

- a project is a fully coordinated group of tasks that are completed by people using resources & processes, Projects has start, End dates & Success criteria.
- Success criteria: [1] on time [2] on budget [3] according to specifications
- process groups: [1] Initiating [2] planning [3] Executing [4] monitoring [5] closing
- Knowledge Areas: [1] Integration [2] scope [3] Time [4] cost [5] Quality [6] Human Resources [7] communication [8] Risk [9] procurement

Why Do we Need a Project Manager?

Like Orchestra, someone is needed to keep symphony rather than noise, usually projects are cross-functional (different dept.)

Essential elements of a project:

[1] charter / scope / plan

- internal project develop a charter. • Ext. & int. has a scope.
- * Scope: the entirety of all work must be accomplished to complete the proj. it is contained within the charter for internal proj. & in contract for ext.
- * Scope Statement: a way to clarify the scope, it answers:
 - [1] The desired result [2] resources & technology [3] assumptions & constraints

Scope Statement outline:

- [1] Project Overview:
 - how to come into being • why undertaken • Scope to be completed
 - how proj. affect organization • how org. affect proj.
- [2] Deliverables: list products/services will be produced.
- [3] Features & functions descriptions:
- [4] Acceptance Criteria: describe the process that will be used to determine user acc.
- [5] Restrictions / constraints: example: material shortage, quality, cost —
- [6] Uncertainties: if-then statements.

* project charter is larger than the project scope.

[2] Project Schedule: intermediate dates beside start / deadline

[3] Project Resources: people / money / time / technology / material

[4] Leadership:

* internal projects: initiatives undertaken by firms to enhance their competitiveness. (2)

- ⑤ Firms sustain themselves: [1] superior service/cost/time [2] anticipating new markets
- ⑥ internal proj. known as "Loss-leader" for temporary loss & future gain (lead)

Difference between Project & program?

Program is a series of projects, like university degree is a program, courses are Projects.

Goal, Objective, Deliverable?

- Goal: Overall purpose of the proj (in contract for ext. & in charter for int.)
- Objective: collection of tasks to produce deliverable.
- Tasks: collection of activities.
- Deliverable: The actual product/service to be developed by proj. team.
- Proj usually have more than one objective & more than one deliverable.
- Scope: comprehensive definition of a project.
- Duration: the time from beginning to end required to complete an activity, task or obj
- Schedule: a timetable for completing all act., tasks, obj.
- Milestone: achievement sufficient for billing the customer a percentage.
- Process: a series of standardized steps used to produce a given results
examples: initiation, planning, execution

Project Success criteria:

[1] on time [2] within budget [3] meets user specifications.

For a successful project manager, must be effective at:

- [1] Building Teams [2] Leading Project Teams [3] motivate teams
- [4] communicate with teams/customer [5] manage time.
- [6] manage change [7] manage diversity [8] Leading periods of adversity

Project Managers Functions:

1 Process Functions:

1 Project Initiation

* project managers are chosen before project initiation begins, this allows:

- (a) establish clear understanding of the customer expectations.
- (b) establish positive working relationship from the outset.
- (c) become familiar with all of the project's stakeholders.

* processes to be done in project initiation phase:

1 Project charter, contains:

- (a) project's purpose (b) objectives (c) success criteria
- (d) general requirements (e) project description (f) product/service characteristics
- (g) summary schedule showing milestones (h) project manager
- (i) name & responsibility of individuals (j) project approval requirements (how success, who decides)

2 Project Stakeholders:

- * Stakeholders: individuals & all organizations that have a stake (interest) in the project.
- * it is important not just to identify the stakeholders, but also to create a stakeholder register.
- * the registry contains the names & positions of all stakeholders and their interest and expectations of the project.

2 Project Planning

* The most extensive Part, usually associated with project management

1 Scope of the project:

* if not developed as part of initiation, then do it now.

2 Work Breakdown Structure (WBS):

- * begin with the deliverables and work backward to form work packages
- * this process is called decomposition.

* work package is the lowest level & is used for duration and cost estimate.

3 Project Schedule:

* can use Professional scheduler / scheduling software

4 Cost Estimate & Budget:

* miscellaneous factors are called enterprise environmental factors and these can be anything that affect the cost, including culture government regulations, market conditions, --

5 Quality Plan:

- * how the team will meet & meet customer specification.
- * continual improvement.
- * Deming cycle:
- * Quality improvement: - communicate results, - Provide training - report progress...



6 Human Resource Plan: (how to properly staff the project team)

- all positions and their responsibilities.
- qualification required for each position.
- reporting relationships of all personal assigned to the proj.

7 Communication Plan

- * ensure generation, collection, storage, retrieval of Proj. info.
- * Stakeholders must be up-to-date.
- * Proj. mang. must talk to Stak., Teams, organization --

8 Risk Management Plan

(a) Technical Factors

- difficult specifications
- Technology
- quality beyond capabilities

(b) External Factors:

- difficult supplies
- government regulations
- market forces.

(c) Internal Factors:

- project's priority
- resources availability
- quality of management

9 Procurement Plan:

- * is the process of acquiring materials, services and other outside resources needed.

- purchasing decisions
- relationships
- changes & errors



3 Project Execution

- * execute the plan phase.



4 Project Monitoring & Controlling

- * effective change order management will prevent scope creep
- * Scope Creep: adding to scope without compensating the firm.
- * Identifying new risks



5 Project Closing

- * includes the whole project & procurement contracts.

2 People's Functions:

1 Leadership Function

2 Team Building Function

3 conflict management Function

4 Motivation Function

5 Communication Function (oil in machine)

6 Time Management (their own time & not proj.)

7 change management

8 Diversity Management

9 Adversity Management

Characteristics of an Effective Project Manager:

1 Strong Process Skills

2 Strong People Skills

3 Intellectual Curiosity

4 Commitment

5 Vision & Insight

6 People Orientation

7 character

8 Focus on Solutions

9 Participative & decisive: ask team when decide

10 Focus on The Customer

11 Focus on win-win outcomes

12 Lead by example

13 get the best from all stakeholders

Organizational Structures:

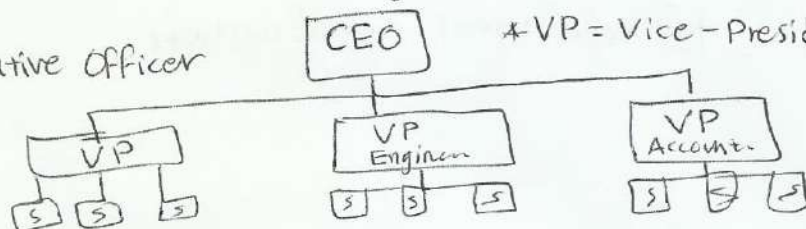
1 Functional Structure

* Traditional & most-common

* AKA Line Organization

* Have clear lines of authority in terms who reports to whom

* CEO = chief Executive Officer



* VP = Vice-President * S = staff

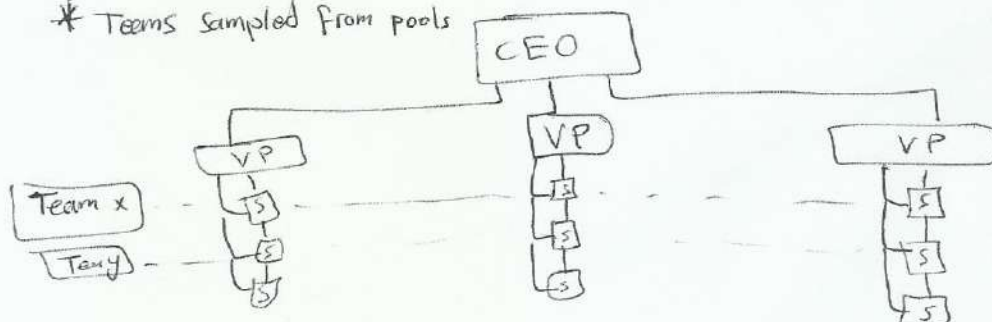
* Project manager isn't necessarily have line authority over staff.

2 Matrix Structure

* Teams are always cross-functional in nature

* project managers don't have line of authority over staff.

* Teams sampled from pools

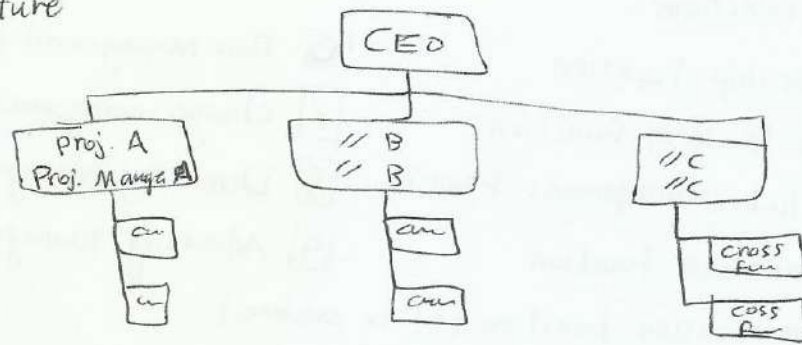


[3] Project Structure

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* Project managers have line of authority over Team.

* Project managers will fight over resources if not handled well



Project Management Certifications

- [1] Project Management Professional (PMP): highest level
- [2] Certified Associate in project management (CAPM): entry-level
- [3] Program Management professional (PgMP): experienced-level
- [4] PMI Scheduling Professional (PMI-SP): specialized-level
- [5] PMI Risk Management Professional (PMI-RMP): specialized-level

Project Management Professional Examination (PMP)

- requirements:
- [1] High-school diploma & 60 months of exp in proj
 - [2] Bachelor degree & 36 month of exp in proj
 - [3] Formal education in proj. man.
 - [4] info about certification

Project Initiation Inputs:

CH3

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- RFP/RFQ
 - Statement of work
 - business case
 - signed contract
- outputs:

1 Project Description: brief but comprehensive overview (high-level)

- ① what project involves ② who the project is for ③ why the project important.

2 Project Feasibility Analysis Report

- ① is the project feasible from a cost-benefit perspective
- is the firm already operating at capacity?
 - Does the project fall within firm's core competencies?
 - is return on investment sufficient (cost vs Benefit)?
 - is the customer financially able to meet obligations?
- ② Best approach to complete it:

- analyze the problem the project is trying to solve.
- Decide what approach is the best.
- develop potential solutions
- identify & compare the adv. vs disadv. of the potential solutions
- make recommendations about best approach.

3 Project Concept Document comprehensive Description (executive-level)

- * helps executives take informed decisions whether to take or leave the Proj
- * before preparing:

- ① Choose Project Manager: because he will create the concept document
- ② Select members of project: ownership feeling towards the proj.
- ③ identify concept input Partners: they will help the team & manager
- ④ identify stakeholders: create stakeholder register.

* Outputs:

- ① overview of the project (can be the project description from earlier)
- ② Purpose Statement
- ③ Goals & objectives of the project
- ④ selected approach & strategies
- ⑤ Financial information
- ⑥ Success factors
- ⑦ Schedule information
- ⑧ Risk information

4 Project charter the first official document that says "we have a proj"

* any charter has to contain:

- ① General information: Project title / contact info of executive
- ② Project Overview: project description, problem trying to solve, feasibility --
- ③ Project Scope: determines whether the cost of change paid by firm.
- ④ Milestones: Large achievements at 25 - 50 - 75 - 100 %

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- ⑤ Authority & Responsibility : who is responsible for what.
 - ⑥ Project organization : chart of hierarchy (customer, exec, PM, Team)
 - ⑦ Disaster Recovery Methodology : IT recovery plan for :
 - servers • Storage • software & automation • Network & physical • skills
 - ⑧ Resources & funding : Resources include time, equipment, ...
 - ⑨ Signatures : of key stakeholders (minimum exec & PM)

5 Stakeholder Register

- * directory of all direct / indirect stakeholders.
- * important to find hidden stakeholders (enemies & friends).

6 Project Kickoff Meeting

- * meeting to start the project formally, agenda:

- ① welcome : PM introduces himself
- ② Introductions : Each team member introduces himself.
- ③ Discussion of project charter : understand the big picture.
- ④ Discussion of stakeholders : identify hidden stakeholders
- ⑤ Discussion of the next steps : who wanna be in project planning
- ⑥ Questions of the team :

* Why Project Planning ?

CH 4

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- if we don't, then a chain reaction will occur, Emp will start late causing hurry-up mode which affects quality & time, we need overtime cost and redo for quality.

- Safety, Employees will dispose toxic material in dumpsite.

* Project Planning has:

[1] Inputs: Project Scope & WBS

[2] Tools/Techniques: bar charts / critical path diagrams

[3] Output: well-planned schedule

* WBS has Formats:

[1] deliverables format [all nodes under parent represent 100% of parent scope]

[2] verb-oriented WBS [action-oriented, first word of each node is verb (plan, erect)]

[3] Noun-oriented (deliverable-oriented) [noun of name is component of larger deliverable]

[4] Time-phased WBS: Breaks project into phase (for large time scale projects) after big part of first phase is done, planning for 2 begins, uses concept known as "rolling wave"

[5] Miscellaneous WBS Formats. (others)

* The 100 percent rule: WBS must 100% represent all work & deliverables

* Rules of Thumb for WBS:

[1] Outcome Rule: Keep decomposing outcomes until actions reached, stop!

[2] 40-hour Rule: any element that takes less than 40-hr labor not added.

[3] 4-percent Rule: any element which represents less than 4% of Time OR Cost is ~~not~~ out!

* WBS numbering:

1.1	1.2
1.1.1	1.2.1
1.1.2	1.2.2

 this X% represents Time

* WBS Dictionary:

- is a doc that contains more detailed info about each element in WBS

* Enterprise Environmental Factors:

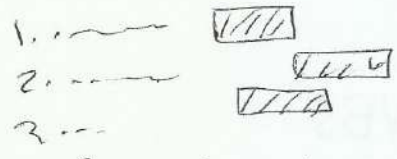
- market conditions
- organizational culture
- governmental Regulation. --

* Estimating Activity duration in WBS is done by estimating individual work packages.

* work packages can be estimated as $AVG(worst + Best)$

- * Activity List: list of all activities within scope of project.
- * Activity attributes: details about each activity on activity list.
- * Sequencing activities is determining precedence relationships among activities.
- * Gantt Chart: tool for charting project schedule (Bar charts)
- * Critical Path Method Network (CPM)

* Slack = TF



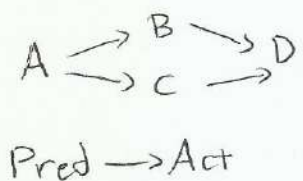
CPM disadvantages:

- 1 Takes time to become professional in it.
- 2 requires a lot of space.

Activity Predecessor Dur

A —
 B ← A
 C ← A
 D ← B
 D ← C

Activity Network Diagram



TF		
Es	Act	Ef
Ls	Dur	Lf
FF		

$$E_s(0) = 0$$

$$E_s(x) = \text{MAX}[E_f(x-1)]$$

$$E_f(x) = E_s(x) + \text{dur} \quad \rightarrow \oplus \rightarrow$$

$$L_f(\text{Final}) = E_f(\text{Final})$$

$$L_f(x) = \text{MIN}[L_s(x+1)]$$

$$L_s(x) = L_f(x) - \text{dur} \quad \leftarrow \ominus \leftarrow$$

$$TF = E_f - L_f \quad \downarrow \ominus$$

$$FF \leq TF$$

$$FF = \text{MIN}[E_s(x+1)] - E_s - \text{dur}$$

CRITICAL PATH = where $TF = 0, 0, 0 \dots$

TF = amount of time activity can be delayed without affecting project finish date.

FF = " " " " " " any early start of successors

* cost estimate is usually developed in response for Request for proposal (RFP) or Request for quote (RFQ) in that case, cost is estimated before project initiation.

- * project contingencies for info lack.
- * in large projects, budget is based on complete and better info than cost estimate
- * in small projects, they are result of same process
- * cost estimate is informed decision.
- * Direct costs: personal, material, equipment, facilities, services, interest inflation allowance, contingencies, RISK.
- * Indirect costs (overhead): utilities, bills company-wide, administrative support Insurance.

* companies accommodate for indirect costs by increasing direct by percentage
 ex: Full = direct + indirect = direct + 0.15 x direct

* in recession (2008/09) companies ignore indirect costs.

* Inputs For Cost Estimation:

- 1 Scope Statement, WBS, WBS dictionary
- 2 Schedule For the Project (good for interest estimation & time-intensive mtd)
- 3 Human Resource Plan for the project (not always ready for cost estimate but always ready for budget)
- 4 Risk Register [direct cost]
- 5 Enterprise Environmental Factors
 * like governmental Regulations, Industry Standards, quality of HR ...

* Estimating Methods:

- 1 Expert Judgment [past data] [weakness is currency]
- 2 Analogous Estimating: [Past data]
- 3 Parametric Estimating: [Past data] [statistical]
- 4 Bottom-up Estimating: [sum cost of work-packages]
- 5 Three point Estimating: [one of or Avg of Best, worst, predicted]
- 6 Reverse Analysis: [add padding to parts or whole]
- 7 Vendor Bid Analysis: [look at bidders (qualified ones only)]
 qualified means: states criteria & specification in RFP or RFQ
- 8 Estimating Software:

* cost estimating results in:

- 1 cost estimation summary: estimate of each component
- 2 cost estimation notes: has the following:

- ① how estimate was developed
- ② explanation of all assumptions estimate based on.
- ③ all constraints & how they affect estimate
- ④ room for error considered (% added or subtracted)
- ⑤ level of confidence in final estimate.

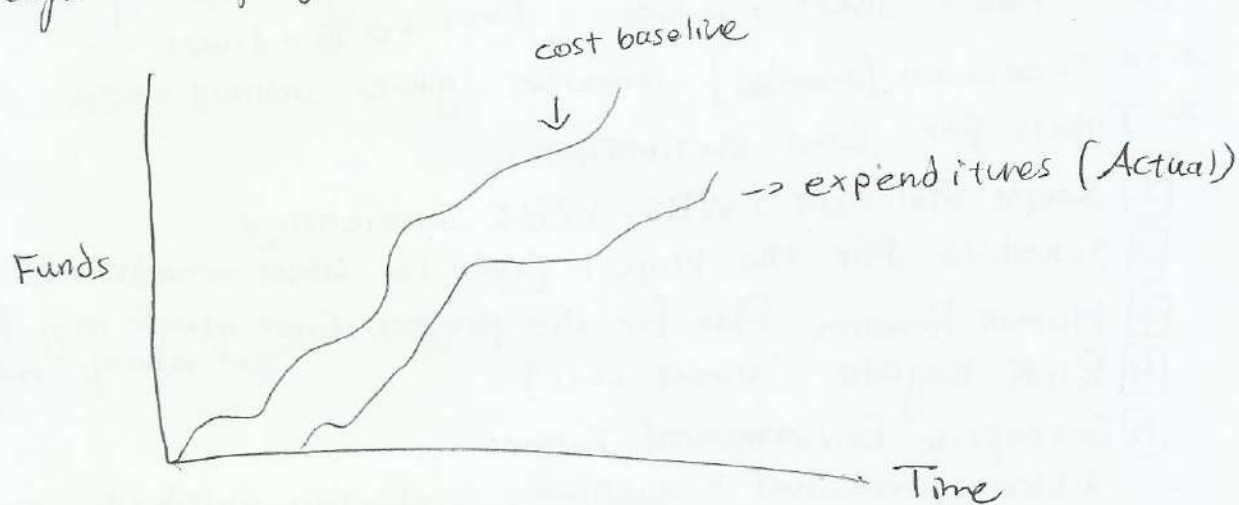
* in small projects budget = cost estimate
 & in large $\neq$

✓ * output of budget:

① Budget Summary [includes project management costs]

② Cost Performance Baseline

* used to monitor actual cost vs cost baseline through the project



* working on Human Resources, CH6 communication, Procurement and Quality Plans begins immediately following Project initiation. 11

A Human Resource Plan

* developed early in planning process

* managers plan organize build lead project teams

1 Roles & Responsibilities: covers **[Includes Project Manager]**

① Roles: describes positions needed

② Authority: range of authority is determined (who can do what)

③ Responsibility: the work that each member is assigned to do.

④ Competency: knowledge, skills, capacity required of each member.

* Another type of summarizing responsibility is RACI

* stands for (Responsible, Accountable, Consult, Inform)

2 Organization Chart:

* shows all roles (positions) * most common form is hierarchical organization

* some project managers use matrix format

3 Staffing

* summarizes how and when PM will acquire the HR needed.

① Acquisition: where needed staff will come from
will PM need help from HR dep. or procurement dep. in case of contractors?

② Time Frames: what period and how much time is needed from each member.
important when PM negotiates other deps for staff.

③ Release Method: summarizes when & how members will be released from project.
important for project cost, as long as members in proj, costs are on proj.

4 Training Needs

* Explains what type of training needed for whom and where.

5 Recognition and Rewards

* motivate team members to higher levels of performance.

* what rewards, criteria, who gives it.

6 Compliance

* Safety, healthy, environmental... usually in government contracts.

* list all compliances & how team will meet them.

7 Safety

* ethical, avoid lawsuits and medical expenses, increase competitiveness

B

B

Communication Plan :

* developed to ensure effective communication among stakeholders through project.

* Answers :

- ① who are the stakeholders ?
- ② what info does each stakeholder needs?
- ③ how often he needs that info
- ④ in what format he needs that info
- ⑤ who is responsible for providing the needed info to stakeholders.

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Procurement Plan

* determining what resources needed, Potential suppliers, best supplies

* 3 Types of contracts :

- ① Fixed-Price: most common type, specified price, doesn't vary
* can have penalty built-in

* Two types: ① Firm Fixed Price: fixed price unless firm asks for extra

② Incentivized fixed price: fixed price but has incentives in case of good work

- ② Cost-Reimbursement Contracts (cost-plus)

* Supplier bills firm for actual costs plus a fee, good when unknown ultimate cost

- ③ Time-Material (open-ended):

* used when firm not sure how much time will be required and when materials quantity unknown

* companies try to avoid this contract & if necessary then define max * hours / material

* Statement of Work

for materials specify: type, amount, quality, location

for Professionals: what work, qualifications, hours, when

* Make-or-buy list

* list of work that will be done internally, called "make decision" or externally, called ~~the~~ "buy decision"

* Procurement Document

standardization protects firm from differently treating ~~each~~ suppliers

* Common Documents:

- ① RFP (Request for Proposal): proposals request to specify price method, capabilities (Solicit Proposal)

- ② RFQ (Request for Quota): (solicit quotes)

quote: less detailed than Proposal & typically used when firm knows capabilities of supplier & need to know Price.

- ③ ITP (Invitation To Bid): (solicit bids)

* Selection Criteria:

- Responsiveness (clarity of the work to be done)
- overall Cost (not just lowest bid) (lowest [goods + operating])
- Capabilities
- Risk (acceptance of its share of risk, plan to avoid it)
- Management Process

D Quality Management Plan:

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- * Firms develop quality policy then develop quality management plans for policies
- * quality plan provides specific details how to apply policy daily
- * subset of Firm organization wide quality Plan.
- * 2-levels:

- ① macro-level [Quality management] [Big Q]: continual improvement
- ② micro-level [Quality control] [Little Q]: subset of above.
ensures the deliverables of project meet specification
& involves applying (cause & effect, Pareto charts, histograms)

Components of The Project Quality Plan

- ① Quality management approach: how quality of deliverables ensured.
- ② Quality Related definitions: Terminology used in quality Plan.
- ③ Quality Objectives for the project: Translate (according to spec, within...) to specific terms & numbers (ex: 02/05/2022 complete 50%)
- ④ Process Quality Measures: lists the measures that will be used to ensure process quality.
- ⑤ Product Quality Measures: lists the measures that will be used to ensure that all deliverables meet quality specification before shipping.
- ⑥ Quality Related Responsibilities of Team Members
lists the broad quality-related responsibilities of the team & individuals.
- ⑦ Quality Tools To Be Employed: 
Flow charts, Control charts, cause & effect diagram
- ⑧ Reporting Procedures
how process & ~~quality~~ product quality results will be reported, how often & to whom
Keep process & product logs, which contains:
 - ① name of process
 - ② date of review
 - ③ findings of the review (problem)
 - ④ how problem was resolved
 - ⑤ date of solve.

- * Risk identification & prioritization CH7 are parts of PM's Job.
- * Risk management happens simultaneously with scheduling, budgeting, HR plan.
- * Large Firms has risk department or risk professionals, in small firms it is PM
- * Risk: Probability that things will not go as planned, and unplanned events occur.

Factors That increases the Level of risk:

- 1 Duration: the longer it takes to complete a project the more likely something goes wrong
- 2 Lapse Time: time between contract and beginning work should be minimized.
- 3 Inexperience: experienced firms are less prone to errors.
- 4 Insufficient Maturation: aged firms are better at eliminating risks.
- 5 Unfamiliarity: new sub-contractors are not guaranteed like the known ones.

Definition of Risk Management from PM's Prespective:

Identifying risks that might negatively affect the successful completion of the project, assessing their impact, developing ~~mitigation~~ ^{mitigation} plans and implement the plans in a way that minimizes risks.

What PM should do to minimize risk?

- 1 Be aware that risks exists on all projects (don't ignore risks)
- 2 Identify project-specific risks.
- 3 Assess the potential consequences of the risks. (Best and worse case scenarios)
- 4 Communicate risks and their potential consequences to stakeholders.
- 5 Develop and implement risk mitigation ^{تخفيف} plans (Strategies to minimize risk)
- 6 Monitor the effectiveness of risk mitigation strategies

Risk Classification:

- 1 External-Unpredictable: arises from third parties, nature, and any uncontrollable.
- 2 External-Predictable But Uncertain: risks that can be predicted to occur, but not the extent to which they will occur.
- 3 Internal-Technical: Risks increase when using new technologies due to bugs and lack of experience with these technologies.
- 4 Internal - Nontechnical: Human & organizational issues.
- 5 Legal/ethical - Civil & Criminal:

Every PM should develop or participate in the development of RBS (Risk Breakdown Structure).

Risk Factors associated with the 5 success criteria:

- 1 Time Related Risk Factors (tight schedule, material delivery problems)
- 2 Cost Related Factors (Poor cost estimation, strikes)
- 3 Specification/Quality Related Factors (Poor planning, rushing work)
- 4 Environmental - Related Factors (Poor supervision, not knowing environmental regulations)
- 5 Safety/Health - Related (Playing Russian Roulette with employees)

Risk Identification Process:

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1 Risk Identification Team.

- * in small firms, team is PM and one or two personnel
- * in large firms, team is PM, risk management expert and members of Project team.

2 Risk Breakdown Structure Template

- * used to trigger the thinking of the risk management team
- * members should not be limited to RBS and add categories if needed.

3 Risk Identification Methods:

- ① Review of Project Documents (expose errors like deadline is too soon)
- ② Brainstorming Sessions (good for finding project-specific risks)
- ③ SWOT analysis (strengths, weaknesses, opportunities, threats)
 - * looks at both positive and negative risks, some time there are Positives that helps solving the negatives.
- ④ Experience Review
 - * use experience from dealing with similar projects in the past.
 - * done before Reviewing document & SWOT
- ⑤ Review of Professional literature
 - * done before Reviewing docs & SWOT.
- ⑥ Survey of Experts/Delphi technique
 - * done before Reviewing docs & SWOT
- ⑦ Expert Judgment
 - * important when reviewing documents.
 - * experts here are the risk identification team members.

4 Process Output

- * the output of the risk management process is list of potential risks organized under broad categories specified in RBS along with new categories added to RBS.
- * each entry in the list is in standard format that informs the response to risk.
- * Best way to write the list is cause-and-effect format, which is just (if-then) statements, this format makes it easier to develop risk response strategies.

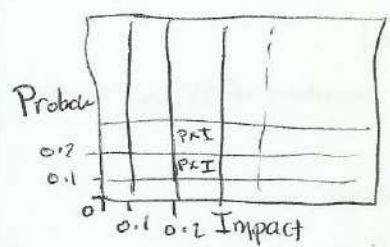
Qualitative Risk Analysis

- * this is the next step after risk identification is done.
- * Qualitative Risk Analysis assesses the probability that a given risk factor will have an impact the project and the extent of the impact.
- * Quantitative Risk Analysis assesses the probability that a given ~~risk factor~~ loss will occur and the magnitude of the loss.
- * Qualitative is widely used (more than Quantitative).
- * Qualitative is completed before risk responses.
- * if we plot probability [0-1] and impact [0-1], we get 3 levels of risk.



Low risk
Moderate risk
High risk.

*another way is matrix format :



entries are $\text{Risk Value} = \text{Probability} \times \text{Impact}$

0 - 0.19 low
 0.20 - 0.39 moderate
 0.40 - plus High

Risk Response Strategies

- 1 Elimination : completely remove risk by solving the issue.
- 2 Transfer : Pay 3rd party to stop worrying about the risk (ex: buy insurance)
- 3 Minimization: two aspects :
 - ① minimize the the chance of that risk- ② minimize the damage of that risk.

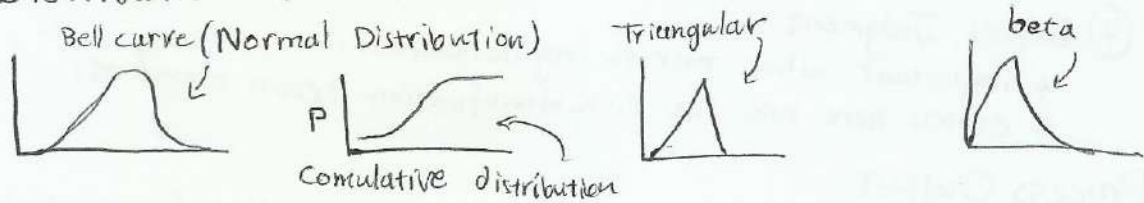
Quantitative Risk Analysis

* complex , needs experts, used to address the following questions:

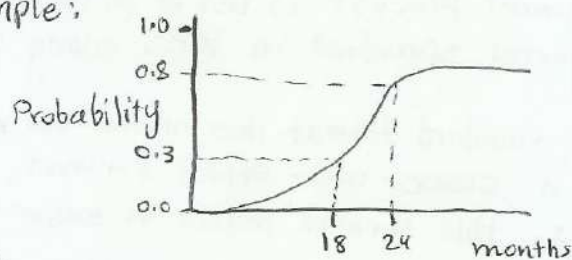
- ① How long the project will take to complete (will it pass leadline?)
- ② How much will it cost to complete on time (will it pass budget)
- ③ will the team be able to meet all specifications (will it meet quality standards)

Quantitative Analysis Tools

1 Distribution Tools & Curves



Example:



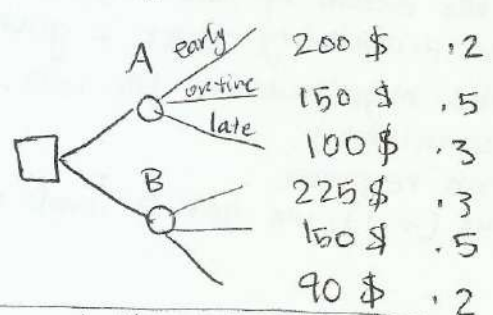
Probability to finish in 24 months is 80% while finishing in 18 month has 30% chance.

2 Decision Trees

* used to analyze cost options, example:

assume 2 suppliers A, B. we ask them to give us 3 Prices:

- ① Base Price : on time delivery ② incentive price: early delivery ③ Penalty Price



* probability of each scenario is given.

* Probability that supplier A delivers on time or earlier = 0.7

* Expected price to pay for A:
 $200 \times 0.2 + 150 \times 0.5 + 100 \times 0.3 = 145 \$$

* Expected price to pay for B:
 $225 \times 0.3 + 150 \times 0.5 + 90 \times 0.2 = 160 \$$

* Probability of B on time or earlier = 0.8

* Team decides whether to optimize for time or cost.

- * Team: group of people working together **CHB** to accomplish a mission.
- * Team building is constantly worked-on through the whole project & ends with the end of the whole project, Teambuilding is PM's responsibility.
- * PM can't always pick team members as most of the employees committed to another Projects
- * "Mission Statement" is used to keep reminding the team of their purpose.
- * Mission Statement contains the name of the project & brief description and the following statement; "our mission is finish on time budget spec"
- * Some firms add safety and environment to the statement.

Responsibilities of Project Managers;

- 1 Serve as the connection between team & higher management
- 2 Serve as a leader to the project team (ultimate responsibility)
- 3 Serve as official record keeper of the team.
- 4 Participate in team discussions, avoid dominating.
- 5 Implement team recommendations within manager's authority.
- 6 Prevent & resolve counter-productive conflicts.

How To Develop Positive Working Relationships in Teams?

- 1 Help team members understand the importance of being honest & reliable
- 2 Help them develop attitude of mutual support
- 3 Help them develop supportive attitude (we are in this together)
- 4 Help them understand that they need to share stress involved in quality, time, budget goals.

PM needs to explain the roles of team members as follows;

- 1 Their Primary Role in the Team.
 - 2 Their Supporting Roles.
 - 3 Their Range of Authority.
- * why these points?
- 1 solve conflict when member thinks others crowding on his territory.
 - 2 also when member thinks others are reluctant to providing help.

The Four-Step Model For Building Teams:

1 Assessing Project Team's Strengths & Weaknesses

- * The following factors are must for effective & productive team:
 - 1 clear direction understood by all members (mission, goal....)
 - 2 Team players on the team (Team comes first, me second)
 - 3 Accountability measures understood by all members

* Conducting a Team Assessment:

- done by using numerical scale, like:
completely true (CT) = 6 Somewhat False (SF) = 2
Somewhat True (ST) = 4 Completely False (CF) = 0
- then by answering questions like "all members support each other"
- any score less than 4 is weakness in the team.

any score above 4 is strength in the team.

2 Developing Team-Building Plan

* The results from Assessment are used to plan how to correct weaknesses and exploit strengths.

3 Executing Team Building Activities

* can be done individually, like when members don't trust mazen, then you pull mazen aside for a little chat.

* or in groups like the first meeting.

4 Evaluate Team building Activities.

* Compare current behaviour with original assessment.

Initiating The Team's Work.

* hold "team initiation" meeting before beginning work.

* different than "Kick off" or "project initiation" meetings.

* not recommended to combine the two meetings.

* meeting contains:

① discussing team's mission ② confirm members commitment

③ inform members to be team players ④ Review Accountability

Coaching = leading ≠ Bossing

Team charter is a document consisting of:

① mission statement for the team.

② ground rules for team members

③ team goals/milestones [from project schedule]

Ground Rules are things like "honesty, no personal agendas..."

* can consult team or just show them a list.

Strategies helps PM to gain respect, and for team to respect each other

① Trust made tangible ② Appreciation of people as assets

③ candid & clear communication ④ Unequivocal ethical standards

Strategies For handling human diversity:

① Identify the different needs of different ~~people~~ groups.

② Confront Cultural Clashes directly & immediately

③ Identify & Eliminate Institutionalized Bias

* institutionalized bias: unintended or intended (usually unintended) bias caused by the changing of society but not the changing of firm (example: few female restrooms vs male because when firm established no females were working)

④ Help people find common ground.

* conflict can occur even if the members agrees to the goal, they may disagree on how to accomplish it.

9

Strategies to Prevent Conflict:

- ① clarify assignments
- ② clarify roles
- ③ Encourage team members to talk through their differences
- ④ Teach members how to disagree without being disagreeable
- ⑤ Handle Conflict promptly

Types of Human Response to Conflict in Teams

① Escape Responses

* negative because they hurt the team & the person who does the escaping.

* Includes: Denial, Flight & Suicide.

② Attack Responses

* negative because they hurt the team, the Victims, and the attacker.

* Includes: Litigation/Formal grievances (Lawsuits), assault, and murder.

* Team members response to such attack is:

① Take Sides: conflict spreads and become worse

② Defence mode: they focus on conflict & not project.

③ Resolution Responses:

* Positive, they lead to a resolution good for all stakeholders

* Responses listed in order of preference: overlook, reconcile, negotiate, mediate, arbitrate.

① overlook: both sides agree to ignore it and go on.

② reconciliation: forgive-and-forget, like shaking hands and apologize.

③ negotiate: not everyone gets everything they want each gets some, but agree to shake hands.

④ mediate: PM works as referee.

⑤ arbitrate: PM gives a decision and all must agree, this the final solution.

* Monitoring and controlling comes CHIO after planning, and it is 10 Simultaneous with execution.

* Monitoring and controlling of a project involves observing and measuring then applying appropriate adjustments based on observations.

* PM and team members monitor the following elements:



1 Monitoring Scope

* one of the challenges PM faces is scope creep.

* Scope creep: changes to the project that exceeds its scope after the contract is signed.

* a proper change-order process prevents scope creep by adjusting budget and schedule accordingly.

* PM and his team do the following steps to monitor scope:

① Ensure Acceptance of Deliverables (signing off on deliverables)

* influenced by "Acceptance Criteria" developed in planning phase.

* after signing-off, the firm is no longer responsible for shipping the product.

② Manage the Change-Order Process

* without change-order it is impossible to meet the 3 basic criteria.

* change-order: document out-of-scope requests so customer is billed.

* also used to document rework done due to poor specification from customer.

* not all change-orders are extra expenses, some are decreasing cost.

③ Update Project Documents

* project close-out is invalid if documents are not updated with changes.



2 Monitoring Schedule

* if project falls behind schedule, PM has 4 options:

① Increase Staff (affects HR plan and budget)

② Approve Overtime (affects budget)

③ Subcontract Some of the Work (affects budget)

④ Miss an Activity Deadline

* if activity is on critical path, it is hard to miss it.

* Sometimes it is possible to delay activity but not whole project.



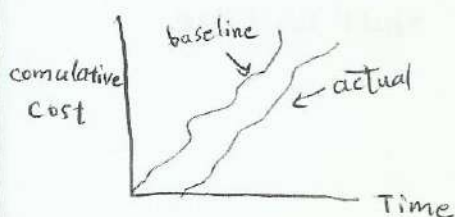
3 Monitoring Costs

* PM monitors predicted costs vs actual using cost baseline graph.

* PM does what is necessary to influence team to stay within budget & don't monitor only.

* PM don't just make budget adjustments, these adjustments needs to be examined & approved

* one of the common budget adjustments is "Performance Value"



* Performance Value is the value of the work being performed on a project.

* if work falls behind schedule due to anomaly, don't adjust historical data.

11

Cost Monitoring & Control Methods

① Earned Value Management (EVM)

* EVM integrates the most important 3 factors (Scope, cost, schedule)

* EVM has 3 dimensions:

① Planned Value (PV) aka Performance Measurement Baseline (PMB)

* The amount of money in the budget planned for activity.

* Total PV for a project is called BAC (Budget at Completion)

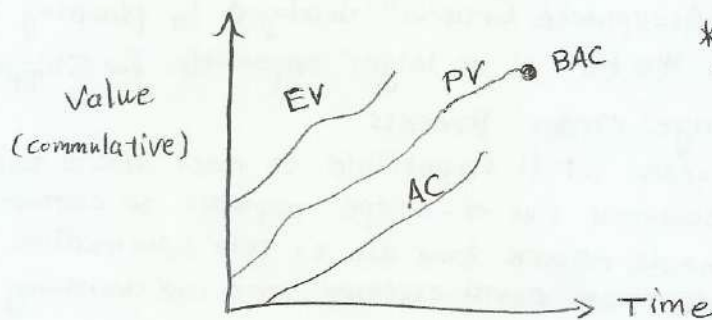
② Earned Value (EV)

* The percent of completion of project work at any point.

③ Actual Cost (AC)

* is what work is actually costing.

* if PV covers direct costs then AC does and if PV covers indirect then AC does as well.



* we always want EV above PV, and AC below PV.

* Beside graphing, we have numerical formulas:

* Schedule Performance Index (SPI) $SPI = \frac{EV}{PV}$

* SPI less than 1.0 means work is behind schedule.

* Cost Performance Index (CPI) $CPI = \frac{EV}{AC}$

* CPI represents "cost variance"

* CPI less than 1.0 means costs are over budget

② Forecasting

* used when we know that actual costs will exceed predicted.

* EAC (estimate at completion), ETC = Estimate to Complete

* $EAC = AC + ETC$

* Developing EAC in an expense of itself.

③ To-Complete Performance Index (TCPI)

* is an estimate of the cost performance that will be necessary to achieve BAC or EAC

for BAC: $TCPI = \frac{BAC - EV}{BAC - AC}$

for EAC: $TCPI = \frac{BAC - EV}{EAC - AC}$

4 Performance Reviews :

- ① Variance Analysis : compares planned cost/schedule to actual.
- ② Trend Analysis : determines if performance is improving, static or declining by plotting actual performance vs planned.

5 Cost Monitoring & Control Software

4 Quality Monitoring

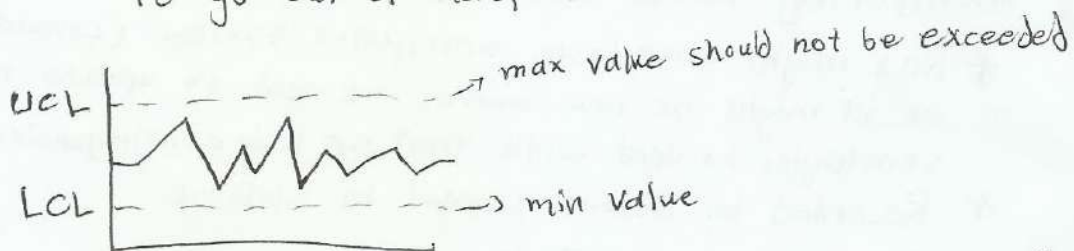
1 Big Q Monitoring & Control : Quality Audits

- * Ensuring that the appropriate process & product quality measure are being used and that quality performance reports are being made. Big Q is sort of the big picture of quality control.
- * we learn from it for the future (lessons-learned at closeout)

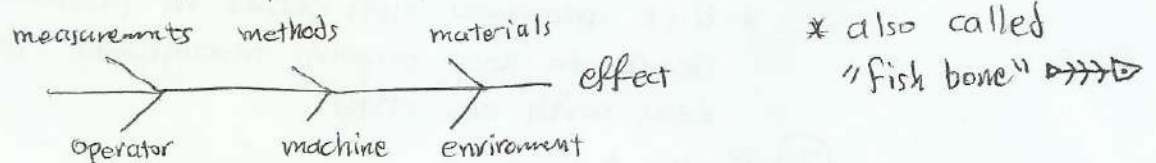
2 Little Q Monitoring & Control : Quality Control

- * day-to-day application of quality tools.
- * list of the available tools :

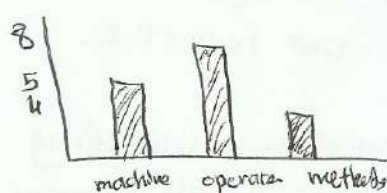
- ① Control charts : Identifies fluctuations that cause performance to go out of acceptable limits, example :



- ② Cause - And - Effect Diagram : used to identify root cause of a quality problem, example :

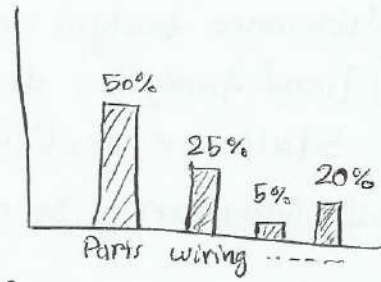


- ③ Histograms : bar chart presented in vertical format that shows how often a given variable occurs, example :



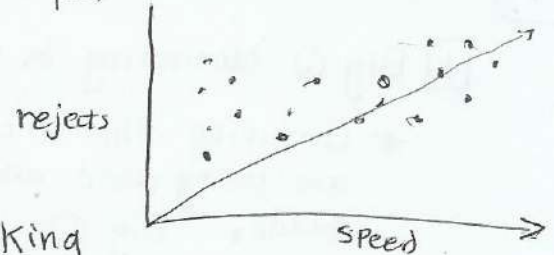
④ Pareto charts : special type of histograms that shows 13

Percentages, example:



⑤ Scatter Diagrams :
used to graphically display the relationship between 2 factors, helps finding how changing a variable would affect the other, example,

in this example,
the faster the machine
the higher rejects



⑥ Statistical Sampling : picking a random sample of smaller percentage (10%, 5%) do represents the larger set, if production line has produced 1000 products, the testing randomly picked 100 products is enough to represent the whole 1000 products.

⑦ Inspections : do them throughout the whole project.

5

Monitoring Risk

- * Risk might come from anticipated sources (covered in CH7) or it might be new source, we need to update response strategies to deal with that or using contingencies built-in.

- * Recorded in lessons-learned in closeout.

- * Risk Monitoring Tools:

① Ongoing Risk Assessment :

- * Risk assessment first occurs in planning phase, but it needs to keep ongoing throughout the project to deal with new risks.

② Risk Audits

- * Audits Aim to measure the effectiveness of the risk responses.

③ Variance & Trend Analysis

- * Same as EVA but for risk.

- * Note that all risk documents - including risk register - should be updated to reflect all changes/revisions.