Learning Objectives

Upon completion of this unit, students should be able to:

1. Explain the concepts and applications of Enterprise Resource Planning (ERP) systems.
2. Explain the critical concepts of distributed systems and client/server systems, including the role of middleware and the distinction between two-tier and three-tier client/server systems.
3. Describe seven major types of organizational systems in use today.
4. Explain the concept of knowledge management and how it is implemented in an organization.
5. Describe ten major types of managerial support systems in use today.
6. Differentiate the types of managerial support systems, and how they relate to the enterprise systems.

Written Lecture

Just What is ERP?

To answer this question, it helps to look back and consider how companies managed before enterprise resource planning (ERP). Companies consist of a number of functions that each work together to earn a profit. These include the creation of a product, (Research and Development (R&D), the production of a product (manufacturing), locating clients and offering the product for sale (Sales and Marketing), shipping the product (warehouse functions), and finally, taking money and accounting for the sale (Finance and Accounting). Prior to the advent of computer systems in business, each function carried out their respective jobs on paper, and kept detailed records in journals, file folders, and filing systems. As the technology became available, some of these paper functions became computerized in order to make them more efficient. However, computerization did not solve the fundamental problem of the paper organization—the difficulty of sharing data.

In a paper organization, accounting kept the books in accounting journals, sales and marketing made notes of contacts in pocket planners and wrote paper reports—or perhaps even sent and received faxes. R&D kept records in engineering notebooks, and finally, the warehouse function kept files and records of incoming and outgoing transactions. ERP was a response to the problem of the intra-organizational sharing of data that previously resided in a function so that companies could become more focused and competitive. However, ERP was not born in a day—rather, it started in one function, and it evolved into what we have today.

In the Beginning, There was Transaction Processing...

Computers began to assert themselves within the business arena by easing the burden of the tedium associated with recording of data. Where was the recording
of data the most intense? This was in the areas of shipping and receiving, accounting, and material control. It is easy to see why recording data in these functions would be time consuming. When a sale was made, the sale would need to be captured on an order form. The order form would typically need to be transferred to an internal inventory "pick-list" or, forms that would pull the associated parts and components forming the "kit" that would fulfill the customer’s order. When the components were pulled, inventory would need to be manually decremented by updating the warehouse books. Accounting would then need to record the sale, increment accounts receivables, and decrement inventory. Invoices would be issued to the customer, and if necessary, orders for new components would be placed to suppliers. This is quite a bit of work, so why not automate the sequence of events? For example, why not enter an order, and have the sequence of internal events and paperwork generate automatically? This where MRP arrived at the scene.

**MRP, the Precursor to ERP**

MRP, or “material requirements planning” is a manufacturing centric system that manages the warehouse, production floor, and material management books, and links all of these with the internal accounting system. The benefits of such systems were obvious to high-volume manufacturing companies who previously had to live with implementing the internal processes by hand and on paper. However, as MRP became more widely used, it became obvious that manufacturing, material control, and accounting were not the entire company—and other company functions had data processing needs, and such data would benefit from being integrated with the MRP system. For example, the management of products from out of R&D into Manufacturing generated part numbers, bills of materials (BOM), and work instructions. Sales and Marketing would collect data on customer requirements and deliver such information to engineering. In short, volumes of detailed data must flow through all functions of a company, and it therefore makes sense to enter the data only once, and use it where applicable. This is the essence of the ERP concept.

**ERP: Common Database, Multiple Systems**

As we have seen, each functional area has its unique data needs, and as a result, each function tends to have systems that are optimized for the particular function, Sales and Marketing, for instance, focuses on the management of sales leads, bids, quotes, and competitive information. The optimal system to manage these functions is the Customer Relationship Management, or CRM system. The R&D function relies on computer aided design or CAD systems along with department intranets, and software development tools. The accounting department relies on specialized accounting software that records and manages transactions and updates the balance sheet, income statement, and cash flow ledger. The beauty of ERP is that each of these optimized systems is maintained, but the data can be shared and retrieved from a single database. In this way, a holistic view of company operations can be developed, and the company’s strategy may be optimized.

**Now that we have ERP, What do we do with it?**

ERP created the centralized database and allowed for the sharing of data collected from the functional systems in the organization. But, just because you have data doesn’t mean you can keep it or make sense of it. Data must be stored somewhere, and tools are needed to sift through the data equivalent of “grains of sand on the seashore”. This need drove the evolution of important
managerial support systems. For example, the need to store volumes of data led to the data warehouse—a large, long-term repository of massive amounts of data. Since large volumes of data are not easy to use, data mining systems were created to enable the “slicing and dicing” of data so that the patterns in the data that are not immediately obvious to the unaided researcher could be observed clearly.

**Last but not Least—the Tools of the Data Trade**

Important trends that impact a business may be subtle at first and difficult to observe directly. Often these trends lie buried in data that a firm has already captured in the course of doing business. The raw data may be collected, stored, and mined, but it takes additional tools to transform the mined data into decisions and company strategy. A DSS, or decision support system, can take many forms and can be as simple as using Microsoft Excel or Access to sort and make calculations with data. Ultimately a DSS is intended to provide support for managerial decisions. Significant trends associated with the macro-environment inhabited by the company require more sophisticated analysis, and this is supported by executive information systems, or the EIS. Further developments in data analysis seem to arrive on the market daily, but what they all have in common is that they attempt to uncover and highlight deeper nuances in the data using algorithms of increasingly advanced sophistication. Managerial support systems are in essence the capstone on the ERP pyramid, in which they are designed to aid businesses in fully realizing what ERP set out to accomplish.