I.T. PROJECT MANAGEMENT

Lecture : Introduction to Project Management

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At the end of the lecture, students should be able to:

- Describe the **software crisis** and how the often dismal track record for information technology (IT) projects provides a motivation for changing how we view and manage IT projects.
- Explain the socio-technical, project management, and knowledge management approaches that support ITPM.
- Define what an IT project is and describe its attributes.
- Define the discipline called project management.
- Describe the role and impact IT projects have on an organization.
- Identify the different roles and interests of project stakeholders.
- Describe the project life cycle, the systems development life cycle, and their relationship.
- Identify the Project Management Body of Knowledge (PMBOK) and its core knowledge areas.

Software Crisis

- IT is becoming more reliable, faster, and less expensive, but
  - the costs,
  - complexities,
  - and risks of IT projects continue to increase.
- In a survey of 365 IT managers, the results were startling:
  - United States spent over $250 billion each year on IT application development projects,
  - 31 percent of these projects were canceled before completion.
  - Almost 53 percent were completed, but
    - were over-budget,
    - over-schedule and
    - did not meet the original specifications

Table 1.2 Summary of Factor Rankings for Successful, Challenged, and Impaired Projects

Rank	*Factors for Successful Projects*	*Factors for Challenged Projects*	*Factors for Impaired Projects*
1	User involvement	Lack of user input	Incomplete requirements
2	Executive management *support*	Incomplete requirements	Lack of user *involvement*
3	Clear statement of requirements	Changing requirements & specifications	Lack of resources
4	Proper planning	Lack of executive support	Unrealistic expectations
5	Realistic expectations	Technology incompetence	Lack of executive support
6	Smaller project milestones	Lack of resources	Changing requirements specifications
7	Competent staff	Unrealistic expectations	Lack of planning
8	Ownership	Unclear objectives	Didn't need it any longer
9	Clear vision & objectives	Unrealistic time frames	Lack of IT management
10	Hard-working, focused team	New technology	Technology illiteracy

SOURCE: Adapted from The Standish Group, *CHAOS* (West Yarmouth, MA: 1995), http://www.standishgroup.com /visitor/chaos.htm.

unpopular project and more and more resources are diverted away from it. The project is barely successful, or a failure.

Improving the Likelihood of IT Project Success

- Socio-Technical Approach
- Project Management Approach
- Knowledge Management Approach

Socio-technical Approach

- To improve IT project success:
  - In the past - focus on the tools, techniques, and methodologies of IT development.
  - A purely technical approach - focuses on the technology.
    - End up developing an application that no one needs.
- Applications to support organizational needs requires attention be paid to the organizational side.
- Early software development involved:
  - defining a set of user requirements,
  - disappearing for several months, and then
  - knocking on the user's door when it is time to deliver the new system.
- IT professionals must:
  - understand the business
  - be actively creative in applying the technology in ways that bring value to the organization.
  - clients must become stakeholders in the project - actively seek, encourage their participation, involvement, and vision.
  - Equal responsibility of the developers and users

Project Management Approach

- Another way of improving IT project success is:
  - One suggestion of the *CHAOS* study was the need for better project management. But, isn't building an information system a project?
- Organizations use project management – principles and tools of project management applied to IT projects
- Build systems on an ad hoc basis.
- Success or failure of an IT project depends largely on who is, or is not, part of the project team.
- Applying project management principles and tools across the entire organization - should be part of a **methodology**
  - The step-by-step activities, processes, tools, quality standards, controls, and deliverables that are defined for the entire project.
  - Project success should not depend primarily on the team, but
  - On the set of processes and infrastructure in place.
- A common set of tools and controls also provides a common language across projects and the ability to compare projects throughout the organization.

Project Management Approach – 2

- Other reasons for project management to support IT projects include
  - *Resources*—When developing or purchasing an information system, all IT projects are capital projects that require cash and other organizational resources.
    - Projects must be estimated accurately, and cost and schedules must be controlled effectively.
    - Without the proper tools, techniques, methods, and controls in place, the project will drain or divert resources away from other projects and areas of the organization. Eventually, these uncontrolled costs could impact the financial stability of the organization.
  - *Expectations*—Today, organizational clients expect IT professionals to deliver quality products and services in a professional manner.
    - Timely status updates and communication, as well as sound project management practices, are required.

Project Management Approach – 3

- *Competition*—Internal and external competition has never been greater.
  - An internal IT department's services can easily be outsourced if the quality of cost of providing IT services can be bettered outside the organization.
  - Competition among consultants is increasing as they compete for business and talent.
- *Efficiency and Effectiveness*—Peter Drucker, the well-known management guru, defined **efficiency** as doing the thing right and **effectiveness** as doing the right thing.
  - Companies report that project management allows for shorter development time, lower costs, and higher quality.
  - Just using project management tools, however, does not guarantee success.
  - Project management must become accepted and supported by all levels within the organization, and
  - continued commitment in terms of training, compensation, career paths, and organizational infrastructure must be in place.
  - This support will allow the organization to do the right things and do them right.

Knowledge Management Approach

- In addition, IT project Success can be facilitated by:
  - Knowledge management
  - Excellence in IT project management for an individual or an organization takes time and experience.
- **Knowledge management** is - a systematic process for acquiring, creating, synthesizing, sharing, and using information, insights, and experiences to transform ideas into business value.
  - Some believe that knowledge management is just a fad or a buzzword.

Knowledge Management – 2

- Experience is a great teacher.
  - Most experiences and the knowledge gained from them are often fragmented
- Knowledge and experience can be documented and made available through the technologies accessible today
  - E.g. World Wide Web or local versions of the web called intranets.
- **Lessons learned** that document both reasons for success and failure can be valuable assets if maintained and used properly.
  - Creation of **best practices**— doing things in the most efficient and effective manner.
- In terms of managing IT projects:
  - Managing knowledge in the form of **lessons learned** can help an organization develop **best practices** that allow all of the project teams within the organization to do the right things and then to do them right.

Project Management Context

- According to the PMBOK guide (Project Management Institute, 2000)
  - A *project* is a temporary endeavour undertaken to accomplish a unique endeavour
  - *Project Management* is the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project

Attributes of a Project

- The attributes of a Project include:
  - *Time frame*
  - *Purpose*
  - *Ownership*
  - *Resources*
  - *Roles*
  - *Risks and assumptions*
  - *Interdependent tasks*
  - *Organizational change*
  - *Operational environment*

Attributes of a Project – 2

- Time frame
  - Definite start and end date
  - Calculation of project completion date from start date
  - Immovable dates (must work the start date backwords)
- Purpose
  - Clearly defined goal (a target)
  - To be agreed upon by all stakeholders
  - Outcomes of any IT project may vary (system, software, or even a recommendation based on a study)
  - The end product of a project must be tangible and produce value to the owners

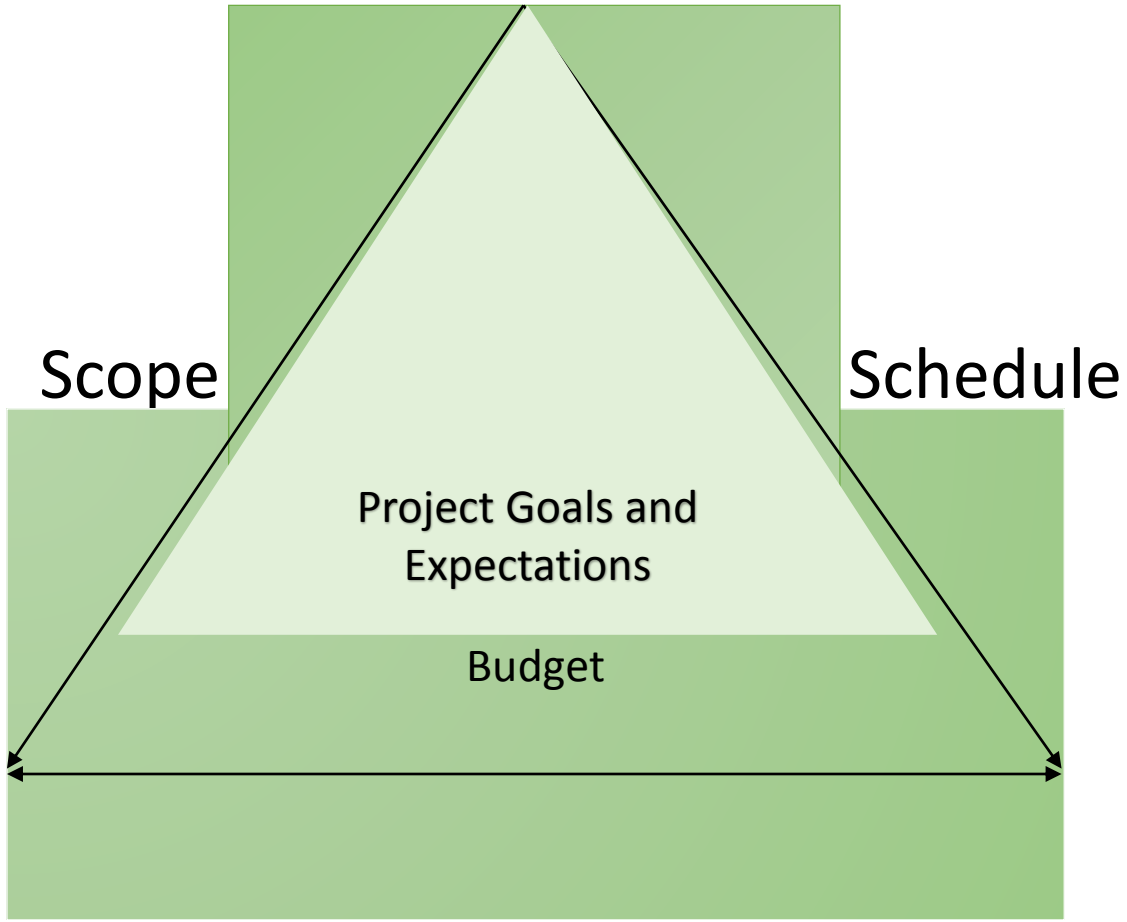
Attributes of a Project – 3

- Ownership
  - A project must provide something of value to an individual or a group
  - Identifying the owner of a project' product is not always that easy
  - E.g. people fight over who owns the system, data, the support, cost of implementation and maintenance, etc.
  - A project may have many *stakeholders* (people/groups with vested interest in project' outcome), BUT
    - A project needs a clear sponsor (the end user or client with the ability and desire to provide the funding, direction and project resources)

Attributes of a Project – 4

- Resources
  - IT projects require time, money, people and technology
  - Resources provide means and also act as constraints to project success
  - The utilization of a project resource has cost implication that must be added to the overall project cost
  - Cost of computer technology and labour in the past vs. today
  - Relationship between IT salaries and IT project costs
  - Additional work (time & cost of unscheduled work added to project schedule and budget
  - Increase in scope leads to increase in schedule and budget
  - If project's schedule and resources are fixed, scope must be reduced to decrease cost or schedule
  - The **'Triple Constraint'** – Scope, Schedule and budget must be in equilibrium

The Scope, Schedule and Budget Relationship



Attributes of a Project - 5

- Roles
  - typically, projects include the following role skills:
    - The Project Manager
      - Responsible for ensuring that all the project management and technical development processes are in place
      - Responsible for ensuring their implementation according to specified requirements. Defined processes and quality standards
    - The Project Sponsor
      - Client, Customer or Organisational Manager
      - Acts as project champion
      - Provides organisational resources and direction when needed

Attributes of a Project – 5b

- Roles continued:
  - Subject Matter Expert(s) (SME)
    - A user or client with specific knowledge, expertise or insight into the specific functional area required
  - Technical Expert(s) (TE)
    - Required to provide technical solution to the organizational problem
    - Responsible for defining, creating and implementing the technical and organisational infrastructure for supporting the IT project output
    - Examples are: systems analyst, network specialists, programmers, graphic designers, trainers, etc.

Attributes of a Project - 6

- Risks and Assumptions
  - Different kinds Risks affect IT projects
  - Internal Risks e.g. estimating cost of project process, key member departure
  - External Risks e.g. dependence on other contractors, vendors, etc.
  - Assumptions are made to estimate scope, schedule, budget and risk assessment
  - All risks capable of impacting the project must be identified and made explicit

Attributes of a Project – 7

- Interdependent Tasks
  - Many tasks in a project depend on each other
  - Delay in one task can affect subsequent tasks dependent on it
  - A slight delay in the project schedule may cause the project to miss its deadline
- Organisational Change
  - Projects are Planned organisational Change
  - Change must be understood and managed
  - IT projects literally changes the way people work
  - There exists a potential for resistance
  - A system that’s a technical success could end up an organizational failure

Attributes of a Project – 8

- Operational Environment
  - Projects exist within a larger environment
  - Projects potentially affect the larger environment within which they are implemented
  - Project team must understand the company culture, environment, politics, etc.
  - These organisational variables influence:
    - the selection of projects,
    - the IT infrastructure, and
    - the role of IT within the organisation
  - Example, a family small business will be different from an individually owned business

Attributes of a Project – 8b

- Understand both technical and organisational variables
  - to align the project well with the structure and strategy of the organisation
- Understanding the organisational variables
  - Helps in understanding the **political climate** which will help in the proper identification of risks and issues that can negatively affect the project

The Project Life Cycle and IT Development

- PLC (**Project Life Cycle**) is a collection of logical stages or phases that maps the life of a project from its beginning to its end in order to define, build and deliver the product of the project
- Each phase should produce one or more deliverables
- A **deliverable** is a tangible and verifiable product of work e.g. project plan, design specifications, delivered system, etc.
  - Deliverables at the end of each phase provide tangible benefits throughout the project
  - Deliverables also tend to define the work and resources needed for each phase

The Project Life Cycle and IT Development (2)

- Breaking up a project into phases to make them more manageable and reduce risks.
- **Phase exits, stage gates,** or **kill points** – phase-end review of key deliverables (the organization evaluates the project's performance & takes immediate action to correct any errors or problems)
- **Fast tracking** – commencing with the next stage before approval is received on the deliverables to be provided
- Projects are born, grow, peak, decline and then terminate
- Although projects vary, they all have a beginning, middle and an end

The Project Life Cycle and IT Development (3)

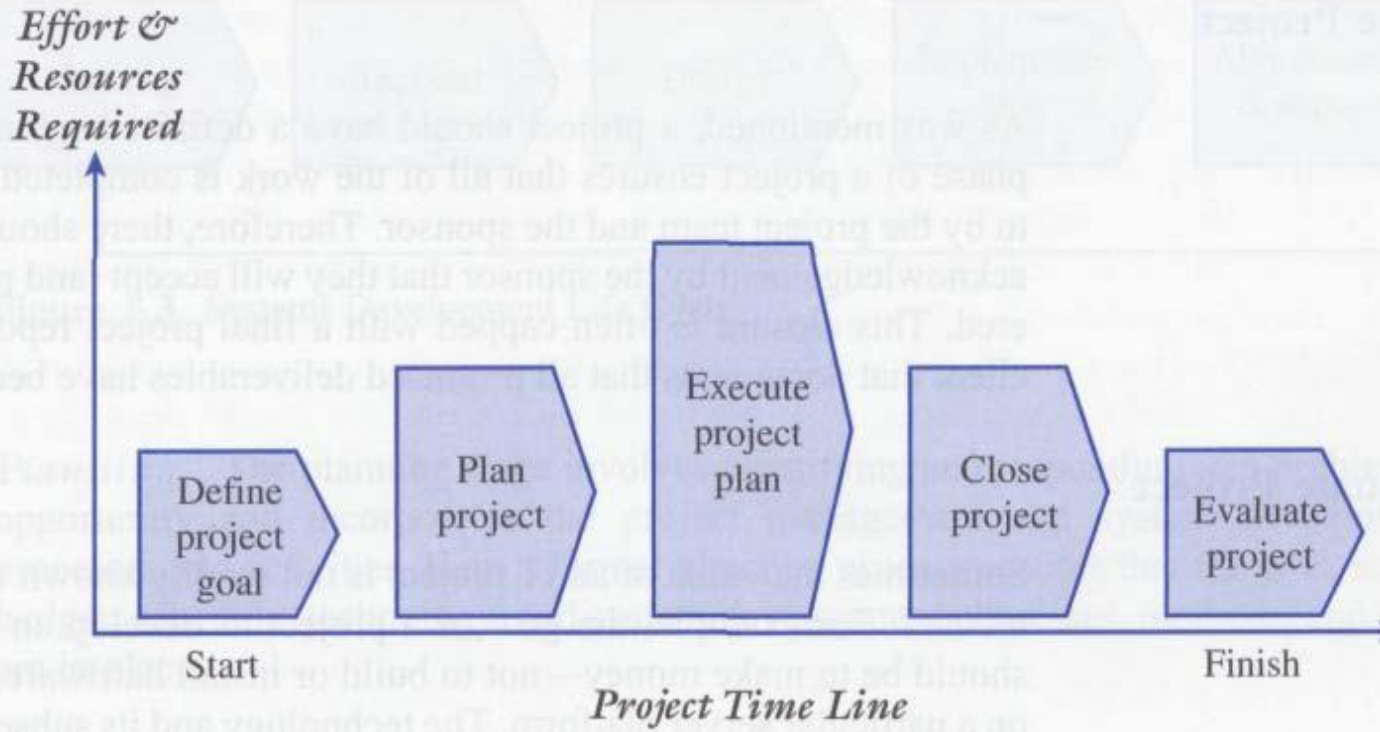


Figure 1.2 A Generic Project Life Cycle

- The ability for stakeholders to influence the scope and cost of the project is highest at the beginning of the project. The cost of changing the scope and correcting errors becomes more expensive as the project progresses.

Plan Project

- After Project goal has been determined, the planning follows. Questions include:
  - What are we going to do?
  - Why are we going to do it?
  - How are we going to do it?
  - Who is going to be involved?
  - How long will it take?
  - How much will it cost?
  - What can go wrong and what can we do about it?
  - How did we estimate the schedule and the budget?
  - Why did we make certain decisions?
  - How will we know if we are successful?

Plan Project – 2

- Also called the **baseline plan** (initial plan)
  - Defines the agreed upon scope, schedule, budget, &
  - used to gauge (measure) project's performance
- The deliverables, tasks, resources, and time to complete each task must be defined for each project phase

Execute Project Plan

- To ensure Project achieves its goal:
  - Scope, schedule, budget and people must be actively managed as work progresses
  - Project progress must be documented and compared with baseline plan
  - Project performance must be communicated to all stakeholders
  - At the end of the execution, a completed product must be delivered or implemented

Close Project

- Important: A formal acknowledgement by the sponsor that they will accept and pay for the product delivered.
  - Ensures that all the work is completed as planned and
  - As agreed by the project team and sponsor
  - A project report is written and submitted

Project Evaluation

- Difficult to evaluate the true value of an IT project
- Project team review its experiences – things to be repeated and avoided in subsequent project – document, store electronically and share throughout organization
  - Leads to the establishment of best practices
- Project Manager can also evaluate the project team & the project
  - Each team member' performance can be assessed
- An outside third party (senior manager, partner) can audit project in terms of:
  - Management
  - Promised deliverables
  - Adherence to laid down procedures
  - Incorporated quality standards
  - Professional and ethical conduct

The IT Product Life Cycle

- Commonest product life Cycle in IT is the Systems Development Life Cycle (SDLC)
  - Sequential phases or stages followed by an information system
  - Establishes a logical order for system development activities
  - Indicates whether or not to proceed from one activity to the other
  - The generally accepted activities and phases of systems development are:
    - Planning
    - Analysis
    - Design
    - Implementation
    - Maintenance and support

SDLC Diagram

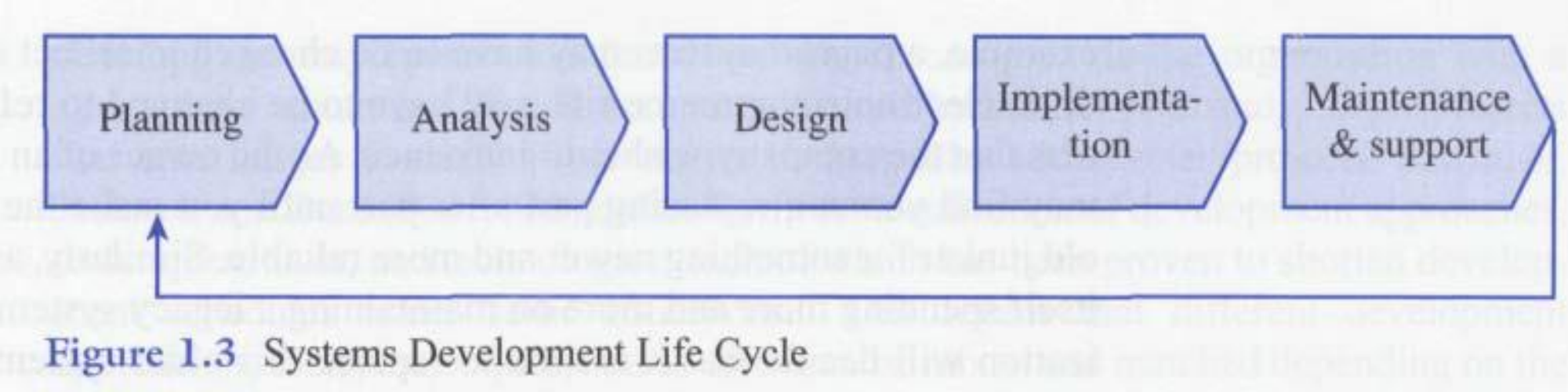


Figure 1.3 Systems Development Life Cycle

SDLC – 2

- Planning
  - Identification and response to a problem or opportunity
  - Integrates project management & systems development processes/activities
  - Goal, scope, budget, schedule, technology and SD processes/tools/methods
- Analysis
  - Develop an ‘as is’ system to understand problem or opportunity
  - Elicit requirements for the new system
    - JAD, interviews, observations, document review, surveys
  - Develop the ‘to be’ system (future system)
    - Current system, user requirements and logical design
      - USING process-oriented, data-oriented & object-oriented modelling techniques

SDLC – 3

- Design
  - Utilizes the requirements and the ‘to be’ logical models
  - Design the architecture to support new system
    - Designing the network
    - Hardware configuration
    - Databases, User Interface and application systems
- Implementation
  - Development/Construction of the system
  - Testing & Installation
  - Training, Support, Documentation

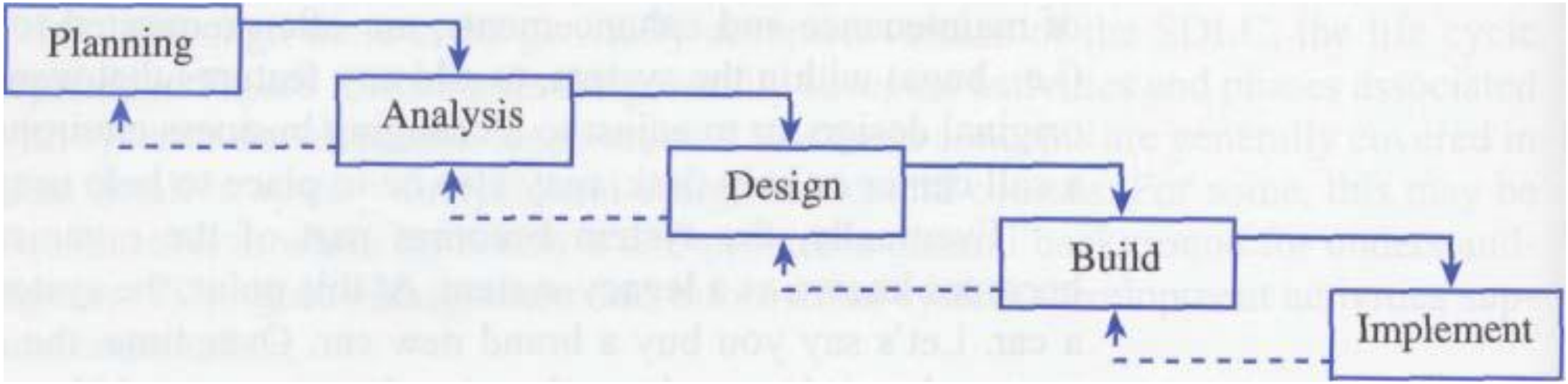
SDLC – 4

- Maintenance
  - Important consideration
  - Change and enhancements to fix discovered errors
  - Add features not already there
  - Adjust to changing business environment
  - Support – call centre/help desk
  - Becomes a legacy system

Systems Development Life Cycle (SDLC)

- A systematic, step-by-step, stage by stage methodology to developing an information system
  - Structured Approach to Systems Development
    - Waterfall Model
  - Rapid Applications Development
    - Prototyping
    - Spiral Development
    - Extreme Programing (XP)

Waterfall Model



Rapid Application Development

- RAD - A collection of development approaches, techniques, tools, and technologies, each of which has been proven to shorten development schedules under some conditions

PLC vs. SDLC

- PLC – Focuses on the processes of managing a project
- SDLC – Focuses on creating and implementing a product – the information system
- The SDLC and the particular approach used would impact
  - The project scope (deliverables)
  - Work activities
- Project schedule and budget affected by - number of activities, their sequence, time-to-complete, & resources required

PLC & SDLC

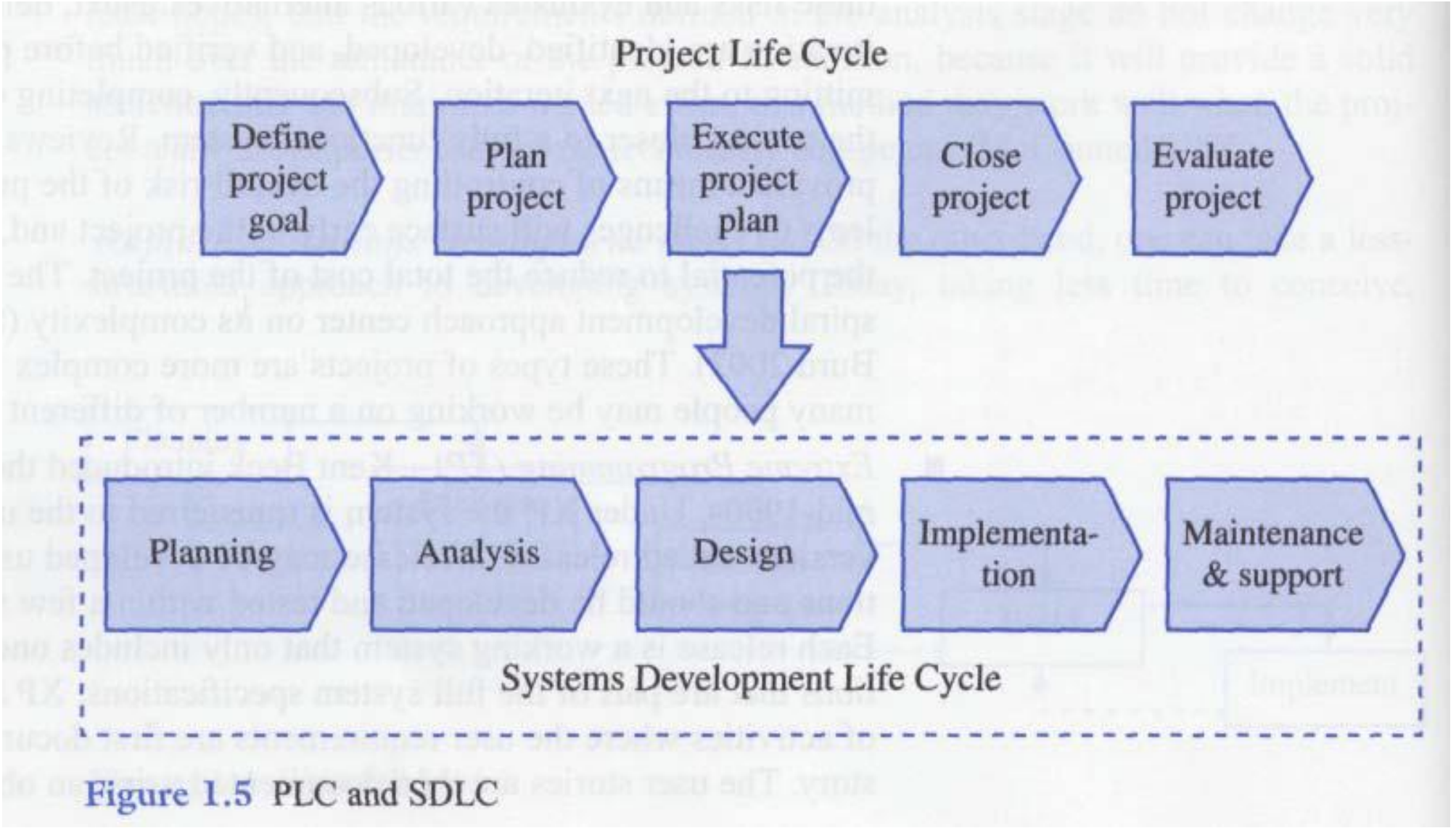


Figure 1.5 PLC and SDLC

PROJECT Management Body of Knowledge (PMBOK)

- The Project Management Knowledge Areas
  - Project Integration Management
  - Project Scope Management
  - Project Time Management
  - Project Cost Management
  - Project Quality Management
  - Project Communications Management
  - Project Risk Management
  - Project Procurement Management
  - Project Human Resource Management

Integration Management

- *Project Integration Management* — Integration focuses on coordinating the project plan's development, execution, and control of changes.

Scope Management

- *Project Scope Management* — A project's scope is the work to be completed by the project team.
- Scope management provides assurance that:
  - the project's work is defined accurately and completely and that it is completed as planned.
  - In addition, scope management includes ways to ensure that proper scope change procedures are in place.

Time Management

- *Project Time Management* — Time management is important for developing,
- monitoring, and managing the project's schedule. It includes identifying the
- project's phases and activities and then estimating, sequencing, and assigning resources for each activity to ensure that the project's scope and objectives are met

Cost Management

- *Project Cost Management* — Cost management assures that the project's budget is developed and completed as approved.

Human Resource Management

- People are the most important resource on a project.
- Human resource management focuses on:
  - creating and developing the project team
  - understanding and responding appropriately to the behavioral side of project management.

Communications Management

- *Project Communications Management*—Communication management
- entails communicating timely and accurate information about the project to the project's stakeholders

Risk Management

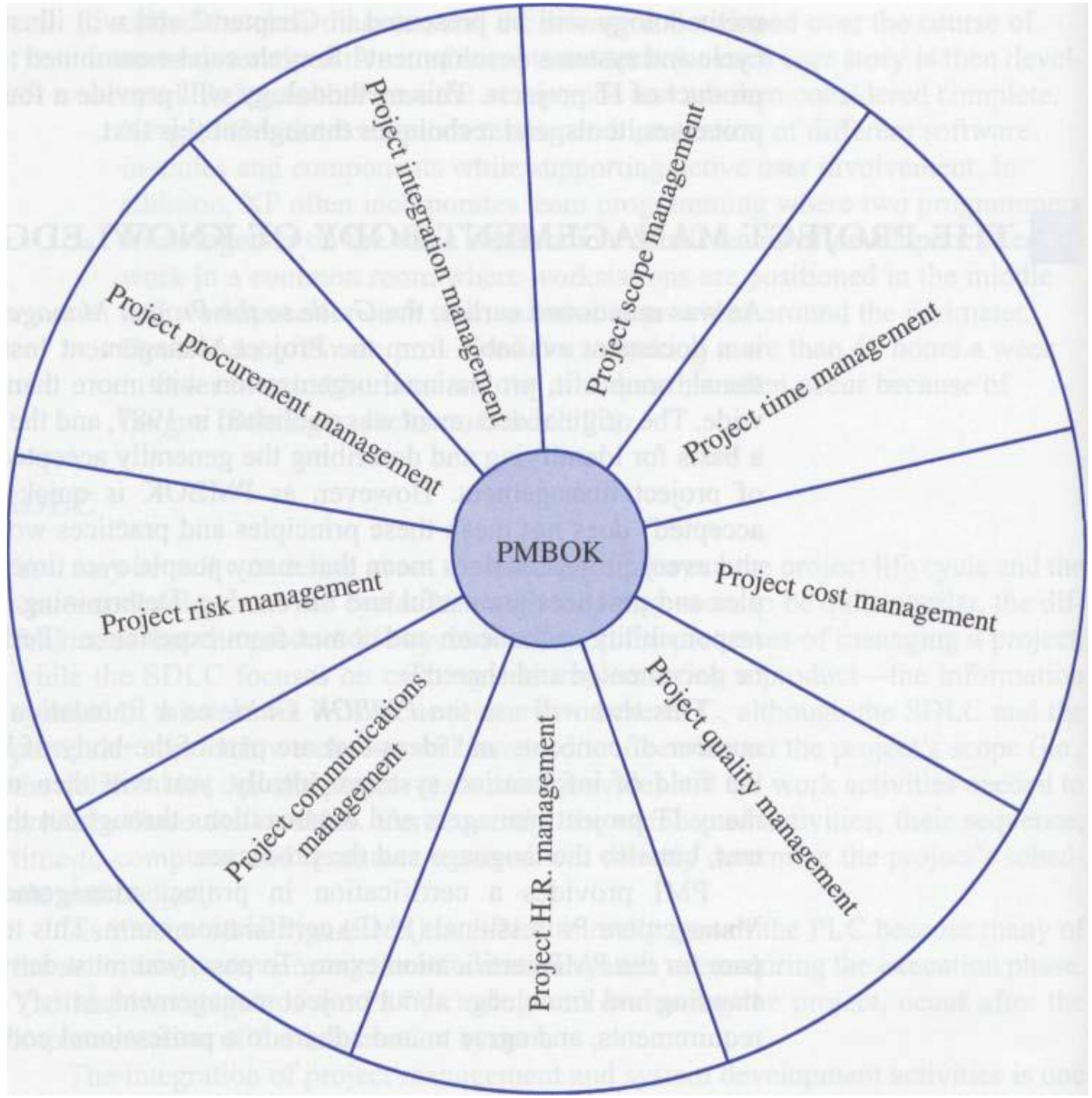
- *Project Risk Management*—All projects face a certain amount of risk.
- Project risk management is concerned with identifying and responding appropriately to risks that can impact the project.

Procurement Management

- *Project Procurement Management*—Projects often require resources (people, hardware, software, etc.) that are outside the organization. Procurement management makes certain that these resources are acquired properly

Quality Management

- *Project Quality Management*—Quality management focuses on planning, developing, and managing a quality environment that allows the project to meet or exceed stakeholder needs or expectations


PMBOK
Project integration management
Project scope management
Project time management
Project cost management
Project quality management
Project H.R. management
Project communications management
Project risk management
Project procurement management

QUESTIONS