

**Project**  
Temporary with a beginning & end.  
Creates unique product, service or result.  
Progressively elaborated.

**Program**  
Group of projects that feed into each other.

**Project Management Office (PMO)**  
Provides policies, methodologies & templates.  
Provides support and guidance.  
Provides project managers.

**Triple Constraint (6 constraints)**  
Cost, Time, Scope, Risk, Quality & Customer Satisfaction.

**Product Life Cycle**  
Conception > Growth > Maturity > Decline > Withdrawal

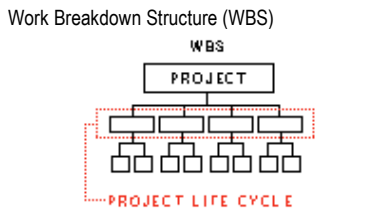
**5 Project Management Process Groups**  
Initiating (I)  
Planning (P)  
Executing (E)  
Monitoring & Controlling (M)  
Closing (C)

**9 Project Management Knowledge Areas**  
Project Integration Management  
Project Scope Management  
Project Time Management  
Project Cost Management  
Project Quality Management  
Project Human Resource Management  
Project Communications Management  
Project Risk Management  
Project Procurement Management

**Project Integration Management**  
Develop Project Charter (I)  
Develop Preliminary Project Scope Statement (I)  
Develop Project Management Plan (P)  
Direct/Manage Project Execution (E)  
Monitor & Control Project Work (M)  
Integrated Change Control (M)  
Close Project (C)

**Project Scope Management**  
Scope Planning (P)  
Scope Definition (P)  
Create Work Breakdown Structure (P)  
Scope Verification (M)  
Scope Control (M)

Scope Verification: Check work against PM Plan.  
Primary focus is customer acceptance.



WBS Dictionary: Description of work to be done  
For each work package.

**Project Time Management**  
Activity Definition (P)  
Activity Sequencing (P)  
Activity Resource Estimating (P)  
Activity Duration Estimating (P)  
Schedule Development (P)  
Schedule Control (M)

Activity Definition: Breaking down work packages  
Further.

Precedence Diagramming Method (PDM)  
Or Activity on Node:  
1) Finish-to-Start (Most common)  
2) Start-to-Start  
3) Finish-to-Finish

Arrow Diagramming Method (ADM) or  
Activity on Arrow:  
  
GERT: Diagrams with loops.  
Milestones: For management.

Leads: Activity starts before the end of  
another.  
Lags: Time needed between activities.

Activity Resource Estimating: Time and  
quantity of resources are determined.

Activity Duration Estimating: Amount of time  
each activity is to take.

One time estimate: Based on expert  
judgment or historical information.

Analogous Estimating: Top-down or expert  
judgment.

Parametric Estimating: Math model based  
on historical records.

Heuristics: Rule of thumb.

Three-Point Estimates: Optimistic (O),  
Pessimistic (P) and Most Likely (M).

PERT Formula =  $(P + 4M + O)/6$   
Standard Deviation of Activity =  $(P - O)/6$   
Variance of Activity =  $[(P - O)/6]^2$

Schedules are calendar based while time  
estimates are not.

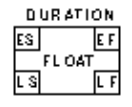
Project Estimate: All critical path activities  
added.

Standard Deviation: All critical path  
variances added then the square root is  
taken.

Total Variance: All critical path variances  
added.

Float = Late Start - Early Start  
= Late Finish - Early Finish

Duration = Early Finish - Early Start  
= Late Finish - Late Start



Activities in the Critical Path have a Float =  
0. Therefore, ES = LS and EF = LF.

Total Float: Time an activity can be delayed  
without delaying the project or milestone.

Free Float: Time an activity can be delayed  
without delaying early start of its successor.

Project Float: Time a project can be delayed  
without delaying required completion date.

Schedule Compression  
1) Fast Tracking: Doing critical path  
activities in parallel. Often results in re-work.  
2) Crashing: Often results in increase.

costs. (e.g. Adding more resources.)

Schedule Baseline: Final schedule

What-If Scenario Analysis  
Monte Carlo Analysis: Computer to simulate  
the outcome of a project. Making use of three  
point estimates (Optimistic, Pessimistic, Most  
Likely).

Resource Leveling: Resource limited  
schedule. Move resources around when  
needed.

Milestone Charts  
Bar Charts

Progress Reporting  
1) 50/50: 50% if started, 100% if completed.  
2) 20/80: 20% if started, 100% if completed.  
3) 0/100: 0% if started, 100% if completed.

**Project Cost Management**  
Cost Estimation (P)  
Cost Budgeting (P)  
Cost Control (M)

Life Cycle Costing: Looking at the life of a  
product, not just the cost of the project.

Value Analysis: Finding less costly ways of the  
doing the same work.

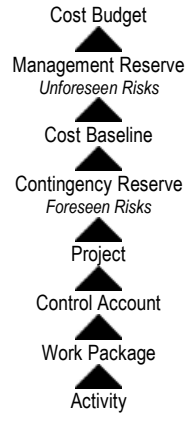
Variable Costs: Costs that change with the  
amount of production or work. (e.g. materials,  
supplies, wages.)

Fixed Costs: Costs that do not change as the  
product changes. (e.g. set up, rental.)

Indirect Costs: Overhead. (e.g. taxes, benefits)

Bottom-Up Estimating: Done at the activity  
level then rolled up.

Rough Order of Magnitude (ROM): At initiation  
-50 to +100%. Definitive: -5% to +10% (later in  
the project).



Earned Value Technique  
Planned Value (PV): Planned cost to date.  
Earned Value (EV): Cost of work performed to  
date.  
Actual Cost (AC): Actual Cost  
Budget at Completion (BAC)  
Estimate at Completion (EAC) = BAC/CPI =  
AC + ETC = AC + BAC - EV  
Estimate to Completion (ETC) = EAC - AC  
Variance at Completion (VAC) = BAC - EAC  
Cost Variance (CV) = EV - AC  
Schedule Variance (SV) = EV - PV  
Cost Performance Index (CPI) = EV/AC

Schedule Performance Index (SPI) = EV/PV

Choosing Projects  
Net Present Value (NPV): Choose higher  
Internal Rate of Return (IRR): Choose higher  
Payback Period: Choose lower  
Benefit Cost Ratio: Choose higher

Opportunity Cost: Cost given up by selecting  
one project over another.  
Sunk Costs: Costs that cannot be recovered to  
any significant degree.  
Law of Diminishing Returns: More you put into  
something the less you get out of it.  
Working Capital: Amount of money the  
company has available to invest.  
Depreciation: Assets that lose value over time.

**Project Quality Management**  
Quality Planning (P)  
Perform Quality Assurance (E)  
Perform Quality Control (M)

Quality: Degree at which the project fulfills  
requirements.  
Gold Plating: Giving extras.  
Prevention over inspection  
Marginal Analysis: Optimal quality is when  
incremental revenue from improvement equals  
incremental cost to secure it.  
Just in Time: Inventory close to zero. Must  
have high quality.  
Poor Quality: Causes increased costs, low  
morale, low customer satisfaction, increased  
risk, rework and delays.

Cost Benefit Analysis  
Benchmarking  
Design of Experiments  
Cost of Quality (COQ): Looking at costs of  
conformance & non-conformance.

Quality Audits  
Process Analysis: Activities/work packages  
repeated and checked for better improvement.

Quality Control: Focuses on correctness of  
work.  
Population/Sample: Inspection of 100% of  
population will take long, cost too much, be  
too destructive.  
Mutual Exclusivity: If two events cannot both  
occur in a single trial.  
Probability: Likelihood that something will  
occur.  
Statistical Independence: The probability of  
one event occurring does not affect the  
probability of another event occurring.  
Standard Deviation: Measure of a range  
1 Sigma: 68.26%  
3 Sigma: 99.73%  
6 Sigma: 99.99985%

7 Basic Tools of Quality  
1. Cause & Effect Diagram (Fishbone,  
Ishikawa): Fix problem & root cause of  
problems.  
2. Flowchart: Analyze quality problems and  
how they occur.  
3. Histogram: Data displayed in bars or  
columns. (e.g. Pareto Chart)  
4. Pareto Chart: Stocking problems into piles.  
Eliminate the larger ones. 80% of problems  
are due to 20% of the root causes.  
5. Run Chart: Charted progress and look for  
trends.  
6. Scatter Diagram: Tracks 2 variables to see  
if they are related.  
7. Control Chart: Monitor production & (cont...)

other processes to see if they are within acceptable limits & if actions are required.

- Upper and lower limits
- Average
- Out of control
- Rule of 7

### Project Human Resource Management

Human Resource Planning (P)

Acquire Project Team (E)

Develop Project Team (E)

Manage Project Team (M)

Roles & Responsibilities must be clearly defined and communicated.

Responsibility Assignment Matrix

ACTIVITY	BOB	ROB	SUE
A	P		P
B		S	

P: Primary

S: Secondary

Also known as RACI Chart

R: Responsible

A: Accountable

C: Consulted

I: Informed

Staffing Management Plan: When/how team members will be added and released. Plus how to develop them.

Resource Histogram: Number of resources per time period.

Recognition & awards motivates.

Acquire project team = Acquire FINAL project team. Negotiations involved.

Halo Effect: Tendency to rate high or low on all factors due to impression of a high/low rating on a specific factor.

Team Building:

- 1) Training
- 2) Ground Rules
- 3) Co-Location (War Room)
- 4) Team Performance Assessment: PM evaluates & enhance effectiveness of team.

Project Performance Appraisals: Team & supervisors provide input (360 view) on the project.

Issue Logs

Powers of Project Manager:

- Formal
- Reward\*
- Penalty
- Expert\*
- Referent: Someone higher referring PM authority.

\*Best form

Expectancy Theory: Expected to be rewarded for efforts.

Arbitration: 3<sup>rd</sup> party resolve disputes.

Perquisites: Special rewards.

Fringe Benefits: Benefits to all employees.

Motivation Theory: Give rewards to motivate.

McGregor's Theory: X – People need to be watched. Y – People don't need supervision.

Leadership Styles:

- Directing
- Facilitating
- Coaching
- Supporting
- Autocratic

- Consultative
- Consensus

Conflict Management: Not bad, depends who needs to solve conflict.

Sources of Conflict:

- Schedules
- Priorities
- Resources
- Technical Opinions
- Administrative Procedures
- Cost
- Personality

Conflict Resolutions:

- Confronting: Problem Solving
- Compromising: Lose-Lose
- Withdrawal: Avoidance
- Smoothing: Emphasis on agreement.
- Forcing

### Project Communications Management

Communications Planning (P)

Information Distribution (E)

Performance Reporting (M)

Manage Stakeholders (M)

#### Effective Communications

55% of communications is non-verbal.

Paralingual Pitch and tone.

Feedback: "Do you understand what I said?"

Communications Technology: Deciding which is the best form of communications.

#### Communications Methods

Formal written: Complex problems, PM Plan, Charter.

Formal verbal: Presentations, speeches.

Informal written: Memo, Emails, Notes.

Informal verbal: Meetings, conversations.

Meetings:

- Have time limit
- Agendas
- Purpose
- Have Rules

Communications Channels =  $(N(N - 1))/2$  where N is the number of communicators.

Lessons Learned

- Technical aspects of project
- Project Management
- Management

Who contributes

- Stakeholders
- Project Management Team
- Team
- Project Manager
- Customers

Status Reports: Where the project now stands.

Progress Reports: What has been accomplished.

Trend Report: Examine project results if they are improving or deteriorating.

Forecasting Report: Predicting future.

Variance Report: Compare results to baselines.

Earned Value: Integrating scope, cost & schedule measures to assess project performance.

Communication Blockers

- Noise
- Distance

- Improper Encoding
- Hostility
- Language
- Culture

### Project Risk Management

Risk Management Planning (P)

Risk Identification (P)

Qualitative Risk Analysis (P)

Quantitative Risk Analysis (P)

Risk Response Planning (P)

Risk Monitoring & Controlling (M)

Threats: Negative risks.

Opportunities: Positive risks.

Risk Factors:

- Probability
- Impact
- Timing
- Frequency

Risk Averse: One who does not want to take any risks.

#### Risk Tolerance & Thresholds

Tolerance: Acceptable/Unacceptable.

Threshold: Amount of risk that is acceptable.

Risk Management Planning Outputs

- Risk Management Plan
- Risk Categories
  - o By source
  - o By external, internal, technical & unforeseeable
  - o By Company's Projects

Risk Breakdown Structure (RBS)

Risk Identification: Involve stakeholders and team. Happens at Initiation & Planning.

Information Gathering Techniques:

- Brainstorming
- Delphi Technique: Consensus of experts.
- Interviewing
- Root Cause Analysis
- SWOT: Strengths, Weaknesses, Opportunities & Threats.

#### Outputs

Risk Register: Document where risk information is kept.

- List of Risks
- Potential Responses
- Root Cause Risks
- Risk Categories

Subjective analysis of risks identified:

Probability x Impact (Probability & Impact Matrix)

Risk Urgency Assessment: Nothing risks that should more quickly through the process.

Watchlist: Non-critical risks.

Numerical analysis of probability & impact of highest risks from qualitative risk analysis.

Risk assessment > Risk identification through quantitative risk analysis.

Expected Monetary Value: Probability x impact.

Monte Carlo Analysis: Simulation of project given variables.

Decision Tree: Decisions regarding individual risks.

Risk Response Strategies

- Avoid: Eliminate threat
- Mitigate: Reduce probability or impact
- Transfer: Make another party responsible

Strategies for Opportunities

- Exploit: Add/change work to make sure opportunity occurs
- Enhance: Increase probability/impact
- Share: Partner to achieve opportunity

For Both

- Accept

#### Outputs

Risk Register

- Residual risks
- Response owners
- Triggers

Workarounds: For unplanned responses.

Risk Audits

Risk Re-Assessment: Revisit & modify plan.

#### Outputs

- Risk Register Updates
- Creation of risk templates, checklist, etc.

### Procurement Management

Centralized vs. Decentralized Contracting

Plan Purchase & Acquisitions (P)

Plan Contracting (P)

Request Seller Responses (E)

Select Sellers (E)

Contract Administration (M)

Contract Closure (C)

#### Make or Buy Analysis

Buy: Decrease risk

Make: Idle plant, proprietary information & procedures

Contracts

- Cost Reimbursable (CR): Buyer with most risk
  - o Cost + Fee: Illegal
  - o Cost + Percentage
  - o Cost + Fixed Fee
- Time & Materials (T&M)
- Fixed Price (FP): Seller with most risk
  - o Fixed Price Incentive Fee
  - o Fixed Price Economic Price Adjustment
  - o Purchase Order

Contract SOW: Describes what work is to be completed under the contract.

Types:

- Performance: Able to accomplish
- Functional: Characteristics of product
- Design: Precisely what work is to be done

Procurement Docs (incl. Evaluation Criteria)

- Request for Proposal, Invitation for Bid, Request for Quote

Non-Disclosure Agreement: All information is confidential

Standard Contracts: Pre-Authorized contracts

Arbitration: Method to resolve disputes with a

3rd party.  
Breach/Default  
Force Majeure: Act of God  
Indemnification: Who is liable for injury

Bidder Conferences  
Proposal or Bid: Seller's response  
Qualified seller list

Weighting system  
Negotiation: Objective is to develop good relationship.  
Tactics: Attacks, insults, good/bad guy, deadline, lying, limited authority, missing man, delay

Contract Administration: Assuring both parties meet contractual requirements.  
Contract Manager has authority to change contract (Contract Change Control System)  
Buyer-Conducted Performance Review: To see if seller is performing.  
Claims Administration: Buyer hurt seller and seller is asking for compensation.  
Records Management System  
Contract Interpretation: Based on analysis of the intent of the parties. Contract supersedes anything prior to contract signing.

All contracts must be closed.  
Contract closure before project closure.  
Admin closure can be done at the end of each phase or project. Contract closure done only once.

Admin closure: Lessons learned  
Contract closure: Procurement Audit

- Product verification
- Financial closure
- Update Records

Termination: Buyer terminates if seller breaches contract or if work is no longer needed.

---

Notes by Josefino Sarmiento on *A Guide to the Project Management Body of Knowledge* and *Rita Mulcahy's PMP Exam Prep* books.

**Notes:**

**Notes:**