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PRINCIPLES OF PROJECT MANAGEMENT

Character Integrity Results

PROJECT MANAGEMENT FRAMEWORK
Learning Objectives

- Projects and Strategic Planning
- Definition of Project
- Definition of Project Management
- Portfolio, Program and Projects
- Operations Versus Projects
- Business Value

What is Project Management?

A Disciplined Profession
A project is “a temporary endeavor undertaken to create a unique product, service or result.”

**Uniqueness of Development Projects**

- Delivering less tangible outcomes
- Aim to address complex problems of poverty, inequality and injustice
- Tend to operate in exceptionally challenging contexts
- Complex array of stakeholder relationships
- Project approach is often as important as the outcomes themselves
- Transferring knowledge and learning is a priority
- Activities cannot be addressed within organization’s normal operational limits.
Balancing Constraints

Success Criteria

- Quality
- Risks
- Schedule
- Budget
- Scope
- Resources

Areas of Expertise

- Project Management Knowledge
- Application area knowledge
  standards & regulations
- Interpersonal Skills
- General Management Skills
- Understanding the Project Environment
PRINCIPLES OF PROJECT MANAGEMENT

Skills needed for Development Projects

- Understanding development sector values and paradigms
- To manage different stakeholders involved in development projects
- To navigate complex development environments
- Work effectively with an array of implementing partners
- Cope with the unique pressures of development environments
- Exhibit cultural sensitivity

Project Management

- “The application of knowledge, skills, tools and techniques to project activities to meet the project requirements.”

Donor’s/Organization’s Expectations

Change Objectives


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The most valuable and least used word in a manager’s vocabulary is “NO”.

You can con a person into committing to an unreasonable deadline, but you can’t bully him into meeting it.

The more ridiculous the deadline, the more it costs to try to meet it.

You can freeze the user’s/donors requirements but he won’t stop expecting.

The conditions attached to a promise are forgotten and the promise is remembered.

A user will tell you anything you ask about - nothing more.

Hidden agendas some people are out to score political points.

Parkinson and Murphy are both alive and well and form part of your project.

Factors Affecting Project Success

- Project uniqueness
- Adequacy of structure and control
  - Cultural and Social importance
  - International, Political and physical environment
  - Success criteria salience and consensus
- Competitive and budgetary pressure
  - Initial over-optimism, conceptual difficulty
- Coordination and relations

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# Potential Benefits of PM for the Organization

- Improved control
- Improved project support opportunities
- High visibility of project results.
- Improved performance
- Portable skills and experience
- Growth opportunities for an Individual
- Recognition of PM as a profession
- Future source of company leaders
- High visibility of project results

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## Your Expectations

- What would you like to learn from this experience?  
  - Solution to a specific problem?  
  - Project management concepts/knowledge?  
  - Specific skills?  
  - Other?
PROJECT LIFE CYCLE

Elements of Project Life Cycle

- Project Identification and Design
- Project Set Up
- Project Planning
- Project Implementation
- Project Monitoring, Evaluation and Control
- End of Project Transition
Project Management in Development Sector

- Balancing Act
- Integrated
- Participative
- Iterative

Organizational Influence

- Organizational Culture
- Organizational Communications
- Organizational Structures
Key Concepts

- Project phase: "A collection of logically related project activities usually culminating in the completion of a major deliverable."

- Project life cycle: "Collectively the project phases are known as the project life cycle."

Project Life Cycle Characteristics

- Risk
- Influence of Stakeholders
- Cost of Resources
- Information to Stakeholders
- Cost of Changes

- Highest in Execution

- Start
- Organize
- Execute
- Close
Project Management is an integrated element

Project Management Process Groups

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Phase-I

PROJECT IDENTIFICATION AND DESIGN
1. Collecting data
   - Identifying Project Needs
   - Types of Data

2. Analyzing data
   - Current State Analysis
   - Future State Analysis

3. Identifying the project intervention logic
   - Project Logical Framework Variations
   - Interpreting the Logical Framework Matrix
1. Collecting Data

• Purpose
  – To broadly explore a wide number and variety of issues, providing information which, when analyzed, will inform priorities and identify interventions that will address the challenges in a target area

Collecting data - Identifying Project Needs

• Normative needs
  – Compare the current situation to a set of professional or expert standards.

• Comparative needs
  – Compare the current situation with the situation of others.

• Felt needs
  – Focus on the thoughts and dreams of the community itself. What the people themselves believe should be the priority. A felt need is likely to be subjective and could be better described as a ‘want’. Felt need is necessarily affected by the knowledge and expectations of the individual, which may be unrealistic and/or unaffordable.

• Expressed needs
  – Are inferred by observation of the community’s actions
**Triangulating needs**

- **Felt Need** – A group of community members indicate they want a health clinic
- **Expressed Need** – Women are walking 10 Kms. to the nearest health clinic
- **Normative Need** – A physician indicates that the infant mortality rates are above established norms
- **Comparative Needs** – Surveys show that vaccination rates are much lower than other communities

**Bradshaw’s classification**

**Collecting data - Types of Data**

- **Secondary data**
  - Information available through published and unpublished sources, including literature reviews, surveys, evaluations, assessments, reports from NGOs, UN agencies, international organizations and government offices.
- **Primary quantitative data**
  - Scalability, Objectivity and accuracy of results, Standardization
- **Primary qualitative data**
  - Qualitative approaches seek to capture participants’ experiences using words, pictures and objects
DATA ANALYSIS: CURRENT STATE

- Starting point for good project design
- Process of understanding
  - the status, condition, trends and key issues affecting people and people’s livelihoods
  - Ecosystems in a given geographic context.

ANALYZING DATA - FUTURE STATE ANALYSIS

Where the project will lead
- What will be different in the future if this project is successful at meeting expectations?
- What will project beneficiaries be able to do that you can’t do now?
- What social change will be enabled?

Strategic questions
- Which elements will be included in the project intervention?
- Which elements will not be included in the scope of the project?
- What are the criteria which will be used to make these decisions?
**Project logical framework**

- A systematic tool for organizing the project thinking and identifying relationships between resources, activities, and project results
- A visual way of presenting and sharing the project intervention logic
- A tool to identify and assess risks inherent in the proposed project design
- A tool for measuring progress through indicators and means of verification

**Logical framework matrix**

- **Activities**
  - actions taken through which inputs are mobilized to produce outputs.
- **Outputs**
  - Tangible deliverables resulting from project activities (e.g. Health care center, Trained staff etc.)
- **Outcomes**
  - Are what the project expects to accomplish at the beneficiary level (e.g. improved yields, improved child health)
- **Goals**
  - Are the highest level desired end results or impacts (e.g. Transformation, sustainability)
### Vertical logic of the Logframework

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Indicators</th>
<th>Means of Verification</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>If the OUTCOMES occur;</td>
<td>If the OUTCOMES occur;</td>
<td>If the OUTCOMES occur;</td>
</tr>
<tr>
<td></td>
<td>Then this should contribute to the overall GOAL</td>
<td></td>
<td>Then this should contribute to the overall GOAL</td>
</tr>
<tr>
<td>Outcome (s)</td>
<td>If the OUTPUTS are produced;</td>
<td>If the OUTPUTS are produced;</td>
<td>If the OUTPUTS are produced;</td>
</tr>
<tr>
<td></td>
<td>Then the OUTCOMES can occur</td>
<td></td>
<td>Then the OUTCOMES can occur</td>
</tr>
<tr>
<td>Outputs</td>
<td>If the ACTIVITIES are conducted;</td>
<td>If the ACTIVITIES are conducted;</td>
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</tr>
<tr>
<td></td>
<td>Then OUTPUTS can be produced</td>
<td></td>
<td>Then OUTPUTS can be produced</td>
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<tr>
<td>Activities</td>
<td>If adequate RESOURCES / INPUTS are provided;</td>
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</table>

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### PROJECT DECISION GATES

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Project Life Cycle

Managing Decision Gates

• Keep the project focused on the need to be addressed
• Ensure that the context and assumptions of the project still exist
• Provide an opportunity for key stakeholders to decide whether to:
  – Continue the project as conceived
  – Modify the project plan
  – Terminate a project (which is not necessarily a failure if the intervention is no longer appropriate, feasible, or necessary)
Phase-II

PROJECT SET UP
**Objectives:**

- Establishing the Project Governance Structure
  - Authority: Who has the power to make decisions and within what tolerance levels
  - Accountability: Who is accountable for the success of the project?
- Officially authorizing the start of the project
- Communicating the project launch

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### Project Proposal Vs. Project Plan

<table>
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<tr>
<th></th>
<th>Project Proposal</th>
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**Problem Based Approach**

- Developing a Problem Tree
- Deriving an Objective Tree
- Decide
  - Which elements of the objectives tree will be included in the project intervention?
  - Which elements will not be included in the scope of the project?

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**Phase III**

**PROJECT IMPLEMENTATION**
Components

- Project Planning
- Monitoring, Evaluation and Control
**Purpose of Planning**

- Planning for Project Set Up
- Planning for Project Planning
- Planning for Project Implementation
- Planning for Project Monitoring and Evaluation
- Planning for Project Transition Planning

**Monitoring-Evaluation-Control**

- **Project Monitoring** tracks the operational work of the project.

- **Project Evaluation** tends to focus on tracking progress at the higher levels of the logical framework i.e. project outcomes.

- **Project Control** involves establishing the systems and decision-making process to manage variances between the project plans (in terms of scope, cost, schedule, etc.) and the realities of project implementation.
Core areas of focus

- What indicators are being monitored and evaluated?
- What information is needed to track the indicator?
- What are the sources of the information?
- What data collection methods are appropriate?
- Who will collect the information?
- How often will it be collected?
- Who will receive and use the results

Project Evaluation Approaches

- Final evaluations
  - Often mandated by a funding agency or required by organization’s own policy
- Mid-term evaluations
  - Provide the opportunity to supply suggestions to improve the project efficiency and impact while the activities are still underway
- Ex-post evaluations
  - Examine project impact at a defined period of time after project completion
Phase IV

END OF PROJECT TRANSITION
End of Project Transition

**Termination**
- The project is formally ended and all project closure activities are completed

**Extension**
- Negotiation of added time / cost to finish the project

**Expansion**
- Identification of elements for replication with a new target area for population

**Redesign**
- Continuation via a new phase with modified interventions or activities

### Manage the End--of-Project Transition Strategy

<table>
<thead>
<tr>
<th>Component</th>
<th>Key Questions</th>
<th>Guiding Principles</th>
<th>Challenges</th>
</tr>
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<tr>
<td>Plan for transition from earliest project Phases</td>
<td>• What type of transition is envisioned? • What is the timeline and what are benchmarks?</td>
<td>• Ongoing project review and revision • Transparency; especially funding</td>
<td>• Balancing firm commitments with flexibility • Allowing adequate time to develop capacity</td>
</tr>
<tr>
<td>Develop partnerships and local linkages</td>
<td>• Selecting the right partners? • What do partners bring?</td>
<td>• Diversity: may need other project inputs • Clear and common Goals</td>
<td>• Aligning needs and objectives of diverse stakeholders • Supporting local Partners</td>
</tr>
<tr>
<td>Build local organizational and human capacity</td>
<td>• What capacities are needed? • What capacities exist?</td>
<td>• Build on existing capacity if possible • Create environments to support capacities</td>
<td>• Designing monitoring to track capacity building • Providing incentives and retaining experienced staff</td>
</tr>
<tr>
<td>Mobilize local and external resources</td>
<td>• What inputs are needed to maintain services? • Can benefits be sustained without ongoing inputs?</td>
<td>• Procure resources locally where possible • Increasingly bring external resources under local control</td>
<td>• Difficulty finding adequate or available local resources • Other funders not ‘buying-in’ to original Objectives</td>
</tr>
<tr>
<td>Stagger phase out of various activities</td>
<td>• What are key project elements? • Which elements are dependent on others?</td>
<td>• Flexibility; staggering sequence may change upon implementation</td>
<td>• Sufficient time allowed in the project cycle to start seeing the intended impact and outcomes</td>
</tr>
<tr>
<td>Allow roles and relationships to evolve after Transition</td>
<td>• What types of ongoing support [advice, mentoring, Technical Assistance, etc.]? • How will ongoing support be funded?</td>
<td>• Prevent slippage of project’s intended results by including in extended, expanded or redesigned project</td>
<td>• Availability of funding for ongoing support • Availability of staff who can focus sufficient time and energy on ongoing Support</td>
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### Administrative, Financial and Contractual Closure

- **Contract closure**
  - Are all contracts closed out? Suppliers? Sub-contractors? Donors? Others? Implementing organizations?
  - Has the donor reviewed and accepted project deliverables?

- **Financial Closure**
  - Has all permitted funding been received from the donor?
  - Have all receivables (project advances, travel advances, and advances to suppliers) been liquidated or transferred to another project number or accounting code?
  - Have all payables been paid?

- **Administrative Closure**
  - Have project personnel been released or reassigned?
  - Have the project equipment, vehicles, offices been reallocated? Sold? Transferred?
  - Are project reports and closure documents complete?
  - Are project archives and/or files up to date?
INITIATING PROJECTS

• Upon Completion, you will be able to ...
  – List the main functions of each PM process group
  – Describe the purpose of the initiation process
  – Identify its inputs and outputs, tools and techniques
  – Develop a sample project charter
• "A series of actions people take to bring about a desired result."

• Types of processes
  – Project management processes
  – Product-oriented processes
  – Business-oriented processes
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### Purpose of Initiating Projects

- A Market demand
- A Business need
- A Customer request
- A Technological advance
- A Legal requirement
- A Social need
1. **Project selection methods**
2. **Expert judgement**

### Tools & Techniques

1. Project selection methods
2. Expert judgement

### Purpose of Initiation Process

1. To commit the organization to a project or phase
2. To set the overall solution direction
3. To define top-level project objectives
4. To secure the necessary approvals for funding and resources
5. Validate alignment with strategic objectives
6. To assign a project manager
"A document issued by senior management that provides the project manager with the authority to apply organizational resources to project activities."

- Business need
- Project objectives
- Project deliverables
- Assumptions
- Constraints
- Key staff
- Written authorization
Sample Initiating Activities

• Negotiate, write, and refine the project charter
• Confirm how the project links to the business need
• Identify management responsibilities
• Identify geographic locations involved
• Test top-level objectives versus strategic business plans
• Make strategic procurement decisions, e.g., make, buy, or identify qualified vendors

Develop Stakeholder Engagement Strategy

<table>
<thead>
<tr>
<th>Input</th>
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<th>Output</th>
</tr>
</thead>
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<tr>
<td>1. Project charter</td>
<td>“Identifying all people or organizations impacted by the project and communicating relevant information regarding project objectives, roles and impact on project success.”</td>
<td>1. Stakeholder register</td>
</tr>
<tr>
<td>2. Contract documents/Partner agreements</td>
<td></td>
<td>2. Stakeholder engagement strategy</td>
</tr>
<tr>
<td>3. Organizational assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Project environment (PESTEL-O)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tools & Techniques

1. Stakeholder analysis
Stakeholders

- Stakeholders are
  - Actively involved in the project / Whose interests may be affected by the project / who may affect the project outcomes

Project

- Project Manager
- Donor Organizations
- Users
- Performing organization
- Sponsor/Project Executive
- Project team
- Other
  - Society
  - Government
  - Political
  - Unions
  - Shareholders
Determine Key Stakeholders
Identify their Roles & Departments
Capture their Interest & Expectations
Determine their Knowledge Levels
Identify their Decision Making Power
Determine how they will Influence the Outcome
Interview Key Stakeholders to determine other stakeholders

List all Stakeholders

Determine the Level of Impact each Stakeholder can make
Determine the Support expected from each Stakeholder
Classify Stakeholder
Determine Strategy to manage stakeholder expectation
Prioritize Stakeholders

Determine how to Enhance Stakeholder Support
Determine how to Mitigate the Negative Impact
Stakeholder Classification models

- Power/interest grid model
  - Grouping the stakeholders by their level of authority (i.e., power) and their level of concern (i.e., interest) regarding the project.

- Power/influence grid model
  - Grouping the stakeholders by their level of authority (i.e., power) and their active involvement (i.e., influence) in the project.

- Influence/impact grid model
  - Grouping the stakeholders based on their active involvement (i.e., influence) in the project and their ability to effect changes to the project’s planning or execution (i.e., impact).

- Salience model
  - Describes classes of stakeholders based on their power, urgency and legitimacy (their involvement in the project is appropriate).

Power/Interest grid model - sample

```
<table>
<thead>
<tr>
<th>Power</th>
<th>Keep satisfied</th>
<th>Monitor (minimum effort)</th>
<th>Manage closely</th>
<th>Keep informed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>D</td>
<td>B</td>
<td>E</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C</td>
<td>F</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>H</td>
</tr>
</tbody>
</table>
```

Interest

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The Engagement levels

- Unaware
  - Unaware of project and potential impacts
- Resistant
  - Aware of project and potential impacts and resistant to change
- Neutral
  - Aware of project yet neither supportive nor resistant
- Supportive
  - Aware of project and potential impacts and supportive to change
- Leading
  - Aware of project and potential impacts and actively engaged in ensuring the project is success

Stakeholder Engagement Assessment Matrix

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Unaware</th>
<th>Resistant</th>
<th>Neutral</th>
<th>Supportive</th>
<th>Leading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder 1</td>
<td>C</td>
<td></td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder 2</td>
<td>C</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Stakeholder 3</td>
<td></td>
<td></td>
<td>C, D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© Current Engagement  D: Desired Engagement
Stakeholder Register

Stakeholder Register contains entry of all identified stakeholders and their details, it includes

- Identification information
  - Name,
  - organizational position,
  - location,
  - role in the project,
  - contact information

- Assessment information
  - Major requirements,
  - main expectations,
  - potential influence in the project,
  - phase in the life cycle with the most interest

- Stakeholder classification

Stakeholder Management Plan

- Desired and current engagement levels
- Scope and impact of change to stakeholders
- Identified interrelationships and potential overlap
- Stakeholder communication requirements
- Information in the form of language, format and level of details
- Reason for distributing information
- Timeframe and frequency of distribution of information
- Method for updating the Stakeholder management plan
Skills

• Interpersonal Skills
  – Building Trust
  – Resolving Conflict
  – Active Listening
  – Overcoming Resistance to Change

• Management Skills
  – Facilitate consensus towards project objectives
  – Influence people
  – Negotiate agreements
  – Modify organizational behavior to accept project outcomes

PLANNING PROJECTS
Upon Completion, you will be able to ...

- Describe the purposes of the planning processes
- Identify the inputs and outputs of core planning processes
- Describe the function and develop sample planning deliverables such as a scope statement, WBS, and milestone chart
- List the major tools and techniques used in the core planning processes
Project Life Cycle

Donor → Feasibility ← Upgrade

Need → Project Life Cycle → Transition

Project Identification and Design → Project Set Up → Project Implementation → End of Project Transition

Planning Process Group

Initiating Processes

Planning Processes

Controlling Processes

Executing Processes

Closing Processes

(arrows represent flow of information)
Purpose of Planning Processes

- To develop a project plan that:
  - Facilitates later accomplishment
  - Ensures project wide integration
  - Monitors change effectively
  - Provides decision support information to stakeholders
  - Can be updated by iterative planning activities

Introduction To Scope Management

- Ensures that the project includes all the work required and only the work required, to complete the project successfully
- Scope Refers to
  - Product/Service scope: Features and functions of the product or service (What?)
  - Project scope: Work required to create and deliver that product (How)
Need for Scope Management

- Proposal is NOT a Project Scope
- To avoid ambiguity and set stakeholder expectations
- To capture inaccurate work estimates from proposal
- To avoid Scope creep

Project Plan Development

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<tr>
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<tr>
<td>1. Other planning outputs</td>
<td>“… taking the results of other planning processes and putting them into a consistent coherent document.”</td>
<td>1. Project plan</td>
</tr>
<tr>
<td>2. Organizational assets and policies</td>
<td></td>
<td>2. Supporting detail</td>
</tr>
<tr>
<td>3. Constraints</td>
<td></td>
<td></td>
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<td>4. Assumptions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tools & Techniques

1. Project planning methodology
2. Stakeholder’s skills & knowledge
3. Project Management information systems
4. Earned Value Management.
The Project Plan

- Schedules
- Budgets
- Risk management plan
- Quality plan
- Staffing plan
- Procurement plan
- Schedule management plan
- Cost management plan
- Cost baseline
- Scope statement
- Work breakdown structure
- Plan updates
- Resource requirements
- Communications plan

Scope Planning

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
</table>
| 1. Project Proposal  
2. Project Charter  
3. Project Intervention Logic | "...is the process of progressively elaborating and documenting the project scope that produces the product of the project." | 1. Scope management plan  
2. Scope statement |

Tools & Techniques

1. Product/Service analysis
2. Cost / benefit/funding analysis
3. Expert judgement
4. Need analysis
5. Collect requirements
Collect Requirements Tools and Techniques

- Interviews
- Focus Groups
- Facilitated Workshops
- Group Creativity Techniques
- Group Decision Making Techniques
- Prototypes
- Observations
- Questionnaires and Surveys
- Context Diagrams
- Document Analysis
- Benchmarking

Context Diagrams

- Product Developers
- Operational standards
- Service Requests
- Program Office
- Algorithms
- Data Exploitation
- Service responses
- Service requests
- Reports
- Management
- Customers

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Classification of Requirements

- Strategic Requirements w.r.t. project
- Stakeholder Requirements
- Solution Requirements
  - Functional Requirements
  - Non-functional Requirements
- Transition Requirements
- Quality Requirements
- Sustainability requirements

Project Scope Statement Purpose

- To provide a general description of the sum of the products and services to be provided by the project
- To develop a common understanding of project scope among stakeholders
- Scope statement should also contain directly or by reference
  - Project Justification
  - Project’s Product
  - Project Deliverables
  - Project Objectives
- May make explicit some exclusions that, based on the audience, would be assumed to be part of the project
### Scope Definition

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Scope Statement</td>
<td>“…subdividing the major project deliverables (as identified in the scope statement) into smaller more manageable components…”</td>
<td>1. Work breakdown structure</td>
</tr>
<tr>
<td>2. Other planning outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Organizational assets</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Tools & Techniques

1. Decomposition

---

### Work Breakdown Structure (WBS)

- "A deliverable oriented grouping of project elements which organizes and defines the total scope of the project.
- Each descending level represents an increasingly detailed definition of a project component.
- Project components may be products or services."
WBS Purpose

• To define:
  – Solution strategy or general approach
  – Implementation tactics
• To support more accurate estimates of project duration and cost than can be made at the project level
• To provide a basis for estimating project resources:
  – Departmental or subcontractor support
  – Vendors and their products
  – Services
  – Any other identifiable resource

Sample WBS
Sample WBS

1. Fecal waste management system
   1.1. Fecal level monitoring system
   1.2. Public awareness campaigns
   1.3. Latrine construction
       1.3.1. Pre-construction preparations
           1.3.1.1. Plan approved by ministry
           1.3.1.2. Engineering specification approved
           1.3.1.3. Ground water study
       1.3.2. Homeowner preparations
       1.3.3. Procurement

Validate your WBS

- All major elements been identified at top level?
- Decomposed into measurable components?
- Lower level(s) items necessary? All inclusive?
- Would stakeholders agree WBS is satisfactory?
- Can elements be scheduled, budgeted, and assigned to a unit that will accept responsibility?
- Too much or too little visibility and control?
- Can status reports be generated at all levels?
Using the WBS to Estimate Cost

• Project manager establishes work requirements by defining the
  – What - Work
  – When - sequence
  – Why - dependencies

• Functional managers estimate cost by determining
  – How - equipment and methods
  – Who - type and level of expertise
  – Where - location, department

Think, Think and Think ...

1. Think through the entire project.
   – Look at dividing high-level deliverables.
2. Think deliverables not activities.
   – What is to be provided/what is required?
   – Think through the production of the deliverables. (What methods? What special processes? What quality requirements? What inspections?)
3. Think with the end in mind.
   – How will this element contribute to the finished deliverable?
   – Do you have the vision of the final product in your mind?
   – What are its constituent parts?
   – How do the pieces work together? What needs to be done?
4. Think performance measurements.
   – What are the gates, intermediate milestones?
5. Think metrics.
   – How will you measure? Know it when you see it? How does the customer define success?)
6. When will you know that you are done?
Project Management Framework

<table>
<thead>
<tr>
<th>Initiating</th>
<th>Planning</th>
<th>Execution</th>
<th>Controlling</th>
<th>Closing</th>
</tr>
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<tbody>
<tr>
<td>Integration</td>
<td>Project Plan Development</td>
<td>Project Plan Execution</td>
<td>Integrated Change Control</td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td>Project Initiation</td>
<td>Scope Planning</td>
<td>Scope Definition</td>
<td>Scope Control</td>
</tr>
<tr>
<td>Time</td>
<td>Develop Project Schedule</td>
<td>Schedule Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>Resource Planning</td>
<td>Cost Estimating</td>
<td>Cost Budgeting</td>
<td>Cost Control</td>
</tr>
<tr>
<td>Quality</td>
<td>Domain Specific</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Resource</td>
<td>Organizational Planning</td>
<td>Staff Acquisition</td>
<td>Team Development</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Develop Stakeholder Engagement Strategy</td>
<td>Communication Planning</td>
<td>Information Distribution</td>
<td>Performance Reporting</td>
</tr>
<tr>
<td>Risk</td>
<td>Risk Management Planning</td>
<td>Risk Identification</td>
<td>Qualitative Risk Analysis</td>
<td>Quantitative Risk Analysis</td>
</tr>
<tr>
<td>Procurement</td>
<td>Procurement Planning</td>
<td>Solicitation Planning</td>
<td>Solicitation Source Selection</td>
<td>Contract Administration</td>
</tr>
</tbody>
</table>

Project Life Cycle

Donor ➞ Feasibility ➞ Upgrade ➞ Transition

Need ➞ Project Life Cycle

Project Identification and Design ➞ Project Set Up ➞ Project Implementation ➞ End of Project Transition
Time Management Roadmap

WBS

Define Activities

Define Resources

Define Duration

Network and Schedule

Tools & Techniques

1. Analogous Estimation
2. Bottom up Estimation
3. Parametric Estimation
4. Scheduling Tool
5. Critical Path Method

Develop Project Schedule

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. WBS</td>
<td>&quot;...determining start and finish dates for project activities and establishing schedule baseline.&quot;</td>
<td>1. Project network diagram</td>
</tr>
<tr>
<td>2. Scope Statement</td>
<td></td>
<td>2. Project schedule</td>
</tr>
<tr>
<td>3. Activity list</td>
<td></td>
<td>3. Schedule baseline</td>
</tr>
<tr>
<td>4. Activity sequence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Activity resource estimate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Activity Duration estimate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Organizational assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. PESTLE-O</td>
<td></td>
<td></td>
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</table>

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Scheduling Techniques

- Activity on node network format
  - Arrows show precedence relationships
  - Nodes show activities
- 3 types of precedence relationships
  - Activity on node 1—successor but no predecessor
  - Activity on node 2—predecessor and successor
  - Activity on node 3—predecessor but no successor

Precedence Diagramming Method
Bottom-up Estimation

- When details are available
- Estimation done for lower level components and aggregated upwards
- Definitive estimates but time consuming

Analogous Estimating

- Done in Initial stage or when scope is not detailed
- Also known as Top Down Estimate
- Established by comparing a similar activity from other project
- Fast but roughly accurate
Parametric Estimating

- Using a parameter as reference
- E.g. meter, No. of units, Square meter etc.
- Based on productivity of the resource
- Example:
  - An activity incorporates laying of 10000 meter of networking cable
  - 1 person can lay 100 meter in a day
  - Then duration = 100 days
  - If 4 resources are available – Dur = 25 days

Forward Pass Definitions

Duration (DU)
- Number of work periods, excluding holidays or other nonworking periods, required to complete the activity; expressed as workdays or workweeks

Forward Pass
- Starting at the beginning (left) of the network develop early start and early finish dates for each task, progressing to end (right-most box) of the network

Early Start Date (ES)
- Earliest possible point in time an activity can start, based on the network logic and any schedule constraints

Early Finish Date (EF)
- Earliest possible point in time an activity can finish
## Backward Pass Definitions

### Backward Pass
- Calculate late start and late finish dates by starting at project completion, using finish times and working backwards

### Late Finish (LF)
- Latest point in time a task may be completed without delaying that activity's successor

### Late Start Date (LS)
- Latest point in time that an activity may begin without delaying that activity's successor

---

## Schedule Purpose

- Converts the project plan to an operating plan that is the basic tool for controlling project activities

Benefits of a realistic schedule?
Benefits of a Realistic Schedule

- Framework for managing critical project activities
- Determines planned start and completion dates
- Identifies activity and task precedence relationships
- Aids project team in defining critical communication content
- Specifies times when staff must be available
- No surprises
- Other?
## Project Management Framework

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## Project Life Cycle

- **Donor** -> **Feasibility** -> **Upgrade** -> **Transition**

- **Project Life Cycle**:
  - **Project Identification and Design** -> **Project Set Up** -> **Project Implementation** -> **End of Project Transition**

[Diagram showing the project life cycle with phases and sub-processes]
Risk is all around us

• To live is to risk dying
• To laugh is to risk appearing the fool
• To hope is to risk despair
• To love is to risk not being loved in return

Reactive strategy

• Don’t worry, I’ll see what to do when it comes.
• I’m always lucky and nothing will happen
• Fire fighting
• Chaos
Is Risk purely a perception?

- For some people taking risks is not necessary, and they avoid risky environments.
- Avoiding risk means getting out of business.
- Intelligent ignorance makes some people more confident to take risk.
- For some people awareness of risk creates fear of failure & so better avoid it.

What is Risk?

- It is the degree of variation in possible outcomes from, an uncertain event or as the variation in actual from expected outcomes.
- Risk is the possibility of loss or injury.
- Risk is the combination of constraints & uncertainties.
**Why Risk Management is necessary?**

**Balanced Approach:**
- Risk management protects from losses & keeps return opportunities open.
- It always better to strike a balance between risks & rewards/ opportunities.
- Art of balancing suggests that different people & different organizations have different tolerances for risks.

---

**The Uncertainty Spectrum**

- **NO INFORMATION** (UNKNOWN UNKNOWNS)
- **PARTIAL INFORMATION** (KNOWN UNKNOWNS)
- **COMPLETE INFORMATION** (KNOWNS)

- **TOTAL UNCERTAINTY**
- **GENERAL UNCERTAINTY**
- **SPECIFIC UNCERTAINTY**
- **TOTAL CERTAINTY**

**SCOPE OF PROJECT RISK MANAGEMENT**
**Risk to whom?**

- Very important question to answer before we decide to manage the risk.

![Diagram showing risk to various stakeholders](image)

**Pure or Static Risks**

- Where the occurrence of the event results in no change in situation of the organization exposed to the risk.

- Most likely it comes as Loss & no possibility of a gain.

  - eg. Fire, Storm, Accident etc.
Speculative Risk or Dynamic Risks

• When the occurrence is either a loss or gain the risk is called Speculative Risk.

• Hence the profit is reward of uncertainty bearings.

Cost of Risk

Direct & Indirect Cost of-risk

Nature of costs

Costs incurred in handling Risk
Cost of Losses
Costs due to existence of Risk

Private Costs
Social Costs
Why take a risk?

- Awareness leads to quantification of risk.
- Every adverse situation if handled properly sows the seeds of future benefits though the proportion may vary.
- If Risk acceptance is co-related with reward objectives then its worth taking the risk.
- Take only these risks, where you can handle the loss
- Adjust risks that are too much to gamble with
- Accept that the price of risk is an occasional failure

Disaster vs. Risk

Disaster
- Known Domain
- Relates to working plan
- Recovery is possible if planned

Risk
- Relates to existence of project
- Recovery is possible if planned
- Uncertain Domain
**Issues, Problems, and Risks**

- **Issues:**
  - Any thing that requires the project manager re-solution

- **Problem:**
  - A thing or an event that has gone wrong and require action to correct it

- **Risk:**
  - An event that may occur and if it occurs will cause profit or loss

- **Crisis:**
  - An unplanned event or possible situation which triggers a real or perceived or possible threat to safety, health or to the environment or to organizational reputation

---

**What is “Risk” in Project Management ?**

- Any event - internal or external which will affect the Project that means time, cost, or quality
  
  - Effect can be negative (Threats) or positive (Opportunity)

- It is a discipline for living with possibility that future events may cause adverse effects.
Risk Management

Physical Control
- Risk Avoidance
- Risk Reduction

Financial Control
- Checking cause / benefits of physical control
- Risk Financing
- Risk Retention

Risk Identification

- It requires
  - Knowledge of organization
  - The type of project & its environment ie social, economical, political etc.
  - Vulnerability to unplanned losses
  - Execution Processes
  - Management Systems
Project Risk Management - Sources

• **External - Unpredictable**
  – Government regulations
  – Natural hazards
  – Acts of God

• **External - Predictable**
  – Cost of money
  – Borrowing rates
  – Raw material availability

• **Internal (Non-technical)**:
  – Labor stoppages
  – Cash flow problems
  – Safety Issues

• **Internal (Technical)**:
  – Changes in technology
  – Changes in manufacturing methods
  – Design Issues
  – Operation and Maintenance issues

• **Legal**:
  – Patent laws
  – Performance failure including sub-vendors

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Organization’s Perception about Risks

- Risk is related as a threat for project success.
- If risk is accepted then what would be the reward?
- Risks could be opportunities for future benefits.
- Fast track schedules can possibly overrun the risks.

## Risk Management Planning

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
</table>
| 1. Project Charter"  
3. Defined Roles and Responsibilities  
6. WBS  
7. Project Environment (PESTEL-O) | It describes how risk identification, qualitative & quantitative analysis, response planning, monitoring and control will be structured and performed during project life cycle. | 1. Risk Management Plan |

### Tools & Techniques

1. Planning Meetings

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**Risk Management Plan - Output Details**

- **Methodology:**
  Defines the approaches, tools and data sources that may be used in Risk Management.
- **Roles and Responsibilities:**
  Defines the lead, support and RM team membership for each type of action in RM.
- **Budgeting:**
  Establishes budget for RM plan.
- **Timings:**
  Defines how often the RM process will be performed and results should be developed to affect the position.

**Risk Management Plan - Details**

- **Scoring and Interpretation:**
  Decides the type and timing of Qualitative & Quantitative Risk Analysis methods must be devised in advance to ensure consistency.
- **Reporting formats:**
  Contains formats of risk response plan for documentation, communication etc.
- **Tracking:**
  Documents for risk activities, future needs, and lessons learned.
1. Risk Management Plan
2. Project Planning Outputs.
3. Risk Categories.
4. Organizational assets
5. Project Environment (PESTEL-O)

It involves determining which risks might affect the project and documenting their characteristics.

1. Risks
2. Triggers
3. Input to other Processes

---

**Tools & Techniques**

1. Documentation Reviews
2. Information Gathering Techniques.
3. Checklists.
4. Assumption analysis.
5. Diagramming Techniques

---

**Risk Identification**

<table>
<thead>
<tr>
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<th>Process</th>
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<tbody>
<tr>
<td>1. Risk Management Plan</td>
<td>It involves determining which risks might affect the project and documenting their characteristics.</td>
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<td>2. Project Planning Outputs.</td>
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<td>3. Risk Categories.</td>
<td></td>
<td>3. Input to other Processes</td>
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<td>4. Organizational assets</td>
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<td></td>
</tr>
<tr>
<td>5. Project Environment (PESTEL-O)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Tools and Techniques**

- **Documentation Reviews**
- **Information Gathering Techniques**
- **Checklist Analysis**
- **Assumption Analysis**
- **Diagramming Techniques**
- **SWOT Analysis**
- **Expert Judgment**

**Brainstorming**
**Delphi Technique**
**Interviewing**
**Root Cause analysis**

- **Cause and Effect Diagram**
- **System or Process Flow Chart**
- **Influence Diagram**
### Qualitative Risk Analysis

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
</table>
| 1. Risk Management Plan  
2. Identified Risks.  
3. Project Status.  
4. Project Type.  
5. Data Precision.  
6. Scales of probability and impact  
7. Project Environment (PESTEL-O) | It is the process of assessing the impact and likelihood of identified risks. This process prioritizes risks according to their potential effect on project objectives. | 1. Overall risk ranking for the project.  
2. List of prioritized risks  
3. List of risks for additional analysis and management.  
4. Trends in qualitative risk analysis results. |

### Tools & Techniques
1. Risk Probability and Impact  
2. Probability Impact rating matrix  
3. Project assumption testing  
4. Data precision ranking

### Rating Impacts for a Risk

<table>
<thead>
<tr>
<th>Project Objective</th>
<th>Very Low .05</th>
<th>Low .1</th>
<th>Moderate .2</th>
<th>High .4</th>
<th>Very High .8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Insignificant Cost Increase</td>
<td>&lt;5% Cost Increase</td>
<td>5–10% Cost Increase</td>
<td>10–20% Cost Increase</td>
<td>&gt;20% Cost Increase</td>
</tr>
<tr>
<td>Schedule</td>
<td>Insignificant Schedule Slippage</td>
<td>Schedule Slippage &lt;5%</td>
<td>Overall Project Slippage 5–10%</td>
<td>Overall Project Slippage 10–20%</td>
<td>Overall Project Slippage &gt;20%</td>
</tr>
<tr>
<td>Scope</td>
<td>Scope Decrease Barely Noticeable</td>
<td>Minor Areas of Scope Are Affected</td>
<td>Major Areas of Scope Are Affected</td>
<td>Scope Reduction Unacceptable to the Client</td>
<td>Project End Item Is Effectively Useless</td>
</tr>
<tr>
<td>Quality</td>
<td>Quality Degradation Barely Noticeable</td>
<td>Only Very Demanding Applications Are Affected</td>
<td>Quality Reduction Requires Client Approval</td>
<td>Quality Reduction Unacceptable to the Client</td>
<td>Project End Item Is Effectively Unusable</td>
</tr>
</tbody>
</table>

The impacts on project objectives can be assessed on a scale from Very Low to Very High or on a numerical scale. The numerical (cardinal) scale shown here is non-linear, indicating that the organization wishes specifically to avoid risks with high and very-high impact.
### Quantitative Risk Analysis

<table>
<thead>
<tr>
<th>Input</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Risk Management Plan</td>
<td>It aims to analyze numerically the probability of each risk and its consequences on project objectives, as well as the extent of overall project risk.</td>
<td>1. Prioritized list of quantified Risks</td>
</tr>
<tr>
<td>2. Identified risks.</td>
<td></td>
<td>2. Probabilistic analysis of the project.</td>
</tr>
<tr>
<td>3. List of risks for additional analysis.</td>
<td></td>
<td>3. Probability of achieving cost and time objectives.</td>
</tr>
<tr>
<td>4. Historical Information.</td>
<td></td>
<td>4. Trends in quantitative risk analysis results</td>
</tr>
<tr>
<td>5. Expert Judgments.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Other Planning outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Project Environment (PESTEL-O)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Tools & Techniques

1. Interviewing
2. Sensitivity Analysis
3. Decision tree analysis.
4. Simulations

### Risk Response Planning

<table>
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<tbody>
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<td>1. Risk Response Plan</td>
</tr>
<tr>
<td>2. List of prioritized risks</td>
<td></td>
<td>2. Residual Risks</td>
</tr>
<tr>
<td>3. Risk ranking of the project</td>
<td></td>
<td>3. Secondary risks</td>
</tr>
<tr>
<td>4. Prioritized list of quantified risks.</td>
<td></td>
<td>4. Contractual agreements</td>
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<tr>
<td>5. Probabilistic analysis of the project.</td>
<td></td>
<td>5. Contingency reserve account needed</td>
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<tr>
<td>6. Probability of achieving the cost and time objectives.</td>
<td></td>
<td>6. Inputs to other processes.</td>
</tr>
<tr>
<td>7. List of potential responses</td>
<td></td>
<td>7. Inputs to revised project plan.</td>
</tr>
<tr>
<td>8. Risk thresholds.</td>
<td></td>
<td></td>
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<tr>
<td>9. Risk Owners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Trends in qualitative and quantitative risk analysis</td>
<td></td>
<td></td>
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</tbody>
</table>

#### Tools & Techniques

1. Strategies for Negative Risks or Threats
2. Strategies for Positive risks or Opportunities
### Strategies for Negative Risks or Threats

- **Avoid**
  - Eliminating the threats caused by adverse risks by changing the project plan

- **Transfer**
  - Shifting the negative impact of a threat along with response of ownership to third party

- **Mitigate**
  - Reduction in the probability and/or impact of an adverse risk event to an acceptable threshold

- **Accept**
  - A strategy adopted because project team has decided not change the project management plan to deal with a risk

### Strategies for Positive risks or Opportunities

- **Exploit**
  - To ensure that opportunity is realized.

- **Share**
  - Allocating ownership to a third party who is best able to capture the opportunity for the benefit of the project.

- **Enhance**
  - Modifies the ‘Size’ of an opportunity by increasing probability and/or positive impacts

- **Accept**
  - Willing to take the benefit but not actively pursuing
Risk Register Updates

- Agreed upon Responses
- Triggers
- Contingency Reserves and Plans
- Fallback Plan
- Residual Risks
- Secondary Risks

Risk Control

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
</table>

Tools & Techniques

1. Workarounds<br>2. Additional risk response development
PRINCIPLES OF PROJECT MANAGEMENT

Project Fire Triangle

A Bad Project
Nothing can ever repair or put right the effects of casualty

PROJECT COST MANAGEMENT
**Cost Management Plan**

- Level of accuracy / Precision
- Units of measure
- Organizational procedure links
- Control thresholds
- Reporting formats
- Process descriptions
- Rules of performance measurement

**Resource Planning**

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
</table>
| 1. WBS  
2. Scope statement  
3. Resource pool description  
4. Organizational assets and policies  
5. Project Environment (PESTEL-O) | "... determining what physical resources (people, equipment, materials) and what quantities of each should be used to perform project activities." | 1. Resource requirements |

**Tools & Techniques**

1. Expert judgement  
2. Alternatives identification
### Cost Estimating

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. WBS</td>
<td>&quot;... developing an approximation (estimation of the cost) of the</td>
<td>1. Cost estimates</td>
</tr>
<tr>
<td>2. Resource requirements</td>
<td>resources needed to complete project activities).&quot;</td>
<td>2. Supporting detail</td>
</tr>
<tr>
<td>4. Activity duration estimates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Historical information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Chart of accounts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Risks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tools & Techniques**

1. Analogous estimating  
2. Parametric modeling  
3. Bottom-up estimating  
4. Computerized tools  
5. Other cost estimating methods

---

### Cost Budgeting

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cost estimates</td>
<td>&quot;... allocating the overall cost estimates to individual work</td>
<td>1. Cost baseline</td>
</tr>
<tr>
<td>2. WBS</td>
<td>items in order to establish a cost baseline for measuring project</td>
<td></td>
</tr>
<tr>
<td>3. Project schedule</td>
<td>performance.&quot;</td>
<td></td>
</tr>
<tr>
<td>4. Risk management plan</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tools & Techniques**

1. Cost budgeting tools and techniques.
Components of Budget

- Comprehensive budget
  - Direct costs
  - Indirect costs
- Detailed budget
  - Transaction costs
  - Shared services
- Timing (Schedule baseline)
- Life of budget (Multi-year budget)
- Annual project budgets
EARNED VALUE MANAGEMENT

Learning Objectives

• Earned Value
• Performance Measurement Analysis
• Forecasting
Earned Value

• A method for measuring project performance

• Earned Value is the value (usually expressed in monetary terms) of the work accomplished up to a point based upon the planned (or budgeted) value for that work

Earned Value Terminology

Basic Elements of EVM

<table>
<thead>
<tr>
<th>Data Element</th>
<th>Old Term</th>
<th>Acronym</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned work (Planned Value)</td>
<td>Budgeted Cost for Work Scheduled (BCWS)</td>
<td>PV</td>
</tr>
<tr>
<td>Earned work (Earned Value)</td>
<td>Budgeted Cost for Work Performed (BCWP)</td>
<td>EV</td>
</tr>
<tr>
<td>Actuals (Actual Cost)</td>
<td>Actual Cost of Work Performed</td>
<td>AC</td>
</tr>
<tr>
<td>Authorized Work (Budget At Completion)</td>
<td>Budget At Completion</td>
<td>BAC</td>
</tr>
</tbody>
</table>
A project manager is working on a project comprising of creation of 4 modules. The vendor has committed the following:

- Cost of 1 module will be $ 10,000
- Time required to complete 1 module shall be 1 week

Hence the project will require 4 weeks to complete and total cost would be $ 40,000

Hence

- BAC = $ 40,000

The project manager takes the status at the end of 1st week and observes the following:

- 80% of one module has been complete
- Actual expenses for the above work is 12,000 USD

Hence

- Planned Value PV = $ 10,000
- Actual Cost AC = $ 12,000
- Earned Value EV = $ 8,000
• Performance Measurement Analysis
  – Schedule Variance \( SV = EV - PV \)
    \[
    = 8000 - 10000 = (-) 2000
    \]
  – Cost Variance \( CV = EV - AC \)
    \[
    = 8000 - 12000 = (-) 4000
    \]

• Conclusions
  – Negative Schedule variance indicates that the project is behind schedule
  – Negative Cost Variance indicates that expenses are more than planned
  – Zero variance indicates that project is performing as per plan
  – Positive variance indicates that project performance is better than planned

Example

• Performance Measurement Analysis
  – Schedule Performance Index \( SPI = EV / PV \)
    \[
    = 8000 / 10000 = 0.8
    \]
  – Cost Performance Index \( CPI = EV / AC \)
    \[
    = 8000 / 12000 = 0.667
    \]

• Conclusions
  – \( SPI < 1 \) indicates that the project is behind schedule
  – \( CPI < 1 \) indicates that expenses are more than planned
  – Performance Index = 1 indicates that project is performing as per plan
  – Performance Index > 1 indicates that project performance is better than planned
• Forecasting
  – ETC is the funds required to complete the remaining deliverables
  – EAC is the total funds required to complete the project
  – EAC = AC + ETC

• Variance at Completion
  – VAC = BAC - EAC

Example

• Future performance will be as per plan
  – ETC = BAC – EV
  – EAC = AC + (BAC – EV)

• Future performance will be same as current performance
  – EAC = BAC / CPI
  – ETC = EAC – AC  **OR**  ETC = (BAC - EV) / CPI

• Forecasting considering both SPI and CPI
  – ETC = (BAC – EV) / (CPI x SPI)
  – EAC = AC + ETC
To Complete Performance Index

- Expected performance in future
- TCPI = (Work remaining) / (funds remaining)
  \[ \text{TCPI} = \frac{\text{BAC} - \text{EV}}{\text{BAC} - \text{AC}} \]

Monitoring performance

- Perfect performance for an earned value project is considered to be at 1.0 level on both the cost and scheduling side.
- Perfect schedule performance to a project baseline results in a dollar’s worth of earned value being achieved for every dollar originally scheduled
**CPI vs. SPI**
- CPI performance below 1.0 is often non-recoverable by the project team
- SPI eventually drifts back to the full 1.0 position when all project tasks have been completed
- SPI becomes insignificant as project nears completion

---

**Monitored performance**

**Earned Value Terminology**
Plan and Estimates
- Task A = $1000 (to be completed by 1st July)
- Task B = $900 (to be completed by 1st July)
- Task C = $1000 (to be 70% completed by 1st July)
- Task D = $1000 (to be 15% completed by 1st July)

Status as on 1st July
- Task A = 100% complete; AC = $950
- Task B = 75% complete; AC = $725
- Task C = 80% complete; AC = $830
- Task D = Yet to start; AC = $0
- TOTAL ACWP = $2505

Calculate BAC, PV, EV, AC, CV, SV, SPI, CPI, EAC and ETC

COMMUNICATION MANAGEMENT
### Project Management Framework

<table>
<thead>
<tr>
<th>Category</th>
<th>Initiating</th>
<th>Planning</th>
<th>Execution</th>
<th>Controlling</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Integration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>Project Initiation</td>
<td>Scope Planning</td>
<td>Project Plan Development</td>
<td>Project Plan Execution</td>
<td>Integrated Change Control</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>Develop Project Schedule</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td>Resource Planning</td>
<td>Cost Estimating</td>
<td>Cost Budgeting</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Quality</strong></td>
<td>Domain Specific</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Human Resource</strong></td>
<td>Organizational Planning</td>
<td>Staff Acquisition</td>
<td>Team Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>Develop Stakeholder Engagement Strategy</td>
<td>Communication Planning</td>
<td>Information Distribution</td>
<td>Performance Reporting</td>
<td>Administrative Closure</td>
</tr>
<tr>
<td><strong>Procurement</strong></td>
<td>Procurement Planning</td>
<td>Solicitation Planning</td>
<td>Solicitation</td>
<td>Source Selection</td>
<td>Contract Administration</td>
</tr>
</tbody>
</table>

### Project Life Cycle

- **Donor** → **Feasibility** → **Upgrade** → **Transition**
- **Need** → **Project Life Cycle**
- **Project Identification and Design** → **Project Set Up** → **Project Implementation** → **End of Project Transition**

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“Give thy Ear to all

but few a Voice.”

Shakespeare

Purpose of Communication Planning

• Who needs what information?

• When they will need it?

• How it will be given?

• Who will give it?
## Communication Planning

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Communications requirement</td>
<td>...Involves determining the information and communication needs of the stakeholders</td>
<td>1. Communication management plan</td>
</tr>
<tr>
<td>2. Communications technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Constraints</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Assumptions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tools & Techniques**

1. Stakeholder analysis

---

### What communication aims at--

- To be understood
  
  *(conveying exactly what you mean)*
- To understand others
  
  *(their exact meanings and intentions)*
- To gain acceptance for yourself and/or your ideas
  
  *(by developing mutual trust)*
- To produce action or change
  
  *(by making others understand what, why and when something is expected, and how to do it)*
Project communication refers to an exchange or sharing of messages and information among the project manager, internal stakeholders, and external stakeholders.

The intents and contents of messages can be of various types which include:
- decisions
- informative
- persuasive
- integrative
- records
- statistical
- research
- formal/informal

### Types of Project Communications

1. Communication skills
2. Information retrieval system
3. Information distribution methods

### Tools & Techniques
- Communication skills
- Information retrieval system
- Information distribution methods

### Information Distribution

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Work results</td>
<td>...Involves making needed information available project stakeholders in a timely manner.</td>
<td>1. Project records</td>
</tr>
<tr>
<td>2. Communication management plan</td>
<td></td>
<td>2. Project reports</td>
</tr>
<tr>
<td>3. Project plan</td>
<td></td>
<td>3. Project Presentations</td>
</tr>
</tbody>
</table>

www.pmsoft.com
Successful PM decisions must pass through the bottlenecks of barriers to communications prior to achieving desired results.

**Bottlenecks in Communication**

Two entities exist when a communication is initiated:
- One: the **sender**
- Other: the **topic**

When the focus is on the sender, communication is ‘subjective’
When the focus is on the topic, communication is ‘objective’

**Objective communication is always effective.**
Leading & Managing

- Managing
  - Managing is primarily concerned with ‘Consistently producing key results expected by stakeholders’

- Leading
  - Establishing direction
  - Aligning people
  - Motivating and Inspiring

Negotiating & Problem Solving

- Negotiating involves conferring with others to come to terms with them or reach an agreement

- Problem definition requires distinguishing between causes and symptoms

- Problem solving involves a combination problem definition and decision making

- Influencing the organization involves the ability to “Get things done”
Characteristics of Effective Communication

• Communication has to be honest, open and continuous because the relationship can only thrive in environment of trust and mutual respect.

• Collocating the project team serves to facilitate the face to face communication process.
## Organization Planning

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project interfaces</td>
<td>...Involves identifying, documenting and assigning project roles, responsibilities and reporting relationships</td>
<td>1. Roles and responsibility assignment</td>
</tr>
<tr>
<td>2. Staffing requirement</td>
<td></td>
<td>2. Staffing management plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Organization chart</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Stakeholder analysis</td>
</tr>
<tr>
<td><strong>Tools &amp; Techniques</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Templates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Organizational theory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Human resource practices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Stakeholder analysis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Staff Acquisition

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Staffing management plan</td>
<td>...Involves getting the needed human resources (individual or groups) assigned to and working on the project</td>
<td>1. Project staff assigned</td>
</tr>
<tr>
<td>2. Staffing pool description</td>
<td></td>
<td>2. Project team directory</td>
</tr>
<tr>
<td>3. Recruitment practices</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tools &amp; Techniques</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Negotiations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Pre assignment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Procurement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Team Development**

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project staff</td>
<td>...includes enhancing the ability of stakeholders to contribute as individuals as well as enhancing the ability of team to function as a team</td>
<td>1. Project records</td>
</tr>
<tr>
<td>2. Project plan</td>
<td></td>
<td>2. Project reports</td>
</tr>
<tr>
<td>3. Staffing management plan</td>
<td></td>
<td>3. Project Presentations</td>
</tr>
<tr>
<td>4. Performance reports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. External feedback</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tools & Techniques**

1. Team building activities
2. General management skills
3. Reward and recognition system
4. Collocation
5. Training

---

**Herzberg / Maslow**

- **Physiological Needs**
  - Company Policy and Administration
  - Supervision
  - Salary
  - Interpersonal Relations
  - Working Conditions

- **Safety Needs**
  - Self Actualization

- **Social Needs**
  - Job Satisfiers

- **Ego Needs**
  - Achievement
  - Recognition for Achievement
  - Work Itself
  - Responsibility
  - Advancement

- **Self Actualization**

---

PMSoft
**What is Conflict?**

- It is a behavior of an individual, a group, or an organization which impedes or restricts (at least temporarily) another party from attaining desired goals.
  
  Thamhain and Wilemon

- Opposition resulting from Incompatible expectations.....??

<table>
<thead>
<tr>
<th>Traditional View</th>
<th>Contemporary View</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Caused by Trouble-Makers</td>
<td>• Inevitable between Humans</td>
</tr>
<tr>
<td>• Bad</td>
<td>• Often Beneficial</td>
</tr>
<tr>
<td>• Should Be Avoided</td>
<td>• Natural Result of Change</td>
</tr>
<tr>
<td>• Must be Suppressed</td>
<td>• Can &amp; Should Be Managed</td>
</tr>
</tbody>
</table>

PMSsoft
The most common types of conflicts occur due to

- Manpower resources
- Equipment & facilities
- Capital expenditure
- Costs
- Technical opinions
- Priorities
- Administrative Procedures
- Scheduling
- Responsibilities
- Personality clashes

Conditions Leading to Conflict

1. Ambiguous Jurisdictions
2. Conflict of Interest
3. Communication Barriers
4. Dependence on One Party
5. Differentiation in Organization
6. Association of the Parties
7. Need for Consensus
8. Behavior Regulations
9. Unresolved Prior Conflicts
### Ingredients of Personality

<table>
<thead>
<tr>
<th>Invisible factors</th>
<th>Visible Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Self Image</td>
<td>• Actions</td>
</tr>
<tr>
<td>• Beliefs/Values</td>
<td>• Voice</td>
</tr>
<tr>
<td>•Capabilities</td>
<td>• Words</td>
</tr>
<tr>
<td>• Thought Process</td>
<td>• People’s Opinion</td>
</tr>
<tr>
<td>• Emotions</td>
<td>• Physical Appearance</td>
</tr>
</tbody>
</table>

### To prevent / handling conflicts ask...

- What are project objectives?
- Why do conflicts occur?
- How to resolve conflicts?
- Can we do the preliminary analysis?
Effective project manager

- Knows the organization
- Building Trust
- Listens with empathy than evaluation
- Good relations with disputing parties
- Facilitates communication amongst disputing parties
- Willing to accept and respect people as they are
- He is at peace with imperfection.

Interpersonal Influence

- **Formal authority** :
  - the ability to gain support because project personnel perceive the project manager as being officially empowered to issue orders.

- **Reward power** :
  - the ability to gain support because project personnel perceive the project manager as capable of directly or indirectly dispensing valued organizational rewards (i.e. salary, promotion, bonus, future work assignments.)
Penalty power:
- the ability to gain support because the project personnel perceive the project manager as capable of directly or indirectly dispensing penalties that they wish to avoid. Penalty power usually derives from the same source as reward power, with one being a necessary condition for the other.

Expert power:
- the ability to gain support because personnel perceive the project manager as possessing special knowledge or expertise (which functional personnel consider as important).

Referent power:
- the ability to gain support because project personnel feel personally attracted to the project manager or his project.
Philosophy of PM by Objectives

- Is it proactive?
- Is the result clearly specified?
- Does it focus on change to improve?

Conflict Management

Stages in Conflict Management
- Facing Conflict
- Understanding Emotions
- Establishing Communications
- Conflict Resolution
- Understanding your Choices
- Interpersonal Influences
**Conflict Handling Modes**

- **Withdrawal:**
  - Retreating or withdrawing from an actual or potential disagreements

- **Smoothing:**
  - De-emphasizing or avoiding areas of difference and emphasizing on areas of agreement

**Conflict Handling Modes (Contd.)**

- **Compromising:**
  - Bargaining or searching for solutions that bring some degree of satisfaction to the parties in dispute

- **Forcing:**
  - Exerting one’s point at the potential expense of another (Win/Lose)
• **Confrontation** :
  – Facing the conflicts directly which involves problem solving approach where affected parties work thru their disagreement

Conflict Handling Modes (Contd.)

Conflict Management

1. Withdrawal
2. Smoothing
3. Compromising
4. Forcing
5. Confrontation

- Temporary Only, Fails to Resolve
- Provides Resolutions

Project Manager Must Carefully Select the Appropriate Mode.
**Living In Freedom and Enquiry**

**DYNAMISM IN ACTION,**

**CLARITY IN THINKING,**

**PEACE IN MIND**

_A. Parthasarathy_

---

<table>
<thead>
<tr>
<th>Force</th>
<th>Personal Goals</th>
<th>Relationships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smooth</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Withdraw</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Compromise</td>
<td>Win-Lose</td>
<td>Low</td>
</tr>
<tr>
<td>Confrontation</td>
<td>Lose-Leave</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Compromise</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Integrative</td>
<td>High</td>
</tr>
</tbody>
</table>

---

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# Major Conflict Source & Recommendations for Minimizing Dysfunctional Consequences

<table>
<thead>
<tr>
<th>Project Life Cycle Phase</th>
<th>Conflict Source</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project</td>
<td>Priorities</td>
<td>Clearly defined plans. Joint decision-making and/or consultation with affected parties.</td>
</tr>
<tr>
<td></td>
<td>Procedures</td>
<td>Develop detailed administrative operating procedures to be followed in conduct of project. Secure approval from key administrators. Develop statement of understanding or character.</td>
</tr>
<tr>
<td></td>
<td>Schedules</td>
<td>Develop schedule commitments in advance of actual project commencement. Forecast other departmental priorities and possible impact on project</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Life Cycle Phase</th>
<th>Conflict Source</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildup phase</td>
<td>Priorities</td>
<td>Provide effective feedback to support areas on forecasted project plans and needs via status review sessions.</td>
</tr>
<tr>
<td></td>
<td>Schedules</td>
<td>Schedule work breakdown packages (project subunits) in cooperation with functional groups.</td>
</tr>
<tr>
<td></td>
<td>Procedures</td>
<td>Contingency planning on key administrative issues.</td>
</tr>
</tbody>
</table>
## Major Conflict Source & Recommendations for Minimizing Dysfunctional Consequences

<table>
<thead>
<tr>
<th>Project Life Cycle Phase</th>
<th>Conflict Source</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main program</td>
<td>Schedules</td>
<td>Continually monitor work in progress. Communicate results to affected parties. Forecast problems and consider alternatives. Identify potential “trouble spots” needing closer surveillance.</td>
</tr>
<tr>
<td></td>
<td>Technical</td>
<td>Early resolution of technical problems. Communication of schedule and budget restraints to technical personnel. Emphasize adequate, early technical testing. Facilitate early agreement on final designs.</td>
</tr>
<tr>
<td></td>
<td>Manpower</td>
<td>Forecast and communicate manpower requirements early.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Life Cycle Phase</th>
<th>Conflict Source</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phaseout</td>
<td>Manpower</td>
<td>Establish manpower requirements and priorities with functional and staff groups.</td>
</tr>
<tr>
<td></td>
<td>Schedules</td>
<td>Close schedule monitoring in project life cycle. Consider reallocation of available manpower to critical project areas prone to schedule slippages. Attain prompt resolution of technical issues which may impact schedules.</td>
</tr>
</tbody>
</table>
## Major Conflict Source & Recommendations for Minimizing Dysfunctional Consequences

<table>
<thead>
<tr>
<th>Project Life Cycle Phase</th>
<th>Conflict Source</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Personality and manpower</td>
<td>Develop plans for reallocation of manpower upon project completion. Maintain harmonious working relationships with project team and support groups. Try to loosen up “high-stress” environment.</td>
</tr>
</tbody>
</table>
• Upon Completion, You will be able to ...
  – Describe the purposes of the executing processes
  – Identify the inputs and outputs of its core processes
  – List the major tools and techniques
### Purpose

- To coordinate, integrate, and manage all resources  
  **Why?**
- in order to achieve the project objectives  
  **How?**
- by carrying out the letter and intent of the project plan  
  **While**
- responding to change and mitigating risks

### Project Plan Execution

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
</table>
| 1. Project plan  
2. Supporting detail  
3. Organizational policies  
4. Corrective action  
5. Preventive action | “… the primary process for carrying out the project plan.” | 1. Work results  
2. Change request |

<table>
<thead>
<tr>
<th>Tools &amp; Techniques</th>
<th></th>
</tr>
</thead>
</table>
| 1. General management skills  
2. Product skills and knowledge  
3. Work authorization system  
4. Status review meetings  
5. Project management information system  
6. Organizational procedures |
Sample Execution Activities

- Managing work results and requests for change
- Using tools and techniques in project plan implementation
- Building effective relationships with vendors and project team members
- Choosing from potential sellers
- Distributing status information in time for stakeholders to act
- Other?

Controlling Projects

- Upon Completion, you will be able to ...
  - Describe the purposes of the controlling processes
  - Identify the inputs and outputs of the core controlling processes
  - List and define the major tools and Techniques
To keep the project on track in order to achieve its objectives as outlined in the project plan by:

- Monitoring and reporting variances
- Controlling scope changes
- Controlling schedule changes
- Controlling costs
- Controlling quality
- Responding to risks
### Performance Reporting

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project plan</td>
<td>“… collecting and disseminating performance performance. This includes status reporting, progress measurements, and forecasting.”</td>
<td>1. Performance reports</td>
</tr>
<tr>
<td>2. Work results</td>
<td></td>
<td>2. Change requests</td>
</tr>
<tr>
<td>3. Other project records</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tools & Techniques**

1. Performance reviews
2. Variance analysis
3. Trend analysis
4. Earned value analysis
5. Information distribution systems

### Integrated Change Control

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project plan</td>
<td>“overall change control is concerned with : a. Influencing the factors which create change to ensure that changes are beneficial, b. Determining that a change has occurred, and c. Managing the actual change when and as they occur.”</td>
<td>1. Project plan updates</td>
</tr>
<tr>
<td>2. Performance reports</td>
<td></td>
<td>2. Corrective action</td>
</tr>
<tr>
<td>3. Change requests</td>
<td></td>
<td>3. Lesson learned</td>
</tr>
</tbody>
</table>

**Tools & Techniques**

1. Change control system
2. Configuration management
3. Performance management
4. Additional Planning
5. Project management information systems
Controlling Activities

- Reporting status versus plan and forecasting
- Responding to changes in risk
- Completing and settling the contract, including resolving of any open items
- Identifying and reporting schedule slips
- Determining whether schedule updates require plan modifications
- Other?

Scope Control

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
</table>
| 1. Work breakdown structure  
2. Performance reports  
3. Change requests  
4. Scope management plan | “is concerned with influencing the factor that create scope changes to ensure that scope changes are agreed upon, determining that a scope change has occurred, and managing the actual changes when and if they occur” | 1. Scope changes  
2. Corrective actions  
3. Lessons learned  
4. Adjusted baseline |

Tools & Techniques

1. Scope change control system  
2. Performance measurement  
3. Additional planning

www.pmsoft.com
**Scope Verification**

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Work results</td>
<td>&quot;is the process of obtaining formal acceptance of the project scope by the stakeholders&quot;</td>
<td>1. Formal acceptance</td>
</tr>
<tr>
<td>2. Product documentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Work breakdown structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Scope statement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Project plan</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tools & Techniques**

1. Inspection

**Schedule Control**

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project schedule</td>
<td>&quot;is concerned with influencing the factor that create schedule changes to ensure that schedule changes are agreed upon, determining that a schedule change has occurred, and managing the actual changes when and if they occur&quot;</td>
<td>1. Schedule updates</td>
</tr>
<tr>
<td>2. Performance reports</td>
<td></td>
<td>2. Corrective action</td>
</tr>
<tr>
<td>3. Change requests</td>
<td></td>
<td>3. Lessons learned</td>
</tr>
<tr>
<td>4. Schedule management plan</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tools & Techniques**

1. Schedule change control system
2. Performance measurement
3. Additional planning
4. Project management software
5. Variance analysis
### Cost Control

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
</table>
| 1. Cost baseline  
2. Performance reports  
3. Change requests  
4. Cost management plan | “is concerned with influencing the factor that create changes to the cost baseline to ensure that changes are agreed upon, determining that cost baseline has changed, and managing the actual changes when and if they occur” | 1. Revised cost estimates  
2. Budget updates  
3. Corrective action  
4. Estimate at completion  
5. Project closeout  
6. Lessons learned |

| Tools & Techniques | 1. Cost change control system  
2. Performance measurement  
3. Earned value management  
4. Additional planning  
5. Project management software |

### PROCUREMENT MANAGEMENT
### Procurement Planning

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Scope statement</td>
<td>&quot;is the process of identifying which project needs to be best met by procuring products or services outside the project organization and should be accomplished during the scope definition effort&quot;</td>
<td>1. Procurement management plan</td>
</tr>
<tr>
<td>2. Product description</td>
<td></td>
<td>2. Statement of work</td>
</tr>
<tr>
<td>3. Procurement resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Market conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Other planning outputs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tools & Techniques**

1. Make or buy analysis
2. Expert judgement
3. Contract type selection

### Contract Types - Fixed Price / Lump-sum

- Involve a fixed total price for well defined scope
- Buyer is aware of the total price at the start of the project
- Types
  - Firm Fixed Price Contracts (FFP)
  - Fixed Price Incentive Fee Contracts (FPIF)
  - Fixed Price With Economic Price Adjustment Contracts (FP-EPA)
Contract Types - Cost Reimbursable contracts

- Actual costs are reimbursed to the seller + a fee representing the profit
- Used when
  - Scope is not precisely defined
  - Project is associated with risks and uncertainties

Types
- Cost Plus Fixed Fee (CPFF)
  - Fee does not vary with cost
  - E.g. $100,000 + $10,000

- Cost Plus Incentive Fee (CPIF)
  - Example:
    - Cost = $200,000; Fee = $20,000
    - If there is saving in the cost it is shared as 80:20 (i.e. 80% to buyer and 20% to seller). If the project completes in $180,000 what is the amount that the seller will receive over and above cost reimbursed?

- Cost Plus Award Fee (CPAF)
**Contract Types – Time and Material (T & M)**

- Can grow as cost reimbursable contracts
- Resemble fixed price type by unit rates
- Generally used in support and operations

---

**Solicitation Planning**

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Procurement management plan</td>
<td>&quot;involves preparing the documents needed to support solicitation&quot;</td>
<td>1. Procurement documents</td>
</tr>
<tr>
<td>2. Statement of work</td>
<td></td>
<td>2. Evaluation criteria</td>
</tr>
<tr>
<td>3. Other planning outputs</td>
<td></td>
<td>3. Statement of work updates</td>
</tr>
</tbody>
</table>

**Tools & Techniques**

1. Standard forms
2. Expert judgement
### Solicitation

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.  Procurement documents</td>
<td>&quot;involves obtaining responses from prospective sellers on how project needs can be met&quot;</td>
<td>1.  Proposals/Bids</td>
</tr>
<tr>
<td>2.  Qualified sellers list</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tools & Techniques**

1. Bidder conferences
2. Advertising

---

### Source Selection

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.  Proposals</td>
<td>&quot;involves the receipt of bids or proposals and the application of the evaluation criteria to select a provider&quot;</td>
<td>1.  Contract</td>
</tr>
<tr>
<td>2.  Evaluation criteria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.  Organizational policies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tools & Techniques**

1. Contract negotiation
2. Weighting system
3. Screening system
4. Independent estimates
PRINCIPLES OF PROJECT MANAGEMENT

Contract Administration

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Contract</td>
<td>&quot;is the process of ensuring that the seller’s performance meets contractual requirements&quot;</td>
<td>1. Correspondence</td>
</tr>
<tr>
<td>2. Work results</td>
<td></td>
<td>2. Contract changes</td>
</tr>
<tr>
<td>3. Change requests</td>
<td></td>
<td>3. Payment requests</td>
</tr>
<tr>
<td>4. Seller invoices</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tools & Techniques

1. Contract change control system
2. Performance reporting
3. Payment system

Contract Closeout

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Contract documentation</td>
<td>&quot;is similar to administrative closure in that it involves both product verification and administrative closeout&quot;</td>
<td>1. Contract file</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Formal acceptance and closure</td>
</tr>
</tbody>
</table>

Tools & Techniques

1. Procurement audits
• Upon completion, you will be able to ...
  – Describe the purposes of closing processes
  – Identify the inputs and outputs of the core processes
  – List the major tools and techniques
Purpose

Formalizing acceptance of the project and bringing it to an orderly and by:

- Closing the contract
- Achieving administrative closure

Administrative Closure

<table>
<thead>
<tr>
<th>Input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Performance measurement documentation</td>
<td>&quot;... verifying and documenting project results to formalize acceptance of the product by the sponsor, client or customer.&quot;</td>
<td>1. Product archives</td>
</tr>
<tr>
<td>2. Documentation of the product of the project.</td>
<td></td>
<td>2. Project Closure</td>
</tr>
<tr>
<td>3. Other project records</td>
<td></td>
<td>3. Lessons learned</td>
</tr>
</tbody>
</table>

Tools & Techniques

- 1. Performance reporting tools and techniques
- 2. Project Reports
- 3. Project Presentation.
Sample Closing Activities

- Ensuring a record of lessons learned is developed, documented, and made available for future projects
- Verifying acceptance of products or services
- Collecting all required project records
- Determining if final products meet specifications
- Assessing the quality, correctness, and completeness of all formal project acceptance documents
- Give performance appraisals and assist in the planned transfer of personnel to other projects or positions
- Other?

Communication Flow
A project is “a temporary endeavor undertaken to create a unique product, service or result.”

Academic sources:

- PMBOK Guide® 2nd and 5th edition by PMI
- PRINCE2® -2009 edition
- PMD Pro is a registered trademark of PM4NGOs