Project Management

09/05/18

What is a Project?

- Interrelated set of activities with a definite start and end point, which results in a unique outcome for a specific allocation of resources. Ex. building a stadium, advertising campaign, new product

What is Project Management?

- the application of knowledge, skills, tools, & techniques to a broad range of activities in order to meet the requirements of a particular project.

Types of Projects

- Computer - Hardware - Computer assembly, web service, data center
- Computer - Software - System software, programming software
- HealthCare - New ICU unit, removing old and installing new equipment
- Product Development - XBOX 360, new IPhone, etc.
- Construction Project - Residential, Commercial, Industrial

Comparison of Project & General Management

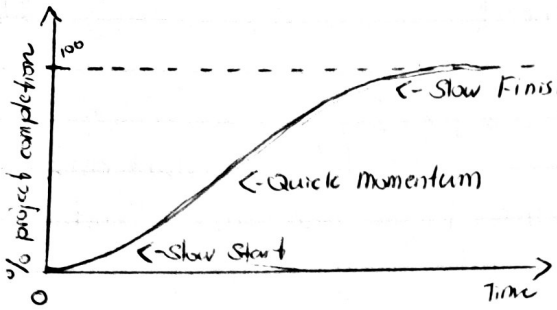
	Project Management	General Management
Types of work activity	Unique	Routine
Management approach	Ability to adapt to change	* Manage by exception
Planning	Critical	Important
Budgeting	Start from stratch; Multiple	Modify from previous
Sequence of Activities	Must be determined	Often predetermined
Location of Work	Crosses organizational units	Within an organizational
Managerial Hierarchy	Informal	Well defined

* Manage by exception means everything is done routinely and general manager only deals with something done out of ordinary

Life Cycle of Projects

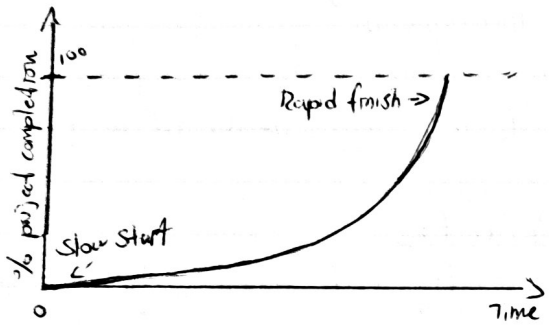
- there are two types of life cycles for projects

★★ Scope: the work that needs to be accomplished to deliver the project



S-Curve Project

- Prominent example is building a house. Has slow start, fast momentum, then slow finish for all the small stuff & details

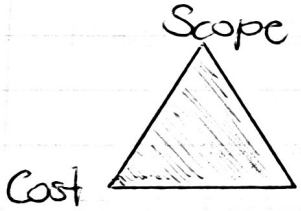


J-Curve Project

- Prominant example is production of computer software
- Chemical-engineering project

Project Management Triangle

- the traditional means of measuring project success with 3 key constraints



Time: the time to complete the project
Cost: the budget available
Scope: the scope & quality of final deliverable

Project Constraints

1. Resources
2. Risk
3. Customer Satt.
4. Scope
5. Quality
6. Stakeholder
7. Schedule
8. Budget

Project Failure Factors

1. Contracts & Legal Agreements
2. Politics & Conflicts
3. Decreased profitability
4. Unrealistic goals
5. Competitive Disadvantage
6. Client dissatisfaction

Six Factors of Project Success

1. Scope - ↑ scope = ↑ time, cost, resources ↑/↓ performance, value
2. Time - ↓ time = ↑ cost, resources, ↓ scope, value, performance
3. Cost - ↓ cost = ↑ time, ↑/↓ resources, ↓ scope, performance, value
4. Resources - ↓ resource = ↑ time, cost, ↓ scope, performance, value
5. Performance - ↓ Perform. = ↑ time, scope, cost ↑/↓ resources, value
6. Value - ↑ Value = ↑ time, cost ↑/↓ resources / performance

Project Selection

13/09/18

- Project Selection involves a process to ensure several conditions are considered:
  - 1. Potentially profitable?
  - 2. Is the project required?
  - 3. Does the firm have the skills?
  - 4. Does it have capacity to do it?
  - 5. Economically successful?

- Multiple criteria's may be applied based on qualitative and/or quantitative models.
  - Must align with the firm's business strategy

5 Catagories of Projects

① Compliance - Projects that are essential to meet new requirements imposed by internal & external ~~forces~~ entities
- Internal - executive management External - government regulation

② Emergency - Needed to meet emergency conditions; if not organization may not be fully operational

③ Mission Critical - Project that is critical to the mission of a company

④ Operational - Projects that are needed to support current operations
- i.e. increase process efficiency, reduce product cost, improve performance

⑤ Strategic - Projects that are essential to support long-range mission
- i.e. increase revenue, market share

Selection Methods

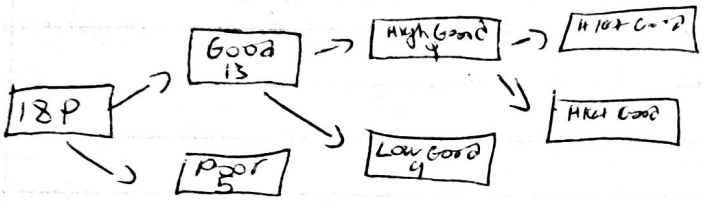
(A) Nonnumeric
1. Sacred Cow
2. Operating / Competitive Neccessity
3. Comparitive Benefits (Q-sort method)

(B) Numeric - uses numbers for evaluation
1. Financial Assessment methods
2. Financial options & Opportunity costs
3. Scoring Methods

(A) 1. Sacred Cow - CEO and/or another executive senior may suggest a potential product or service it might offer to customers
↳ Project will be approved no matter what

(A) 2. Operating - Method that selects project that is necessary for continued operation of firm
↳ Firm invests in unprofitable product/service but is competitive

(A) 3. Comparitive Benefits - Separate projects into 3 subsets; good, fair, bad. Subdivide the projects until each set has no more than 7/8 members. Rank order the items in each subset.



(B) A. Payback Period
- investment of $100,000
- returns of $25,000 p/y

$$\text{Payback} = \frac{\text{Fixed Investment}}{\text{Annual Inflow}} = \frac{100{,}000}{25{,}000}$$

Discounted Cash Flow - Considers, time value of money, inflation rate, ROI

$$V_t = \frac{F_t}{(1+K+p_t)^t}$$

F_t = Cash flow received in the future
K = rate of return
P_t = inflation
V_t = Net Present Vale

DCF does not take into account uncertainties in the future

Market uncertainties:
↳ Demand forecasts improve
↳ Economics risks realize
↳ Competitors decisions
↳ Customers need are assessed

Operational / technical uncertainties:
↳ Product / service designs improve
↳ Costs decrease for a firm
↳ Bugs or technical problems are solved

Scoring Method - Project selection based on different criteria's
↳ List multiple criteria of significant interest to management
↳ Each criteria is weighted and checked which are satisfied

Weighted Scoring Method - $S_i = \sum_{j=1}^{n} S_{ij} W_j$

S_i = total score of the i^{th} project
S_{ij} = the score of the i^{th} project on the j^{th} criterion
W_j = The weight or importance of the j^{th} criterion

Chapter 2 : The Manager, Organization & Team — 19/09/18

Selecting a Project Manager (PM)

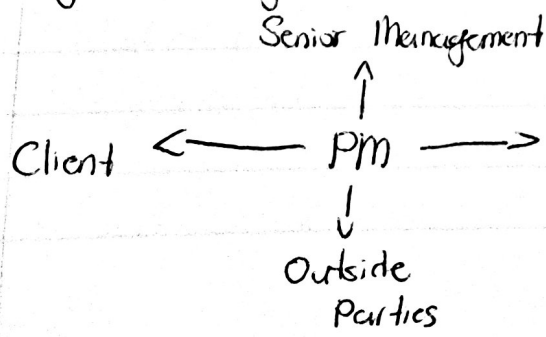
- Usually selected after project is selected
  ↳ Interview with senior management
  ↳ Calls a "lunch meeting" with stakeholders & knowledgable people

Project Manager Role: FACILITATOR

1. Managing well-established unit vs. multidisciplinary environment (PM)
   ↳ Must ensure those working on project have appropriate knowledge, resources & time
   ↳ Resolving conflicts between members of a project team

2. Analytical Approach vs. Systems Approach
   ↳ the former approach attempts to understand the bits and pieces of a system that a traditional manager uses.
   ↳ The latter approach understands the bits and how they fit together, interact, affect & are affected by their environment.
   ↳ A project is comprised of subsystems and subtasks, then so on...

Project Manager Role: Communicator & Stress



- A Project Manager must communicate effectively with various stakeholders.
- Needs to handle tons of stress that arise and deal with it.

Globalization & Virtual Project Manager

- Brings different problems like communication
  - L> So much is conducted via emails, telephone, or video conferencing
  - L> Miss facial and body language, rely on feedback

Pros: Foreign language skills
- Knowledge of culture
- Awareness of customs & etiquette
- Technology adoption

Cons: Adds dimension of complexity
- Changes project dynamics
- Requires awareness of factors - currency, culture, religion, politics

PM's Responsibilities

- PM must keep senior management up to date on project
  - L> Also inform them of any problems affecting the project
- Clients often want changes to the project - cost, schedule, scope
  - L> Help the client the impact of the changes
- Acquiring resources and fighting obstacles
- Making trade offs between cost, schedule, scope & risk
- Negotiation, conflict resolution, & persuasion

Developing Project Manager Competence

- Delegation - empowering each team member to reach the expected results for their area of responsibility
  - L> there are degrees of delegation, PM's should strive to use the highest
  - L> PM can use a checklist to rate effectiveness of delegation
- Changes always happen in a project by various stakeholders
  - L> PM needs to establish a change control system

Why Organisations Emphasize Projects?

1. Time-to-Market - being competitive
2. Need for specialized knowledge from variety of areas
3. Explosive rate of technological change
4. Need for accountability & control
5. Rapid growth of globalized industry

Pure Project Organization - Assemble & disassemble when project is done,
↳ Supplies, workers, & equipment arrive when needed E.g. building a stadium
↳ Effective & efficient in large projects, resources available when needed
↳ Lack specific knowledge, short lines of communication

Functional Project Organization - embeded in project's home functional group
↳ Immediate & direct contact
↳ Communication outside department slow, rarely given high priority

Matrix Project Organization - Combo advantages of Pure and Functional

Project Team Development
1. Forming - Individuals gets introduced and familiar.
↳ Positive expectations, define and plan the tasks
2. Storming - Start applying skills to work, increasing dissatisfication in PM
3. Norming - Conflicts resolved, teams accepted to environment, trust develops, and team members give and ask for feedback
4. Performing - High commitment, open communication, team empowered

Barriers to Team Effectiveness
1. Unclear vision and objective
2. Unclear definition of roles and responsibilities
3. Lack of project structure
4. Poor communication
5. Turnover of project team members

Project Scope

26/09/18

Establish Project Objective
- The planning process is based on the PROJECT OBJECTIVE, which states what is to be accomplished
- Project Objective stated in the PROJECT CHARTER that comes from the Request for Proposal (RFP)
- Usually defined in terms of the end product or deliverable, schedule and budget

• Requires completing the project scope and producing all the deliverables by a certain time & within budget

4 Elements of Project Objective

① Expected Benefits - It establishes why the project is being done and may include verbs such as "to increase", "to expand", etc.
② Primary project end product or deliverable - the final product/deliverable being made
③ Date - the project is required to be completed by
④ Budget - Within the project must be completed

★ Ex. To increase emergency room capacity by 20% and reduce average patient waiting time by 50% through a reconfiguration, and process improvement project to be completed in 12 months and with a budget of $400,000.

Defining Project Scope

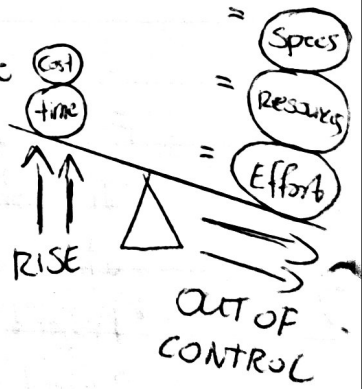
• All the work to produce all the project deliverables to meet the acceptance criteria
★ • Project scope accomplish the project objectives

4 Elements of Project Scope Document

① Customer Requirements - Functional, Operational, & performance specifications or capabilities
② Statement of Work (SOW) - Describes the work to be done in detail
③ Deliverables - Products or outputs that the team will produce for the client
④ Acceptance Criteria - All project deliverables must be described in great detail including quantitative measures or references to specifications, standards or codes
↳ Helps assure the quality of the deliverable and avoid misunderstanding
↳ The basis for the client agreeing that a deliverable is acceptable

Project Scope Creep

• Uncontrolled changes or continous growth in a project's scope
↳ Can occur when scope not properly defined, documented, or controlled.
↳ If budget, resources & schedule are increased ALONG with scope, that is an acceptable addition to project



4 Sources of Scope Creep

① Vagueness - When there is no clearly defined and controlled project scope
↳ Lay out all project boundaries in the Project Scope Document

② Weak Leadership - Stakeholders will change scope to suit their needs
↳ Stand your ground when people inflate scope, Communicate strongly with body l

③ Differing Stakeholders Opinions - Motivations vary wildly with stakeholders
↳ Limit stakeholders, determine motivations to arrive at a common ground

④ Late Involvement - Involving customers late in the process and give unanticipated feedba
↳ Collaborate with your clients early and often

Difference between Project Scope & Project Charter

- Project Charter contains the rationale for the project, the reasons for its existence, who initated it & why
  ↳ Serves the PM as a map of the route from project start to finish.
- Project Scope is a secondary function of the project charter
  ↳ Tries to encompass full scope of project in a paragraph or two

Project Charter

- Project authorization or project initation document serves a number of purposes
  ↳ Provides sponser approval to go forward with project
  ↳ Commits the funding for the project
  ↳ Summarizes key conditions & parameters for the project
  ↳ Establishes the framework for further elaboration of project scope

8 ELEMENTS OF PROJECT CHARTER

① Purpose - describes the business case for the project
↳ Strategic reasons, expected profitability, competitive effects, desired scope

② Objective - detailed description of primary end product/service, due date,
↳ Communicate to team what will be done to achieve overall project objec

③ Overview - intended for senior management
↳ Deliverables, milestones, significant events, constraints, profitability, competitive effects

④ Schedule - Summary of schedules and milestones
↳ Major tasks listed in Work Breakdown Structure (WBS)

⑤ Resource Requirements - Estimates of project expenses, overhead & fixed

⑥ Personnel & Stakeholders - describes stakeholders, sponsor, PM, any team members
↳ Special legal arrangements, special skill requirements & necessary training

⑦ Risk Management - List of major & minor potential disasters. Contingency plans

⑧ Evaluation Methods - Procedures & Quality standards, appraisals and audits @ ea

Work Breakdown Structure (WBS)
- Hierarchical decomposition of the project work scope into work packages
↳ Ensure that no task is overlooked
↳ Every task should be listed along with material and human resources
↳ Level 1 activities should be between 5-15 tasks
↳ Subsets under tasks like Level 2, 3, etc.

Mind Mapping: Whole-Brain Approach to Project Planning
- Process begins with writing project goal at center of page
- Team members brainstorm to identify major tasks to accomplish the goal
↳ Components are continuously broken down into more detailed tasks

Chapter 5: Scheduling a Project

03/10/18

Schedule: A listing of a project's milestones, activities, & deliverables, usually with intended start and finish dates

3 Types of Formats

① Gantt Charts ② PERT Network ③ CPM Network

- Program Evaluation & Review Technique (PERT) is a statistical tool
- Critical Path Method (CPM)
  ↳ Both independently developed in 50's and employ networks to schedule and display task

IMPORTANT DEFINITIONS

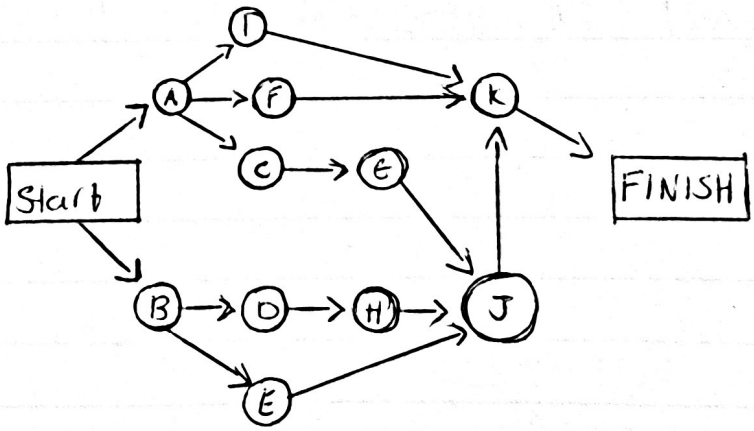
Activity: A task or set of tasks required by the project and use resource & time
Event: An identifiable state resulting from completion of one or more activities
Milestones: Identifiable and noteworthy events that mark significant progress
Network: A diagram of nodes (activities or events) and arrows that illustrate the technological relationships of activities
Path: A series of connected activities between two events
Critical Path: The set of activities on a path that, if delayed, will delay the completion date of the project
Critical Time: the time required to complete all activities on the critical path

TWO WAYS TO DISPLAY PROJECT NETWORK

① Activities on Arrows (AOA) Network
↳ Activities as arrows & events as nodes
↳ Generally more difficult but depicts technical relationships
↳ AOA usually associated with CPM

★② Activities on Nodes (AON) Network ≪ FOCUS
↳ Each task is shown as a node & technological relationship by arrows
↳ AON usually associated with PERT

Immediate Predecessor			
A	-	H	D
B	-	I	A
C	~~A~~	J	E, G, H
D	B	K	F, I, J
E	B		
F	A		
G	C		



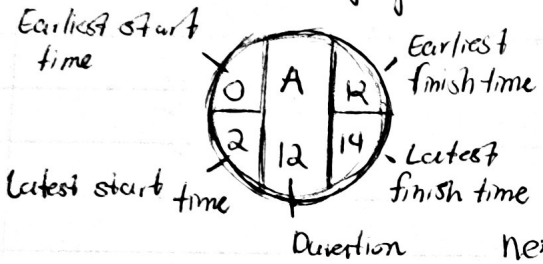
Earliest Start Time (ES) - The earliest finish time of the immediately preceeding activities

Earliest Finish Time (EF) - The earliest start time plus is estimated duration
EF = ES + t

Latest Finish Time (LF) - The latest start time of the activity that immediatly follows

Latest Start Time (LS) - the latest finish time minus its estimated duration LS = LF - t

Activity Slack - The maximum length of time an activity can be delayed without delaying the entire project LF - EF OR LS - ES



★ The longest time is the time to complete the project

★ Pick the latest Earliest Finish time for the next node's Earliest Start time

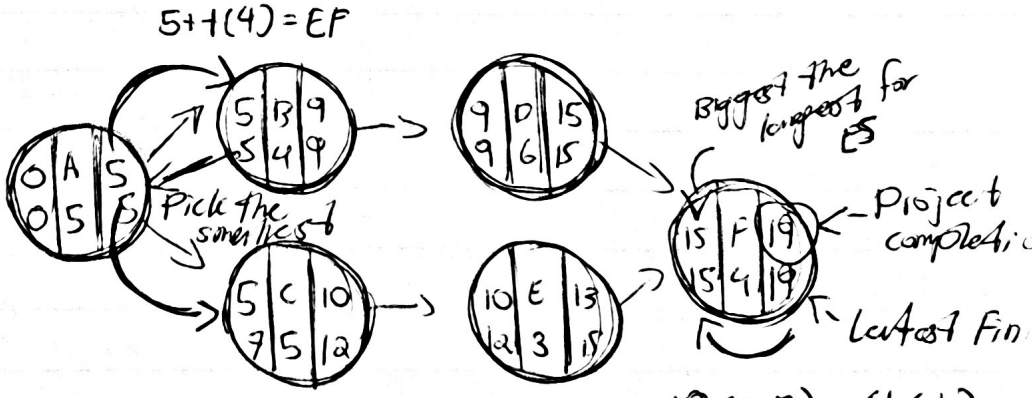
Finding the Critical Path

↳ All activities & paths must be completed to finish the project

↳ Shortest time for completion = longest path through network

↳ If any activity is delayed, projected is delayed

	Pred.	Dur.
A	-	5
B	A	4
C	A	5
D	B	6
E	C	3
F	D, E	4



19 (LF) - 4 (4)
= LS = 15

★ t = duration of event