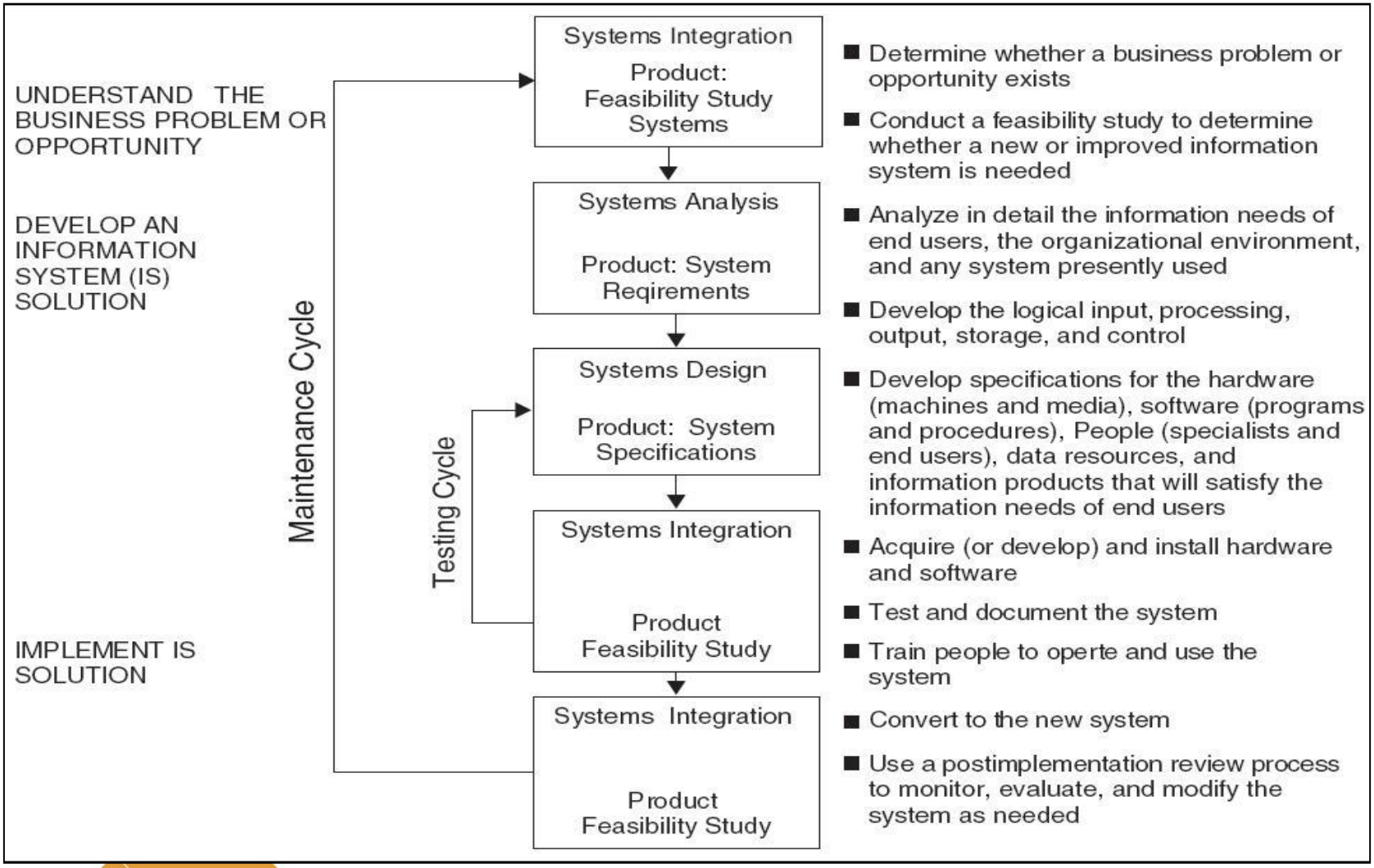
SCSP 3744
ENTERPRISE SYSTEM DESIGN AND MODELING

System Development Life Cycle

SDLC Approach

- SDLC uses a systems approach for problem solving that basically states that complex problems need to be broken up into smaller manageable problems using a systems' hierarchy, and then developing a solution for each problem within the hierarchy.
- It provides a structured top-down problem identification and bottom-up solution process for managing complex problems.
- The structured or phased approach is designed to catch problems at an early stage before they become a major risk to the system implementation process.
- The SDLC process requires both technical and nontechnical problem-solving skills; therefore, the development team must understand technology, as well as the organization's business processes, culture, and people (or potential end users of this system).

SDLC Approach



Rapid SDLC Approaches

- **Prototyping**
  - This approach does not go through the analysis and design phase.
  - It implements a skeleton or a prototype of the actual system with a focus on data input and output.
  - The idea is to demonstrate the system functionality to the users.
  - Feedback is incorporated into the new system and demonstrated back to the users.
  - This approach has proven to be very effective with user interactive systems because the prototype is eventually converted into a full-scale system.

- **End User Development (EUD)**
  - Users are trained to develop their own applications (e.g., a departmental employee tracking system with an Access database).

ERP LIFECYLE

Differences between ERP and Other Software

ERP	Other Packaged Software
Millions of dollars	Hundreds to Thousands
Mission critical	Support or productivity improvement
One to several years	Almost instantly
Requires significant change management strategy from beginning to end for success; business process change, training, communications, etc.	Requires some training and support
Requires in-house employee time, consultants and vendor support in millions of dollars	Requires little or no consulting support or vendor technical support

ERP Implementation Plan

- **Comprehensive**
  - Involves implementation of the full functionality of the ERP software in addition to industry-specific modules.
  - Requires a high level of business process re-engineering.
- **Middle-of-the-Road**
  - Involves some changes in the core ERP modules and a significant amount of business process re-engineering.
- **Vanilla**
  - Utilizes core ERP functionality and exploits the best practice business processes built into the software.
  - Business process re-engineering is eliminated.

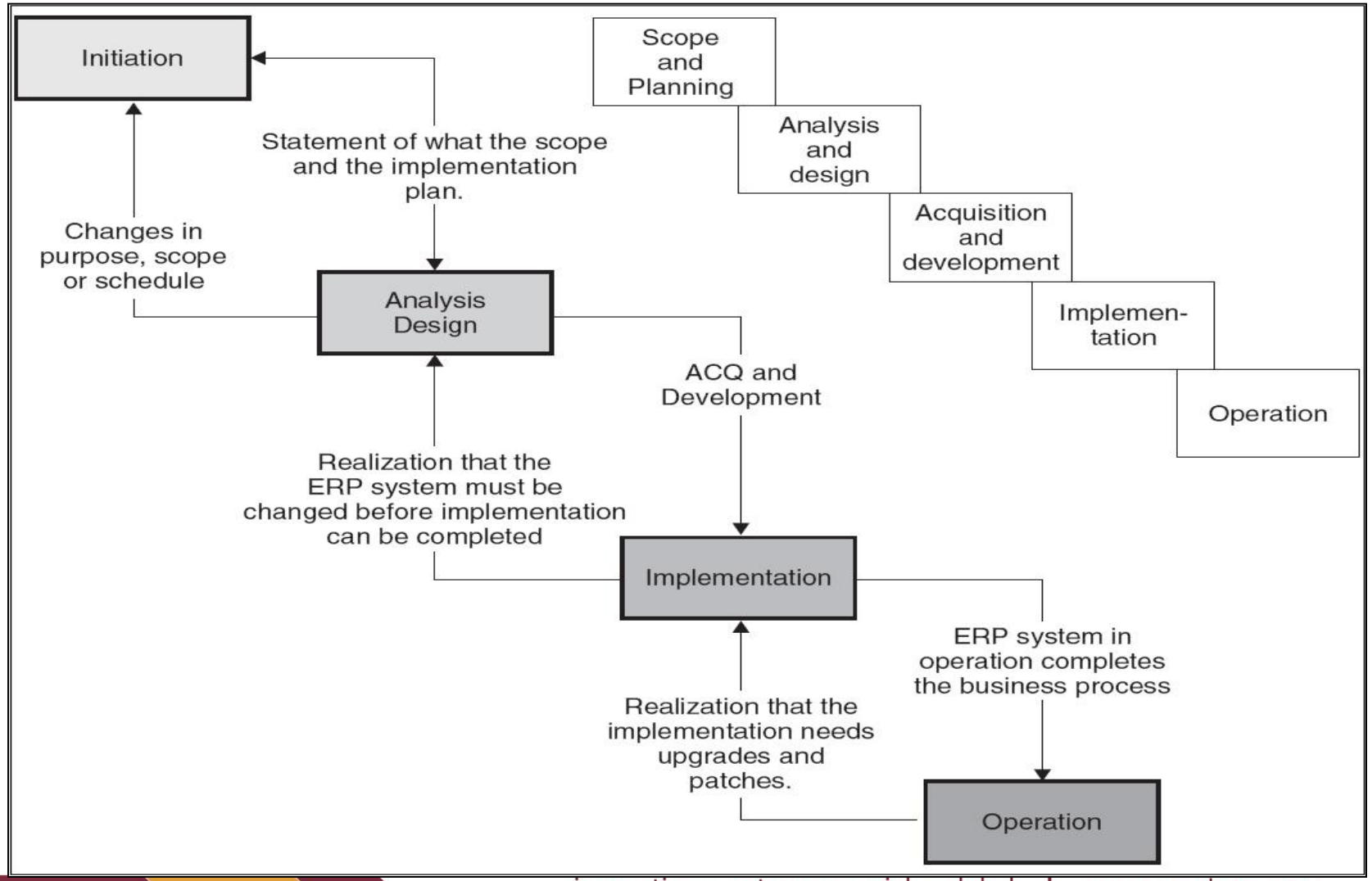
ERP Implementation Methodology

- An ERP development life cycle provides a systematic approach to implementing ERP software in the changing but limited-resource organizational environment.

- The traditional ERP life cycle accomplishes one stage at a time and requires formal milestone approvals prior to moving to the next stage.

- In a rapid ERP life cycle, once a company commits to the implementation, employees are empowered to make the decisions to keep the project moving forward.

Traditional ERP Life Cycle



Traditional ERP Life Cycle (Cont'd)

- **Stage 1.** *Scope and commitment stage.*
  - To conduct the feasibility study
  - To develop a scope of ERP implementation within the resource and time requirement.
  - A number of task parameters or characteristics of the ERP implementation need to be defined at the planning stage.
    - How large will the ERP system scope be in terms of departmental or functional coverage?
    - Develop a long-term vision for the new system and a short-term implementation plan and top management's commitment for both the vision and implementation plan.
    - The composition and the structure of the implementation team, the role of external consultants both in terms of time and scope, and the role of internal employees, including the subject matter experts (SMEs) who will provide the knowledge to embed business rules and input for interface and report design, are other key factors to be considered at this stage.
    - Vendor selection is another key activity toward the end of this stage. Although no decisions should be made on the ERP software, vendor information must be reviewed and choices could be narrowed by testing alternative software and developing a business case for the project. A number of items need to be assessed and established to create the boundaries and scope.

Traditional ERP Life Cycle (Cont'd)

- ***Stage 2. Analysis and design stage.***
  - Analysis of user requirements
  - Make a decision on the software and decide on consultants and SMEs.
  - Map the differences between the current business process and the embedded process in the ERP software or gap analysis
  - Develop a long-term plan on whether to change the business processes of the organization or to customize the ERP software to support existing processes.
  - Using the gap analysis, the team must develop a design that includes:
    - a change management plan,
    - a list of embedded processes,
    - user interface screens,
    - and reports in the ERP software that will need customization, design of these changes, and a process of involving subject matter experts in the design.
    - creating plans for data conversion, system conversion, and training.
    - develop a detailed change management strategy and plan for the release of the new system.
  - By the end of this stage, the team usually has a sandbox or prototype of the ERP software installed that is accessible to the entire implementation team, consultants, and SMEs

List of Scopes and Commitments

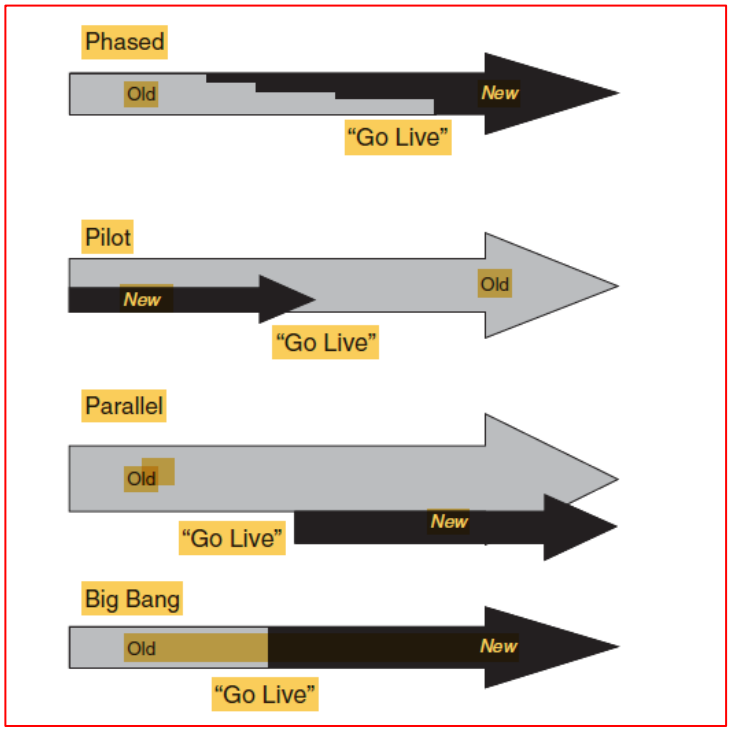
Gap Analysis	Evaluation of the functions provided by the ERP system compared with the operational processes necessary to run your business
Physical Scope	Establishes which sites will be addressed, the geographical locations of the sites, and the number of users.
BPR Scope	Will the current processes be refined, replaced, or eliminated? What users, departments, sites will be affected?
Technical Scope	How much modification will be done to the ERP software? What processes will be utilized as is and which will be customized?
Resource Scope	How much time and budget is allocated for the project?
Implementation Scope	Which modules should be implemented? How should the modules be connected to the existing system?

Traditional ERP Life Cycle (Cont'd)

- **Stage 3.** ***Acquisition and development stage***.
  - Similar to the acquisition and testing stage of traditional SDLC.
  - Purchase the license for the production version of the software and build the production version of the system, which is eventually to be made available to the end users.
  - Configure the entire production platform and built with the necessary hardware, network, security, software, database, and real production data.
  - The tasks identified in the gap analysis are executed at this stage. These include
    - customization of embedded software rules, data in the database tables, input screens, and reports that come with the ERP system.
  - While the technical team is working on the installation, the change management team works with end users on implementing the changes in business processes and preliminary training with the sandbox version of the software.
  - The data team similarly works on migrating data from the old system to the new system.
    - This can be an extremely difficult task when the old system is a legacy application using a nonrelational database.
    - Data mapping, missing data, and data dictionary design are the major tasks for data conversion.
  - Finally, the ERP system needs to be configured with proper security, implement the authentication and authorization policy for accessing the system, and contain other modifications as recommended by the design plan.

Traditional ERP Life Cycle (Cont'd)

- ***Stage 4. Implementation stage.***
  - The focus for this stage is on installing and releasing the system to the end users (i.e., "Go-Live") and on monitoring the system release to the end users.
  - This production platform is a mirror of the development version of the system.
    - Errors found in the production version have to go through the help desk or support staff.
    - Any changes made to the development version are then retested and migrated to the production system as regularly scheduled updates.
  - Training end users on how to use the new system.
  - Feedback received from system usage needs to be funneled to the post-implementation team for ongoing system support.

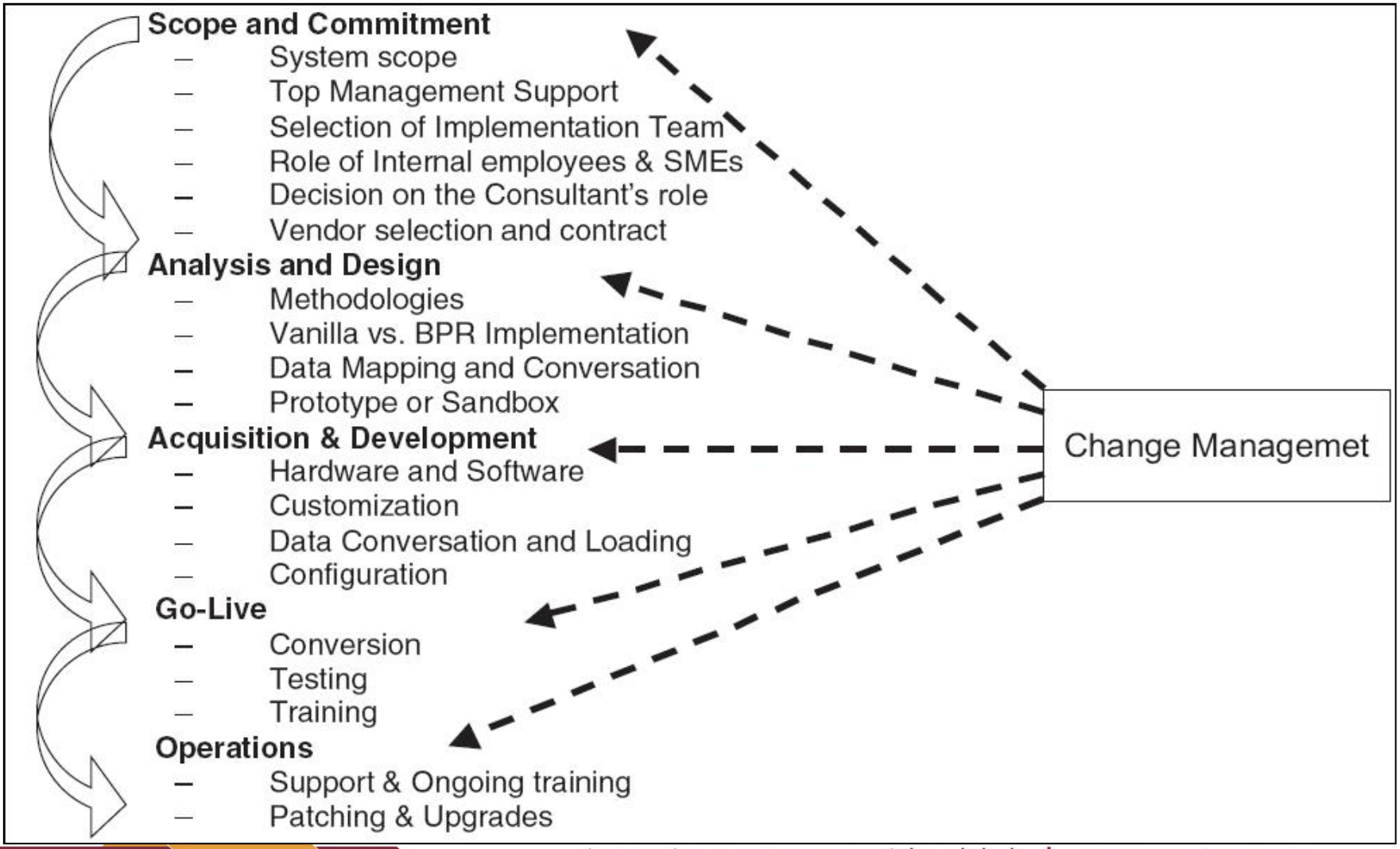


Types of system conversion

Traditional ERP Life Cycle (Cont'd)

- ***Stage 5:Operation Stage***
  - Handover or knowledge transfer is the major activity as support for the new system is migrated to the help desk and support staff.
  - Training of new users to the system as ERP modules are released.
  - Managing of new releases of the software, installation of patches and upgrades.
  - Managing the software contract with the ERP vendor.

ERP Life Cycle Phases Summary



Role of Change Management

- System failures often occur when the attention is not paid to change management from the beginning stages.
- A vision for CM needs to be articulated from the first stage and then revised, monitored, and implemented on a constant basis.
- SMEs and other internal users have the role of working with the team and to guide the implementation team on all the activities of change management.
- Support of the top management as well as skills of the change management team are essential for successful implementation.

Methodologies used in ERP implementation

- **Total Solution (Ernst & Young, LLP)**
- **Phases**
  - *Value Proposition*. Does the solution make sound business sense?
  - *Reality Check.* Is the organization ready for change?
  - *Aligned approach*. Setting the right expectations that deliver both short-term and long-term value.
  - *Success Dimension*. Getting the right blend of people, skills, methods, and management in the team.
  - *Delivering Value*. Measuring results and celebrating success.

Methodologies used in ERP implementation (cont'd)

- **Fast Track (Deloitte & Touche)**
- **Phases**
  - *Scoping and Planning:* Project definition and scope. Project planning is initiated.
  - *Visioning and Targeting:* Needs assessment. Vision and targets identified. As-is modeling.
  - *Redesign:* To-be Modeling. Software design and development.
  - *Configuration:* Software development. Integration test planning.
  - *Testing and Delivery:* Integration testing. Business and system delivery.

Business Integration Methodology (BIM)

- **Business Integration Methodology (Accenture)**
  - *The Planning Phase*. Help define appropriate strategies and approaches for achieving an enduring competitive advantage and building stakeholder value.
  - *The Delivering Phase*. Translates the business architecture into a specific business capability.
  - *The Managing Phase*. The Managing Phase directs, coordinates, and monitors the activities outlined in the other three phases, in order to achieve improved business results.
  - *The Operating Phase*. Operates the new business capabilities that were created in the Delivering Phase.

Agile Development

- Agile methodologies start with smaller sets of requirements, they start small and deliver functionality incrementally in a series of releases.
- No single release covers all requirements, but every release delivers more than the previous one.
- Users are able to provide feedback quickly on how the system meets their needs and also if a requirement is missing or wrong, it can be corrected quickly.
- Two of the most popular implementations are:
  - Scrum- Much is left up to the project team.
  - Extreme programming (XP)- Stresses customer satisfaction and gives working software to the customers quickly and incorporates their feedback quickly.

Comparing and Contrasting SDLC with ERPLC

	SDLC	ERP Life Cycle
Goal	Develop a new system to support the organization requirements	Implement a packaged system to support the organization requirements
Analysis	Evaluate user needs through observations and interviews and create system specifications	Vendor analysis and evaluation of business process changes due to the implementation
Design	Develop new system architecture, user interface, and reporting tools	Installation and Customization plan of ERP software, data conversion, and change management strategies
Implementation	Acquire hardware, software, develop applications, installation, testing, training, and conversion	“Go-Live” conversion or releasing the system to the users, training, and support

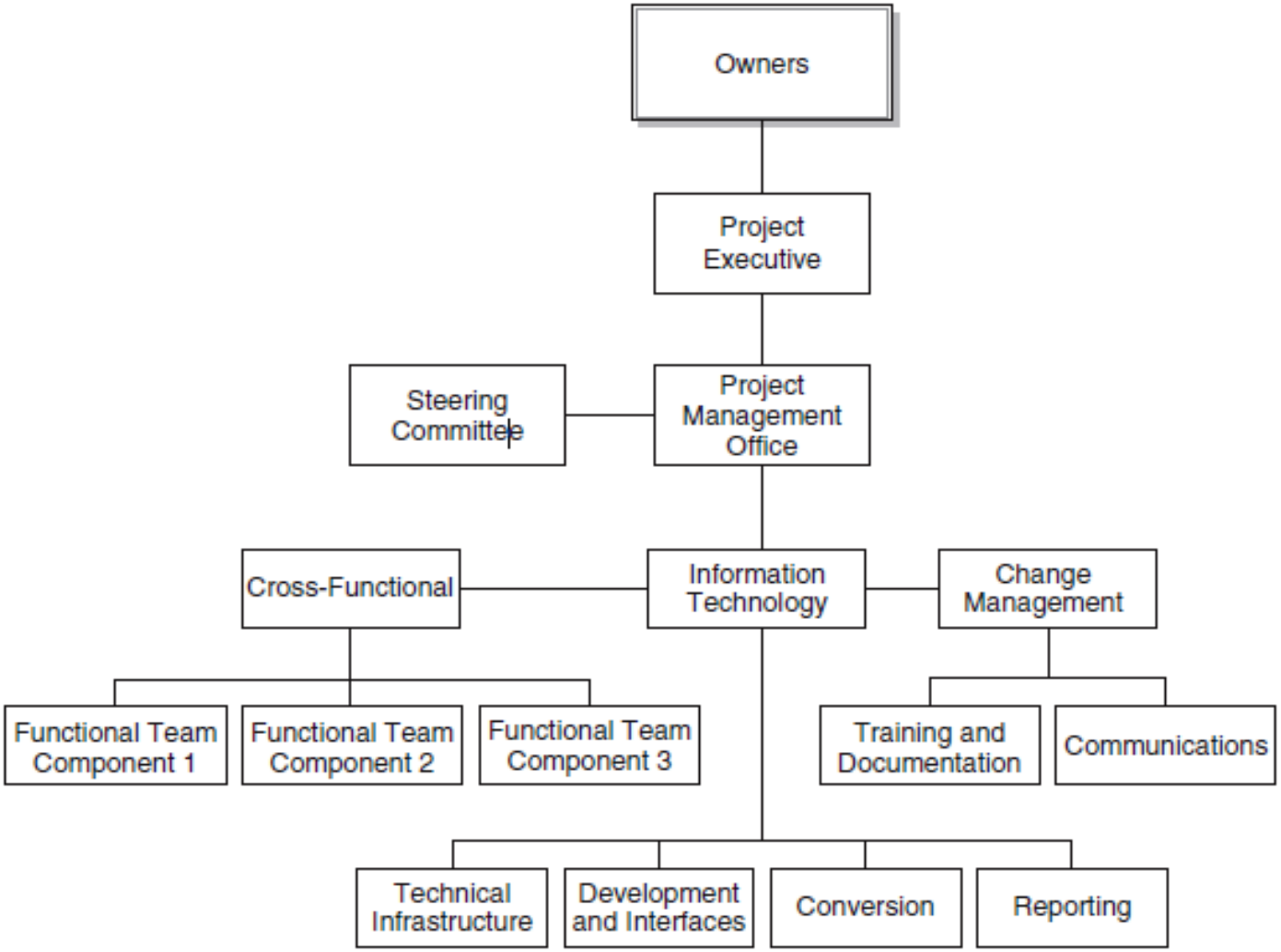
Comparing and Contrasting SDLC with ERPLC

	SDLC	ERP Life Cycle
Consultant Role	Technical support mainly during design and implementation	Change management, process change, and technical support from beginning to end
Management Role	Some oversight and support	Significant oversight and involvement especially in change management
End-User Role	Focus group providing input during various stages with most involvement during Implementation stage	Multiple groups such as SMEs, advance users, and self-service users are part of implementation team with continuous involvement
Operations	Maintains, updates, and provides technical support	Maintains, updates, upgrades, monitors change management strategy

Project Management

- A clear project plan and reporting structure will better ensure that the project receives the attention and accountability needed to be successful.
- The project owners, a project steering committee, and project executive must develop the hierarchy and determine responsibilities.
- Many businesses now have a project management organization within IT to provide the project management necessary for company projects.
- The functional, technical, and change management staff for the project will likely consist of existing staff from the business, new hires, and consultants.

Project Organization



The Project Organization

- **Project Management Office (PMO)**
- Project Leads
  - They provide the input to management and coordinate team activities.
- Project Teams
  - The Functional Team- Knowledgeable staff from each area.
  - The Infrastructure Team- Implements hardware and software .
  - The Development Team- Modify the software to meet the goals.
  - The Conversion Team- Convert the legacy data to the new system.
  - The Reporting Team- Develops a reporting framework and initial set of reports to be included in the system implementation.
  - The Change Management Team- Training and communications plan for the project. Their role is to provide project implementation information to key areas within the organization

Project Roles and Responsibilities

- Identifying and describing roles and responsibilities for project staff is necessary to ensure there is accountability within the project.
- Defining roles, often used as job descriptions on a project, will be the responsibility of the project management office.
- Each member of the project team will need to know what is expected of them, who they will report to, and what they will be evaluated on.

Implications for Management

- It is critical to have solid top management commitment.
- It is important to have strong and experienced program management.
- It is a good practice to minimize the type and number of customizations that are implemented.
- It is critical to emphasize training and change management.
    - Effective and frequent communication keeps everyone on the same page and give the greatest chance of problems being identified early.

Summary

- A review of the systems development life cycle—both traditional and alternative approaches—and points out the benefits and limitations of the traditional and the newer approaches.
- The ERP life cycle has variations from the SDLC process. The key reason is that organizations buy ERP as prepackaged software, and then have to customize them as well as change their company's business processes.
- There are three routes for the company in choosing an appropriate implementation strategy;
  - Comprehensive.
  - Vanilla.
  - Middle-of-the-road.

Summary (cont'd)

- There are rapid implementation methodologies developed by ERP consulting firms.
  - Total Solution.
  - Fast-Track.
  - Rapid Application Development.
  - ASAP.
  - BIM.
- 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 organizations.

Summary (cont'd)

- ERP applications generally do not require the rigorous traditional SDLC process.
- ERP software is mission critical, has a major impact on the organization business processes, and impacts a lot of people.
- It is the role of the project management office to address teamwork initially and throughout the project as teamwork is paramount to the project.
- Each person on the project needs to understand their role and responsibility, thus making individuals and the project organization accountable to the project and the project's success.

Review Questions

1. What is the role of the systems approach in the SDLC?
2. Briefly discuss the key phases of the SDLC methodology.
3. Discuss the alternate approaches of SDLC and the benefits of these alternatives.
4. Compare and contrast the three major ERP implementation categories.
5. What is ERP implementation methodology? Give examples.