

# FIT2090

## BUSINESS INFORMATION SYSTEMS AND PROCESSES

### Lecture 5 Organisations, BPI and BPR

CLAYTON, FACULTY OF INFORMATION TECHNOLOGY  
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# Principles

- IS must be implemented in such a manner that they are accepted and work well within the context of an organisation and support its fundamental business goals and strategies
- Businesses need to be sure that improvements or completely new systems help lower costs, increase profits, improve service or achieve competitive advantage

# Objectives

On completion of this lecture, you will be able to:

- Describe the value chain and the role that IS play in creating value in the value chain
- Discuss ways of measuring BIS successes and outcomes
- Discuss the philosophies of Business Process Improvement and Business Process Reengineering

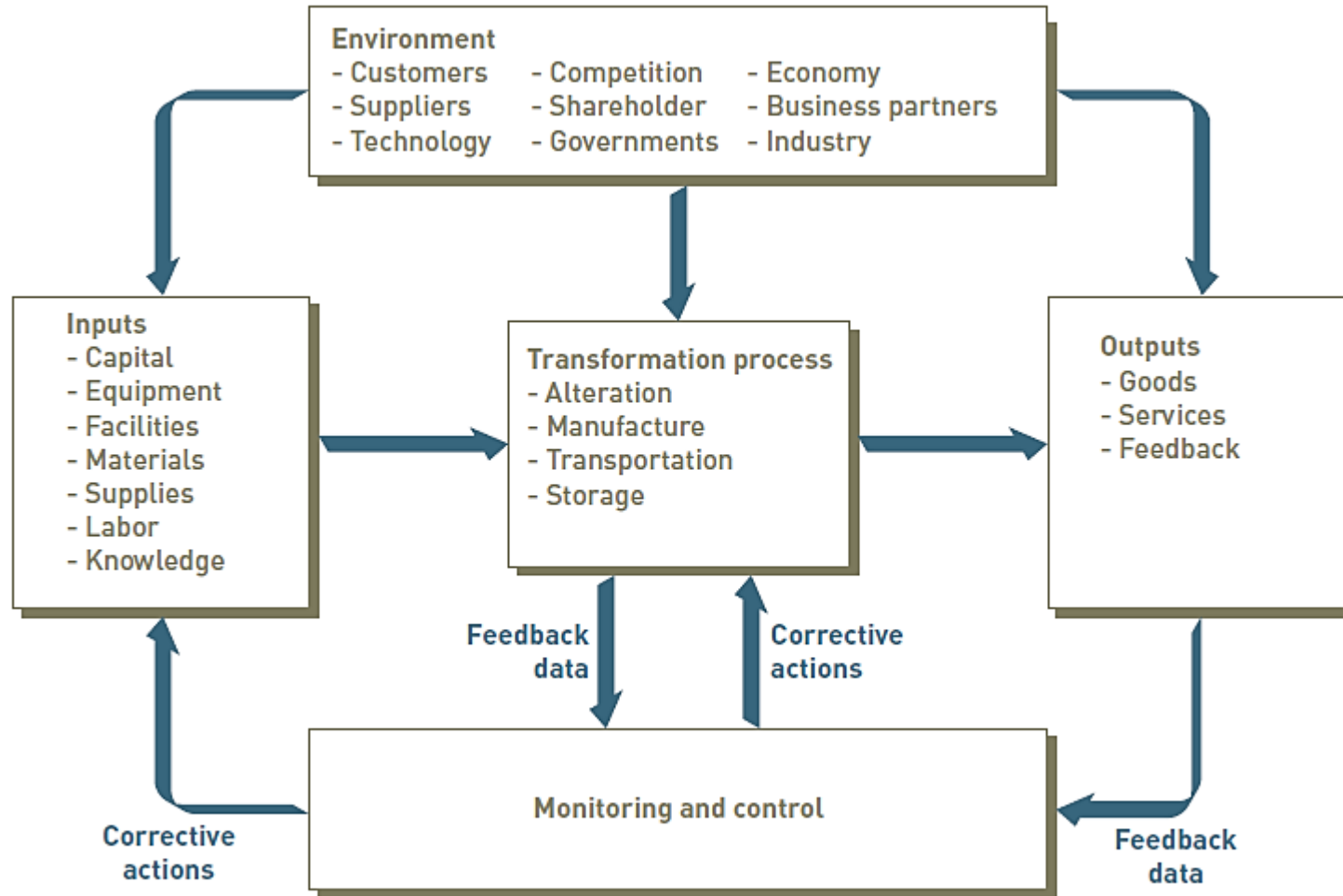
# Why should we study/understand –BPI and Organisational Change

- Due to competition and ‘globalization’ successful companies cannot afford internal inefficiencies
- Customers have become more demanding
- So organizations must achieve:
  - Internal efficiency
  - External effectiveness
- Organizations must align their internal activities and resources with the external requirements

# Organizations and Information Systems

- Organization: a group of people that is structured and managed to meet its mission or set of group goals
  - There are relationships between members of the organization and their various activities
  - Processes are defined that assign roles, responsibilities, and authority to complete the various activities
- Organizations are open systems
  - They affect and are affected by their surrounding environment

# General Model of an Organization



# Organizations and Information Systems: Value Chain

- Value chain: a series (chain) of activities that an organization performs to transform inputs into outputs
  - The value of the input is increased
- Supply chain: key value chain in a manufacturing organization

# Porter's Value Chain Theory

- Porter (1985) developed value chain theory and argued that a firm exists for creating value for customers
- Value (e.g. Low cost, quality, prompt availability) is something for which a customer is willing to pay for

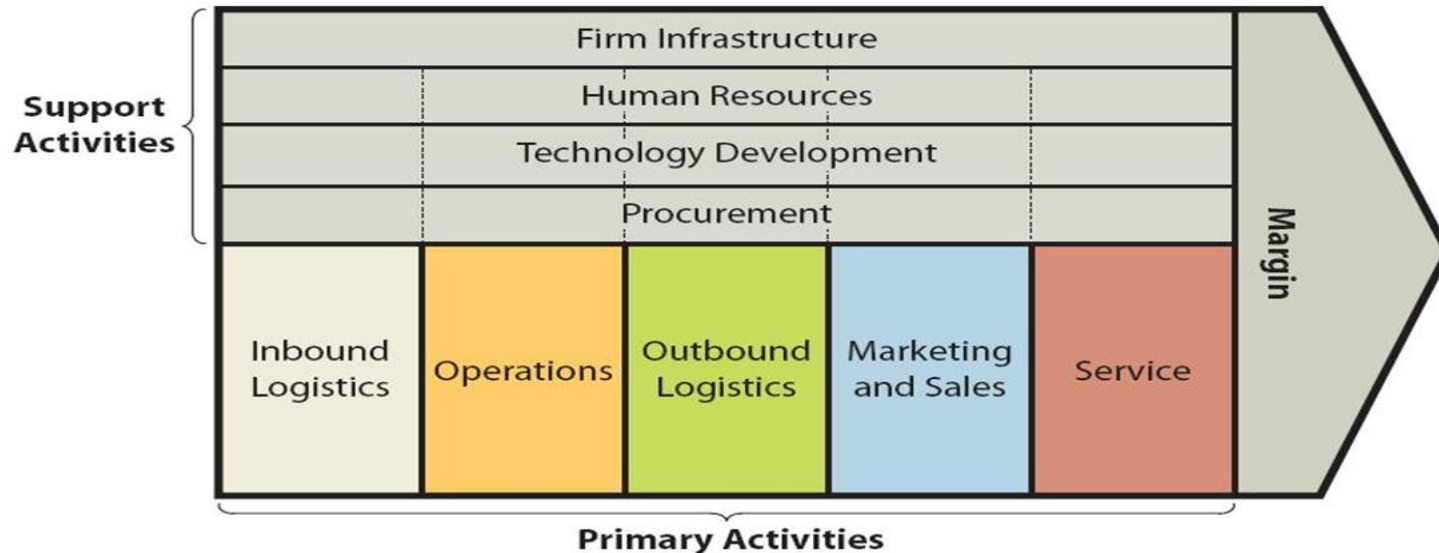


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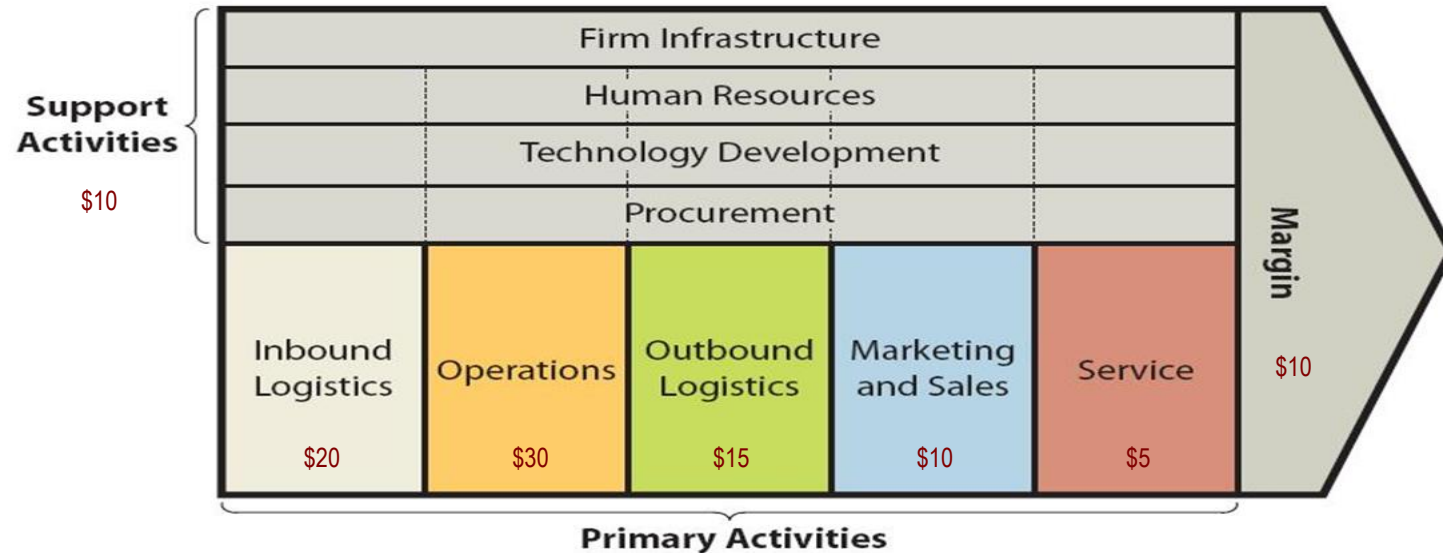
# Porter's Value Chain Theory ...

- An organisation is perceived as a collection or chain of 2 types of activities (primary and support) that contribute to create consumer value



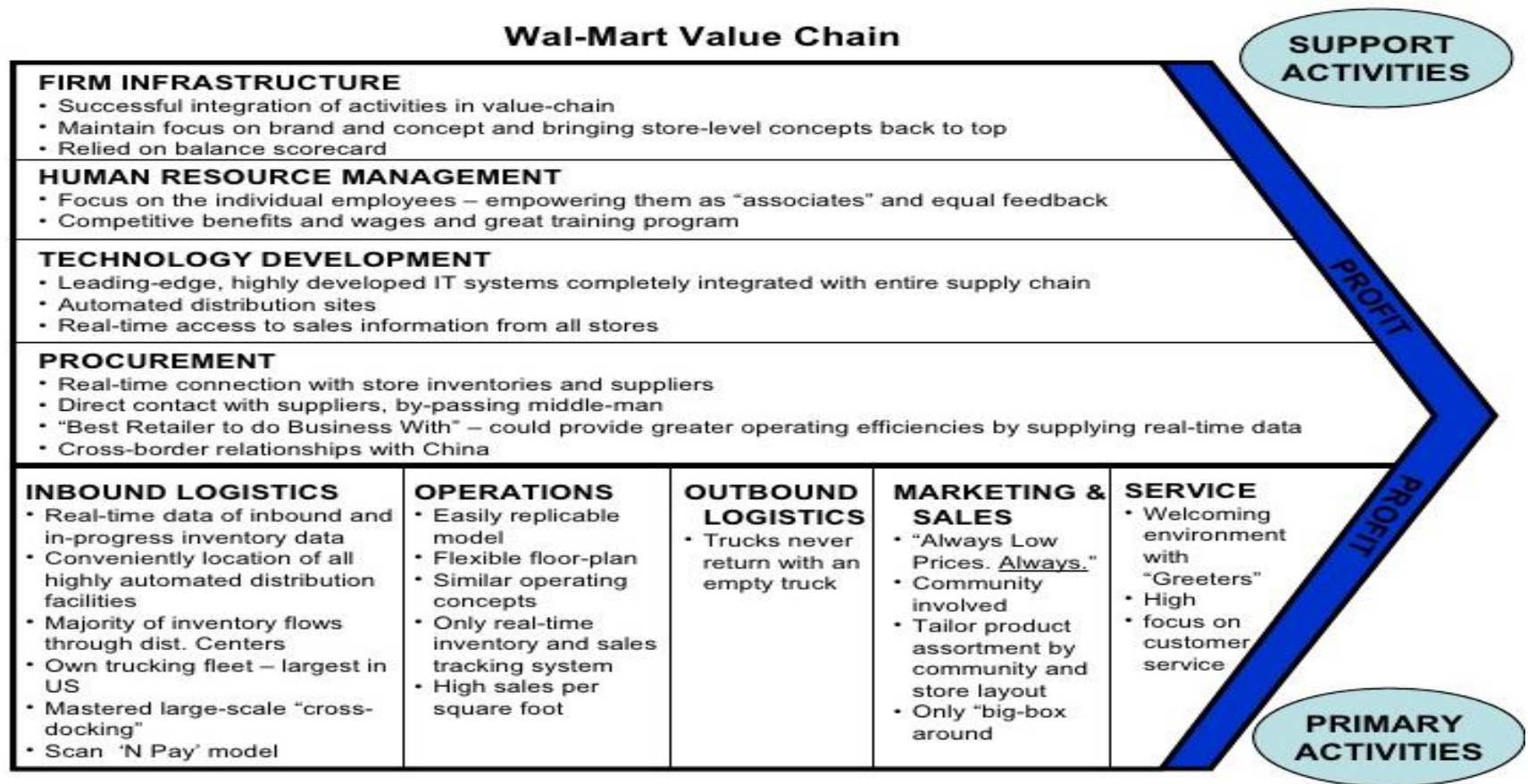
- Margin = differences between total value and cost of producing value of a product
- Margin can be expressed in monetary terms (see next slide for example)

# Example of Value Chain of a Firm



- Note that cost of producing value is shared by different primary activities.
- Total cost contribution of primary activities is: **\$80**.
- Support activities together contribute **\$10** of cost.
- Margin is: \$10 (After assuming sale price is set at \$100)

# Example of Value Chain in Wal-Mart



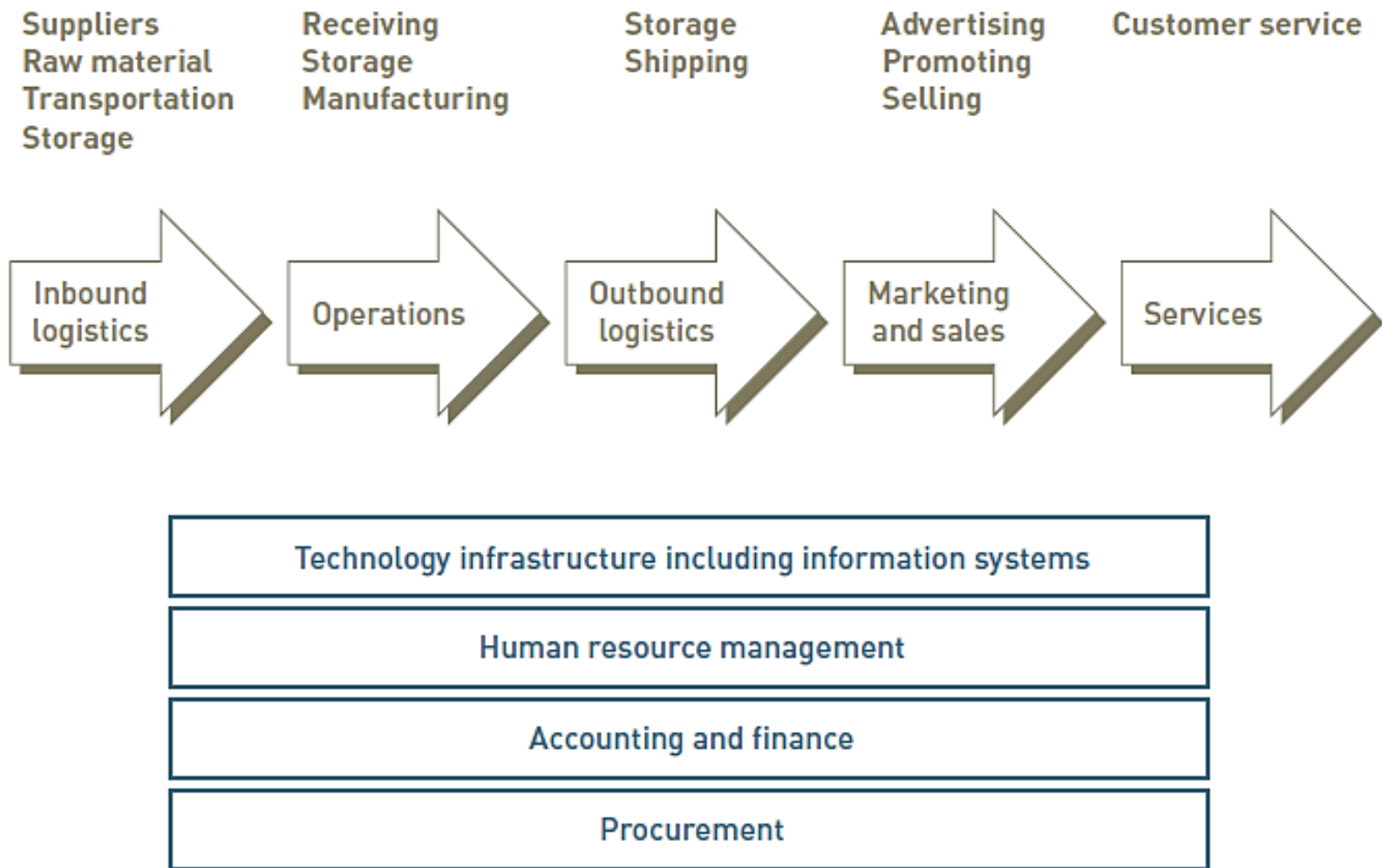
A list of activities included within each of the primary and support activities of Wal-Mart

# Porter's Value Chain Theory ...

Examples of IT systems that are assigned to support primary and support activities

<b>Infrastructure</b>	Use of corporate Intranet for internal communications			
<b>HR</b>	B2E portals			
<b>Technology</b>	CAD			
<b>Procurement</b>	Use of e-marketplaces, web-based e-procurement systems			
<b>Inbound logistics</b>	<b>Production</b>	<b>Outbound logistics</b>	<b>Marketing and Sales</b>	<b>Service</b>
EDI	Computer Integrated Manufacturing (CIM)	Web-based order-tracking system	CRM, marketing campaign management system	System for local troubleshooting

# Supply Chain



# Supply Chain Management (SCM)

- The management of all the activities required to get the right product into the right consumer's hands in the right quantity at the right time and at the right cost
  - Encompasses acquisition of raw materials through customer delivery

# Supply Chain Management (SCM) (cont'd.)

Supply chain organizations are “linked” together through both physical flows and information flows

- Physical: supplies and raw materials
- Information: participants communicating their plans, coordinating their work, and managing the efficient flow of goods and material

# The Information System as Part of the Supply Chain

- The information system can play an integral role in the supply chain process:
  - Providing input
  - Aiding product transformation
  - Producing output
- Organizations with integral IS
  - Zara
  - Coles



# Organizational Structures

- Organizational structure
  - Organizational subunits and the way they relate to the overall organization
  - Dependent upon an organization's goals and its approach to management
- Common types of organizational structures
  - Traditional
  - Project
  - Team
  - Virtual

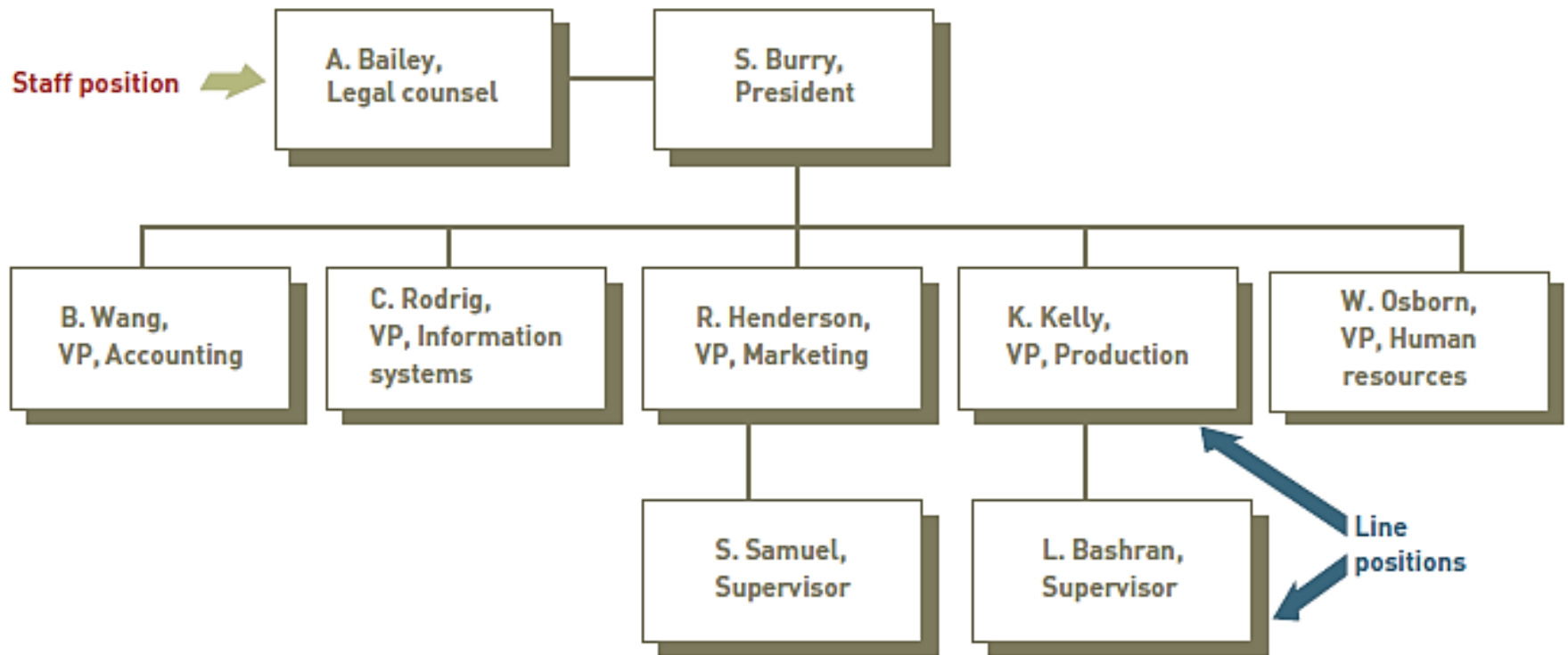
# Traditional Hierarchical Organizational Structure

- Also referred to as a functional structure
  - The hierarchy of decision making and authority flows from the strategic management at the top down to operational management and nonmanagement employees
- Autocratic decision making is a weakness

# Levels of Management



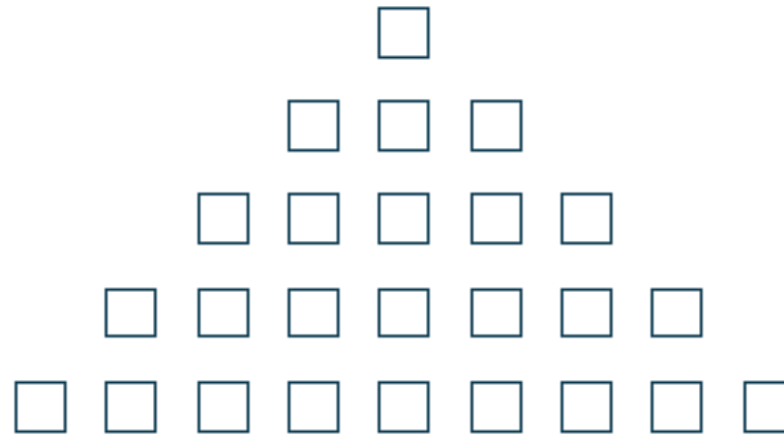
# Traditional Organizational Structure



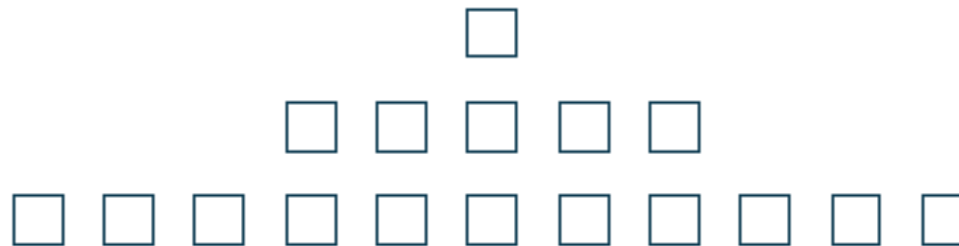
# Flat Organizational Structure

- An organizational structure with a reduced number of management layers
- Empowers employees at lower levels
  - Gives employees and their managers more responsibility and authority to make decisions

# Traditional Versus Flat Organizational Structure



Traditional multilevel hierarchical organization



Hierarchical organization that has been flattened by removing levels of management and expanding managers' span of control

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# Matrix Organization Structure

- An organization structure in which an individual has two reporting superiors (managers)—one functional and one operational
  - The functional manager oversees how the work is done
  - The operational manager decides what is to be done

# Matrix Organization Chart

Regions	Functions			
	Finance and accounting	Sales	Information systems	Human resources
Asia/Pacific				
Europe/Middle East				
Latin America				
North America				

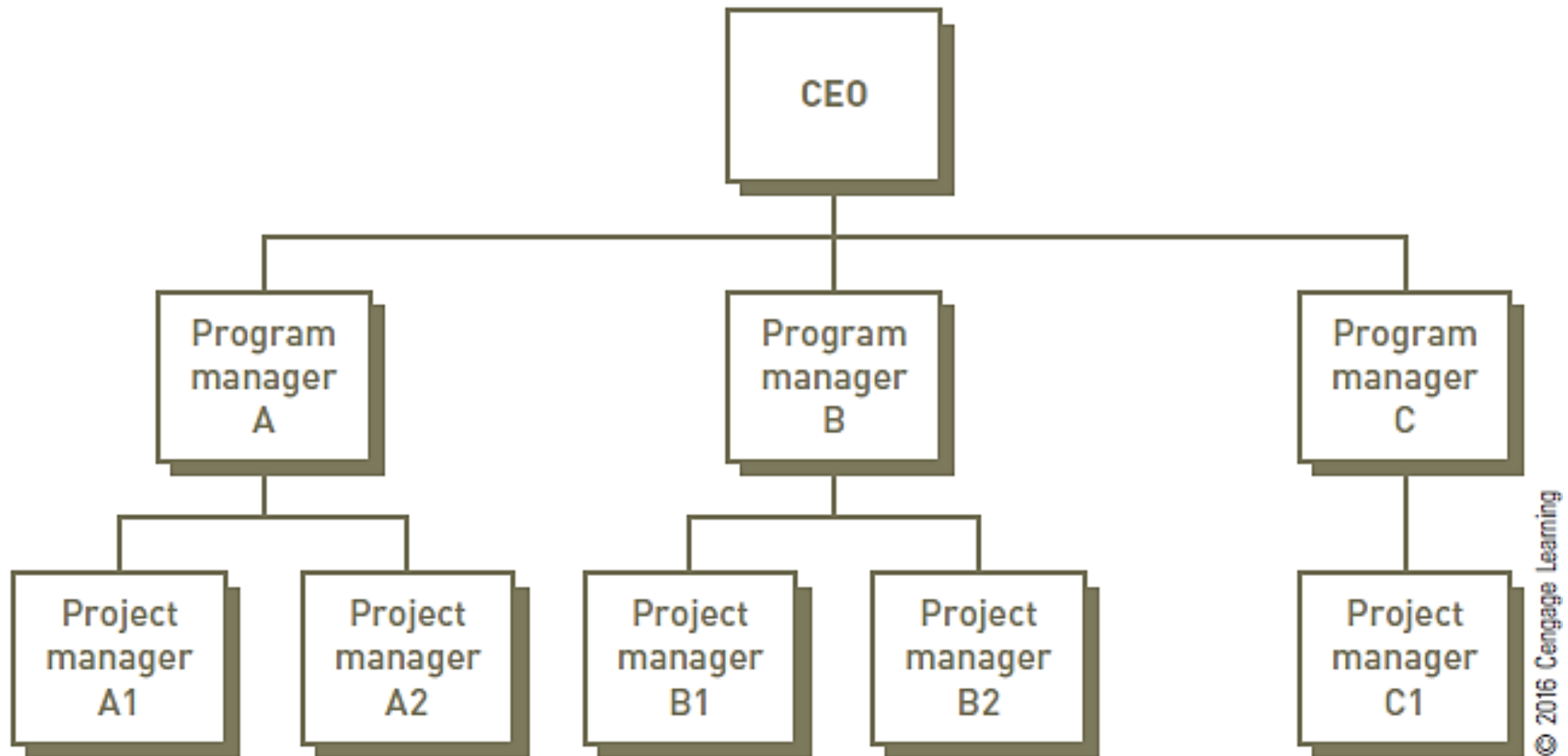
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# Project Organizational Structure

- A structure focused on major products or services
  - Program managers are responsible for directing one or more projects
  - Effective for project-driven organizations such as construction companies and companies that work on government contracts

# Project Organizational Structure (cont'd.)



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# Virtual Teams and Collaborative Work

- Virtual team: individual members are distributed geographically; work as a coherent unit through the use of information systems technology
  - Strength: the best available people are enlisted to solve important organizational problems
  - Supported by electronic communications: email, instant messages, video conferences, etc.

# Innovation

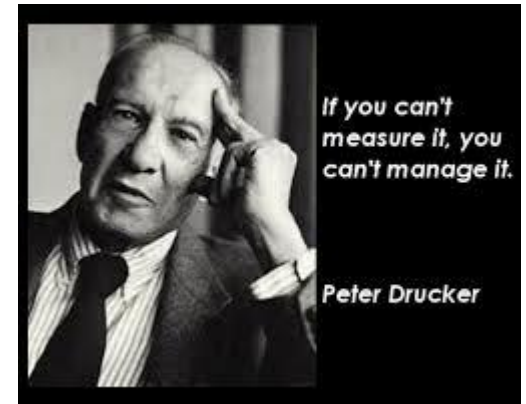
- A catalyst for the growth and success of an organization
- Can lead to cutting-edge products
  - New revenue streams
  - Increased profits
- Types of innovation
  - Sustaining innovation
  - Disruptive innovation

# Measuring BIS Success ...

*“If you can’t measure it, you can’t manage it.”*

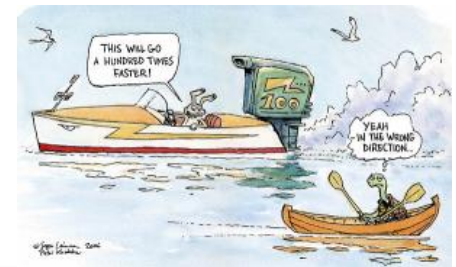
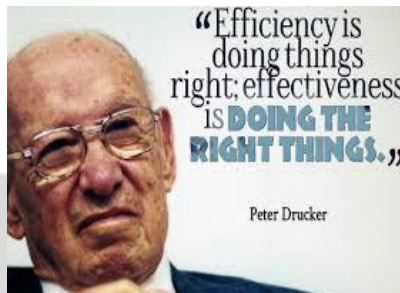
– *Peter Drucker (a famous management guru)*

- To successfully **manage BIS function** in an organisation, business managers must be able to *measure* the success of BIS
- Generally, a set of *Key Performance Indicators (KPIs)* are established to evaluate BIS success
- *Metrics* are detailed measures that feed KPIs



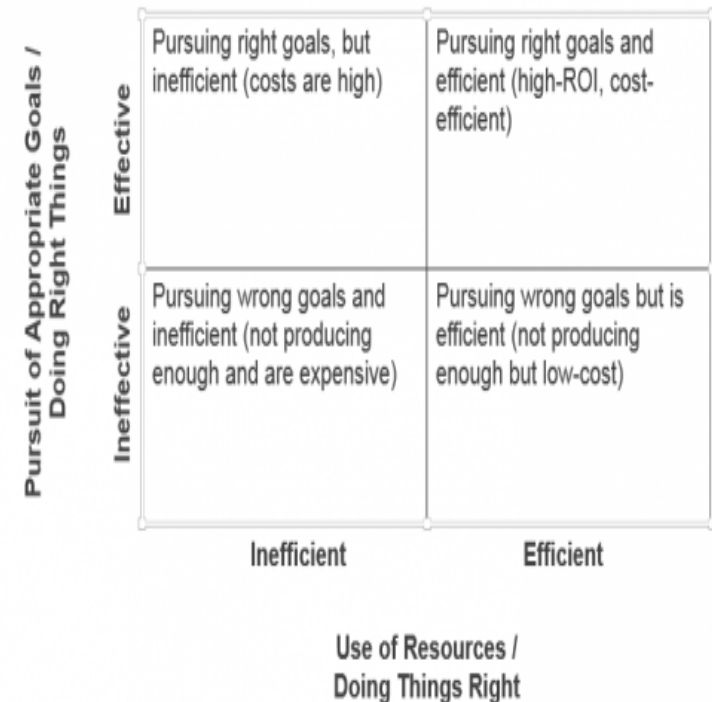
# Success Metrics

- Efficiency IS metric
  - How *fast* (with *minimum resources*) IT system can help an organisation to perform a business activity
  - Focuses on *output/input ratio*
  - Examples: speed, and availability (24x7), down time, activity rate
- Effectiveness IS metric
  - Whether the business is focussing on the right activity
  - measures the impact BIS has on business processes and activities
  - Example: order fulfilment times of HP is 3 days
- Efficiency is an *important performance indicator* for any organization.
- However, with consumers facing an increasing number of choices, *effectiveness* of an organization is always questioned.



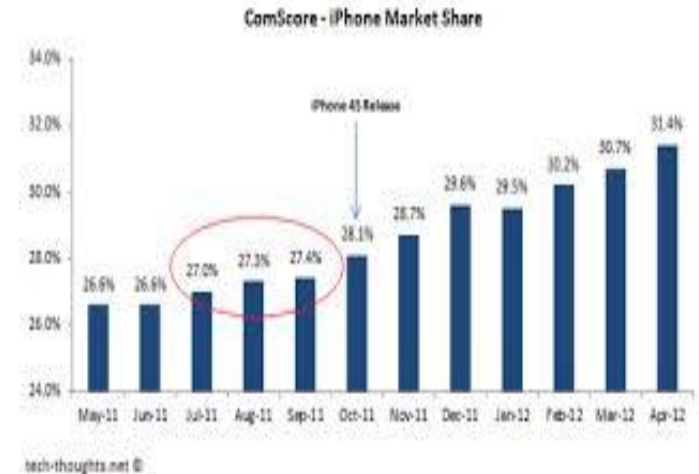
# Relationship between efficiency and effectiveness

- The Holy Grail for every company is to always pursue the top right box – pursuing:
  - the right business activities
  - Doing right activities efficiently
    - by making use of technological advances, not wasting time, and having better alignment and collaboration of between employees.
- Many companies have their hearts in the right place – they know what goals they want to achieve, but are inefficient in achieving those goals.



# Success Metrics

- Strategic IS metric
  - Measures *the contribution of IS towards meeting an organisation's strategic objectives*
  - Examples
    - increase in market share
    - % of sales increase,
    - customer satisfaction ratings
    - increase in share price





# BIS consequences

- Besides efficiency and effectiveness improvements, an IS has:
  - other direct and indirect effects on people within and outside organisations (e.g., employees, customers, contractors, suppliers, stakeholders)
- Some effects are Positive (Intended):
  - including employees' empowerment
  - and widening scope of their responsibility
- While others are Negative (Unintended):
  - Deskilling
  - loss of authority,
  - creation of a *monotonous working environment*
- Example: Unintended consequences of *Big data*, *Internet*, *Websites*



# Unintended negative consequences: BIS

- Big data
  - Intended consequence of Big Data is **IMPROVED EFFICIENCY** in marketing;
  - but consumer behaviour can be manipulated through the inference of individuals' interests from Big Data accumulated about them
- Internet
  - cyber-threats are escalating into all aspects of individual and business life, from identity theft to corporate espionage.
- Web site
  - **IRRITATION** is an unintended outcome of a website
  - disorganized websites, containing features like broken links, inappropriate use of colour, graphics, or animation, may IRRITATE users

# IS/IT Outcomes ...

- Another important outcome of IS may affect future opportunities (e.g., future IS and strategic initiatives) available to organisations because:
  - future systems typically rely on, or connect with, pre-existing ones
- Example: consider a grocery store that has introduced check-out scanners. This system often becomes the basis for Automatic Reorder Initiatives when organisations have:
  - achieved a satisfactory level of reliability and precision of scanner data



# Business Process Performance

- There are SEVEN common performance metrics that are used to measure efficiency of business processes. These are summarised in the next slide:
  - Activity rate
  - Output rate
  - Consistency
  - Productivity
  - Cycle time
  - Down time
  - Security
- Many of these performance metrics are mutually reinforcing
  - Example: reducing cycle time often increases productivity



# Business Process Performance Metrics

Metrics	Problems if the Metrics are High	Typical Measure	Role of IT
Activity rate		No. of work steps completed per day	Track the rate at which work steps are occurring
Output rate		Avg. units completed per hour or week	Automation of some works leads increases output rate
Consistency		Defect rate	To find causes of defects
Productivity	Focus on quality can be compromised	Ratio of outputs to inputs	Help people produce more output with the same effort (input)
Cycle time		Elapsed time from start to finish	To reduce cycle time by performing steps in parallel
Downtime	Longer cycle times Lower productivity	Total time out of operation	Track the process and equipment to identify things that are going out of operations
Security	Excess attention to security gets in the way of doing work	No. of processes breaches within a time interval	Track all non-standards transactions (e.g., changes in completed transactions)

# Business Process Performance Metrics

- **Activity rate**

- Represents the number of **Interim Work Steps** that are performed per unit time
- This metric is most relevant when processes take a long time to complete
- Example: a construction company trying to stay on schedule while building a bridge would find it is far more useful to track its activity rate in work steps per week rather than its output rate (expressed in terms of no. of bridges completed per week)

- **Output rate**

- Represents the amount of completed outputs that a process produces per unit of time
- Example: Number of customer queries answered per day

# Business Process Performance Metrics

## ■ Consistency

- It means applying the same techniques in the same way to obtain the same desired results
- High consistency *means no variation in processes*
- IT systems enable organisations to perform business processes in a *consistent manner*



# Business Process Performance Metrics

## ■ Productivity

- relationship between the amount of output produced by a business process and the amount of money it consumes
  - It is measured in terms of:
    - Units of output/dollar sales
  - IT systems are used to improve productivity by supporting automation
- Efficiency Toyota = 4,000 cars / 20,000 Hours = 0.2 Cars / Hour
- Efficiency Ford = 6,000 cars / 30,000 Hours = 0.2 Cars / Hour
- Productivity Toyota:  $[(4,000 * \$8,000) / (20,000 * \$12)] = \$133.33$  / Car
- Productivity Ford:  $[(6,000 * \$9,500) / (30,000 * \$14)] = \$135.71$  / Car
- So, based on the data set above, it appears that Efficiency by Hours, both Car Toyota and Car Ford the same; but, Productivity by Dollars, Car (Toyota) is cheaper to make given the labour hours and hourly rate.

	Quantity	\$/Unit of Car
Toyota	4000	8000
Ford	6000	9500
Labour hrs for Toyota	20,000	\$12/hr
Labour hours for Ford	30,000	\$14/hr



# Business Process Performance Metrics

## ■ Cycle Time

- Represents the **length of time taken between** the start of the process and its completion
- It includes time take for completing each step (in a process) and also any waiting time between the steps
- Example: For procurement process, ordering cycle time may vary from 1 day to 3 days

## ■ Down Time

- Represents the *percentage of time during which the process is out of operation*
- Downtime may occur because a computer system is out of operation unexpectedly
- Down time is of significance to e-commerce systems
- Down time is a source of revenue loss and customer frustration
- Example: In 1999, a software glitch brought online auction pioneer eBay's network to its knees for 3 days in a row

# Business Process Performance Metrics

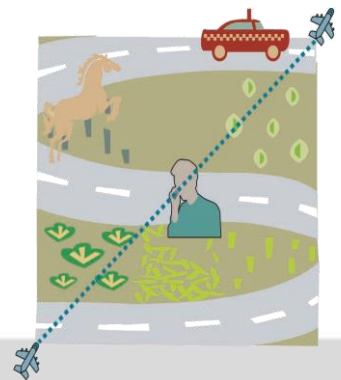
## ■ Security

- Represents the likelihood that a business process is not vulnerable to unauthorised uses, sabotage and any form of criminal activity
- To ensure secure business processes, organisations need to monitor unauthorised access to business processes
- IT systems are often used to improve security when they facilitate effective safeguards against unauthorised access and use



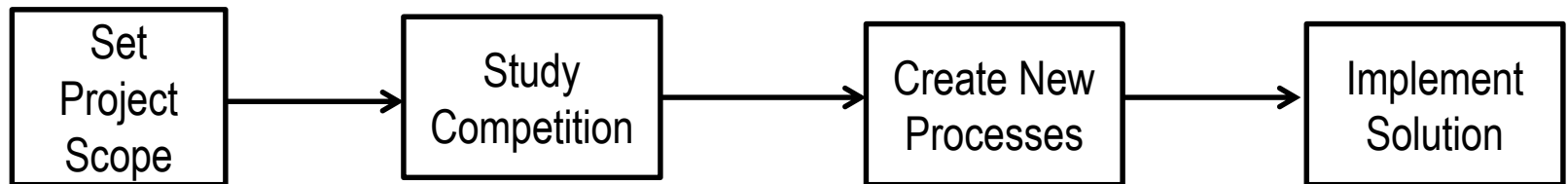
# Business Process Improvement (BPI)

- Companies must improve their business processes because customers are demanding better products and services
- BIS plays a role in BPI and BPR initiatives
- **Business process improvement (BPI)**
  - attempts to make small changes in processes
  - changes are made over time
  - Changes are primarily automate and informate in nature
- **Business process reengineering (BPR)**
  - Radical changes
  - Changes are generally made in one attempt
  - Transformational changes – which shakes structure and people components
  - Risky and can fail



# Business Process Reengineering (BPR)

- Companies sometimes request methods for faster BPI, as they want breakthrough performance changes, not just incremental changes, and they want it NOW
- **Business process reengineering (BPR)**
  - analysis and redesign of workflow within and between enterprises
  - One approach for rapid change and dramatic improvement
- A basic BPR model:

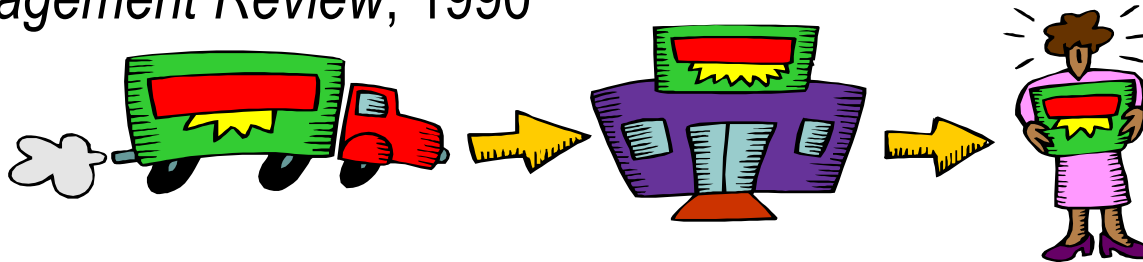


# Business Process Reengineering



# Introduction to Business Process Reengineering

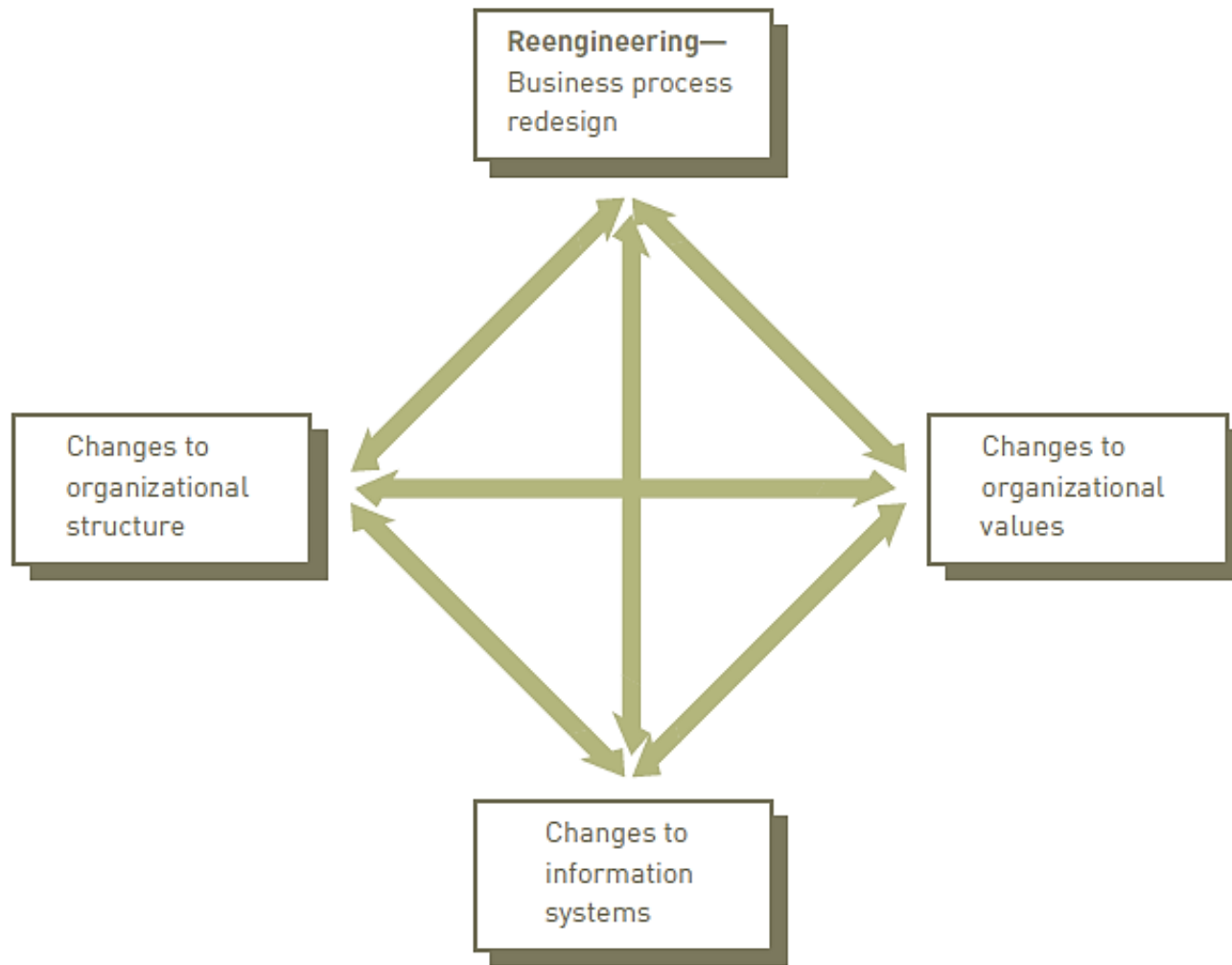
- Business Process Reengineering (BPR)
  - One of the buzzwords of the late 80's and early 90's
  - "...achieves drastic improvements by completely redesigning core business processes"
- BPR has been the subject of numerous articles and books; classical examples are:
  - "Reengineering Work: Don't Automate, Obliterate", Michael Hammer, *Harvard Business Review*, 1990
  - "The New Industrial Engineering", Davenport and Short, *Sloan Management Review*, 1990



# BPR and its Relationships to Other Improvement Programs

- Reengineering - what is that?
  - “The fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality, service and speed” (Hammer and Champy 1993)
  - A number of similar definitions by other authors also exist
- Reengineering characteristics
  - Focus on core competencies or value adding business processes
  - The goal is to achieve dramatic improvement through rapid and radical redesign and implementation
  - ⇒ **Projects that yield only marginal improvement and drag out over time are failures from a reengineering perspective**

# Business Process Reengineering



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# Business Process Reengineering (BPR)

- In the extreme, BPR assumes the current process:
  - is irrelevant
  - does not work
  - is broken
  - must be overhauled from scratch
- A clean slate enables business process designers to disassociate themselves from current process and focus on a new process by projecting themselves into the future and asking:
  - What should the process look like?
  - What do customers want it to look like?
  - What do other employees want it to look like?
  - How do best-in-class companies do it?
  - How can new technology facilitate the process?

# When Should a Process be Reengineered?

Three forces are driving companies towards redesign (The three C's, Hammer & Champy, 1993)

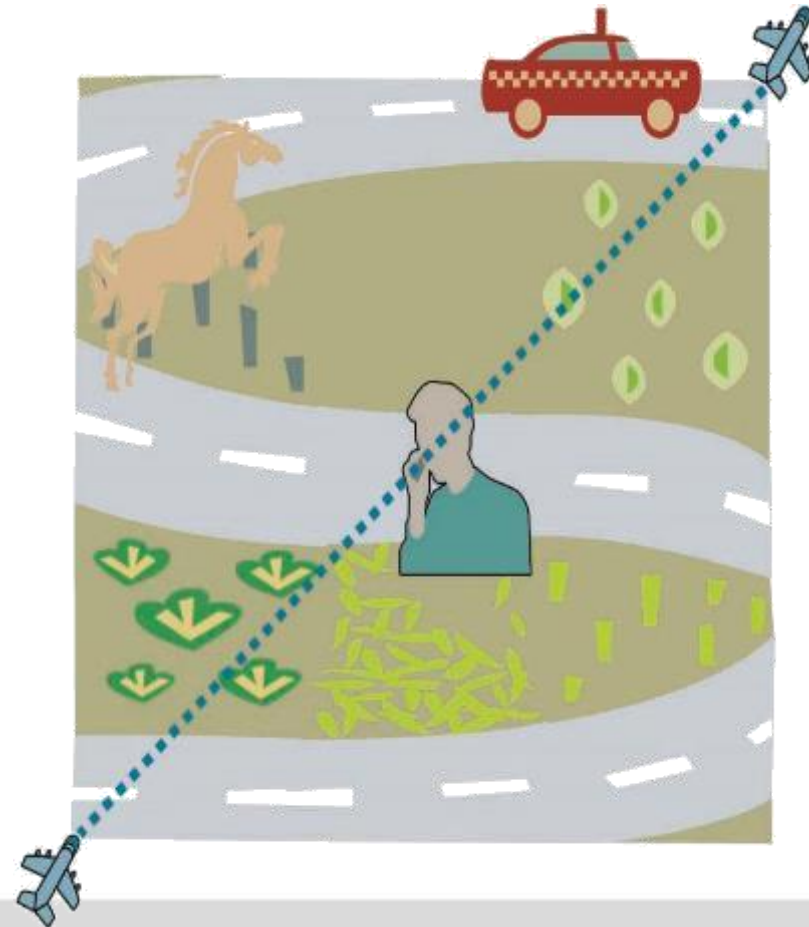
- **Customers** are becoming increasingly more demanding
- **Competition** has intensified and is harder to predict
- **Change** in technology
  - constant pressure to improve; design new products faster
  - flexibility and ability to change fast are requirements for survival

# When Should a Process be Reengineered?

- Useful questions to ask (Cross et al. (1994))
  - Are customers demanding more for less?
  - Are your competitors providing more for less?
  - Can you hand-carry a job through the process much faster than the normal cycle time (ex five times faster)?
  - Have your incremental improvement efforts been stalled?
  - Have technology investments been a disappointment?
  - Are you planning to introduce radically new products/services or to serve new markets?
  - Are you in danger of becoming unprofitable?
  - Have cost-cutting programs failed to turn the ship around?
  - Are operations being merged or consolidated?
  - Are the core business processes fragmented?

# Finding Opportunity Using BPR

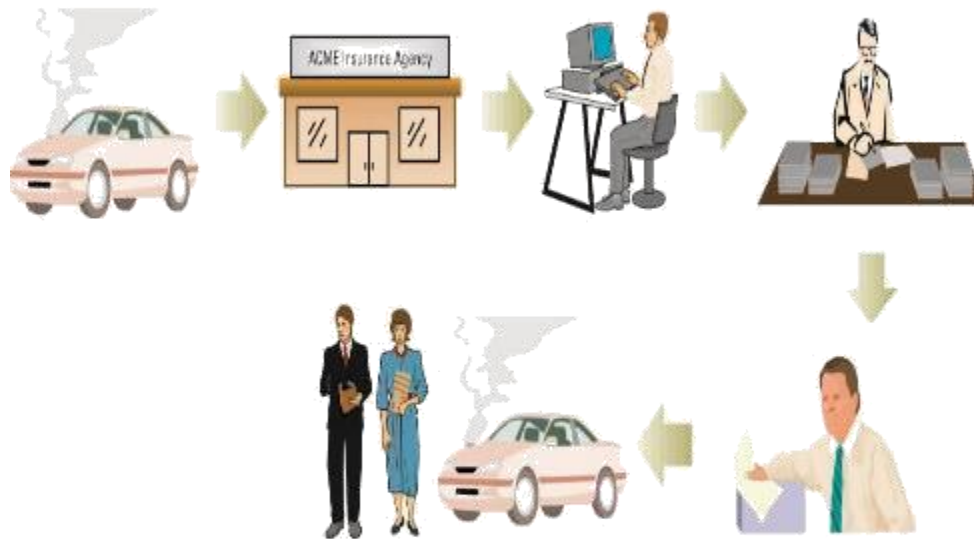
- Different ways to travel the same road:
  - A company can improve the way it travels the road by moving from foot to horse and then horse to car
  - **BPR** looks at taking a different *path*, such as an airplane which ignores the road completely
- Companies often follow the same indirect path for doing business, not realising there might be a different, faster, and more direct way



# Finding Opportunity Using BPR

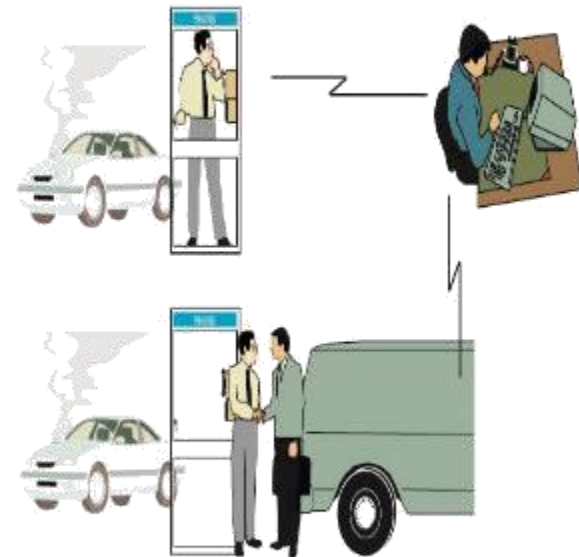
- Example: Progressive Insurance mobile claim process

Company A: Claims Resolution Process



**Resolution Cycle Time: 3–8 weeks**

Progressive Insurance: Claims Resolution Process



**Resolution Cycle Time 30 min–3 hours**

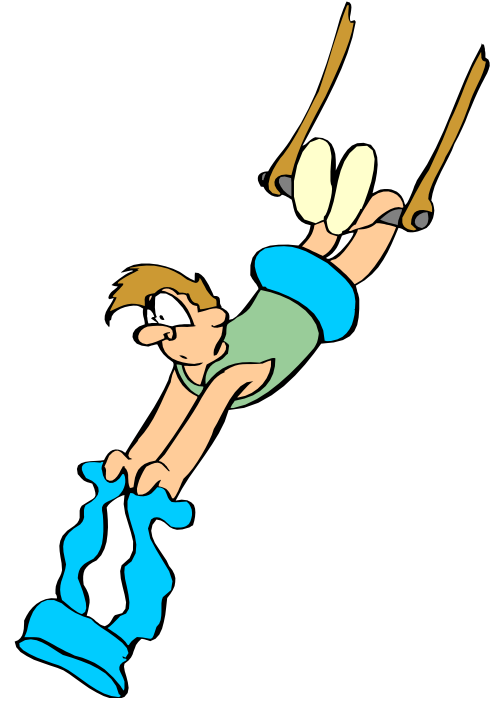
# What Should be Reengineered?

- Processes (not organizations) are reengineered
  - Confusion arises because organizational units are well defined, processes are often not.
- Formal processes are prime candidates for reengineering
  - Formal processes are guided by written policies; informal processes are not.
  - Typically involve several departments and many employees.
  - More likely rigid and therefore more likely to be based on invalid assumptions.

# What Should be Reengineered?

## Screening criteria

1. Dysfunction
  - Which processes are in deepest trouble (most broken or inefficient)?
2. Importance
  - Which processes have the greatest impact on the company's customers?
3. Feasibility
  - Which processes are currently most likely to be successfully reengineered?



# Dysfunctional or Broken Processes

## Symptoms and diseases of broken processes

	<i>Symptom</i>	<i>Disease</i>
1	Extensive information exchange, data redundancy and re-keying	Arbitrary fragmentation of a natural process
2	Inventory, buffers and other assets	System slack to cope with uncertainty
3	High ratio of checking and control to value-adding	Fragmentation
4	Rework and (re)iteration	Inadequate feedback along chains
5	Complexity, exceptions and special cases	Accretion onto a simple base



# Selecting a Process to Reengineer

- An organisation can reengineer cross-departmental business process or an individual department's business process, according to its needs
- Focus on core processes that are critical to organisation's performance
- Criteria to determine the importance of the process:
  - Is the process broken?
  - Is it feasible that reengineering of this process will succeed?
  - Does it have a high impact on the strategic direction?
  - Does it significantly impact customer satisfaction?
  - Is it antiquated?
  - Does it fall far below best-in-class?
  - Is it crucial for productivity improvement?
  - Will savings from automation be clearly visible?
  - Is the return on investment high?

# BPR Success Stories and Failures

## Success Stories

- Ford cuts payable headcount by 75%
- Mutual Benefit Life improves underwriting efficiency by 40%
- Xerox redesigns its order fulfillment process and improves service levels by 75-97% and cycle times by 70% with inventory savings of \$500 million
- ***Those that succeed take a long time to implement and realize***

## Failures

- An estimated 50-70% of all reengineering projects have failed

# Reasons for BPR Failures

- Lack of support from senior management
  - Poor understanding of the organization and the infrastructure
- Inability to deliver necessary technology
  - Lack of guidance, motivation and focus
- *Fixing* a process instead of *changing* it
  - Neglecting people's values and beliefs
- Willingness to settle for marginal results
  - Quitting too early
- Allowing existing corporate cultures and management attitudes to prevent redesign
  - Not assigning enough resources
- Pulling back when people resist change
  - Trying to change processes without making anyone unhappy

# Some Pitfalls of BPR

- BPR assumes that the factor that limits an organisation's performance is the ineffectiveness of its processes (which may or may not be true) and offers no means of validating that assumption
- BPR assumes the need to start the process of performance improvement with a “clean slate,” i.e., totally disregard the *status quo*
- Companies may become so wrapped up in fighting its own demons that it fails to keep up with its competitors in offering new products or services
  - Example: While AMEX tackled a comprehensive reengineering of its credit card business, MasterCard and Visa introduced a new product—the corporate procurement card. AMEX lagged a full year behind before offering its customers the same service

# BPR and its Relationships to Other Improvement Programs

	<i><b>Rightsizing</b></i>	<i><b>Restructuring</b></i>	<i><b>Automation</b></i>	<i><b>TQM</b></i>	<i><b>Reengineering</b></i>
<i><b>Assumptions questioned</b></i>	Staffing	Reporting relationships	Technology applications	Customer needs	Fundamental
<i><b>Focus of change</b></i>	staffing, job responsibilities	Organization	Systems	Bottom-up improvements	Radical change
<i><b>Orientation</b></i>	Functional	Functional	Procedures	Processes	Processes
<i><b>Role of IT</b></i>	Often blamed	occasionally emphasized	To speed up existing systems	Incidental	Key
<i><b>Improvement goals</b></i>	usually incremental	usually incremental	Incremental	Incremental	Dramatic and significant
<i><b>Frequency</b></i>	Usually one time	usually one time	Periodic	Continuous	Usually one time

# Comparing Business Process Reengineering to Continuous Improvement

Business Process Reengineering	Continuous Improvement
Strong action taken to solve serious problem	Routine action taken to make minor improvements
Top-down change driven by senior executives	Bottom-up change driven by workers
Broad in scope; cuts across departments	Narrow in scope; focuses on tasks in a given area
Goal is to achieve a major breakthrough	Goal is continuous, gradual improvements
Often led by outsiders	Usually led by workers close to the business
Information systems are integral to the solution	Information systems provide data to guide the improvement team

Table 2.3 Pg 68, Stair & Reynold

# Summary

- Porter's value chain
- Role that IS play in creating value in the value chain
- Ways of measuring BIS successes and outcomes
- Philosophies of Business Process Improvement and Business Process Reengineering

# References

- Stair & Reynolds, “Principles of Information Systems”, Chapter 2, 2016.
- Laguna & Marklund, “Business Process Modelling, Simulation and Design, 2<sup>nd</sup> Edition, 2013, Chapters 1-2.