 ISBN: 978-81-927230-0-6

A Role of Knowledge Work Systems in Knowledge Management

Prof. A. A. Sattikar[#1]
#Department of Computer Application
V.P. Institute of ManagementStudies and Research, Sangli[1]

*Prof. Mrs. V. S. Jadhav**[2]
**#Department of Computer Application*
V.P. Institute of ManagementStudies and Research, Sangli[2]

Abstract — **Knowledge Management systems are the set of processes developed in an organization to create, gather, store, maintain, and disseminate the firm's knowledge. The major information systems that support knowledge management are office systems, knowledge work systems, group collaboration systems, and artificial intelligence systems. Office systems are systems designed to increase the productivity of information workers in the office. Knowledge work systems help create and integrate new knowledge within the organization. Knowledge management systems codify knowledge and experience, make the collected knowledge and experience available when and where it is needed, and provide links to external sources of knowledge. Organizational processes include creating knowledge, discovering and codifying knowledge, sharing knowledge, and distributing knowledge. Knowledge work systems support knowledge creation; artificial intelligence systems support knowledge discovery and codification; group collaboration systems support knowledge sharing, and office and communication tools support knowledge distribution. Examples of knowledge work systems include engineering workstations, managerial workstations, and graphics workstations. Knowledge work systems provide knowledge workers with the specialized tools they need. They have adequate computing power to handle the specialized tasks and complex calculations, provide easy access to external databases to support research, and present a user-friendly interface.**

Keywords — CAD, Teamware. Fuzzy logic, Robotics

I. INTRODUCTION

Many managers work in an organisation. However, these managers do not work at the same level. They work and operate at different positions. Hierarchy of these managerial positions is called Levels of Management. There are three basic levels of management in any organization. Top level management is in charge of administration. Middle level management is tasked with executor task. Lowe level managers are tasked with supervision and line management.

The top level management has maximum authority and responsibility. They are the top or final authority in the organisation. They are directly responsible to the Shareholders, Government and the General Public. The success or failure of the organisation largely depends on their efficiency and decision making. They require more conceptual skills and less technical Skills.

The middle Level Management has limited authority and responsibility. They are intermediary between top and lower management. They are directly responsible to the chief executive officer and board of directors. They require more managerial and technical skills and less conceptual skills.
The lower level management consists of the Foremen and the Supervisors. They are selected by the middle level management. It is also called Operative / Supervisory level or First Line of Management. They have limited authority but important responsibility of getting the work done from the workers. Along with the experience and basic management skills, they also require more technical and communication skills. Organizations utilize different types of information systems to take their business decisions for their operations. The hierarchy levels of the organizations in general are operational, knowledge, management, and strategic. Accordingly, the need of information required at different levels varies.

Accordingly, three main categories of information systems serve at different organizational levels on hierarchy are:

- Management-level systems
- Knowledge-Work Systems
- Operational-level systems

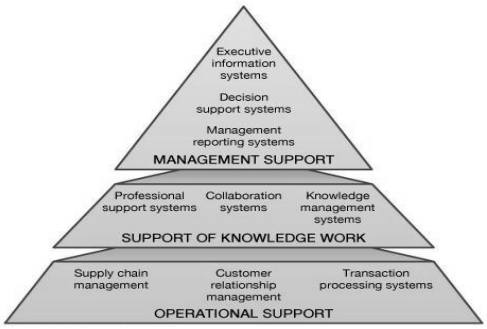

Fig. 1Systems used by Different Management Levels

Major type's information systems in organizations include transaction processing systems, office systems, knowledge work systems, decision-support systems, management information systems, and executive support systems. Transaction processing systems function at the operational level of the organization. Knowledge work systems help create

and integrate new knowledge within the organization. Management information systems provide managers with reports based primarily on data pulled from transaction processing systems, have an internal orientation, and have limited flexibility. . Decision-support systems function at the management level and provide analytical models and data analysis tools to provide support for semi structured and unstructured decision-making activities. Executive support systems function at the strategic level, support unstructured decision making, and use advanced graphics and communications. In this chapter the different types of information systems that are used by the business organizations are detailed.

II. INTRODUCTION TO KNOWLEDGE WORK SYSTEMS

Knowledge work systems are information systems that aid knowledge workers in the creation and integration of new knowledge in the organization. Examples of knowledge work systems include CAD, virtual reality, and investment workstations. Group collaboration systems facilitate communication, collaboration, and coordination. Examples of group collaboration systems include groupware, teamware, and intranets. Artificial intelligence is the development of systems that behave as humans. Examples of artificial intelligence systems include expert systems, neural nets, fuzzy logic, genetic algorithms, and intelligent agents. Natural language, robotics, perceptive systems, expert systems, and intelligent machines are artificial intelligence initiatives.

These systems reflect the special needs of knowledge workers. In this day and age, knowledge work is critical to most organizations, and in some organizations knowledge work systems produce strategic advantage or the knowledge that enables their company to keep up with others who are trying for strategic advantages.

CAD systems automate the creation and revision of designs using computers and sophisticated graphics software. By using CAD, a business benefits in many ways, including the production of more sophisticated and functional designs, reducing the time required to produce designs, reducing expensive engineering changes, preparing fewer prototypes, and facilitating the tooling and manufacturing process.

Virtual reality systems have visualization, rendering, and simulation capabilities. Virtual reality systems use interactive graphics software to create computer-generated simulations that are so close to reality that users believe they are participating in a "real" world. The users actually feel immersed in the computer-generated world. Virtual reality is providing educational, scientific, and business benefits.

Investment workstations are computer systems that access and manipulate massive amounts of financial data to manage financial trades and portfolio management. In addition to massive amounts of data, financial data are produced so quickly that specialized, very powerful systems are necessary to keep up with the rapid speed of finance and financial changes today. 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.

Expert systems model human knowledge as a set of rules that collectively are called the knowledge base. The strategy used to search through the collection of rules and formulate conclusions is called the inference engine. The inference engine works by searching through the rules and "firing" those rules that are triggered by facts gathered and entered by the user. Expert systems help organizations make high-quality decisions with fewer people. They are used in discrete, highly structured, decision-making situations where expertise is expensive or in short supply.

III. *KNOWLEDGE WORK SYSTEM AND KNOWLEDGE WORKERS*

Knowledge work systems (KWS) serve the information needs at the knowledge level of the organization. Knowledge work systems aid knowledge workers. In general, knowledge workers are people who hold formal university degrees and who are often members of a recognized profession, like engineers, doctors, lawyers, and science. Their jobs consist primarily of creating new information and knowledge. Knowledge work systems, such as scientific or engineering design workstations, promote the creation of new knowledge and ensure that new knowledge and technical expertise are properly integrated into the business. Knowledge workers, who create, produce and share knowledge, have traditionally utilized office automation technology as well. Now, however, they also have new technologies available to support their role in the firm. Knowledge workers perform three key roles that are critical to the organization and to the managers who work within the organization:

- Keeping the organization current in knowledge
- Serving as internal consultants regarding knowledge
- Acting as change agents

Knowledge workers rely on traditional office systems but often require highly specialized knowledge work systems with powerful graphics, analytical tools, and communications and document management capabilities. These systems require great computing power, access to external databases, easy-to-use interfaces, and optimization for the specific tasks to be performed.

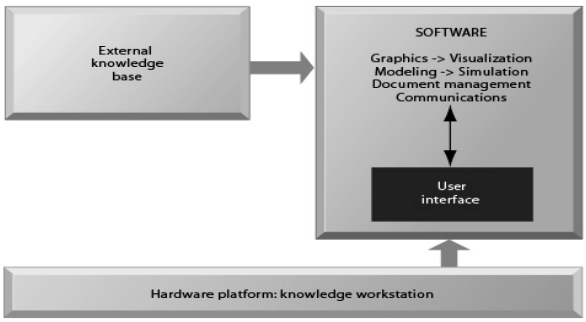

Fig. 2 Requirements of Knowledge Work Systems

Knowledge work systems require strong links to external knowledge bases in addition to specialized hardware and

software. Powerful desktop computers called workstations with graphic, analytic, document management, and communications capabilities can pool together information from diverse perspectives and sources both inside and outside the firm. For example, a design engineer requires a different workstation than financial analyst. Design engineer need graphics with enough power to handle three-dimensional data. However financial analyst are more interested in access to a external databases and technology for storing and accessing huge amount of financial data. Lawyers, in turn, may want to scan thousands of legal finding on their desktop before recommending a strategy.

IV. *APPLICATIONS OF KNOWLEDGE WORK SYSTEM*

Knowledge work systems, such as scientific or engineering design workstations, promote the creation of new knowledge and ensure that new knowledge and technical expertise are properly integrated into the business. Office automation systems are information technology applications designed to increase the productivity of data workers in the office by supporting the coordinate and communicating activities of the typical office, Office automation systems coordinate diverse information workers, geography units, and functional areas: The systems communicate with customers, suppliers, and other organizations outside the firm, and serve as a clearinghouse for information and knowledge flows. Typical office automation handle and manage documents (through word processing, desktop publishing, and digital filing), scheduling (through electronic calendars), and communication (through electronic main, voice mail, or videoconferencing). Word processing refers to the software and hardware that creates, edits, formats, stores, and prints documents. Word processing system represent the single most common application of information technology to office work in part because producing documents is what offices are all about.

Desktop publishing produces professional publishing-quality documents by combining output from word processing software with design elements, graphics, and special layout features. Knowledge workers, who create and produce knowledge, have traditionally utilized office automation technology as well. Now, however, they also have new technologies available to support their role in the firm. In the engineering field, knowledge work systems might use such tools to run thousands of calculations before designers are satisfied that a specific part is safe. Designers and drafting experts might want to use workstations with 3-D graphics software to visualize a model of a product more fully. Manufacturing and production information systems provide information for planning, product development, production or service scheduling, and controlling the flow of products and services. Specific manufacturing and production information systems include machine control, CAD, production planning, and facilities location. The implementation of such knowledge work system is increasingly the focus of redesign and reengineering efforts, to respond to pressures for increased competitive demand for speed, quality, and efficiency, and in order to cope with the increased need to integrate complex organizations across a variety of dimensions.

V. *CONCLUSIONS*

Knowledge Management is about systematically making use of the knowledge in the organization. The productivity of individual firms and the entire economy increasingly depends on knowledge-level systems. Knowledge is the ability to make effective decisions, and take effective action. Hence knowledge-level systems also have become tied in more closely with the other systems in the firm. The role of knowledge work systems in the firm cannot be underestimated. As the economy shifts from relying on manufactured goods to producing services, knowledge, and information, the productivity of individual firms and the entire economy will increasingly depend on knowledge-work systems. This is one reason knowledge-level systems have been the fastest-growing applications over the last decade and are likely to grow in the future.

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