Chapter 11- Decision Making and Relevant Information

Relevant Information and Costs:

- **Info has 2 characteristics:**

1.) It occurs in the FUTURE

2.) It DIFFERS among the alternative course of action

- **Relevant costs:**

i.) Expected future costs

- **Relevant Revenues:**

i.) Expected future Revenues

Irrelevant Information:

- **HISTORICAL costs that incurred in the past and are irrelevant when making decisions between alternatives**
- **Also called SUNK costs**
- **INFORMATION that does NOT CHANGE between alternative courses of actions is irrelevant.**
- **Example: Revenue is $500 with the old alternative and new- therefore it will not impact the decision since they both cancel one another out**

Terminology:

- **Incremental Cost:**

i.) Additional total cost incurred for an activity

ii.) Difference between two alternative relevant costs

iii.) Also called Out-of-pocket, Outlay, or Differential Cost

- **Net Relevant Cost:**

i.) Incremental Saving minus the Incremental cost

- **Incremental Revenue:**

i.) Any additional total revenue from one alternative

- **Differential Revenue:**

i.) Difference between the total revenue of two or more alternatives

***** Variance or difference (U) or (F) is relative to the decreasing or increasing effect of each choice on Operating Income**

Types of Information:

- **QUANTITATIVE factors that can be MEASURED in numerical terms:**

i.) Can be financial; or

ii.) Non-financial- Examples include amounts of:

A.) Labour-Hours

B.)Direct Materials

C.) Units Produced

- **QUALITATIVE factors that CANNOT be MEASURED in numerical terms:**

i.) Such as Satisfaction

ii.) Important even though difficult to measure

iii.) Examples:

A.) Employee morale

B.)Customer Satisfaction

C.) Ineffective training

D.) Incorrect assumptions

- **Causes for Unfavourable Manufacturing Labour Costs:**

1.) Skills of workers does not match those required for the new process- can lead to overtime- suggests failure in recruitment, training, and/or placement

2.) Training programs failing- workers did not get thorough understanding or practice of new equipment- Human resource failure or failure of communication for the need of new training needs

3.) Equipment installation failure- causing batch size issues, non-productive idle time for setups and overtime for workers- suggests failure to foresee and fulfill the need for process improvement

4.) Layoffs affected morale and productivity-leading to hiring more workers- Human Resource failed to foresee and fulfill HRM needs

5.) Assumptions top management used in their forecast were incorrect- Signals weakness in either performance measurement or in strategic process

<u>Types of Decisions to make:</u>

1.) One-Time Only Special Orders
2.) Make/Buy Decision:
i.) Outsourcing
ii.) Insourcing
iii.) Opportunity Cost
3.) Equipment-Replacement Decisions
4.) Product-Mix Decisions

****** Use Variable Costing- Segregate Fixed and Variable Costs and show in Contribution Margin Format**

1.) <u>One-Time Only Special Orders:</u>
- **Compares relevant revenues and costs to DETERMINE PROFITABILITY**
- **ACCEPTING or REJECTING special orders:**

A.) When there is IDLE PRODUCTION CAPACITY- should accept if there is extra wiggle room to make products i.e. falls within the relevant range without incurring extra costs
B.) Should not have long-term implications- only an exception (therefore short-term)

- **DECISION RULE:**

i.) Special order should generate additional operating income

- **QUALATITATIVE considerations-Examples:**

i.) What will the impact be on regular customers- are they offended, do they ask for same deal, do some leave, etc.
ii.) What's the potential to do business with the same customer in the future

- **Fixed Costs (Sunk Costs) are irrelevant:**

i.) Costs cannot be retrieved

ii.) Have incurred already

- **Use Variable Costing with Contribution Margin Format**

2.) <u>Make/Buy Decision- Outsourcing/Insourcing:</u>

- **Insourcing:**

i.) Producing goods or services within an organization

ii.) May require an expansion to capacity

iii.) A strategy of VERTICAL INTEGRATION

- **Outsourcing:**

i.) Purchasing goods or services from outside vendors

- **Decision Rule:**

i.) Select the option that will provide the firm with the LOWEST COST, and therefore the highest profit

- **Qualitative factors to look at:**

i.) QUALITY requirements

ii.) REPUTATION of outsourcer

iii.) LOGISTICAL considerations- distance from plant

iv.) DEPENDENCE on suppliers can increase risk:

A.) Suppliers could increase PRICES, or allow quality or performance to slip

B.) Avoid or minimize RISKS by entering into long-term contracts- build RELATIONSHIPS/PARTNERSHIPS with suppliers

- **Opportunity Cost:**

i.) The contribution to operating income FOREGONE by not using a limited resource in its next best alternative use:

A.) How much did the firm lose out on by not selecting the best alternative?

ii.) A special type of opportunity cost is HOLDING COST of inventory:

A.) Funds tied up in inventory are not able to be invested elsewhere- like in shares, bonds, etc.

- **Strategic and Qualitative Factors-Affecting Outsourcing/Insourcing Decisions**

1- May want to manufacture products in-house to retain control over the design, quality, reliability and delivery schedules- reason for INSOURCING

2- May want to become a small organization and focus on its main competencies or strengths- reason for OUTSOURCING

3.) <u>Equipment Replacement Decisions:</u>

- **Decision analysis can be hard due to the IRRELEVANT INFORMATION managers hold on to:**

i.) HISTORICAL COSTS, DEPRECIATION, BOOK VALUE of existing equipment are SUNK COSTS

ii.) CAPITAL GAINS AND LOSSES are not accounted for during decision analysis- it is a financial accounting phenomenon only

- **MUST concentrate on RELEVANT INFORMATION:**

i.) Current DISPOSAL PROCEEDS of old machine

ii.) COST of new machine

iii.) Both are FUTURE cash flows and DIFFER between alternatives

4.) <u>Product Mix Decisions:</u>

- **Companies with CAPACITY CONSTRAINTS must decide WHICH PRODUCTS to make (sell) and in WHAT QUANTITIES to maximize operating profit**
- **DECISION RULE: choose the product that produces the HIGHEST CONTRIBUTION MARGIN PER UNIT OF THE CONSTRAINING FACTOR**
- **CONSTRAINT- The scarce, limiting or critical factor**
- **Many constraints can exist- machine hours, materials, labour, financial, etc.**
- **If machine hours are constrained, MAXIMIXE INCOME of that unit that is more profitable with respects to CONTRIBUTION MARGIN <u>PER UNIT</u> and then shift production to the less profitable unit**
- **Managing Constraints:**

A.) How to manage the "BOTTLENECK" constraint to increase output and contribution margin-

i.) DECREASE the constraint (e.g. reduce idle time)

ii.) REDUCE the amount of constraint used per unit

iii.) IMPROVE quality so that the constraint is not being used to produce defective units

B.) Linear programming- helps with complicated problems like having MORE THAN ONE CONSTRAINT

1- Linear Programming:

i.) Optimization technique used to MAXIMIZE TOTAL CONTRIBUTION MARGIN given multiple constraints

ii.) Assumes all costs can be classified as FIXED or VARIABLE with respect to a single driver (unit of output)

2- Steps in solving an Linear Programming Problem:

i.) DETERMINE THE OBJECTIVE FUNCTION- To MAXIMIZE contribution margin or MINIMIZE costs

ii.) SPECIFY THE CONSTRAINTS- Mathematical qualities or inequalities that must be satisfied by the variables in a mathematical model

iii.) COMPUTE THE OPTIMAL SOLUTION- 2 Methods:

1. **Trial-and-Error Approach**
2. **Graphic Approach**

C.) Unit Costs can mislead:

i.) When irrelevant costs are included

ii.) When unit costs at different output levels are compared

D.) Pitfalls in relevant-cost analysis:

i.) Assume all variable costs are relevant; and

ii.) All fixed costs are irrelevant

E.) Avoid pitfalls by:

i.) FOCUS ON RELEVANCE CONCEPT

ii.) Item included in analysis should be AN EXPECTED FUTURE REVENUE, OR COST; and

iii.) DIFFERENT BETWEEN THE ALTERNATIVES

F.) Confusing Terminology-Terms to describe the costs of specific products and services:

- **Business Function Costs = Sum of ALL the COSTS (Variable costs and Fixed Costs) in a particular business function in the value chain**
- **- Manufacturing Costs = For inventory costing purposes, referring to Absorption Costs**
- **Full Product Costs = Sum of ALL the COSTS in ALL the BUSINESS FUNCTIONS in the value chain (R&D, design, production, marketing, distribution, and customer service)**

G.) Decisions and Performance Evaluation:

- **Managers tend to favour the alternative that makes their PERFORMANCE LOOK BETTER**
- **Problems occur when the performance evaluation model CONFLICTS with the Decisions Model**
- **Managers engage in behaviour such as delaying needed equipment maintenance in order to me their PROFITABILITY QUOTAS for PERFORMANCE BONUSES**
- ***** Solution- to add project performance to MIS**
- **Objective should be to learn from mistakes rather than to blame the mistakes**

Chapter 12- Pricing Decisions

Pricing Strategies:

1.) **Target Pricing- Price is based on what customers are willing to pay**
2.) **Cost-Plus Pricing- A flat rate target profit percentage is added to the full product cost**
3.) **Life-Cycle Pricing- (Cradle to grave), which includes the environmental costs of production, reclamation, recycling, and reuse of materials**

Influences On Pricing:

1- **CUSTOMERS- Influence price demand for a product or service, based on quality, availability, and substitutability.**
2- **COSTS- prices must cover all costs in the long run, and produce a profit**
3- **COMPETITORS-**

i.) **Effect on pricing differs due to competitive environment (monopoly versus competition)**
ii.) **A company must accept the price that customers are willing to pay**

Factors in Pricing Decisions:

- **Perceived VALUE of the attributes of the product**
- **COSTS of producing, selling, distributing and after-sale service of the product**
- **The pricing strategy of COMPETITORS**

Product Cost Categories:

1.) UPSTREAM COSTS-

i.) PRE-PRODUCTION costs of research and development (R&D) and/or product and process design

2.) DOWNSTREAM COSTS-

i.) POST-PRODUCTION- costs incurred to make a sale and keep customers satisfied (marketing, distribution, and after-sales service)

3.) FULL PRODUCT COSTING-

i.) Recovers all upstream, production and downstream costs PLUS PROFIT

<u>Time Horizon:</u>

1.) SHORT-RUN PRICING DECISIONS-

i.) 6 months to one year

ii.) Pricing for ONE-TIME-ONLY special orders

iii.) ADJUSTING product mix and output in a COMPETITIVE MARKET

2.) LONG-RUN PRICING DECISIONS:

i.) 1 Year or Longer

ii.) Pricing a product in a MAJOR MARKET where price setting has considerable leeway

<u>Pricing Decisions:</u>

1.) Short Run

i.) A one-time-only special order

ii.) Adjust product mix and output volume

2.) Long Run-

i.) Market- Based- Full Cost or Target Costing

A.) What do our customers want and what are our competitors doing?

ii.) Cost-Based- Cost-Plus

A.) What price should we charge to cover our costs and earn a profit?

Special Order Decision Process:

1.) IDENTIFY THE PROBLEM-

i.) Acceptance or rejection does NOT FFECT SALES from existing outlets?

ii.) Customer is UNLIKELY TO PLACE future orders?

iii.) Idle capacity EXISTS?

2.) GATHER INFORMATION-

i.) Focus on FUTURE direct AND indirect costs that will CHANGE by accepting the one-time-only special order

3.) FORECAST FUTURE OUTCOMES

i.) Based on available information

4.) DECIDE AMONG ALTERNATIVES

i.) Consider QUALITATIVE factors as well as quantitative analysis

5.) EVALUATE PERFORMANCE

i.) Gather performance data COMPARING actual profitability to predicted profitability

Market Based Pricing:

1.) Starts with a TARGET PRICE-

i.) Estimated price for a product or service that potential customers will be WILLING TO PAY

ii.) Based on customers' PERCEIVED VALUE for a product or service and how COMPETITORS will price competing products or services

2.) TARGET COST-

i.) Estimated LONG-RUN COST per unit that, when sold at the target price, enables the company to ACHIEVE ITS TARGET MARGIN PERCENTAGE

3.) 4 Steps in Target pricing and Target Costing-

1- Develop a product that satisfies a customer need
2- Choose a target price based on customer's values, competitor actions and target income
3- Derive a target cost per unit = Target Price – Target Income
4- Perform VALUE ENGINEERING (a critical analysis of the value chain) to achieve the target cost-

i.) Cost of value added activities are reduced;
ii.) Non value-added activities are eliminated

- Long-Term Pricing Example: Astel's Pro-value Notebook:

1.) Identify The Problem-

i.) Sustaining competitiveness, given the short product life
ii.) Target full product cost is $720 per unit
iii.) Current full product cost is $900 per unit
iv.) Operating Margin= 10%
v.) Manufacturing Savings due to reduced complexity

2.) Gather Information

3.) Forecast Future Outcomes-

i.) Decrease in defect rate from 8% to 6.5% achieved through simplification of the current design
ii.) By reducing the price Astel will increase sales from 150,000 units to 200,000 units
iii.) Decrease in direct material costs from $460 to $385
iv.) Decrease in testing and inspection time from 30 to 15 hours per unit
v.) Increased total rework hours from 30,000 to 32,500
vi.) Decreased in components from 22,500 to 21,250
vii.) Decrease in direct manufacturing hours from 3.2 per unit to 2.65 per unit

4.) Decide Among Alternatives-

i.) Competition from lower cost producers means that prices cannot be increased
ii.) Products are on the market for shorter periods of time, leaving less time and opportunity to recover from pricing mistakes

iii.) Customers have become more knowledgeable and demand quality products at reasonable prices

- Key Concepts In Value Analysis:

1- Cost Incurrence-

i.) When a resource is actually consumed (or benefit forgone) to meet specific objective

2- Locked-In Costs (Designed-In Costs)-

i.) Have not yet been incurred but, based on decisions that have already been made, will be incurred in the future

ii.) Become locked-in at different stages of product development depending upon the industry

- Issues with Value Engineering and Target Costing:

1- DECREASED MORALE- if performance targets are not attained

2- Compromises in product attributes result in POOR DESIGN

3- MISSED OPPORTUNITIES because of longer product development time

4- Unequal burden of cost reduction resulting in FUNCTIONAL conflict as non-value-added costs are eliminated

5.) Evaluate performance:

1- Gather performance data COMPARING actual profitability to predicted profitability

<u>Cost-Plus Pricing:</u>

1.) The general formula adds a mark-up to the cost base to determine a prospective selling price

2.) Pro-Value example- Check note book/slides

-<u>Forms of Cost-Plus Pricing:</u>

i.) ROI method

ii.) Setting a target rate of return on investment (ROI)

iii.) ROI = Target Operating Income / Invested Capital

iv.) Pro-value Example- Check notebook/ Slide

- **Alternative Cost-Plus Methods:**

i.) Cost-plus pricing begins with some form of product or service cost and adds on an appropriate mark-up

ii.) Pro-Value example- Check notebook/Slide

1- Common Business Practice:

i.) Most firms use ABSORPTION COSTING for their cost-based pricing decisions, because:

A.) Allows for FULL RECOVERY of all costs of the product

B.) Allows for PRICE STABILITY- limits the ability to cut prices and facilitates planning

C.) SIMPLICITY- does not require a detailed analysis of cost behaviour

Product Life-Cycle Pricing and Costing:

1.) Product Life-Cycle:

i.) The time from initial R&D on a product to when customer service and support are no longer offered

2.) Life-Cycle Costing:

i.) Tracks and accumulates the actual costs of to each product from start to finish

ii.) Also Called "CRADLE-TO-GRAVE" and "Womb-To-Tomb" costing

Life-Cycle Budgeting:

- **Estimate full product costs across the VALUE CHAIN**

- **INCLUDING recycling, reuse, and reclamation costs**
- **All revenues and costs associated with the product BECOME VISIBLE**
- **Percentage of total costs incurred at early stages of life cycle are HIGHLIGHTED**
- **Interrelationships among business function cost categories are HIGHLIGHTED**

i.) Theory indicates that marginal cost should be the most relevant cost for pricing in the short term. Yet surveys consistently show that managers use full cost when setting prices: Why?-

1- Need to think long term, and need to recover fixed costs in the long term;
2- Perceived benefit of price stability
3- Simplicity;
4- Price Justification (mainly a US consideration)

<u>Fair Business Practices in Pricing:</u>

1.) Price Discrimination-

i.) The practice of charging different customers different prices for the same product or service

2.) Predatory Pricing-

i.) Manufacturers sell product at lower than cost with the intent to reduce competition

3.) Peak-Load Pricing-

i.) The practice of charging a higher price for the same product or service when the demand for it approaches the physical capacity limits

4.) Dumping-

i.) When a foreign company sells goods in Canada at a price below market value, receives a government subsidy and injures Canadian industry

5.) Collusive Pricing-

i.) When companies in an industry conspire to achieve above the competitive price

Environmental Sustainability:

1.) **Concerns about environmental sustainability are extending the view of life-cycle costing-**

i.) **Past the end of a product's life-cycle**

ii.) **Now includes RESPONSIBLE WASTE DISPOSAL during production and disposal of obsolete products**

Additional Considerations for Pricing:

1.) **Production Capacity limits**
2.) **Peak-load pricing when at limit of capacity**
3.) **Customize prices- Price Discrimination**
4.) **Locked-In Costs**
5.) **Competition in the industry**
6.) **Customers and Suppliers profile and expectations**
7.) **Current and potential substitutes**

Chapter 13- Strategy, Balance Scorecard, and Profitability Analysis

- **Strategy- How an organization Creates Value for customers while Differentiating Itself from competitors**

- **Core/Distinctive Competence- Overlap between corporate Strength, maximizing Opportunity, and countering Threats**

i.) **Distinctive Competence- is a unique combination of human and capital resources that enables a company to outperform competitors**

- **Scalability- able to process large amounts of work in a productive and capable manner**

1.) Five Competitive Forces that help managers identify 2 Types of Strategies: Cost Leadership and Product Differentiation

1- Competitors:

i.) **Must do an analysis on competitors- What are their prices, what makes them unique and their products, why are customers loyal to them, etc.**
ii.) **Economies Of Scale- Result from highly automated processes, spreading the cost of capacity (fixed costs) over Large Volumes of Products to reduce costs**

2- Potential New Entrants:

i.) New entrants are not allowed in by keeping entry level costs high
ii.) Allows existing companies to be more competitive due to less suppliers
iii.) Decide labor costs since alternatives to switch to another employer are low

3- **Substitute Products:**

i.) Products should be made unique so substitutes for the products do not exist
ii.) Prices should match competitors so current customers don't switch over to same good/service that is being provided for cheaper by a competitor

4- **Price-Setting Power of Customers (Monopsony)-**

i.) Dominant customers have the ability to bargain with large companies who purchase large volume of products
ii.) Threat of dominant customer walking away and no one to replace him

5- **Price-Setting Power of Input Supplier (Monopoly):**

i.) Suppliers have power when few suppliers can supply similar inputs (materials)
ii.) Threat of loosing Human Capital- the value added by people with skill and experience gained from working together; have bargaining power and can demand higher prices and wages for their unique advantage

*** These 5 forces can result in Higher Costs and Lower Revenue

- Price Takers- corporations that must accept the price that the customers are willing to pay and the costs monopsony suppliers can charge
- Cost Leadership- Produce products that are at least equal to others at the Lowest Cost
- Value leader/Product Differentiation- Customers perceive a

product with superior or uniquely desirable attributes

- Economies of Scope- Result from designing New Products that can be produced using existing plant and equipment- **Reduce costs like Economies of Scale**

2.) Selecting an Appropriate Strategy: Factor in Porter's 5 forces

1- Identify the problem-

i.) Choose a strategy- Value or Cost leadership

2- Gather and Analyze relevant information-

i.) Data about competitors, customers and product attributes
ii.) Customer Preference Map can be used to analyze data

3- Make Predictions about the future-

i.) Short life cycles of technological products mean that customers wait only a short time for a "better" product

4- Make The Decision-

i.) Highly automated processes create Economies Of Scale And Scope
ii.) Cost leadership strategy should be implemented if workers are skilled enough to be productive but not creative

5- Implement the decision, Evaluate performance and Learn-

i.) Improve internal processes to Increase Yield
ii.) Reduce Opportunities for error, improve quality and speed

*** Strategy map consists of Key Success Factors/ Key Performance Factors

3.) Strategy Map:

1- Financial Perspective-

i.) Operating Income from productivity gain
ii.) Revenue growth
iii.) Operating Income growth

2- Customer Perspective:

i.) Customer Satisfaction Ratings
ii.) Number of new Customers
iii.) Market share in communication network segment

3- Internal Business Perspective:

i.) Yield- Percentage of processes with advanced controls
ii.) Order delivery time- Number of major improvements in manufacturing and business processes
iii.) On-Time delivery
iv.) Service Response time

4- Learning and Growth Perspective:

i.) Employee Satisfaction rating
ii.) Percentage of Employees trained in process and quality management
iii.) Percentage of line workers empowered to manage processes
iv.) Percentage of manufacturing processes with real-time feedback

- **Reengineering/ Redesigning- is the fundamental rethinking and redesign of business processes to achieve improvements in critical measures such as cost, quality, speed, and customer satisfaction.**

4.) The Balanced Scorecard (BSC):

i.) Assesses the Implementation of corporate strategy in Day-To-Day operations
ii.) Represents Interdependencies between Key Performance Indicators (KPF) using Financial And Nonfinancial measures of cost and benefit

5.) The Four Perspectives of the Balanced Scorecard:

1- Financial Perspective- highlights achievement of financially strategic goals. The maximization of shareholder value is a strategic goal shared by all for-profit businesses.

i.) Creating organizational value for owners/shareholders
ii.) Activities that change
A.) More effective capacity use
B.) Reduce unitized fixed cost
C.) Strengthen Customer Relationships
iii.) Measure-
A.) Improve Yield
B.) Increase Operating Income growth
C.) Increase Revenue
iv.) Prediction (Budgeted) Calculations VS. Actual Performance Calculations

2- Customer Perspective-Identifies the targeted market segments and measures the company's success in these segments

i.) Adding value for customers
ii.) Activities that change-
A.) Identify attributes clients need
B.) Identify new groups of clients
C.) Increase focus on the client
iii.) Measures-
A.) Market Share
B.) Quantity of new groups
C.) Customer Satisfaction
iv.) Budgeted (Prediction) VS. Actual Performance Calculations

3- Internal Business Process Perspective- requires analysis of how to improve internal operations, which implicates the entire value chain of business functions.

i.) Ensuring efficiency and quality in the value chain
ii.) Activities that Change-
A.) Decrease service cycle time
B.) Increase quality and yield
C.) Decrease delivery and cycle time
D.) Increase on-time deliveries
E.) Streamline Business process
F.) Improve quality control
iii.) Measures-
A.) Time to complete a job
B.) Yield
C.) Order-delivery time
D.) On-time delivery ratio
E.) Quantity of innovations
F.) Advanced Controls ratio
iv.) Budgeted (Predictions) VS. Actual Performance Calculations

4- Learning and Growth- as expanded to become a field of study of its own on the identification, development, retention, and valuation of *intellectual capital*. Intellectual capital is hard to identify, let alone measure and relate to competitive advantage, which makes this the most intangible target of management. The goal of intellectual capital management is to apply, retain, and expand knowledge and improve long-term competitive success.

i.) Investing in Organizational infrastructure
ii.) Activities that Change-
A.) Increase ratio of improved team performance from workers' suggestions
B.) Increase font-line workers' scope of decision making
C.) Increase training programs
D.) Increase independent data searches for benchmarks
iii.) Measures-
A.) Employee Satisfaction
B.) Ratio of workers' to total decisions
C.) Ratio of employees trained to total
D.) Ratio of real-time feedback to total processes
iv.) Budgeted (Prediction) Vs. Actual Performance Calculations

6.) Features of a Good BSC:

1- Focuses on a limited set of linked features that will Increase Profitability
2- Communicated through understandable operational targets
3- Includes Non-Financial measures- based on social, legal and environmental perspectives
4- Identifies only the most Critical Key Success Factors (KSF)
5- Highlights Sub-Optimal Tradeoffs

7.) Pitfalls When Implementing BSC:

1- Challenge to identify the Strength And Speed of orderly change
2- Scarce resources require Priority Setting of strategic goals
3- Intangible achievement of intellectual goals requires Qualitative and Subjective measurement
4- Managers tend to Focus on performance measurement rather than Corporate Success

8.) Evaluation Strategy:

1- Growth Component- Measures the change in operating income attributable solely to the change in the quantity of output sold between the current and prior periods
2- Price-Recovery Component- Measures the change in operating income attributable solely to changes in prices of inputs and outputs between the current and prior periods
3- Productivity Component- Measures the change in costs attributable to a change in the quantity of inputs between the current and prior periods

9.) Strategic Analysis of Operating Income:

- See how successful a company has been with its strategy (Cost leadership, product differentiation and growth)
- Focus on 3 components-

1- Growth
2- Price Recovery

3- Productivity

- **If a company is successful in Cost Leadership you will expect to see Large Favorable Productivity and Growth Components**
- **If company is successful in Product Differentiation you will see Large Price-Recovery and Growth Components**

10.) Strategic Analysis of Operating Income-Formulas: Evaluation of BSC

A.) Growth Component-

**** Measures the Increase in Revenue Minus the Increase in Costs**

1- Revenue Effect- Measures increase in quantity sold, assume same price in past year. Assumes output prices, input prices, efficiencies, capacity is same between years

i.) Revenue Effect Of Growth = (Actual Units of Output Sold in Current Year – Actual Units of Output Sold in Previous Period) * Selling Price of Previous Period

ii.) Example- Current year is 2014, then actual units of output sold in 2014 – actual units sold in previous period which will become 2013 since current is 2014

2- Cost Effect – Measures the amount by which current year costs would have increased if input/output relationships and input prices from last year continued in current year

i.) Cost Effect of Growth For Variable Costs = (Units of input required to produce current output in previous period – Actual

Units of Input used to produce previous periods output) * Input Price in Previous Period

3- Cost of Growth for Fixed Costs- i.) Adequate Capacity and ii.) Inadequate Capacity

i.) Cost Effect of Growth For Fixed Costs = (Actual Units of Capacity in Previous Year if adequate to produce current period output in previous year – Actual Units of capacity in previous year) * Price per unit of capacity in previous year

ii.) Cost Effect of Growth For Fixed Costs = Units of Capacity required to produce current period output in previous period – Actual Units of Capacity in previous year) * Price per unit of Capacity in Previous Period

B.) Effect of Price Recovery:

1- Price Component- Effect of changes in prices between years

i.) Revenue Effect- To isolate the changes in revenues between the years due to changes in prices

ii.) Revenue Effect of Price Recovery = (Selling Price in Current Period – Selling Price in Previous Period) * Actual Units of Output Sold in Current Period

2- Cost Effect- To isolate the changes in costs caused by changes in prices of inputs between the years

i.) Cost Effect of Price Recovery for Variable Costs = (Input Price in Current Period – Input Price in Previous Year) * Units of Input Required to Produce Current Period output in Previous Period

3- Cost Effect of recovery for fixed costs- i.) Adequate and ii.) Inadequate Capacity

i.) Cost Effect of Price Recovery for Fixed Costs = (Price per unit of capacity in current period – Price Per unit of capacity in

previous period) * Actual Units of Capacity in Previous Year if adequate to produce Current Period Output in Previous Period

ii.) Cost Effect of Recovery For Fixed Costs = (Price per unit of capacity in current period – Price per unit of capacity in Previous Period) * Units of Capacity required to produce Current period output in Previous Period

C.) Effect of Productivity:

1- Productivity Component- Effect of changes in fewer inputs, input mix, less capacity to produce current year output, assuming current year input prices

- Use current year prices and output to isolate the change in costs between years caused solely by changes in quantities, mix, and capacities of inputs

i.) Cost Effect of Productivity for Variable Costs = (Actual Units of Input Used to produce Current Period Output – Units of Input Required to Produce Current Period Output in Previous Period) * Input Price in Current Period

2- Cost Effect of Productivity for Fixed Costs- i.) Adequate and ii.) Inadequate

i.) Cost Effect of Productivity For Fixed Costs= (Actual Units of Capacity in Current Period – Actual Units of Capacity in Previous Period, if adequate to produce Current Period Output in Previous Year) * Price per Unit of Capacity in Current Period

ii.) Cost Effect of Productivity for Fixe Costs = (Actual Units of Capacity in Current Period – Units of Capacity Required to Produce Current Period Output in Previous Period) * Price Per Unit of Capacity in Current Period

11.) Productivity Improvement:

1- Partial Productivity- Compares the Quantity of Output produced with the Quantity of an input used

i.) Partial Productivity = Quantity of Output Produced / Quantity of Input Used

ii.) Direct Materials Partial Productivity = Quantity of Units Produced during Current Period / Quantity of Direct Materials Used to Produce Product in Current Period

2- Total Factor Productivity- The result of changing all inputs simultaneously

i.) Total Factor Productivity = Quantity of Output Produced in Current Period / Costs of all Inputs Used in Current Period based on Current Period prices

ii.) Benchmark Total Factor Productivity = Quantity of Output Produced in Current Period / Costs of inputs that would have been used in Previous Period to Produce Current Period Output

12.) Capacity Control Measures/ Cost Classification

1- Engineered Costs- Have a Cause-And-Effect relationship between output and resources used

2- Discretionary Costs-
i.) Maximum amount determined periodically

ii.) No clearly measureable Cause-And-Effect Relationship

3- Infrastructure Costs- Fixed Costs of Property, Plant, and Equipment

- **Difference Between Engineered Costs and Discretionary Costs:**

i.) Engineered Costs- Examples- Manufacturing, Distribution

1- Type of Process or Activity

A.) Detailed and Physically Observable

B.) Repetitive

2- Level of Uncertainty (the possibility that actual costs will deviate from expected costs)

A.) Moderate or Small

ii.) Discretionary Costs- Examples- R&D, Advertising, Public Relations

1- Type of Process or Activity

A.) Black Box (knowledge of process is sketchy or unavailable)

B.) Non-repetitive or non-routine

2- Level of Uncertainty (the possibility that Actual Costs will deviate from Expected Costs)

A.) Large

13.) Managing Unused Capacity:

1- Eliminate Unused Capacity by Downsizing (Rightsizing)

i.) An integrated approach of configuring processes, products, and people to match costs to the activities that need to be performed to operate effectively and efficiently in the present and future

2- Use Excess Capacity

i.) To Increase production and revenues

Chapter 19-Quality, Time, and the Theory Of Constraints

1.) Quality as a Competitive Tool (Apply Balance Scorecard [BSC] concepts to the analysis of quality):

- **4 Perspectives to Measure the Costs of Quality-**

A.) Quality Perspective

1- **Quality of Design- How closely the characteristics of products or services meet the needs and wants of customers**

2- **Conformance Quality- The performance of a product or service according to design and product specifications**

Actual Performance Design Specifications Customer Satisfaction

|←----------Conformance ------→| ←--------Quality of Design---------→|
Quality

B.) The Financial Perspective

1- **Prevention Costs- Preclude the production of products that do not conform to specifications**

2- **Appraisal Costs- Detect which of the individual units of products do not conform to specifications**

3- **Internal Failure Costs- Defective products Before they are shipped**

to customers

4- External Failure Costs- Defective products After they are shipped to customers

i.) Items Included in Cost-of-Quality Reports:

1. Prevention Costs-

i.) Design Engineering
ii.) Process engineering
iii.) Supplier Evaluations
iv.) Preventive Equipment Maintenance
v.) Quality Training
vi.) Testing of new materials

2. Appraisal Costs-

i.) Inspection
ii.) Online product manufacturing and process inspection
iii.) Product testing

3. Internal Failure Costs-

i.) Spoilage
ii.) Rework
iii.) Scrap
iv.) Machine Repairs
v.) Manufacturing/Process engineering on internal failures

4. External Failure Costs-

i.) Customer support
ii.) Manufacturing/Process engineering for external failures
iii.) Warranty Repair Costs
iv.) Liability Claims

C.) Customer-Service Perspective (Nonfinancial Measures)

1- Market Research customer preferences and satisfaction

2- Market Share

3- Customer Satisfaction Ratings

4- Number of customer Complaints

5- Product Fail Rates

6- Customer Response Time

7- On-time Delivery Rates

D.) The Learning and Growth Measures of Quality

1- Employee Turnover Ratio

2- Employee Empowerment

i.) Number of processes in which employees have the Right To Make Decisions without consulting supervisors

3- Employee Satisfaction

4- Employee Training

2.) Analyze Quality-Control Problems using 3 Methods:

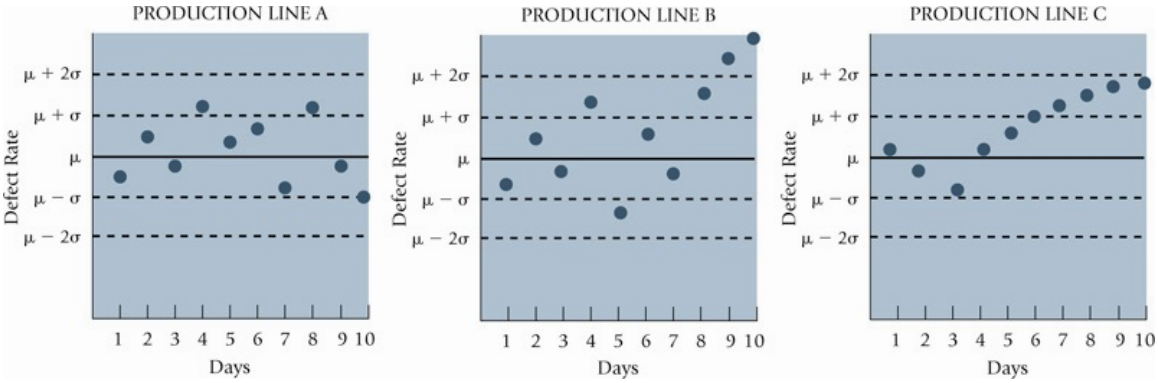
- Analyze Quality-Control Problems- Internal Business Process

A.) Control Charts

1- Statistical Quality Control (SQC) Chart- A graph of a series of successive observations of a particular step, procedure, or

operating taken at regular intervals of time.

2- Those observations outside the Specified Limits are ordinarily regarded as nonrandom and worth investigating (Outliers)



i.) Which of these charts needs attention

- All observations for production line A are Within The Range of ±2σ; no investigation is necessary

- The last 2 observations for production line B indicate an Out-Of-Control occurrence; investigation is required

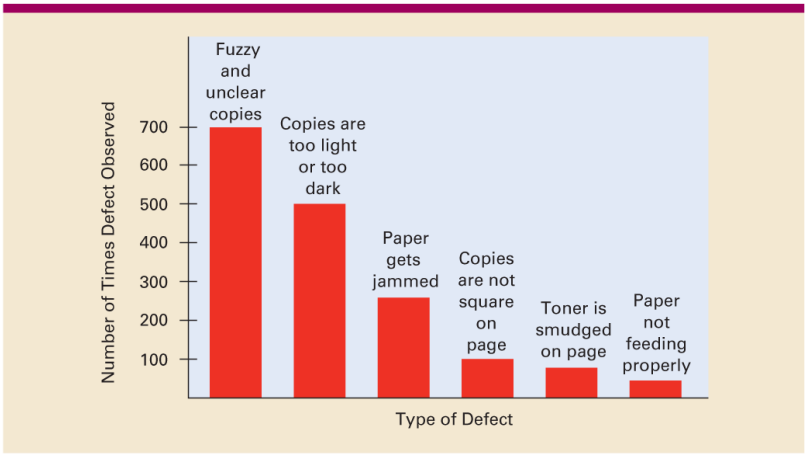
- Production line C would not prompt investigation, but may well be Out-Of-Control

B.) Pareto Diagram

1- Indicates how Frequently each type of defect occurs, in order from the most frequent to the least frequent

2- Problems identified by the Pareto diagram are analyzed using cause-and-effect diagrams

EXHIBIT 19-10
Pareto Diagram for the Photon Corporation

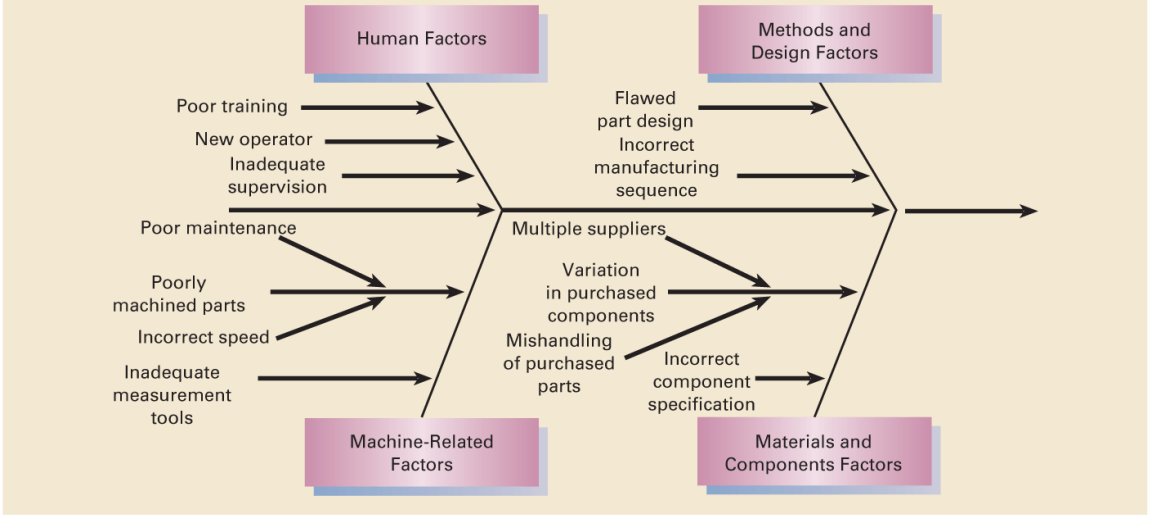


C.) Cause-and-Effect Diagram

1- Identifies potential causes of defects

2- Also Called Fishbone Diagrams

EXHIBIT 19-11
Cause-and-Effect Diagram for Fuzzy and Unclear Copies at the Photon Corporation



3.) Analyze the benefits of using both Financial and Nonfinancial measures of quality:

- **Relevant Costs and Benefits of Quality Improvement**

EXHIBIT 19-12

Estimated Effect of Quality-Improvement Actions on Costs of Quality for Photocopying Machines at Photon Corporation

	A	B	C	D
1		Relevant Costs and Benefits of		
2		Further Inspecting		Redesigning
3	Relevant Items	Incoming Frames		Frames
4	(1)	(2)		(3)
5	Additional inspection and testing costs	$(400,000)		—
6	Additional process engineering costs	—		$ (300,000)
7	Additional design engineering costs	—		(160,000)
8	Savings in rework costs			
9	($40 per hour × 24,000 fewer rework-hours)	960,000		
10	($40 per hour × 32,000 fewer rework-hours)			1,280,000
11	Savings in customer-support costs			
12	($20 per hour × 2,000 fewer customer-support hours)	40,000		
13	($20 per hour × 2,800 fewer customer-support hours)			56,000
14	Savings in transportation costs for repair parts			
15	($180 per load × 500 fewer loads moved)	90,000		
16	($180 per hour × 700 fewer loads moved)			126,000
17	Savings in warranty repair costs			
18	($45 per hour × 20,000 fewer repair-hours)	900,000		
19	($45 per hour × 28,000 fewer repair-hours)			1,260,000
20	Total contribution margin from additional sales			
21	(250 additional copiers × $6,000 per copier)	1,500,000		
22	(300 additional copiers × $6,000 per copier)			1,800,000
23	Net cost savings and additional contribution margin	$3,090,000		$4,062,000
24	Difference in favour of redesigning frame		$972,000	

1- (BSC) Nonfinancial Measures of Internal Business Process Quality

i.) **Defect Rate**- The percentage of defective products

ii.) **Average Repair Time** to fix machines at customer's site

iii.) Rework Rate- Percentage of Reworked Products
iv.) Number of different Types Of Defects found

v.) Number of design and process Changes Made

2- (BSC) The Learning and Growth Measures of Quality

i.) Employee Turnover ratio

ii.) Employee Empowerment

A.) Number of processes in which employees have the Right To Make Decisions without consulting supervisors

iii.) Employee Satisfaction

iv.) Employee Training

3- (BSC)-Evaluating Quality- Financial Measures

i.) Focuses attention on the costs of poor quality

ii.) Compares different quality improvement programs and Sets Priorities for maximum cost reduction

iii.) Provides a single, Summary measure of quality performance

4- (BSC)-Evaluating Quality- Nonfinancial Measures

i.) Easy to quantify and understand

ii.) Direct Attention to physical processes and to areas that need improvement

iii.) Provide Immediate Feedback on whether quality-improvement efforts have succeeded

iv.) Are useful indicators of Long-Run performance

4.) Evaluate Methods Using Time as A Competitive Tool:

- Types of common Operational Measures of time-

1. Customer-Response Time- The time from when a customer places an order to when the product or service is delivered to the customer

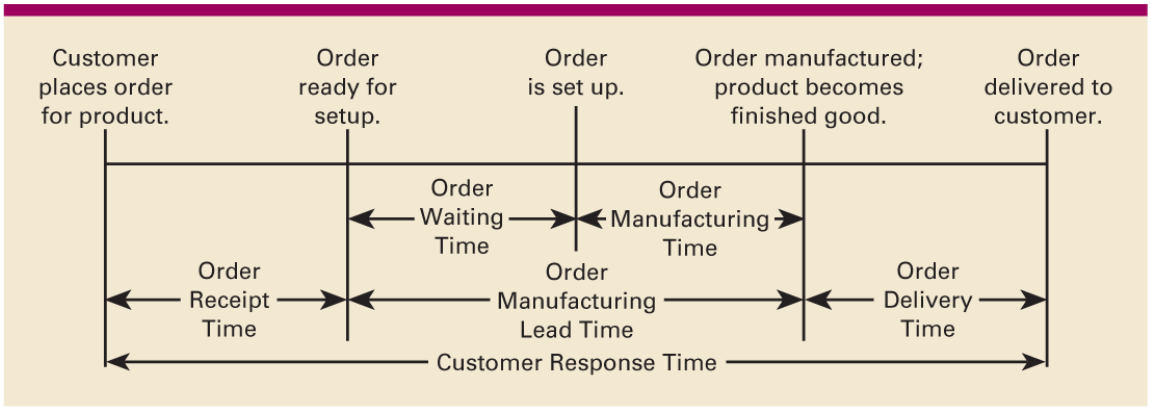
2. Manufacturing Lead Time- Time between order set up on the production line and completion of finished goods

3. Order Delivery Time- Time for distribution to move the order from production line to the customer

4. On-Time Performance- Product or service is delivered when it was scheduled to be delivered

- Components of Customer-Response Time

EXHIBIT 19-13
Components of Customer-Response Time



A.) Uncertainty and Bottlenecks as Drivers of Time

1- Time Driver- A factor when changed causes a change in the speed of an activity

i.) Uncertainty- About when customers will order products and services

ii.) Bottleneck- When the work to be performed approaches or exceeds the available capacity

B.) Relevant Revenues and Costs of Time

EXHIBIT 19-14

Determining Expected Relevant Revenues and Relevant Costs for Falcon Works' Decision to Introduce C33

Relevant Items	Alternative 1: Introduce C33 (1)	Alternative 2: Do Not Introduce C33 (2)	Difference (3) = (1) − (2)
Expected revenues	$741,000[a]	$660,000[b]	$ 81,000
Expected variable costs	560,000[c]	480,000[d]	(80,000)
Expected inventory carrying costs	14,625[e]	7,500[f]	(7,125)
Expected total costs	574,625	487,500	(87,125)
Expected revenues minus expected costs	$166,375	$172,500	$ (6,125)

[a]($21,500 × 30) + ($9,600 × 10) = $741,000; average manufacturing lead time will be more than 300 hours.
[b]($22,000 × 30) = $660,000; average manufacturing lead time will be less than 300 hours.
[c]($16,000 × 30) + ($8,000 × 10) = $560,000.
[d]$16,000 × 30 = $480,000.
[e](Average manufacturing lead time for A22 × Inventory carrying cost per order for A22 × Expected number of orders for A22) + (Average manufacturing lead time for C33 × Inventory carrying cost per order for C33 × Expected number of orders for C33) = (425 × $1.00 × 30) + (375 × $0.50 × 10) = $12,750 + $1,875 = $14,625.
[f]Average manufacturing lead time for A22 × Inventory carrying cost per order for A22 × Expected number of orders for A22 = 250 × $1.00 × 30 = $7,500.

5.) Evaluate the strengths and weaknesses of the theory of constraints (TOC) and activity- based costing (ABC) for managing bottlenecks:

- **Theory of Constraints and Throughput Contribution Analysis**

1- Measurements of Constraints

i.) Throughput Contribution- Sales Revenue less Direct Materials Cost

ii.) Investments (Inventory)- Sum of materials costs of inventory, cost of R&D, equipment and buildings

iii.) Operating Costs- Excluding direct materials costs

2- Theory of Constraints (TOC)

i.) Describes Methods to Maximize operating income when faced with some bottleneck and some non-bottleneck operations

ii.) Focuses on a Short-Run time horizon

iii.) Assumes that Operating Costs Are Fixed costs

- **Management of Bottle Neck Resources-4 Steps:**

1. **Recognize that the bottleneck resource determines throughput contribution**
2. **Search and find the bottleneck resource**
3. **Keep the bottleneck operation busy and subordinate all non-bottleneck resources to the bottleneck resource**
4. **Take action to increase bottleneck efficiency and capacity**

- **TOC Actions/Methods to Relieve Bottlenecks:**

1. **Eliminate Idle Time- At the bottleneck operation**
2. **Process only those parts or products that Increase Sales and throughput contribution**
3. **Shift Products to non-bottleneck processes, or to outside facilities**
4. **Reduce setup and processing time at bottleneck operations**
5. **Improve The Quality of parts or products manufactured at the bottleneck operation**

Chapter 14

- **Relevance Criterion to meet for allocating non-manufacturing (period) costs :**

1.) Provide Information for economic decisions
2.) Motivate managers and other employees
3.) Justify costs or reimbursement amounts internally or externally
4.) Measure GAAP-compliant income and assets for reports to external parties
5.) Causality- Direct cause-and-effect relationship of one business function cost driver to the quantities consumed by user business functions
6.) Benefits Received- beneficiaries of the services provided are charged with costs in proportion to the benefits received
7.) Fairness- if the parties believe the process is undertaken in good faith among all who may ne affected and they have equal access to relevant information, the outcome will be perceived as fair
8.) Ability to Bear- Costs are allocated in proportion to the cost objects ability to bear them; Generally, larger or more profitable objects receive proportionally more of the allocated costs

- **2 methods to allocate costs for IT services:**

1.) Single-Step Method:
i.) Period costs are allocated using a single cost driver
ii.) No distinguish between fixed and variable costs
iii.) Transfers unfavorable variances (spending/efficiency) from IT to Users

2.) Dual-rate Method:
i.) Fixed and Variable costs are allocated using different cost drivers
ii.) Motivates honest capacity-use estimates
iii.) Identifies the opportunity cost of outsourcing when capacity is available

- **3 cost methods for a product-sustaining inventor-able period cost and a facilities-sustaining period costs-:**

1.) Direct-Method:

i.) Most widely used method of allocating support department costs

ii.) Allocates support costs directly to the operating departments

iii.) Service provided by one support department to another support department is ignored

iv.) Simple

2.) Step-Down Method:

i.) Recognizes the cost of services provided by one support department to another

ii.) Allocate support costs to other support departments and operating departments in a ranked order

iii.) Can be ranked by percentage of service or the dollar value of service provided to other departments

iv.) Lacks simplicity, economic plausibility

3.) Reciprocal Method:

i.) Explicitly includes costs of mutual services between support areas

ii.) Uses simultaneous equations to obtain reciprocated (artificial) costs

- **Using linear equations, matrix algebra or Excel Solver**

iii.) Highlights the complete reciprocated costs of support departments

iv.) Shows clearly how actual costs differ from budget

- **2 methods for allocating common costs (the cost of operating a facility, activity, or similar cost object that is shared by two or more users):**

1.) Stand Alone Cost Allocation:

i.) Uses information about each user of a cost object as a separate entity to determine the cost-allocation weights

- **Individual costs are added together and allocated on the basis of each user's percentage of the total of the individual stand-alone costs**

2.) Incremental Cost Allocation Method:

i.) Uses ranking of cost objects to allocate the cost among those cost objects:

- **The first ranked cost is the primary party and is allocated costs up to its costs as a stand-alone entity**
- **The second ranked cost is the incremental party and is allocated the additional cost that arises from there being two users rather than just the primary user**
- **Subsequent parties handled in the same manner as the second ranked party**

- **Cost Allocations and Contracting:**

i.) Approaches to reimbursing costs as determined by a contract:

1.) The contractor is paid a set price without analysis of actual contract cost data

2.) The contractor is paid after an analysis of actual contract cost data. The contract may state that reimbursement is based on actual allowable costs plus a fixed fee (cost-plus contract)

Chapter 15-Cost Allocation- Joint Products and Byproducts

- **Joint Cost Terminology:**

1.) Joint Costs- Costs of a single production process that yields multiple products simultaneously
2.) Split-off Point- The place, in a joint production process, where two or more products become separately identifiable
3.) Separable Costs- All costs incurred beyond the split-off point that are assignable to one or more individual products
4.) Product- Any output with a positive sales value, or an output used internally that enables a firm to avoid incurring costs
5.) Joint Products- Outputs that have a high sales value but are not separately identifiable as individual products until the split-off point
6.) Main Product- Output of a process that yields one product with a high sales value compares to the balues of the other outputs
7.) By-Product- Has a low sales value compared to the sales values of the main or joint products
8.) Scrap- Minimal sales value

- **Reasons for Allocating Joint Costs:**

1.) Required for GAAP and Taxation purposes
2.) Costs values may be used for Evaluation purposes
3.) Cost-based Contracting
4.) Insurance Settlements
5.) Required by Regulators
6.) Litigation

- **Analyze 2 methods to Allocate Joint Costs: Appropriate if Sold at Split-Off Point**

1- Physical Measure Method:

1.) Allocates Joint costs on the basis of their Relative Proportions at the split-off point-
i.) Using a common physical measure such as Weight or Volume
2.) Less Desirable as physical allocation measure has no Relationship To Revenue-Producing Power of the individual products
3.) Can be Problematic if no common physical measure is available

2- Sales Value at Split-Off Method:

1.) Uses the Sales Value of the entire production in the accounting period to calculate allocation Percentage:
i.) Costs are allocated to products in proportion to their Revenue-Generating Power

ii.) Consistent with the Benefits-Received criterion of cost allocation

iii.) Ignores Inventories

- **Sell or Further Process Decisions:**

1.) Joint products have been produced, and a prospective decision must be made: to sell immediately or process further and sell later

2.) Joint Costs are Sunk (the same no matter what decision is take- process further or not)

3.) Separable costs need to be evaluated for Relevance individually

- **2 Market Methods to Allocate Joint Costs: More appropriate than Physical Measure and Sales Value Split-off Method- Appropriate to use when Processed further rather than sold at Split-Off Point:**

1.) Estimated Net Realizable Value (NRV) Method:

i.) Allocates Joint costs on the basis of relative Estimated Net Realizable Value of total production of the joint products

A.) Expected Sales Value less Expected separable costs of production and marketing of total production

ii.) NRV = Final Sales Value- Separable Costs:

A.) An alternative when Selling Prices of one or more products at Split-Off Do Not Exist

2.) Constant Gross Margin % of NRV Method:

i.) Allocates joint costs to joint products in a way that the overall Gross-Margin Percentage Is Identical for the individual products
ii.) Joint costs are calculated as a Residual Amount

- **Method Selection:**

1.) Sales Value At Split-Off method is preferable
i.) Consistent with Benefits-Received criterion
ii.) Does Not Presuppose any further management actions
iii.) The denominator used (dollars) is Meaningful And Consistent (may not be available under other methods)
iv.) Simple to calculate
v.) Physical measures are usually used in Rate-Regulated Settings

- **Accounting Challenges:**

1.) Market-based joint cost allocation methods result in Positive Operating Incomes for all products
2.) Allocating joint costs using physical measures can result in one or more joint products having Negative Operating Income
3.) Implication for performance evaluation:
i.) Managers may be reluctant to be responsible for products with negative margins

.ca

- **Byproducts: 2 Methods to Account for Byproducts:**

1.) Production Method: more correct method
i.) Recognizes Byproduct inventory as it is produced
ii.) Recorded as inventory at their selling price, or at selling price less normal profit margin
2.) Sales Method: used when the dollar amounts of byproduct are immaterial
i.) Delays recognition Byproducts until they are sold
ii.) Byproduct inventory is not recognized
iii.) Revenue is recorded at the time of sale

Chapter 21- Capital Budgeting- Methods of Investment Analysis

1.) Apply the concept of the Time Value Money to Capital Budgeting Decisions:

- **Capital Budgeting:**

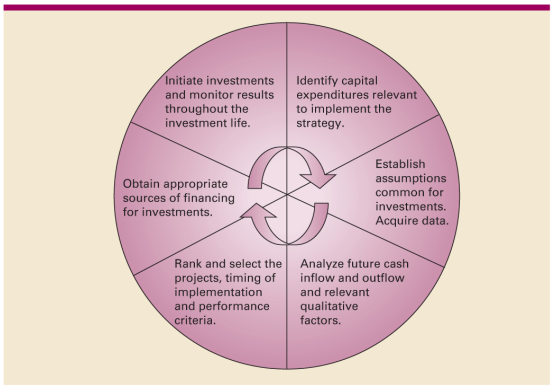
1. **Long-Term planning for making and financing acquisitions (investments)**

i.) Long-term Cash Allocation decision

2. **Basis for Evaluating Strategic choices made in the past**
3. **A Decision Process that focuses on Multi-Year projects**
4. **Balances risk and Return**

- **Capital Budgeting Decision Model:**

EXHIBIT 21-1
Capital Budgeting Decision Process Model



- **Factors in Investing Decisions:**

1. **Non-Financial Factors-**

i.) **Effect of an investment on market share**
ii.) **Revenue mix**

iii.) **Productivity**

iv.) **Yield**

v.) **Environmental Sustainability**

2. **Qualitative Factors-**

i.) **Effect of an investment on corporate governance**

ii.) **Perceived Corporate Social Responsibility**

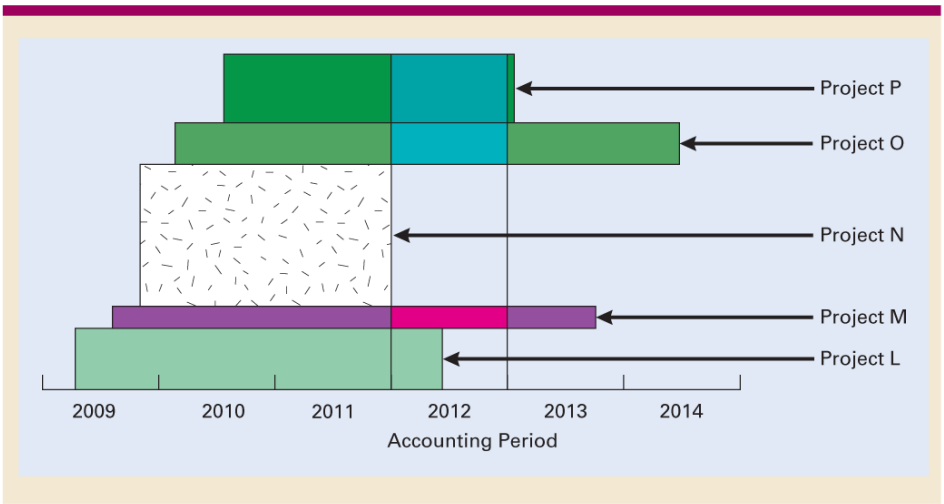
- **Capital Budgeting:**

1. **Rate of Return- Ratio of predicted net cost flows divided by total outflow for an investment**

2. **Project Dimension-** One project spans multiple accounting periods

3. **Time Dimension-** One period contains multiple projects which span several years

EXHIBIT 21-2
The Project and Time Dimensions of Capital Budgeting



- **Discounted Cash Flow Methods:**

1. **Discounted cash flow (DCF) measures cash inflows and outflows of a project as if they occurred at a single point in time**

2. **Focuses on cash inflows and outflows rather than net income**

3. **Common methods are-**

i.) Net present Value (NPV)-

- **Discount all expected future cash flows to the present using a minimum desired rate of return**

- **Accept project if NPV > 0**

ii.) Internal Rate of Return (IRR)

1. **Determine the rate of return, which will result in a NPV of zero**
2. **Accept project if IRR > minimum desired rate of return**

- **Required Rate of Return (RRR):**

  i.) **The Minimum Acceptable rate of return on an investment**

  ii.) **The return that an organization could expect to Receive Elsewhere for an investment of comparable risk**

  iii.) **Also called the Discount Rate, Hurdle Rate, or Opportunity Cost Of Capital**

  iv.) **NPV is calculated by using the RRR**

1. **Example of NPV:**

Net initial investment (Cash Outflow)	$379,100
Useful life	5 years
Annual cash inflow/savings	$100,000
Required rate of return	8%
Present value of initial investment, now	($379,100)
Present value of $100,000 savings in one year	$92,593
Present value of $100,000 savings in two years	$85,734
Present value of $100,000 savings in three years	$79,383
Present value of $100,000 savings in four years	$73,503
Present value of $100,000 savings in five years	$68,058
Net Present Value of new machine	$20,171
**Since NPV is positive, the rate of return for the new machine	
is higher than the required rate of return**	

2.) Evaluate Discounted Cash Flow (DCF) and Non-DCF Methods to Calculate Rate Of Return (ROR)

2. Example of IRR:

Net initial investment (Cash Outflow)	$379,100
Useful life	5 years
Annual cash inflow/savings	$100,000
Required rate of return	8%
IRR, Using excel	10%
**The internal rate of return is greater than the	
required rate of return**	

	A	B	C	D	E	F	G	H	I
1			Net initial investment	$379,100					
2			Useful life	5 years					
3			Annual cash inflow	$100,000					
4			Annual Discount rate	10%					
5									
6		Present Value	Present Value of	Sketch of Relevant Cash Flows at End of Each Time Period					
7		of Cash Flow	$1 Discounted at 10%	0	1	2	3	4	5
8	**Approach 1: Discounting Each Year's Cash Flow Separately[b]**								
9	Net initial investment	$(379,100)	1.000	$(379,100)					
10		90,900	0.909		$100,000				
11		82,600	0.826			$100,000			
12	Annual cash inflow	75,100	0.751				$100,000		
13		68,300	0.683					$100,000	
14		62,100	0.621						$100,000
15	NPV if new machine purchased[c] (the zero difference proves that the internal rate of return is 10%)	$ 0							
16									
17	**Approach 2: Using Annuity Table**								
18	Net initial investment	$(379,100)	1.000	$(379,100)					
19					$100,000	$100,000	$100,000	$100,000	$100,000
20									
21	Annual cash inflow	379,100	3.791[d]						
22	NPV if new machine purchased	$ 0							
23									
24	*Note:* Parentheses denote relevant cash outflows throughout all exhibits in Chapter 21.								
25	[a]The internal rate of return is computed by methods explained on pp. 854–855.								
26	[b]Present values from Table 2, Appendix A at the end of the book.								
27	[c]Sum is $(100) due to rounding. We round to $0.								
28	[d]Annuity present value from Table 4, Appendix A. The annuity table value of 3.791 is the sum of the individual discount rates 0.909 + 0.826 + 0.751 + 0.683 + 0.621, subject to rounding.								

**** Can also do it by using the annuity table:**

F- Factor N- Period

$379,000 = $100,000F
F= $379,000/ $100,000

F= 3.791

F = 3.781 N= 5

IRR = 10 %

- **Internal Rate of Return:**

i.) **The internal rate of return (IRR)- is the discount rate at which the present value of expected cash inflows from a project equals the present value of expected cash out- flows of the project.**

ii.) **It is the operational equivalent of breakeven.**
1. **That is, the IRR is the discount rate that makes NPV = $0.**

iii.) **IRR is sometimes called the time-adjusted rate of return.**

iv.) **Where the NPV requires the management team to select a discount rate, with the IRR method the discount rate is determined by the data**

v.) **The IRR is the discount rate at which the investment will break even over its lifetime.**

vi.) **The cash outflow will exactly equal the discounted cash inflows**

- **Sensitivity Analysis:**

i.) **Useful to compare how the evaluation of the projects will change if there is a change in:**

i.) **Projected cash flows**
ii.) **Timing of the cash flows**
iii.) **Required Rates of Return change**

3. **NPV method used with RRR:**

Net Present Value Calculations for Lifetime Care Hospital Under Different Assumptions of Annual Cash Flows and Required Rates of Return[a]

	A	B	C	D	E	F
1	Required	Annual Cash Flow				
2	Rate of Return	$80,000	$90,000	$100,000	$110,000	$120,000
3	6%	$(42,140)	$ (20)	$42,100	$84,220	$126,340
4	8%	$(59,660)	$(19,730)	$20,200	$60,130	$100,060
5	10%	$(75,820)	$(37,910)	$ 0	$37,910	$ 75,820
6						
7	[a]All calculated amounts assume the project's useful life is five years.					

investment is $379,100, and the present-value factor at the 8% required rate of return for a five-year annuity of $1 is 3.993. Then:

$$\begin{aligned} \text{NPV} &= \$0 \\ 3.993A - \$379{,}100 &= \$0 \\ 3.993A &= \$379{,}100 \\ A &= \$94{,}941 \end{aligned}$$

Thus, at the discount rate of 8%, annual cash inflows can decrease to $94,941 (a decline of $100,000 – $94,941 = $5,059) before NPV falls below zero. If management believes it can attain annual cash savings of at least $94,941, it could justify investing in the new X-ray machine on financial grounds alone.

- **Comparing NPV and IRR Models:**

1. **NPV calculates an amount in dollars rather than a percentage-**
1. **Avoids problems inherent in comparing percentages**
2. **Various NPVs can be added together**

2. **NPV can also incorporate different required rates of return over the life of a project**
1. **Such as 8% for 1-3 years and 12 % for years 4-5**

****** 2 Discounted Cash Flow Methods Are:**

i.) Net Present Value (NPV)

ii.) Internal Rate Of Return (IRR)

****** 2 Non-Discounted Cash Flow Methods:**

i.) Payback

ii.) Accrual Accounting Rate of Return (AARR)

- **Payback Method:**

1. **Measures the time it will take to Recover the net Initial Investment in a project in the form of expected Future Cash Flows-**

1. **Assumes Uniform Cash Flows through the expected life cycle**

2. **The Greater The Risk, the Shorter the Acceptable Payback Period**

3. **Easy to understand**

4. **Ignores the time value of money and cash flows after payback period**

5. **The payback method highlights liquidity, which is often an important factor in capital budgeting decisions.**

6. **Managers prefer projects with shorter paybacks (more liquid) to projects with longer paybacks, if all other things are equal.**

7. **Projects with shorter payback periods give the organization more flexibility because funds for other projects become available sooner.**

i.) **Also, managers are less confident about cash flow predictions that stretch far into the future**

4. **With Uniform Annual Cash Flows:**

Payback Period = Net Initial Investment / Uniform Increase in Annual Future Cash Flows

5. **With Non-Uniform Annual Cash Flows: Takes A Cumulative FORM:**

Year	Cash Savings	Cumulative Cash Savings	Net Initial Investment Yet to Be Recovered at the End of the Year
0	—	—	$150,000
1	$ 50,000	$ 50,000	100,000
2	60,000	110,000	40,000
3	80,000	190,000	—
4	90,000	280,000	—
5	100,000	380,000	—

Straight-line interpolation within the third year, which has cash savings of $80,000, reveals that the final $40,000 needed to recover the $150,000 investment (that is, $150,000 − $110,000 recovered by the end of year 2) will be achieved halfway through year 3 (in which $80,000 of cash savings occur):

$$\text{Payback} = 2 \text{ years} + \left(\frac{\$40{,}000}{\$80{,}000} \times 1 \text{ year}\right) = 2.5 \text{ years}$$

The videoconferencing example has a single cash outflow of $150,000 at year 0. Where a project has multiple cash outflows occurring at different points in time, these outflows are added to derive a total cash outflow figure for the project. No adjustment is made for the time value of money when adding these cash outflows in computing the payback period.

**** 2 Years is the years that the initial Investment has been recovered**

**** $40,000 is the remaining about to be recovered ($150,000 – $110,000)**

**** $80,000 is the cost saving that occurs in year 3, in which the initial investment will be fully recovered**

**** Multiplied by 1 year to show that within a Year the remaining amount will be recovered**

- **Accrual Accounting Rate of Return (AARR) Method:**

i.) **An accounting measure of Income Divided by an accrual accounting measure of Investment**

ii.) **Firms vary in how they calculate AARR**

iii.) **Easy to understand, and use numbers reported in financial statements**

iv.) **Does Not Track cash flows**

v.) **Ignores time value of money**

vi.) **Also called the Accounting Rate Of Return or Return On Investment (ROI) Model**

6. **Formula:**

Accrual Accounting Rate of Return =

Increase in Expected Average Annual Operating Income/ Net Initial Investment

**** The greater the positive difference between the AARR of a project and the AARR hurdle RATE (Discount Rate), the more preferable the investment**

3.) **Apply The Concept of Relevance to DCF Methods of Capital Budgeting**

- **Five Major Categories of Cash Flows:**

1. **Initial Investment- The cash purchase price and any investment in Working Capital Required- Cash outflow**

2. **Proceeds On Disposal of old equipment- Cash inflow**

3. **Recurring Operating Cash Flows that Differ between alternatives-**

i.) Depreciation is irrelevant because non-cash

4. **Proceeds on disposal at End of Project**

1. **Including any Recovery of Working Capital**

5. **Income Tax impact on above Cash Flows**

EXHIBIT 21-6
Relevant Cash Inflows and Outflows for Lifetime Care Hospital

	A	B	C	D	E	F	G	H
1					Sketch of Relevant Cash Flows			
2			⊢	⊢	⊢	⊢	⊢	⊢
3		End of Time Period:	0	1	2	3	4	5
4	1a	Initial machine investment	$(372,890)					
5	b	Initial working capital investment	(10,000)					
6	2	Current disposal price of old machine	3,790					
7		Net initial investment	$(379,100)					
8	3	Recurring operating cash flows		$100,000	$100,000	$100,000	$100,000	$ 90,000
9	4a	Terminal disposal price of new machine						—
10	b	Recovery of working capital						10,000
11		Total relevant cash inflows and outflows						
12		as shown in Exhibits 21-3 and 21-4	$(379,100)	$100,000	$100,000	$100,000	$100,000	$100,000

4.) Assess the Complexities In Capital Budgeting Within an Interdependent Set of Value-Chain Business Functions

- **Complexities in Capital Budgeting:**

1. **Predicting the full set of benefits and costs is a challenge and often difficult to quantify**

2. **Difficult to recognize the full time horizon of the project**

i.) When benefits will occur over a Long Period Of Time

ii.) When major benefits occur Far In The Future

EXHIBIT 21-7

Factors Considered in Making Capital Budgeting Decisions for CIM Projects

Examples of Financial Outcomes	Examples of Nonfinancial and Qualitative Outcomes
Lower direct labour costs	Reduction in manufacturing cycle time
Lower hourly support labour costs	Increase in manufacturing flexibility
Less scrap and rework	Increase in business risk due to higher fixed cost structure
Lower inventory costs	Improved product delivery and service
Increase in software and related costs	Reduction in product development time
Costs of retraining personnel	Faster response to market changes
	Increased learning by workers about automation
	Improved competitive position in the industry

Exhibit 21-7 presents examples of the broader set of factors that companies in the United States, Australia, Japan, and the United Kingdom weigh in evaluating CIM technology. The benefits include:

1. *Faster response to market changes.* An automated plant can, for example, make major design modifications (such as switching from a two-door to a four-door car) relatively quickly. To quantify this benefit requires some notion of consumer demand changes that may occur many years in the future and of the manufacturing technology choices made by competitors (defensive investment).
2. *Increased worker knowledge of automation.* If workers have a positive experience with CIM, the company can implement other automation projects more quickly and more successfully. Quantifying this benefit requires a prediction of the company's subsequent automation plans. Survey evidence emphasizes the importance of linking CIM decisions to a company's overall competitive strategies (intellectual capital management).

Predicting the full set of costs also presents problems. Three classes of costs are difficult to measure and are often underestimated:

1. Costs associated with a reduced competitive position in the industry. If other companies in the industry are investing in CIM, a company not investing in CIM will probably suffer a decline in market share because of its inferior quality and slower delivery performance. Several companies in the machine tool industry that continued to use a conventional manufacturing approach experienced rapid drops in market share after their competitors introduced CIM.
2. Costs of retraining the operating and maintenance personnel to handle the automated facilities.
3. Costs of developing and maintaining the software and maintenance programs to operate the automated manufacturing activities.

- **Evaluating Managers and Goal-Congruence Issues:**

1. **Some firms use NPV for Capital Budgeting Decisions and a different method for evaluating performance**

2. **Managers may be tempted to make capital budgeting decisions on the basis of Short-Run Accrual Accounting Results, even though that would not be in the best interest of the firm**

- **Managing the Project:**

i.) Implementation and Control-
1.) Management of the investment activity itself
2.) Management Control of the project as a whole

ii.) A Post-Investment Audit may be done to provide management with feedback about the performance of a project, so that management can Compare Actual Results to the Costs and Benefits Expected at the time the project was selected

MANAGEMENT CONTROL OF THE PROJECT—POST-INVESTMENT AUDIT

A post-investment audit compares the predictions of investment costs and outcomes made at the time a project was selected to the actual results. It provides management with feedback about the investment's performance. Suppose, for example, that actual outcomes (operating cash savings from the new X-ray machine in the Lifetime Care example) are much lower than predicted outcomes. Management must then investigate whether this occurred because the original estimates were overly optimistic or because there were problems in implementing the project. Both types of problems are a concern.

Optimistic estimates are a concern because they may result in the acceptance of a project that would otherwise have been rejected. To discourage optimistic estimates, companies like DuPont maintain records comparing actual performance to the estimates made by individual managers when seeking approval for capital investments. DuPont believes that post-investment audits discourage managers from making unrealistic forecasts. Problems in implementing a project are an obvious concern because the returns from the project will not meet expectations. Post-investment audits can point to areas requiring corrective action.

Care should be exercised when performing a post-investment audit. It should be done only after project outcomes have stabilized. Doing the audit early may give a misleading picture. Obtaining actual data to compare against estimates is often not easy. For example, actual labour cost savings from the new X-ray machine may not be comparable to the estimated savings, because the actual number and types of X-rays taken may be different from the quantities assumed during the capital budgeting process. Post-investment audits of capital projects require information about project-specific costs and benefits. It can be extremely costly, however, to disentangle these actual outcomes as if they were independent from, instead of interdependent with, overall corporate outcomes.

5.) Apply The Concept of Defensive Strategic Investment To The Capital Budgeting Process

- **Strategic Considerations in Capital Budgeting:**

A company's strategy is the source of its strategic capital budgeting decisions. Strategic investments may be undertaken offensively to grow market share and profitability or defensively to avoid impairing a company's competitive advantage. A defensive strategy will mean that quantitative factors, while somewhat important, are secondary to the qualitative choice to defend market share.

1. **A company's Strategy is the Source of its strategic capital budgeting decisions**

2. **Some firms regard R&D Projects as important strategic investments-**

i.) **Outcomes Very Uncertain**

ii.) **Far In The Future**

- **Customer Value and Capital Budgeting:**

To remain viable, companies must keep their profitable customers and gain new ones. Consider Potato Supreme, which makes potato products for sale to retail outlets. It is currently analyzing two of its customers: Shine Stores and Always Open. Potato Supreme predicts the following cash flow from operations, net of income taxes (in thousands), from each customer account for the next five years:

	2012	2013	2014	2015	2016
Shine Stores	$1,450	$1,305	$1,175	$1,058	$ 950
Always Open	690	1,160	1,900	2,950	4,160

Which customer is more valuable to Potato Supreme? Looking at only the first year, 2012, Shine Stores provides more than double the cash flow compared to Always Open ($1,450 versus $690). A different picture emerges, however, when looking over the entire five-year horizon. Using Potato Supreme's 10% RRR, the NPV of the Always Open customer is $7,610, compared to $4,591 for Shine Stores (computations not shown). These NPV amounts are calculated using the 10% NPV of $1,318 ($1,450 × 0.909) for Shine Stores and $627 ($690 × 0.909) for Always Open.

Note how NPV captures in its estimate of customer value the future growth of Always Open. Potato Supreme uses this information to allocate more resources and salespersons to service the Always Open account. Potato Supreme can also use NPV calculations to examine the effects of alternative ways of increasing customer loyalty and retention, such as introducing frequent-purchaser cards.

A comparison of year-to-year changes in customer NPV estimates highlights whether managers have been successful in maintaining long-run profitable relationships with their customers. Suppose the NPV of Potato Supreme's customer base declines 15% in one year. Management can then examine the reasons for the decline, such as aggressive pricing by competitors, and devise new product development and marketing strategies for the future.

Capital One, a financial-services company, uses NPV to estimate the value of different credit-card customers. Cellular telephone companies such as Rogers and Telus attempt to sign up customers for multiple years of service. The objective is to prevent "customer churn," customers switching frequently from one company to another. The higher the probability of customer churn, the lower the NPV of the customer to the telecommunications company.

Chapter 22-Capital Budgeting: A Closer Look (Including CCA)

1.) Analyze the Impact Of Income Taxes on operating and capital cash flows

- **Income Taxes and Capital Budgeting:**

1. Income taxes are **Mandatory** cash disbursements and influence the **Amount And Timing** of cash flows

2. **The Marginal Tax R**ate- The rate paid on any additional amounts of pretax income
3. Consider operating cash flows on an **After-Tax Basis**

i.) After-Tax Savings = $60,000 X (1 – Tax rate of 40%) = $36,000

- **Tax Effect on Investment Cash flows:**

1. The **Canadian Revenue Agency (CRA)** does not permit a deduction for depreciation reported in financial statements prepared under GAAP, in determining taxable income

2. CRA does allow companies to deduct **Capital Cost Allowance (CCA)**

i.) Ensures **Consistent** application across corporations

ii.)CCA is similar to **Declining Balance Depreciation**

- **Capital Cost Allowance:**

1. **CRA assigns assets to specific defined CCA classes**

2. **Unamortized Capital Cost (UCC)**

i.) The original capital expenditure less the capital cost allowance that has been claimed for tax purposes

ii.)Similar to netbook value in accounting terms

3. CRA limits the rate of CCA to half of the regular rate in the first year (Half-Year Rule) for most assets

- **Tax Shield:**

1. **Cash Saving on taxes due to deductibility of CCA**

i.) = CCA x Marginal Tax Rate %

2. **Tax Shield Formula- Formula for calculating the present value of the tax saving from deducting capital cost allowance-**

$$\text{Present value of tax savings} = \left(\text{Investment} \times \text{marginal tax rate}\right)\left(\frac{\text{CCA rate}}{\text{CCA rate} + \text{required rate of return}}\right)\frac{(2 + \text{required rate of return})}{2(1 + \text{required rate of return})}$$

$$\text{Tax shield rate} = \frac{T \times C}{C + R} \quad X \quad \frac{2 + R}{2(1 + R)}$$

Where:

T = the income tax rate

C = the CCA rate

R = the cost of capital or required rate of return

Capital Cost Allowance Illustration

CCA—Class 8
Rate is 20% Declining Balance
(rounded to the nearest dollar)

Year 1 (day 1) net addition	$10,000	Year 13 UCC	618
CCA year 1 (20% half-year rule applied)	1,000	CCA year 14 (20%)	124
Year end UCC	9,000	Year 14 UCC	494
CCA year 2 (20%)	1,800	CCA year 15 (20%)	99
Year 2 UCC	7,200	Year 15 UCC	395
CCA year 3 (20%)	1,440	CCA year 16 (20%)	79
Year 3 UCC	5,760	Year 16 UCC	316
CCA year 4 (20%)	1,152	CCA year 17 (20%)	63
Year 4 UCC	4,608	Year 17 UCC	253
CCA year 5 (20%)	922	CCA year 18 (20%)	51
Year 5 UCC	3,686	Year 18 UCC	202
CCA year 6 (20%)	737	CCA year 19 (20%)	40
Year 6 UCC	2,949	Year 19 UCC	162
CCA year 7 (20%)	590	CCA year 20 (20%)	32
Year 7 UCC	2,359	Year 20 UCC	130
CCA year 8 (20%)	472	CCA year 21 (20%)	26
Year 8 UCC	1,887	Year 21 UCC	104
CCA year 9 (20%)	377	CCA year 22 (20%)	21
Year 9 UCC	1,510	Year 22 UCC	83
CCA year 10 (20%)	302	CCA year 23 (20%)	17
Year 10 UCC	1,208	Year 23 UCC	66
CCA year 11 (20%)	242	CCA year 24 (20%)	13
Year 11 UCC	966	Year 24 UCC	53
CCA year 12 (20%)	193	CCA year 25 (20%)	11
Year 12 UCC	773	Year 25 UCC	$42*
CCA year 12 (20%)	155		

*CCA is discretionary (see p. 893).

The CCA of each year is deducted in the calculation of a company's taxable income. Thus, the CCA is not a cash flow. Rather we must multiply the CCA of each year by the company's marginal tax rate to calculate the actual cash flow tax savings in each year. In Chapter 21, we recognized the time value of money. Thus, to determine the present value of the tax savings, we would need to multiply the tax savings of each year by the present value factor from the CCA list for each year at the company's required rate of return (say 10%).

In the case of the $10,000 desk, the present value of the tax savings from deducting CCA, commonly referred to as the tax shield, is $2,548, computed as follows assuming a 10% required rate of return:

$$\text{Tax shield} = (\$10{,}000 \times 40\%)\left(\frac{20\%}{20\% + 10\%}\right)\left(\frac{(2 + 10\%)}{2(1 + 10\%)}\right)$$

$$= \$4{,}000 \times 0.667 \times 0.955$$
$$= \$2{,}668 \times 0.955$$
$$= \$2{,}548$$

Therefore, the net after-tax cost of the desk is $7,452, or $10,000 – $2,548.

Capital Cost Allowance (CCA) Classes Examples

Class	Maximum CCA Rate	Tangible Assets in This Class
1	4%	Buildings acquired after 1987
3	5%	Buildings acquired or under construction on June 18, 1987
8	20%	Furniture, fixtures, appliances, electronic copying and telecommunications equipment acquired before March 23, 2004
10	30%	Automotive equipment, electronic data processing equipment
12	100%	Software, tools costing less than $200
29	Straight-line	Eligible machinery and equipment used in manufacturing and processing in Canada

- **Trade-Ins and Disposal of Capital Assets:**

1. **CCA system works on a Pool Basis**
   - **i.) Buy a new asset for $12,000 with a $4,000 trade-in, add $8,000 to the pool, half-year rule applies to $8,0000**
   - **ii.) Ignore the UCC balance in the pool for the capital asset that was traded in**

2. **The half-year rule does not apply to CCA calculations when there is a Net Disposition**

Trade-ins and Disposals

EXHIBIT 22-3

Net Capital Cash Flow of Trade-ins and Disposals

Trade-in:	Purchase price	$12,000
	Trade-in	(4,000)
	Net cash payment	8,000
	Tax shield[a]	2,036
	NPV cash outflow	$ 5,964
Disposal:	Sales price	4,000
	Lost tax shield[b]	1,067
	NPV cash inflow	$ 2,933

[a]Includes the half-year adjustment:

$$(\$8{,}000 \times 40\%) \times \left(\frac{20\%}{20\% + 10\%}\right) \times \left(\frac{2 + 10\%}{2(1 + 10\%)}\right)$$

[b]Excludes the half-year adjustment

$$(\$4{,}000 \times 40\%) \times \left(\frac{20\%}{20\% + 10\%}\right)$$

- **Capital Gains and Losses:**

1. **Adjusted Cost Base (ABC)- Purchase price of capital property plus purchase expense**

2. **Capital Gain- Sales price of capital property plus sales expense is greater than ACB**

3. **Capital Loss- Sales price of capital property plus sales expenses is less than ACB**

- **Proceeds on Disposition:**

EXHIBIT 22-4

Proceeds on Disposition of the Last Capital Asset in an Asset Class

	A	B	C	D
Proceeds of disposition	$ 4,000	$ 7,000	$ 3,000	$ 12,000
Less: ACB	(10,000)	(10,000)	(10,000)	(10,000)
Capital gain				$ 2,000
Capital (loss)	$ (6,000)	$ (3,000)	$ (7,000)	
Calculation including CCA				
Recapture of CCA and/or Terminal Loss				
UCC Beginning Balance	10,000	10,000	10,000	10,000
Less accumulated CCA	(4,000)	(4,000)	(4,000)	(4,000)
UCC in year of disposition	$ 6,000	$ 6,000	$ 6,000	$ 6,000
Subtract lesser of ACB or Proceeds of disposition	(4,000)	(7,000)	$ (3,000)	(10,000)
Terminal loss (recapture of CCA)	$ 2,000	$ (1,000)	$ 3,000	$ (4,000)

A: The business has no capital gain. There is a capital loss of $6,000 that can be used in this tax year to offset any taxable capital gains. There is a terminal loss of $2,000 that is 100% deductible from taxable income on the filing for the calendar year.

B: The business has no capital gain but has a capital loss of $3,000 that can be used in this tax year to offset any taxable capital gain. This is also a recapture of CCA of $1,000 that must declared as business income for the calendar year.

C: The company has a capital loss of $7,000, of which 50% can be deducted from any taxable capital gain in the year. There is a terminal loss of $3,000 that is 100% deductible from taxable income in the filing for the calendar year.

D: The business has a capital gain of $2,000 that may be taxable. The business also has a recapture of CCA of $4,000 that must be declared as business income for the calendar year.

2.) Apply the Total-Project Approach and the Differential Approach appropriately to different capital budgeting decisions

- **Alternative Approaches to Capital Budgeting:**

1. **Differential Approach- Analyzes only those future cash outflows and inflows that Differ among alternatives**

2. **Total Project Approach-**

i.) Incorporates All Relevant revenues and costs under each alternative

ii.) Calculates the present value of all future cash inflows and outflows under each alternative Separately

**** Both Methods will give the same Net Present Values**

3.) Apply Concepts of Real and Nominal Rate of Return to account for inflation in capital budgeting

- **Capital Budgeting and Inflation:**

1. **Inflation- The decline in the general purchasing power of the monetary unit**

2. **Real Rate of Return- The rate of return required to cover only investment risk**

$$\text{Real rate} = \frac{(1 + \text{Nominal rate})}{(1 + \text{Inflation rate})} - 1$$

3. **Nominal Rate of Return- The rate of return required to cover investment risk and expected inflation**

$$\text{Nominal rate} = (1 + \text{Real rate}) \times (1 + \text{inflation rate}) - 1$$

4. **Include Inflation in capital budgeting model if significant over the life of the project**

4.) Analyze alternative approaches used to recognize the degree of risk in capital budgeting projects

- **Project Risk and Required Rate of Return (RRR):**

- **Organizations typically use at least one of the following approaches in dealing with project risk-**

1. **Varying The Required Payback Time- The higher the risk, the shorter the desired payback time**

2. **Adjusting The Required Rate Of Return- Use a higher required rate for risky projects**

3. **Adjusting The Estimated Future Cash Inflows- Reduce cash flows for riskier projects**

4. **Sensitivity (What-If) Analysis- Examine the consequences of changing key assumptions**

5. **Estimating The Probability Distribution Of Future Cash Flows**

5.) Explain the usefulness of Excess Present Value Index in Capital Budgeting, and explain why IRR and NPV may Rank projects differently

- **Implementing Capital Budgeting:**

1. **Both profit-oriented and not-for-profit organizations must work within an overall capital budget limit**

2. **Excess Present Value Index/Profitability Index- Measures the cash flow return per dollar invested**

= Present Value of Future Cash Inflows and Outflows / Present Value of Initial Investment

- **Net Present Value Index:**

Project	Superdraw	Masterdraw
Present Value @ 10% (1)	$1,400,000	$3,900,000
Net Initial Investment (2)	$1,000,000	$3,000,000
Excess Present Value Index (1)÷(2)	140%	130%
Net Present Value (1)-(2)	$400,000	$900,000

- **Different Methods Give Different Rankings:**

1. **Where Projects have Unequal Lives or investments, IRR can rank differently than NPV-**

i.) **IRR assumes the reinvestment rate = calculated rate of return**

ii.) **NPV assumes the reinvestment rate = company's required rate of return**

2. **NPV is general considered Superior To IRR**

- **Ranking Projects Using IRR and NPV:**

EXHIBIT 22-11

Ranking of Projects Using Internal Rate of Return and Net Present Value

				IRR Method		NPV Method $r = 10\%$*		
Project	Life	Net Initial Investment	Annual Cash Flow from Operations, Net of Income Taxes	IRR	Ranking	PV of Annual Cash Flow from Operations, Net of Income Taxes	NPV	Ranking
X	5	$286,400	$100,000	22%	1	$379,100	$ 92,700	3
Y	10	419,200	100,000	20	2	614,500	195,300	2
Z	15	509,200	100,000	18	3	760,600	251,400	1

*If the r is changed to 20%, the NPV rankings will change to NPV_X = $12,660 (first); NPV_Y = $50 (second); NPV_Z = −$41,650 (not considered at all because it is negative).

Chapter 23

1.) Management Control Systems:

- **Key elements**

i.) **INTEGRITY and ETHICAL values**
ii.) **Commitment to COMPETENCE**
iii.) **Participation at CORPORATE GOVERNANCE level**
iv.) **Approach to IDENTIFYING, TAKING AND MANAGING RISK**
v.) **Organizational STRUCTURE**
vi.) **Organization STRUCTURE**
vii.) **AUTHORITY and lack of override opportunities**
viii.) **Human resources POLICIES AND PRACTICES**

2.) Regulation:

- **Canadian Professional Engagement Manual (CPEM):**

i.) **Provides assurance regarding the QUALITY of financial reporting**
ii.) **EFETIVENESS AND EFFICIENCY of operations**
iii.) **COMPLIANCE with laws and regulations**
iv.) **Ensures GOOD STEWARDSHIP of resources**

3.) Legislation:

- **National Instrument 52-109 (NI52-109) (Pending):**

i.) **Formalizes the BALANCED SCORECARD (BSC) approach to management control**
ii.) **Enforces FRAUD legislation**
iii.) **Explicit requirement to DETECT AND PREVENT BRIBERY**
iv.) **CEO and CFO responsible for internal control systems**
v.) **Includes specific ENFORCEMENT action**

4.) Internal Control and Legislation:

BSC Perspectives: **NI 58-201:**

i.) **Financial- Purpose- Indicators of achievement; Monitoring, Learning-appropriate information and communication system**
ii.) **Internal Business- Capability- skill, tools, competence, communication, coordination; Monitoring, Learning- challenge assumptions**
iii.) **Customer- Monitoring, Learning- feedback on external environment**
iv.) **Learning and Growth (Intellectual Capital)- Commitment- ethics, mutual trust, HR policies; Capability- knowledge communication**

5.) Decentralization:

- **the freedom of managers at lower levels of the organization to make decisions**
- **Benefits of Decentralization:**

i.) **Creates greater responsiveness to local needs- Improved customer services locally**
ii.) **Leads to quicker decision-making- enabled us to respond quickly to changing needs**
iii.) **Increases motivation- decentralization= creativity=productivity**
iv.) **Aids management development and learning**
v.) **Sharpens the focus of of managers to local issues**

- **Costs of Decentralization:**

i.) **Leads to sub-optimal decision making- local benefits cost organization more $$ overall**
ii.) **Results in duplication of activities- duplicate staff function**
iii.) **Decreases loyalty toward the total organization- kingdom building syndrome- we vs they mentality against other operating divisions**
iv.) **Increases costs of gathering information- increased time spent negotiating internal prices for products transferred between subunits**

6.) Responsibility Centres:

i.) **Cost Centre – manager is accountable for costs only**
ii.) **Revenue Centre- manager is accountable for revenues only**
iii.) **Profit Centre- manager is accountable for revenues and costs**
iv.) **Investment Centre- manager is accountable for investments, revenues and costs**

7.) Transfer Pricing:

- **INTERMEDIATE PRODUCT:**

i.) **Unfinished product transferred from one subunit to another in the same organization**

ii.) **Production stages may be in separate subunits of the organization, that may be geographically apart**

iii.) **Product may be processed further by the transferee or sold directly to an external customer**

- **TRANSFER PRICE:**

i.) **Agreed-upon price between subunits**

ii.) **Creates revenues for the selling subunit and purchase costs for the buying subunit, affecting each subunits operating income**

- **ARMS-LENGTH PRINCIPLE:**

i.) **Transfer price should be the same as if subunits were independent companies**

- **Types of Transfer Prices:**

i.) **Market Prices**

ii.) **Cost Based- Variable, Fixed, or ABC; Actual or Standard; Including Profit or not including Profit**

iii.) **Negotiated Prices**

iv.) **Dual Pricing- Separate transfer prices to each department**

8.) Inter-Provincial Transfers and Taxes:

i.) **Provincial governments prefer transfer prices at MARKET PRICE as it is an ARMS-LENGTH price**

ii.) **SPLIT of taxable income between provinces impacts both operating CASH FLOW and NET INCOME**

iii.) **ADVANCED TRANSFER PRICE ARRANGEMENT (APA)- can be negotiated with tax authorities in advance; Avoids costly and time-consuming disputes with tax authorities**

9.) Market-Based Transfer Prices:

- **THREE CONDITIONS:**

i.) **The intermediate market is PERFECTLY COMPETITIVE**

ii.) **Interdependencies of subunits are minimal**

iii.) There are no additional costs or benefits in using market instead of pricing transacting internally

- **A PERFECTLY COMPETITIVE MARKET exists when:**

i.) There is a homogeneous product with equivalent buying and selling prices
ii.) No individual buyer or seller can affect those prices by their own actions

- **Allows a firm to achieve goal CONGRUENCE, motivating management EFFORT, optimal subunit PERFORMANCE and subunit AUTONOMY**
- **DISTRESS PRICES:**

i.) "Temporary" price declines due to excess supply
ii.) In the short term, supplier division should meet the distress price as long as it exceeds incremental costs
iii.) In the long term, supplier division should stop producing

10.) Cost-Based Transfer Prices:

- **Helpful when market prices are UNVAILABLE, INAPPROPRIATE OR TOO COSTLY TO OBTAIN**

- **FULL-COST BASES:**

i.) Many companies use transfer prices based on FULL COSTS that contain an allocation of fixed overhead
ii.) Can lead to SUBOPTIMAL decisions in decentralized companies
iii.) Full-cost based on ABC cost drivers can provide more refined allocation bases

- **VARIABLE COST BASES:**

i.) Can lead to divisions recording larger losses and income due to transfer pricing

- **Cost-Based Transfer pricing Alternatives:**

i.) PRORATING- Choose a transfer price that SPLITS THE DIFFERENCE between the maximum and minimum cost-based transfer prices

ii.) DUAL-PRICING-

a.) Use TWO SEPARATE TRANSFER-PRICING methods to price each transfer from one subunit to another
b.) Difference in pricing is absorbed by corporate office rather than operating units
c.) Promotes goal congruence
d.) Not widely used in practice

- **Negotiated Transfer prices:**

i.) **Where subunits of a firm are FREE TO NEGOTIATE the transfer price between themselves and then to DECIDE whether to buy and sell internally or deal with external parties**

ii.) **May or may not bear any resemblance to cost or market data**

iii.) **Often used when market prices are VOLATILE**

11.) General Guideline For Transfer Pricing:

- **Minimum Transfer Price = Additional incremental or outlay costs per unit incurred up to the point of transfer + Opportunity costs per unit to the supplying division**

- **OPPORTUNITY COST- is the maximum contribution margin forgone by the selling subunit if the product or service is transferred internally**

- **If supplying division has no idle capacity, this formula yields the market price**

- **If supplying division has enough excess capacity to fill the order, the formula yields a number equal to incremental (variable) costs**

- **Also consider the competitive nature of the market**

Market Price (Maximum price to charge internally)

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Transfer Price Range

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v **Minimum Variable Cost**

(Minimum price to charge internally)

12.) Multinational Transfer Pricing and Tax Considerations:

i.) **Transfer prices across borders have TAX IMPLICATIONS- income taxes, payroll taxes, etc.**
ii.) **Establishing an ARM'S-LENGTH PRICE for value-added services such as marketing and intangibles is DIFFICULT**
iii.) **Income Tax Act of Canada (Section 247) limits transfer pricing to 5 METHODS**

- **Setting Transfer Prices— 5 Metods:**

i.) TRADITIONAL TRANSACTION METHODS-

1- COMPARABLE UNCONTROLLED PRICE (CUP)- internal market-based price
2- RESALE PRICE METHOD (RPM) – the calculated arm's-length resale price
3- COST-PLUS METHOD (CPM)

ii.) TRANSACTIONAL PROFIT METHODS-

1- PROFIT SPLIT METHOD (PSM)
2- TRANSACTIONAL NET MARGIN METHOD (TNMM)

13.) Tax Minimization Strategies-

i.) **Establish a legitimate subsidiary in a TAX HAVEN- have no TAX TREATIES with Canada**
ii.) **Establish a legitimate subsidiary in an INTERNATIONAL FINANCIAL CENTRE with very low tax rates- have TAX TREATIES with Canada**
iii.) **Request an ADVANCE PRICING ARRANGEMENT with all involved tax authorities**

Chapter 24

1.) Performance, Incentives and Compensation

i.) Strategy
ii.) Goals
iii.) Measures

iv.) Critical Performance Variables

1- Critical Performance Variables

a.) Important activities or outcomes
b.) Sensitive to managerial action
c.) Influence the probability of meeting goals
d.) Largest potential for marginal gain

2- Performance Measurement

a.) Monitor critical performance measures
b.) Periodic comparison provides feedback
c.) Allow adjustment of inputs or processes
d.) Ensure meeting important targets
e.) Fueled by formal incentives

3- Incentives

a.) Tied by formula to performance
b.) Part of the control system
c.) Allow management by exception
d.) Focus attention of the rewards outcomes
e.) Motivates people

4- Incentives and Compensation

a.) Economic rewards
b.) Public recognition
c.) Self-esteem and Satisfaction

5- Compensation

a.) Reward to motivate performance
b.) Bonus pool (money)
c.) Allocation formula
d.) Subjective based

2.) Governance and Compensation

- **Must disclose how compensation policy and practice BALANCE RISK AND RETURN**
- **INTENSE SCRUTINY of performance measures and compensation policies**
- **Compensation Disclosure and Analysis section in ANNUAL REPORT**

- **Constraints On Performance Measurement Decisions (Constraints on Board Of Directors' Performance Measurement Decisions; Compensation Committees**

1- Global Governance Treaties
2- CSA Governance Legislation
3- CRA Tax Legislation
4- Provincial Stock Exchange Regulation
5- Shareholder Activist Groups
6- Industry Advisory Committee Recommendations

3.) Return on Investment (ROI)

- **ROI is an accounting measure of income divided by an accounting measure of investment**

i.) ROI = INCOME / INVESTMENT

- **ROI may be broken down into 2 components as follows-**

1- Income/ Investment = Income/Investment * Revenues/Investment
2- ROI = Return on Sales * Investment Turnover

- **Return On Investment (ROI)**

i.) MOST POPULAR APPROACH:
a.) Blends all major ingredients of profitability (revenues, costs, and investment) into a single number
b.) Compared to other ROIs both inside and outside the firm
c.) Also called the ACCOUNTING RATE OF RETURN (ARR) or the ACCRUAL ACCOUNTING RATE OF RETURN (AARR)
d.) Numerator: Operating Income, Net Income
e.) Denominator: Total Assets, Total Assets less Current Liabilities

4.) Residual Income (RI)

- **Income minus a required dollar return on the investment**
- **RI = Income – (Required Rate of Return * Investment)**
- **Required rate of return (ROR) = The company's WEIGHTED-AVERAGE COST OF CAPITAL (WACC) – the after-tax average cost of all long-term funding**

5.) Problems with RI and ROI

- **RI promotes a focus on maximizing an absolute dollar amount, inducing GOAL CONGRUENCE**
- **Maximizing ROI may result in SUBOPTIMAL PERFORMANCE**

i.) **Managers earning high ROI % may reject projects that earn more than the company's required rate of return**

ii.) **Managers earning low ROI % may accept projects that earn less than the company's required rate of return**

6.) ECONOMIC VALUE ADDED (EVA)

- **Type of RESIDUAL INCOME CALCULATION that has recently gained popularity**

i.) **DOES NOT use a reported GAAP accrual in the numerator**

- **EVA = After- Tax Operating Income – [Weighted-Average Cost of Capital * (Total Assets – Current Liabilities)]**

- **KEY CALCULATION is the Weighted Average Cost of Capital (WACC)**

7.) Return on Sales (ROS)

- **RETURN ON SALES is income divided by sales**
- **SIMPLE to compute and widely UNDERSTOOD**

- **Return on Sales = Income / Sales**

8.) Select the Time Horizon of the Performance Measures

- **ROI, RI, EVA, and ROS evaluate one period of time**
- **May be adapted to evaluate multiple periods of time**

i.) **PREVENTS actions that cause SHORT-RUN increases in these measures but conflict with long-run interests of the organization**

ii.) **BENEFITS of actions taken in current year may take SEVERAL YEARS to be measured**

9.) Alternative Definitions of Costs: Current Costs

- **The cost of purchasing an IDENTICAL ASSET today to the one currently held**
- **The cost of ACQUIRING THE SERVICES provided by that asset if an identical asset cannot be currently purchased**
- **ROIs calculated using current costs will differ from those calculated using historical costs**

10.) Alternative Definitions of Costs: Long-Term Assets

- **Cost Measured at GROSS BOOK VALUE (Original cost); or**
- **Cost measured at NET BOOK VALUE (Original cost less accumulated depreciation)**

i.) Using NET BOOK VALUE results in a HIGER ROI due to the smaller base (which decreases every year)

ii.) Net book value is consistent with total assets shown on the balance sheet and with net income (includes depreciation expense)

iii.) Incentive for RETAINING old property, plant, and equipment

11.) Selecting Performance Goals

- **BOOK VALUE accounting measures are widely used**

i.) Must ensure that the budget is tailored to a particular subunit and the particular accounting data

- **CONTINOUS IMPROVEMENT component**

i.) Initial selection of performance measure is less important than measuring the CHANGE in the measure CONSISTENTLY

12.) Performance Measurement in Multinational Companies

- **DIFFICULTIES faced by multinational companies are:**

i.) Economic, legal, political, social, and cultural ENVIRONMENTS DIFFER significantly across countries

ii.) Governments impose CONTROLS AND LIMIT selling prices of a company's products

iii.) AVAILABILITY AND COSTS of materials, skilled labor, and infrastructure differ across countries

iv.) Divisions operating in different countries account for their performance in DIFFERENT CURRENCIES

13.) Preferred Performance Measures

- **Measures that are sensitive to or CHANGE significantly with the MANAGER'S PERFORMANCE**
- **Do NOT CHANGE much with changes in factors that are BEYOND THE MANAGER'S CONTROL**
- **MOTIVATE the manager, LIMIT exposure to risk, REDUCING the cost of providing incentives**
- **Include BENCHMARKING – Best practice inside or outside the organization**

14.) Moral Hazard

- **An employee exerts LESS EFFORT (or reports distorted information) because the employee's effort (or the validity of the reported information) CANNOT be accurately MONITORED AND ENFORCED**
- **BSC approach can be used to measure performance in MORE THAN ONE WAY**

15.) Team-Based Compensation

- **TEAMS of employees can achieve better results than employees acting on their own**
- **Encourages employees to WORK TOGETHER to achieve common goals**
- **Encourages COOPERATION**
- **BALANCE competition and cooperation by giving incentives to individuals on the basis of team performance**

16.) Executive Compensation Plans

- **Based on both FINANCIAL AND NONFINANCIAL performance measures, and include mix of:**

i.) Base SALARY
ii.) ANNUAL incentives, such as cash bonuses
iii.) LONG-RUN incentives, such as stock options
iv.) PERQUISITES, such as life insurance, office with a view

- **Emphasize ACHIEVEMENT of organizational goals, administrative EASE and perceived FAIRNESS**

17.) Levers of Control: Diagnostic Control Systems

- **Analyze a firm's performance by monitoring and evaluating CRITICAL PERFORMANCE CRITERIA, including:**

i.) ROI, RI, EVA
ii.) Customer Satisfaction
iii.) Employee Satisfaction

- **MUST BE BALANCED by the other levers of control**

1- Levers of Control: Boundary Systems

- **STANDARDS of behaviour and codes of conduct expected of all employees**

i.) Highlights actions that are "off-limits"
ii.) A code of conduct describes APPROPRIATE AND INAPPROPRIATE individual behaviors-Code of Ethics

2- Levers of Control: Belief Systems

- **Articulate the MISSION, PURPOSE, AND CORE VALUES of a company**

i.) Describe the ACCEPTED NORMS and patterns of behavior expected of all managers and employees with respect to each other, shareholders, customers, and communities.
ii.) Values and culture generate organizational commitment, pride, and intrinsic motivation to enhance individual performance

3- Levers of Control: Interactive Control Systems

- **Formal information systems that managers use to FOCUS ORGANIZATIONAL ATTENTION AND LERNING on key strategic issues**
- **Track strategic UNCERTAINTIES- changes in technology, customer preferences, regulations, industry competition that can under cut a business**

Chapter 18

1.) Rework and Scrap

- **REWORK— Unacceptable units of production that are subsequently REPAIRED AND SOLD as finished goods of the same or lower quality**
- **SCRAP—**

i.) **RESIDUAL material that results from manufacturing a product**
ii.) **Has LITTLE SALES VALUE, often zero, compared with the total sales value of the product**
iii.) **May be REUSED**

2.) Spoilage

- **Output that FAILS TO ATTAIN either a specified performance level or standard of composition— can be partially or fully complete**
- **INSPECTION POINT—**

i.) **The stage of the production process at which PRODUCTS ARE EXAMINED to determine whether they are acceptable or spoiled**
ii.) **Spoilage is typically assumed to occur at the stage of completion where inspection takes place**

3.) Process Costing and Spoilage

- **NORMAL SPOILAGE arises under efficient operating conditions—**

i.) **As a result of PREDICTABLE RATES OF FAILURE in a production process**
ii.) **Costs are part of the cost of goods manufactured**

- **ABNORMAL SPOILAGE is not expected to arise under efficient operating conditions—**

i.) **Considered AVOIDABLE AND CONTROLLABLE**
ii.) **Written off as losses in period of occurrence**

4.) Accounting for Spoilage

- **Determine the MAGNITUDE of spoilage costs**

- **Distinguish between costs of NORMAL AND ABNORMAL spoilage**
- **Decide on whether to COUNT or NOT COUNT spoilage in output— Counting all spoilage is considered preferable, as it makes spoilage costs visible**
- **NORMAL SPOILAGE costs are ALLOCATED TO UNITS in ending WIP only if they have PASSED THE INSPECTION POINT**

i.) **WIP not sufficiently complete will not be allocated any costs of spoilage**

- **When there are MULTIPLE INSPECTION points, WIP will attract spoilage costs as it passes each point**

5.) Process Costing with Spoilage

- **SUMMARIZE the flow of PHYSICAL UNITS of output'— identify both normal and abnormal spoilage**
- **COMPUTE output cost allocation base in EQUIVALENT UNITS— Spoiled units are included in the computation**
- **COMPUTE CONVERSION COST allocation rate per EU**
- **SUMMARIZE TOTAL COSTS to account for**
- **ASSIGN TOTAL costs to—**

i.) **Units completed**
ii.) **Spoiled units**
iii.) **Units in ending working in process**

6.) Weighted Average Method and Spoilage

- **The COST PER GOOD UNIT completed and transferred out equals the total costs transferred out, INCLUDING the costs of NORMAL SPOILAGE, divided by the number of good units produced**
- **The COST OF ABNORMAL SPOILAGE is assigned to the LOSS FROM ABNORMAL SPOILAGE account and do not affect the cost of good units**

7.) FIFO Method and Spoilage

- **FIFO includes INCREMENTAL EFFORT to complete goods from previous period**
- **Under FIFO, previous period goods are transferred out first**
- **Pure FIFO would require normal spoilage costs to be split using costs of goods started and completed in current period and those completed from beginning WIP**
- **SIMPLER, modified FIFO only USES COSTS OF THE CURRENT PERIOD in assigning normal spoilage costs**

8.) Standard Costing and Spoilage

- **STANDARD costing SIMPLIFIES the allocation of costs to normal and abnormal spoilage**
- **NORMAL SPOILAGE costs are INCLUDED in the cost of goods units TRANSFERRED OUT**

9.) Job Costing and Spoilage

- **NORMAL SPOILAGE ATTRIBUTABLE TO A SPECIFIC JOB— The job bears the cost of the SPOILAGE PLUS THE DISPOSAL VALUE of the spoilage**
- **NORMAL SPOILAGE COMMON TO ALL JOBS—**

i.) **In some cases, spoilage may be considered a normal characteristic of the production process**

ii.) **The spoilage is TREATED AS MANUFACTURING OVERHEAD because it is common to all jobs**

iii.) **The budgeted manufacturing overhead Rate includes a provision for normal spoilage**

- **ABNORMAL SPOILAGE—**

i.) **If the spoilage is abnormal, the net loss is charged to the LOSS FROM ABNORMAL SPOILAGE account**

ii.) **Abnormal spoilage costs are not included as a part of the cost of good units produced**

10.) Reworked Units

- **NORMAL REWORK ATTRIBUTABLE TO A SPECIFIC JOB— The rework costs are charged to that job**
- **NORMAL REWORK COMMON TO ALL JOBS— The costs are charged to manufacturing overhead and spread, through overhead allocation, over all jobs**
- **ABNORMAL REWORK— Charged to the LOSS from Abnormal Rework account on the income statement**

11.) Accounting for Scrap

- **Two aspects of accounting for scrap—**

1- PLANNING AND CONTROL, including physical tracking

2- IVENTROY COSTING, including when and how it affects operating income

- **Scrap is RECOGNIZED at—**

1- Time of PRODUCTION, or
2- Time of SALE

A.) Recognizing Scrap at Time of Sale

- **SCRAP ATTRIBUTABLE TO A SPECIFIC JOB—**

i.) Job-costing systems sometimes TRACE THE SCRAP revenues TO THE JOBS that yielded the scrap
ii.) Done only when the tracing can be done in an ECONOMICALLY FEASIBLE WAY
iii.) NO COST assigned to scrap
iv.) Revenue from sale of scrap reduces overall costs of job

- **SCRAP COMMON TO ALL JOBS— All products bear production costs without any credit for scrap revenues except in an indirect manner**
- **Expected SCRAP REVENUES are considered when SETTLING OVERHEAD BUDGET RATE— The budgeted overhead rate is thus lower than if no credit for scrap is recognized**

B.) Recognizing Scrap at Time of Production

- **If the value of the scrap is MATERIAL, and the TIME between storing and selling it is long**
- **Assign an inventory cost to scrap at a CONSERVATIVE ESTIMATE OF ITS NET REALIZABLE VALUE so that production costs and related scrap revenues are recognized in the same accounting period**
- **Applied only where the tracing of scrap can be done in an ECONOMICALLY FEASIBLE way**

Chapter 20

1.) Costs Associated with Goods for Sale

- **PURCHASING COSTS— Cost of GOODS acquired from suppliers, including freight**
- **ORDERING COSTS— Costs of PREPARING AND ISSUING purchase orders; including special processing, receiving, inspection and payment costs**
- **CARRYING COSTS— Costs of HOLDING INVENTORY of goods for sale, including storage (rent, insurance, obsolescence, spoilage) and the opportunity cost of the investment tied up in the inventory**
- **STOCKOUT COSTS— When a company runs out of a product which customers' demand (stock out) and incurs ADDITIONAL ORDERING AND TRANSPORTATION COSTS to expedite an order**
- **COSTS OF QUALITY— Incurred to PREVENT OR RECTIFY the production of a low-quality product**
- **SHRINKAGE COTS— Arise from theft, embezzlement, misclassifications, and clerical errors**

2.) Economic Order Quantity (EOQ) Procurement Model

- **ASSUMPTIONS—**

i.) **The SAME QUANTITY is ordered at each reorder point**
ii.) **Demand, purchase-order lead time, ordering costs, and carrying costs are CERTAIN**
iii.) **Purchasing COST PER UNIT are unaffected by the quantity ordered**
iv.) **NO STOCKOUTS occur**
v.) **Costs of quality and shrinkage are ONLY CONSIDERED IF they effect ordering or carrying costs**

- **EOQ FORMULA**

$$EOQ = \sqrt{2DP/C}$$

i.) **D= DEMAND in units for specified period**
ii.) **P= Relevant ordering costs per PURCHASE order**

iii.) C= Relevant CARRYING costs of one unit in stock for the time period used for D

3.) Total Relevant Costs (TRC)

- **Total Relevant Cots = Total Relevant Order Costs + Total Relevant Carrying Costs**

i.) Total Annual Relevant Ordering Costs = Number of Purchase orders per year * Relevant Ordering Costs per Purchase Order