Project Management
Sharif MBA – Fall 1385

Session 3 - Dr. Sepehri
Project Lifecycle

Burke Chapter 3
Time, Cost and Quality Triangle
Project Environment Model
Project Stages & Gates

The starting point in the development of Project Management methodology is the implementation of a stage-gate process.

Stage-gate process requires a life-cycle and process owner definition.
**Stages & Gates**

- Groups of series or parallel activities (based upon the risks of the project)
- Managed by cross-functional teams
- To reach a predetermined deliverable established by management
- Structured decision points at the end of each stage
- Number of gates must be limited
Project Phases and the Project Life Cycle

Figure 2-1. Sample Generic Life Cycle
Project Phases and the Project Life Cycle

- Organizations performing projects will usually divide each project into several **project phases** to improve management control and provide for links to the ongoing operations of the performing organization. Collectively, the project phases are known as the **project life cycle**.

- Each project phase is marked by completion of one or more deliverables. A **deliverable** is tangible, verifiable work product such as a feasibility study, a detail design, or a working prototype.

- The conclusion of a project phase is generally marked by a review of both key deliverables and project performance to date, to a) determine if the project should continue into its next phase and b) detect and correct errors cost effectively. These phase-end reviews are often called **phase exits**, **stage gates**, or **kill points**.
Definition of a project life cycle

<table>
<thead>
<tr>
<th>Phase</th>
<th>Resources Utilized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conceptual Phase</td>
<td></td>
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<tr>
<td>Feasibility and Preliminary Planning Phase</td>
<td></td>
</tr>
<tr>
<td>Detailed Planning Phase</td>
<td></td>
</tr>
<tr>
<td>Implementation Phase</td>
<td></td>
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<tr>
<td>Conversion or Termination Phase</td>
<td></td>
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</tbody>
</table>

PMO
Project Phases and the Project Life Cycle

- The phase sequence defined by most project life cycles generally involves some form of technology transfer or handoff such as requirements to design, construction to operations, or design to manufacturing.
- Deliverables from the preceding phase are usually approved before work starts on the next phase. However, a subsequent phase is sometimes begun prior to approval of the previous phase deliverables when the risks involved are deemed acceptable.
- This overlapping phases is often called fast tracking.
- Project life-cycle descriptions may be very general or very detailed. Highly detailed descriptions may have numerous forms, charts, and checklists to provide structure and consistency. Such detailed approaches are often called project management methodologies.
- Care should be taken to distinguish the project life cycle from the product life cycle. For example, a project undertaken to bring a new desktop computer to market is but one phase or stage of the product life cycle.
Project Phases and the Project Life Cycle

![Diagram showing the project life cycle and its stages: Feasibility, Planning and Design, Construction, and Turnover and Startup. Each stage includes specific activities such as Project Formulation, Feasibility Studies, Strategy Design and Approval, Base Design, Cost and Schedule, Contract Terms and Conditions, Detailed Planning, Manufacturing, Delivery, Civil Works, Installation, Testing, and Final Testing and Maintenance.]

Figure 2-3. Representative Construction Project Life Cycle, per Morris
Gatekeepers

- Individuals (i.e. sponsors) or groups of individuals assigned by senior management
- Empowered to enforce the structured process (including change management)
- Authorized to evaluate performance and make decisions
- And willing to provide the team necessary technical and business information
Gatekeeper’s decisions

- Proceed to next gate with the original objectives
- Proceed to the next gate with revised objectives
- Delay making a gate decision until further information is obtained
- Terminate the project
Stage-Gate Failures

- Assigning gatekeepers and not empowering them to make decisions
- Assigning gatekeepers who are afraid to terminate a project
- Failure to provide the team with information critical to gate reviews
- Allowing the team to focus more on the gates than on the stages
Project Life-Cycle (level of effort)

<table>
<thead>
<tr>
<th>Level of Effort</th>
<th>Concept &amp; Initiation</th>
<th>Design &amp; Development</th>
<th>Implementation or Construction</th>
<th>Commision or Handover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accumulative Effort</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate of Effort</td>
<td></td>
<td></td>
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</tbody>
</table>
### Project Life-Cycle Components

(for a typical project)

<table>
<thead>
<tr>
<th></th>
<th>Concept</th>
<th>Design</th>
<th>Implementation</th>
<th>Commission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>Input</td>
<td>Input</td>
<td>Input</td>
<td>Input</td>
</tr>
<tr>
<td>Process</td>
<td>Process</td>
<td>Process</td>
<td>Process</td>
<td>Process</td>
</tr>
<tr>
<td>Key Activities</td>
<td>Key Activities</td>
<td>Key Activities</td>
<td>Key Activities</td>
<td></td>
</tr>
<tr>
<td>Hold Points</td>
<td>Hold Points</td>
<td>Hold Points</td>
<td>Hold Points</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>Output</td>
<td>Output</td>
<td>Output</td>
<td>Output</td>
</tr>
<tr>
<td>Approval</td>
<td>Approval</td>
<td>Approval</td>
<td>Approval</td>
<td>Approval</td>
</tr>
</tbody>
</table>

Accumulative Effort
Potential to Add Value / Cost of Changes

<table>
<thead>
<tr>
<th>Concept</th>
<th>Design</th>
<th>Implementation</th>
<th>Comm</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

- **Concept**: Potential to add value
- **Design**: Level of influence
- **Implementation**: Cost to change

- **Cost to change one item for an IT project**:
  - Concept: $1
  - Design: $10
  - Implementation: $100
  - Commission: $1000
Project Life-Cycle (level of detail)
Product life-cycle
Product Life-Cycle (Frigate/Military Project)

Product Life-Cycle (Frigate/Military Project)

Project Life-Cycle

Operation Life-Cycle

Pre-project
- Old ships
- Obsolete weapon systems
- Increasing maintenance costs

Concept
- Feasibility study
- Stakeholders needs analysis
- Establish budgets
- Proposal

Design
- Design frigate

Implement
- Build frigate

Handover
- Commission frigate

M

Upgrade

Maintenance Project
- Dry docking
- Overhaul equipment
- Antifoul bottom

Upgrade Project
- Half-life refit
- Fit new engines
- Fit new weapons
- Check hull plating

Disposal Project
- Closeout report
- Sell to the third world navy, or use for target practice
Product Life-Cycle (Computer System)

- Pre-project: Old computer system becomes obsolete as new technology becomes available
  - Feasibility study
  - Stakeholder needs analysis
  - Establish budgets
  - Proposal

- Concept: Design computer system
  - Design computer system
  - Budgets
  - Scope of work

- Design: Implement computer system
  - Implement computer system

- Implement: Commission (debug) computer system
  - Train new

- Handover: Maintenance Project
  - Overhaul hardware
  - Rationalize software
  - Check archives

- Upgrade Project
  - Enhance computer system, upgrade where possible and cost effective

- Disposal Project
  - Closeout report
  - Sell hardware to employees as new computer system becomes operational

- Disposal
Product Life-Cycle (Nuclear Power Station)

<table>
<thead>
<tr>
<th>Pre-project</th>
<th>Concept</th>
<th>Design</th>
<th>Implement</th>
<th>Handover</th>
<th>M</th>
<th>Upgrade</th>
<th>Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Old power stations being decommissioned - New technology available</td>
<td>- Feasibility study - Stakeholders needs analysis - Establish budgets - Proposal</td>
<td>- Design power station</td>
<td>- Build power</td>
<td>- Commission power station</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Annual maintenance - Replace spent fuel rods

- Major overhaul of equipment - Install new technology where appropriate

- Closeout report - Decommission and dispose of radio active material as planned in the design phase
Project Phases and Project Life Cycle
The Three-Legged Stool

- Project Manager
- Line Management
- Senior Management (I.e. Sponsor)
Project Manager vs. Line Manager

Functional Manager:
- Defines how the work will be done!
- Provide sufficient resources.
- Has responsibility for the deliverables.

Project Manager:
- Completes task definitions.
- Resource requirements definitions
- Major timetable milestones
- End-item quality and reliability requirements
- Basis for performance measurements
Most projects also have a project sponsor which may or may not reside at the executive levels of management.
Multiple Boss Reporting

SPONSOR

PM

APM

APM

GM

LM

LM

LM

PM = Project Manager
APM = Assistant Project Manager
LM = Line or Functional Manager
Which of the above is Usually NOT performed by the project manager?
Promises Made???

- Promotion
- Grade
- Salary
- Bonus
- Overtime
- Responsibility
- Future work assignments
The Functional Role

- The functional manager has the responsibility to define how the task will be done and where the task will be done (i.e., the technical criteria).
- The functional manager has the responsibility to provide sufficient resources to accomplish the objective within the project’s constraints (i.e., who will get the job done).
Functional Obstacles

- Unlimited work requests (especially during competitive bidding)
- Predetermined deadlines
- All requests having a high priority
- Limited number of resources
- Limited availability of resources
- Unscheduled changes in the project plan
- Unpredicted lack of progress
Functional Obstacles (continued)

- Unpredicted lack of progress
- Unplanned absence of resources
- Unplanned breakdown of resources
- Unplanned loss of resources
- Unplanned turnover of personnel
Sponsorship

Client

Project Sponsor

Project Manager

Project Task Force

Scope of Work

Master Plan

Project Org. Structure

Key Staffing

Policies

Monitoring Execution

Executive Client Contact
The Project Sponsor Interface

Relationship:
- Objective Setting
- Up-Front Planning
- Project Organization
- Key Staffing
- Master Plan
- Policies
- Monitoring Execution
- Priority-Setting
- Conflict Resolution
- Executive-Client Contact
Project Vs. Functional Influences

- Functional Influence in Decision-Making
- Dual Influence
- Project Influence in Decision-Making

- Functional Organization
- Matrix Organization
- Project Organization

Relative Influence
Types of Cultures

- Cooperative
- Non-cooperative
- Competitive
- Isolated (large companies)
- Fragmented (multinational)
Resistance to Change

High
Neutral
Low

Sales
Marketing
Finance
Procurement
H.R.
Manu.
Eng.
R&D
I.T.
36
Resistance to Change

**Work Habits**
- New guidelines/processes
- Need to share power information
- Creation of a fragmented work environment
- Need to give up established work patterns
- Change in comfort zones

**Social Groups**
- Unknown new relationships
- Multiple bosses
- Multiple, temporary assignments
- Severing of established ties
Resistance to Change

**Embedded Fears**
- Fear of failure
- Fear of termination
- Fear of added workload
- Fear or dislike of uncertainty/unknown
- Fear of embarrassment
- Fear of “we/they’’ organization

**Wage and Salary Administration**
- Shift in authority and power
- Lack of recognition after the changes
- Unknown rewards and punishments
- Improper evaluation of personal performance
- Multiple bosses
Change Process

Time

Support for Change

Denial
Exploration
Resistance
Resistance
Support
The Tip-of-the-iceberg Syndrome

Many of the problems associated with project management will surface much later in the project and result in much higher costs.
Successful Culture

- A good daily working relationship between the project manager and those line managers who directly assign resources to projects.
- The ability of functional employees to report vertically to their line manager at the same time they report horizontally to one or more project managers.
The Definition Of Success
Success

Definition of Success

Primary Factors

- Within Time
- Within Cost
- Within Quality
- Accepted by The Customer
Success

Secondary Factors:

- Customer Reference
- Follow-on Work
- Financial Success
- Technical Superiority
- Strategic Alignment
- Regulatory Agency Relations
- Health and Safety
- Environmental Protection
- Corporate Reputation
- Employee Alignment
- Ethical conduct
Success

- Critical Success Factors (CSFs) [Focuses on the Deliverables]

- Key Performance Indicators (KPIs) [Focuses on the Execution Metrics of the Process]
Key Performance Indicators

These are shared learning topics which allow us to maximize what we do right and correct what we do wrong.
Success: Point Or Cube?

\[
\begin{align*}
\text{Cost} & \quad \text{Quality (or scope)} \\
\text{Time} & \quad \downarrow \\
\end{align*}
\]
Components of Failure

Accomplishment →

None

Actual

Perceived Failure

Planned Failure

Achievable Failure

Planning Failure

Perfection
Components of Failure

- None
- Actual
- Achievable
- Planned
- Perfection

Accomplishment →

- Perceived Failure
- Actual Failure
- Planning Failure
Mitigation Strategies Available

Technical Risk Assessment and Forecasting

Financial Risk Assessment

Project Objectives

Project Planning

Schedule Risk Assessment

Project Execution

Numerous Opportunities for Tradeoffs Resulting from Risk Analyses

Limited 50
Risk Planning

- Poor Risk Management
- Technical Inability
- Customer Expectations
- Actual Performance

Time

Performance
Project Management Inputs
Integrated Processes
(Past, Present, and Future)

Yrs: 1990-2000
- Project management
- Total quality management
- Concurrent engineering
- Scope change management
- Risk management

Yrs: 2000-2010
- Supply chain management
- Business processes
- Feasibility studies
- Cost-benefit analyses (ROI)
- Capital budgeting

Current Integrated Processes
Integrated Processes for The 21st Century

Project Management

Concurrent Engineering

Total Quality Management

Change Management

Risk Management