when the governor of Pakistan contacted the World Bank office in his country to ask about new technology for Pakistan's deteriorating highway system. Denning says that in the past, the bank normally would have assembled a team to visit the country and write a report on the issue, which could take months.

But what actually happened was quite different. The task manager contracted the "community of practice" within the bank that consists of highway experts, asking for urgent advice. A highway expert working at the World Bank sector in Jordan found that his country was using a technology that could be applied in Pakistan. On the same day, someone in Argentina was working on a book about a technology being

used in Asia, South America, Africa and Australia. Meanwhile, one of the World Bank's outside partners in South Africa said the country had been using the technology for decades. So he shared the pros and cons with the task manager, who was able to quickly gather global experience and apply it to Pakistan. Finally, this knowledge is being captured in a knowledge base.

Currently, the World Bank has more than 110 communities of practice around the worlds that are in the process of connecting with each other and improving the quality of the knowledge base. Denning says the organisation's vision is to share its knowledge about development externally by 2000, so that all who are interested will be able to access it via the Internet.

A. 5 Document management software [6]

The aim of this selection of software is to support the creation and dissemination of information to support the co-ordination between people and documentation and the collaboration between different groups within and outside the organisation.

It comprises of the following types of software:

- Enterprise Document Management Software (EDM)
- Full-text Retrieval software
- Viewer and Publisher Software
- Workflow
- Push Technologies
- Integrated Document and Output Management (IDOM)

1. Enterprise Document Management Software (EDM)

EDM software manages the production of, the access to, and the distribution of documents. Features like the ability to automate change, to validate the integrity of the document and to facilitate the re-use of document content are common in EDM[7] software. Because the status of a document changes as it moves through its lifecycle from 'draft' to 'in submission' to 'approved' and the access levels vary from author, to reviewer, to public access, the EDM group of software enables access and security control procedures and monitors how documents change over time. It deals with how information is created and captured as well as how critical documents are moved around according to the business rules.

Other features include:

- workflow abilities which address conditional logic;
- the ability to push relevant information to appropriate users in the right format;
- the ability to maintain document content, e.g. the company logo which is updated by a parenting ability so that the change of one logo is reflected in all the relevant documents;

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[6] White, Amie S., and Combell, Ian, (1997), "Document Management Software", *1996-2001: Market Review and Forecast*, International Data Corporation

[7] Microsoft and Documentum – Whitepaper, (1997)

- the ability to re-use document content, e.g. to easily reflect tender information that forms part of one document in other documents.

Trends

A number of trends are observed in the market, such as:

- standards like DMA (Document Management API) and ODMA (Open Document Management API) is expected from EDM software for easier application and the integration between different file formats; and
- the scalability of the application beyond a workgroup to an enterprise-wide deployment.

EDM Features

The key features of an EDM software solution include:

Configuration Control	Version Control (Revision, Data Integrity)
Security	Rendition Creation (Comment)
Check in/out	Push/Pull technology
Search ability	Virtual Project Cabinet folder
Maintainability	Web-enabled/accessible solutions
Workflow	Information reuse
Collaborative solution	OCR (optical character recognition) ability

Examples of EDM Software

There is currently a wide range of EDM products on the market and a few examples of these are:

Keyfile

Keyfile has the feature of viewing and accessing shared documents, stored in multiple folders, desktops or file cabinets. It provides full multiple revision track records of documents, with the necessary security control on pages, users, and almost any type of document and with full view ability. It interfaces effectively with the Microsoft Exchange, collaborative tools, effectively supports Keyflow as workflow software and is an easy to use integrated Microsoft Object oriented desktop solution.

Altris

Altris provides the capability of sharing images across distances (by modem, Internet, WAN, etc) and mixing very large files, images and drawings, with a business document.

2. *Full text Retrieval software (26%)*

Knowledge retrieval technology uses algorithms with Boolean and context-based search techniques to give context to a query, to sift through a huge volume of information and to return high quality 'hits'. This could include providing intuitive search, retrieval, collaboration, and push capabilities. The value addition of search engines is in their ability to save time and resources by finding relevant information faster and more accurate to the users' satisfaction.

Appropriate Information retrieval (IR) facilities solve large-scale search and retrieval needs to ultimately develop the company's ability to manage its knowledge. This requires adequate understanding of the type of data sources and data that need to be indexed and searched and the user requirements of the client. If the requirements include a search engine with extensive, accurate search ability in a fuzzy kind of environment, Excalibur is the preferred choice. It leads the fuzzy search category of search engines with its semantic search features and its effectiveness in the search of image content, foreign language and bad quality documents.

If the search engine is required to perform searches across multiple data types and sources, Excalibur outperforms the competition. It specialises in image-types of data, with its adaptive pattern recognition technology and has proven superior to competitors with search abilities limited to electronic text-based products and not the integrating paper-based knowledge assets.

Verity, on the other hand, has a strong ability to leverage its relationships, due to focused leadership and strategic partnerships. According to MetaGroup's research "Verity's strength is in its presence within the greatest variety of leading GroupWare, document management, Internet, Intranet, and database products on the market". In additions Verity's ability to create a single index across multiple information stores makes it an attractive alternative.

Other features of search and retrieval solutions include the employment of intelligent agents and web crawlers as well as summarisation and categorisation abilities. The ability of a vendor to implement and support the system, as well as cost considerations are other important criteria.

Other features of retrieval software include:

- *semantic networks* that are developed from dictionaries to distinguish among the different meanings of a word depending on its context; and
- *adaptive pattern recognition* that provides the ability to recognise query terms even when misspelled due to OCR, author, searcher' errors.

Trends

A number of trends are observed in the market, such as:

- the ability to push mission-critical data to end users;
- intuitive search and retrieval as well as collaborative technology; and
- the ability to exploit the corporate intranet.

Examples of Full Text Retrieval Software

There is currently a wide range of products on the market and *Table 8: Full Text Retrieval Ware* indicates the position of the dominant players in the market.

Table 8: Full Text Retrieval Ware

	NEW USERS (%)	REVENUES (%)	INSTALLED USERS (%)
VERITY	**53.7**	29.7	**88.2**
FULCRUM	10.8	**30.3**	1.5
EXCALIBUR	4.3	11.7	2.4
GRAPEVINE	1.3	0.6	0.3
FOLIO	3.1	7.5	1.7

3. Viewer/Publisher Software (20.5%)

This group of software provides the ability to convert paper documents into searchable Portable Document Format (PDF) files whilst maintaining all the formatting, text, graphics and signatures.

Features of Viewer/Publisher Software

The functionality of this type of software includes the following:

- ability to integrate with other business critical applications such as product development;
- reduced maintenance and administration associated with Internet-based application;
- enable the management and distribution of huge amounts of documents easier;
- provide independent platform support;
- access to remote users;
- administration of critical information is centralised; and
- scalability beyond company borders.

4. *Workflow*

Knowledge embedded in methodologies, processes, and repetitive activities can be exploited through workflow technologies that have the ability to automate business processes whilst distributing the related electronic documents. Features like ability to activate, create, monitor and modify workflow instances across the organisation makes this integrated software solution highly effective.

It is the catalyst that deploys flexible business processes, provides for continuous improvement and ties together a collaborative team. It enables faster application development at a lower cost as well as the rapid access to the accurate information.

Example of Workflow Software

There is currently a wide range of products on the market which include:

Keyflow

Keyfile's Keyflow integrate seamlessly into Microsoft Exchange environment with Outlook as user interface, thereby enabling collaborative processes. It provides for the ability to map an automated business process, to view the status of a workflow in process as well as creates a higher connectivity throughout the organisation.

5. *Push Technologies*

This type of products accesses all the internal and external sources of knowledge including broadcast media and Intranet applications to deliver relevant information timeously to a target audiences through secured channels. It enables the automation and streamlining of information dissemination across the organisation. With the ability of such an agent a user saves time on performing a search and receives any new entries via an e-mail message with a link to or the source document itself. One example of this type of software is BackWeb

6. *Integrated Document and Output Management (IDOM)*

There is another type of software in the market that provides an total solution to the challenge of document management and integrates all the above-mentioned functions. These types of products provide production imaging, workflow, information retrieval and integrated document management software. It also provides publishing and viewing technologies, hard-copy production, distributed print and distributed output management, electronic forms, database publishing, integrated documents archival and retrieval strategies, automated document factories, paper reduction and application development for production output.

Examples of IDOM Software

Herewith a few examples of IDOM software solutions currently available on the market

Open Text (Livelink)

Livelink 7 lives within an Intranet, it has a workflow capability that enables users to construct collaborative processes of any type, providing an Intranet home page as the locations for users to receive work. It manages any file, news group or object type, it provides process and project management and enables intranet-based work. Livelink Intranet includes Livelink Library (document management), Livelink Workflow, Livelink Project Collaboration, and Netscape's Enterprise web server as well as Livelink Search for search capabilities.

PCDOC's – Docs Enterprise Suite

PCDoc's enterprise suite includes Docs Open for document management, Docs Imaging for the capturing of digitised images and text and Docs Routing for a low level serial, parallel, or broadcast routing regardless of the file format. CyberDocs is a web-enabler (browser) that provides secure cost effective document management via the Internet and Intranet.

Fulcrum – Knowledge Network

Via a knowledge map and a CyberDocs interface the user can navigate a search with fulcrum ability across the different servers of information according to their security levels.

NetRight – Java based solution

This solution provides the implementation of a Java-based technology browser, without installing or maintaining document management software at every site. This approach provides without extra installation cost, the necessary secure communication, low memory requirements, low licensing costs, and limited network traffic.

Unlike the Hypertext Markup Language (HTML) and Gateway Interface (CGI) technologies that is used in most document management vendors, Java-compatible technology does not show the same limits in comprehensive document management functionality.

It provides a cost-effective, technical superior solution with enhanced features compared to HTML based solutions as defined in *Table 9: Comparison between JAVA and HTML Technology.* [8]

Table 9: Comparison between JAVA and HTML Technology

JAVA-based solution	CGI and HTML-based solution
Uses smart caching – automatically retrieves updated transaction information	Uses browser caching – user periodically reload pages to see updated info.
Decreases network traffic – uses a few short transactions optimized for DMS	Increases network traffic – large HTML pages connects and disconnect
Limited server resources – a single multithreaded program to speed up response time	Uses server resources by running CGI programs for each client request
Scalable to support huge amounts of users	Limited number of users can be supported
Security by encrypting documents and transactions	No security between server and client
Control communication link	No control over communication failures

Features of Integrated Document and Output Management Software

The functionality of this type of software includes the following abilities:

- Search ability
  - Pattern recognition (spelling mistakes)
  - Binary Pattern (scan quality)
  - Auto correct
  - Prioritising
- Security control
- Semantics
  - Language meaning
  - Clustering such as categorisation (similarity engine)
  - Semantic nets (weighted relationships)
- Indexing ability
- Internet interaction
- MiddelWare
- Knowledge mapping
  - Content abstraction (summarizing)
  - Clustering (key words)
- SAP, GIS and other integration
- Sharing (collaborative)
- Web search
- Pull Technology (Agent)

[8] Rafiq Mohammadi, (1997), "Which document management Internet/Intranet strategy is best for you", http://www.kmworld.com/newestlibrary