Paper 111

Knowledge Management - Integrated Solutions for Information Delivery

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ABSTRACT

Knowledge Management is defined as the systematic process of finding, selecting, organizing, distilling, and presenting information in a way that improves an employee's comprehension and use of business assets in a specific area of interest. Knowledge Management provides the ability to link structured and unstructured information with the changing rules by which people apply it.

This paper will cover the concepts that define knowledge management and processes for integration with enterprise data management techniques. The author will define the four key areas of KM with concentration on EDM and BI components, successful information delivery through the deployment of these components as well as the roles required to support these solutions. This paper will also touch on areas such as collaboration and document automation.

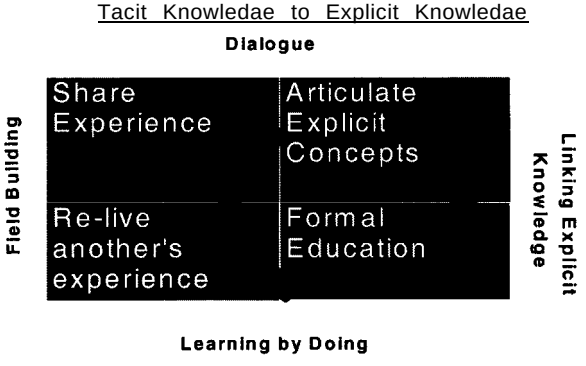
INTRODUCTION

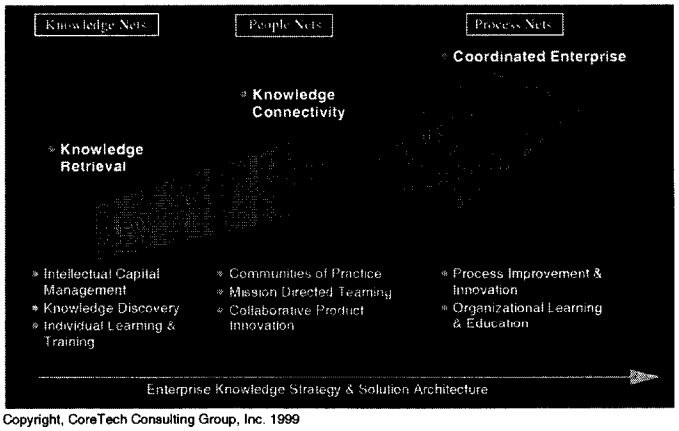
Knowledge Management (KM) helps companies achieve their strategic and tactical goals by leveraging intellectual capital. Through the application of strategies, processes, and technologies, Knowledge Management helps companies fully utilize the power of knowledge in databases, documents, and employee's minds. Knowledge management focuses on four key components:

- Enterprise Data Management
- Business Intelligence
- Collaboration (e-mail, group communications)
- Document Automation

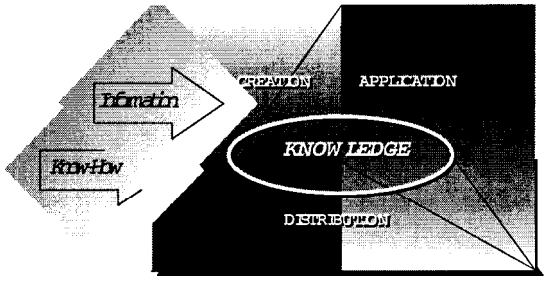
KM incorporates the application of two forms: tacit and explicit knowledge. Explicit knowledge incorporates data that is articulated in a formal way (reports, manuals, directions, instructions). Tacit knowledge, on the other hand, is less formal and includes that which is part of an individual's actions and reactions (habits, patterns, behaviors). The types of knowledge that can exist include: content, process and people. The evolution of KM is the movement of taking intellectual capital and disseminating it in a way that allows for shared understanding and reuse of valuable information, processes, and techniques.

By converting tacit knowledge to explicit knowledge, we are able to evolve from strictly 'doing' to 'applying' skills based on more educated usage of data.





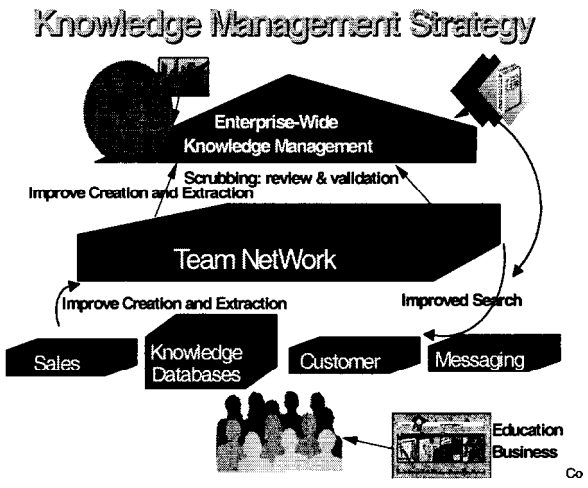
INFORMATION INTEGRATION - KNOWLEDGE MANAGEMENT



Recognizing that intellectual capital is as important as financial capital

Knowledge Management takes information delivery one step further than traditional EDM. KM encompasses the application of technology based strategies, processes and structure to allow for the delivery of business critical information. KM solutions allow for leverage of business knowledge to increase an organization's intellectual capital by accessing, managing, and sharing information. This includes the implementation of integrated strategies and techniques to improve process flow, data management, and the visualization of business critical information, increasing a business' ability to perform in today's highly competitive marketplace.

By utilizing these integrated techniques, organizations better prepare themselves for the onset of competition in a marketplace where bigger, better, faster, and more continue to rule.

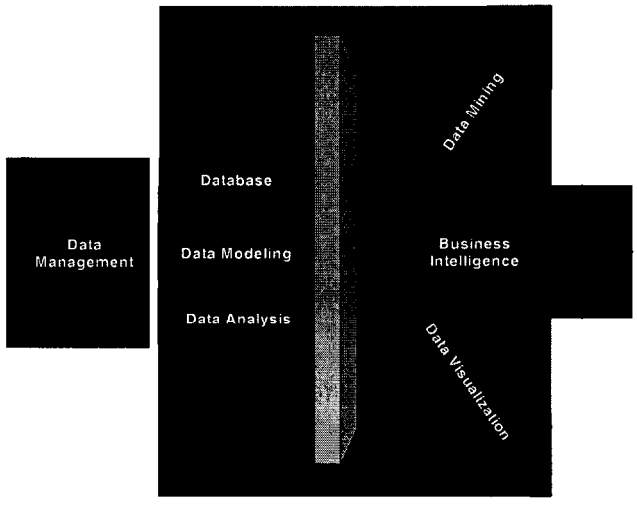


STRATEGIC PLANNING ASSUMPTIONS

When assessing your organization's business needs, it is important to identify strategic planning assumptions. Some examples that drive the demand for KM include:

- Rapid ROI or time to market
- Timely access to accurate information
- Techniques for sharing consistent data
- Managed query and reporting capabilities
- Increased usage of e-mail, on-line documentation, web access (Internet, intranet capabilities)

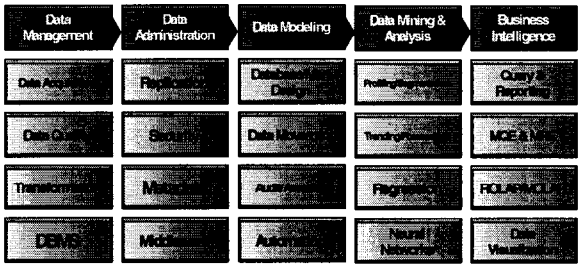
ENTERPRISE DATA MANAGEMENT



Enterprise Data Management (EDM) is a process accomplished by applying the following basic steps:

- Defining business information needs
- Identifying data that will satisfy those needs
- Guiding users through the process of using data to discover hidden relationships and trends
- Introducing tools to present information for the purpose of continuous discovery

These steps are applied to five major concentration areas for the design and deployment of EDM strategies:



These elements are defined as follows:

Data Management:

This is the staging area for data warehouse/mart data collection from operational or transactional data stores. This service line also incorporates the organization of non-volatile, integrated data by subject area over time in preparation for information access and delivery.

Data Administration:

This element encompasses the replication and administrative management of the new data stores. Data dictionaries, security, performance standards, middleware, and connectivity issues are all addressed through data administration.

Data Modeling/DBMS Design:

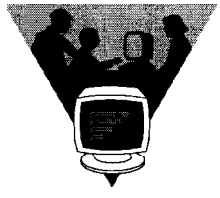
Data modeling includes the development of smaller data stores for use in vertical business applications. Database design and data movement methods are established then indexed and summarized data is audited and assessed before final automation procedures are put in place.

Data Mining & Analysis:

Once data staging is complete, analysis techniques can be applied. The automated discovery of new information, associations, hidden relationships, and changes in large quantities of operational, transactional and summary level data allows for improved decision making capabilities. Different methods of analysis are utilized based on specific business objectives. Trending, forecasting, market segmentation, customer profiling, and advanced statistical analyses (use of neural networks for predictability assessments) are all functions of data mining.

Business Intelligence:

Tools and techniques used to provide business analysis capabilities against data that has been staged (ad hoc as well as managed query and reporting environments - MQE, MRE). This also includes on-line analytical processing capabilities using multi-dimensional and relational databases (MOLAP/ROLAP) and data visualization. This element applies decision making processes with the meaningful delivery of business facts.



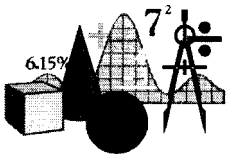
Business Intelligence

Query & Reporting Tools

These tools can be used to perform basic spreadsheet type functions like frequency analysis, summation reports, and graphical capabilities like bar or pie charts. These types of tools are useful because in most cases they do not require the user to do programming or understand extraction logic for accessing data.

Query and reporting tools provide the user with the ability to access data stores and perform different

levels of analysis based on queries or calls to the source data. They are used primarily to get a sense of what has occurred within a particular business area (ex. customer segment or product line).

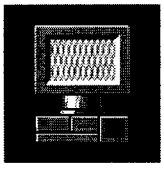


On-line Analytical Processing (OLAP)

OLAP tools pick up the ball where query and reporting tools leave off. Sometimes, it is necessary to do more complex statistical analysis or locate reasons why specific trends or frequencies occur. These tools allow the user to drill through data and make comparisons across or downward and increase the level of analysis capabilities. In many cases, OLAP works well when applied to a data mart or data warehouse because it provides functionality to access multiple, complex, and large data sources. It work well in situations where users want to:

- Move through hierarchical views of data (ex. from a customer based view of data to account or household level views)
- Do statistical queries (ex. chi-squared testing)
- Do multi-dimensional analysis (ex. see total sales over product line by month or quarter)
- Access many different data stores (ex. internal profitability analysis compared to industry averages obtained from an outside data provider)

These tools are customizable and can be tailored to the specific needs of the business or user. However, you will need to remember that SQL programming or other procedural logic will likely be required in order to format or access different data sources. Naming conventions for data elements need to be understandable to the user. You may find it necessary to rename, reformat and massage data for usability and consistency sake. Object-oriented programming and development techniques are critical in supporting a front-end that is user-friendly and has reusable functionality.

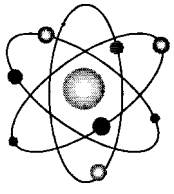


Executive Information Systems (EIS)

EIS tools take OLAP functionality and apply it to a higher level of user (hence the word 'executive'). These tools usually provide snapshots of a business line or particular area's bottom line at a particular point in time. The visualization is concise and the analysis is highly summarized. Particular attention is paid to tool flexibility and user friendly design that allows for intuitive usage, and provides quick access to information. These tools are effective when large numbers of users need to access the same information on a regular basis (like weekly or monthly). The information should be at the user's fingertips while still providing drill-down and across functionality. EIS tools may not be as customizable as other types of OLAP tools. However, the focus here is on the type of user accessing the information. Who is the audience? What are they looking for and how proficient are they at understanding the analysis being done? You want to save them as much time looking for information as possible and alert their attention to areas of concern or trends (loss of profits, increase in market share, etc.).

Geographical Information Systems (GIS)

GIS tools combine OLAP functionality, EIS quick access to more integrated information, and geographical analysis capabilities. They allow the user to view spatial data as it compares to business information and provides mapping capabilities to boot. If your users want to look at information over time, by products but also want to see how a particular market region or segment is performing, these tools are designed to give them just that. Users can view reports, graphs, or trend plots segmented by a particular geography after selecting a region on a map. Government agencies, financial organizations, and environmental based companies find these tools particularly useful in order to also view demographic information within a tri-state, county, or census tract area. Mapping tools can be quite large and take specialized programming techniques to support customized development.



Data Mining

One of the fastest growing areas that has caught the attention of the technology industry (besides the zillions of Internet applications) is data mining. Data mining tools apply discovery techniques for analyzing data to find unknown or unexpected relationships or patterns. Where you drill-down using OLAP tools you would, conversely, drill upward through information when data mining. Ideally, most businesses make decisions based on an understanding of the relationship between their internal and external

environments (i.e. business performance versus the economy) . Data mining tools help uncover critical *unknown* relationships or facts. Locating and identifying anomalies are also common characteristics. Users can see where their business may be taking a somewhat subtle turn in a not-so-positive direction and make decisions on what can be done to make adjustments through early detection. Predictive modeling, decision trees, fractal analysis (use of chaos), and neural networks are common examples where data mining is used. The function of these tools is to provide users with strategic insights on how they do business, what they need to do to change it, and how to identify potential effective approaches for moving forward. These tools are very powerful, take can a great deal of effort to design and depend heavily on statistical models for analysis. However, the results can be extremely valuable.

Business intelligence tools are designed exactly as they are named. They allow users to make intelligent business decisions. At no time should they be developed to replace an existing transaction processing system. They are meant to provide visual support for business activities but not for every single transaction or field that the organization maintains. Decisions are made based on compilations of data. In order to make these decisions, a lot of information needs to be gathered, analyzed, and presented in a way that users can understand and use. Opening doors that provide hidden business trends and information is key as is incorporating the ability to apply self-learning techniques within the tools.

A CASE STUDY

Below is an overview of a sample EDM & BI process where SAS tools were used to successfully deliver business critical information:

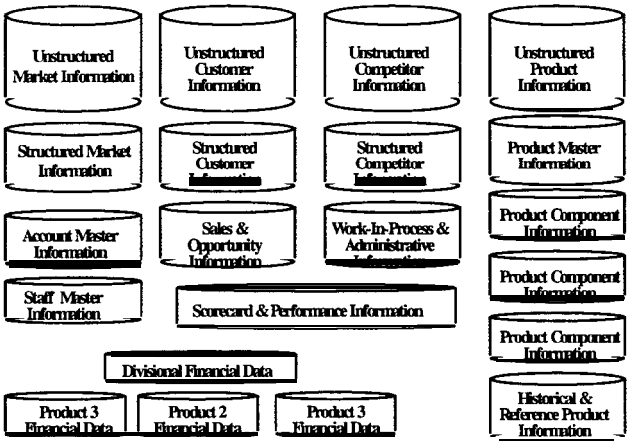


Figure 1 shows multiple silos of information that need to be accessible to 200+ users in multiple geographical locations for the purpose of departmental, operational, executive, and regional reporting. The databases range from Excel spreadsheets on user hard drives to DB2 tables stored on legacy platforms. The first step was to review critical reporting required by specific departments for making business decisions. The next step was to locate what data would meet those reporting needs and what tools would facilitate the process.

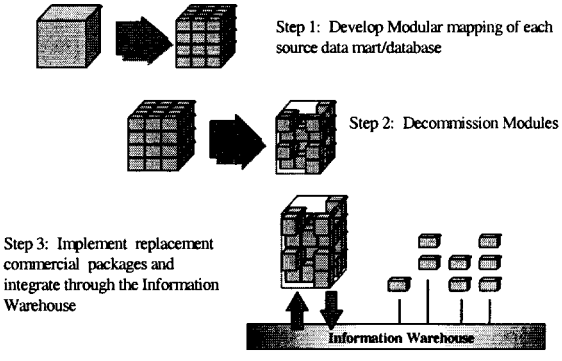


Figure 2 outlines the steps necessary to extract business critical data elements from silo repositories. It was necessary to spend a great deal of time extracting, cleansing, transforming, and normalizing data to ensure accuracy.

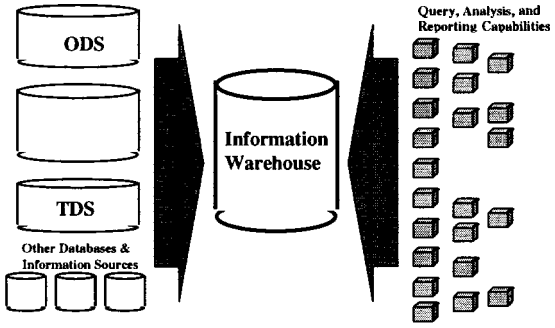
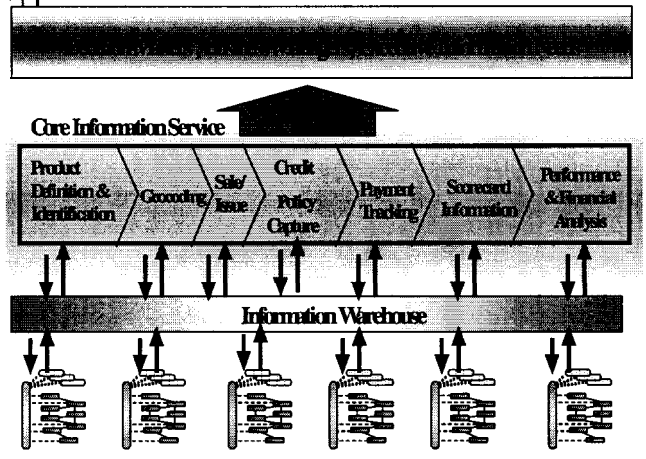


Figure 3 shows the 'virtual warehouse' established to allow sharing of data across different platforms. Once the warehouse was established, a complete review of tools and technologies was done to determine where managed query and reporting could be applied. SAS front-end tools were selected in addition to some departmental specific 'home grown' applications.

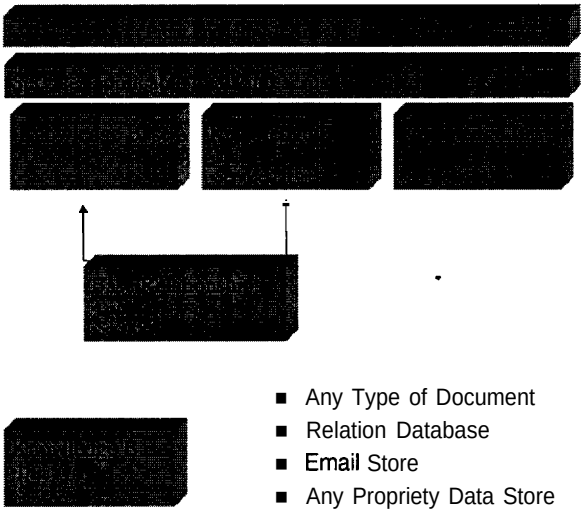


Once the data has been staged and the virtual warehouse built, front end tools and applications are selected and customized to meet the needs of the users. The original reporting requirements identified at the onset of the process are revisited to ensure that the business goals have been met. All 200+ users are able to access business critical information via intranet and Internet using EIS, GIS, and OLAP tools.

The next step to making information available incorporating collaboration.

COLLABORATION

Collaborative strategies include the implementation of enhanced communication processes within and between workgroups. These processes are developed through the application of groupware technologies and structured information management strategies against unstructured data. Collaborative development taps into the flow of communication that is already happening in an organization.



- Any Type of Document
- Relation Database
- Email Store
- Any Propriety Data Store

DOCUMENT AUTOMATION

Document automation provides implementation of modeled business processes and resources reauired to support those processes. The three basic components necessary to build a document repository:

- creating/capturing information assets
- securing/combining assets
- distributing/retrieving assets
- converting paper documents into on-line, searchable documents

ROLES FOR SUCCESS

The successful delivery of KM solutions is significantly dependent on the fulfillment of specific roles. Key roles are outlined below:

Role	Description
Project Manager	Manage overall project budget, and roles
Architect(s)	Provide system, database, and application infrastructure
Data Modeler	Establish ER, process, and all data models
Database Designer	Build DBMS to support information access
DBA	Provide ongoing data management and administrative support
BI Developer	Build managed query and reporting environment
Groupware Developer	Build and manage group communication environment for shared access to information
Workflow Modeler	Establish workflow procedures for the management and movement of data across tiers
Network Engineer	Manage server environment, disaster recovery, security, and optimize performance

Without the development of a strong team to deploy KM solutions, be prepared for the following roadblocks and leading issues to come about:

- Human reaction: “Not my day job”
- Organizational reaction: “What is the business benefit?”
- Managing the repository of knowledge
- Building shared context/vocabulary
- Incentives and processes for creating, applying and distributing knowledge
- Technology support requirements must be met & managed
- Creation, search and distribution technologies
- Managing just in time knowledge

COMBINING KM COMPONENTS - THE BENEFITS

Building a KM application or environment:

- Provides a common interface into diverse knowledge bases
- Provides core services that span different knowledge bases
- Provides extensibility into n number of knowledge bases
- Provides services unique to a given knowledge base
- Provides for relationships between bases

Successful information delivery requires establishing an integrated approach to meet business needs. Some of the benefits of applying cohesive KM techniques include:

- Data access, accuracy, & reusability
- Identification of new business opportunities
- Enhanced customer service
- Strategic market segmentation approaches
- Risk management
- Forecasting & trending analysis
- Competitive assessments
- Information reporting & presentation
- Education on knowledge discovery techniques

With the application of KM, IT needs to sell business deliverables and assign ownership of business requirements to the business sponsors. This should include:

- Leverageable requirements - tracking ROI
- Emphasizing high-value deliverables, that can be provided in a short span of time (less than six months), limit the scope of the project to a single subject area
- Establishing multiple deliverables
- Avoiding unrealistic goals
- Leaving room for incremental feedback to drive additional requirements.

It is important to remember that knowledge is the only enduring asset within an organization.

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