

MANAGEMENT OF TECHNOLOGY

ROLE OF TECHNOLOGY IN THE CREATION OF WEALTH

by

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Chapter Outline

- Evolution By Age of Technology
- The Creation of Wealth
- The Evolution of Production Technology
- The Evolution of Product Technology
- Technology Role in Organization
- Technology and National Economy



Lesson Outcome

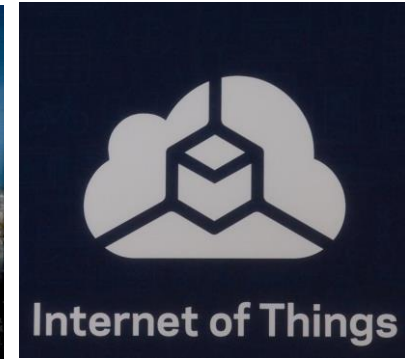
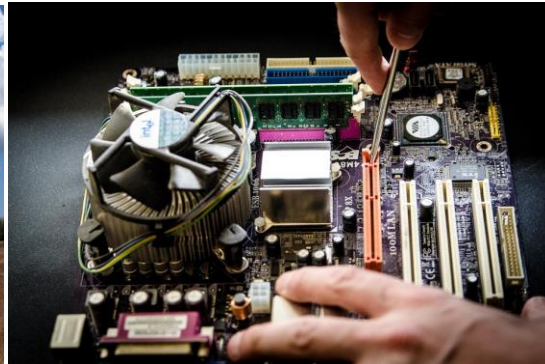
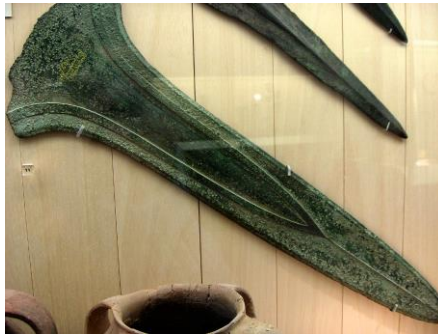
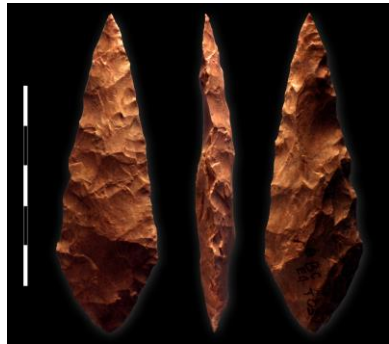
- Identify the evolution of technology
- Explain how technology role is important to the creation of wealth



Evolution By Age Of Technology

What is the dominant technology in each age?

Stone Bronze Iron Steam power Electricity nuclear power Electronics Space age Information Biotechnology



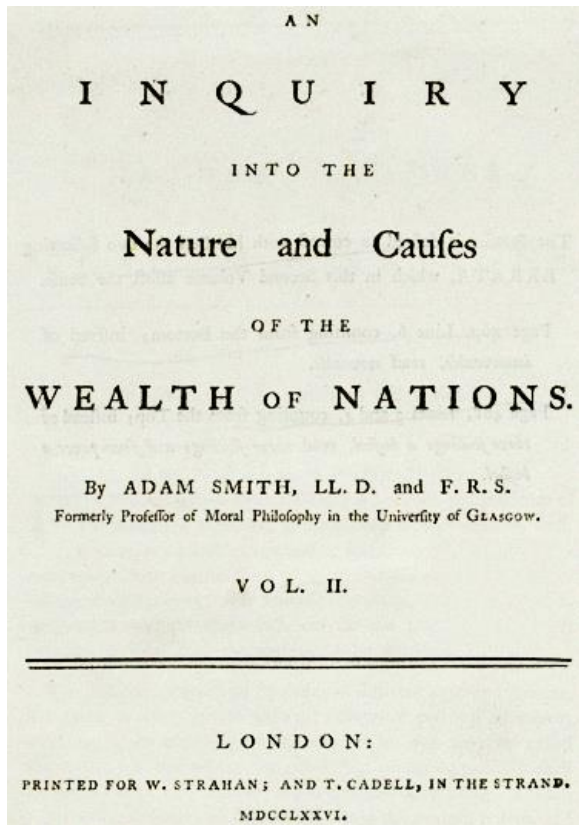
The Creation of Wealth



Technology → Customer needs →
Product/Service → Commercialization →
Wealth to Firm → **Goal to society achieved!**



Adam Smith



Robert Merton Solow

- Born August 23, 1924 (93 years old)
- Education from Harvard University &
- Field : Macroeconomics
- Technical progress contribute to economic growth
- Developing new technology will increase the growth of economy in the long run



Joseph Schumpeter

- Born: 8 February 1883
- German economist
- Theory of Economic Development
- **Schumpeter stressed on:**

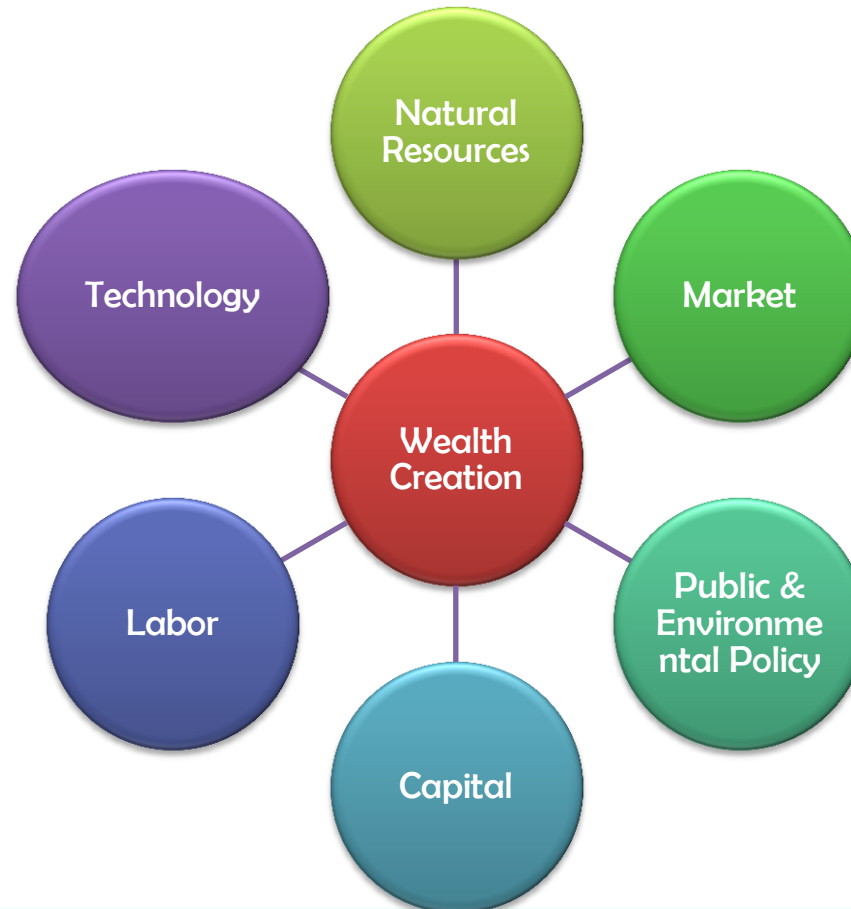
1st : Innovation very important element

2nd: Improving continuously for economic development and growth of economy



The Creation of Wealth

Factors that contribute to the wealth-creation system

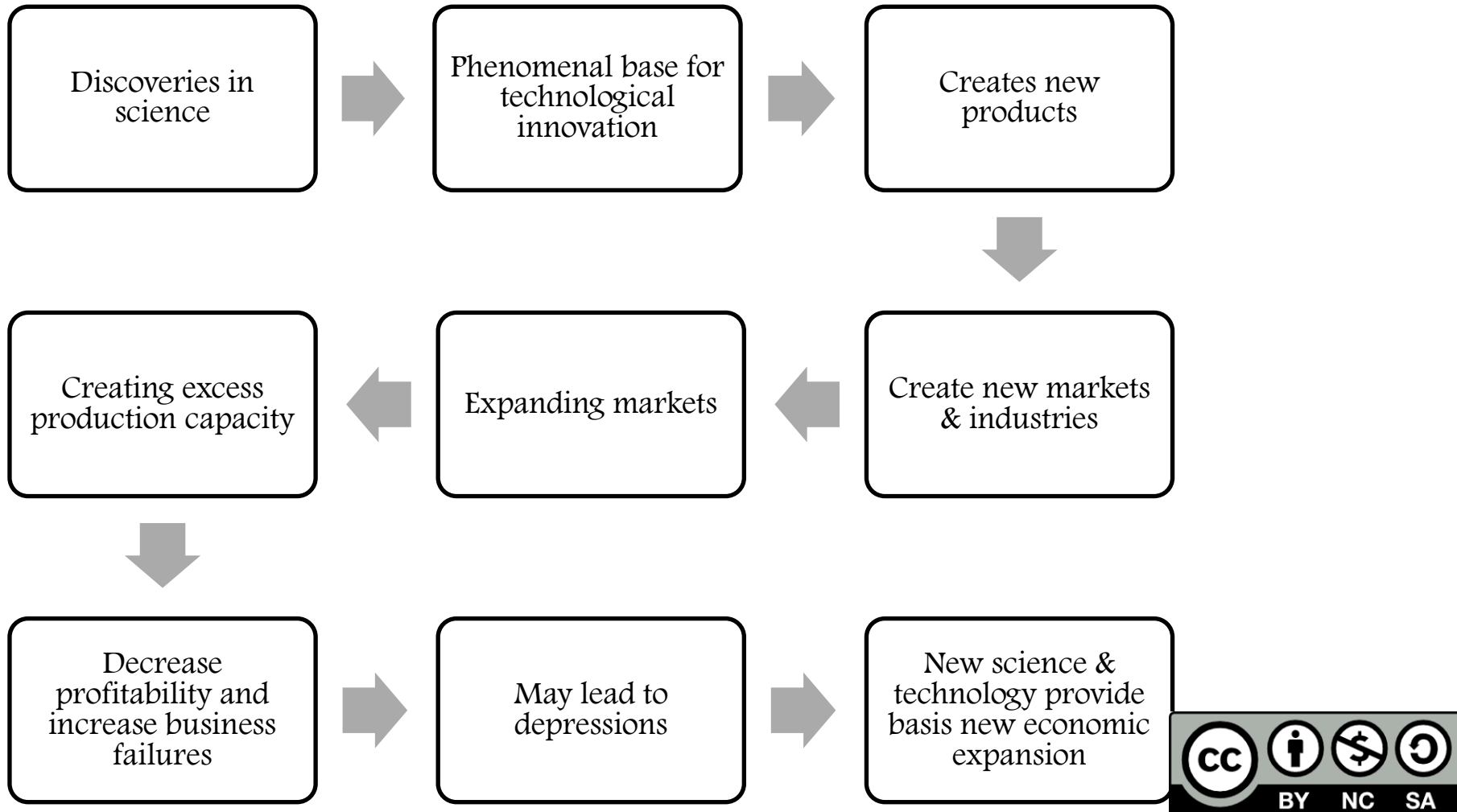


The Long-Wave Cycle

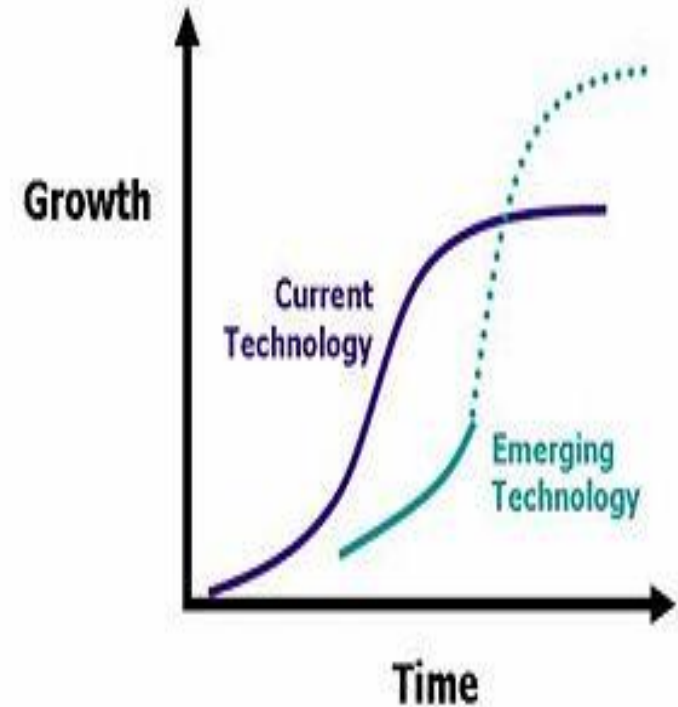
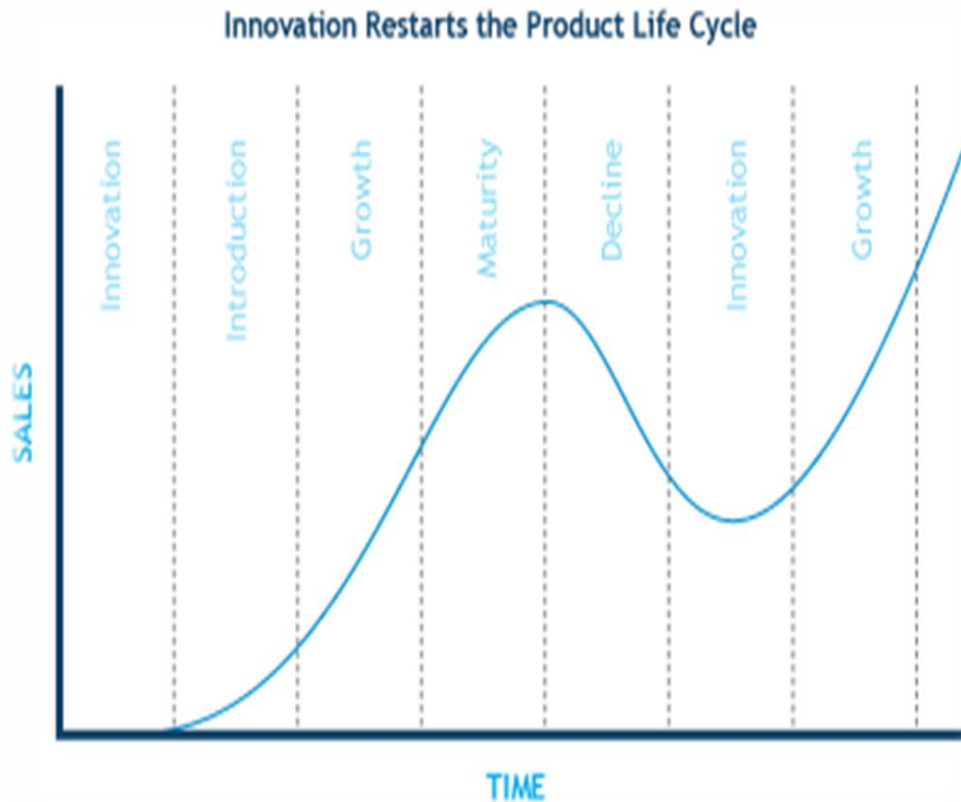
- Improvement in productivity is vitally important to an economic system – technology is the driver
- Emerging and new technology spurs economic expansion known as the long-wave or long economic cycle
- Betz (1987) suggested that the process behind it is an interaction between technology, business opportunities the new technology creates and an eventual overbuilding of capital after the technology ages.



The Long-Wave Hypothesis (Betz, 1987)



The Long-Wave Hypothesis (Betz, 1987)



Source : Khalil (2000). Management of Technology.
McGraw-Hill Education (India) Pvt Limited



The Long-Wave Hypothesis (Betz, 1987)

- Cutting-edge technology is behind the long waves of economic activity.
- High-technology products displace old technology when there is a justification for performance over cost.
- Technology life cycles of industries affect long cycles in the national economy.
- New technology comes from science and science comes from new discoveries in nature.
- A new technology, when created, will begin a new wave.



Evolution of Production Technology

1880

- Agriculture Society – manual labor dominated
- The Industrial Revolution – factory concept was born

1880 >

- Scientific Management – introduced by Frederick Taylor
- Times Studies & Mass Production
- Division of Labor, Labor Unions
- Standardization, Assembly Line – introduced by Henry Ford

1900 >

- Organizational Concepts
- Motion Study – introduced by Frank & Lillian Gilbreth
- Piecework



Evolution of Production Technology

1920 >

- Production Control & Management Planning
- Queuing, Wage Incentive, Management Planning
- Statistical Quality Control (SQC) – introduced by Deming & Juran

1940 >

- Tool Design, Human Factors
- Productivity, Engineering Economy
- Inventory Theory, Layout, Material Handling

1950 >

- Computerization, Reliability
- Operational Research
- Statistical Analysis, Network Techniques



Evolution of Production Technology

1960 >

- Automation, System Design, Teleprocessing
- Information Systems, Decision Theory, Simulation
- System Engineering, Optimization Theory

1970 >

- Control Theory, Large Scale System
- Total System Design, Social System, Cybernetics
- Behavioral Theory, Personal Computers

1980 >

- Technology Revolution
- Management of Technology



Evolution of Product Technology

1793 ~ 1829

- Cotton gin (Whitney)
- Practical Steamboat (Fulton)
- Steam Powered Locomotive for passengers and freight

1830 ~ 1900

- Telegraph (Morse), Improved plow (Deere)
- Vulcanized Rubber, Internal Combustion Engine
- Telephone (Bell), Radio (Marconi)

1901 ~ 1939

- Air Conditioner, FM Radio
- First Flight (Wright Bros.), Model T (Ford)
- Helicopter, Jet Engine, Liquid-Fueled Rockets



Evolution of Product Technology

1940 ~ 1949

- Color TV, Electronic Appliance
- Digital Computer, Instant Camera
- Jet Airliner, Transistor, Supersonic Flight

1950 ~ 1969

- Sputnik 1 (USSR), NASA, Apollo XI
- Integrated Circuit, Operable Laser, Fiber Optics
- Telstar Satellite, First Man in Space

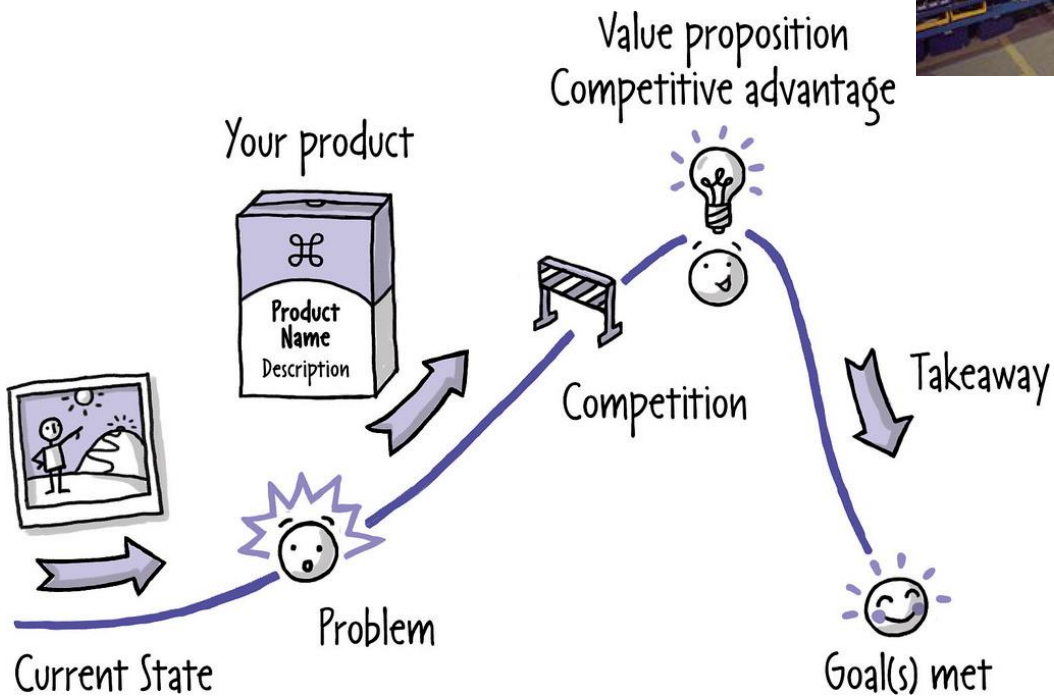
1970 onwards

- Microprocessor, Recombinant DNA
- Laser Printer, MRI Scanner, Space Shuttle
- Scanning Tunneling Microscope



Technology Role in the Organization

- Provides sustainable competitive advantage
- Increases Productivity
- Create Profits



Technology Role in the Organization

Protect from obsolescence

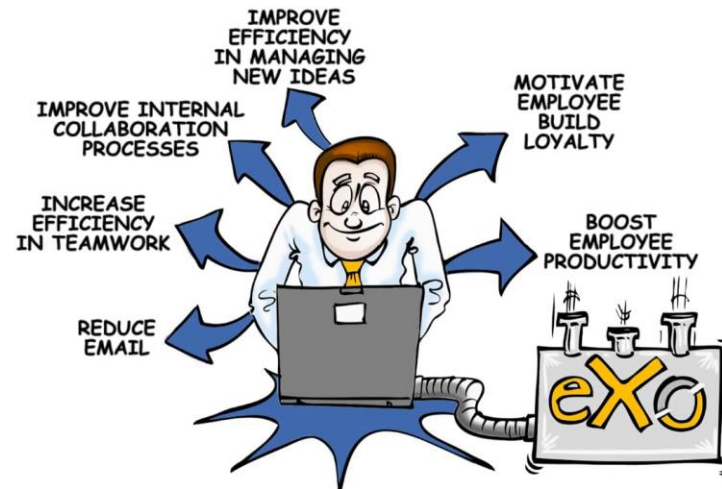


Achieves Business-Market Fit



Technology Role in the Organization

- Enhances Motivation and Potential of Employees
 - *technology encourages workers to work smart*
- Engine of Economic Growth
- Improves Quality of Life



Technology & National Economy

United States of America	Tigers of Asia
1. High technology	1. Medium and low levels of technology
2. High cost of labour	2. Low cost of labour
3. 1970s and early 1980s – Financial crisis	3. Better job in managing tech
4. Turnaround in the US economy	4. Wealth = tech+production+smart work



Credit to:
Tarek M.Khalil
Ahmad Nazif Kamar