CHAPTER 4: DEVELOPMENT LIFE CYCLE

CHAPTER OBJECTIVES

- Review the System Development Life Cycle (SDLC)
- Examine the problems and alternatives with SDLC
- Know the key issues in ERP implementation strategy
- Understand ERP Implementation Life Cycle
- Examine the rapid implementation methodologies
- Compare and contrast SDLC and ERP Life Cycles
- Examine the role of people like top management, consultants, and subject matter experts (SMEs) in ERP Life Cycle
- Understand the importance of the project management office and the project organization to a successful ERP implementation.
- Know the components of a project organization and the roles and responsibilities of each.

CHAPTER OUTLINE

I.   Opening Case: Of Men and Mice: An ERP Case Study
II.   Preview
III.   System Development Life Cycle
     a) Traditional SDLC
     b) Rapid SDLC Approaches
IV.   ERP Implementation Life Cycle
     a) ERP Implementation Plan
     b) ERP Implementation Methodology
     c) Traditional ERP Life Cycle
     d) Rapid ERP Life Cycle
     e) ERP Life Cycle Vs. SDLC
V.   Project Management
     a) Project Roles and Responsibilities
VI.   Implications for Management
VII.   Chapter Summary
VIII. Real World Case: Two Short Cases: OilCO & ExploreCO

CHAPTER OVERVIEW

This chapter discusses the challenges in the ERP system development process. The opening case at the beginning of the chapter is on Jackson Laboratory located in Bar Harbor, Maine. They had to deal with the problem of customization while implementing Oracle's ERP system. Jackson was able to implement their ERP very close to its $5 million budget and only six

months longer than its one year goal. The case presents interesting issues on how organizations have to be alert and aggressive in order to achieve their implementation goals.

The traditional information system development process is called the system development life cycle (SDLC). Traditional SDLC included five phases: investigation, analysis, design, implementation, and maintenance. The investigation phase checks if the new system is feasible. It also checks the costs associated with the system. The analysis phase determines the user requirements for the system. The design phase produces the technical specifications for the system. The implementation phase starts with gathering the tools and hardware needed to put the system into motion. This includes any testing and training needed to put the system into operation. The key limitation of the SDLC process is that it is not quick and easy to develop a new system. Sometimes by the time it is developed, it has become outdated. Recruiting a development team is costly, so that makes SDLC very expensive. Also, not all information systems require SDLC. Some smaller applications do not need SDLC.

Quicker and less expensive short cuts for this process are called Rapid SDLC approaches. Prototyping is one such Rapid SDLC approach. This approach skips the analysis and design phase; instead it implements a prototype of the actual system using fake data. This is to see if it generates the wanted results as soon as possible. Another approach is End-User development, which lets end-users create their own applications. In this approach, the end-users are trained to develop custom applications.

An ERP implementation plan provides the clear path of the implementation process. It sees the costs, scope, and time restraints of the application. There are three choices: First, is a *comprehensive* ERP integration plan, which is the most expensive and time-consuming plan. It involves making sure that the implementation has full functionality. It also involves a high level of Business Process Reengineering. Second, is the *middle-of-the-road* ERP implementation plan. This is exactly how it sounds; it is not as expensive or extensive as the comprehensive plan, but it is not as clear-cut as the next plan. Third, is the *vanilla* ERP implementation plan, which basically aligns the business processes to the ERP system and minimizes reengineering. Several ERP implementation methodologies are available from vendors to make the life cycle more efficient.

The ERP implementation life cycle varies from the traditional SDLC in that it adapts to the package-driven approach, since the systems are not developed from the ground up; rather, the ERP package must be configured or customized for the organization. The ERPLC process like its counterpart SDLC has an outcome at the end of each stage. The first stage is the *scope and commitment stage*. It is similar to the investigation stage of the SDLC. Different scopes are looked at and decisions are made based on these analyses. The second stage is the *analysis and design stage*. One main part in this stage is to check the differences in the current business process and the process in the ERP software. The next stage is the *acquisition and development stage*. The entire platform is configured and built. The fourth stage is the *implementation stage*. The system is released to end-users and the usage is monitored. The final stage is the *operation stage*. This stage includes any training needed or patches that are needed for the system.

ERP implementation requires application of good project management approaches for efficient and effective organization of the various teams. Besides the balancing of project triangle with proper scope, adequate resource allocation and time management, the project management office must provide a detailed project organization chart (see Figure 4-8). This organization structure must be aligned with good project governance consisting of owners to the various teams. If these committees and teams are assigned proper roles and responsibilities, the chances of project success increases. Good project management follows this up with evaluation of the teams' achievements.

The case study at the end of the chapter discusses ERP implementation at two oil companies—OilCO and ExploreCO—in Australia. The names of these companies are anonymized to maintain their privacy. The first company, OilCO, is a refiner and marketer of petroleum products in eleven companies in the Pacific. OilCO wanted a system that will achieve full process integration and automation. They wanted to improve their customer service and expedite a restructuring of the business plan. OilCO selected a mainframe-based ERP, the biggest in the world, with 1600 users in Australia, New Zealand and the Pacific islands, processing 25,000 to 35,000 transactions per hour, and over 1,000 orders per day. The implementation was completed over the planned budget, taking longer than expected.

The second company, ExploreCO, is an oil and gas exploration and production company. They are based in the southwest of Australia and are an affiliate of OilCO. ExploreCO had to decide whether to upgrade their existing system or replace it with a new one. They chose to replace it with a new system and performed a feasibility analysis of several ERP systems. The implementation was completed on time and within budget.

Comparing the two companies, one can see how the changes in strategy impacted the final outcome. ExploreCO learned from the implementation of OilCO, applying the lesson in their project implementation. ExploreCO also used experienced project managers and workers, something OilCO failed to do. Also, ExploreCO needed to align their new system with OilCO's system, and since it was already in place, it was easier for ExploreCO to follow the lead.

ADDITIONAL RELATED INFORMATION

1. Wikipedia—System Development Life Cycle
   http://en.wikipedia.org/wiki/Systems_Development_Life_Cycle

2. The Department of Justice Systems Development Life Cycle Guidance Document
   http://www.usdoj.gov/jmd/irm/lifecycle/table.htm

ANSWERS TO END-OF-CHAPTER REVIEW QUESTIONS

1.   What is the role of systems approach in the SDLC?

Systems approach is used for problem solving. This approach takes complex problems and breaks them down into small manageable problems. It identifies problems from the top-down

and then solutions are derived from the bottom-up.

2.   Briefly discuss the key phases of the SDLC methodology.

Traditional SDLC included five phases. The investigation phase checks if the new system is feasible. It also checks the costs associated with the system. The analysis phase determines the user requirements for the system. The design phase produces the technical specifications for the system. The implementation phase gathers the tools and hardware needed to put the system into motion. This includes any testing and training needed to put the system into operation. The final stage is the operation stage which includes the implementation of needed training or patches for the system.

3.   Discuss the alternatives approaches of SDLC and the benefits of alternatives.

One alternative is prototyping. This approach skips the analysis and design phase; instead it implements a prototype of the actual system using fake data to see if it generates the wanted results as soon as possible. Another alternative is end-user development, which lets end-users create their own applications. In this approach, the end-users are trained to develop custom applications.

4.   Compare and contrast the three major ERP implementation categories.

The first is a comprehensive ERP integration plan which is the most expensive and time consuming plan. It involves making sure that the implementation has full functionality. It also involves a high level of Business Process Reengineering. The second plan is called the middle-of-the-road ERP implementation plan. It is not as expensive or extensive as the comprehensive plan, but it is not as clear-cut as the vanilla plan. It also involves a high level of BPR. The last plan is called the vanilla ERP implementation plan. It basically aligns the business processes to the ERP system and minimizes reengineering.

5.   What is ERP implementation methodology? Give Examples.

This refers to a well thought-out approach to solving a business problem. Some examples are Total Solution, FastTrack, Rapid-Re, ASAP, BIM.

6.   List the major tasks in the scope and commitment phase of ERP life cycle?

1. Gap Analysis – what functions are necessary and can your operation handle it.
2. Physical Scope – geographic location of the sites and the number of users.
3. BRP Scope – what is happening to the current process (changing or ending).
4. Technical Scope – how much the software it changing and will it be customized.
5. Resource Scope – time and money needed for the project.
6. Implementation Scope - how should it be implemented (phase, pilot, parallel, big bang).

7.   List the major tasks in the analysis and design phase of ERP life cycle?

1. User Requirements
2. Differences between current business process and the embedded process in the ERP software
3. Data Conversion, System Conversion, and Training
4. Execution Plan for the new system release
5. Prototype of the ERP software

8.   List the major tasks in the acquisition and development phase of ERP life cycle?

1. Purchase license for production version of the software.
2. Configure platform with hardware, network, security, software, database, and real production data.
3. Customize of embedded rules, data in the tables, input screens, and reports.
4. Migrate data from old to new system.
5. Configure ERP system with proper security.

9.   What is the role of change management in the ERP life cycle?

Using the gap analysis, the team must develop a design that includes a change management plan. This must be detailed with an execution strategy for the release of the new system. This team must work with the end users on implementing the changes in business processes with the prototype version of the software. Change management is also part of the implementation stage to smoothen the transition. When it gets to the operation stage, the team carefully monitors user feedback from training to make necessary adjustments to the change management approach.

10.   List the major differences between ERP life cycle and SDLC.

1. In SDLC the new application is made for the user requirements. In ERP life cycle the business process must be changed to fit the best practices of the ERP software.
2. In SDLC consultants are limited to IT hardware, software, and training. In ERP life cycle consultants are important from beginning to end in advising the organization on software selection, reengineering of business process, and software installation and change management.
3. In ERP life-cycle software is selected very early in the implementation process. In SDLC it is not brought up until the forth stage.

DISCUSSION QUESTIONS

1. **Is a surety bond an effective means to establish true accountability for IT implementation, as presented in the Jackson Lab case?**

    Surety bonds are only great for contract lawyers because they always end up entrenched with hundreds of thousands of dollars of litigation. The surety (the party who ensures the Jackson Lab will get what it bargained for) always disputes a claim filed by the principle (the principle in the case is Jackson Lab) for the full penal sum. Disputes come because

the principle always feels it did not get what it bargained for and sees surety bond claims as a way to either make an extra profit, or never lose. However, in Jackson Lab's case (as with all IT industry bonds) insufficient commonality and standardization in IT projects and bonds result in even more than normal litigation. Also, unless the project has simple, clear, easily identified, and understood benchmarks, those who contract for a surety bonds will never truly understand what they contracted for (the result in the complex litigation docket). Surety bonds only work with clear identifiable project goals, and in the IT industry unlike other industries (e.g. fiduciary duty type pension plan management / investment), goals may be difficult to quantify and articulate before a contract is written. As far as pure accountability for IT implementation is concerned, surety bonds hurt, because the party building the system knows that a surety bond is between them and a lawsuit. In other words the party that needs to be accountable to Jackson Lab for its IT implementation will have much less worry about doing a good job because if they are sued a surety bond will step in. It also provides disincentive to employees of Jackson Lab to fully immerse and commit themselves to making the ERP project successful.

2. **Was the phased implementation a good approach for an organization like Jackson Lab that deploys an ERP solution for the first time? Would it allow focus on a key/critical area, stabilization of the system usage and quicker visible benefits?**

With all of the strategies taken by Jackson Lab to reduce risk they went with a phased approach. Phasing out the new ERP system allowed the core team to focus their training on certain employees and specific functionally areas of the company. It also allowed "kinks" in the system to be realized and resolved before the entire company was up and running.

There is also less resistance from employees when the live is phased because the core team is able to offer more support and focus attention on the areas going live. This allows for the new system to get a good "reputation" among other employees who know they will need to go up in the future with the product.

A phased implementation was the correct approach. This was a good decision because this was the first time Jackson Lab had been through an ERP implementation process. A big-bang approach could have severely disrupted the flow of every day work even more than the phased did when the brightest employees were taken. The phased approach allowed for a focus on training and the installation of the ERP system, as barely anyone had experience dealing with this sort of process.

3. **What do you think about the modifications in a unique business process at the Jackson Lab like raising and distributing the mice?**

The biggest challenge for Jackson Lab was the modification of Oracle Process Manufacturing (OPM) module to accommodate the lab's unique business processes of raising and distributing mice. However, the OPM module was designed for companies

that mix ingredients together to produce products like bread or beer; not for a lab environment.

Indeed the biggest challenge is yet to come. In the event an update is needed, installing a newer version of the system will not go smoothly—in fact it will be a problem. That is why the chocolate approach is not recommended. Usually a phased implementation approach and continuous improvement efforts will require ongoing time commitments. Employee turnover and job rotation will also require ongoing training efforts. The nature of the ERP software package (and associated system software and hardware) typically mandates the number and expertise of MIS personnel needed for ongoing support. The short timeframe involved in the Jackson Lab implementation prevented much of this concern, otherwise it could have been a nightmare.

4. **Discuss the risks and benefits of going for a big-bang conversion versus using the phased or parallel approaches.**

   The big bang implementation strategy converts from the old to new system within a relatively shorter period of time than if the project were phased or parallel. The benefits are simplicity and lower implementation costs. It also condenses the pain and difficulty of an ERP project into a shorter period of time, although sometimes the pain can be more pronounced, if things go wrong. The risks of the big bang implementation approach is that the project is often rushed, details are overlooked, and changes to business processes may not be the best ones for the organization.

   The phased approach is done either be by functional business area or geography. The benefit here is that is allows project teams to take their time in the planning, customization, and testing of the system while continuing with day-to-day jobs. The risks are that these types of phased projects often lack the urgency and focus of a big-bang project. It can also lead to "change fatigue," which can cause employees to become burned out on constant change. Instead of getting the project over with in a shorter period of time, these projects involve constant change over longer periods, which can be draining to employees.

   The parallel approach is done by transferring between an old IT system to a target IT system in an organization. In order to reduce risk, the old and new system run simultaneously for some period of time after which, if the criteria for the new system are met, the old system is disabled. The process requires careful planning and control and a significant investment in labor hours, and system resources.

   All three approaches have their clear pros and cons. However, it is important to find what works best for your organization. Implementation schedules need to be aggressive, but not to the extent that they cause you to overlook important details or make sub-par decisions. It is often helpful to do the project in multiple (but aggressive) phases to help focus the organization and create a sense of urgency. These details should be carefully outlined as part of your ERP Project Planning Approach

5. **How should organizations approach the change management strategy to manage their people problems that usually cause many mishaps and are the main reason of failure in ERP implementation project?**

    A change management strategy means helping employees see the value of change. ERP Implementations and Change Management Strategy share several of the same key components—each must have a vision that identifies the desired future state. A Change Management Roadmap needs to be developed that provides a cost effective strategy to prepare all employees for a change.

    An organizational impact analysis needs to be developed that can assess how the changes will impact specific employees and the organization as a whole. This is coupled with customized training and ongoing support for the employees to learn the new processes, tools, roles, and responsibilities. Finally, there needs to be leadership and a communication strategy that brings integration and sustainability into the process.

    The keys to change management are

    1.   A clear communication plan outlining how change will be communicated
    2.   A plan for involving all stakeholders and those affected by the change so that expectations of the implementation can be clearly communicated
    3.   A clear definition of change.

    The communication plan defines requirements for status reports (weekly or monthly or as necessary) that communicate change and the required activity of the change. The activity may involve IT support and SME support.

    Setting expectations involves communication of what will be involved and required of the individuals who are affected by the implementation. It will serve to generate consensus and participation among those who will make or break the implementation.

    The final step is to define what a change is. Is change a requirement that we forgot and now need to include in a business process, is it a requirement that we define but was not understood or correct like a hardware server not adequate to support the required function?

    These three things will help to keep staff up to date and on board with the changes that arise throughout an implementation

6. **Pick any two rapid implementation methodologies of ERP. Discuss the benefits and limitations of each in a table format.**

Total Solution	Rapid Re	Accelerated SAP (ASAP)	Benefits/Limitations

Ernst & Young	Gateway	SAP	
1 - The Value Proposition build business case for ERP solution	Stage 1 – Preparation Mobilize, organize, and energize those performing reengineering project	Phase 1 – Project Preparation Planning and assigning organizational readiness	TS examines business case where RR and AS have already assumed it RR & SAP seem more technical less "touchie feelie" than TS
2 - Reality Check Assessing the organization's readiness for change	Stage 2 – Identification Develop customer-oriented process model for the business	Phase 2 – Business Blueprint Develop visual model for the business' future desired future state based on toolkit of predefined options	RR & AS are changing and defining processes. RR seems more tailored to the specific business where AS starts with generic toolkit and then focuses on specific may be left with generic BR.
3 - Aligned Approach Setting expectations that deliver long & short-term value	Stage 3 – Vision Select processes to reengineer Formulate redesign options for breakthrough performance	Phase 3 – Realization Configure R/3 system 1.) config baseline sys 2.) fine tune to meet all business process requirements	RR begin selection of system to design and reengineering. TS defines modules that would allow for a phased approach. AS is actually configuring a base system that can be up and running in little time
4 - Success Dimension right blend of people, skills, methods and management team	Stage 4 – Solution Define technical & social reqs. For new processes Develop detailed implementation plan	Phase 4 – Final Preparation R/3 system fine tuned Adjustments made to system and business to prepare for start-up Fine sys tests and training	AS is fine tuning the toolbox where RR is defining resource requirements. AS has rubber on the road more quickly. TS focuses only on the team
5 - Delivering Value Measure results and celebrate success	Stage 5 – Transformation Implement implementation plans	Phase 5 – Go Live and Support Measure benefits of R/3 implementation on-going basis	TS measures implementation results. RR moves from implementation to production. AS is production and supporting the system.

7. What do you think should be the role of consultants in the ERP life cycle? Explain.

If an organization does not have experience in the ERP life cycle it should look seriously at hiring a consulting company as an implementation partner to assist and possibly lead the organization through the implementation. However, if they have experience, consultants should only be needed to address gap skills.

Consultants play an important role in rapid implementation of ERP systems. Rapid or accelerated implementation approaches are very popular and require the use of experienced consultants to leverage the knowledge of techniques that have worked well with other organization. This involves the use of scripts and wizards developed by consulting firms. These tools can help automate some of the more common tasks that occur during an implementation. Some of the tasks that can be accelerated are as follows: migration of data, identification of duplicate data, and other standard tasks.

8. **Discuss why top management support and involvement is important for the ERP life cycle.**

As more and more companies are turning towards ERP systems to improve their overall business operations, it is vital of senior management to be on board with ERP. ERP, when used effectively, can be a vital tool for senior management by helping management capture the necessary data across all major business functions. Having just one platform that can capture all of the pertinent information allows for top management to easily comprehend the current state of the business, what is working well, where improvements need to be made, etc. It is vital for top management to support and be active within an ERP system during the ERP's life cycle in order to guarantee the success of the ERP System. If top management is not attuned to the functionality of the ERP System, the system stands little chance of being successful within the organization. Management may decide to take the company in a direction that may not be easily adaptable to the ERP system that is in place, or senior management's lack of support for the system could very well cause a trickle down effect. Senior management starts distancing themselves from the ERP System which then causes Middle management to distance themselves, which then causes supervisors to distance themselves, eventually causing the system to fail.

CASE STUDY QUESTIONS: OILCO AND EXPLORECO

1. **Compare and contrast the implementation of OilCO and ExploreCO. What were the similarities and differences between the two implementations?**

Similarities include: Adoption of critical success factors, minimal modification of software and major changes to business processes to achieve goals.

Differences include:

ExploreCO	OilCo
An identified project champion for that was there throughout the project.	Had a champion but never fully identified or engaged in the project nor was it the same person throughout the project
Very focused implementation	Very large ERP implementation and included the development of a module specific to Oil industry
Hands on approach to implementation by the project champion	Lack continuity with the champion
Best people full time on the project	Not the best staff on the project
Strong project management and adherence to deliverable dates	Less strong project management and little adherence to deliverable dates.

2. **Why do you think the projects were successful? Was it the articulation of CSFs? Was it their strategy of minimal customization? Or something else? Explain.**

Both projects were ultimately successful in that senior management was committed, a governance structure was in place and the critical success factors were documented and understood. ExploreCO adhered to the scope much better than OilCo.

3. **What can we learn from this case? Also, provide suggestions for improvement.**

Project champions are key to delivering a project on time. Governance along with decision making at the project level are key to meeting deadlines. In the case of OilCo the lack of good decision makers on the project that were focused on the deliverable caused for a significant delay in the implementation.