

# **Chapter 12**

# **Business Analytics and Knowledge Management**

**Managing and Using Information Systems: A  
Strategic Approach**

**by Keri Pearlson & Carol Saunders**

# Learning Objectives

- Understand the difference between data, information, and knowledge.
- Define how tacit knowledge differs from explicit knowledge.
- Describe why knowledge management is so important.
- Understand how knowledge is generated and captured.
- Describe a knowledge map.

# Real World Examples

- Harrah's found a way to double revenues by collecting and then analyzing customer data.
- They mine their customer data completely.
- They use loyalty cards to track customer behavior and to determine high revenue customers.
- Determined that these customers were motivated by reduced hotel room rates, and wanted quick service.
- They found ways to reduce lines and wait time.
  - High revenue customers rarely waited in any line.
- Found ways to keep customers coming back.

# Knowledge Management

- Knowledge Management (KM) is defined as the processes needed to generate, capture, codify and transfer knowledge across the organization to achieve competitive advantage
- Technology plays a significant role in managing knowledge.
- Intellectual capital is defined as knowledge that has been identified, captured, and leveraged to produce higher-value goods.
- Intellectual property allows individuals to own their creativity.

# Knowledge Management

- KM is related to IS in three ways:
  - IT makes up the infrastructure for KM systems
  - KM systems make up the data infrastructure for many IS applications
  - KM is often referred to as an application of IS
- A position called “Coordinator for International Intellectual Property Enforcement” was created by the US Department of Commerce.

# DATA, INFORMATION, AND KNOWLEDGE

# Information

- Data, information, and knowledge have significant and discreet meanings within KM (Figure 12.1 shows their differences).
- Data are specific, objective facts or observations (inventory contains 45 units).
- Data is turned into information by organizing the data into some unit of analysis (dollars, dates, customers, etc.).

<b>Data</b>	<b>Knowledge</b>	<b>Information</b>
<p>Simple observations of the world:</p> <ul style="list-style-type: none"> <li>•Easily captured</li> <li>•Easily structured</li> <li>•Easily transferred</li> <li>•Compact, quantifiable</li> </ul>	<p>Data with relevance and purpose:</p> <ul style="list-style-type: none"> <li>•Requires unit of analysis</li> <li>•Needs consensus on meaning</li> <li>•Human mediation necessary</li> <li>•Often garbled in transmission</li> </ul>	<p>Valuable information from the human mind: includes reflection, synthesis, context</p> <ul style="list-style-type: none"> <li>•Hard to capture electronically</li> <li>•Hard to structure</li> <li>•Often tacit</li> <li>•Hard to transfer</li> <li>•Highly personal to the source</li> </ul>

More human contribution →

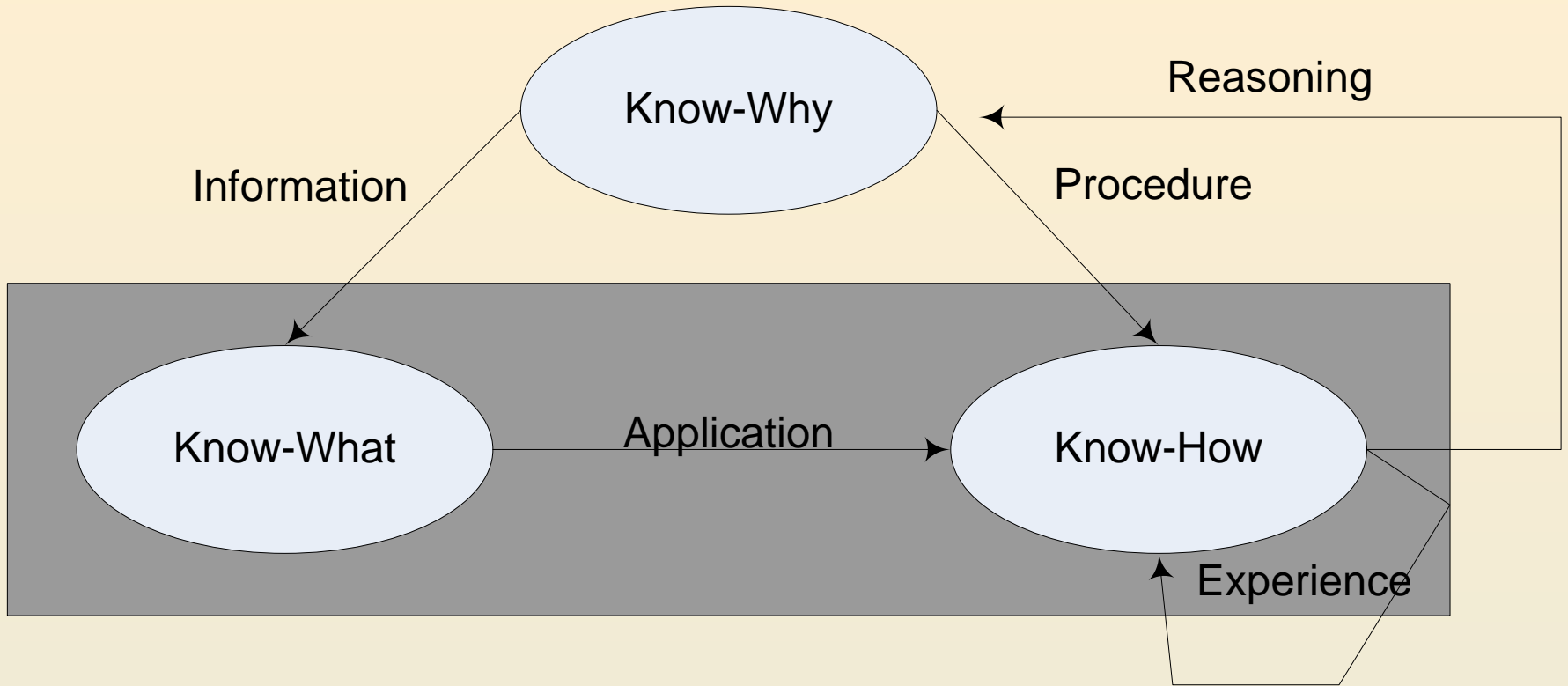
Greater value →

**Figure 12.1** The relationships between data, information, and knowledge.



# Knowledge

- Knowledge is a mix of contextual information, experiences, rules, and values.
- Richer, deeper, and more valuable.
- Consider knowing –
  - What? - based upon assembling information and eventually applying it.
  - How? – applying knowledge leads to learning how to do something.
  - Why? – casual knowledge of why something occurs.
  - (Figure 12.2 graphically illustrates these types of knowing).



**Figure 12.2** Taxonomy of Knowledge

# Tacit vs. Explicit Knowledge

- **Tacit** knowledge is personal, context-specific and hard to formalize and communicate
  - A [knowledge] developed and internalized by the knower over a long period of time . . . incorporates so much accrued and embedded learning that its rules may be impossible to separate from how an individual acts. **‘knowing how’**
- **Explicit** knowledge can be easily collected, organized and transferred through digital means.
  - A theory of the world, conceived of as a set of all of the conceptual entities describing classes of objects, relationships, processes, and behavioral norms. Often referred to as **‘knowing that’**, or declarative knowledge.
- See Figure 12.3 for more examples.

## **Tacit Knowledge**

- Knowing how to identify the key issues necessary to solve a problem
- Applying similar experiences from past situations
- Estimating work required based on intuition & experience
- Deciding on an appropriate course of action

## **Explicit Knowledge**

- Procedures listed in a manual
- Books and articles
- News reports and financial statements
- Information left over from past projects

**Figure 12.3** Examples of explicit and tacit knowledge

**FROM MANAGING  
KNOWLEDGE TO BUSINESS  
INTELLIGENCE**

# From Managing Knowledge to BI

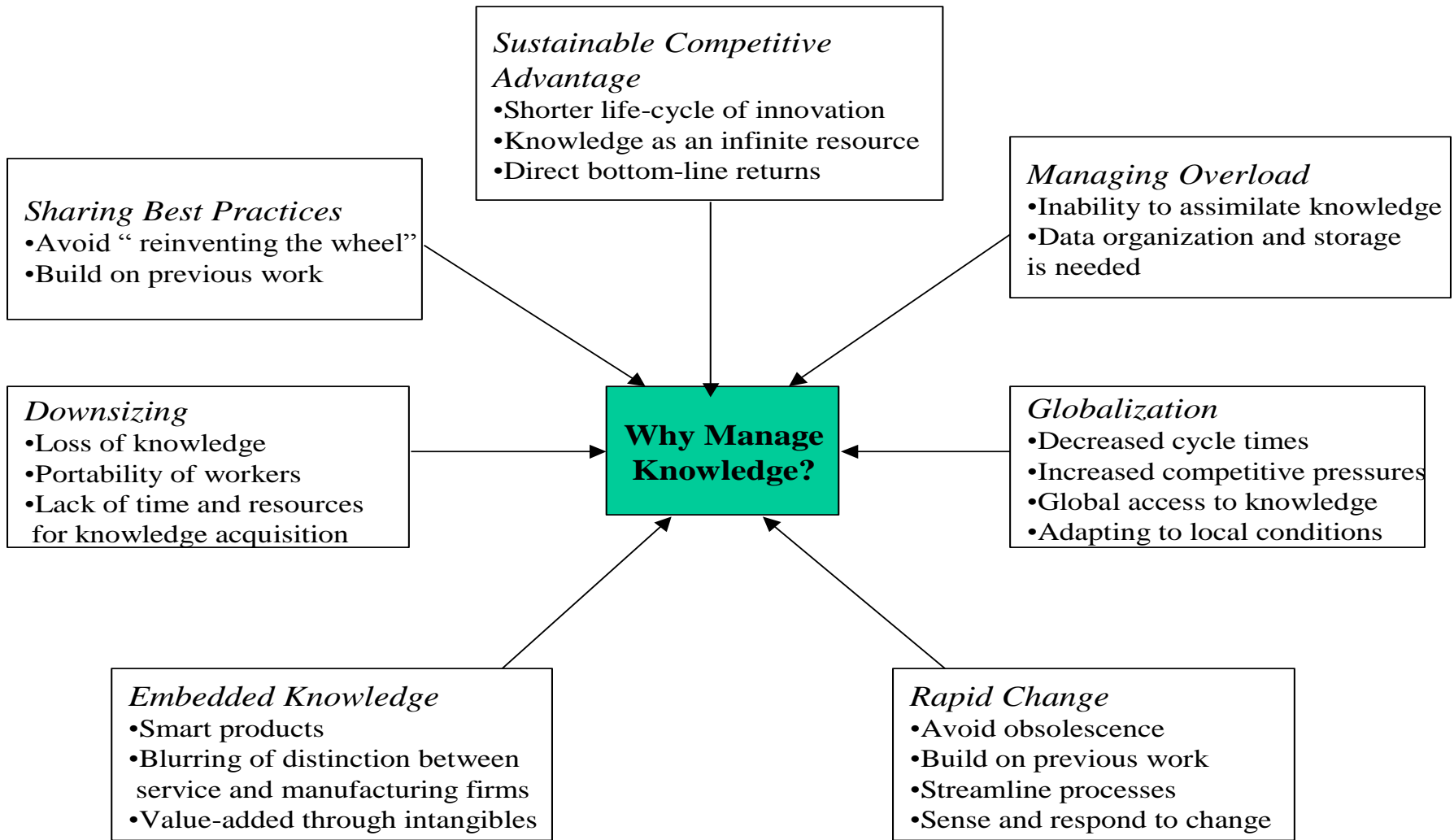
- Managing knowledge is not a new concept, but one reinvigorated by IT.
- KM is still an emerging discipline
- Business Intelligence (BI) term used to describe the set of technologies and processes used to describe business performance.
  - BI is a component of KM.
- Business Analytics – use of quantitative and predictive models, and fact based mgmt to drive decisions.
- An organization's only sustainable competitive advantage lies with how its employees apply knowledge to business problems
- KM is not a magic bullet.

**WHY MANAGE  
KNOWLEDGE?**

# Why Manage Knowledge?

- Information and knowledge have become the fields in which businesses compete.
- Several important factors include:
  - Sharing Best Practice
  - Globalization
  - Rapid Change
  - Downsizing
  - Managing Information and Communication Overload
  - Knowledge Embedded in Products
  - Sustainable Competitive Advantage
  - Figure 12.4 summarizes these trends.





**Figure 12.4** Reasons for Managing Knowledge. ©IBM Global Services

# Sharing Best Practices

- Sharing best practices means leveraging the knowledge gained by a subset of the organization.
- Increasingly important in organizations who depend on applying their expertise such as accounting, consulting and training firms.
- KM systems capture best practices to disseminate their experience within the firm.
- Problems often arise from employees who may be reluctant to share their knowledge (managers must encourage and reward open sharing).

# Globalization

- Historically three factors, ***land***, ***labor*** and ***capital*** were the key to economic success
- ***Knowledge*** has become a fourth factor.
- Knowledge-based businesses can grow without traditional land, labor, and capital requirements.
- Key competitive factor will be how well an organization acquires and applies knowledge.

# Other factors

- **Rapid change:** firms must be nimble and adaptive to compete
- **Downsizing:** sometimes the wrong people get fired when creating a leaner organization
- **Managing Info and Comm Overload:** data must be categorized in some manner if it is to be useful rather than overwhelming
- **Knowledge Embedded in Products:** the intangibles that add the most value to goods and services are becoming increasingly knowledge-based
- **Sustainable Competitive Advantage:** KM is the way to do this. Shorter innovation life cycles keep companies ahead of the competition.

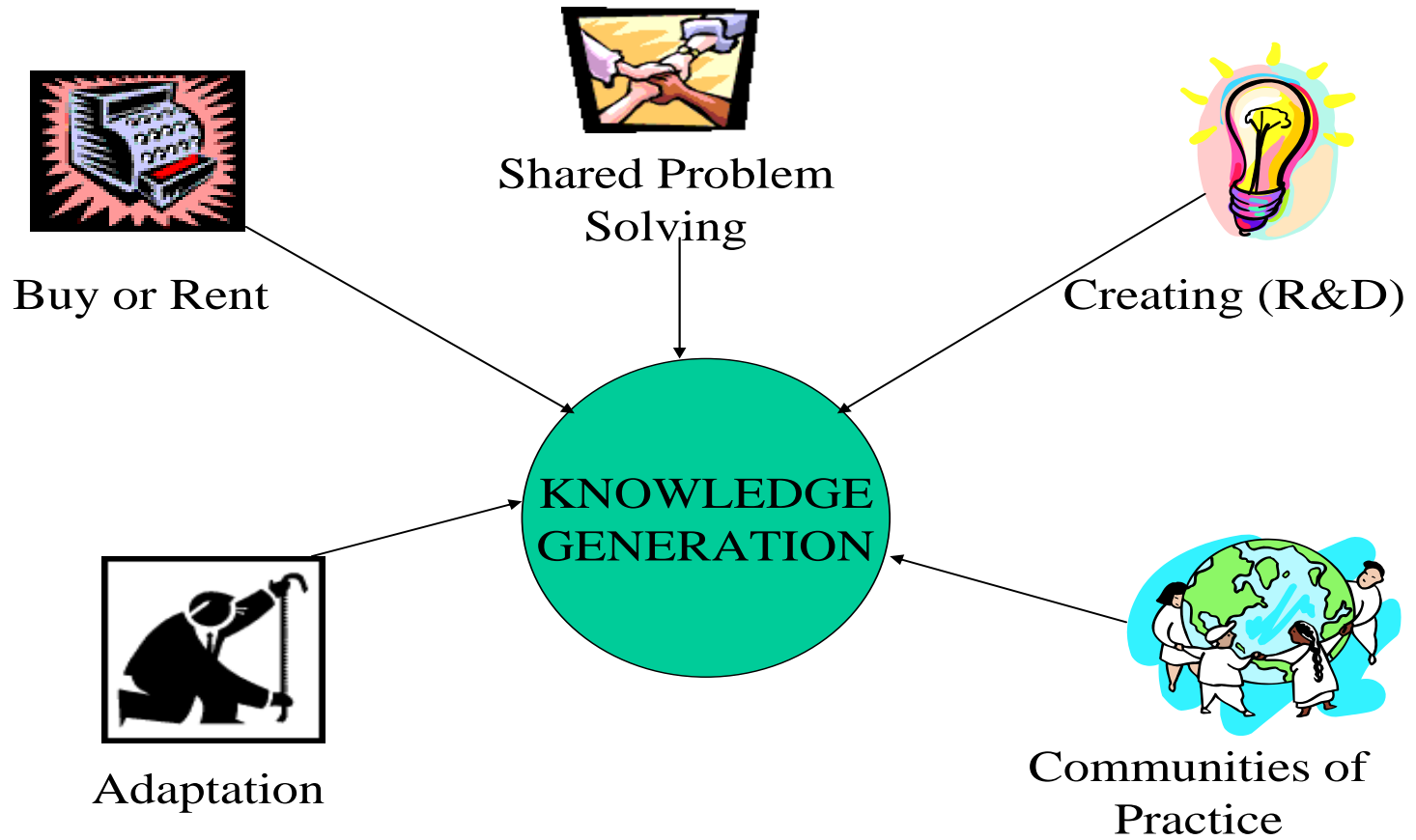
# KNOWLEDGE MANAGEMENT PROCESSES

# Knowledge Management

- KM involves four main processes –
  - Generation – all activities that discover “new” knowledge.
  - Capture – all continuous processes of scanning, organizing, and packaging knowledge after it has been generated.
  - Codification – the representation of knowledge in a manner that can be easily accessed and transferred.
  - Transfer – transmitting knowledge from one person or group to another, and the absorption of that knowledge.

# Knowledge Generation

- Concerns the intentional activities of an organization to acquire/create new knowledge.
- Two primary ways are knowledge creation and knowledge sharing.
- Methods include:
  - Research and Development
  - Adaptation
  - Buy or Rent
  - Shared Problem Solving
  - Communities of Practice



**Figure 12.5** Knowledge Generation Strategies



# Research and Development

- Knowledge generated by R&D efforts frequently arises from synthesis
- Synthesis brings disparate pieces of knowledge together, often from extremely diverse sources, then seeks interesting and useful relationships among them
- Realizing value from R&D depends largely on how effectively new knowledge is communicated and applied across the rest of the firm

# Adaptation

- Adaptation is the ability to apply existing resources in new ways when external changes make old ways of doing business prohibitive
- A firm's ability to adapt is based on two factors: having sufficient internal resources to accomplish change and being open and willing to change

# Buy or Rent

- Knowledge may be acquired by purchasing it or by hiring individuals, either as employees or consultants, who possess the desired knowledge.
- Another technique is to support outside research in exchange for rights to the first commercial use of the results

# Shared Problem Solving

- Also called “fusion,” shared problem solving brings together people with different backgrounds and cognitive styles to work on the same problem
- The creative energy generated by problem-solving groups with diverse backgrounds has been termed “creative abrasion”

# Helping Fusion Work

- Ideas that help fusion work effectively include:
  - (1) fostering awareness of the value of the knowledge sought and a willingness to invest in it;
  - (2) emphasizing the creative potential inherent in different styles of thinking and viewing the differences as positive;
  - (3) clearly specifying the parameters of the problem to focus the group on a common goal

# Communities of Practice

- Achieved by groups of workers with common interests and objectives, but not necessarily employed in the same department or location, and who occupy different roles on the organization chart.
- Workers communicate in person, by telephone or by e-mail to solve problems together.
- Communities of practice are held together by a common sense of purpose and a need to know what other members of the network know

# Knowledge Codification

- Knowledge must be used or shared to be of value.
- Codification puts the knowledge into a form that makes it easy to find and use.
- It is difficult to measure knowledge in discrete units (since it changes over time).
- Knowledge has a shelf life.

# Four Basic Principles of Knowledge Codification\*

1. Decide what business goals the codified knowledge will serve (define strategic intent).
2. Identify existing knowledge necessary to achieve strategic intent.
3. Evaluate existing knowledge for usefulness and the ability to be codified.
4. Determine the appropriate medium for codification and distribution.

\*Davenport and Prusak (1998)



# Knowledge Capture

- Knowledge capture takes into account the media to be used in the codification process.
- The 3 main knowledge capture activities are:
  - Scanning (gather “raw” information) – can be electronic or human.
  - Organizing (move it into an acceptable form) – must be easy for all types of users to access.
  - Designing knowledge maps (providing a guide for navigating the knowledge base)

# Organizing Knowledge

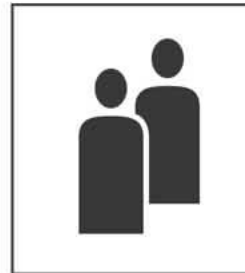
- Folksonomies – site for collaboratively creating and managing tags for annotating and categorizing content.
- One scheme for categorizing knowledge uses four broad classifications (Ruggles 1997):
  - Process knowledge – best practices, useful for increasing efficiency.
  - Factual knowledge – easy to document; basic information about people/things.
  - Catalog knowledge – know where things are; like directories of expertise.
  - Cultural knowledge – knowing how things get done politically and culturally.

# Designing Knowledge Maps

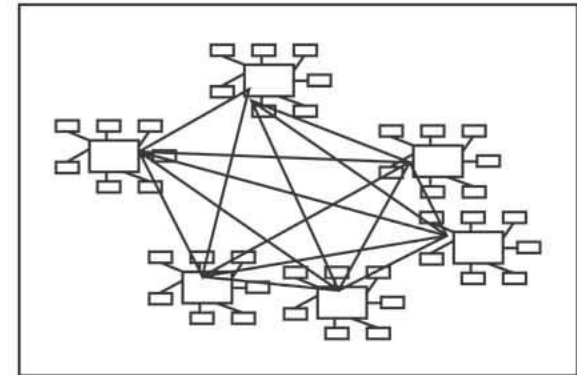
- A knowledge map (see figure 12.6) serves as both a guide to where knowledge exists in an organization and an inventory of the knowledge assets available.
- A knowledge map can consist of nothing more than a list of people, documents, and databases telling employees where to go when they need help.
- Provides access to resources that would otherwise be difficult or impossible to find
- Can capture tacit knowledge through narratives.
  - Good stories are effective for knowledge transfer.

A knowledge map shows the location of knowledge resources within a firm

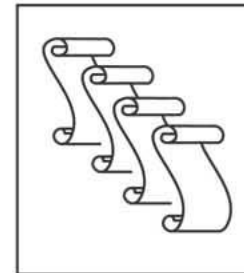
- Individual experts
- Networks of practitioners
- Documents and databases



Experts



Networks



Documents/Databases

**Figure 12.6** Contents of knowledge maps

# Knowledge Transfer

- Nonaka and Takeuchi's Knowledge Transfer describe four different modes of knowledge conversion (transfer):
  - Socialization: from tacit knowledge to tacit knowledge
  - Externalization: from tacit knowledge to explicit knowledge
  - Combination: from explicit knowledge to explicit knowledge
  - Internalization: from explicit knowledge to tacit knowledge

# COMPETING WITH BUSINESS ANALYTICS

# Business Analytics

- Companies find success through better use of analytics.
- Many companies offer similar products and user comparable technologies.
- Business processes are among the last remaining points of differentiation.
- They fuel fact-based decision making.

# Business Analytics

- Davenport and Harris suggest that companies who are successful competing with business analytics have these five capabilities:
  - Hard to duplicate
  - Uniqueness
  - Adaptability
  - Better than competition
  - Renewability



# COMPONENTS OF BUSINESS ANALYTICS

<b>Component</b>	<b>Definition</b>	<b>Example</b>
Data Repository	Servers and software used to store data	Data warehouses
Software Tools	Applications and processes for statistical analysis, forecasting, predictive modeling and optimization.	Data mining process; Forecasting software package
Analytics Environment	Organizational environment that creates and sustains the use of analytics tools	Reward system that encourages the use of the analytics tools; willingness to test or experiment
Skilled Work Force	Work force that has the training, experience and capability to use the analytics tools	Harrahs and Capital One have such work forces

**Figure 12.8** Components of Business Analytics

# Components of Business Analytics

- Data repositories - data warehouses sometimes serve as repositories of organizational knowledge.
- Software Tools – data mining is used to analyze data in the data warehouse looking for “gems”.
  - Four categories of tools used:
    - Statistical analysis
    - Forecasting/extrapolation
    - Predictive modeling
    - Optimization

# Components of Business Analytics

- Analytics Environment – alignment of corporate culture.
  - Incentive system
  - Metrics used to measure success of initiatives
  - Processes for using analytics
- Skilled work force – experts are needed.
  - Managers must set the example (CEO-level sponsorship).
  - Require decisions be made using analytics.

# CAVEATS FOR MANAGING KNOWLEDGE

# Caveats for Managing Knowledge

- KM and BI are emerging disciplines
- Competitive advantage increasingly depends on knowledge assets that are hard to reproduce, so it is sometimes in the best interests of the firm to keep knowledge tacit, hidden, and nontransferable
- Knowledge can create a shared context for thinking about the future, not to know the future, but rather to know what projections influence long-term strategy and short-term tactics
- The success of KM ultimately depends on a personal and organizational willingness to learn

FOOD FOR THOUGHT:  
BUSINESS  
EXPERIMENTATION

# Business Experimentation

- Thomke discusses business experimentation as a means of innovation.
- Products and services are created and improved using analytics through a process of experimentation.
- Companies who excel are able to create new products and services at a fraction of the cost of others.
- Capital One is built around this methodology.
- Ran 1,000s of experiments on their bank's customer database to test and develop new ideas.



# Business Experimentation

- Capital One had the following results:
  - Increased business savings retention by 87%
  - Lowered the cost of acquiring new accounts by 83%
- It is a concept of test and learn.
  - Projects are managed as experiments.
  - Projects are designed with a series of rapid iterations.
- Both Harrah's and Capital One have built a core competency in business experimentation and analytics.

# Summary

- KM is related to information systems in three ways: IT makes up its infrastructure, KM makes up the data infrastructure for many IS and apps, and KM is often referred to as an app of IS.
- Data, information, and knowledge should not be seen as interchangeable.
- The 2 kinds of knowledge are tacit and explicit.
- Manage knowledge carefully, there are many valid and of course legal reasons.
- KM projects can be measured using project-based measures.