IIT ROORKEE

NPTEL ONLINE CERTIFICATION COURSE

Project Management for Managers

Lec – 30

Product Mix and Plant Capacity Analysis

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Product Mix

- The choice of product mix is guided by market requirements. In the production of most of the items, variations in size and quality are aimed at satisfying a broad range of customers.

- While planning the production facilities of the firm, some flexibility with respect to the product mix must be sought.

Plant Capacity

- Plant capacity (also referred to as production capacity) refers to the volume or number of units that can be manufactured during a given period.
- Plant capacity may be defined in two ways : feasible normal capacity and nominal maximum capacity (Installed capacity)
- Several factors have a bearing on the capacity decision:

Plant Capacity

·**Investment cost:** (The investment cost per unit of capacity decreases as the plant capacity increases)

$C2 = C1 (Q2/Q1)^{\alpha}$

Where C2 is derived cost for Q2 units, C1 is the known cost for Q1 units of capacity, and α is factor reflecting capacity – cost relationship.

Ex: For 5000 units, the investment is Rs.1000,000. What would be the investment for 10,000 units. Given $\alpha = 0.6$.

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$C2 = 1000,000\ (2)^{0.6}$

Plant Capacity

·Technological requirement (cement plant – capacity of 300 tones per day- rotary kiln method, other wise use vertical shaft method for lower capacity)

·Input constraints: (power supply, raw material/ labor availability, etc.

·Market conditions: If favorable, then higher capacity of plant.

·Resources of the firm: Managerial and financial limit the capacity decision.

·Governmental policy :

Location and Site

Location refers to a broad area; site refers to a specific piece of land. The choice of location is influenced by a variety of considerations:

- **Proximity to raw materials and markets**
- **Availability of infrastructure**
- **Labour situation**
- **Governmental policies**
- **Other factors** **(climate conditions, general living conditions, proximity to ancillary, ease in coping up with pollution)**

Machineries and Equipment

- The requirement of machineries and equipment is dependent on production technology and plant capacity. It is influenced by the type of project.
- For a process-oriented industry, like a petrochemical unit, machineries and equipments required should be such that the various stages are matched well.
- The choices of machineries and equipment for a manufacturing industry is somewhat wider.

Structures and Civil Works

Structures and civil works may be divided into three categories:

- **Site preparation and development**: **(leveling, gardening, removal of existing structures, relocation of existing pipelines, cables, power lines, roads, reclamation of swamp, and draining and removal of standing water, connection of electric power, water, communication)**
- **Buildings and structures: (Factory building, stores, warehouse, laboratory, administrative building, staff welfare building, cafeteria, medical, etc)**
- **Outdoor works: (Handling and treatment of emission, wastages, effluents, transportation and traffic signals, out door lighting, boundary wall, fencing, gates, security posts)**

Environmental Aspects

The environmental aspects of projects have to be properly examined. The key issues that need to be considered in this respect are:

- What are the types of effluents and emissions generated ?
- What needs to be done for proper disposal of effluents and treatment of emissions ?
- Will the project be able to secure all environmental clearances and comply with all statutory requirements ?

Project Charts and Plant Layout

Once data is available on the principal dimensions (market size, plant capacity, production technology, building and civil works, etc.) of the project, project charts and layout may be prepared.

The important charts and layout drawings are :

(i) general functional layout,
(ii) material flow diagrams,
(iii) production line diagram,
(iv) transport layout,
(v) utility consumption points layout,
(vi) communication layout
(vii) organisational layout, and
(viii) plant layout

Plant Layout

The important considerations in preparing the plant layout are:

- **Consistency with production technology**
- **Smooth flow of goods from one stage to another**
- **Proper utilisation of space**
- **Scope for expansion**
- **Minimisation of production cost**
- **Safety of personnel**

Schedule of Project Implementation

As part of technical analysis, a project implementation schedule is also usually prepared. For preparing the project implementation schedule the following information is required:

- List of all possible activities from project planning to commencement of production
- The sequence in which various activities have to be performed
- The time required for performing various activities
- The resources normally required for performing various activities
- The implications of putting more resources or less resources than are normally required.

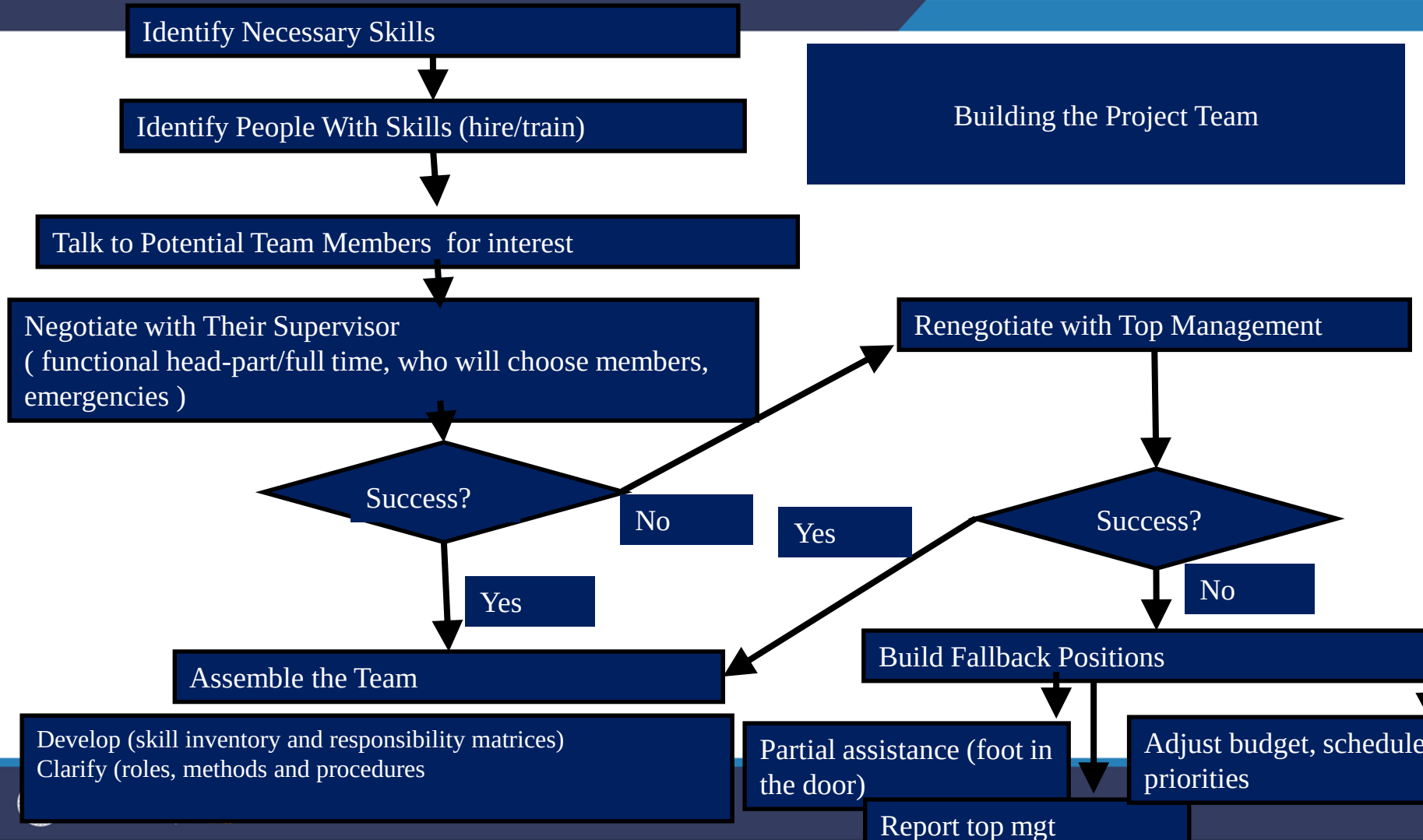
The Need for Considering Alternatives

There are alternative ways of transforming an idea into a concrete project. These alternatives may differ in one or more of the following aspects:

- Nature of project
- Production process
- Product quality
- Scale of operation and time phasing
- Location

Project Team Building, Conflict, and Negotiation

Building the Project Team



Effective Project Teams Should Have

- **Clear Sense of Mission:** Understanding of objectives.
- **Productive Interdependency:** degree of joint activity among team members required to complete project. (MIS,Engg, A/c,mkt, admin- give importance to interrelatedness of each others' efforts)
- **Cohesiveness:** Degree of mutual attraction that team members hold for each other and their task.
- **Trust:** Tam's **comfort level** with each individual member. How to build trust – PM – "what happens here stay here" (divulging of views and confidence betrayed). It takes time. It is 1 or 0, trust worthy or not (nothing like slightly trustworthy). Trust occurs at professional level, integrity level, and emotional level.