11-1 What is the role of knowledge management systems in business?

• Define knowledge management and explain its value to businesses.

Knowledge Management: Knowledge management refers to the set of business processes developed in an organization to create, store, transfer, and apply knowledge.

Knowledge management increases the ability of the organization to learn from its environment and to incorporate knowledge into its business processes.

• Describe the important dimensions of knowledge.

KNOWLEDGE IS A FIRM ASSET

- Knowledge is an intangible asset.
- The transformation of data into useful information and knowledge requires organizational resources.
- Knowledge is not subject to the law of diminishing returns as are physical assets but instead experiences
- network effects as its value increases as more people share it.

KNOWLEDGE HAS DIFFERENT FORMS

- Knowledge can be either tacit or explicit (codified).
- Knowledge involves know-how, craft, and skill.
- Knowledge involves knowing how to follow procedures.
- Knowledge involves knowing why, not simply when, things happen (causality).

KNOWLEDGE HAS A LOCATION

- Knowledge is a cognitive event involving mental models and maps of individuals.
- There is both a social and an individual basis of knowledge.
- Knowledge is “sticky” (hard to move), situated (enmeshed in a firm’s culture), and contextual (works only in certain situations).

KNOWLEDGE IS SITUATIONAL

- Knowledge is conditional; knowing when to apply a procedure is just as important as knowing the procedure (conditional).
- Knowledge is related to context; you must know how to use a certain tool and under what circumstances.

• Distinguish between data, knowledge, andwisdom and between tacit knowledge and explicit knowledge.

data as a flow of events or transactions captured by an organization’s systems that, by itself, is useful for transacting but little else.

Knowledge To transform information into knowledge , a firm must expend additional resources to discover patterns, rules, and contexts where the knowledge works.

Wisdom wisdom is thought to be the collective and individual experience of applying knowledge to the solution of problems. Wisdom involves where, when, and how to apply knowledge.

Tactic Knowledge: Knowledge residing in the minds of employees that has not been documented is called tacit knowledge ,

Explicit Knowledge: knowledge that has been documented is called explicit knowledge .

• Describe the stages in the knowledge management value chain.

1. Knowledge acquisition: Organizations acquire knowledge in a number of ways, depending on the type of knowledge they seek. The first knowledge management systems sought to build corporate repositories of documents, reports, presentations, and best practices.
2. Knowledge Storage: Once they are discovered, documents, patterns, and expert rules must be stored so they can be retrieved and used by employees. Knowledge storage generally involves the creation of a database. Document management systems that digitize, index, and tag documents according to a coherent framework are large databases adept at storing collections of documents. Expert systems also help corporations preserve the knowledge that is acquired by incorporating that knowledge into organizational processes and culture.
3. Knowledge dissemination: Portals, e-mail, instant messaging, wikis, social business tools, and search engine technology have added to an existing array of collaboration tools for sharing calendars, documents, data, and graphics. Contemporary technology seems to have created a deluge of information and knowledge.
4. Knowledge application: Regardless of what type of knowledge management system is involved, knowledge that is not shared and applied to the practical problems facing firms and managers does not add business value. To provide a return on investment, organizational knowledge must become a systematic part of management decision making and become situated in systems for decision support.
5. Building Organizational and Management Capital: managers can help by developing new organizational roles and responsibilities for the acquisition of knowledge, including the creation of chief knowledge officer executive positions, dedicated staff positions (knowledge managers), and communities of practice.

11-2* What types of systems are used for enterprise-wide knowledge management, and how do they provide value for businesses?

• Define and describe the various types of enterprise-wide knowledge management systems and
explain how they provide value for businesses

Enterprise-wide knowledge management systems are general-purpose firmwide efforts to collect, store, distribute, and apply digital content and knowledge. These systems include capabilities for searching for information, storing both structured and unstructured data, and locating employee expertise within the firm. They also include supporting technologies such as portals, search engines, collaboration and social business tools, and learning management systems.

Knowledge work systems (KWS) are specialized systems built for engineers, scientists, and other knowledge workers charged with discovering and creating new knowledge for a company.

intelligent techniques , such as data mining, expert systems, neural networks, fuzzy logic, genetic algorithms, and intelligent agents. These techniques have different objectives, from a focus on discovering knowledge (data mining and neural networks) to distilling knowledge in the

form of rules for a computer program (expert systems and fuzzy logic) to discovering optimal solutions for problems (genetic algorithms).

• Describe the role of the following in facilitating knowledge management: taxonomies, MOOCs, and learning management systems.

Taxonomies: A key problem in managing knowledge is the creation of an appropriate classification scheme, or taxonomy , to organize information into meaningful categories so that it can be easily accessed. Once the categories for classifying knowledge have been created, each knowledge object needs to be "tagged," or classified, so that it can be easily retrieved. Enterprise content management systems have capabilities for tagging, interfacing with corporate databases and content repositories, and creating enterprise knowledge portals that provide a single point of access to information resources.
MOOCs: Businesses run their own learning management systems, but they are also turning to publicly available massive open online courses (MOOCs) to educate their employees. A MOOC is an online course made available via the web to very large numbers of participants. Companies view MOOCs as a new way to design and deliver online learning where learners can collaborate with each other, watch short videos, and participate in threaded discussion groups.
learning management systems: A learning management system (LMS) provides tools for the management, delivery, tracking, and assessment of various types of employee learning and training.

11-3* What are the major types of knowledge work systems, and how do they provide value for firms?
• Define knowledge work systems and describe the generic requirements of knowledge work Systems.
knowledge work systems with powerful graphics, analytical tools, and communications and document management capabilities. provide online directory of corporate experts in well-defined knowledge domains
Generic Requirements:

1. Sufficient computation power to handle sophisticated graphics or complex calculation
2. Easy access to external database
3. User friendly interface

• Describe how the following systems support knowledge work: CAD, virtual reality, and augmented reality.

Computer-aided design (CAD) automates the creation and revision of designs, using computers and sophisticated graphics software. Using a more traditional physical design methodology, each design modification requires a mold to be made and a prototype to be tested physically. That process must be repeated many times, which is a very expensive and time-consuming process. Using a CAD workstation, the designer need only make a physical

prototype toward the end of the design process because the design can be easily tested and changed on the computer. The ability of CAD software to provide design specifications for the tooling and manufacturing processes also saves a great deal of time and money while producing a manufacturing process with far fewer problems.

Virtual reality (VR) systems have visualization, rendering, and simulation capabilities that go far beyond those of conventional CAD systems. They use interactive graphics software to create computer-generated simulations that are so close to reality that users almost believe they are participating in a real-world situation. In many virtual reality systems, the user dons special clothing, headgear, and equipment, depending on the application. The clothing contains sensors that record the user's movements and immediately transmit that information back to the computer. For instance, to walk through a virtual reality simulation of a house, you would need garb that monitors the movement of your feet, hands, and head. You also would need goggles containing video screens and sometimes audio attachments and feeling gloves so that you can be immersed in the computer feedback. In the chapter- opening case, users of Cadillac's VR dealer system wear special VR headsets and headphones that make them feel they are seeing and listening to a real-world car.

Augmented reality (AR) is a related technology for enhancing visualization. AR provides a live direct or indirect view of a physical real-world environment whose elements are augmented by virtual computer-generated imagery. The user is grounded in the real physical world, and the virtual images are merged with the real view to create the augmented display. The digital technology provides additional information to enhance the perception of reality, making the surrounding real world of the user more interactive and meaningful. The yellow first-down markers shown on televised football games are examples of augmented reality as are medical procedures like image-guided surgery, where data acquired from computerized tomography (CT) and magnetic resonance imaging (MRI) scans or from ultrasound imaging are superimposed on the patient in the operating room. Other industries where AR has caught on include military training, engineering design, robotics, and consumer design.

11-4 What are the business benefits of using intelligent techniques for knowledge management?

• Define artificial intelligence and explain its role in knowledge management.

Artificial intelligence (AI) technology, which consists of computer-based systems (both hardware and software) that attempt to emulate human behavior.

AI applications play an important role in contemporary knowledge management, but they do not exhibit the breadth, complexity, originality, and generality of human intelligence. Existing AI systems do not come up with new and novel solutions to problems. AI systems extend the powers of humans but in no way substitute for them or capture much of their intelligence. Briefly, existing

systems lack the common sense and generality of naturally intelligent human beings. Human intelligence is vastly more complex than the most sophisticated computer programs and covers a much broader range of activities than is currently possible with so-called artificially intelligent devices.

• Define an expert system, describe how it works, and explain its value to business.

Expert systems are an intelligent technique for capturing tacit knowledge in a very specific and limited domain of human expertise. These systems capture the knowledge of skilled employees in the form of a set of rules in a software system that can be used by others in the organization. The set of rules in the expert system adds to the memory, or stored learning, of the firm.
Human knowledge must be modeled or represented in a way that a computer can process. Expert systems model human knowledge as a set of rules that collectively are called the knowledge base . The rules are obtained by carefully interviewing one or several “experts” who have a thorough command of the knowledge base for the system or by documenting business rules found in
manuals, books, or reports. Expert systems have from 200 to many thousands of these rules, depending on the complexity of the problem.
The strategy used to search through the knowledge base is called the inference engine . Two strategies are commonly used: forward chaining and backward chaining.
In forward chaining , the inference engine begins with the information entered by the user and searches the rule base to arrive at a conclusion. The strategy is to fire, or carry out, the action of the rule when a condition is true.
In backward chaining , the strategy for searching the rule base starts with a hypothesis and proceeds by asking the user questions about selected facts until the hypothesis is either confirmed or disproved.
• Define case-based reasoning and explain how it differs from an expert system.
In case-based reasoning (CBR) , descriptions of past experiences of human specialists, represented as cases, are documented and stored in a database for later retrieval when the user encounters a new case with similar parameters. The system searches for stored cases with problem characteristics similar to the new one, finds the closest fit, and applies the solutions of the old case to the new case. Successful solutions are tagged to the new case and both are stored together with the other cases in the knowledge base. Unsuccessful solutions also are appended to the case database along with explanations as to why the solutions did not work.
Expert systems work by applying a set of **IF-THEN-ELSE** rules extracted from human experts. Case-based reasoning, in contrast, represents **knowledge as a series of cases,** and this knowledge base is continuously expanded and refined by user.

• Define fuzzy logic and describe the types of decisions fuzzy logic systems make .
Fuzzy logic is a rule-based technology that can represent such imprecision by creating rules that use approximate or subjective values. It can describe a particular phenomenon or process linguistically and then represent that description in a small number of flexible rules.
Organizations can use fuzzy logic to create software systems that capture tacit knowledge where there is linguistic ambiguity.
Management also has found fuzzy logic useful for decision making and organizational control.

• Define machine learning and give some examples.
Machine learning is the study of how computer programs can improve their performance without explicit programming. A machine that learns is a machine that, like a human being, can

recognize patterns in data, and change its behavior based on its recognition of patterns, experience, or prior learnings (a database).
We use machine learning every day but don't recognize it. Every Google search is resolved using algorithms that rank the billions of web pages based on your query and change the results based on any changes you make in your search, all in a few milliseconds. Search results also vary according to your prior searches and the items you clicked on. Every time you buy something
on Amazon, its recommender engine will suggest other items you might be interested in based on patterns in your prior consumption, behavior on other websites, and the purchases of others who are "similar" to you. Every time you visit Netflix, a recommender system will come up with movies you might be interested in based on a similar set of factors.

• Define and describe intelligent agents and give an example of a type of intelligent agent.
Intelligent agents are software programs that work without direct human intervention to carry out specific tasks for an individual user, business process, or software application. The agent uses a built-in or learned knowledge base to accomplish tasks or make decisions on the user's behalf, such as deleting junk e-mail, scheduling appointments, or traveling over interconnected networks to find the cheapest airfare to California.
Chatbots (chatterbots) are software agents designed to simulate a conversation with one or more human users via textual or auditory methods. They try to understand what you type or say and respond by answering questions or executing tasks. Chatbots are typically used in systems for customer service or information acquisition. For example, Facebook has integrated chatbots into its Messenger messaging app so that an outside company with a Facebook brand page can interact with Facebook users through the chat program. A Facebook user could, for example, browse for a pair of lightweight running shoes on Messenger by texting a message to begin a conversation with Spring, a mobile shopping app. Spring would ask the user for his or her preferred price range for the shoes and display small selections of what it thinks the user might like.