Productivity & Technology

- Technology – its impact on economic productivity?
- Stephen Roach (Late 1980's)
  - found no evidence of an increase in worker productivity associated with the massive increase in investment in information technology.
- Robert Solow (Nobel Prize winning economist)
  - "*We see computers everywhere except in the productivity statistics.*"
  - --->
    - computers perform a variety of tasks
    - these tasks are not done in any particularly new or efficient manner
    - but rather they are only done faster

Productivity & Technology

- **Productivity Paradox**
  - Productivity growth has slowed while investments in information technology have grown dramatically
  - Some take this as proof that information technology doesn't affect productivity.
  - Still valid today
- IT's impact
  - productivity, value to business
  - application of information technology improves productivity

Value of an IT investment

- **Productivity**
  - Using IT allows company to produce more/better/faster output from the same inputs
- **Structure of competition**
  - Using IT can alter the way corporations compete
- **End customer**
  - Ability to provide cheaper and better goods & services as a result of IT and increased competition

IS Improvement to Productivity

- **Increasing efficiency**
  - Business Process accomplished
    - Quicker/ With Fewer Resources and/or Facilities
  - "Doing Things Right"
- **Increased effectiveness**
  - Company offers new or improved goods or services that is valued by the customer
  - "Doing the Right Things"

IS Improvement to Productivity

- Company may choose to focus on one of:
  - Doing things right
  - Doing the right things
- Companies with long term success tend to focus on both effectiveness and efficiency.

Business Processes and Value Chains

- Value chain is a network of value-creating activities
  - Primary activities
  - Support activities
- Contains
  - at least one
  - often many business processes
- Each Business Process adds value
  - Chain of events → Value Chain

Primary Activities

- Five activities
  - Inbound logistics
  - Operations
  - Outbound logistics
  - Marketing and sales
  - Service
- Each stage
  - Accumulate costs
  - Value added to product
  - Difference is the margin
    - price charged – cost of production

Support Activities

- Four activities
  - Firm infrastructure
  - Human resources
  - Technological development
  - Procurement
- Contribute indirectly
  - production, sales & service
- Add value & costs (indirectly)
  - Difficult to calculate margin

Linkages in the Value Chain

- Interactions across value activities
  - Important sources of efficiencies
  - Readily supported by IS
    - new and improved

Understanding the Value Chain

- Help to understand how information systems increase productivity
- Enable the development of more efficient or more effective supporting activities
- Increase the margin enjoyed by company
- Information systems increase productivity by offering new and improved services, primary activities

Organizational Strategy & Industry Structure

- Organizational Strategy
  - Determines organization's goal and objectives
  - Developed from organizational structure
  - Creates the value chain for organization
  - Establishes the structure, features, and functions of IS
- Company's Strategy
  - Directly influenced by the competitive structure of the company's industry

Porter's Five Competitive Forces

- Bargaining power of customers
- Threat of substitution
- Bargaining power of suppliers
- Threat of new entrants
- Rivalry among existing firms

Intensity of each of these
- Determines characteristics of the industry
- Profitability
- Sustainability of the profits

Competitive Strategy

- Porter's four competitive strategies:
  - Cost leadership
    - across industry
    - focused on particular industry segment
  - Differentiation
    - across industry
    - focused on particular industry segment

Competitive Strategy

- Strategy: Cost Leader
  - Develop business activities as economical as possible
- Strategy: Differentiation
  - Provide a net benefit or margin
  - Adding benefits not available from competitors at a premium price

Competitive Strategy

- Goals, objectives, culture, and activities must be consistent with organizational strategy
- IS must facilitate the organization's competitive strategy
- Once strategy formulated
  - Organize & structure organization
  - Implement strategy

Innovation & Information Technology

- Changes (industry structure) occur through innovation
- **Sustaining technologies**
  - Changes in technology that maintain the rate of improvement in customer value
  - Example: vulcanization of rubber → better tires
- **Disruptive technologies**
  - Introduction of a new package of attributes to the accepted mainstream products
  - Example: MP3 format → disruptive to Music Industry

Information Systems & Industry Structure

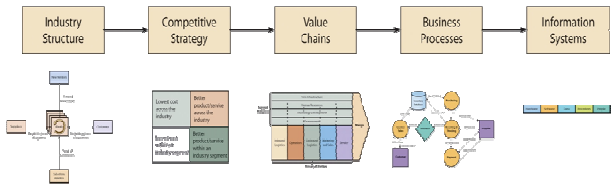
- Consider the importance of technology:
  - Rate of innovation (staggering)
  - ^speed, ^memory → store & retrieve data quicker!
- Examples (competitive advantages):
  - Royal Bank & ATMs
  - RIM & the Blackberry
  - Competitive Advantage → new industry
    - Microcomputers: Microsoft, Intel, Apple, Oracle, Dell
    - Wireless Technology: RIM
    - Social Networking: Facebook, MySpace & Twitter

Diffusion of Innovation

- Theory defined by Everett Rogers
- Innovation: "catches on" or diffuses through it
- The process by which an innovation is communicated through certain channels over time among the members of a social system
- Defines five stages of diffusion:
  - Knowledge, Persuasion, Decision, Implementation, Confirmation

Information Systems & Competitive Advantage

Organizational Strategy Determines Information Systems



Competitive Advantage via Products

- Advantage by
  - Creating new products or services
  - Enhancing existing products or services
  - Differentiating their products or services
- Role of Information Systems

Competitive Advantage – via Business Process

- Locking in customers
  - High switching costs
- Locking in suppliers
  - Easy to connect to and work with
- Create entry barriers
  - Expensive for new competition to enter market
- Establish alliances
  - Establish standards, promote product awareness
- Reducing costs
  - Increased profitability

Sustaining Competitive Advantage through Information Systems

- Competitors often react to innovations by replicating the technology (hardware and software)
- The more common place the information technology becomes, the less competitive advantage information technology provides
- If this is true about technology, it isn't true about information systems since it includes procedures and people along with information technology
- In business, people make the difference!

Long-term competitive advantage

- Companies must successfully integrate many technology systems with people and procedures in the organization
- While competitors might be able to purchase the technology, it takes time for people to gain the necessary experience and skill
- Matching the entire set of information systems is a high barrier for companies with less experience and success in integrating people and technology

Consider…

- Knowledge of how information technology affects productivity
  - provides an understanding of where technology can be used to increase effectiveness and efficiency
- Knowledge of business processes
  - helps the understanding of where technology can add value for the customer
- Long-term advantage is provided by people learning how to incorporate new technology into company procedures