CHAPTER 1: INTRODUCTION TO ENTERPRISE SYSTEMS FOR MANAGEMENT

CHAPTER OBJECTIVES:

- Understand the information systems evolution and its historical role in organizations leading to systems integration and eventually Enterprise Resource Planning (ERP).
- Learn about ERP systems and their evolution, components and architecture. Understand the benefits and drawbacks of implementing ERP systems and how they can help an organization improve its efficiency and worker productivity.
- Have an overview of the implementation process (e.g., the ERP life cycle, business process reengineering, project management, and change management). Understand the role of staff, vendors, consultants, and the organization in making the ERP implementation process successful.
- Comprehend the ethical, global and security challenges while implementing an ERP system, as well as get an overview of ERP vendors and industry trends.

CHAPTER OUTLINE:

I. Opening Case: Hershey's Enterprise 21 Project
II. Preview
  a) Enterprise Systems in Organizations
  b) Information Silos and Systems Integration
  c) Enterprise Resource Planning (ERP) Systems
III. Enterprise Resource Planning Systems
  a) What is an ERP?
  b) Evolution of ERP
  c) Business Process and ERP
  d) ERP System Components
  e) ERP Architecture
  f) e-Business and ERP
  g) Benefits and Limitations of ERP
IV. ERP Implementation
  a) Business Process Management
  b) ERP Life Cycle
  c) ERP Implementation Strategies
  d) Software and Vendor Selection
  e) Operations and Post-Implementation
V. People and Organization
  a) Project Management
  b) Role of Consultants
  c) Change Management
  d) Business Process Reengineering
  e) Global, Ethical and Security Management

VI. ERP Vendors
  a) Key Vendors
  b) Software Extensions and Trends
VII. Implications for Management
VIII. Summary
IX. Exercises
X. Review Questions
XI. Discussion Questions
XII. Real World Case: Rolls Royce's ERP Implementation

CHAPTER OVERVIEW

This chapter provides a quick overview of the Enterprise Resource Planning (ERP) implementation process and the various topics covered in the remaining chapters of the book. It begins with an overview of the information systems field and defines ERP systems a few different ways, explaining their origin and evolution, and describes important components and basic implementation options. In addition, it discusses the evolution and role of ERP in the organizations and provides reasons for the popularity of ERP systems today.

ERP systems are comprehensive applications that support and connect all aspects of an organization's business processes. When discussing business processes, one means such departments as Accounting, Human Resources, Marketing, Purchasing, Manufacturing, etc. ERP systems appeared in the 1990s as a way to provide accessibility, flexibility and consistency across all the major business functions, unlike its predecessors. Organizations that use ERP systems have a better chance of sustaining competitive advantage in an ever-changing business environment.

The evolution of ERP started during the early 1990s after decades of using silo-based information systems within business organizations. ERP is a software-based system that is responsible for making information, reporting and functions widely available and centrally located within business organizations. In addition, the chapter continues to explain that ERP implementation is not as easy as selecting and installing packaged software. The opening Hershey case shows how a business went about the process the wrong way, and then corrected their mistakes the second time around. Hershey went live with their ERP implementation via the "Big Bang" method. Their initial problem was trying to implement too much, too fast. The case provides a good example of what to avoid.

The five important components have to work together in order to create an ERP system. These components are: hardware, software, information, processes and people. Hardware consists of the physical equipment such as servers and peripherals. Software is the operating system and/or database that the company or specific department uses. Examples of software today are Windows XP or Win 7. The information component is basically the data that is input to the system by internal or external organizational resources. Processes consist of policies and procedures that create the ways of conducting their business. The people of an ERP system are the end-users and IT staff. End-users can be anyone from the employees to the suppliers of a company.

Another interesting aspect of ERP systems covered in this chapter is how they are implemented in organization. Just like homes and large scale buildings, ERP systems have an architecture that the implementers must follow. Most of the time, a vendor is the one who

creates the ERP architecture when an organization wishes to purchase outside the company. The two types of architecture for an ERP System are logical and physical. Logical architecture supports the needs of the end-users while physical architecture focuses on the efficiency of the actual ERP system. With logical ERP architecture, one must carefully examine what will make up the layers, or tiers, in the blueprint.

The different facets and features of an ERP system are explained throughout much of the chapter. Vanilla and chocolate architectures are explained in terms of their strengths and weaknesses. Package-driven (vanilla) ERP architectures are "off-the-shelf" implementations that are generally much quicker to get up and running. Chocolate architectures are customized options. Both architectures have their ups and downs. Vanilla implementations are quicker and less expensive; yet do not fully conform to the organization's business procedures. Chocolate architectures take more time and money to configure, and may be more difficult to upgrade; but they can result in a more ideal ERP system for the organization.

Implementation strategies and the product life cycle are discussed. Both sections stress the importance of taking it slow during this process. It is important to stay on track and follow the initial implementation plan through completion without getting bogged down by minor issues or changes. Preparing for implementation is one of the most crucial times for an organization when replacing their current system with a new ERP system. It is important that the organization create an implementation committee in order to communicate necessary changes. These members should be knowledgeable enough to understand and plan for the implementation process itself. Another key decision a company must settle on is whether or not they should change their business processes to fit the ERP system. If they decide to do so, this is known as "vanilla implementation." It minimally modifies the ERP system that is purchased from the chosen vendor. This implementation committee needs to also understand the ERP life cycle and methodology during this process. With a well-defined methodology, a company is able to take one step at a time, define objectives, and plan a budget for the ERP implementation.

The following sections deal with vendor selection, "going live", and post-implementation. The chapter gives good advice about what criteria should be considered when trying to decide upon a vendor. After a vendor is chosen and testing has been completed, it is time to "go live" with the software. This section warns that this can be the riskiest stage, and also provides examples of implementation disasters. Guidelines and tips for maintaining the system after the "go live" stage are also discussed.

Beyond the architecture and implementation process, this chapter compares the technologies of e-Business and ERP. During the 1990's, there was speculation that e-Business and ERP would compete as technologies. However, the technologies have developed more, and now work together to provide a wider range of business support. Also, the Microsoft example presented in the middle of the chapter exemplifies the optimal outcome of a successful ERP implementation. Microsoft utilized the ERP vendor SAP to restructure its systems which resulted in annual savings of eighteen million dollars, and a greatly improved information system with significantly decreased data redundancies.

Towards the end of the chapter is an exploration of business process management and the people involvement during the implementation of ERP systems. Process change and people are the most important factors for success. There is advice on choosing project managers and vendors, how to deal with change management, and finally, some of the key vendors on the market. Most organizations purchase ERP systems through outside vendors such as Oracle or SAP. Vendors need to fulfill certain criteria of a company in order to be considered. Project

management and change management help create trust among the people involved in overseeing the new ERP system, and closely monitor objectives of the implementation plan.

The chapter ends with some implications for management in the ERP process. In sum, it gives a good step-by-step introduction to key information about ERP. It explains its development, components, limitations, successes, risks and the process of establishing an implementation plan. It also gives the reader so much information about ERP systems that it acts as a summary for the rest of the book in itself. Additionally, tables in the summary section provide a quick overview of benefits and limitations of ERP systems.

ADDITIONAL RELATED INFORMATION

1. http://en.wikipedia.org/wiki/Enterprise_resource_planning
2. http://www-03.ibm.com/solutions/businesssolutions/doc/jsp/indseg/solutionarea/erp/index.jsp
3. http://www.centredaily.com/business/technology/story/496923.html
4. http://olcsoft.com/top%20ERP%20vendors.htm – an exhaustive list of current ERP vendors
5. http://en.wikipedia.org/wiki/Information_systems – review of information systems including history of, and applications
6. http://erpwire.com general information about ERP and ERP vendors
7. http://media.wiley.com/product_data/excerpt/80/04712351/0471235180.pdf – a chapter discussing ERP implementation in detail
8. http://www.dba-oracle.com/art_insider_erp.htm – information about the vendor selection process
9. http://www.cio.com/topic/1463/ERP – a good general resource for ERP questions and product information

ANSWERS TO END-OF-CHAPTER REVIEW QUESTIONS

1. **How is the role of an ERP system different from traditional TPS, MIS, DSS and others? Can an ERP system support all levels of management?**

   An ERP system is different in that it brings all departments within an organization together. It seeks to unite all departments, open communication and consolidate all databases into one accessible database. Previous information system models did not have this focus or ability. ERP can support all levels of management, because it allows each level to utilize information in a customized manner. Upper-level management can utilize reports suited to their positions as overseers, while operational management can utilize detailed reports for their specific functions.

2. **Discuss the evolution of information systems in an organization. How can the use of ERP systems remove information or functional silos in organizations?**

   Most organizations start out with basic information systems, and build from a standard platform as they grow in size and needs. As their needs and market positions change,

they may find that they need an information system that can better aid their business practices. At some point they may decide to implement an ERP system from a vendor such as SAP, Peoplesoft or Oracle. When a company implements the ERP system, it eliminates the divisions or silos that naturally occur in the organization.

3. **Among all the ERP components listed in the chapter, which component is most critical in the implementation process and why?**

   People, including all levels of employees and management, are the ones that will use and be affected by the ERP system. It is critical that all are on board with the decisions that are made, and willing to give feedback during all stages. An ERP system cannot be successful unless the people of an organization are willing to accept the possibility of change and business reform.

4. **Discuss the role of ERP in organizations. Are ERP tools used for business process reengineering (BPR) or does BPR occur due to ERP implementation***?*

   Implementing an ERP often means BPR will take place. Organizations should realize that the purchase of ERP software requires some changes to business practices in order to run smoothly. Vanilla implementations will require the most amount of BPR, while chocolate implementations (although more difficult to get up and running) will likely require less BPR in the long run.

5. **Why is the design and selection of ERP architecture crucial for the implementation project? What are the long-term implications of selecting a wrong architecture?**

   A business organization must start with the correct architecture to meet their needs for a new ERP system. If they choose a chocolate implementation, but really only need a package-driven vanilla architecture, they may waste large sums of company money and time. Chocolate implementations can be very time consuming and costly. Also, vanilla implementation architectures are toted as being the best option from vendors, as they utilize the "best business practices" across various industries.

6. **Discuss the criteria for selecting ERP vendors. Which is the most important criteria and why?**

   The criteria to consider are what industry the ERP vendors specialize in and what sizes of organizations their software supports. Also important to consider is the reputation of the vendor, how successful their implementations have been and their outlook in terms of longevity. Other items to seriously consider are their customer support services, total cost of ownership, IT requirements for the software and the ability to integrate third-party software.

7. **From the examples provided in the chapter on ERP success and failure stories, what are the critical factors of success and failure?**

For success, it is critical that all management is on board with the plan to implement an ERP system. Their attitudes towards the system and willingness to be a part the developmental stages will decide its success. Choosing the correct architecture and moving forward with it is also important. The failure stories have two things in common: they did not have everyone on the same page, nor did they stick to the implementation plan.

8. **What are the critical steps of an ERP project cycle? Discuss the critical success factors.**

   The first critical step is to identify a project manager and subsequent teams. Then, to find a vendor that is able to deliver solutions identified by the project manager and upper management is the next step. Other important steps include establishing a project timeframe, deciding if consultants are necessary, and most importantly performing adequate ERP testing. Finally, after going live, it is essential to work closely with the consultants to solve any problems that may arise during implementation. Keeping these steps in mind will aid in a successful project implementation.

DISCUSSION QUESTIONS

1. **Refer to the Hershey case. What were the goals and details of the Enterprise 21 project?**

   1. Establish a single supply chain across all divisions.
   2. Streamline all business processes by reengineering them across all functional areas.
   3. Increase the gross margin and maintain sales growth.
   4. Save $75 – 80 million through corporate restructuring and closing of older distribution sites.
   5. Fix their Y2K problem and replace existing mainframe environment.

2. **Refer to the Hershey case. What were some of the key problems that Hershey encountered when choosing, integrating and implementing their new ERP system?**

   The implementation of the ERP for Hershey was beset with difficulties due to a number of failures:

   a. Project management issues, not faulty software: The company did not use the proper resources do ensure a good launch. This especially includes the failures of top management.
   b. Big Bang versus phased implementation: With their second attempt Hershey was able to plan more thoroughly in order to reduce redundancies, properly train and troubleshoot on a manageable basis.

   There were several key problems Hershey faced during the implementation of their new system:

- Lack of upper level management—the absence of IT executive leadership before the arrival of George Davis.
- Lack of a perspective—lower level managers were making decisions based on their individual business needs rather than addressing the needs of the company as a whole.
- Big bang approach—three new systems were implemented simultaneously, rather than employing a phased implementation.
- Bad timing—systems were implemented during Halloween, Hershey's peak sales season.
- Improper architecture and lack of training—data entry into SAP was difficult and employees were not properly trained.

3. **Refer to the Hershey case. What difficult lessons did Hershey learn from this entire process? Did Hershey ultimately achieve its original goals by implementing this new ERP system?**

   Hershey did meet its business and IT goals with the upgrade to SAP/R3. They learned the following:
   - Top management must be on board from start to finish during and ERP implementation. They appointed George Davis as CIO and had other top executives participating.
   - All data requirements need to be clearly defined before implementation begins. Hershey's internal data users communicated their data requirements to the implementation team which was directed by a steering committee which included top management like the CEO and CIO.
   - Slow and steady wins the race. Instead of choosing the hard cut in option as they had in the past, they rolled out the final upgrade.
   - Know your business. Basic business definitions and processes were not left to external consultants but defined by involved internal resources.
   - Don't try to do everything all at once. Spend appropriate time and resources testing the new system. Keep things simple by limiting the number of software applications in the new system.

4. **Provide examples of ERP components in an organization that you know of or where you are working. Provide examples of the hardware, software, people, processes and databases.**

   Good to read about ERP systems at your work. Another good example of ERP is the ISIS system that you are using for course registration, etc.

   Basically, ERP integrates all data and processes of an organization into a unified system. A typical ERP system will use multiple components of computer software and hardware to achieve the integration. Ideally, an ERP system delivers a single database that contains all data for the software modules, which would include:

   > Manufacturing – Engineering, Bills of Material, Scheduling, Capacity, Workflow Management, Quality Control, Cost Management, Manufacturing Processes, Manufacturing Projects, Manufacturing Flow.

Supply Chain Management – Inventory, Order Entry, Purchasing, Product Configurator, Supply Chain Planning, Supplier Scheduling, Inspection of goods, Claim Processing, Commission Calculation

Financials – General Ledger, Cash Management, Accounts Payable, Accounts Receivable, and Fixed Assets.

Projects – Costing, Billing, Time and Expense, Activity Management

Human Resources – Human Resources, Payroll, Training, Time & Attendance, Benefits

Customer Relationship Management – Sales and Marketing, Commissions, Service, Customer Contact and Call Center support

Data Warehouse and various Self-Service interfaces for Customers, Suppliers, and Employees.

5. **If you had a choice between customizing an ERP application to meet the organization processes and modifying organization processes to meet the ERP functionality which would you choose? Explain.**

I agree with some of the comments made on this DB, namely, if you have to choose between process change vs. customization, then go for process change. In the long-run more benefits are accrued with this option. However, a lot depends on the organization's goal and objectives and people. Basically, customizing the package (commercial off-the-shelf software) has lots of headaches especially when the technology upgrade becomes necessary.

Another benefit of minimizing customization is the opportunity to rethink and improve business processes. Very few firms actively seek out improvements in business processes and instead they rely on technology changes. Many of the vanilla installations have built best practices for business processes.

However it does depend on the gap between the systems best practices and the company's current practices. With a wide selection of ERP vendors available, a company could benefit from thorough research to determine which package best fits the company's needs and is suitable for the specific industry.

Once the vendor is selected, it's best to stick with as 'vanilla' of a solution as possible. It will keep costs down and allow easier support and upgrades. But it will require changes in employee habits. The resistance that will come from employees forced to change how they work is absolutely unavoidable, so with a vanilla implementation, managers must be prepared to deal with the resistance and have the confidence to coach employees through the changes.

6. **Where are ERP systems heading in the future? Do you agree or disagree with the trends discussed in the chapter? Explain.**

The **ERP** market has matured to a point where heightened competition has brought declining sales. As a result, **ERP** vendors are expanding their functionality to add-value and support new organizational needs from compliance management, customer support, global supply chain, and emerging technology platforms such as open source software and Service-Oriented Architectures **(SOAs).** Open source addresses a key concern in this instance. Often, **ERP** vendors pitch to smaller enterprises packaged applications that they can run as is, requiring little or no IT investment. It's a logical pitch in environments with scarce technology resources.

Another trend among big vendors has been to expand their software market for small to medium size business. The saturation of the demand in big business and the lucrative nature of the small and mid sized business market has led vendors like **SAP** and **Oracle** to enter the small to mid size business market, too.

According to an article by Roberto Michel, senior contributing editor of Manufacturing Business Technology, the market for **ERP** software—the integrated enterprise management suites that companies rely on for everything from accounting to manufacturing management—is clipping along nicely. Some analysts peg market growth as high as 10 percent; but despite this healthy outlook, it's a space that has undergone major transformation in the last several years.

Most recently, the biggest vendors devised new middleware platforms aimed at supporting service-oriented architecture **(SOA)** in which functionality could be more flexibly delivered as services. Analysts say **ERP** vendors are adjusting to this **SOA** era, but maintain that factors such as ease of integration and industry functionality still weigh heavily in user purchasing decisions.

7. **Why is it necessary for the project triangle to be balanced at all times for project success? Discuss the implications of an unbalanced project triangle.**

An unbalanced triangle leads to cost overruns based on scope creep and resource constraints. Project scope must be balanced with time and resource constraints otherwise the implications are project failure, cost overruns and scope creep.

ROLLS-ROYCE CASE QUESTIONS

RR did a good job in planning user and SME involvement and got early help of external consultants to make sure their implementation was successful.

1. **What do you think of RR's ERP Implementation project? Did they select the right implementation strategy?**

Rolls-Royce selected an implementation strategy that fit the organization. The IT team was experienced and augmented with EDS and SAP consultants. In addition the phased rollout allowed the business to adapt to the new system and address new functionality on a later phase. Conversion was a priority and is often the critical path. Lastly, the Change Management team provided a training strategy that allowed for users to be trained in depth.

2. **Discuss the Critical Success Factors of RR's implementation strategy and the role of SMEs in the project.**

   RR had knowledgeable and cross-functional SMEs on the project that were able to overcome a major issue in most implementations, that is, SMEs inability to think about functions across the organization.

3. **What advice can you give to RR's technical team on their approach of migrating the legacy system to the SAP software?**

   Conversion is usually the critical path with data cleansing taking the longest. Clean data is the key to the overall success of an implementation. In addition, minimizing the number of interfaces and retiring legacy systems should be the focus of the technical teams.