Learning Objectives

- Explain what strategic cost management and how it can be used to help a firm create a competitive advantage.
- Discuss the importance of the value chain approach to analyzing decision alternatives.
- Activity-based management (ABM)
- Business process re-engineering (BPR)
- Life-Cycle costing and budgeting
- Explain life-cycle cost management and how it can be used to maximise profits over a product’s Life-Cycle.
- Managing throughout.
- Managing quality.
- Total quality management (TQM)
Cost Management

- Contemporary management accounting systems include a range of tools and techniques that provide information for cost management.
- Cost management:
  - Improvement of an organisation’s cost effectiveness through understanding and managing the real causes of cost.
  - Whilst main focus is usually on cost reduction, it is also on improving other aspects of performance such as quality and delivery.
  - Note that cost management is not synonymous with cost minimisation or cost containment. In fact it includes, where feasible, increasing costs in pursuit of even greater increases in revenue.

Conventional versus Contemporary Approaches

- Drivers of cost:
  - Conventional approach: managers control costs by bringing them into line with some predetermined goal.
  - Contemporary approach: reduce costs by identifying waste and eliminating it through identifying the real cost drivers.

- Strategic perspective:
  - Conventional approach: control costs within the organisation.
  - Contemporary approach: cost management also concerned with achieving value for the customer.

(cont.)
Conventional versus Contemporary Approaches (Cont.)

- Process perspective
  - Conventional approach: control costs by reporting results for responsibility centres
  - Contemporary approach: recognise that customers' needs are met by processes which flow across the business
- Contemporary approaches include
  - Activity-based management
  - Business process re-engineering
  - Life-Cycle costing
  - Target costing
  - Throughput accounting

What is Strategic Cost Management?

- Strategic cost management is making decisions concerning specific cost drivers
  - Within the context of an organisation’s business strategy,
  - Its internal value chain,
  - And its place in a larger value chain stretching from the development and use of resources to final consumers.

Business Unit Strategies

- Business Unit Strategies are concerned with how to compete in a particular industry
  - Its "MISSION"
  - Its COMPETITIVE ADVANTAGE
Competitive Advantage

- **COMPETITIVE ADVANTAGE** is the process of creating better **CUSTOMER VALUE** for the same or lower cost than that of competitors or creating equivalent value for lower cost than that of competitors.
- **CUSTOMER VALUE** is the difference between what a customer receives (customer realization) and what the customer gives up (customer sacrifice).

Business Unit Competitive Advantage

**Generic Competitive Advantage**

- Low Cost
- Differentiation
- Focused

The Production Value Chain

The **value chain** is the linked set of value-creating activities from basic raw materials to the disposal of the finished product by (not to) end-use customers.

Fundamental to a value-chain framework is the recognition that there exist complex **linkages** and interrelationships among activities **both within and external** to the firm.
Value Chain
The value chain can be analysed at three levels

- Business Entities
- Major Processes of a business entity
- Activities within a process

The Value Chain
The value chain is important because it provides a vantage point that encompasses all activities performed to deliver products and services to final customers.

Value-added and Value Chain Perspectives
Under a value-added perspective,
- The goal is to maximise value-added (the difference between the selling price and costs) by the organisation.

Under a value chain perspective,
- The goal is to maximise value and minimise cost to final customers, often by developing partnerships with suppliers and customers.
Vertically and Horizontally Integrated Organisations

- **Vertically Integrated** organisation is one that operates two or more units that might be regarded as independent links in a value chain.

- **Horizontally Integrated** organisation is one that operates many entities in the same industry.

Internal and External Linkages

There are two types of linkages that must be analyzed and understood: internal and external linkages.

- **Internal Linkages** are relationships among activities that are performed within a firm’s portion of the value chain.

- **External Linkages** describe the relationship of a firm’s value-chain activities that are performed with its suppliers and customers. There are two types: supplier linkages and customer linkages.

Vertical Integration and the Value Chain

- **Internal Linkages**
  - Hatchery
  - Poultry Farm
  - Chicken Processor
  - Wholesale Distributor
  - Grocery Store
  - Final Consumer

- **External Linkages**
Strategic Cost Management

Value Chains and Effective Cost Management

Research and Development
- Production
- Marketing
- Customer Service

Production
- Marketing
- Customer Service

Strategic Decisions
- External and Internal Linkages
- Operational decisions

Activities & Cost Drivers

For strategic analysis purposes, a firm's activities and cost drivers are classified into two major categories:

**Organisational**

**Operational**

Organisational Activities & Cost Drivers

- Organisational activities are activities that determine the organisation’s structure and business processes.
- Organisational cost drivers are structural and executional factors that determine the long-term cost structure of an organisation.
Organisational Activities & Cost Drivers

- **Structural activities** are those that determine the underlying economic structure.
- **Executional activities** are those that define the processes of an organisation.
- **Structural and executional cost drivers** that determine the long term cost structure of the organisation.

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 Organizational Activities and Drivers

**Structural Activities**
- Building plants
- Management structuring
- Grouping employees
- Complexity
- Vertically integrating
- Selecting and using process technologies

**Structural Cost Drivers**
- Number of plants, scale, degree of centralization
- Management style and philosophy
- Number and type of work units
- Number of product lines, number of unique processes, number of unique parts
- Scope, buying power, selling power
- Types of process technologies, experience

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 Organizational Activities and Drivers

**Executional Activities**
- Using employees
- Providing quality
- Providing plant layout
- Designing and producing products
- Providing capacity

**Executional Cost Drivers**
- Degree of involvement
- Quality management approach
- Plant layout efficiency
- Product configuration
- Capacity utilization
Strategic Cost Management and Organisational Activities

- Organisational Activities
  - Structural Activities
    - Building Plants
    - Mergers
    - Using Technology
    - Vertical Integration
  - Executive Activities
    - Using Employees
    - Degree of Involvement
    - Providing Quality Techniques
    - Providing Capacity
    - Capacity Utilisation
  - Executional cost drivers
    - Number of plants
    - Mgt. Style
    - Type of Tech.
    - Buying Power

Operational Activities & Cost Drivers

- Operational
  - Activities are normal every day activities performed as a result of the structure of the organisation
  - Cost drivers are those factors that drive the cost of operational activities

Examples: receiving and inspecting incoming parts, moving materials, shipping products, testing new products, servicing products, and setting up equipment.

Activity-Based Management (ABM)

- In Continuous Improvement an organisation's employees constantly evaluate products, services, and processes, seeking ways to do better.
- Process Reengineering is the fundamental redesign of a process to serve internal or external customers.
Value-Add

Value-added Activities
- Those activities necessary to remain in business are called value-added activities.
- Activities needed to comply with legal, statutory and financial reporting requirements, such as the IFRS, are value-added by a mandate.
- Implicit in this definition is the notion that value-added activities may contain nonessential actions that create unnecessary cost.

Value-Added and NonValue-Added Activities
- A value-added activity is an activity that adds value to a product or service from the viewpoint of the customer.
- A nonvalue-added activity is an activity that does not add value to a product or service from the viewpoint of the final customer.
Value-added activity is a process that adds value to an output product or service, that is, the activity merits the cost of the resources it consumes in production. It contributes to producing a designated product or service that meets customers requirements and that the customer is willing to pay for.

- Identifying Value-added Activities is often more art than science, however can often be identified because:
  - The activity produces a change of state; and
  - The change of state was not achievable by preceding activities; and
  - The activity enables other activities to be performed.

All activities other than those essential to remain in business are referred to as non value-added activities. These activities fail to produce a change in the product’s state or those activities that replicate work because it wasn’t done correctly the first time.

- Scheduling
- Moving
- Waiting
- Inspecting
- Storing
Value-Added and Non-Value-Added Activities

Activity Based Management (ABM)

Assessing Activity Performance
- Efficiency
- Quality
- Time
Using ABC systems for improving cost management and profitability

- Activity-based management (ABM) is a method of management that uses ABC as an integral part in critical decision-making situations, including:
  - pricing and product-mix decisions
  - cost reduction and process improvement decisions
  - design decisions
  - planning and managing activities.

Activity-based management (ABM)

- Activity-based management (ABM) stresses the identification and selection of activities that maximise the value while minimising the cost of activities from the viewpoint of the final customer.

Process-Based Management

- Process-based management goes further than ABM by emphasising that in evaluating activities, managers must consider the entire process of which activities are a part.
Activity-based management (ABM)
- Focuses on managing activities/business processes to achieve organizational objectives.
- Reduces cost drivers of non-value activities and transfers resources to economic value creating activities/business processes the customer wants and is willing to pay for.
- Creates performance measures for cost, time, quality, and outcomes so everyone understands how their activities contribute to the inflation and strategy.
- Supports balanced scorecard by creating performance measures.
- Improves cash flow, quality, cycle time reduction,
- Basis for business process redesign,
- Supports gain sharing/goal sharing, and teams.

The Two-Dimensional Activity-Based Management Model

Process Value Analysis
- Process value analysis is fundamental to activity-based responsibility accounting.
- Process value analysis focuses on accountability for activities rather than costs, and emphasizes the optimization of systemwide performance instead of individual performance.
- Process value analysis is concerned with:
  - Driver analysis
  - Activity analysis
  - Performance measurement
Driver analysis is the effort expended to identify the factors that are the root causes of activity costs.

Activity analysis is the process of identifying, describing, and evaluating the activities an organization performs. Activity analysis should produce four outcomes: (What; When; How & Why)
- What activities are performed.
- The time and resources are required to perform the activities.
- How many people perform the activities.
- An assessment of the value of the activities to the organization.

Activity management can reduce costs in four ways:
- Activity elimination
- Activity selection
- Activity reduction
- Activity sharing

LIFE-CYCLE COSTING
**Life-Cycle Cost Management**

Actions taken that cause a product to be:
- Designed, developed, produced, marketed, distributed, operated, maintained, serviced and disposed of
- So that life-cycle profits are maximised

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**Life-Cycle Costing**

Analysis of the costs of activities, including both upstream and downstream costs, that occur over the Life-Cycle of the product.

Four stages of the product Life-Cycle:
1. Product planning and initial concept design
2. Product design and development
3. Production
4. Distribution and customer (logistic) support

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**Customer Life-Cycle Costing**

Customer life-cycle costs focus on the total costs incurred by a customer to:
- **Acquire** a product or service
- **Use** a product or service
- **Maintain** a product or service, and
- **Dispose** of a product or service.
Life-Cycle Budgeting
- Involves estimating the expected costs and revenues for each year of the expected life of a product
- Useful in product mix or pricing decisions

Product Life-Cycle Viewpoints
THERE ARE THREE BASIC VIEWS OF THE PRODUCT Life-Cycle:
- MARKETING VIEWPOINT
- PRODUCTION VIEWPOINT
- CONSUMABLE LIFE VIEWPOINT

Life-Cycle Cost Management
Life-Cycle Cost Management

Cost Commitment Curve

Costs are committed at this point

Life-Cycle Cost %

Planning       Design         Testing         Production  Logistics

100

90

75

25

90 percent of life-cycle costs are committed at this point

Life-Cycle Cost Management

Research and Development

Product Development

Process Design

Manufacturing

Marketing

Customer Service

Traditional cost accounting focused only on manufacturing costs that were predominately driven by unit-based drivers such as direct labour hours. Life cycle costing focuses on upstream, manufacturing, and downstream costs.
Impediments to Life-Cycle Costing

- A lack of awareness, or uncertainty about how to calculate Life-Cycle costs
- Not easy for products with longer lives as it is more difficult to assess
  - Changes in consumer tastes
  - Impact of competitors’ actions
  - Effects of inflation

Managing Throughput

- The Theory of Constraints
  - Focuses on identifying and removing bottlenecks to improve the rate of throughput
  - Recognises the rate of production is limited to the capacity of the constraints (or bottlenecks) that exist
- Throughput Accounting
  - Measures effects of bottlenecks and other operational decisions using measures of throughput, inventory and operating expenses
The unit contribution margins are $300 and $600 for X and Y, respectively. 

\[ Z = 300X + 600Y \]

This equation is called the objective function, the function to be optimized.

### Basic Concepts of Constrained Optimization

#### Linear Programming Approach

- **One Binding Internal Constraint**

<table>
<thead>
<tr>
<th>Data</th>
<th>Machine hours available per week</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Machine hours/part</td>
<td>Part X</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Contribution Margin</td>
<td>$300</td>
</tr>
</tbody>
</table>

Contribution Margin per machine hour $300 $200
Basic Concepts of Constrained Optimization
Linear Programming Approach

- **One Binding Internal Constraint**

<table>
<thead>
<tr>
<th>Machine hours available per week</th>
<th>120</th>
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<tr>
<td>Machine hours/part</td>
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</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Contribution Margin</td>
<td>$300</td>
</tr>
<tr>
<td>Contribution Margin per machine hour</td>
<td>$300</td>
</tr>
<tr>
<td>Contribution Margin per week</td>
<td>$36,000</td>
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<tr>
<td>Optimal mix</td>
<td>120</td>
</tr>
</tbody>
</table>

Basic Concepts of Constrained Optimization
Linear Programming Approach

- **More than one binding Constraint**

the Objective Function is Max Z = $300X + $600Y

<table>
<thead>
<tr>
<th>Resource</th>
<th>Available</th>
<th>Part X Usage/Unit</th>
<th>Part Y Usage/Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grinding</td>
<td>80 hours</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Drilling</td>
<td>120 hours</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Polishing</td>
<td>90 hours</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Part X Demand</td>
<td>60 units</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Part Y Demand</td>
<td>150 units</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Internal Constraints
- $X + Y \leq 80$ grinding hours
- $X + 3Y \leq 120$ drilling hours
- $2X + Y \leq 90$ labour hours

External Constraints
- $X \leq 60$
- $Y \leq 100$

Non-negativity constraints
- $X \geq 0$
- $Y \geq 0$
Basic Concepts of Constrained Optimization

Graphical Solution

**Basic Concepts of Constrained Optimization**

- Solve using simultaneous equations

\[ 2X + Y = 90 \]
\[ X = 3Y - 1Y \]

Substitute \( X \) into \( 2X + Y = 90 \)
\[ 2(3Y) + Y = 90 \]
\[ 6Y + Y = 90 \]
\[ 7Y = 90 \]
\[ Y = 13 \]

Substitute \( Y \) into \( X + 3Y = 120 \)
\[ X + 3(13) = 120 \]
\[ X + 39 = 120 \]
\[ X = 81 \]

OR

\[ 2X + Y = 90 \]
\[ Y = 90 - 2X \]

Substitute \( Y \) into \( X + 3Y = 120 \)
\[ X + 3(90 - 2X) = 120 \]
\[ X + 270 - 6X = 120 \]
\[ 5X = 150 \]
\[ X = 30 \]

Substitute \( X \) into \( 2X + Y = 90 \)
\[ 2(30) + Y = 90 \]
\[ 60 + Y = 90 \]
\[ Y = 30 \]
Linear Programming

<table>
<thead>
<tr>
<th>Corner Point</th>
<th>X-Value</th>
<th>Y-Value</th>
<th>Z = $300X + $600Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0</td>
<td>0</td>
<td>$0</td>
</tr>
<tr>
<td>B</td>
<td>0</td>
<td>40</td>
<td>24,000</td>
</tr>
<tr>
<td>C</td>
<td>30</td>
<td>30</td>
<td>27,000</td>
</tr>
<tr>
<td>D</td>
<td>45</td>
<td>0</td>
<td>13,500</td>
</tr>
</tbody>
</table>

C is the optimal solution!

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**Basic Concepts of Constrained Optimization**

**Theory of Constraints**

Three Measures of Systems Performance:

- Throughput
  \[
  \text{Throughput} = \frac{\text{Sales revenue} - \text{Unit-level variable expenses}}{\text{Time}}
  \]
- Inventory
- Operating expenses

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**Five-Step Method for Improving Performance**

1. Identify an organization’s constraints.
2. Exploit the binding constraints.
3. Subordinate everything else to the decisions made in Step 2.
4. Elevate the organization’s binding constraints.
5. Repeat the process as a new constraint emerges to limit output.
4. Elevate the organization’s binding constraints.
5. Repeat the process as a new constraint emerges to limit output.
Graphical Solution

Basic Concepts of Constrained Optimization

- Solve using simultaneous equations

\[ 2X + Y = 90 \]
\[ X + Y = 80 \]
\[ X = 80 - Y \]

Substitute X into 2X + Y = 90
\[ 2(80 - Y) + Y = 90 \]
\[ 160 - 2Y + Y = 90 \]
\[ Y = 70 \]

Substitute Y into X + Y = 80
\[ X + 70 = 80 \]
\[ X = 10 \]
Managing quality

What is quality?
- Quality of design
  - Degree to which a product’s design specifications meet customers’ expectations
- Quality of conformance
  - Degree to which a product meets formal design specifications
- A clear understanding of customer value is needed to provide customers with a high-quality product

Quality
- Is the degree or grade of excellence
  - A relative measure of goodness
- For this definition to have relevance to “business” organisations, a “customer” focus must be adopted

Quality - Customer Focused
- Customer’s life-cycle costs include the total cost over the product’s entire useful life
  - Products with the lowest total product costs over their lifetime are most desirable
  - Quality products conform to customer expectations
Eight dimensions of service quality

- Performance
- Aesthetics
- Serviceability
- Features
- Reliability
- Durability
- Conformance
- Fitness for use

Eight dimensions of service quality

- Performance
  - How well and consistently a product functions

- Aesthetics
  - The appearance (style, beauty etc) of products and/or associated facilities, equipment, personnel etc.

Eight dimensions of service quality

- Serviceability
  - Ease of maintenance and/or repairing of product

- Features
  - (Quality of design) characteristics of the product that differentiate it from other products
Eight dimensions of service quality

- **Reliability**
  - The probability that a product or service will perform its function for a specified time

- **Durability**
  - Length of time a product functions

Eight dimensions of service quality

- **Conformance**
  - How well a product meets its specifications

- **Fitness for use**
  - How suitable a product is for carrying out its advertised functions

Quality Failures

- **Failure in quality of design**
  - A failure of conformance between customer expectations and design
  - Results in poor quality of design.

- **Failure in quality of conformance**
  - A detected failure of conformance between design and the actual product or service
  - Results in a reported quality failure.
Quality Product (or Service) Process

- Step 1 customers' expectations from product
- Step 2 product functional specifications
- Step 3 design specifications
- Step 4 manufacturing specifications
- Step 5 actual results of product

Quality of Design and Conformance

- Customer Expectations
- Quality (Conformance to customer expectations)
- Design Specifications
- Quality of Design
- Quality (Conformance to customer expectations)
Quality of Design and Conformance

Customer Expectations → Design Specifications → Actual Results

Quality (Conformance to customer expectations)

Measuring the Costs of Quality
- Prevention Costs
- Appraisal Costs
- Internal Failure Costs
- External Failure Costs

Costs of Controlling Quality
- **Prevention costs** are the costs of activities that prevent defects from occurring during the design and delivery of products or services.
- **Appraisal costs** are the costs of activities that detect, measure, evaluate, and audit products and processes to ensure that they conform to customer requirements and performance standards.
Costs of Failing to Control Quality

- **Internal failure costs** are the costs associated with defects discovered by a business before the product or service is delivered to the consumer.

- **External failure costs** are the costs incurred after defective units or services have been delivered to consumers. Although difficult to measure, it may be the largest cost in the quality equation. (Both observable and hidden/opportunity costs)

Examples of Observable Quality Costs

**Prevention costs**
- Quality engineering
- Quality training
- Quality planning
- Quality audits
- Design reviews
- Quality circles

**Appraisal Costs**
- Inspection of raw materials
- Packaging inspection
- Product acceptance
- Process acceptance
- Field testing
- Supplier verification

Examples of Observable Quality Costs (Continued)

**Internal Failure costs**
- Scrap
- Rework
- Downtime (defect related)
- Re-inspection
- Retesting
- Design changes
- Repairs (pre-delivery)

**External Failure costs**
- Returns/allowances
- Warranties
- Repair (post-delivery)
- Recalls
- Product liability
- Complaint adjustment
Examples of Hidden Quality Costs (Continued)

External Failure costs
- Lost sales
- Lost market share
- Customer dissatisfaction
- Ill will

Hidden costs are usually significant and should be estimated.

Oppportunity costs not usually recognised in the accounting records.

Estimating Hidden Quality Costs
- Estimating hidden quality costs can be difficult and various methods can be used. Suggested methods include:
  - The multiplier method
  - The market research method
  - Taguchi quality cost function

Quality Cost Activity Analysis

<table>
<thead>
<tr>
<th>Quality activities</th>
<th>activity cost</th>
<th>classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rework</td>
<td>$380,000</td>
<td>Internal failure</td>
</tr>
<tr>
<td>Warranty work</td>
<td>$225,000</td>
<td>External failure</td>
</tr>
<tr>
<td>Disposing of scrap</td>
<td>$195,000</td>
<td>Internal failure</td>
</tr>
<tr>
<td>Disposal of rejected materials</td>
<td>$160,000</td>
<td>Internal failure</td>
</tr>
<tr>
<td>Processing returned materials</td>
<td>$150,000</td>
<td>External failure</td>
</tr>
<tr>
<td>Finished goods inspection</td>
<td>$140,000</td>
<td>Appraisal</td>
</tr>
<tr>
<td>Preventive maintenance</td>
<td>$80,000</td>
<td>Prevention</td>
</tr>
<tr>
<td>Materials inspection</td>
<td>$70,000</td>
<td>Appraisal</td>
</tr>
<tr>
<td>Design engineering</td>
<td>$55,000</td>
<td>Prevention</td>
</tr>
<tr>
<td>Assessing vendor quality</td>
<td>$45,000</td>
<td>Prevention</td>
</tr>
<tr>
<td>Total activity cost</td>
<td>$1,500,000</td>
<td></td>
</tr>
</tbody>
</table>
### Value-Added / Nonvalue-Added Activity Analysis

<table>
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<tr>
<td><strong>Total activity cost</strong></td>
<td><strong>$1,500,000</strong></td>
</tr>
</tbody>
</table>

**Which activities are value-added and which are nonvalue-added?**

- **Nonvalue-added**
  - Rework: $380,000
  - Warranty work: 225,000
  - Disposing of scrap: 195,000
  - Disposal of rejected materials: 160,000
  - Processing returned materials: 150,000
  - Preventive maintenance: 80,000
  - Materials inspection: 70,000
  - Design engineering: 55,000
  - Assessing vendor quality: 45,000
  - **Total nonvalue-added cost**: $1,110,000 (74% of total cost)

- **Value-added**
  - Rework: $380,000
  - Warranty work: 225,000
  - Disposing of scrap: 195,000
  - Disposal of rejected materials: 160,000
  - Processing returned materials: 150,000
  - Preventive maintenance: 80,000
  - Materials inspection: 70,000
  - Design engineering: 55,000
  - Assessing vendor quality: 45,000
  - **Total value-added cost**: $390,000 (26% of total cost)
Controlling Quality
- When it comes to quality
  - Appraisal and internal failure costs are better than external failure costs, but
  - Prevention is best of all

Using Cost of Quality Information
- Helps managers reduce cost and improve quality
- Places a dollar figure on the costs of poor quality
- Helps prioritise quality improvement programs
- Helps managers monitor the effects of the ‘quality effort’
- Helps identify the optimal level of quality for the firm
Contemporary Quality Cost Graph

- Traditional View
- Cost of Failures
- Cost of Control
- Costs Decline as we approach ZERO DEFECTS

Total quality management (TQM) and a quality culture

- TQM is a management approach that focuses on meeting customer requirements by achieving continuous improvement in goods or services
- TQM is:
  - Organisation-wide
  - Customer-driven
  - Involves empowerment
  - Has a process perspective
  - Is supported by a quality management system
  - Involves continuous improvement

Total quality management (TQM) and a quality culture (cont.)

- Six Sigma is a rigorous business improvement methodology that focuses on improving business processes through identifying and eliminating defects
- Organisations may achieve quality accreditation by meeting international ISO 9000 quality standards:
  - Systems, quality documentation, process controls and delivery methods that a firm has in place to deliver quality goods and services
  - May provide assurance to customers that a firm has high levels of quality
  - Expensive to implement and maintain