Knowledge Management

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Chapter Three
Organizational Impacts of Knowledge Management

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Reasons for organizations Adopting KM

- Retaining expertise of Employees
- Enhancing customers satisfaction with the company's product and
- Increasing profits or revenues

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Impacts of Knowledge Management

- According to Benjamin Franklin, "An investment in knowledge pays the best interest
- KM can impact organizations and organizational performance at several levels:
  - People
  - Processes
  - Products, and the overall organizational performance

Impacts of Knowledge Management

Impact on People

- it can facilitate their learning (from each other as well as from external sources)
- KM can facilitate employee learning
- KM also causes employees to become more flexible, and
- enhances their job satisfaction

Impact on employee learning

- KM can help enhance the employee's learning and exposure to the latest knowledge in their fields.
- This can be accomplished in a variety of ways including
  - Externalization
  - Internalization,
  - socialization, and communities of practice

Impacts of Knowledge Management

Impact on Employee Adaptability

- Employees are likely to adapt when they interact with each other
- They are more likely to accept change
- They are more prepared to respond to change

Impacts of Knowledge Management

Impact on employee job satisfaction

- Two benefits of KM that accrue directly to individual employees have been discussed above:
  1. They are able to learn better than employees in firms that are lacking in KM, and
  2. They are better prepared for change
- These impacts cause the employees to feel better
  - because of the knowledge acquisition and skill enhancement and
  - also the impacts enhance their market value relative to other organizations employees
- knowledge management also provides employees with solutions to problems they face
- Recent study found that in organizations having more employees sharing knowledge with one another, turnover rates were reduced, thereby positively affecting revenue and profit

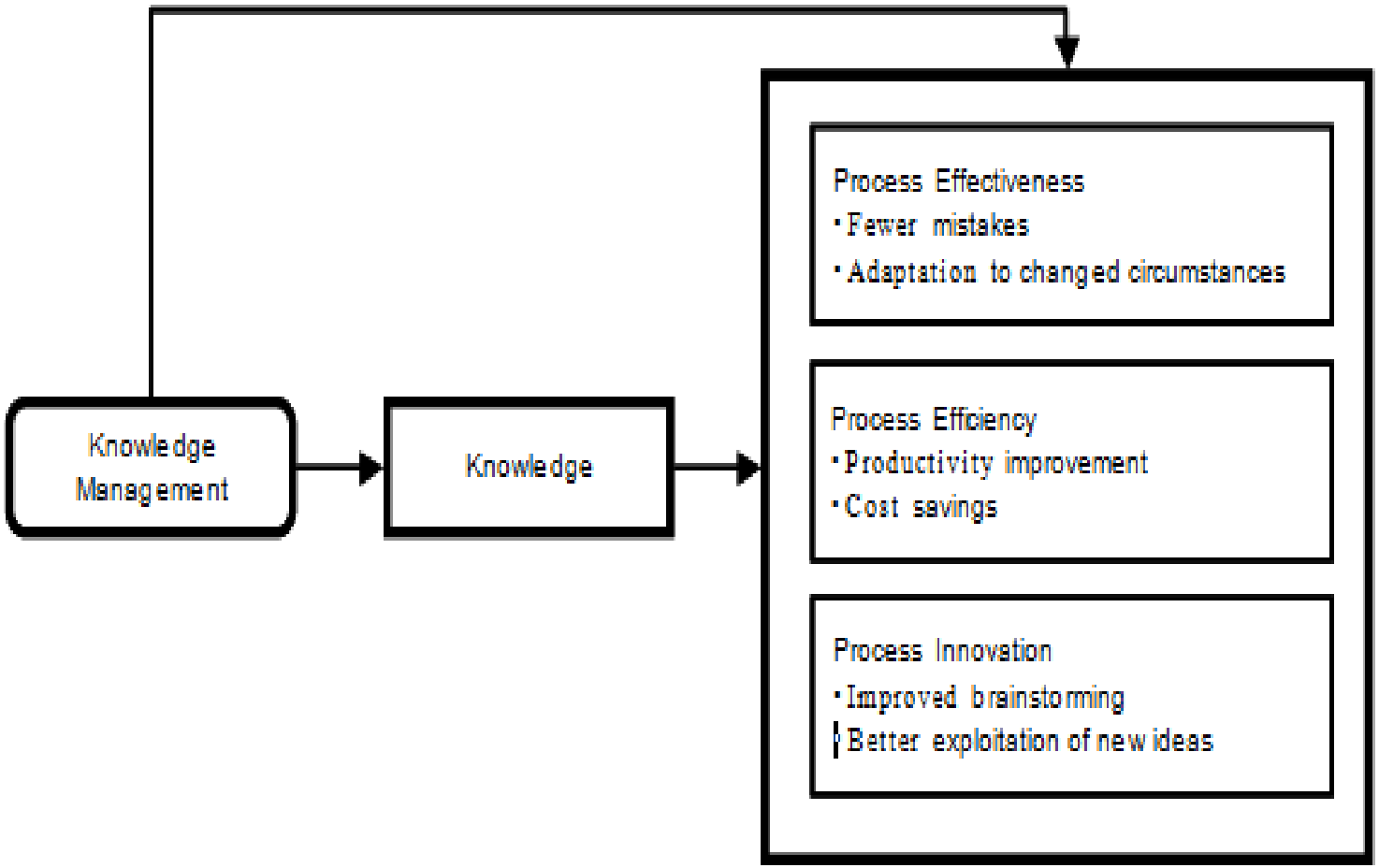
Impacts of Knowledge Management

Impact on Process

- Knowledge management also enables improvements in organizational processes
  - such as marketing, manufacturing, accounting, engineering, public relations, and so forth.
- These impacts can be seen along three major dimensions: Effectiveness, Efficiency, and Degree of innovation of the processes.
- Effectiveness is performing the most suitable processes and making the best possible decisions
- Efficiency is performing the processes quickly and in a low-cost fashion.
- Innovation is performing the processes in a creative and novel fashion, that improves effectiveness and efficiency or at least marketability

Impacts of Knowledge Management

Impact on Process



Impacts of Knowledge Management

- Knowledge management also impacts the **organizations products.**
  - These impacts can be seen in two respects: value-added products and knowledge-based products.

Impact on Value-Added Products

- Knowledge management processes can help organizations offer new products or improved products that provide a significant additional value as compared to earlier products.
- Value-added products also benefit from KM due to the effect the latter has on organizational process innovation

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Impact on knowledge-based products

- KM can have a significant impact on product that are knowledge based like those in consulting or software development etc.

Impacts on Organizational Performance

knowledge management may also affect the overall performance of the organization either directly or indirectly.

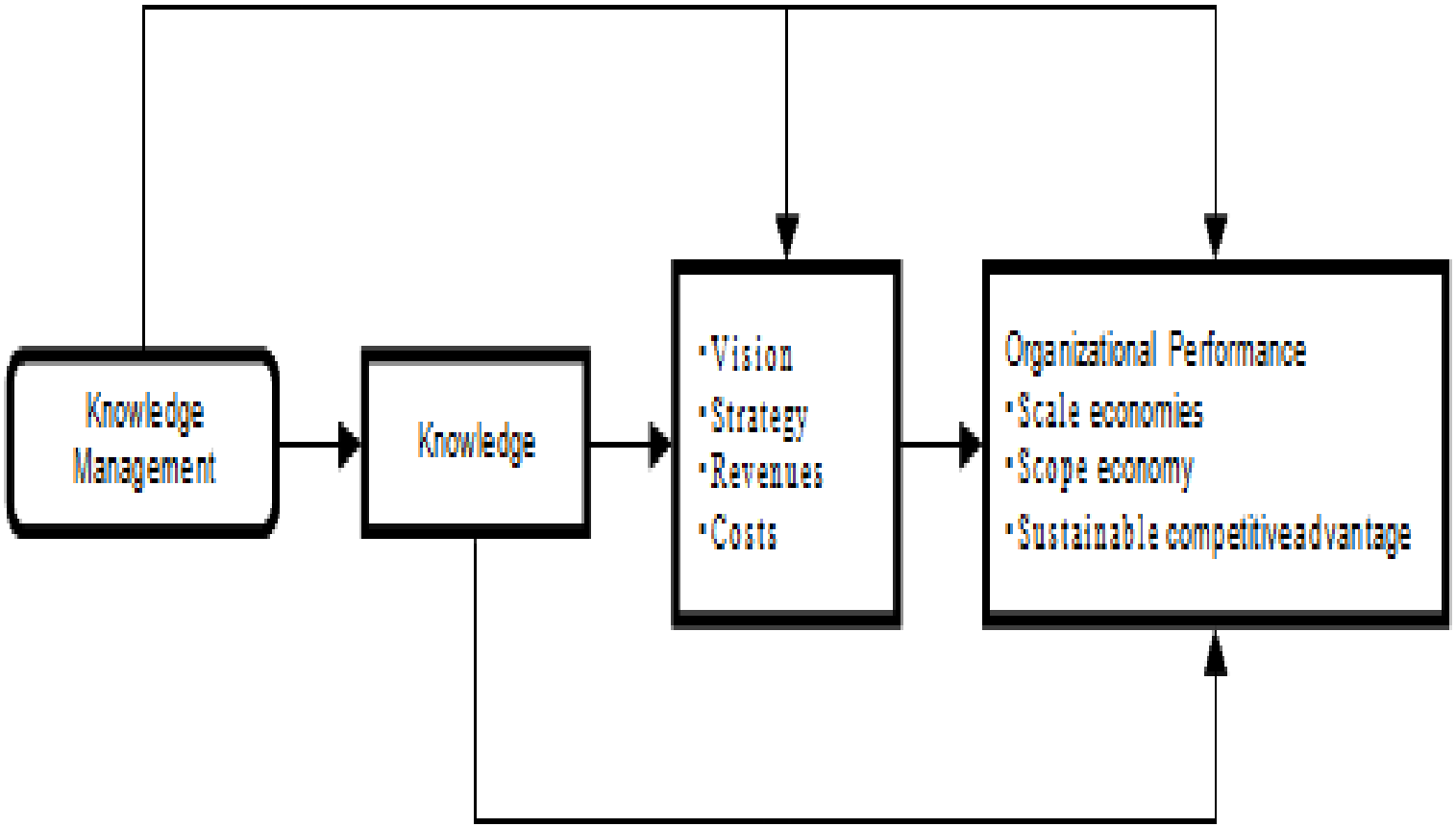
Direct Impacts

- Knowledge is used to create innovative products that generate revenue and profit

Indirect Impacts

- Use of KM to demonstrate intellectual leadership within the industry, which, in turn, might enhance customer loyalty
- Example of indirect benefits is the use of knowledge management to achieve economies of scale and scope
- Economies of scale for a firm involve reductions in the average cost (cost per unit) arising from increasing the scale of production for a single product type.

Impacts on Organizational Performance



Chapter Four Knowledge Application Systems: Systems that Utilize Knowledge

Knowledge Application Systems

Knowledge Application Systems(KAS)

- KAS support the process through which individuals utilize the knowledge possessed by other individuals without actually acquiring, or learning, that knowledge.
- Both mechanisms and technologies can support KAS by facilitating the knowledge management processes of routines and direction.
  - **Mechanisms** facilitating direction include hierarchical relationships, help desks, and support centers; whereas
  - mechanisms facilitating routines include organizational policies, work practices, and standards.
  - **Technologies** supporting direction and routines include expert systems, decision support, advisory systems, fault diagnosis (or troubleshooting) systems, and help desk systems.
- Knowledge application systems are typically enabled by intelligent technologies.
- Technologies for Applying Knowledge is:Artificial Intelligence (AI), Rule-based Systems and Case-based Reasoning Systems

Technologies for Applying Knowledge

Artificial Intelligence(AI)

- refers to enabling computers to perform tasks that resemble human thinking ability.
- Modern AI systems are based on the understanding that intelligence and knowledge are tightly intertwined.
- Knowledge is associated with the cognitive symbols we manipulate.
- while human intelligence refers to our ability to learn and communicate in order to solve problems
- Intelligent systems offer us technologies to manage knowledge
- with in AI include games, natural language understanding, classification, diagnostics, design, machine learning, planning and scheduling, robotics, and computer vision.

Technologies for Applying Knowledge

Rule-based systems

- The development of knowledge-based systems had been based on the use of rules or models to represent the domain knowledge.
- The development of KBS requires the collaboration of a subject matter expert with a knowledge engineer
  - Knowledge engineer is eliciting the knowledge from the expert and representing it a form that is usable by computers.
- Knowledge engineers typically build knowledge application systems by:-
  1. First interviewing in detail the domain expert and
  2. Representing the knowledge more commonly in a set of heuristics, or rules-of-thumb
- Experts develop these rules-of-thumb over years of practical experience at solving problems.

Rule-based systems...

- In order for the computer to understand these rules-of-thumb, we represent them as production rules or IF-THEN statements
- For example: IF the number of employees is less than 500, THEN the firm is a small business
- Rule-based systems have some disadvantages,
  one is that the number of rules that may be needed to properly represent the domain may be quite large
- Expert systems with such a large number of rules offer many disadvantages
  1. Difficulty in coding, verifying, validating, and maintaining the rules; and
  2. Reduction in the efficiency of the inference engine executing the rules.

Technologies for Applying Knowledge

Case-based reasoning(CBR)

- Case-based reasoning is an AI technique designed to mimic human problem solving
- When faced with a new problem, humans search their memories for past problems resembling the current problem and adapt the prior solution to "fit" the current problem.
- CBR is the process of solving new problems based on the solutions of similar past problems.
- CBR is a method of analogical reasoning that utilizes old cases or experiences in an effort to solve problems, critique solutions, explain anomalous situations, or interpret situations
- Example An auto mechanic who fixes an engine by recalling another car that exhibited similar symptoms is using CBR

Technologies for Applying Knowledge

Case-based reasoning(CBR)...

- A typical case-based knowledge application system will consist of the following processes:
  1. Search the case library for similar cases
  2. Select and retrieve the most similar case(s)
  3. Adapt the solution for the most similar case.
  4. Apply the generated solution and obtain feedback.
  5. Add the newly solved problem to the case library
- There are several advantages to using CBR over rules or models for developing knowledge application systems
  - light when the relationship between the case attributes and the solution

Technologies for Applying Knowledge

Case-based reasoning(CBR)...

- There are several variants of CBR
- Exemplar-based reasoning
  - These systems seek to solve problems through classification, that is, finding the right class for the unclassified exemplar.
  - CBR methods that learn concepts.
- Instance-based reasoning
  - A specialization of the exemplar-based reasoning into a highly syntactic CBR-approach
  - These systems require a large number of instances (or cases) that are typically simple; that is, they are defined by a small set of attribute vectors.
- Analogy-based reasoning
  - These systems are typically used to solve new problems based on past cases from a different domain.

Technologies for Applying Knowledge

- Other important technologies used to develop knowledge application systems are worth mentioning
- Constraint-based reasoning
  - is an AI technique that uses essentially "**what cannot be done**" to guide the process of finding a solution
  - This technique is useful in naturally constrained tasks such as planning and scheduling.
  - For example, to schedule a meeting all the individuals that need to attend must be available at the same time, otherwise the "availability constraint" will be violated.
- diagrammatic reasoning
  - is an AI technique that aims to understand concepts and ideas using diagrams that represent knowledge

Knowledge Application Systems

Technologies for Applying Knowledge

- Model-based reasoning
  - is an intelligent reasoning technique that uses a model of an engineered system to simulate its normal behavior
  - The simulated operation is compared with the behavior of a real system
  - E.g a ***hurricane*** model can be designed and implemented to predict a hurricane's trajectory,
    given the set of current weather conditions such as *wind speed, presence of a cold front, temperature etc..*

Developing Knowledge Application Systems

- The effective implementation of the knowledge application system requires a carefully thought-out methodology.
  The Case-Method Cycle is a methodology that describes an iterative approach to effectively develop CBR and knowledge application systems in general.
- The Case-Method Cycle describes the following six processes:
  1:-System development process
  - This process is based on standard software engineering approaches, and
  - Its goal is to develop a KAS that will store new cases and retrieve relevant cases.

Developing Knowledge Application Systems

- 2:-Case library development process
- The goal of this process is to develop and maintain a large-scale case library that will adequately support the domain in question.
- In terms of actually developing the case library the following sub-processes is considered.
  - Case Collection-This process entails the collection of seed cases.
  - Attribute-Value Extraction and Hierarchy Formation
  - Feedback: -quality of the cases can be improved.

Developing Knowledge Application Systems

- 3:-System operation process
- Its goal is to define the installation, deployment, and user support of the KAS.

4:-Database mining process

- This process uses rule-inferencing techniques and statistical analysis to analyze the case library.
- This step could help infer new relationships between the data, which could be articulated to enhance the KAS.

5:- Management process

- This process describes how the project task force will be formed and
- what organizational support will be provided to the project.

6:- Knowledge transfer processThis process describes the incentive systems that will be implemented to encourage user acceptance and support of the KAS.

Types of Knowledge Application Systems

- Advisor systems
- Fault diagnosis or troubleshooting systems
- Expert systems
- Help desk systems
- Decision-support systems.

Thank you!