ENGINEERING MANAGEMENT

Management —

(1) Human Resources

Management Skills :— To deal with the manpower & (i)
(ii) machines & (iii) materials & (iv) money. [4 m]
Planning of location (climatic locations)
layout decision

Stage of Management
① Planning   ② Directing & Executing
③ Controlling   → Periodical checks

Quality :— Customer expectations are fulfilled.

Product has 2 f^n Also a necesides are
                                          Quality Product
① Core function
② Esteemed value   Product's
                               perceptions are different

way to ↑ee o/p

① Innovation,
   breakthrough   Producer
        ↓   Customer   (Certain
   Resources highly reduced (Expectations)   standards)
② i/p ↑ but o/p ↑↑↑   Tolerance
                                                 [deviation
   Productivity = $\dfrac{o/p}{i/p}$ o/p ↑   i/p ↓ $\dfrac{o/p↑}{i/p}$ (subordinate)

                              o/p ↑↑   i/p ↑
   manager → सावकी   o/p Ø↓   i/p ↓↓↓
                              o/p   i/p ↓

Supply chain — flow of goods from producer to consumer
Goods, Money & (Demand != supply not informed)
       ⤷ Information flow (bull vipi effect
                 ⤷प्रया   information
                                    distortion)

Project. (i) Planning (ii) Implement /Execute/ (iii) Control
Schedule

X → काम करने का

Y → Not doing work

Investment == Sale (Break even Point,) analysis

{ Fixed Cost + variable Cost ?

Brainstorming - Make 1 leader & ask other views.

(i) creation of ideas (iii) Important pts good

(ii) Elimination of idea (Feasible or not)

FMCG : Fast Moving Consumers Good
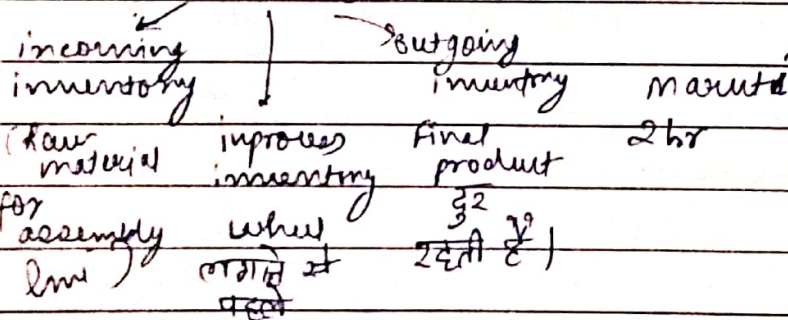↳ Biscuits

Industrial Management Prime objectives —

① To ↑se productivity (inventory → store house)

Eliminate waste (inventory reduction)

3 company

3000 cars /day 1 car = ₹ 7,00,000

Inventory inventory is a necessary evil

incoming } →outgoing lead time :- order
inventory inventory maruti place करो. 2 में आता 3 महीने/

(raw improves final 2hr JIT System
material inventory product (Just In Time)
for assembly when 32 ↳ TPPS
low) चाहिए तो 2ची है। Toyota Production System

Cost = ₹ 2 10 0,00,00,000 } wastages

Outgoing inventory = Cost * 5 =

(Non value added activities)

Resources manpower, machine Energy
money, material

SYSTEM DESIGN :-
• System capacity. - Decision for 5 decades

② Location of facilities — 1 time decision
③ Arrangement of departments — 20 to 25 yrs decision
  ↳ CSE dept.

④ Product & services planning
  ↳ what you gonna serve
  Stick on core competancy
  NIT should not start MBA

$$E = mc^2$$
$$E = Excellence$$
$$m = motivation$$
$$C = committment$$

⑤ Acquisition & placement of equipment   (Long term)

⑥ management of Personnel
⑦ Inventory planning & control
⑧ Scheduling
⑨ Project management   → Timelining task   Cost vs Time
                                                    tradeoff
⑩ Quality assurance   (customer expectation + Producer)

* Management functions
                                                    ERP
① Planning ————→ Requirements gathering, technical i/p.
                      people, time deadline.
② Organizing ——→ Proper , Assigning tasks , Allocating resources
③ Staffing → Recruitment of requirements
④ Directing —→ Guiding & motivating people to work hard.
⑤ Controlling → Salary cut, monetory benifit, pay ↑se, threat
   Punishment is the type of motivation
   Rewards is also the type of motivation

   ergonomics >   ↳ Desktop vs the System (Desktop)
   Industrial Engineering .

Productivity = $\dfrac{\text{current} - \text{previous}}{\text{previous}}$

KPIs : key performance index Indicators
MANIT   placement 80% ———→ 85%   thought of 90%
        research   deficiency = 5%
        intake
        anual budge
        infrastructure improvement

firm   KPIs ———→ Sales, Profit,
Kaplan & Norton   ———→ HBR (Harvard Business Reviews)
                              ↳ TOP journal in management

✱ any financial org. can't only be measured on the basis of finance
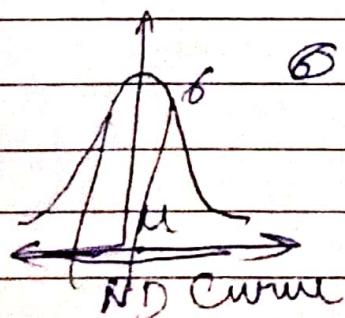 ↳ created . Balanced Score Card (BSC)
  4 Parameters —   developed by Kaplan & Norton in 2004
                                    in HBR
① Finance : How should the we look to our shareholders
② Per customers Relation How should be we look to our
                                                     customers?
④ (work culture) Learning & Growing
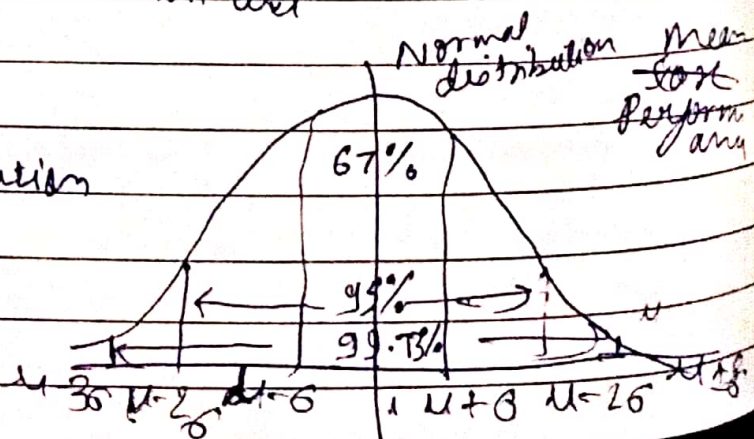③ (operational) Processes — At which business processes must be
                                   ^   exist?

xpis in Finance-
(i) Become industry cost expert in market   २।२-८। material
Dimension   Objectives   target in kpi   target KPI score
                                                          results
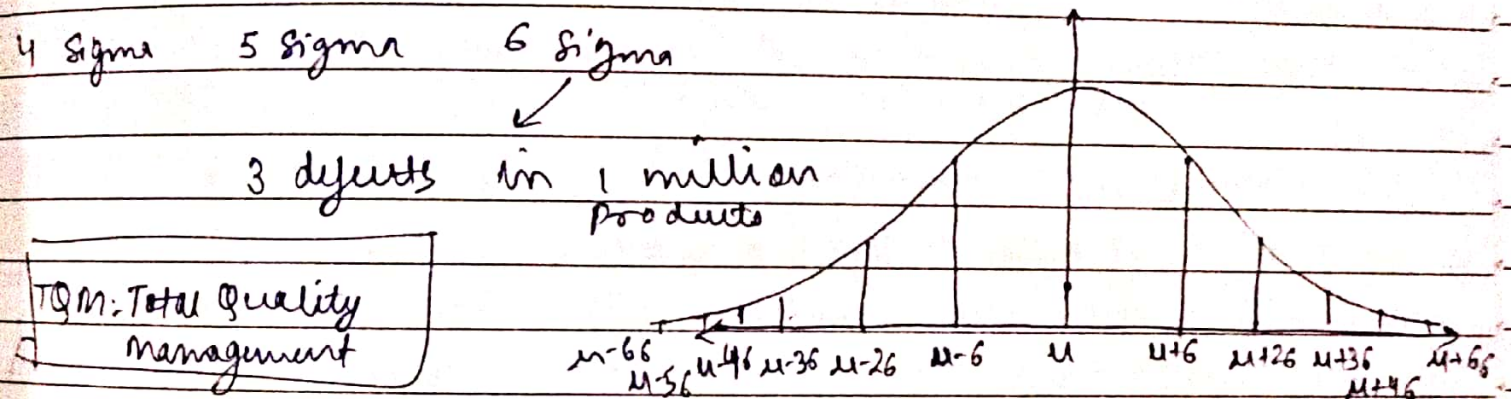Productivity Becomes Cost Leader % reduction
                                   in cost
Growth

⑥ Six Sigma Certification
  ↳ ठीक ढंग

ND Curve

Normal distribution mean
                         cost
                       perform
                         any
67%
95%
99.73%
μ-3σ μ-σ   μ+σ μ-2σ

67%	One Sigma	1σ		B+	
2	Two Sigma	2σ	95%	A	Extraordinary
	Three Sigma	3σ	99.73%	A+	(100-99.73)% =
	Four Sigma	4σ			0.27% if the products are
	Five Sigma	5σ			not as per
	Six Sigma	6σ			the quality products

Asian Heart Hospital → Best hospital situated in Mumbai
Six Sigma Certified

Sigma 1 Million → 2700 deaths

$$\frac{0.27}{100} \quad 1,000,000$$

No compromise should be there

4 Sigma   5 Sigma   6 Sigma
↓
3 defects in 1 million products

TQM : Total Quality Management

Mumbai Dabbawala → 6 Sigma

To achieve 6 Sigma —
follow TQM
→ Demin

Quality means doing it right when no one is looking

Quality is not an act but a habit

Compromising Quality
① Toyota cars
② bp ⇌ Transocean US
③ Rocket

→ Dabawala :-
Ⓞ leader   no extra salary
Ⓞ Customer is God
Ⓞ No strike
Ⓞ Value added services

work is workship   (Bonus)

Ⓞ No legal
(Salary, watch)
mobile

even

Ⓞ Passionate
Ⓞ Retention
Zero attrition rate
Work

Dr. Pawan Agrawal

Coding System   Responsibility of work
Business ethics   Time consistent.

Factors to determine plant Location —

Guergoan + ~~faw~~ ~~ro~~ Industrial area   → Reoan; Delhi connectivity
                    (Automobile)

Banglore [IT hub] — connectivity { Easy to Dunlop other company at same area (easy availability of man power)

Wallmart takes orders from Bangladesh [

BPOs culture in India & China

Global source तो Tier-1 की जरूरत नहीं]

① Neemuch, Nagda & shrinpuri → cement industry
            Raw material = Rock
② NTPC electricity in Haridwar (Source of operating point near)
③ Tier-1 city (Near to pot^n market) (Labour)
④ Transport & communication facilities [Tier-1 IIT Indore]
⑤ Integration with other companies (TATA + suppliers)

Price Minus system : Price of product divided   (Tyre आदि की
or Cost Minus system ,   En: TATA Nano   Engine change)
        (Ancillary units)   in Bengal

Gift City : Gujarat
    Trading ~~city~~ cost ↑↑↑   Singapore , Hong Kong
    ~~Dholera City~~ ↳ Foreign Exchange   की से है |
    Financial Hub
⑥   Land & climate   (Banglore)
⑦   Govt. benefits (tax benefit, etc)   → Uttarakhand SEZs
            Honda units,   ←   Rudrapur excise duty naming

- Availability of housing & service
- Political situation . Mamta Banerjee.

Types of Facilities -
1. Heavy manufacturing — — NTPC BHEL
2. Light industry facilities — Biscuits, Proximity to city
3. Retail & service — Bank, customer location

Location Analysis Techniques, (Management)
1. Location Rating factor
2. Centre of gravity factor

Location Rating factor
(i) Identify imp. factors.
(ii) Weight factor (0.00 – 1.00)
(iii) Subjectively score each factor (0 – 100)
(iv) Sum weighted score.

Q)

Location factor	wt.	Site 1	Site 2	Site 3
		score (0 to 100)		
Labour	0.3	80 .	65	90
Proximity to supplier	0.2	100		subjectively लिख दोगे है

$\sum wt_j (f_i)_{site_1}$

$\sum = 1$

City 1 – 77.5
City 2 – 80.8
City 3 – 82.05 ✓

Problem:
(ii) R कोई factor miss (TATA – Political factor miss)
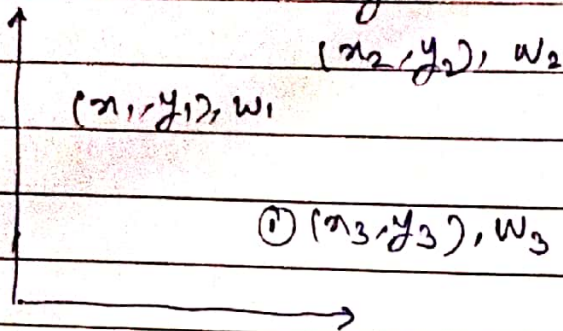   Nano
(i) Weights गलत assign.

2. Centre of gravity
(i) Locate facility at center of geographic area
(ii) Based on wt & dist. travelled establish grid-map area.
(iii) Identify coordinates & weights shipped for each location

(OEMs)

If you know where are your suppliers and or market to.
[How much load you are transporting]

$(x_2, y_2), W_2$

$(x_1, y_1), W_1$

$x = \dfrac{\Sigma x_i w_i}{\Sigma w_i}$

① $(x_3, y_3), W_3$

$y = \dfrac{\Sigma y_i w_i}{\Sigma w_i}$

x, y : coordinates of new facility at COG

x_i, y_i : coordinates of existing facility i

w_i : annual unt. shipped from facility i.

$\begin{bmatrix} x = 238 \\ y = 444 \end{bmatrix}$ COG (Centre of Gravity)

	A	B	C	D
x	200	100	250	500
y	200	500	600	300
W	75	105	135	60

75
105
135
60
___
375

COG = If say is parliament then management helps to decide the location

Load Dist. Technique
i) compute (Load × Distance) for each site.
ii) Choose site with lowest (load × distance)
iii) dist. can be actual or straight line.

$$LD = \sum_{i=1}^{n} l_i d_i$$

↳ Load Dist value

↳ Load

→ load expressed as a unt., number of trips or units being shipped from proposed

360

Farm sity   supplius

		A	B	C	D
x	360	180			
x			200	100	
y					

l
3

sited   wt → Load

$$d_A = \sqrt{(x_A - x_1)^2 + (y_A - y_1)^2}$$

200 - 360   200 - 180

method.

1. Where to locate based on factors

2. Based on suppliers/m locate.

3. Solution among sites + Locations info

420   COG $\begin{cases} x = 290.47 \\ y = 311.90 \end{cases}$

	A	B	C
X	$X_a = 150$	$X_b = 300$	$X_c = 400$
Y	$Y_A = 250$	$Y_b = 100$	$Y_c = 500$
Wt	$Wt = 140$	110	170

Facility layout Decisions