University
Exercise Book

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4-1
Industrial Management
ME-4117

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06.05.18.

Four pillers of Management:

1. Planning → Min. resource, max. output.
2. Organizing → Chain of command, work break down structure (WBDS)
3. Leading
4. Controlling → feedback, Conformance (As per specification)

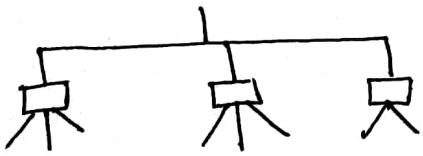
[1] Feasible point → Optimal solution

Capacity → Fixed time duration

1. Design Capacity → Theoritical max. capacity.
2. Effective Capacity → Actual output < Design capacity.

Due to machine maintenance, fatigue etc.

[2] Project



Project
↓
Task
↓
Subtask
↓
Work package

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Total Quality Management → TQM

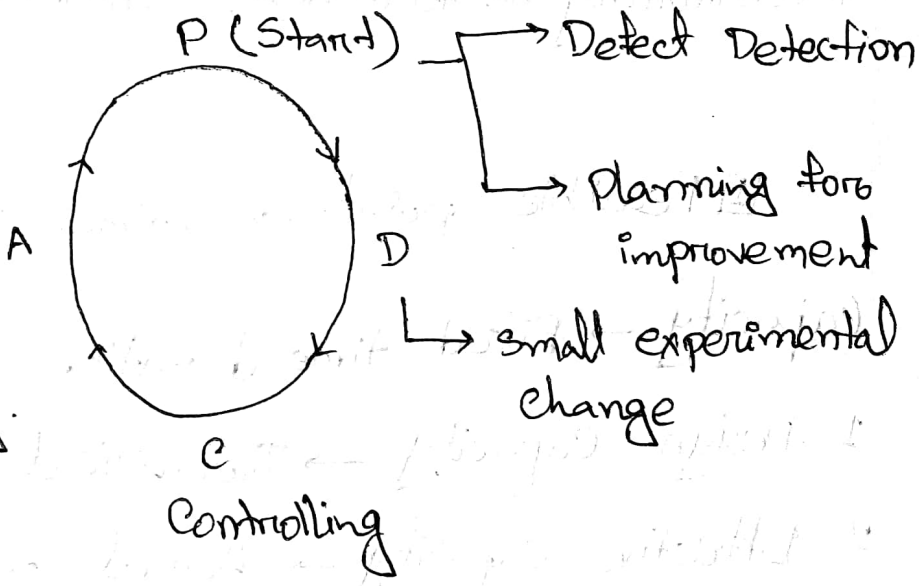
Tool of TQM

↳ PDCA cycle / Shewart cycle / Deming wheel

↳ Plan Do Check Act.

Continual process of betterment

BPR



large scale change for full facility.

(A never ending process)

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08.05.18.

Definition of Management:

Process of designing and maintaining an environment in which individuals, working together in groups.

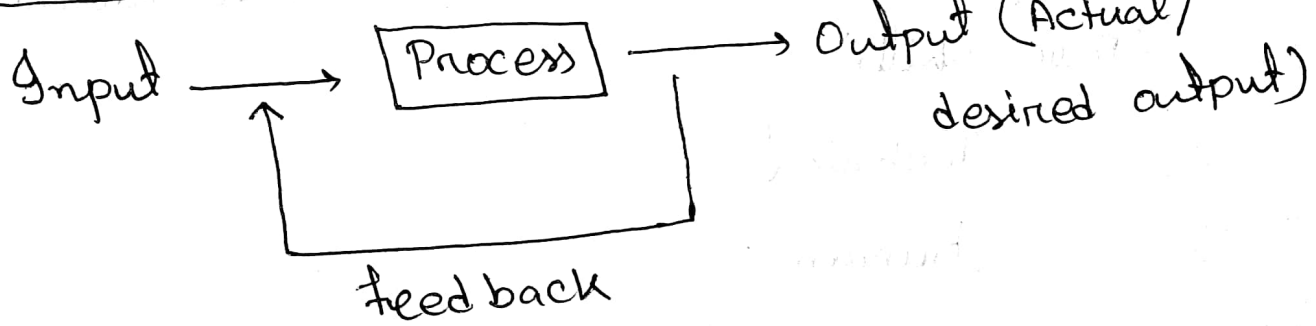
* Organizational level:

Top line

Middle line

bottom line / Supervisor level

Staffing



The process will continue, Unless actual output = desired output

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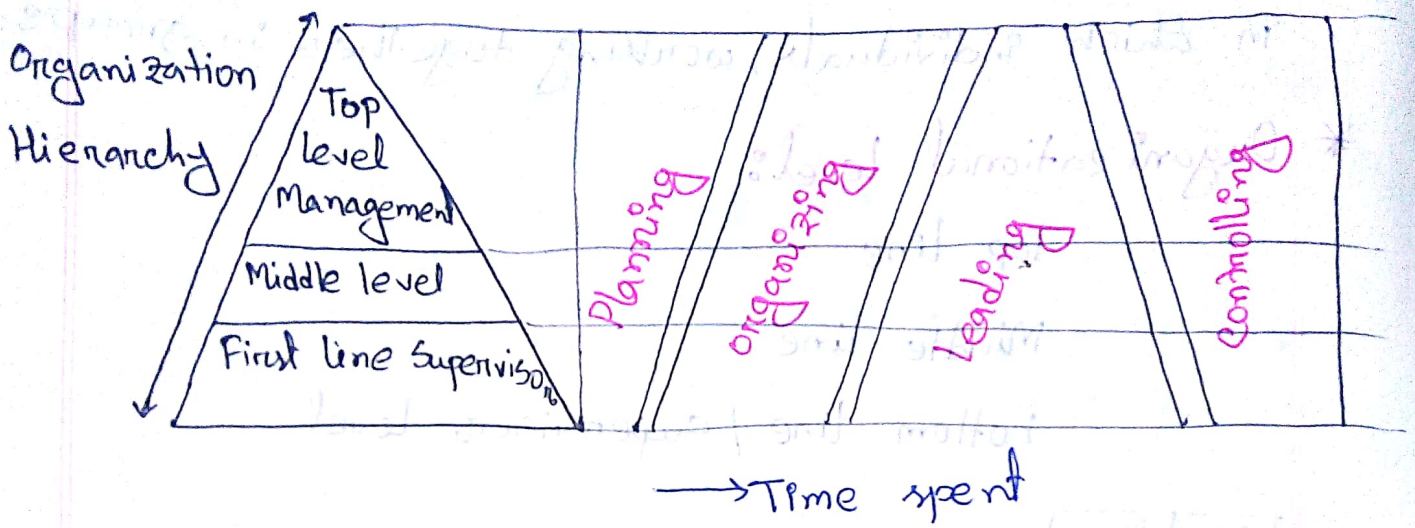
* Managerial Functions at Different Organizational Levels:



* Managerial Skills and organizational Hierarchy:

(Four skills)

- Technical
- Human
- Conceptual
- Design skills

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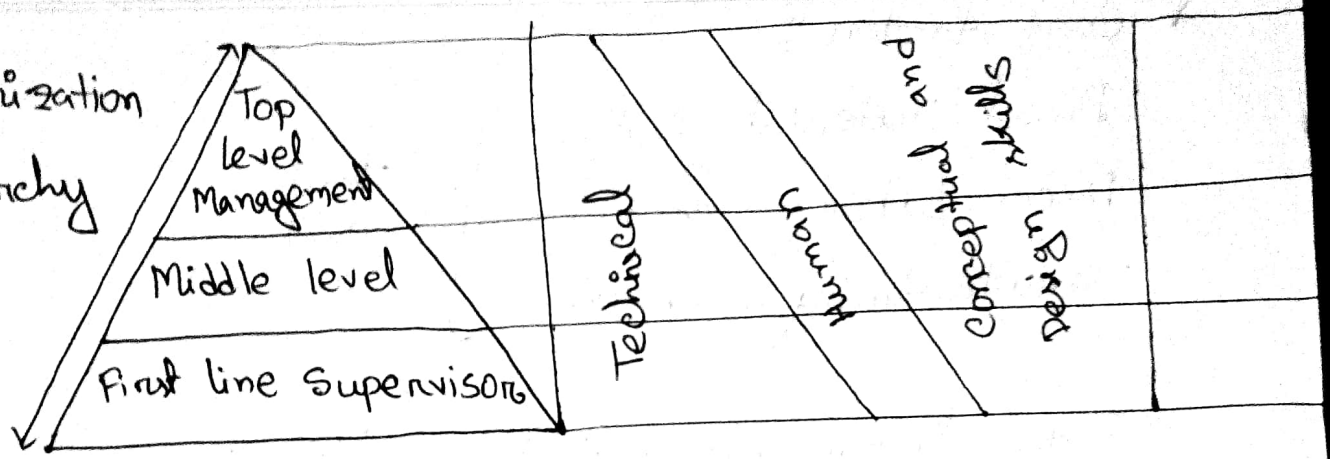
organization Hierarchy



* The goals of all managers and organizations:
  * Surplus of:

    Business organization ⟶ Profit

    Nonprofit " ⟶ Satisfaction of needs

* Key Terms:

  * Productivity

$$= \frac{\text{output}}{\text{input}}$$ (time period & quality is fixed)

(time / cost)

↓ Unit time ⟶ Unit cost

  * How to increase
  * Total-factor productivity
  * Partial productivity
  * Efficiency
  * Effectiveness

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* Cost factor:

Direct Material Cost
Direct Labor cost
Manufacturing over cost
} Total cost

Total factor productivity $= \frac{100}{\text{Total cost}}$

$100 + 50 + 150$

If output = 100 unit

DM cost = 100 TK

DL cost = 50 TK

MO Cost = 100 TK

* Productivity in terms of direct material

$= \frac{\text{output}}{\text{Direct material cost}} = \frac{100}{100}$

Efficiency = To do the things in the right way.

Effectiveness = To do right things.

Ref. Book → Management (a global perspective)

— Heinz weihrich, Harold Koontz.

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* Key Terms:

Capacity

Design capacity (Theoritically max. output)

Effective capacity (Actual output)

Efficiency

Utilization.

* Capacity:

Output of a system in a particular amount of time.

Design capacity > Effective capacity

↓

due to loss

$$\text{Efficiency} = \frac{\text{output}}{\text{Effective capacity}}$$

$$\text{Utilization} = \frac{\text{output}}{\text{Design capacity}}$$

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* Efficiency > Utilization at constant output.

* Principle of Management:

1. Fredrick Taylor's Scientific management:

Experience → Rules of thumb.

2. Henri Fayol's modern operational management theory:

Father of modern management theory.

14 principles → Search

Division of work

Authority and responsibility

Unity of command

Unity of Direction

Subordination of Individual interest

Remuneration

The degree of centralization

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Scalar chain

Order

Equity

Stability of Tenure of Personnel

Initiative

Esprit de Corps (Unit of employees).

3. Elton Mayo and F.J. Roethlis bergen's Hawthorne Studies:

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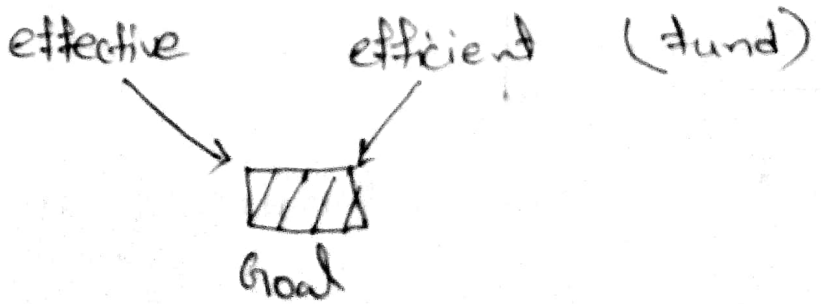
13.05.18

* Financial Management:

Refers to the efficient and effective management of money (funds) in such a manner as to accomplish the objectives of the organization.



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Planning
↑
fund

* 10 basic Principles of Financial Management:

→ Organize your Finances.

Organize — what you have?

planning — what you need to do?

→ Spend Less Than You Earn.

→ Put your money to work.

"Time value of money"

Future value (FV) = Present value (PV) $(1+i)^n$

n → Time

i → interest

$$\boxed{FV = PV(1+i)^n}$$

→ Limit Debt to Income Producing Assets.

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→ Continuously Educate Yourself.

→ Understand Risk.

→ Diversification is Not Just for Investments.

→ Maximize Your Employment Benefits.

→ Pay Attention to Taxes.

→ Plan for the Unexpected.

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CT-1

Next Sunday

Class Time

Till Here Syllabus

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⇒ Ref. Book → Quality control and management.

— Dr. Ahsan Akter Hasin.
(TQM)

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15.05.18.

Management of Innovation:

R&D
→ Research & Development.

Common Tools:

Brainstorming
Virtual prototyping
⋮

* Innovation process may be either pushed or pulled process.

Pushed → Technology
(i.e. Garments)

Pulled → Technology
(i.e. Tailor)

Customer needs

Common Tools:

✓ Brainstorming
✓ Virtual prototyping
✓ Product lifecycle management.

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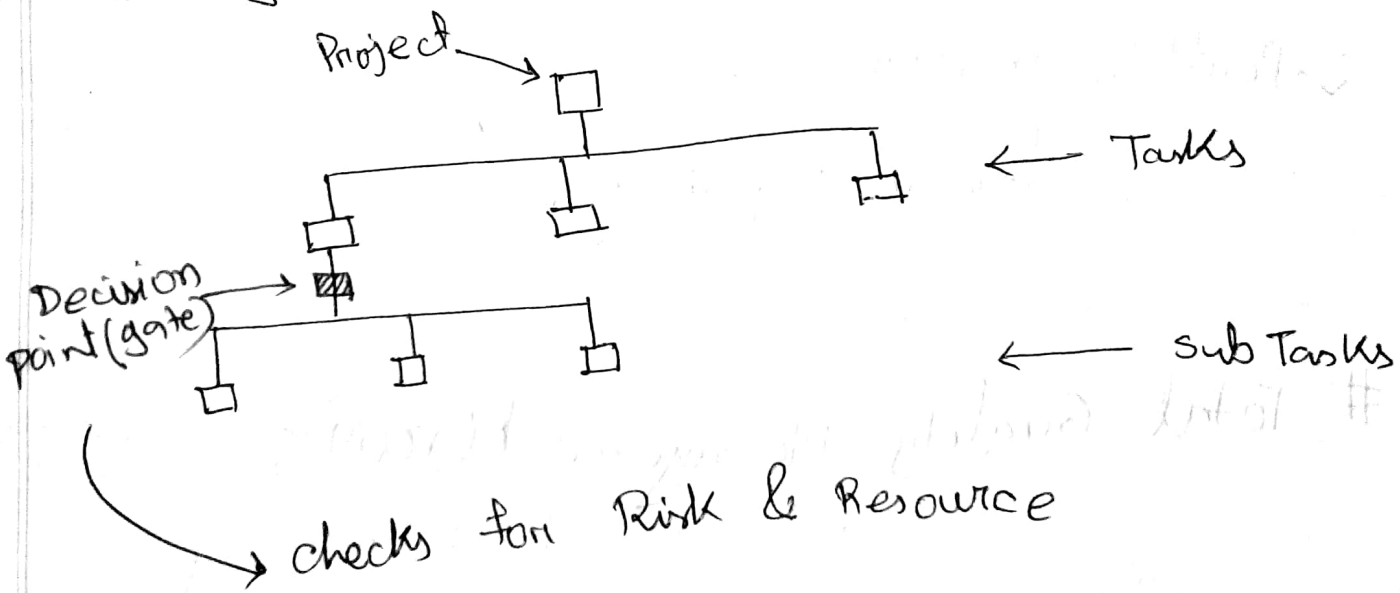
Trade-off
- Competition → ↓ Product lifecycle
- Quality → ↑ (")

✓ Idea management.

✓ TRIZ (Theory of the Resolution of Invention-related tasks)

✓ Phase gate model.



✓ Project Management.

Goal

Specific Time.

* Primary constraints → scope, time, quality and budget.

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✓ Product line planning.

Marketing
↓
Product
↓
Product line

{ Minimize marketing risk.
{ Maximize difference among items.

✓ Portfolio management.

Investment policy

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Total Quality Management (TQM): 16.05.18

Organization level activity.

Quality → Customer's Satisfaction.

* TQM in different stages in product development.

Quality Function Deployment → QFD.

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Production Activity Control → PAC

Shop floor control → SFC

Characteristics of TQM:

* Continual improvement:
* Customer focus:
* Organization-wide activity.
* Employee empowerment.

  Power dedication

  gives birth to Quality circle (QC).

  ↓

  Volunteer work

* Team approach.
* Competitive benchmarking.
* Knowledge of tools.
* Internal and external customers.
* Long-term relationship with the suppliers.

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20.05.18.

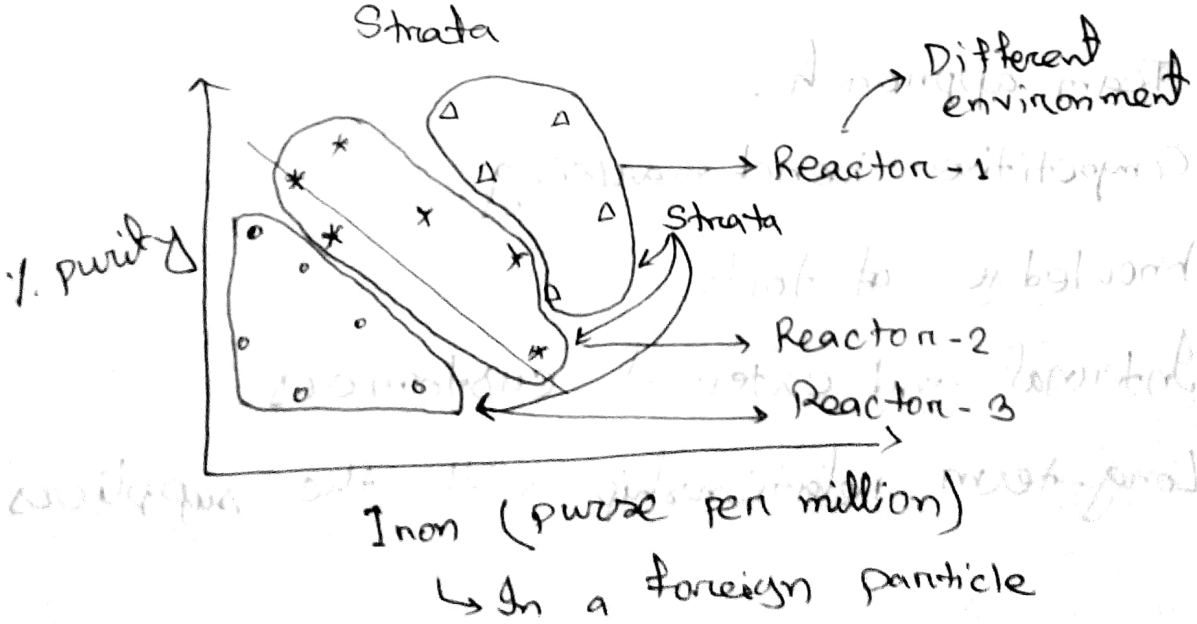
Tools of TQM:

1. Check sheet.

Type	Tally	Frequency
Distortion	~~IIII~~ II	7
Crack	~~IIII~~	5
Spatter	III	3

2. Stratification analysis.

Data
↓
Strata



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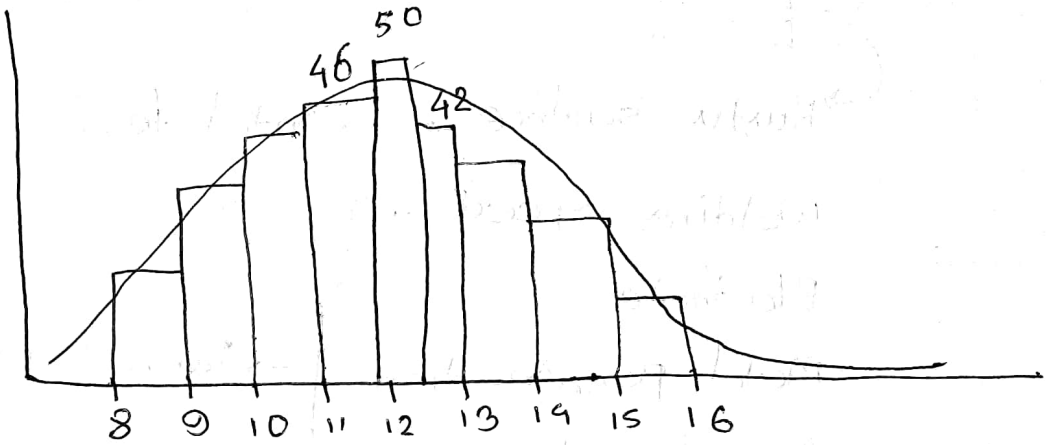
3. Histogram.

Frequency Distribution → Graphical view.

12 cm → Desired value

9-15 cm → tolerance

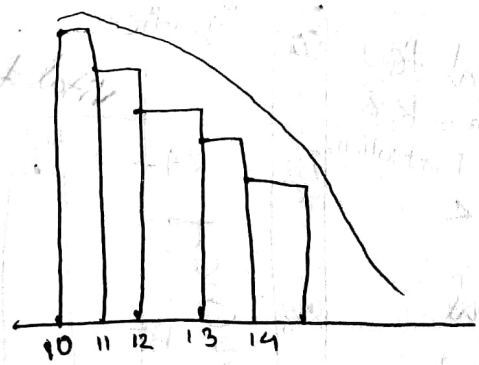


Normal → Distribution.

Acceptance Range

(i) Normal Distribution

(ii) Skewed "



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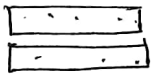
4. Pareto Analysis.

Vital few

Trivial many

Chapter-3
page-39

Welding



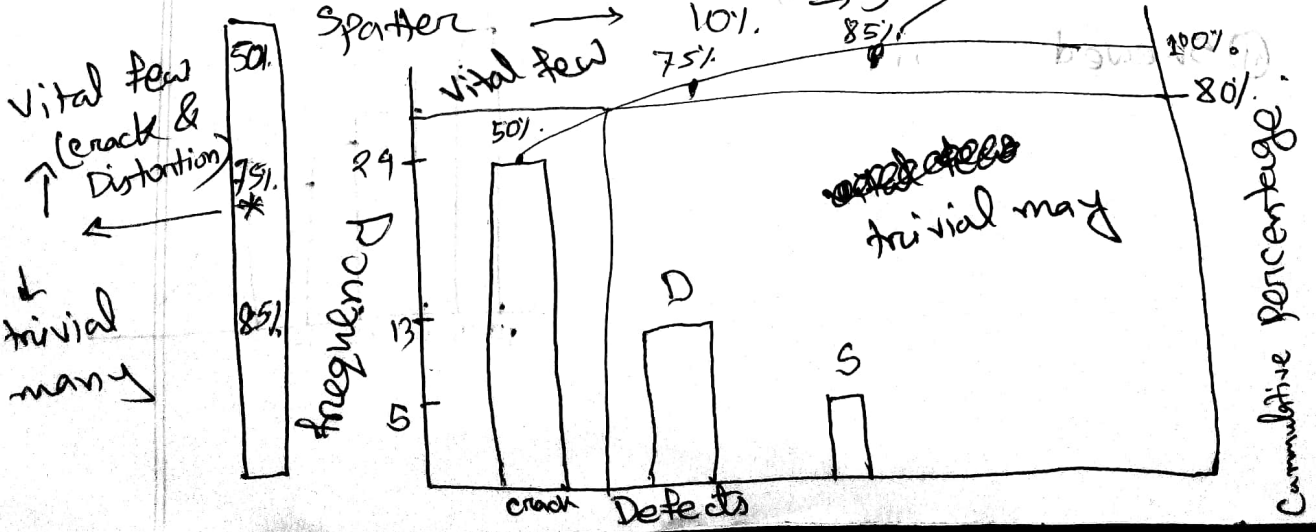
→ Rusty surface → vital few

Welding speed
Electrode
Metal penatration
Arc length.
} → trivial many

	frequency	
Crack →	50%	→ 24
Distortion →	25%	→ 13
Spatter →	10%	→ 5

$\frac{24}{\text{Total sum of frequency}} \times 100\%$

cummulative percentage sum



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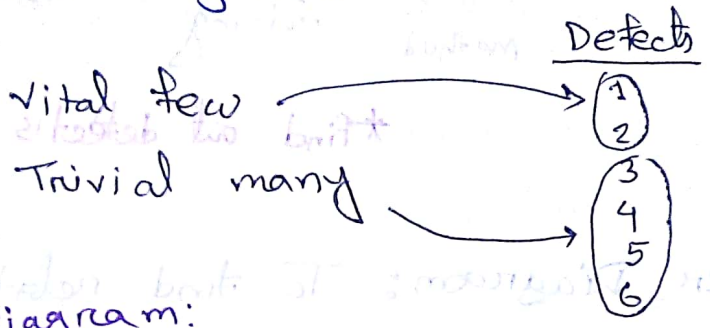
22.05.18.

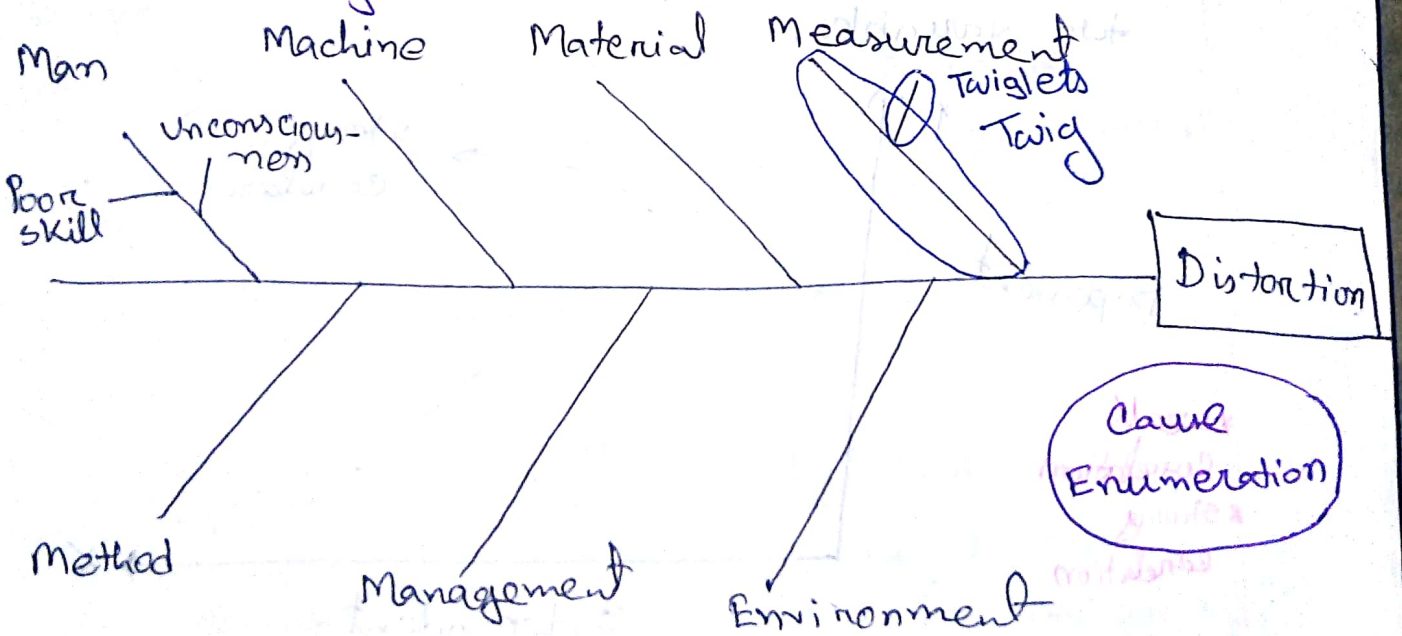
5. Process flow chart:

Input → [S-1] → [S-2] → [S-3] → output.

6. Cause-effect Diagram:



Fishbone Diagram:



Check sheet → Frequency

↓

Pareto Analysis → vital few

↓

Cause-effect Diagram → Reason/cause finding

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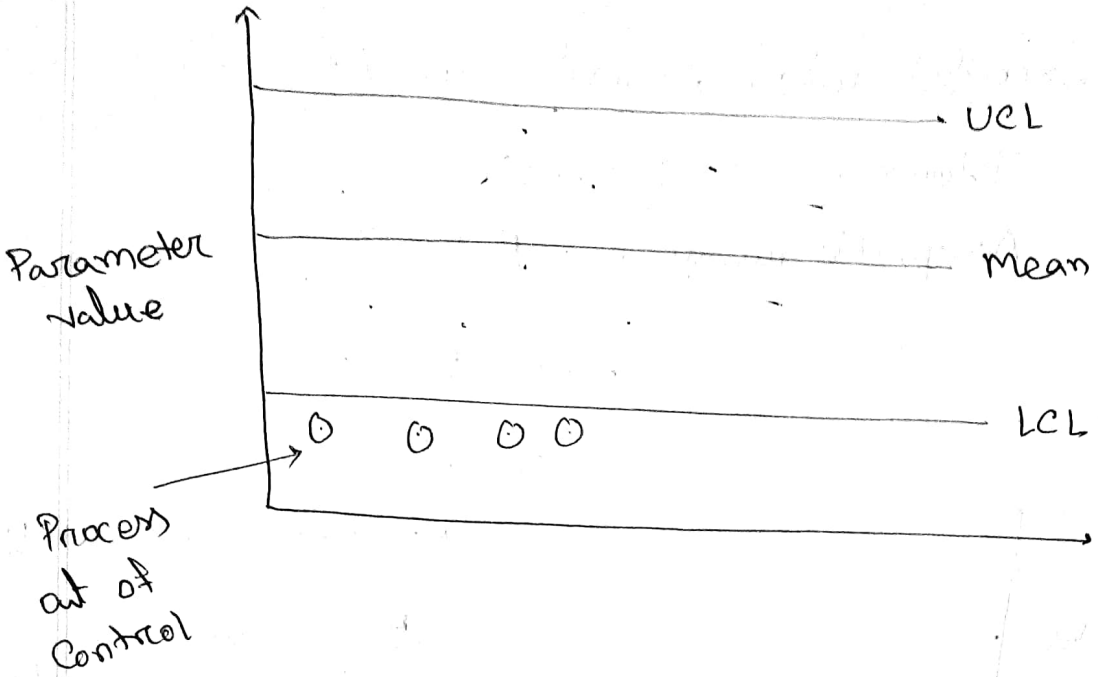
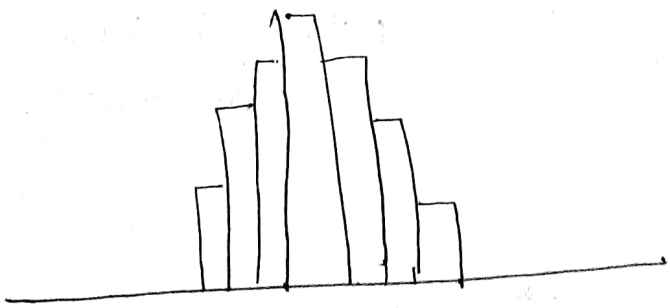
24.05.18.

Control Chart:



* Deviation:

1. Chance / Common Cause → Not removable
   → Small variation
2. Assignable cause → large deviation
   → Too much → Process out of control.



* Normal distribution for discrete value

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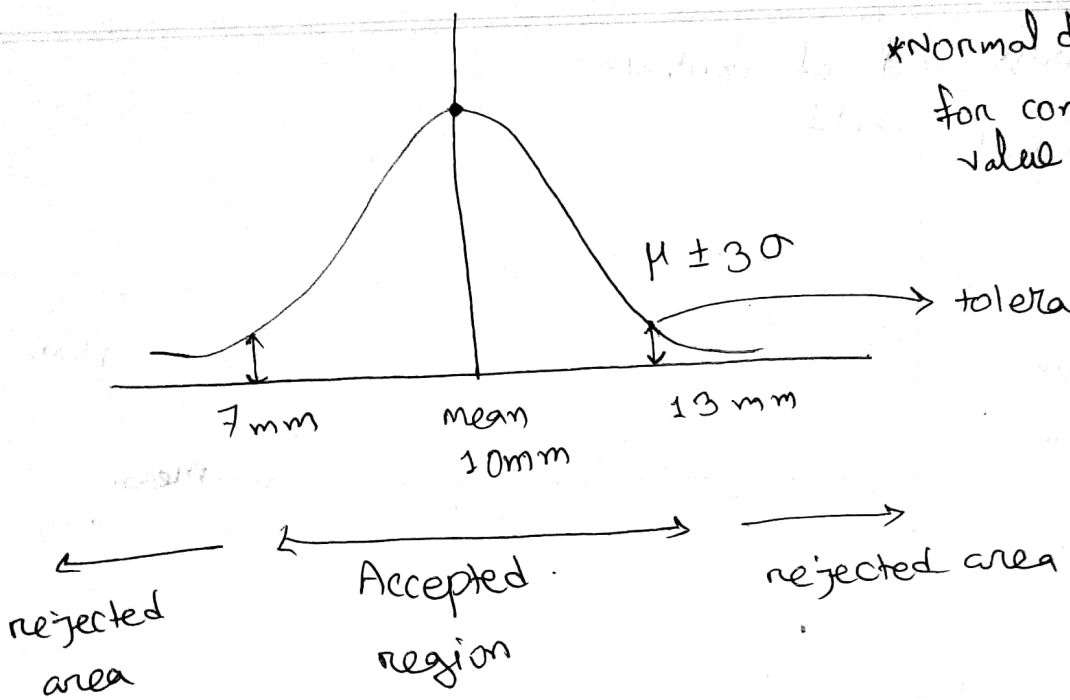
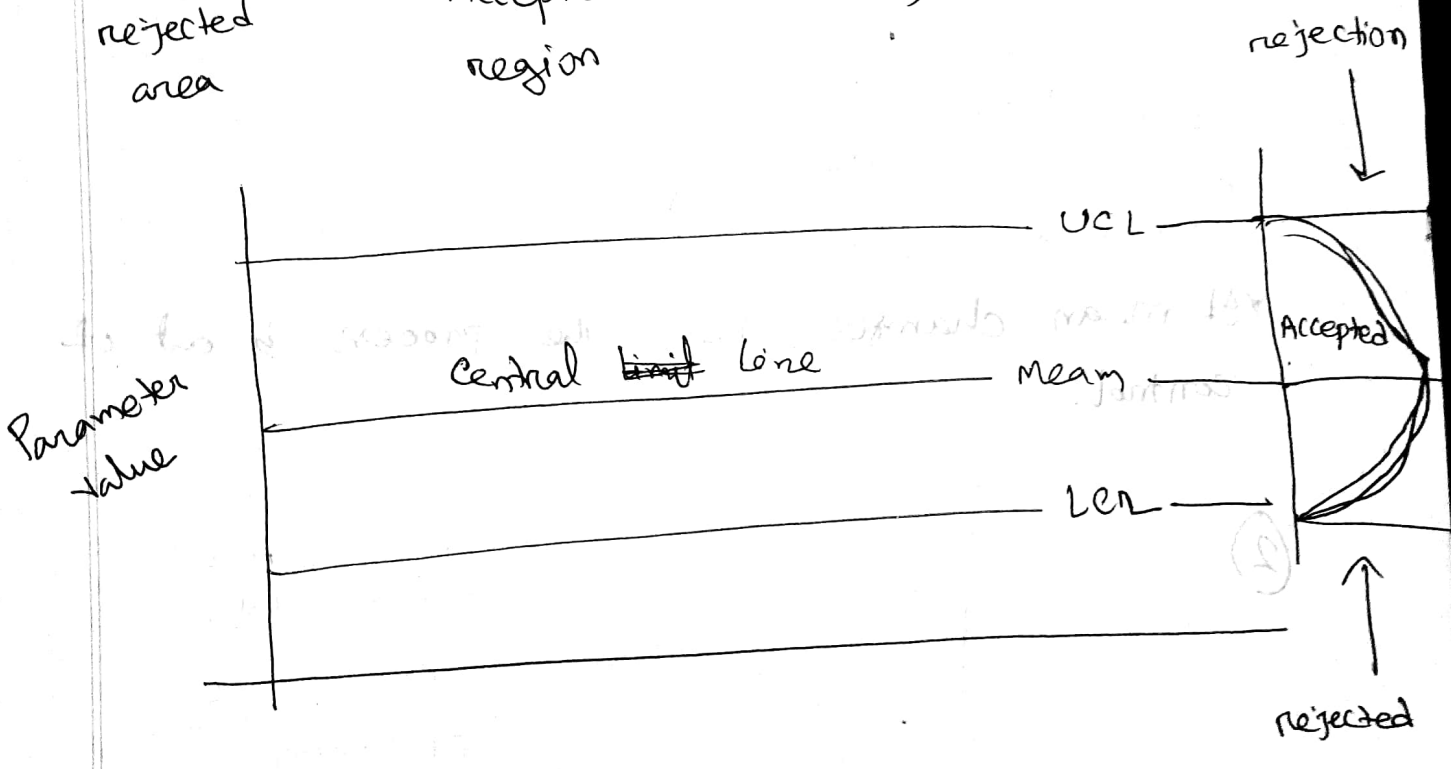
*Normal distribution for continuous value.





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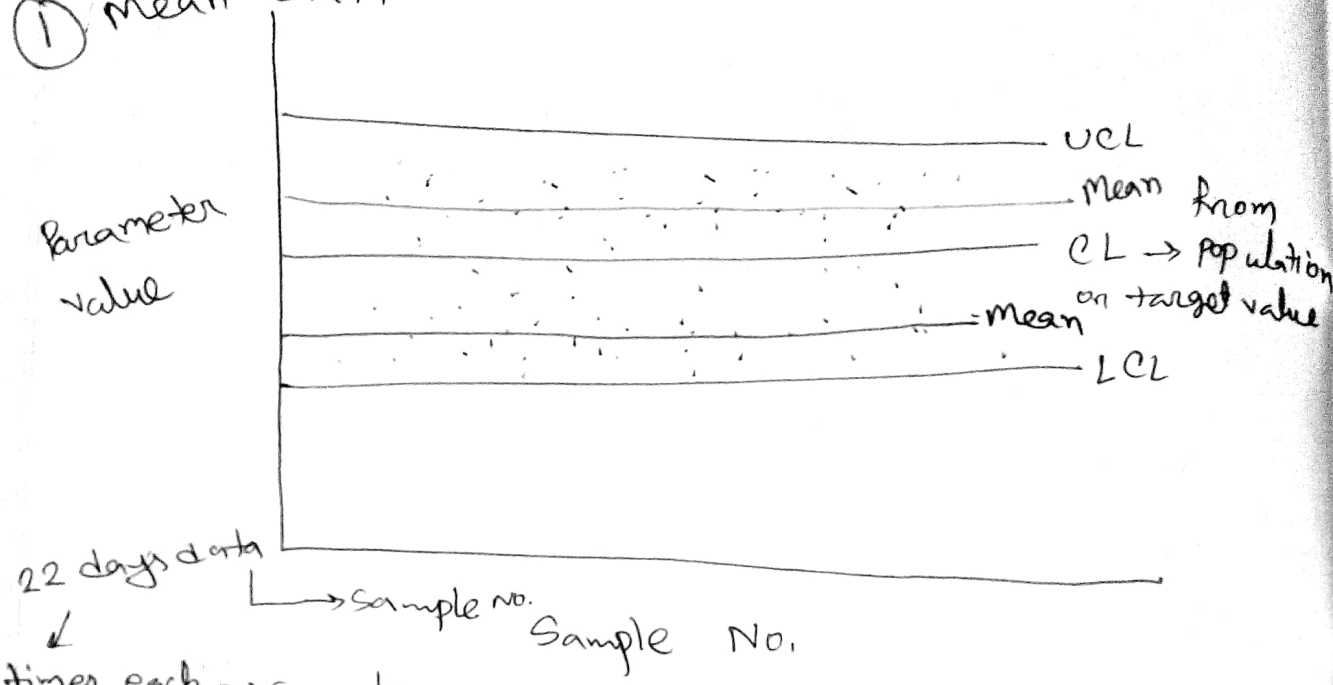
* Process out of control:

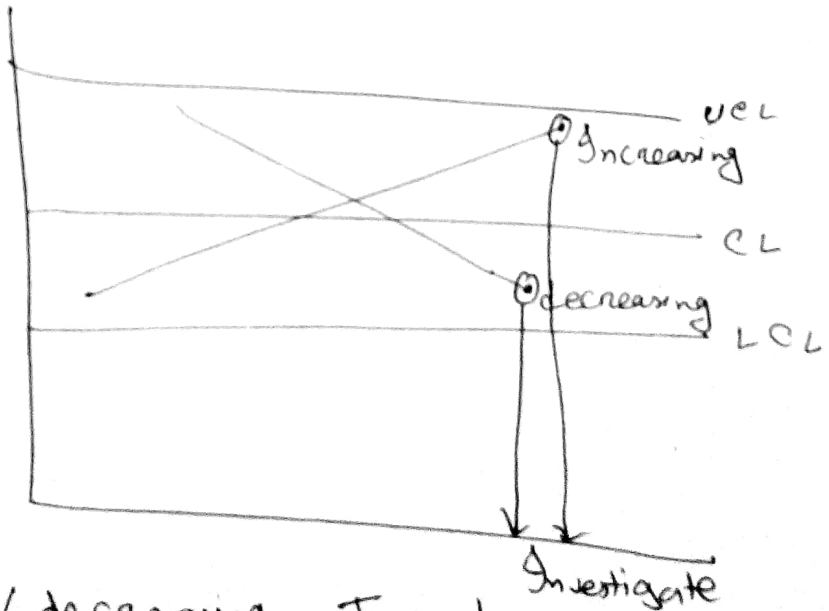
① Mean shift



5 times each → sample size

* If mean changes, then the process is out of control.

②



② Increasing / decreasing Trend

* Alarming situation, needs to be investigated.

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* Decision:

1. Mean Shift ?
2. Increasing / Decreasing rate.
3. Points which are out of UCL & LCL.
4. Points which are very close to UCL & LCL.
5. If there are successive points out of UCL & LCL, then the process is out of control; else need to be investigated.

P-Chart: (P Probability)

Attribute type → yes or no ans.

$$P = \frac{\text{defective Unit}}{\text{Total Unit}}$$

$$\text{Mean} = P = \left(\frac{\text{No of defective unit.d}}{n} = \frac{nP}{n} = P \right)$$

$$\text{variance} = nP(1-P)$$

$$\text{Standard deviation} = \sqrt{\frac{\text{Variance}}{n^2}}$$

n = sample size.

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Standard deviation $= \sqrt{\dfrac{nP(1-P)}{n^2}}$

$= \sqrt{\dfrac{P(1-P)}{n}}$

* Sampling distribution of sample mean

variance $= \dfrac{nP(1-P)}{n^2}$

Standard deviation $= \sqrt{\text{variance}}$

$= \sqrt{\dfrac{nP(1-P)}{n^2}}$

$= \sqrt{\dfrac{P(1-P)}{n}}$

* General formula:

$UCL = E(a) + k\sqrt{\text{variance}(a)}$; k = factor $= 3$

$CL = E(a)$

$LCL = E(a) - k\sqrt{\text{variance}(a)}$

$\Rightarrow \sigma$ = Standard deviation $= \sqrt{\text{variance}(a)}$

(3σ)

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* For P-chart:

$$UCL = P + 3\sqrt{\frac{P(1-P)}{n}}$$

$$CL = P$$

$$LCL = P - 3\sqrt{\frac{P(1-P)}{n}}$$

Chapter - 10

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29.05.18

Control chart:

* P-chart:

$$UCL_p = P + 3\sqrt{\frac{P(1-P)}{n}}$$

$$CL_p = P$$

$$LCL_p = P - 3\sqrt{\frac{P(1-P)}{n}}$$

n = Sample size

3σ = standard deviation.

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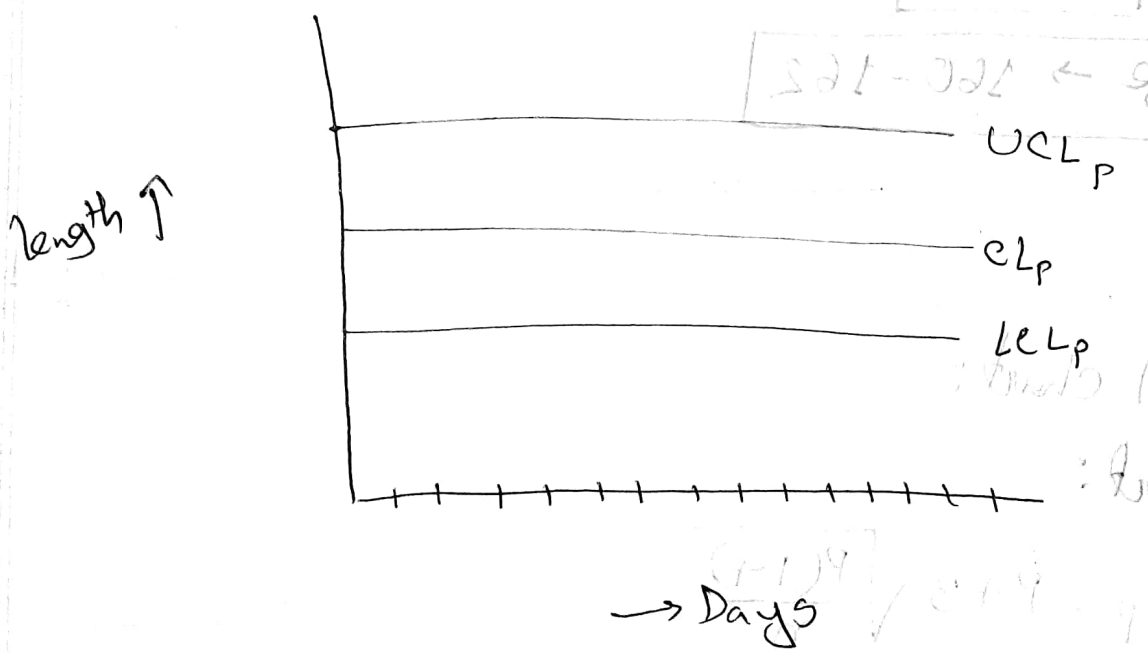
$$UCL_p = P + 3\sqrt{\frac{P(1-P)}{n}}$$

$P \rightarrow$ Fraction nonconforming (population)

$n \rightarrow$ Sample size (given)

$$CL_p = P$$

$$LCL_p = P - 3\sqrt{\frac{P(1-P)}{n}}$$



If P is not given,

$$\bar{P} = \frac{\sum_{i=1}^{m} d_i}{mn}$$

d = defective units in the ith day

$(\bar{P} \rightarrow P)$

m = No. of days

n = sample size

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Problem:

(Attribute type → yes/no decision)

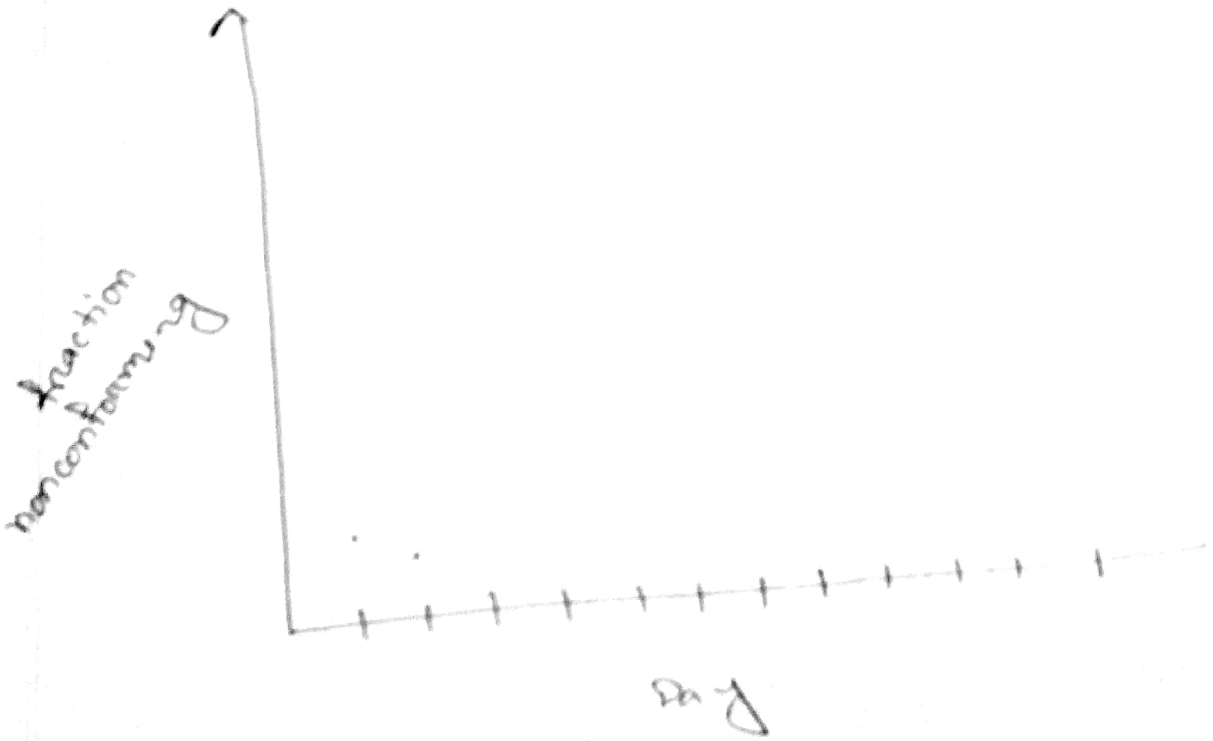
$n = 50$

$m = 22$

Fraction nonconforming (point plotting) $= \dfrac{\text{No of failure at a particular day.}}{n}$

$= \dfrac{3}{50}$ (for day 1)

$= \dfrac{2}{50}$ (for day 2)



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Steps:

1. Find Fraction nonconforming
2. Find $\overline{P}$
3. Find UCL
   CL
   LCL
4. Graph plot
5. Decision
6. Discard

$$\overline{P} = \frac{\sum_{i=1}^{m} d_i}{mn}$$

$$= \frac{67}{22 \times 50}$$

$$= 0.0609$$

$$UCL = \overline{P} + 3\sqrt{\frac{\overline{P}(1-\overline{P})}{n}}$$

$$= 0.1624$$

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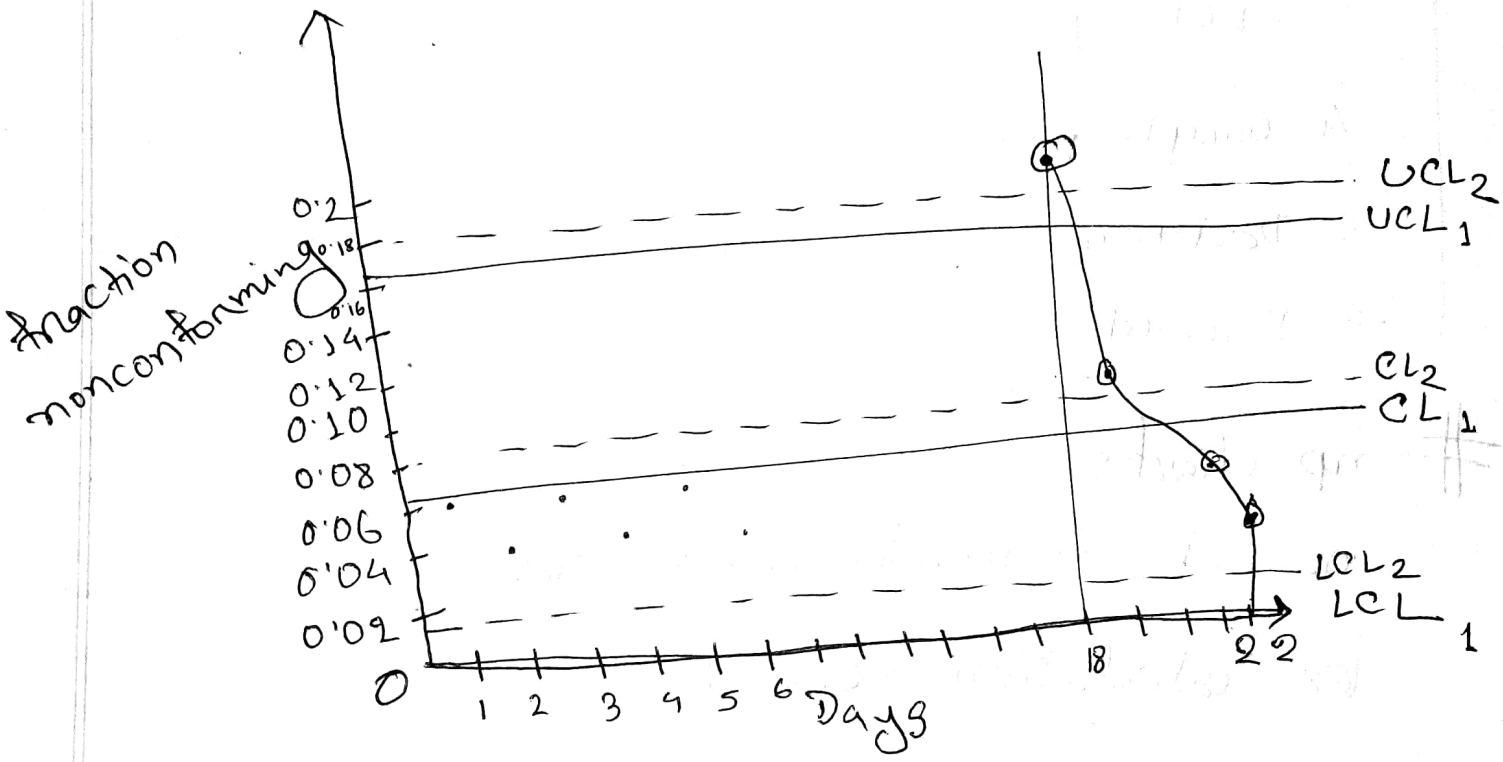
$CL = \bar{p} = 0.0609$

$$LCL = \bar{p} - 3\sqrt{\frac{\bar{p}(1-\bar{p})}{n}}$$

$= -0.04$ (consider as 0)



Discard points out of UCL and LCL.

∴ Now,

$$\bar{p} = \frac{(67-9)}{(22-1)\times 50}$$

* Discard until the process is in control.

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* Steps:

1. Fractional nonconforming find
2. $\bar{p}$ find
3. UCL, CL, LCL } find
4. Graph plot
5. Decision
6. Discard

np chart:

no. of nonconformities plot.

less calculation needed.

C - chart:

when sample forms an inspection unit.

$\boxed{\text{poission distribution}}$

Mean
Variance
Standard deviation.

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Expected / mean $\rightarrow$ $\lambda = c = np$; n = sample size
p = fraction nonconformities

variance $\rightarrow$ $c = np$

standard deviation $\rightarrow$ $\sqrt{c} = \sqrt{np}$ $= \sqrt{\text{variance}}$

$$UCL = E(a) + k\sqrt{\text{variance}(a)}$$

$$= c + 3\sqrt{c}$$

$$CL = E(a) = c$$

$$LCL = c - 3\sqrt{c}$$

$c \rightarrow$ population's nonconformities

$$\bar{c} = \frac{\text{Total defect}}{\text{Total day}}$$

$\bar{c} \rightarrow c$

* Algorithm:

1. $\bar{c}$ find
2. UCL, CL, LCL find
3. Graph plot
4. Decision
5. Discard

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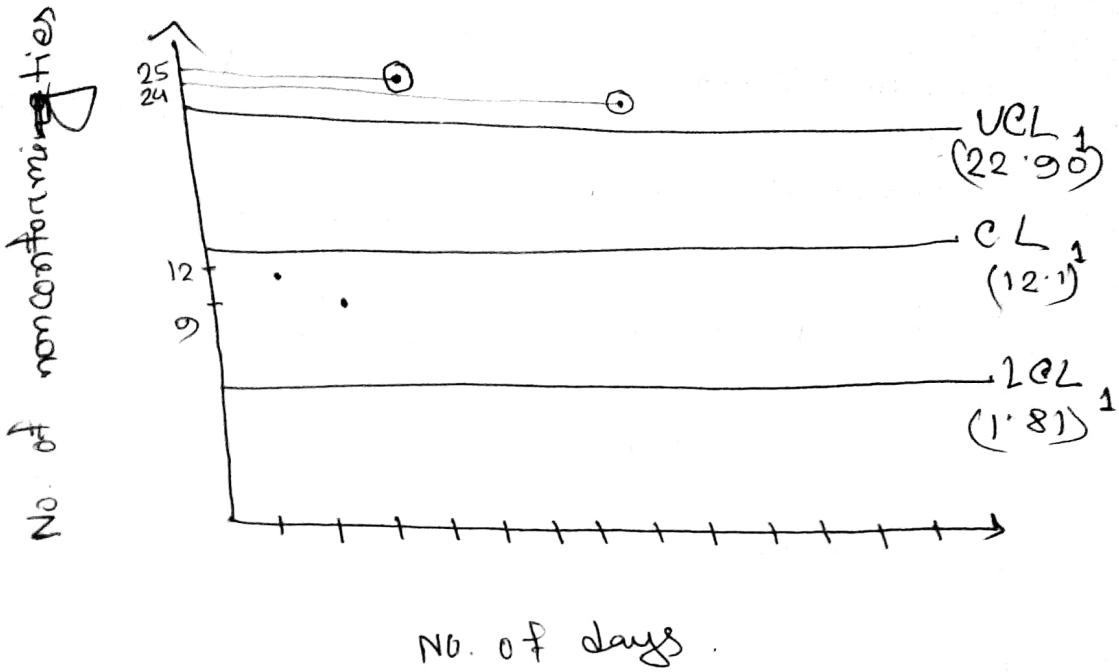
Problem:



Discard 3rd day & 17th day
↓ ↓
25 24

$$(\text{new})\ \bar{c} = \frac{272 - 25 - 24}{22 - 2}$$

$$= 11.15.$$

(new) UCL, CL, LCL find & repeat algorithm.

— x —

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Problem:

* U - chart: (Full Inspection)

$$\bar{u} = \frac{\text{Total No. of defective units}}{\text{Total sample size}}$$

$$= \frac{72}{635}$$

$$= 0.1134$$

Mean $\rightarrow \bar{u}$

Variance $= \frac{\bar{u}}{n}$

Standard deviation $= \sqrt{\frac{\bar{u}}{n}}$

UCL $\longrightarrow \bar{u} + 3\sqrt{\frac{\bar{u}}{n}}$

CL $\longrightarrow \bar{u}$

LCL $\longrightarrow \bar{u} - 3\sqrt{\frac{\bar{u}}{n}}$

—x—

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03.06.18

U-chart:

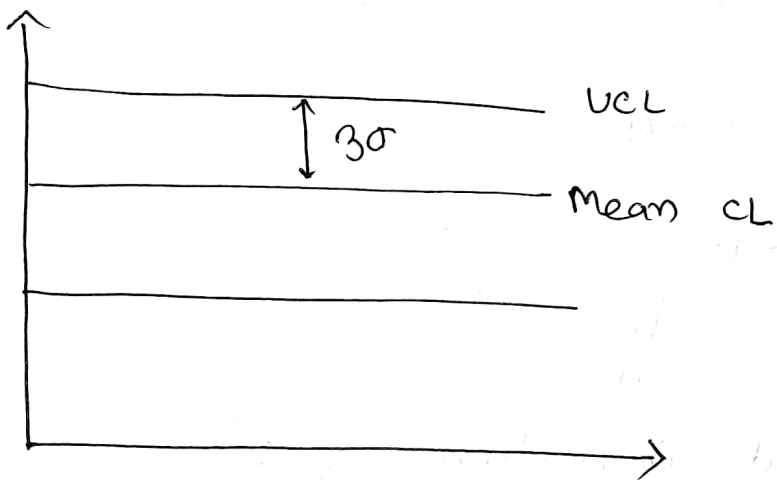
$$UCL = \bar{u} + 3\sqrt{\frac{\bar{u}}{n_i}}$$

$\bar{u}$ = mean

$$CL = \bar{u}$$

$$\sqrt{\frac{\bar{u}}{n_i}}$$ = Standard deviation.

$$LCL = \bar{u} - 3\sqrt{\frac{\bar{u}}{n_i}}$$



UCL = Mean + 3x Standard deviation.

$$\bar{u} = \frac{\text{Total defective Units}}{\text{Total Sample}}$$

$$= \frac{72}{635} = 0.1134$$

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$n_i \rightarrow n$ varies

$25 \rightarrow n_{25} = n_1$

$30 \rightarrow n_{30} = n_2$

$40 \rightarrow n_{40} = n_3$

$n_1 = 25$	$n_2 = 30$	$n_3 = 40$
$UCL = \bar{u} + 3\sqrt{\frac{\bar{u}}{25}}$	$UCL = \bar{u} + 3\sqrt{\frac{\bar{u}}{30}}$	$UCL = \bar{u} + 3\sqrt{\frac{\bar{u}}{40}}$
$CL = \bar{u}$	$CL = \bar{u}$	$CL = \bar{u}$
$LCL = \bar{u} - 3\sqrt{\frac{\bar{u}}{25}}$	$LCL = \bar{u} - 3\sqrt{\frac{\bar{u}}{30}}$	$LCL = \bar{u} - 3\sqrt{\frac{\bar{u}}{40}}$

5th day $\rightarrow 40 \, ft^2$

(4 Decision)

$\hookrightarrow$ Describe

Control chart for variables:

* 2 parameters are needed to express any dataset.

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2 parameters:

i) Central tendancy. → $\bar{x}$ or μ

$\bar{x}$ → sample mean

μ → population mean

ii) Dispersion or variability. → R | S | σ

R → Range

S → Sample standard deviation

σ → population standard deviation

2
4
6
8

→ Mean = 5

Range = (2 - 8) variability

4
5
6
5

→ Mean = 5

Range (4 - 6) variability

* Control charts:

1. $\bar{X}$ - R chart
2. $\bar{X}$ - S chart
3. CUSUM chart (Cumulative Sum)

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m = no. of days

n = sample size

Sampling distribution of sample mean

↓

Central limit theorem follows

$$\mu \approx \bar{\bar{x}}$$

1st day $(x) \Rightarrow$ 10 10.2 10.5 11 11.2

$$\bar{x} = \sum_{i=1}^{n=5} x_i/5 \quad \text{or} \quad \sum_{i=1}^{n=5} x_i/n$$

$$\bar{\bar{x}} = \sum_{j=1}^{m} \bar{x}_j/m$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

n = sample size

Sample standard deviation

Population standard deviation

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06.06.18.

$\bar{\bar{X}} \approx \mu$

$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$

$\bar{X}$-R chart:

2nd June → 5 7 8 9 12

$$\bar{X} = \frac{5+7+8+9+12}{5}$$

$R = 12 - 5 = 7$ (Range)

$R_i = X_{max} - X_{min}$

$$\bar{R} = \frac{\sum_{i=1}^{m} R_i}{m}$$ (mean value)

$\omega = \frac{R}{\sigma}$ (relative weight)

Expected value, $E(\omega) = \frac{E(R)}{E(\sigma)}$;// mean value

$\Rightarrow d_2 = \frac{\bar{R}}{\hat{\sigma}}$

$f(n)$
function of sample size n

$\Rightarrow d_2 = \frac{\bar{R}}{\sigma}$ $[\hat{\sigma} \approx \sigma]$

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$$\Rightarrow \sigma = \frac{\bar{R}}{d_2}$$

$$UCL = \mu + Z_{\alpha/2}\,\sigma_{\bar{x}} \qquad Z_{\alpha/2} \rightarrow K \leftarrow 3$$

$$= \bar{\bar{x}} + 3\frac{\sigma}{\sqrt{n}}$$

$$= \bar{\bar{x}} + 3\frac{\bar{R}/d_2}{\sqrt{n}}$$

$$\mu \approx \bar{\bar{x}}$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

$$\sigma = \frac{\bar{R}}{d_2}$$

$$\boxed{UCL = \bar{\bar{x}} + 3\frac{\bar{R}}{d_2\sqrt{n}}}$$

$$\boxed{\begin{aligned} CL &= \bar{\bar{x}} \\ LCL &= \bar{\bar{x}} - 3\frac{\bar{R}}{d_2\sqrt{3}} \end{aligned}}$$

For $\bar{x}$ - chart

~~For $\bar{x}$ - chart~~

$$\frac{3}{d_2\sqrt{n}} \longrightarrow A_2 \rightarrow f(n)$$

* R - chart:

$$UCL_R = \bar{R} + 3d_3\left(\frac{\bar{R}}{d_2}\right)$$

$$= \bar{R}\left(1 + \frac{3d_3}{d_2}\right)$$

$$= \bar{R}D_4$$

$$1 + \frac{3d_3}{d_2} = D_4 \rightarrow f(n)$$

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$CL_R = \bar{R}$

$LCL_R = \bar{R} D_3$ | $D_3 = \left(1 - \frac{3d_3}{d_2}\right) \rightarrow f(n)$

$\downarrow$ $f(n)$

Again,

$D_4 = 1 + \frac{3d_3}{d_2}$ | it could be given the value of d_2 & d_3 in the question

— x —

After Mid

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26.06.18.

Control chart for variables:

$\bar{X}$ - R chart

↓

Range

$R = X_{max} - X_{min}$

$= 6 - 4$

$= 2$

$\bar{X} = \frac{\Sigma X}{n}$

↓

Sample size

for day 1,

$= \frac{4+6+5+5}{4} = 5$

$\bar{\bar{X}}$ $\bar{R}$

↓ ↓

$\frac{\Sigma \bar{X}}{m}$ $\frac{\Sigma R}{m}$

$d_2 \rightarrow f(n)$

↓

Constant

Sample No. (n)

Day	1	2	3	4
1	4	6	5	5 - length (x)
2	6	5	4	6
3	5	4	6	4
4	3	5	3	4
5	4	3	5	3

$\bar{X}$	R
5	2
5.25	2
4.75	4
3.75	4
3.75	2

$\bar{\bar{X}} = \frac{\Sigma X}{m}$ $\bar{R} = \frac{\Sigma R}{m}$

$= \frac{22.5}{5}$ $= \frac{10}{5}$

$= 4.5$ $= 2$

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$\bar{X}$ - chart:

$$UCL = \bar{\bar{X}} + \frac{3}{d_2\sqrt{n}}\bar{R}$$

$$= \bar{\bar{X}} + A_2\bar{R}$$

$$CL = \bar{\bar{X}}$$

$$LCL = \bar{\bar{X}} - \frac{3}{d_2\sqrt{n}}\bar{R}$$

$$= \bar{\bar{X}} - A_2\bar{R}$$

R-chart:

$$UCL = \bar{R}\left(1 + \frac{3d_3}{d_2}\right)$$

$$= \bar{R}D_4$$

$$CL = \bar{R}$$

$$LCL = \bar{R}\left(1 - \frac{3d_3}{d_2}\right)$$

$$= \bar{R}D_4$$

$$d_3, d_2 \rightarrow f(n)$$

R-chart

↓

$\bar{X}$ - chart

↓

Take decision

—o—

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27.06.18.

$\bar{X}$-R chart:

$\bar{X}$ → one chart

R → another chart

R chart
↓
$\bar{X}$ chart
↓
Decision.

Day (m)	Sample No./ sample size (n) 1	2	3	4	$\frac{\Sigma X}{n} = \bar{X}$ $\bar{X}$ (length-variable type data)	R
1	5	5	4	6	5	2
2	6	4	6	4	5	2
3	4	6	3	5	4.5	3
4	3	6	5	3	4.25	3
5	4	3	4	5	4	2

$$\bar{R} = \frac{\Sigma R}{m}$$

$$= \frac{2+2+3+3+2}{5}$$

$$= 2.4$$

$$R = X_{max} - X_{min}$$

$$\bar{\bar{X}} = \frac{\Sigma \bar{X}}{m}$$

$$= \frac{5+5+4.5+4.25+4}{5} = 4.55.$$

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* $\bar{X}$ - chart:

$$UCL = \bar{\bar{X}} + \frac{3}{d_2\sqrt{n}}\bar{R}$$

$$= \bar{\bar{X}} + A_2\bar{R}$$

$$CL = \bar{\bar{X}}$$

$$LCL = \bar{\bar{X}} - \frac{3}{d_2\sqrt{n}}\bar{R}$$

$$= \bar{\bar{X}} - A_2\bar{R}$$

* R - chart:

$$UCL = \bar{R}\left(1 + \frac{3d_3}{d_2}\right)$$

$$= \bar{R}D_4$$

$$CL = \bar{R}$$

$$LCL = \bar{R}\left(1 - \frac{3d_3}{d_2}\right)$$

$$= \bar{R}D_3$$

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* If we get process in controll after doing the R-chart, then we'll go for $\bar{x}$-chart.
Else, we'll reduct the points outof ~~contro~~ range of UCL & LCL, And will repeat the process again.

—x—

01.07.18

$\bar{X}$-S chart:

Range → disportion.

S → Sample standard deviation.

n → sample size

$\bar{X}$ - R → 3/4

$\bar{X}$ - S → > 10

$$S_i = \sqrt{\frac{\sum_{j=1}^{n} (x_j - \bar{x})^2}{n-1}} \quad ; \quad \bar{X} = \frac{1}{m} \sum_{i=1}^{m} \bar{x}_i$$

$$\bar{S} = \frac{1}{m} \sum_{i=1}^{m} S_i$$

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m = no. of days (i)

Sample No. / Day observation	n = No. of sample (j) sample size 1	2	3	4	$\bar{X}_j$	S_i
1	4	6	3	6	$\bar{x}_1 = 4.8$	$S_1 =$
2	6	5	4	3	$\bar{x}_2 = 4.5$	$S_2 =$
3	5	6	5	4	$S_3 = 4.5$	$S_3 =$
4	3	3	6	5	⋮	⋮
5	4	4	3	6	⋮	⋮

$\bar{\bar{x}}$ or $\bar{X} = \frac{4.8 + 4.5 + \dots + 4.8}{5}$ $\bar{\bar{S}} =$

$= 4.5$

$$S_1 = \sqrt{\frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + (x_3 - \bar{x})^2 + (x_4 - \bar{x})^2}{4-1}}$$

$$= \sqrt{\frac{(4-4.5)^2 + (6-4.5)^2 + (3-4.5)^2 + (6-4.5)^2}{4-1}}$$

$$S_2 = \sqrt{\frac{(6-4.5)^2 + (5-4.5)^2 + (4-4.5)^2 + (3-4.5)^2}{4-1}}$$

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$$\bar{S} = \frac{S_1 + S_2 + S_3 + S_4 + S_5}{5}$$

$\bar{X}$ - chart:

$UCL = \bar{\bar{X}} + A_3 \bar{S}$

$CL = \bar{\bar{X}}$

$LCL = \bar{\bar{X}} - A_3 \bar{S}$

S- chart:

$UCL = B_4 \bar{S}$

$CL = \bar{S}$

$LCL = B_3 \bar{S}$

$\bar{\bar{X}}, \bar{S}, \underline{A_3, B_4, B_3}$

function of n

$\bar{X}$
$\downarrow$
S

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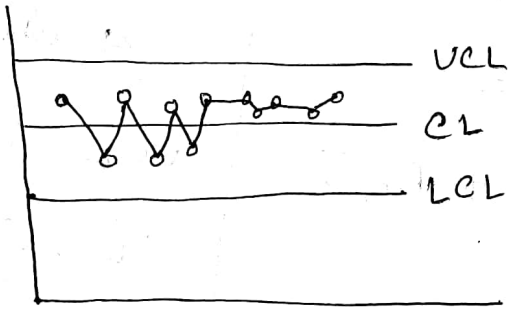
03.07.18.

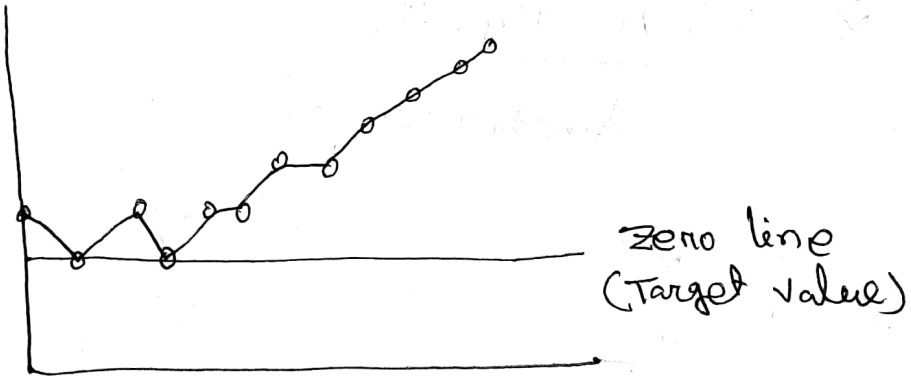
CUSUM Chart: (Cumulative Summation chart)

Special type control chart.

Shewhart Control chart



* Sensitive to small deviation from target value.



Special use:

1. Liquid substances.
2. When 100% inspection is done. (Critical product)

* Target value will be given (population mean)

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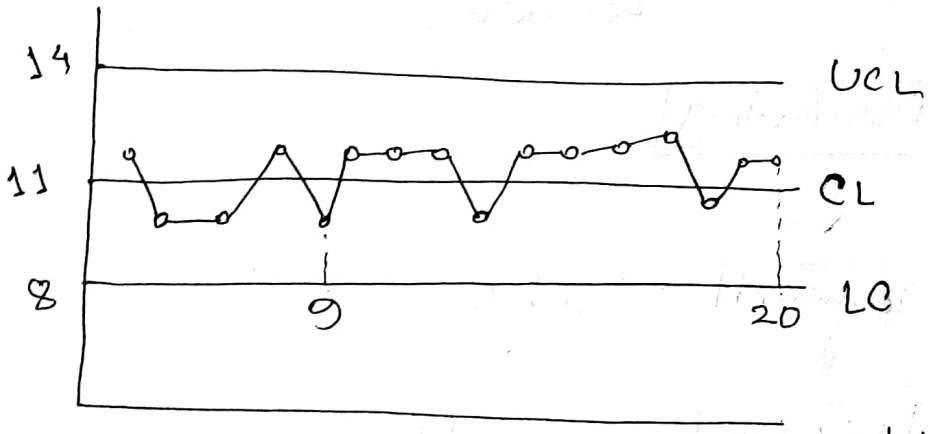
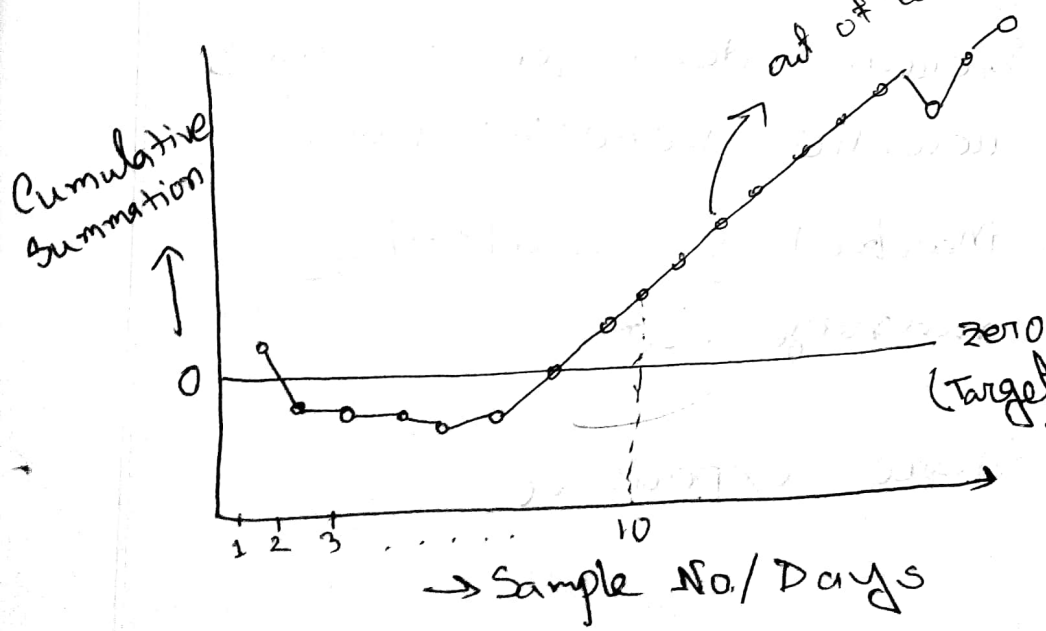
* Sample deviation = $\bar{x}$ − target value

Target value = 11

Sample deviation = 11.20 − 11 = 0.20



CuSum chart:



UCL = $\mu + 3\sigma$

11 ↙ ↘ 1

= 11 + 3

= 14

= $\bar{x}$ − target value

= 11 − 11 = 0

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"Marketing Management" 08.07.18.

"Chapter-1"

Sales and Marketing:

Marketing → popularized any goods or service.

Marketing
↓
Demand → Jobs
↓
Revenue → Profit → Savings.

marketing → ~~prop~~ popularized product, increases demand, increases revenue, increases profit.

Definition → Marketing, marketing management.

Experiences: Share experience.

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Events : advertisement for particular event.

Properties : real state advertisement.

Organization : (i) profit
Information : (ii) Non - profit.

Ideas : Advertise Ideas

Who markets ?

* Marketer :

← Attention → prospect (customer)

← purchase —

⋮

* Types of Demand :

Need : Basic requirement for something.

Want :

Demand :

(i) Negative Demand

Nonexistent

Lefend.

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Fill:

* overfill

Irregular.

Defining

* Unwholesome:

Fig: 1.1 → market

* Resource market.

Manufacturer "

Intermidiary "

Consumer "

Govt. "

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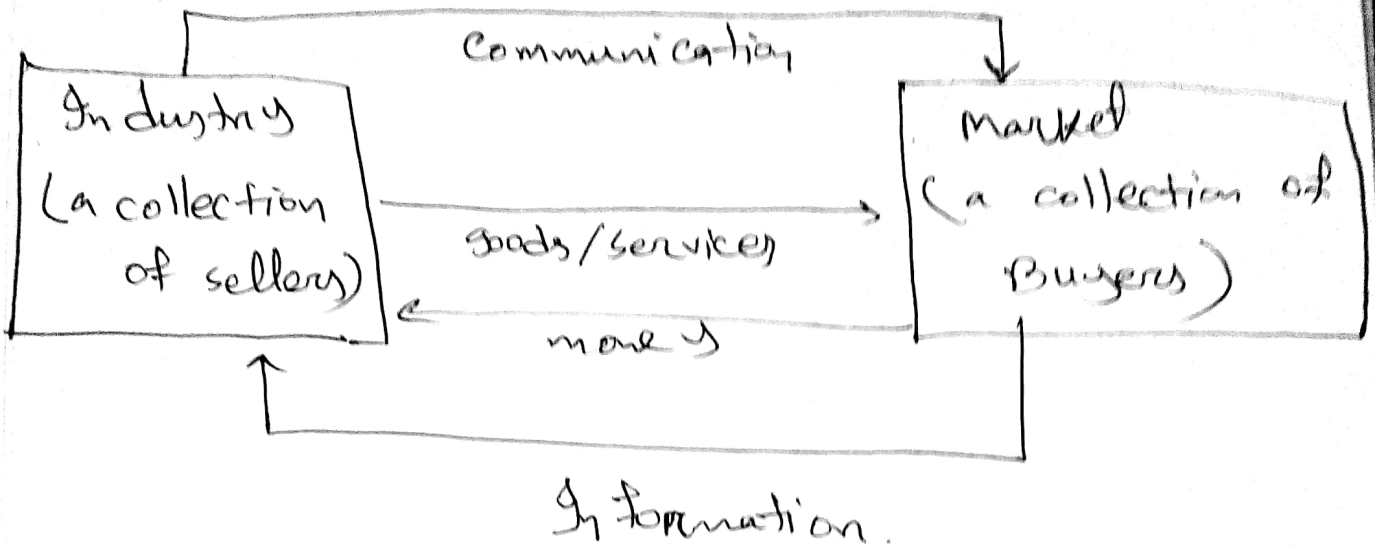
Simple marketing system:



—x—

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10.07.18.

Key Customer Markets:

→ Global Market (cultural, legal)

→ Consumer "

→ Business " (Business goods & services)

→ Government " (Non-profit organization)

Strong negotiate needed → Business market.

Markets:

→ Marketplaces (physical market)

→ Marketspaces (online marketing)

→ Metamarkets.

Core Marketing Concepts:

→ Needs, Wants, and Demands

→ Offerings and Brands

→ Target markets, Positioning and segmentation

→ Value and Satisfaction.

→ marketing channels. → competition.

→ Supply chain

→ market environment

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customer requirements.

↓

* The intangible <u>value proposition</u> is made physical by an offering.

* An offering from a known source is Brand.

Segmentation (Demographic, Psychographic, behavioral difference)

↓

Target market (where to sell)

↓

Positioning (when to sell)

offerings

↓

Most value → ↑value is a combination of ↑quality, ↑service and ↓price.

(QSP → Customer value triad)

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* Judgement of perceived performance with expectation. → Satisfaction.

disappointed → perceived performance < expectation

Satisfied → " = "

Delighted → " > "

* Marketing channels:

1. Communication channel (advertisement, billboard etc)
2. Distribution "
3. Service "

⇒ Ref Book:

Marketing management. (chapter-1)

→ Philip Kotler

* Marketing environment:

1. Task environment → Producing, distributing & Promoting the offerings.
2. Broad " → External factors (Demographic, Political, legal, Technology, natural environment, economy, socio-cultural etc)

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12.07.18.

* Supply chain:

Raw Materials → Finished Goods → Delivery to customers.

* Competition:

offerings, features.

Holistic Marketing Dimensions:

* Holistic Marketing: (Marketing Concepts)

development, design and implementation of marketing program.

* Relationship Marketing:

→ Long term relationships among,

- Customers
- employees
- marketing partners
- financial community
- offers

→ to achieve Goals of the individuals.

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* Integrated Marketing:

→ Assembles marketing program. (advertisement, sells, maintenance, installation, after sell services etc.)

1. Many different marketing activities can create, communicate and deliver value.

2. Marketers should design & implement any one marketing activity with all other activity in mind.

* Internal Marketing:

In the organization.

→ hiring & training of the employee

→ Harmony among the departments and top management. (Good collaboration)

↓ vertical collaboration/ alignment

↓ horizontal collaboration/ alignment

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* Performance Marketing:

→ Evaluate financial & nonfinancial returns.

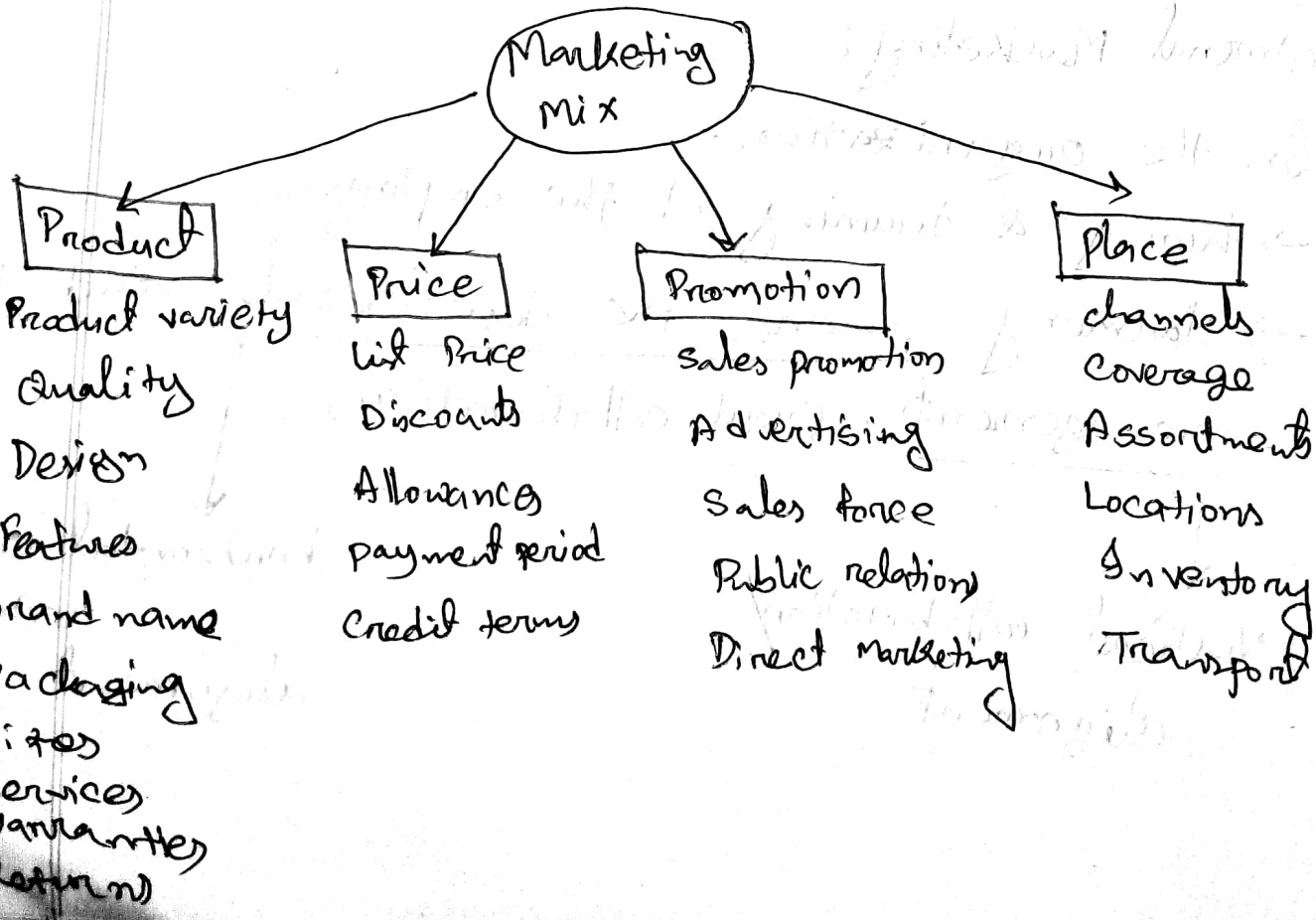
→ Customers feedback.

→ legal, ethical, social, environmental effects of marketing activities.

———x———

15.07.18

The Four P's of the Marketing Mix:



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Three V's approach to marketing:

Define the value segment

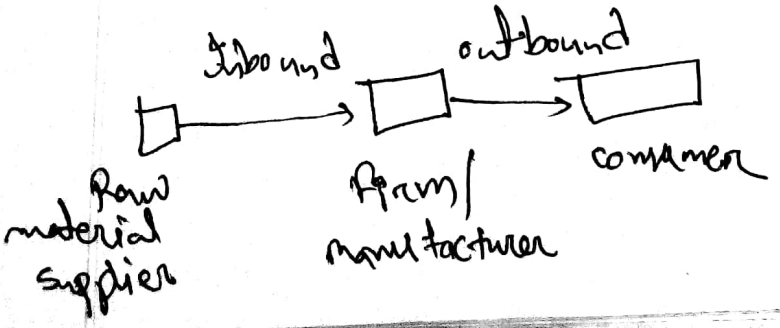
" " value proposition

" " value network

* Value chain:

is a tool for identifying ways to create more customer value because every firm is a synthesis of primary & support activities performed to design, produce, market, deliver, and support its product.

Primary Activities	Support Activities
1. Inbound logistics	1. Procurement
2. Operation	2. Technology development
3. Outbound logistics	3. Human resource management
4. Marketing	4. Firm Infrastructure.
5. Service	



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* Characteristics of Core Competencies:

→ A source of competitive advantage

→ Applications in a wide variety of markets

→ Difficult to imitate.

$\boxed{\text{Competitive Benchmarking}}$

↓

standard

Outsourcing 'X' → 'X'

Offshoring 'Y' ← 'X'

* Holistic Marketing:

Integrating value exploration, value creation, & value delivery.

* Marketing Plan:

(1) Strategic (11) Tactical

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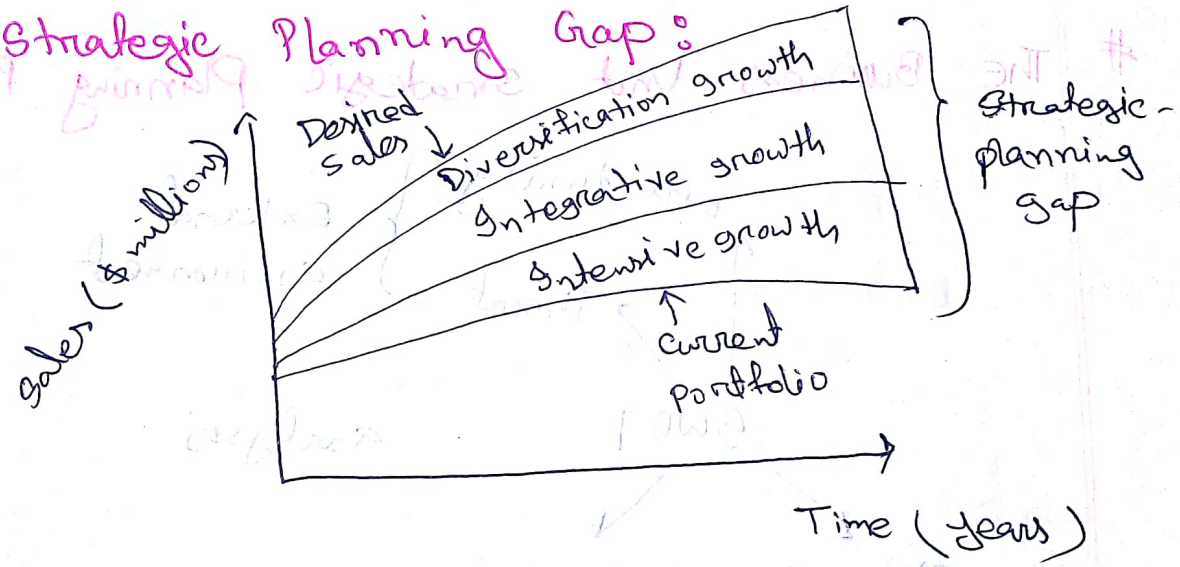
The Strategic Planning, Implementation, & control Processes :

Planning → Implementing → Controlling.

—x—

17.07.18

The Strategic Planning Gap :



* Intensive growth → growth within current business.

* Integrative growth → acquire business related to current business (Robi + Airtel)

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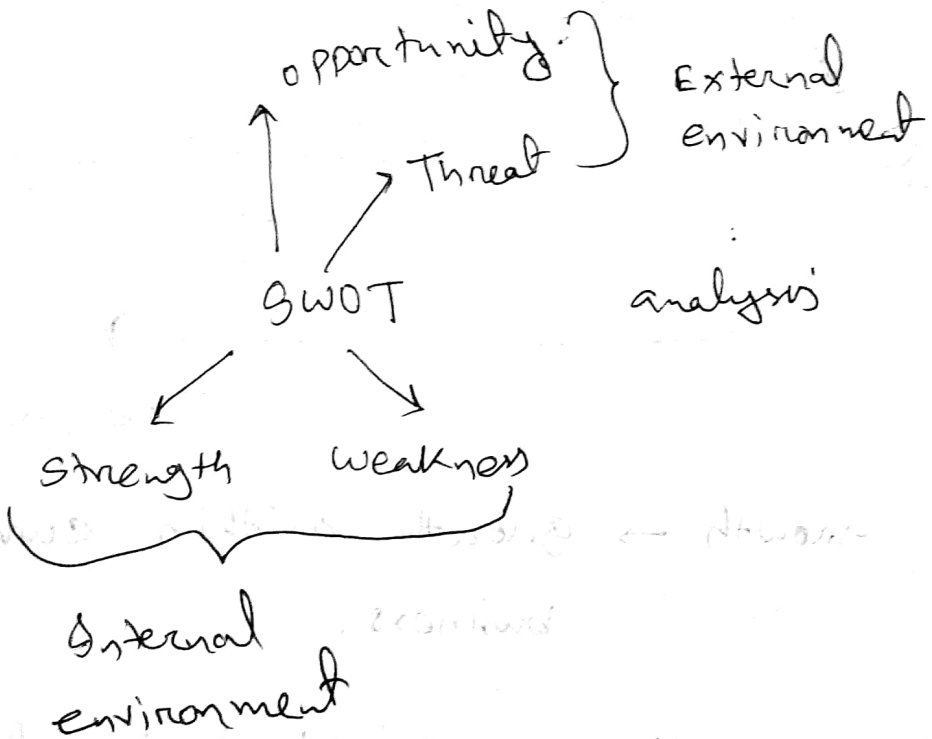
* Diversification Code → Add attractive unrelated business.

Corporate Culture: is the shared experiences, stories, beliefs, and norms that characterize an organization.

The Business Unit Strategic Planning Process:



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Opportunity Matrix:

Success Probability

Attractiveness	High	Low
High	1	2
Low	3	4

[accept]

Threat Matrix:

Probability of Occurrence

Seriousness	High	Low
High	1	2
Low	3	4

[avoid].

[Overcome] → 1

[ignore] → 4

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Porter's Generic Strategies:

* Goal Formulation & MBO:
  - Hierarchical
  - Quantitative
  - realistic
  - Consistency

measure cost ← overall cost leadership

measure quality ← Differentiation

Focus

↓

Trade off between cost & quality

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18.07.18

Categories of marketing Alliances:

Product or service Alliances

Promotional "

Logistic "

Pricing Collaborations.

* Program formulation:

R & D section

↙ Research ↘ Development

* Implementation:

Mass production → business level production.

$\boxed{\text{dynamic relationships}}$ stakeholders → Satisfied.

i.e. → Employee ↑ → Quality ↑ → Customer ↑ → Profit ↑

i.e. New technology's dynamic implementation.

* Feedback & Control:

i.e. Qualitative feedback, quantitative feedback

(Product output) (customer)

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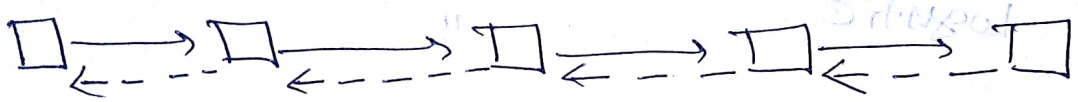
22.07.18.

Management Information System (MIS):

Create, Process, Store & retrieve info. (IS)

Supplier Manufacturer Whole seller Retailer Customer



⟶ Product Flow

- - - > Info. Flow

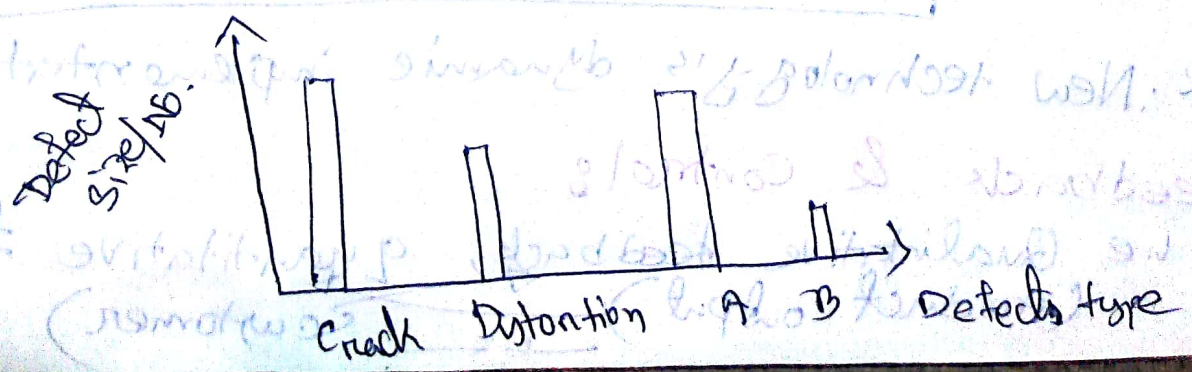
Information Co-ordination

* Organized Data are information.

IS → Information System

IT → Information Technology.

Tools & Technique (software)



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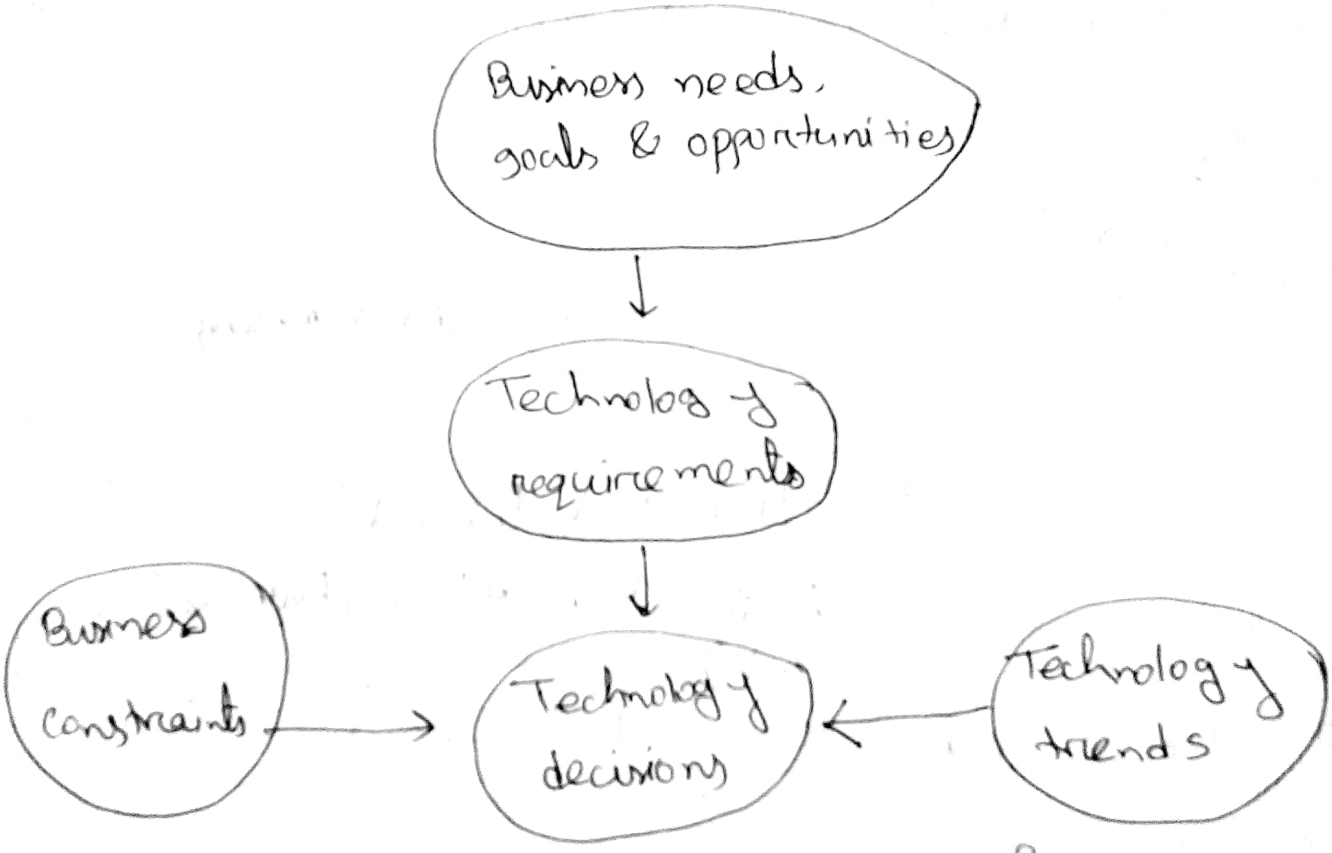
* Data:
The raw material from which information is gathered.

* Information:
Data processed and converted ~~int~~ into a form that is useful to the decision ~~making~~ maker.



* How technology decisions are made?

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* Computer literacy:
Working Knowledge of computers, their components and their functions.

* Information literacy:
To use computers in innovative and meaningful ways to solve business problem.

Components of information literacy.

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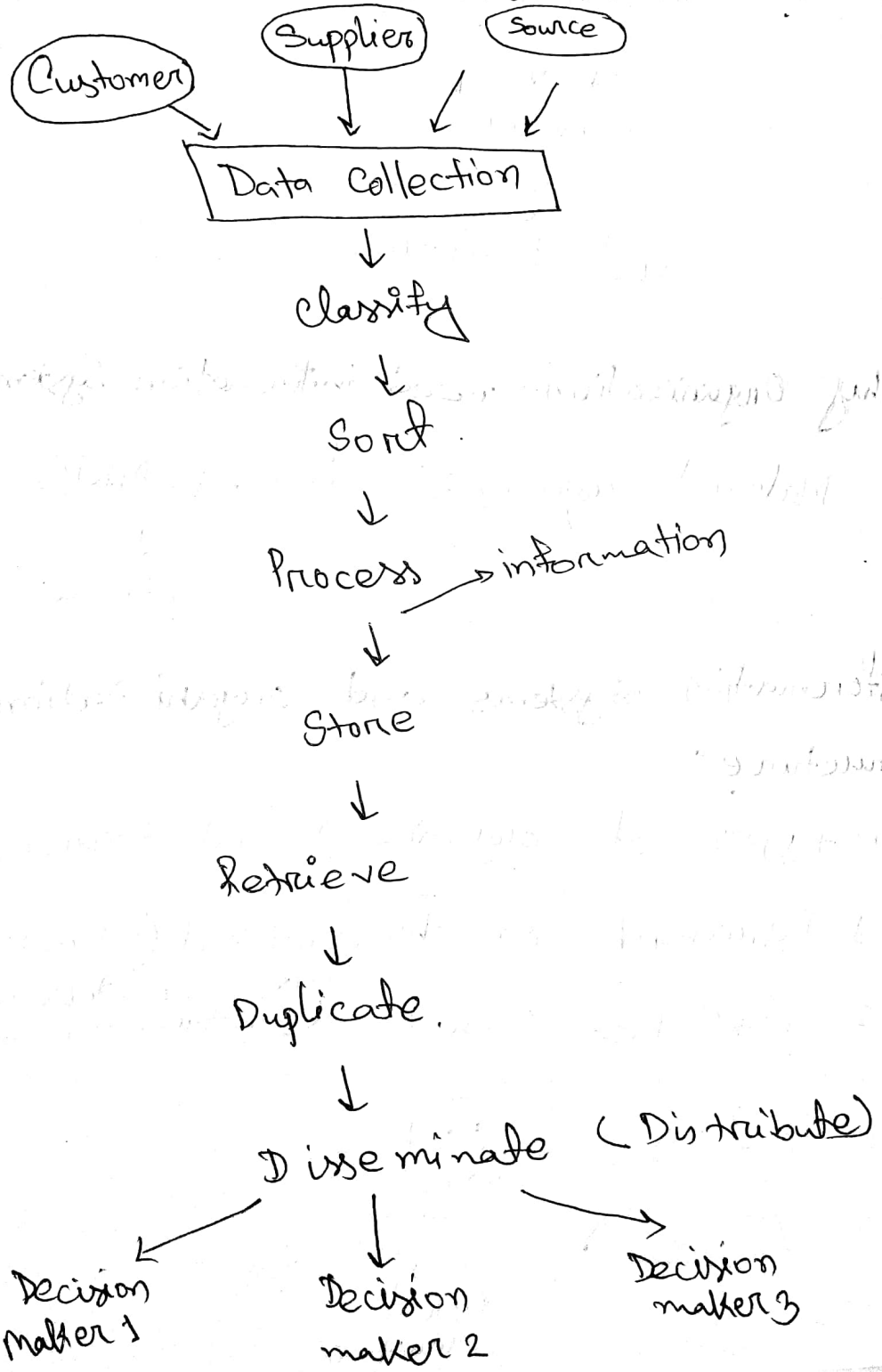
24.07.18.

Data Vs Information:

* How data is converted into information?



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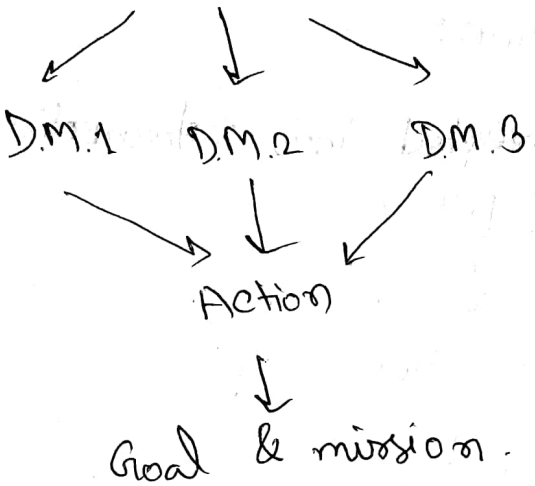


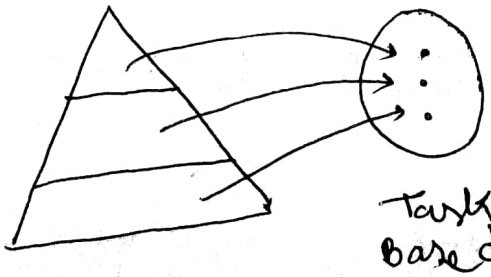
* Why Organization need information System?

Material Requirement planning (MRP).
↓
Software

* Information Systems and organizational structure:

2 types of organizational structure:

1. Pyramid or hierarchical (Structured task, semi structured task) (Unstructured task).
2. ~~Task~~ Task Based,



Task based Structure.

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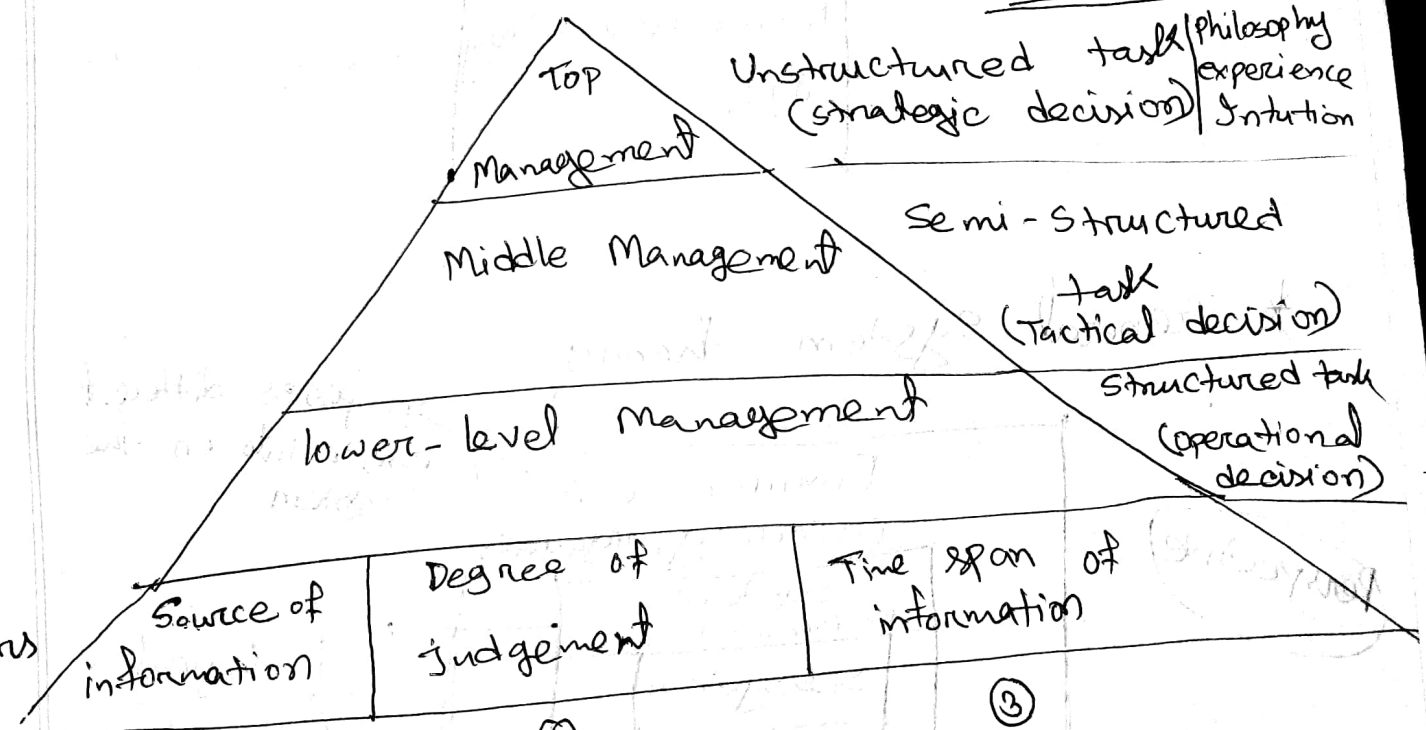
CT2 → Next Thursday

Marketing 2nd slide.

Time : 11:30 + (Example)

—— x ——

25.07.18



Factors ↓ influences information handling

① i) External
ii) Internal
→ Top Management & Middle "
Middle & lower-level management

② i) Intution
ii) No intution
Top Manage.
→ lower-level Management

③ i). long-term planning
ii). Short-term planning
Top Management
→ lower level management

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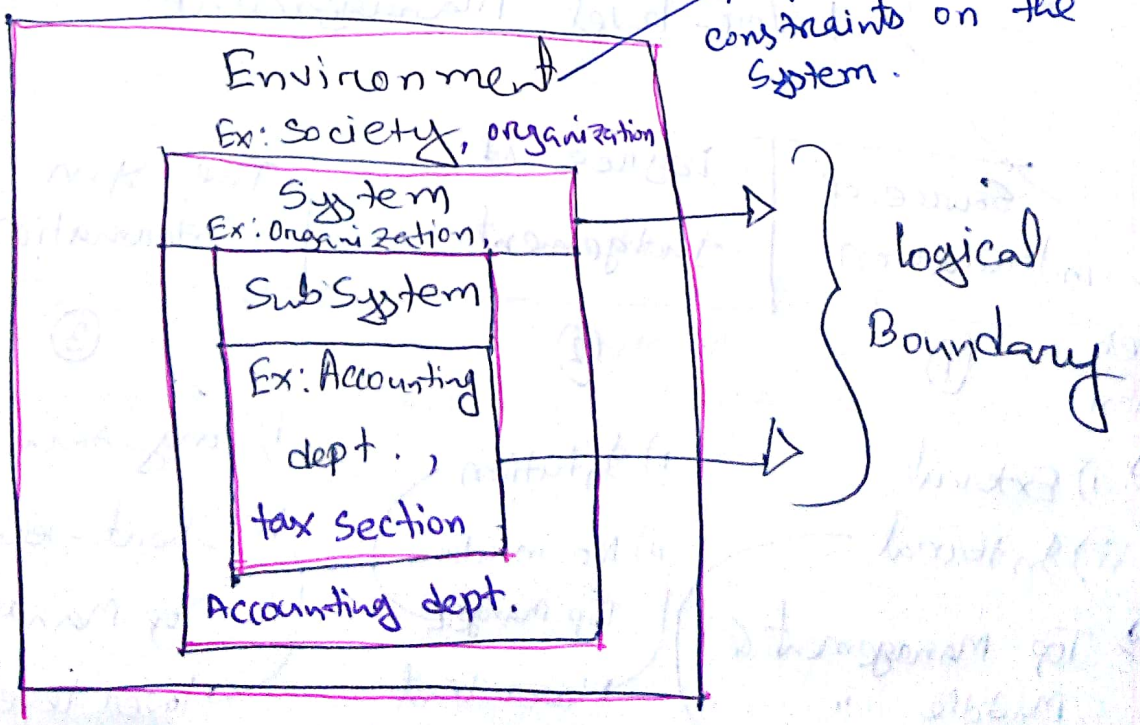
Personal Information System	Work group information System	organization-wide information System
Forecasting of sales for the next 5 years. (approx.)	Launching a Product. Resource & Development, Finance, manufacturing dept.	Product details. Raw materials to after sale service information system

* General system theory:

Perspective



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29.07.18

Information system for managerial decision making:

* Managers at different level take different kind of decisions (strategical, tactical, operational)

↓

Need different kind of information

↓

To provide this info there are different types of info systems

* 4 types of information system:

1 Transaction Processing system (TPS)

2 Management information " (MIS)

3 Intelligent support " (ISS)

DSS ↓ EIS ↓ ES

4 Offline Automation system (OAS)

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TPS:

→ Record external & internal info.

→ Record, process, validate & store transaction.

i.e: Withdrawal money from bank.

* 2 types:

(I) External transaction: out of organization.

i.e → Product sale.

(II) Internal transaction: Inside the organization

i.e: Inter department

* TPS performs routine, repetitive task, used by lower level managers

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Six steps in processing a Transaction:

1. Data entry.
2. Data validation
3. Processing & revalidation.
4. Storage
5. Output generation
6. Query support

* 1 Data entry:

create source document.

2. Data validation:

- checking accuracy comparing with standards.

- 2 steps:
  - → Error detection
  - → Error correction.

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Error Detection:

Missing Data

Invalid data

Inconsistent Data.

3. Processing & revalidation:

2 ways:

(OLTP) ① Online transaction Processing	Batch processing
1. No time lag between data creation & data processing	1. Transactions are accumulated over a certain period of time before they are processed
2. Update continually	2. Update periodically
3. Detect errors as it appears.	3. Error detected while processing.

entry

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* Batch processing:

Transaction file

Master file

Revalidation:

4. Storage:

Store Data for future use.

5. Output Generation:

Processed information.

* 2 ways to send information to the decision maker:

(i) Documents & Reports.

(ii) Forms.

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* Document:

Single transaction.

* Reports:

Summary of several transactions.

* Documents & Reports → (not easily can be changed), i.e. Hard copy.

* Forms → (can be changed easily.)

i.e. soft copy.

6. Query Support:

feedbacks

—x—

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⟹ 4 types of information system:

1. TPS
2. MIS
3. ISS
4. OAS.

⟹ 3 Categories of ISS:

1. DSS
2. EIS
3. ES.

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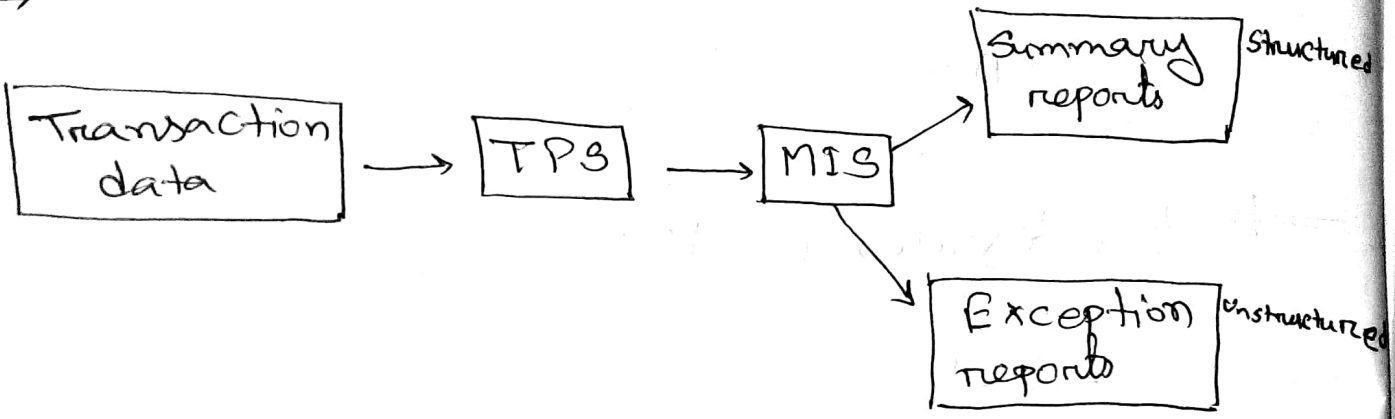
31.07.18

Management Information System (MIS):

→ Monitors and control the internal operation of an organization.

→ Provide middle managers with vital information necessary to make tactical decision.

→



Report Vs Document.

TPS	MIS
1. Record & process transaction.	1. Produce summary & exception reports.
2. Input - transaction data	2. Input — TPS
3. For operational decision making	3. Tactical decision making.

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③ # Intelligent Support System (ISS):

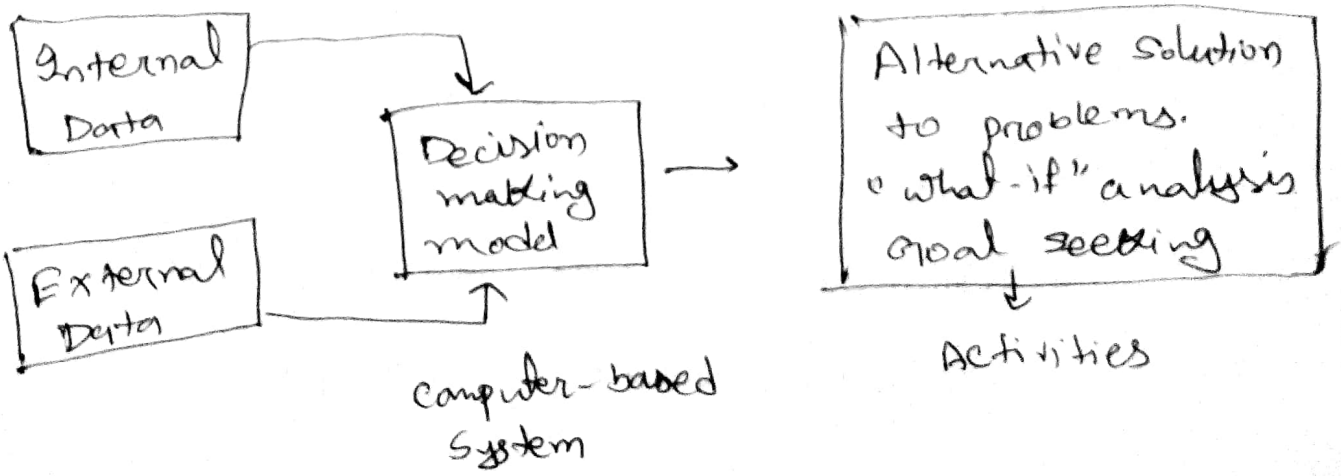
→ Facilitate decision making using Knowledge, intuition, experience, expertise.

→ Require application of theoretical knowledge & practical experience.

3 Categories:

1. DSS (Distribution Support System)
2. EIS (Executive Information ")
3. ES (Expert System)

DSS → Provide managers with data, tools, models to facilitate semistructured/tactical Decision making.



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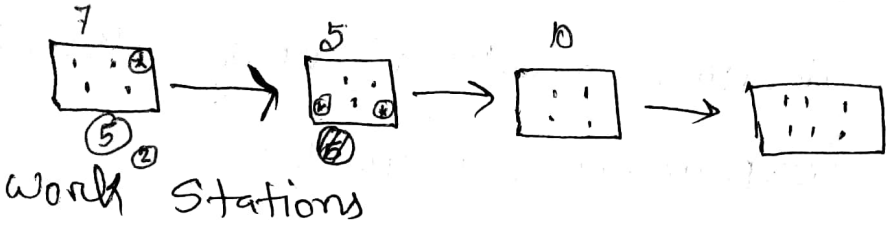
Fixed time = 5 min



———— x ————

28.08.18

Information System:

1. TPS
2. MIS
3. ISS → DSS, EIS, ES
4. OAS

* Executive Information System (EIS):

→ User-friendly and interactive computer-based systems, designed to meet the information needs of top managers.

→ Required for long term planning and strategic decision making.

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DSS	EIS
1. Generate alternatives soln of a given problem.	1. Integrate data from different sources & present it in a useful format.
2. Hasn't drill-down capability.	2. Has drill-down capability.

* AI:
A branch of computer science whose goal is to design & develop machines that emulate human intelligence.

Expert System:
software designed to capture the Knowledge and problem solving skill of human expert.

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* Expert System has three main components:

Knowledge base	→	Reasoning mechanism (inference engine)	→	User interface
Knowledge, experience, judgement & intution of experts		Rules for applying Knowledge		Tools that allow the user to interact with the system

Knowledge representation

Office Automation System (OAS):

→ Increase productivity

→ Increase communication.

—x—

Book: Management Information System.

chapters → 1, 2, 8.

(Gupta)

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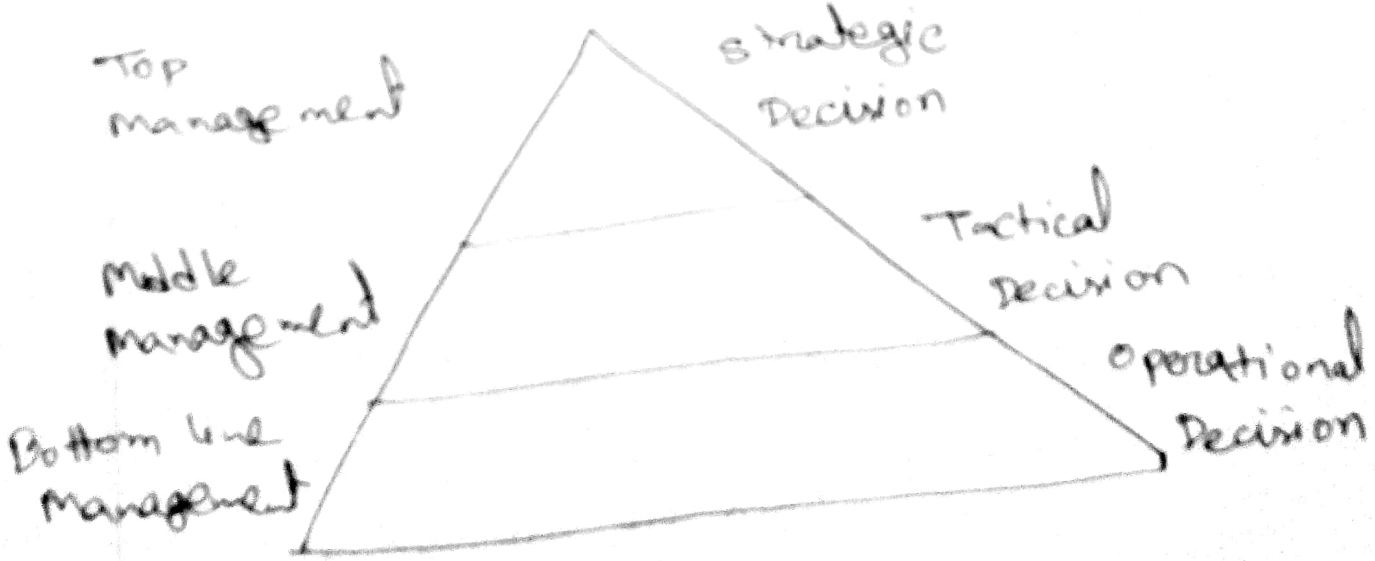
Mv

29.08.18

Decision Support System (DSS):

* Structured Decision: (operational decision)
  Unique Decision i.e compound interest calculation.
  $FV = PV(1+R)^n$
  Unstructured Decision: (Strategic Decision)
  Experience, intuition, judgement i.e launching a product.
  Semi-structured Decision: (Tactical Decision)
  i.e Admission in a college



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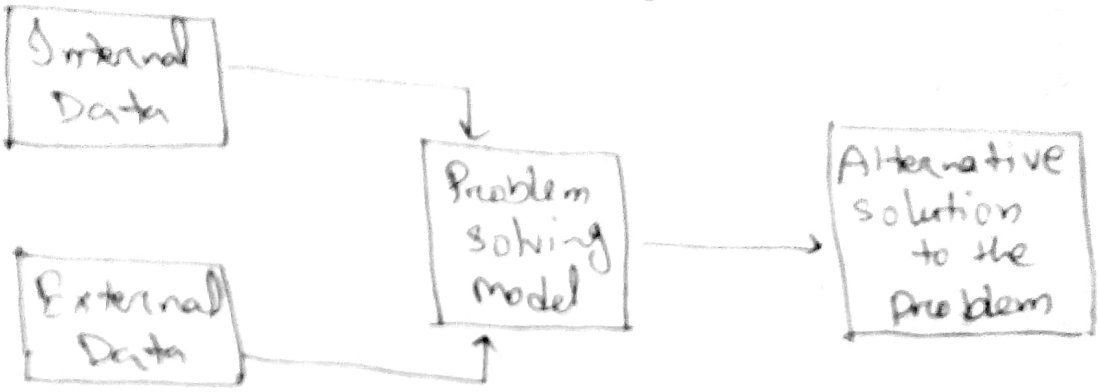
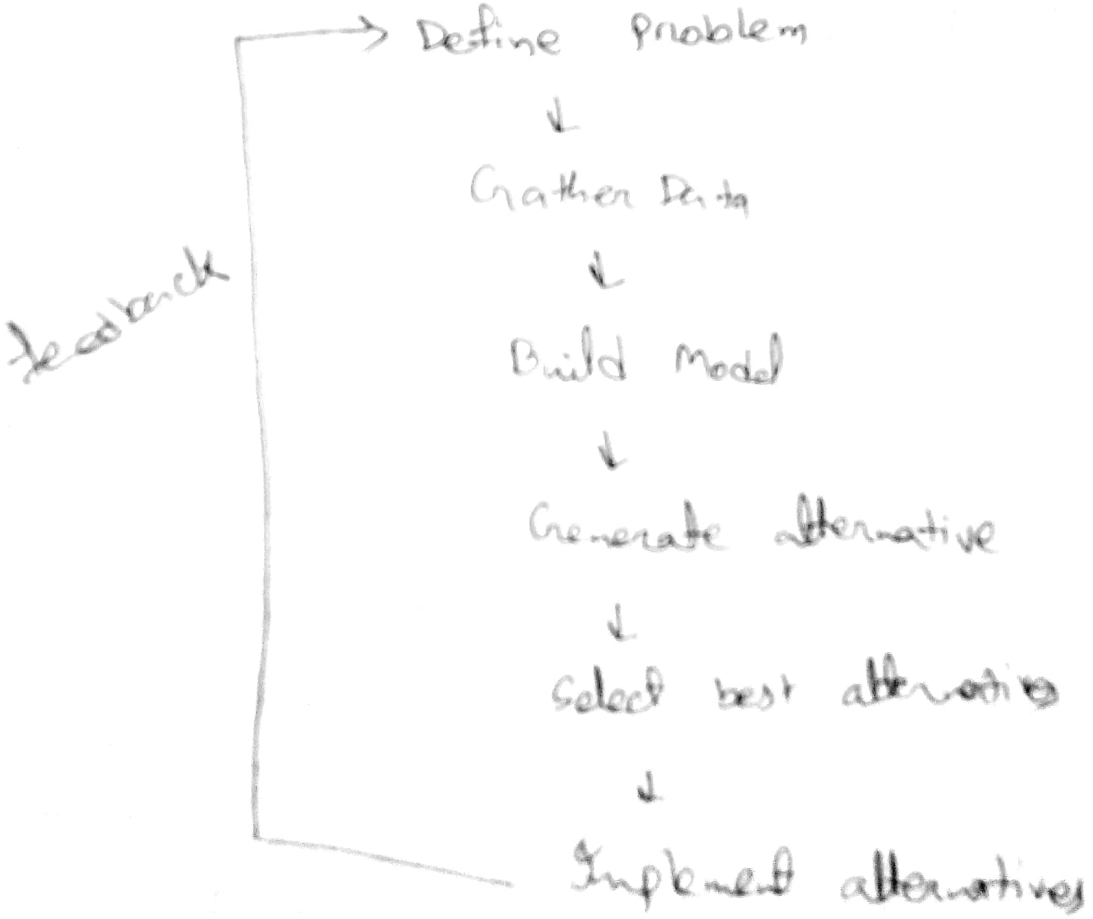
* Steps in problem Solving:





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Product A

Sale ↓

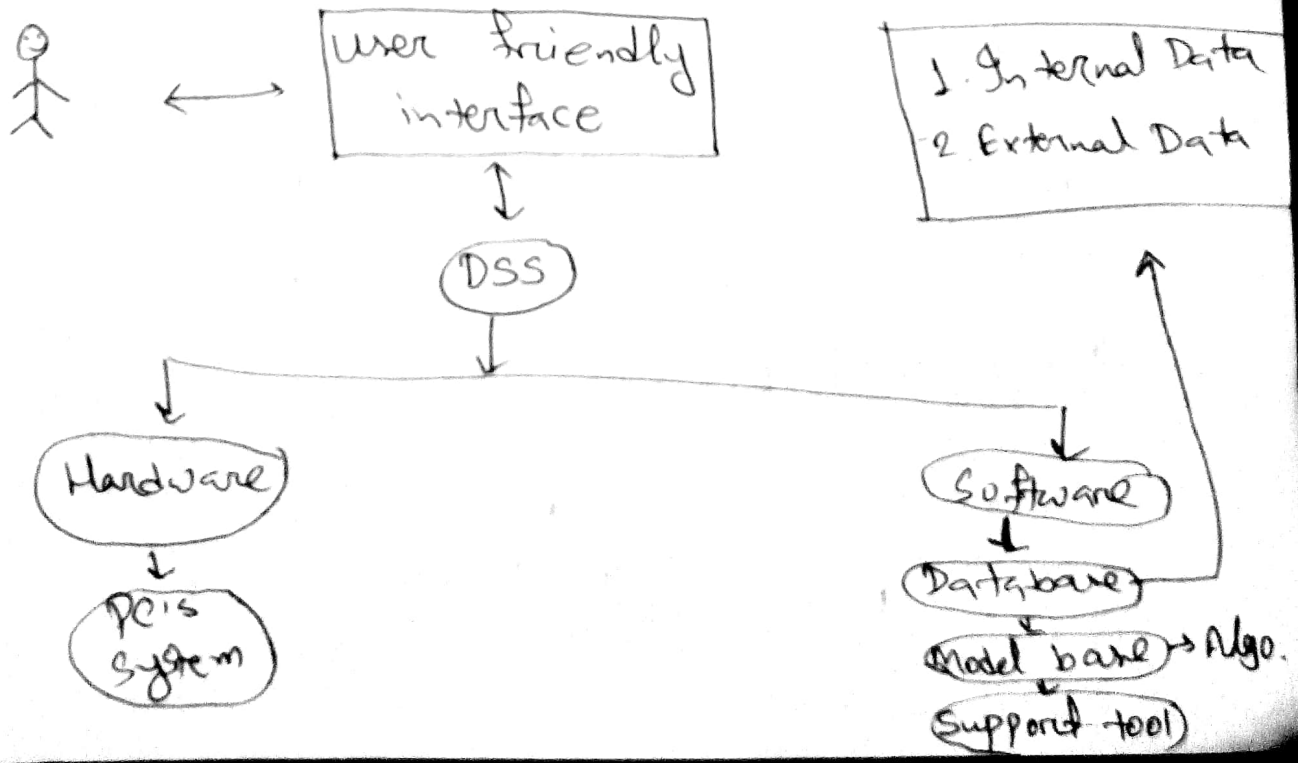
1. Demand ↓
2. Market shrink
3. Price ↑

} Define problem.

* We can use DSS to take semistructured and unstructured Decision.

Characteristics of DSS (Book):

Components of a DSS:



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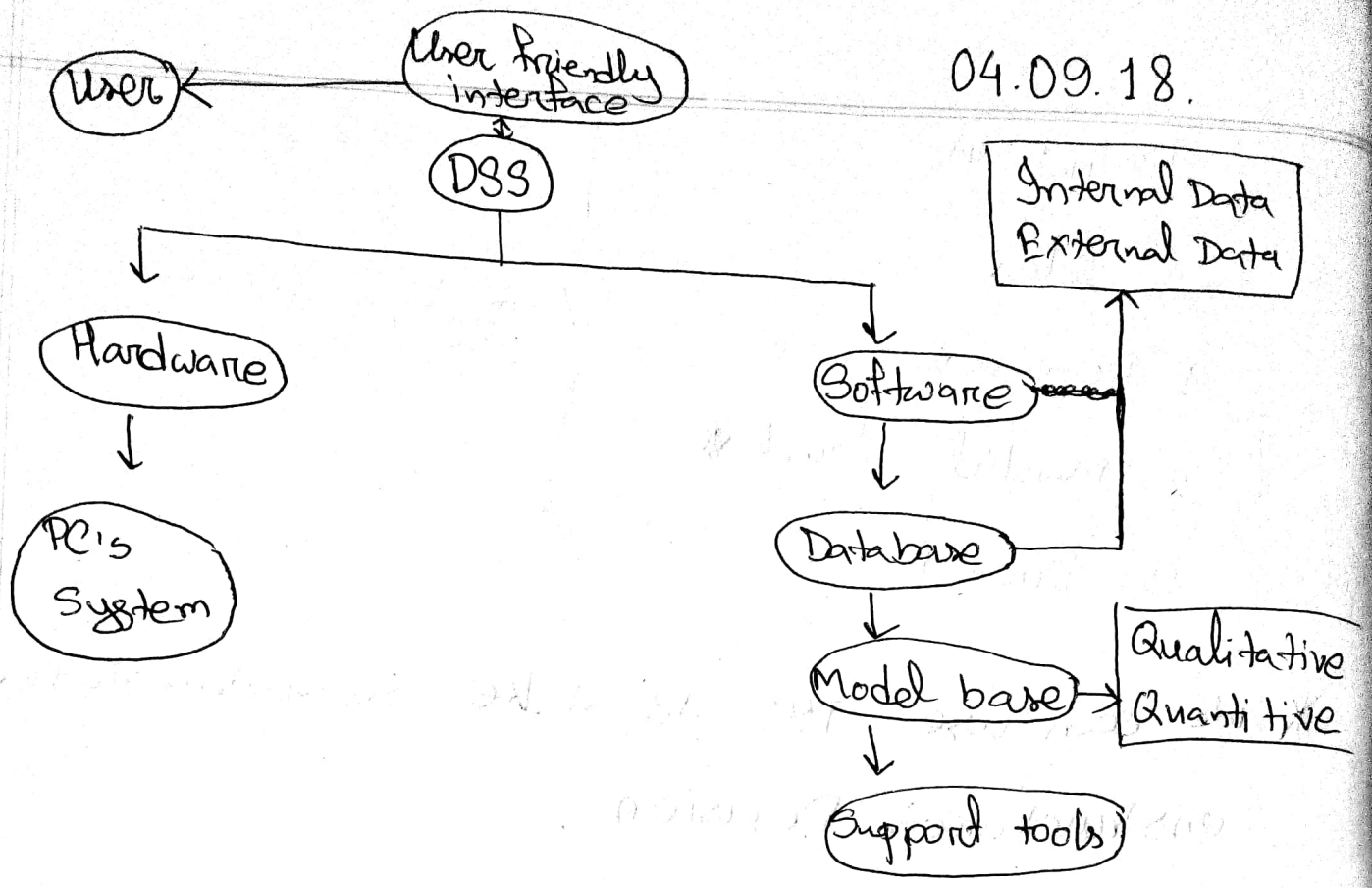
Components of DSS:

04.09.18.



(i) Database Management System → Internal Data, External Data

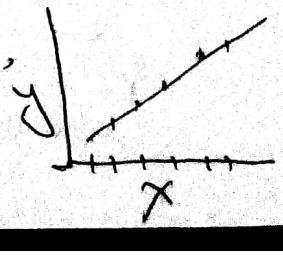
(ii) Model Management System →
- Statistical Model
- Financial & Accounting Model
- Production Model (layout design), Scheduling)
- Marketing Model (Pricing, Promotional, placing policies)
- Human resource Model. (Manpower planning, labor negotiation)

Model → Abstract representation of reality

* Model builder

Avg., Std., deviation, regression analysis.

$y = f(x)$



Cost benefit Analysis, Investment analysis.

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* Support tool:
which facilitates user's interaction with the system.

* User interface
* Graphical analysis
* Error - Correction.

Functions of a DSS:

5 functions:

1. Model building

(i) Input variables & their relationships (demand, cost, profit)

(ii) Model Assumption (price increase 5% over the forecasting period)

(iii) Constraints (production capacity is limited to 500 units)

Profit = (Selling price x demand) - Cost

———x———

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05.09.18.

Functions of a DSS:

5 Main Functions:

1. Model Building:

Based on

(i) Input variables & their inter relationships

(ii) Assumption

(iii) Constraints.

2. "What-if" analysis:

* Find impact of changes in,

(i) Model Variables

(ii) Values of the variables

(iii) Interrelationships among variables.

* Proactive than reactive decision making.

* For unstructured & semistructured problem.

* Bottom-up Approach.

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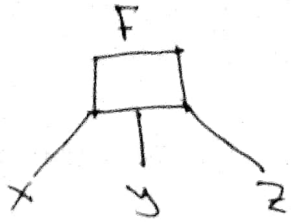
Demand selling cost Promotion

$F = f(x, y, z)$ + a

e^x $\ln x$



Bottom-up approach.

3. Goal-Seeking:

* Determining input variable necessary to achieve a certain goal. Target identify first.
* Opposite to "what-if" analysis.
* Top-down approach.

4. Risk Analysis:

* Evaluate risk and uncertainities associated with different decision.
* computed in probabilistic maner.
* Rate decision as high risk, → break through
  medium risk
  & low risk.

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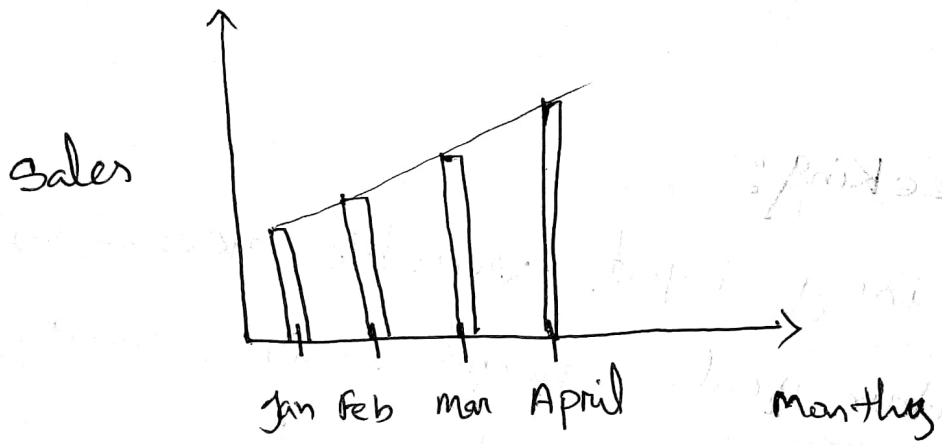
5. Graphical Analysis:

* Display of data in easy to understand format.

* To quickly draw conclusion



(i) Marketing ~~Mang~~ Manager

(ii) Production "

——— x ———

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09.09.18.

* $\bar{X}$-R chart

1. R chart $\rightarrow$ $UCL_R = \bar{R} D_4$

$$CL_R = \bar{R}$$

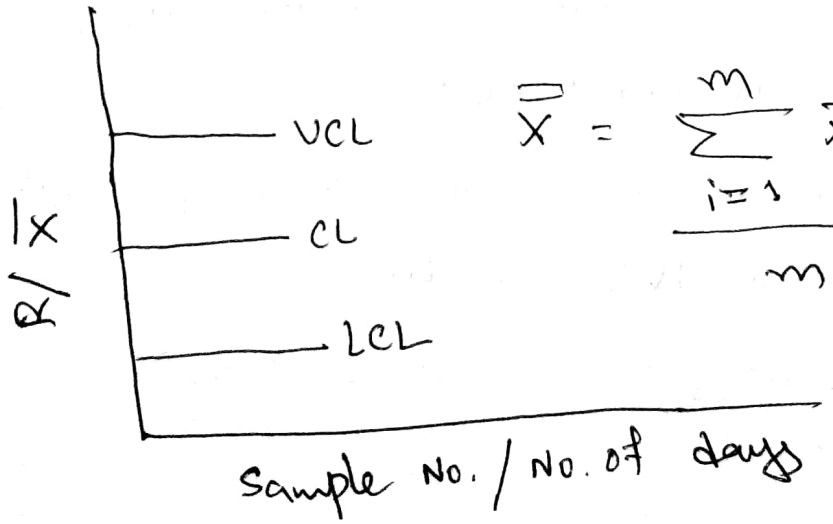
$$LCL_R = \bar{R} D_3$$

$$\bar{R} = \frac{\sum_{i=1}^{m} R_i}{m} = \frac{\text{Total range}}{\text{No. of days}}$$

2. $\bar{X}$ Chart $\longrightarrow$ $UCL_{\bar{x}} = \bar{\bar{X}} + A_2\bar{R}$

$$CL_{\bar{x}} = \bar{\bar{X}}$$

$$LCL_{\bar{x}} = \bar{\bar{X}} - A_2\bar{R}$$



$$\bar{\bar{X}} = \frac{\sum_{i=1}^{m} \bar{X}_i}{m}$$

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Given, $D_4 = 2.114$

$D_3 = 0$

$A_2 = 0.557$.

———x———

16.09.18

Commoditization Vs Differentiation:

* Commoditization:

Low value, simple.

↓

More similarity

* Differentiation:

Innovative features, Highly valued

* Other factors to compare:

- Commodity product & Finished product
- Similarity and dissimilarity
- Customer focus (Price of feature)
- value addition
- Example.

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* Value addition is more in differentiation.

Entrepreneurship:

↳ Designing, launch, run → (long term).

using Innovative latest technology.

* Characteristics of an entrepreneur:

⇒ Passion and Motivation.

↓ Self determined

↓ Self Motivated.

⇒ Not afraid to take risks.

⇒ Self-belief, Hard work and Disciplined Dedication.

⇒ Adaptable and Flexible.

⇒ Product and Market Knowledge.

⇒ Strong Money Management. (Proper utilization of money)

↳ limited resource

→ Emergency fund

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⇒ Effective planning (Not Over-planning) skills.

⇒ The Right connections.

⇒ Exit Preparedness

Plan A → Exit

Plan B → Entry

—— x ——

18.09.18

Management Principles: (Global principles).

* Book → Management

Till Slide 35 → Book

Others → Slide

Page → (4 - 16), 27, 28, 29.

Slide 39 → 10 points.

—x—

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Total Quality Management:

Chapter - 2 (25, 26, 27)

Book → Quality Management.

characteristics of TQM.

Tools of TQM → slide

Control chart →

P, C, Q, $\bar{X}$-R chart

Book → chapter - 10

page (160 - 177)

page (181 - 188)

Book → Kotler

chapter → 1, 2

New marketing realities → No need

25, 16, 17, 18 → Slide → No need.

Four P's of the marketing Mix → (v.v.g)

Holistic marketing → (v.v.g)

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Chapter - 2

Three Vis approach (v.v.I)

Slide → 5, 8, 9, 10, 11, 12, 13, 16,

(no need) 17, 18, 19, 20, 21, .

Strategic Planning Gap - (v.v.I)

The Business

SWOT Analysis

MOA

opportunity matrix

Threat "

Porter's Generic strategies (v.v.I)

marketing Alliances

* management Information System:

Data Vs Info. (v.v.I), Definition

Why organization need info. system?

slide → 11, 12, 13, 14, 15, 16, 17.

DSS → (v.v.v.I) (v.v.I)

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Part A → Management Principle, TQM, Kotler (chaper-1).

Part B → others.

ME-4117 (Slide) (v.v.I).

↓

All

— x —

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