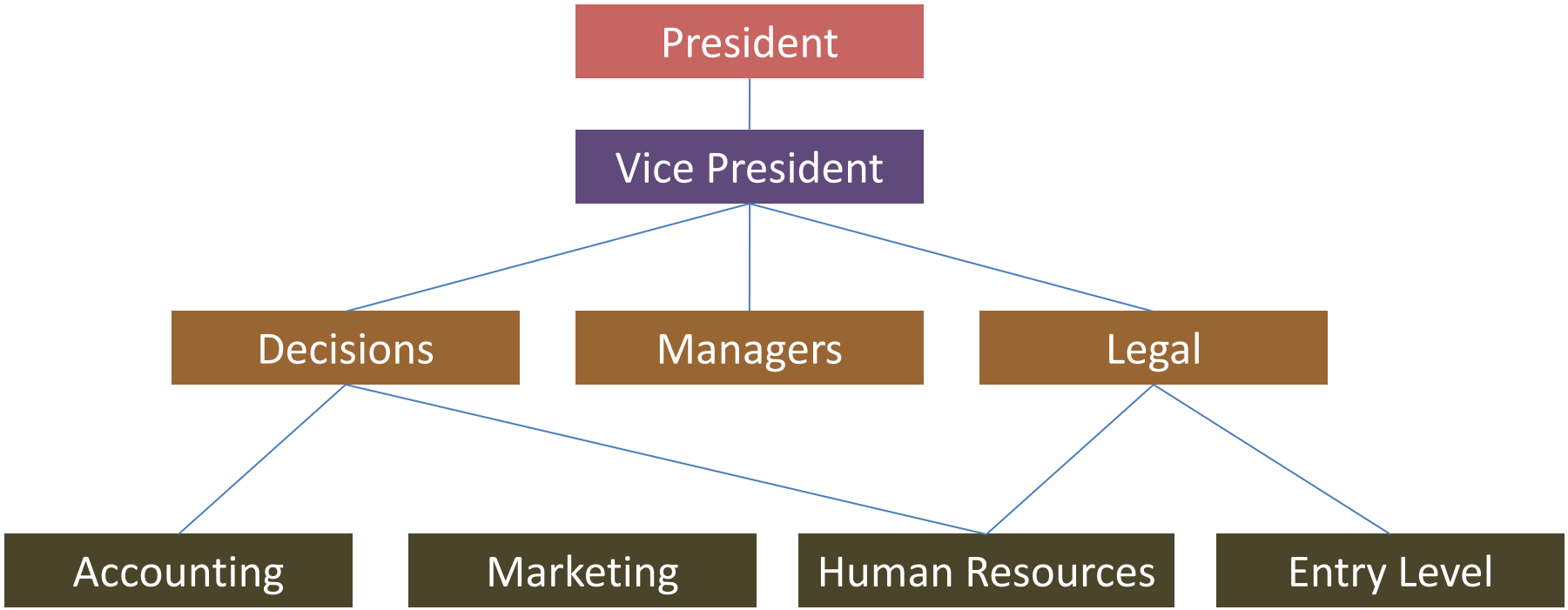
Unit-2
Quality Management

Organization structure and design



A matrix of organization structure

Quality function

A technique to make the product as per the need and desire of the customers

The main functions of quality group to implement quality activities:

- To advice the top management to prepare a customer friendly quality policy
- Evaluation of product design to improve the quality and reduction in quality cost
- Deployment of the quality standards, quality control techniques, quality inspections
- Quality audits periodically to conform the present status of the quality standard
- Periodic calibration of process control equipments
- Finally the quality of packaging process must be checked to ensure that the product must be able to withstand the transportation hazards
- Collecting the feedback of customers and accordingly reshape the quality parameters of the product when product reached to the market

Decentralization Quality Function	Centralization Quality Function
▪ In this type of arrangements the middle level management are also responsible for quality management.	▪ In centralized process the middle level management is not having decision making authority.
▪ Decisions about quality improvement in this process are relatively minor.	▪ Decisions are specific and significant.
▪ Quality managers of each process can effectively manage heir own controlled department.	▪ Little bit difficult to manage by one maner department.
▪ Risk of failure of company is less.	▪ Risk of failure of company is more.

Cost of Quality

- Cost of Achieving Good Quality
  - Prevention costs
    - costs incurred during product design
  - Appraisal costs
    - costs of measuring, testing, and analyzing
- Cost of Poor Quality
  - Internal failure costs
    - include scrap, rework, process failure, downtime, and price reductions
  - External failure costs
    - include complaints, returns, warranty claims, liability, and lost sales

Prevention Costs

- Quality planning costs
  - costs of developing and implementing quality management program
- Product-design costs
  - costs of designing products with quality characteristics
- Process costs
  - costs expended to make sure productive process conforms to quality specifications

- Training costs
  - costs of developing and putting on quality training programs for employees and management
- Information costs
  - costs of acquiring and maintaining data related to quality, and development of reports on quality performance

Appraisal Costs

- Inspection and testing
  - costs of testing and inspecting materials, parts, and product at various stages and at the end of a process
- Test equipment costs
  - costs of maintaining equipment used in testing quality characteristics of products
- Operator costs
  - costs of time spent by operators to gar data for testing product quality, to make equipment adjustments to maintain quality, and to stop work to assess quality

Internal Failure Costs

- *Scrap costs*
  - costs of poor-quality products that must be discarded, including labor, material, and indirect costs
- *Rework costs*
  - costs of fixing defective products to conform to quality specifications
- *Process failure costs*
  - costs of determining why production process is producing poor-quality products

- *Process downtime costs*
  - costs of shutting down productive process to fix problem
- *Price-downgrading costs*
  - costs of discounting poor-quality products—that is, selling products as "seconds"

External Failure Costs

- Customer complaint costs
  - costs of investigating and satisfactorily responding to a customer complaint resulting from a poor-quality product
- Product return costs
  - costs of handling and replacing poor-quality products returned by customer
- Warranty claims costs
  - costs of complying with product warranties

- Product liability costs
  - litigation costs resulting from product liability and customer injury
- Lost sales costs
  - costs incurred because customers are dissatisfied with poor quality products and do not make additional purchases

Measuring and Reporting Quality Costs

- **Index numbers**
  - ratios that measure quality costs against a base value
  - **labor index**
    - ratio of quality cost to labor hours
  - **cost index**
    - ratio of quality cost to manufacturing cost
  - **sales index**
    - ratio of quality cost to sales
  - **production index**
    - ratio of quality cost to units of final product

Quality–Cost Relationship

- **Cost of quality**
  - Difference between price of nonconformance and conformance
  - Cost of doing things wrong
    - 20 to 35% of revenues
  - Cost of doing things right
    - 3 to 4% of revenues
  - Profitability
    - In the long run, quality is free

Quality Management and Productivity

- **Productivity:**
  - ratio of output to input
- **Yield:**
  - a measure of productivity

Yield=(total input)(% good units) + (total input)(1-%good units)(% reworked)

or

Y=(I)(%G)+(I)(1-%G)(%R)

Product Cost

$$\text{Product Cost} = \frac{(K_d)(I)+(K_r)(R)}{Y}$$

where:

K_d = direct manufacturing cost per unit

I = input

K_r = rework cost per unit

R = reworked units

Y = yield

Computing Product Yield for Multistage Processes

$$Y = (I)(\%g_1)(\%g_2) \ldots (\%g_n)$$

where:

I = input of items to the production process that will result in finished products

g_i = good-quality, work-in-process products at stage i

Quality–Productivity Ratio

QPR

- productivity index that includes productivity and quality costs

$$\text{QPR} = \frac{\text{(non-defective units)}}{\text{(input) (processing cost)} + \text{(defective units) (reworked cost)}}$$

Attitude of top management towards human factor

Improvement is based on six basic performance management elements:

- Commitment to human resources excellence
- Dedicated work drivers
- Benchmarks/proven approaches rather than re-inventing wheel
- Move the needle on engagement
- Healthy lust for kaizen
- Increasing driving force

Responsibility towards Quality

- Customer quality
- External quality
- Failure analysis lab
- Field quality
- Manufacturing quality
- NPI quality
- Quality systems
- Reliability lab
- Software quality
- Quality standards and bodies

Causes of apparatus error

1) Blunders (Mistakes)

2) Instrumental limitations

3) Human error

4) Sampling

5) Not all measurements have well-defined values

6) Observing the system may cause errors

7) Errors due external influences

Thank you