

MANAGEMENT OF TECHNOLOGY

TECHNOLOGICAL INNOVATION

by

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Chapter Outline

- Introduction
- Concept and Nature of Innovation
- Types of Innovation
- Sources of Innovation
- Models of Innovation
- Innovation Process
- Influencing Factors



Lesson Outcome

- Explain the concept, components and characteristics of innovation
- Describe the models and sources of innovation
- Know the stages in the innovation process
- Identify the factors that contribute to successful innovation



Introduction

It requires:

Great creativity
Investing in R&D



Tech
creation

Novel
service/
product

Market



Concept and Nature of Innovation

Invention → technological innovation

Technological innovation:

- Multidisciplinary activities
- Changes ideas/scientific knowledge into real applications that gives good impact to the society

Characteristics of innovation:

- Procedure or product that is tangible
- It is new to the organization
- Not done accidentally
- A challenging change
- Aiming at predicting benefit to the organization
- Public in its effect



Components of Innovation

Physical, Material or Hardware

- Computer
- Machinery

Functional or Process Mechanism

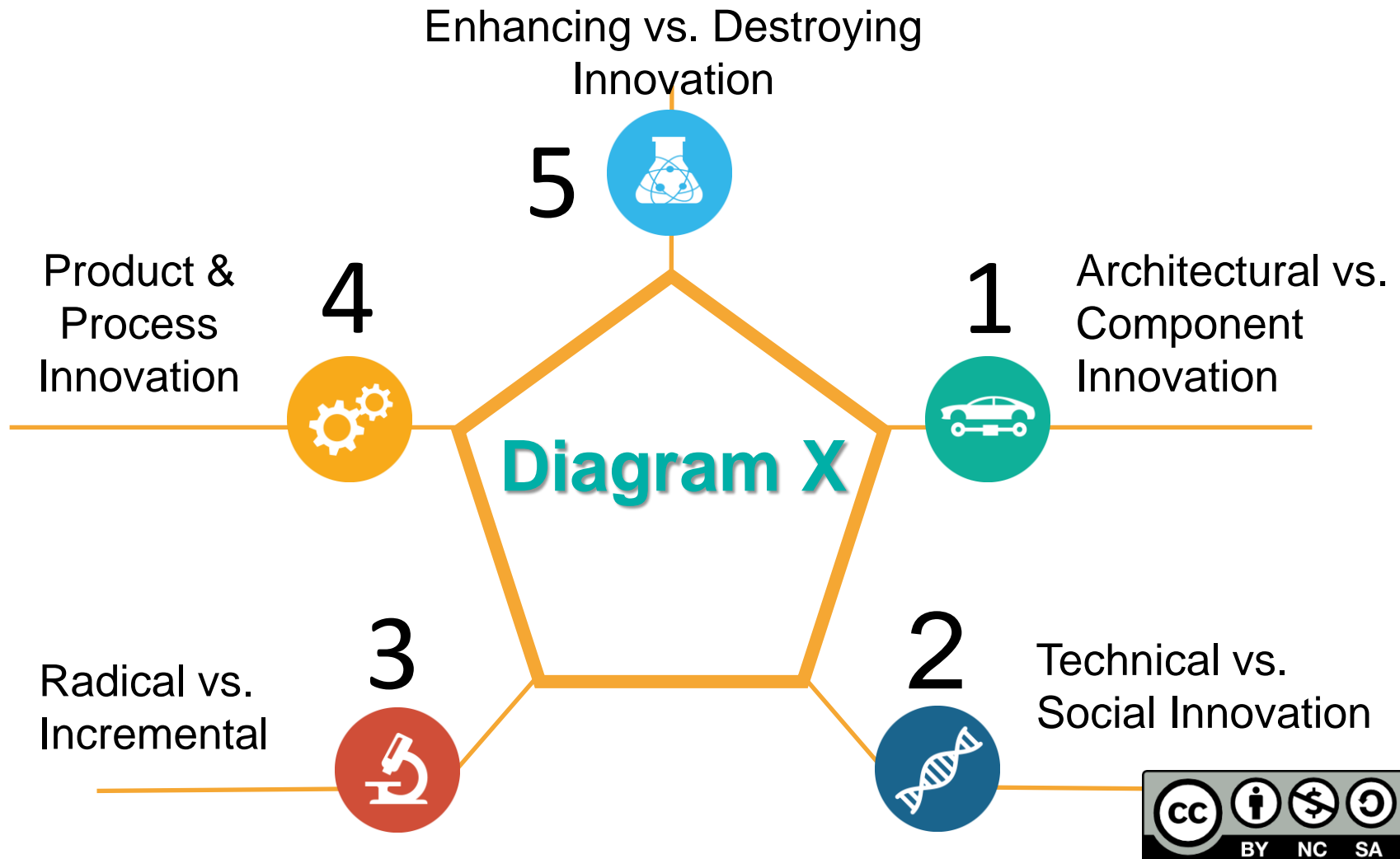
- Software
- Process Reengineering

Knowledge Component

- Manual
- Operating instruction

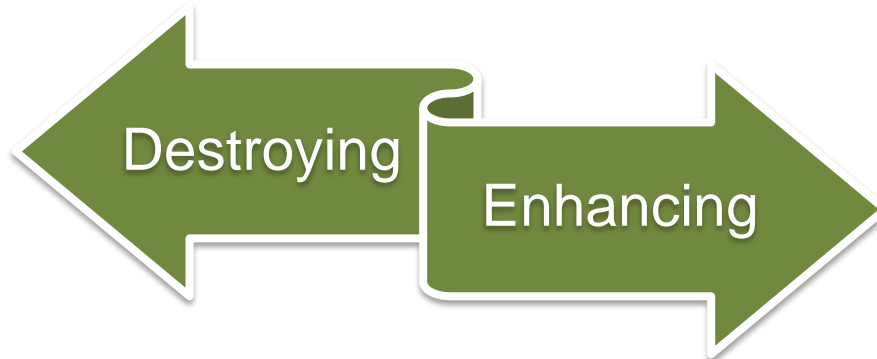
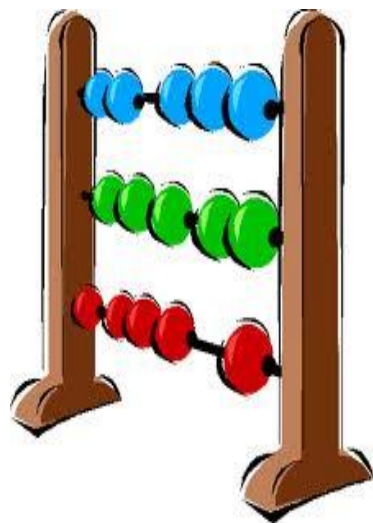


TYPES OF INNOVATION



Enhancing vs. Competence Destroying

Competence enhancing innovation is based on knowledge and skills that already exist



Architectural vs Component Innovation

Architectural

- Changing of Overall Architect of the product.



Component

- Changing of one or more component of the product.



To make a mouse wireless, we need to add a power supply section and transmitter and receiver circuit.



Architectural vs Component Innovation

Component Innovation



Component in a system is changed



Example : seat of a bicycle is filled with gel

Architectural Innovation



Change the total design



Example: safety bicycle from high-wheel bicycle



Technical vs Social Innovation

Technical Innovation

Management, that is the 'useful knowledge' that enables man for the first time to render productive people of different skills and knowledge working together in an 'organization'

Social Innovation

Solution that is original to a social problem
More efficient, effective and sustainable to the society



Radical & Incremental Innovation

RADICAL INNOVATION

May mean as combination of something new & the degree of differences

Totally different than the previous innovation and new worldwide

New technologies that requires different manufacturing & service processes is also a radical one

Eg: Wifi charging in Samsung Galaxy S IV



Radical & Incremental Innovation

INCREMENTAL INNOVATION

Technology could be similar to existing products

Technology is known to world

Technologies that requires slightly different manufacturing & services than old or previous ones

Eg: small changes in configurations of mobile phones



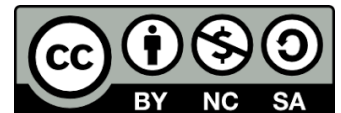
Product & Process Innovations

1. Product Innovation

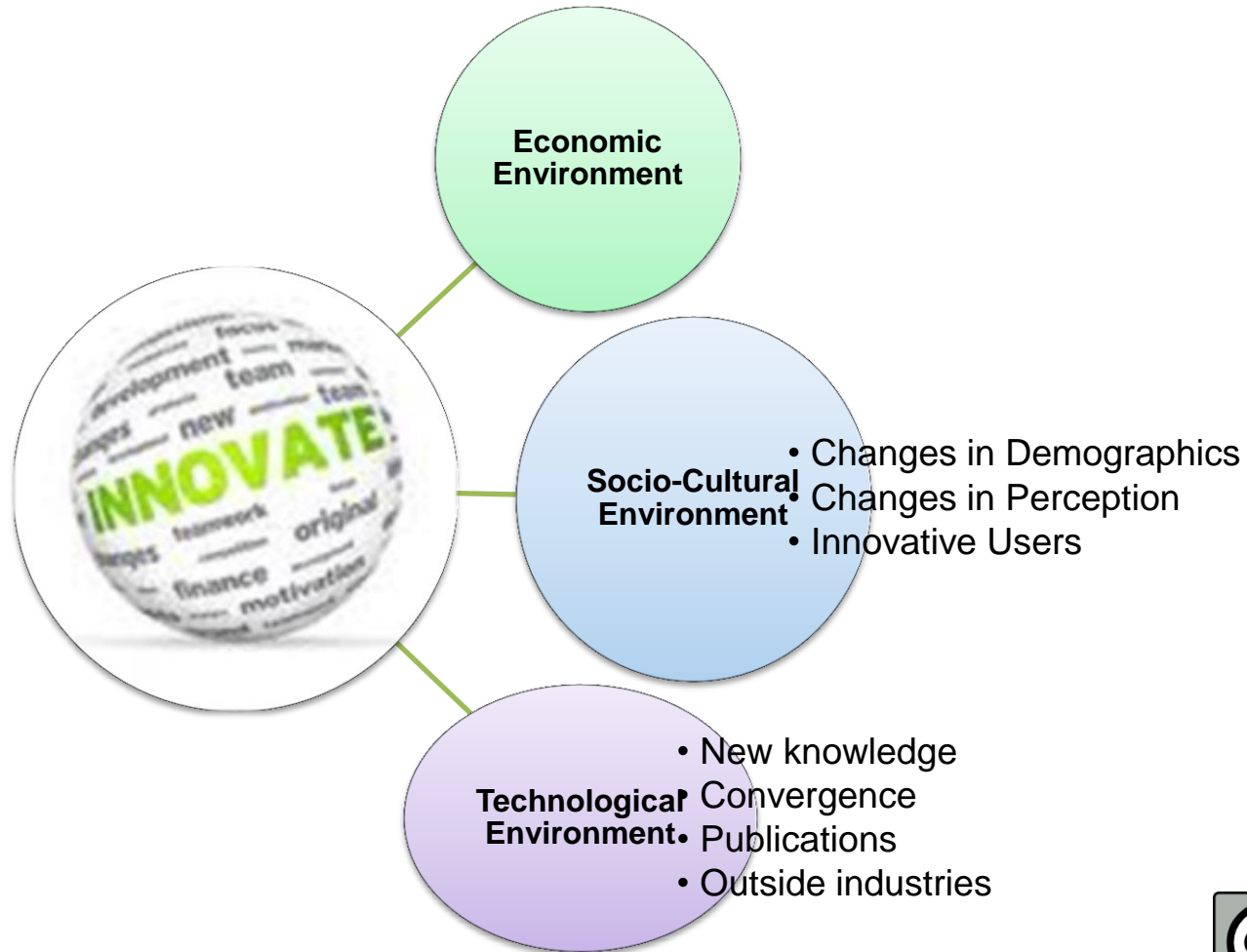
Improvements in existing products or creating entirely new products

2. Process Innovation

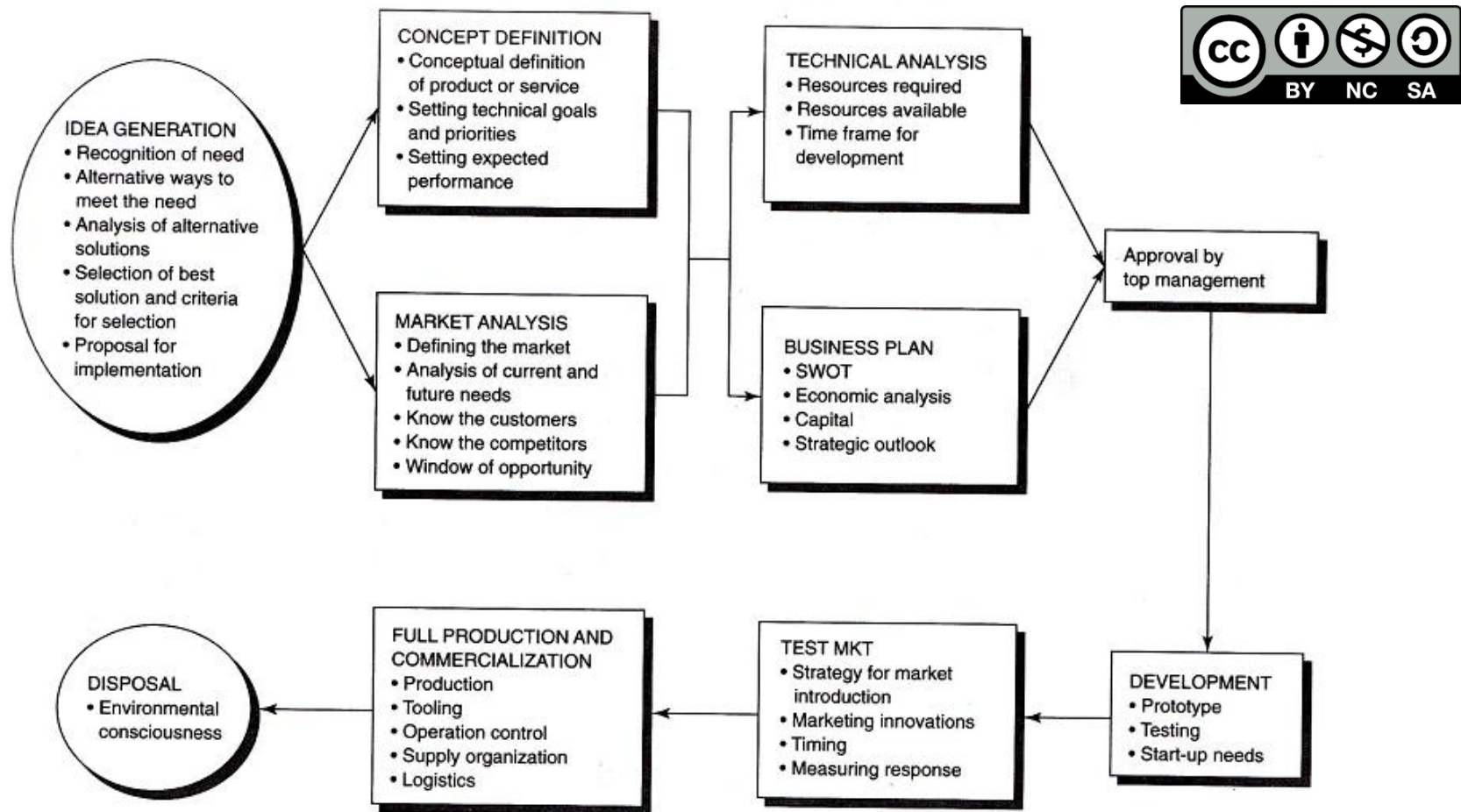
Involve changes in existing process or adopting a entirely new process



Sources of Innovation



Models of Innovation

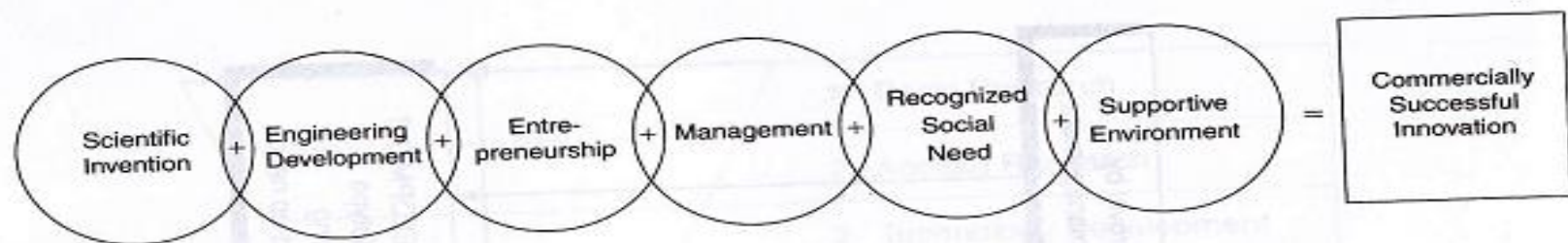


Fundamental components of the model are the same but the nature of the business may dictate variations in implementation techniques.

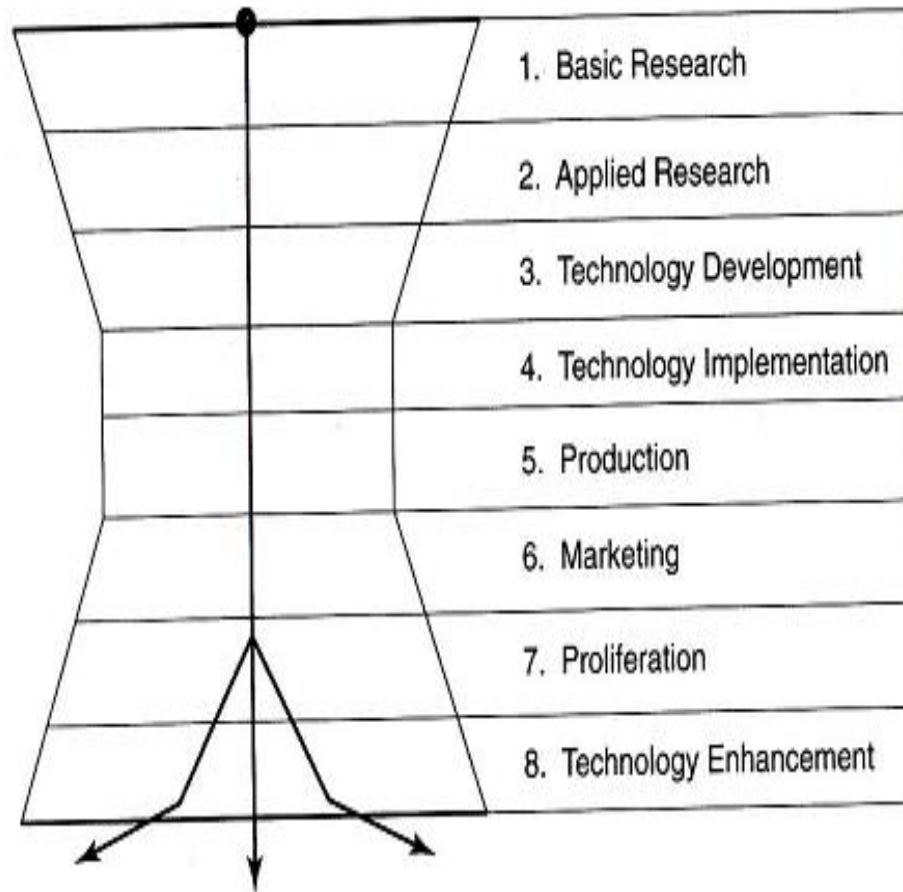
Models of Innovation

Martin (1994) illustrate the technological innovation process as a chain equation:

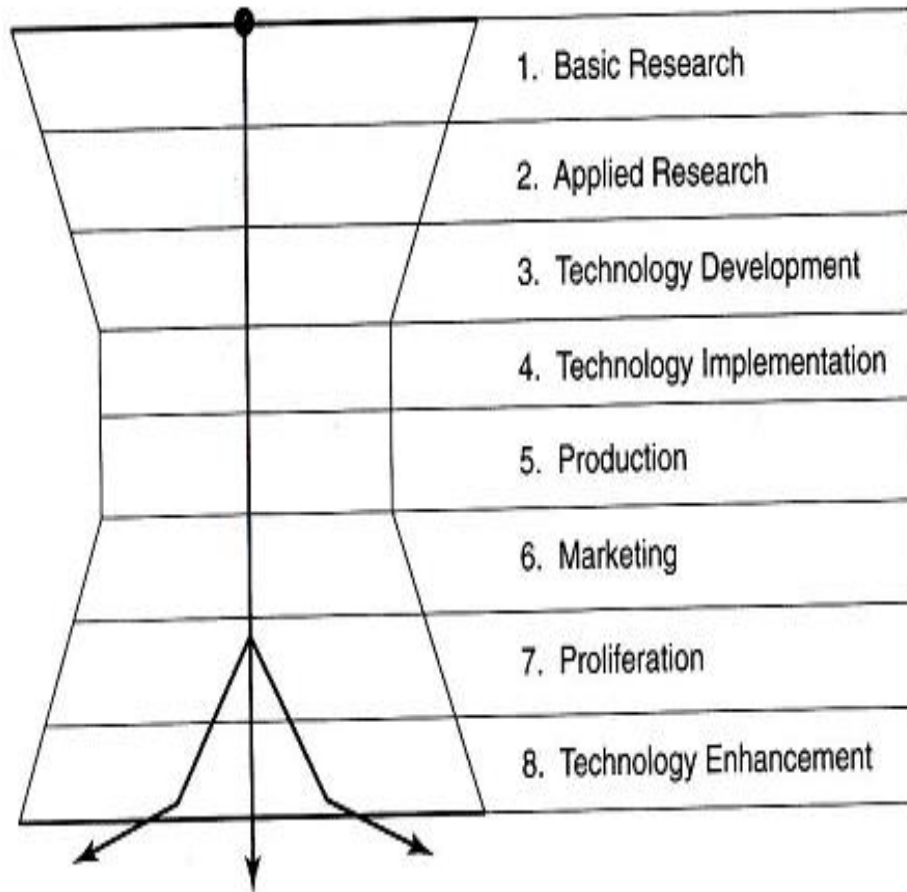
Reveals the important role of entrepreneurship in connecting ideas to the marketplace



Stages of Technology Innovation



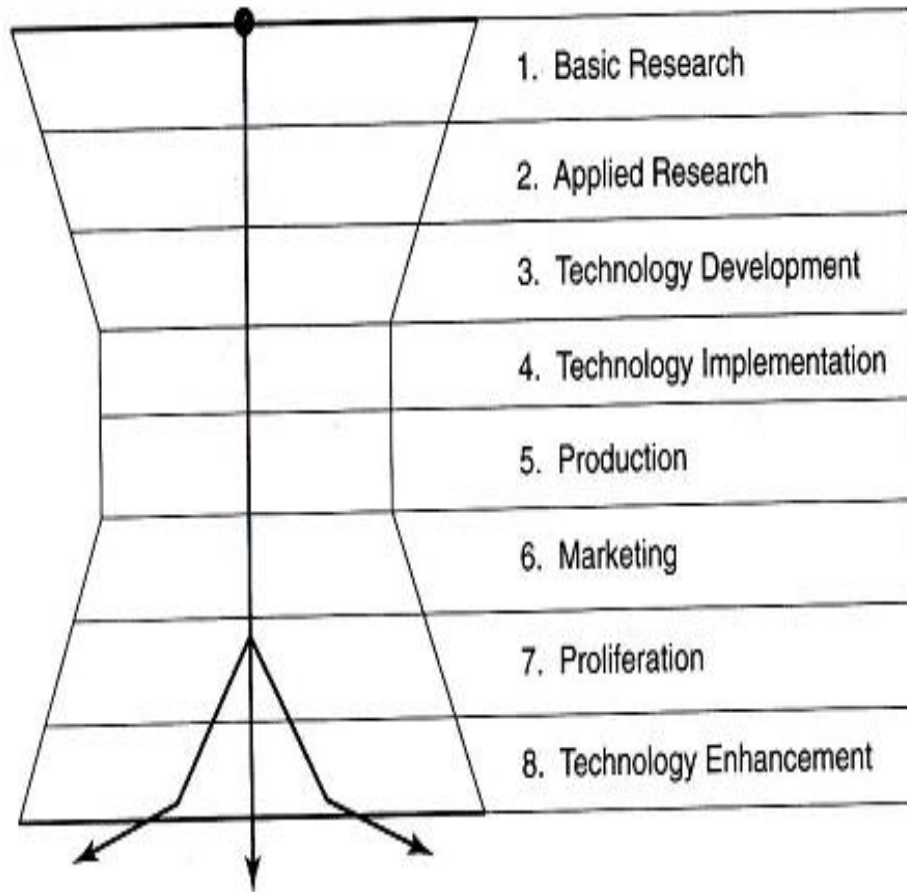
Stages of Technology Innovation: Basic Research (1)



- Fundamental knowledge by observing and understanding
- Takes time
- No specific application



Stages of Technology Innovation: Applied Research (2)



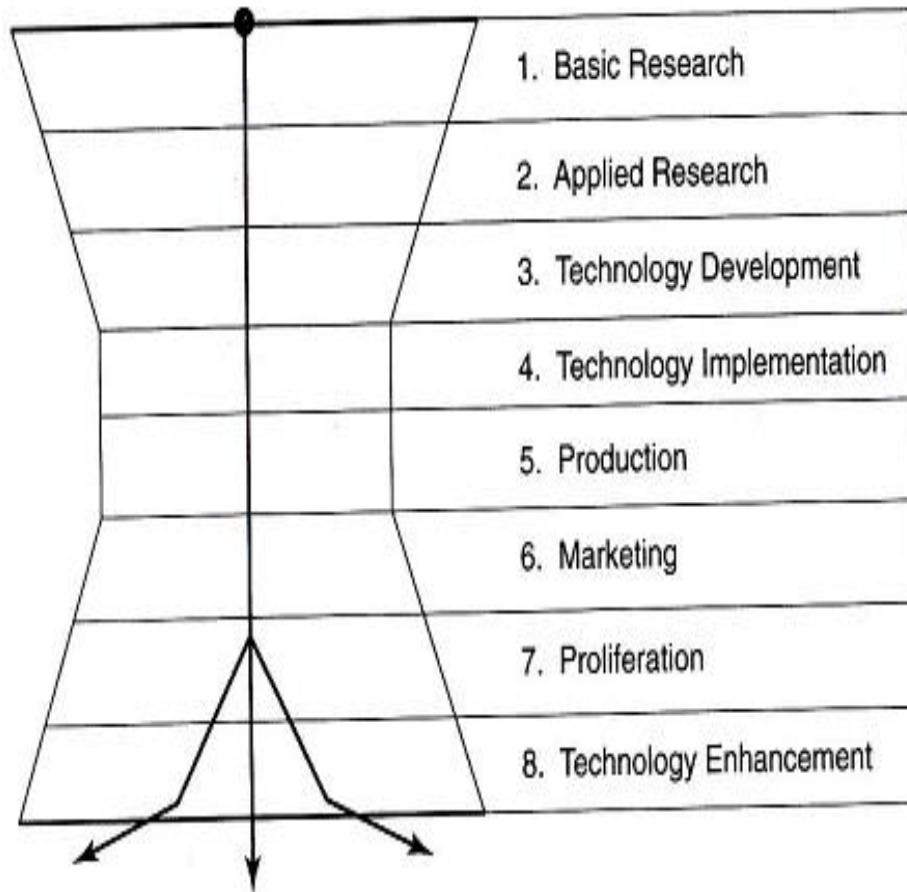
- Problem are solved through this method

E.g 1: research conducted to develop a drug for treating a known disease

E.g 2 : How can obesity be prevented?



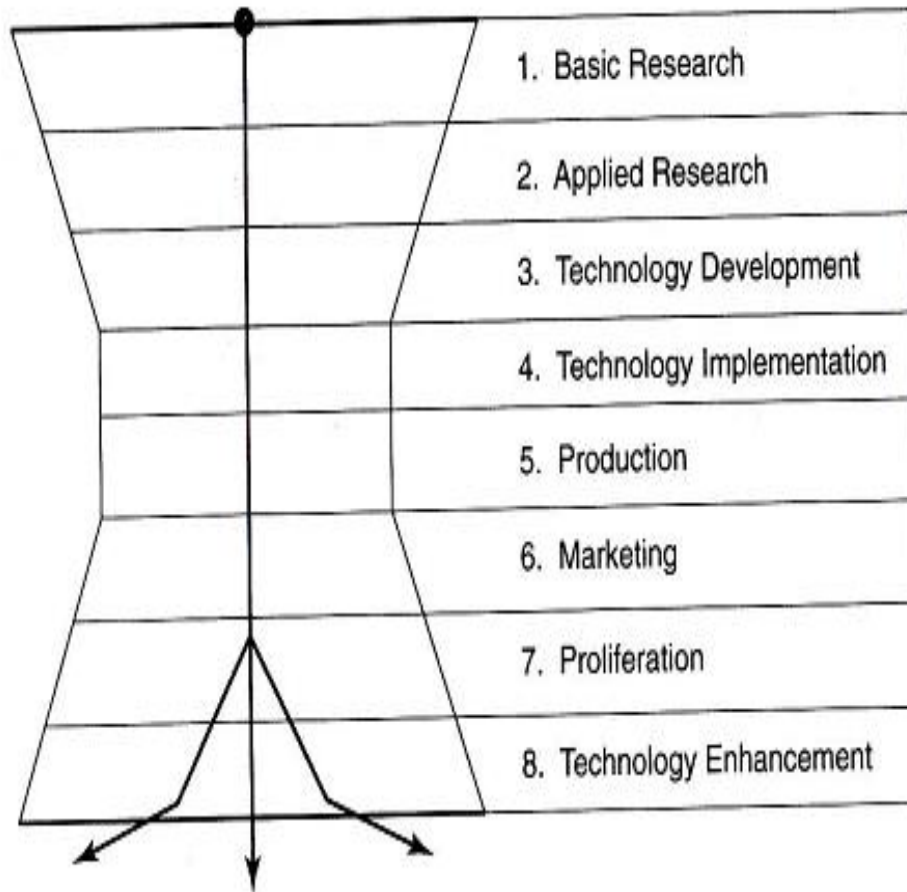
Stages of Technology Innovation: Technology Development(3)



- Ideas for technology are based on research
- Ideas are converted into reality
- Prototype
- If prototype is not working, review and improve
- If prototype is working, real product would be made



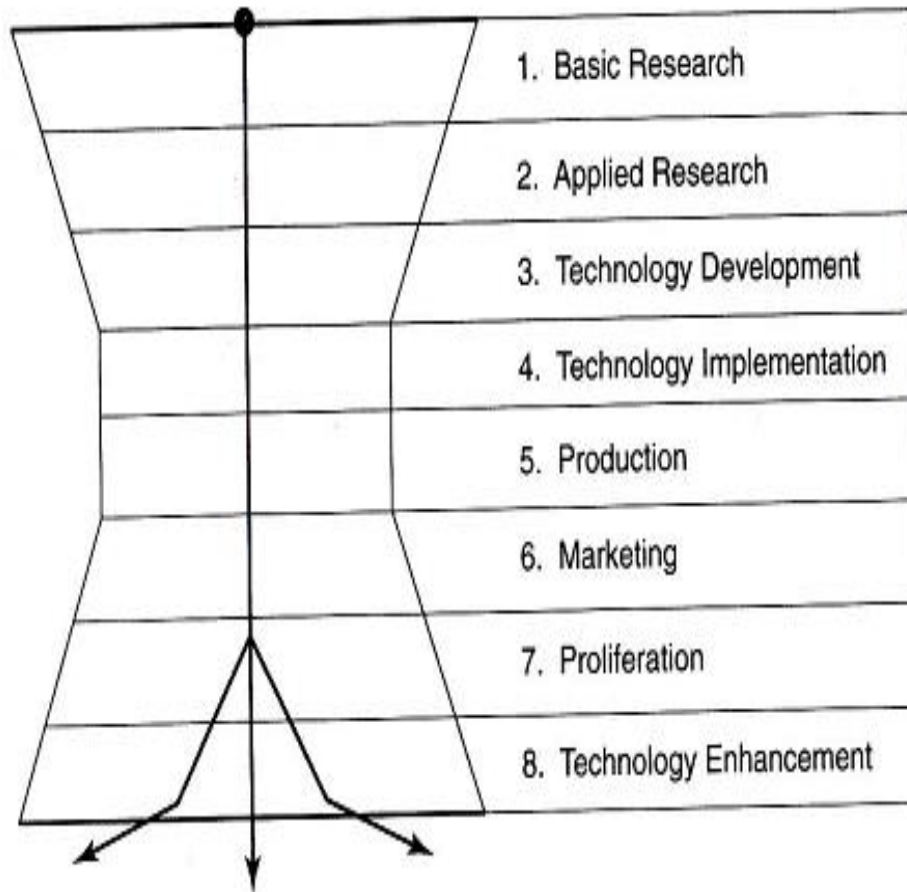
Stages of Technology Innovation: Technology Implementation (4)



- By commercializing into the market
- First utilization by the society
- Taking into account cost, safety and the environment



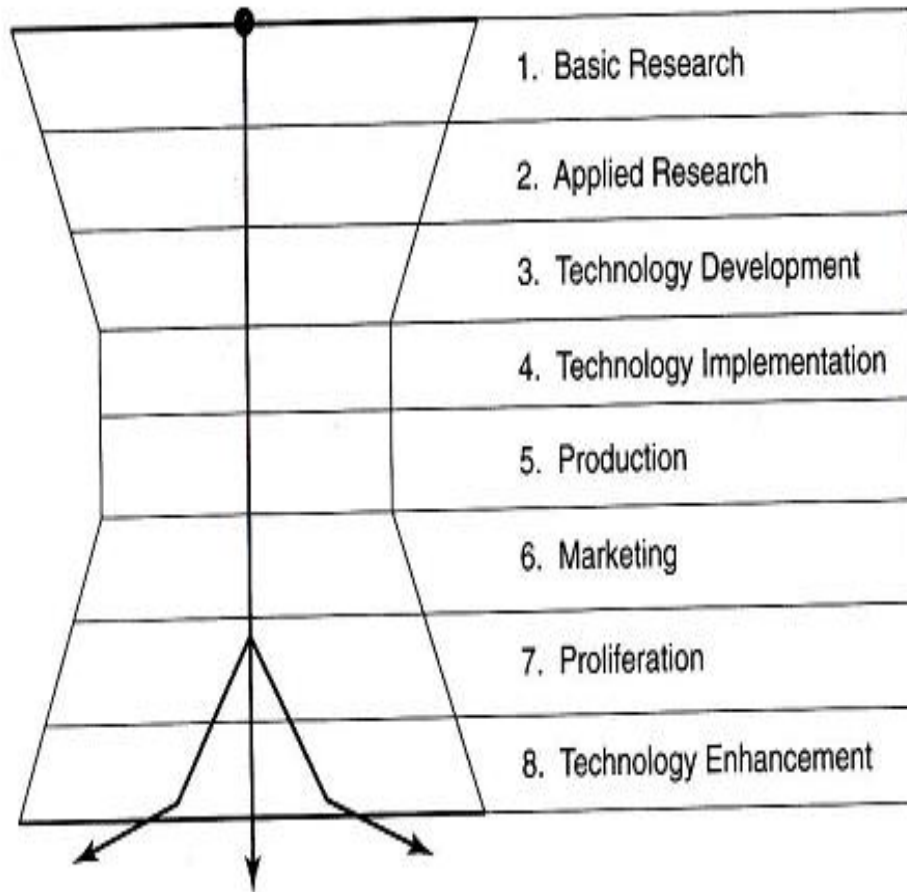
Stages of Technology Innovation: Production (5)



- Design concepts are transferred into products or services
- Included all kind of resources such as material, labor, machine, modal and technology.
- Under control by quality control, six sigma .



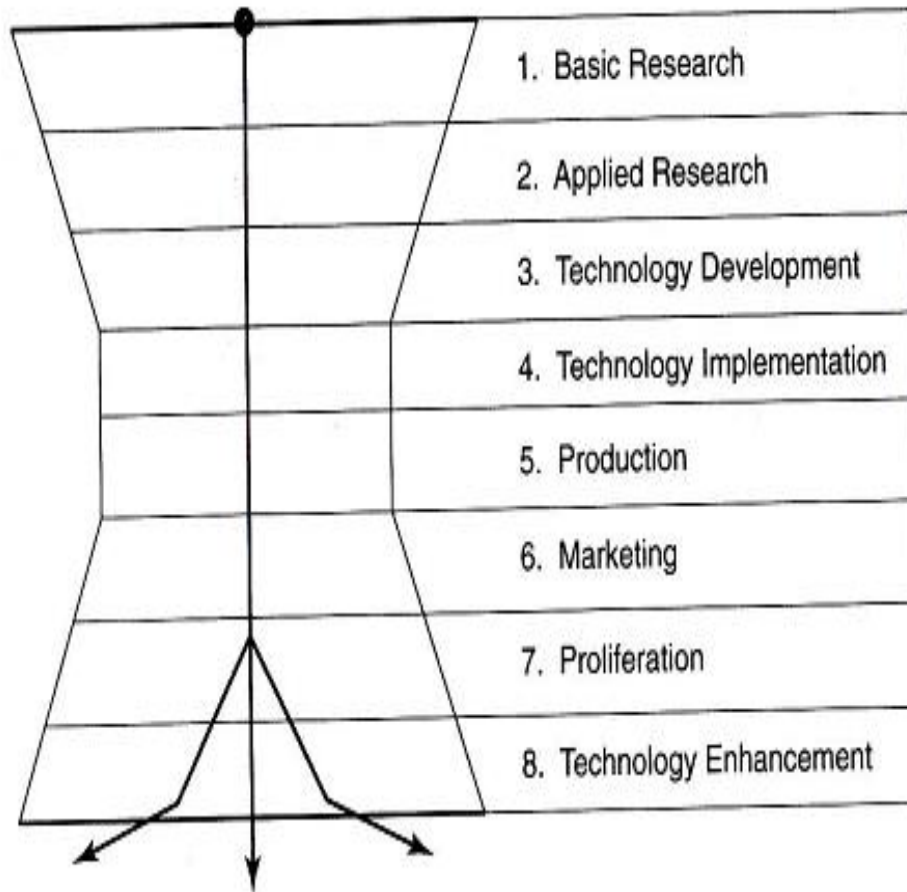
Stages of Technology Innovation: Marketing (6)



- Series of activity that ensures that customers accept and use the technology
- It includes:
- Promotion. To raise customer awareness about a product or brand
 - Distribution strategy by ensuring products reach the retailers, consumers by locating the right target market, transportation and warehouse



Stages of Technology Innovation: Proliferation/Diffusion (7)



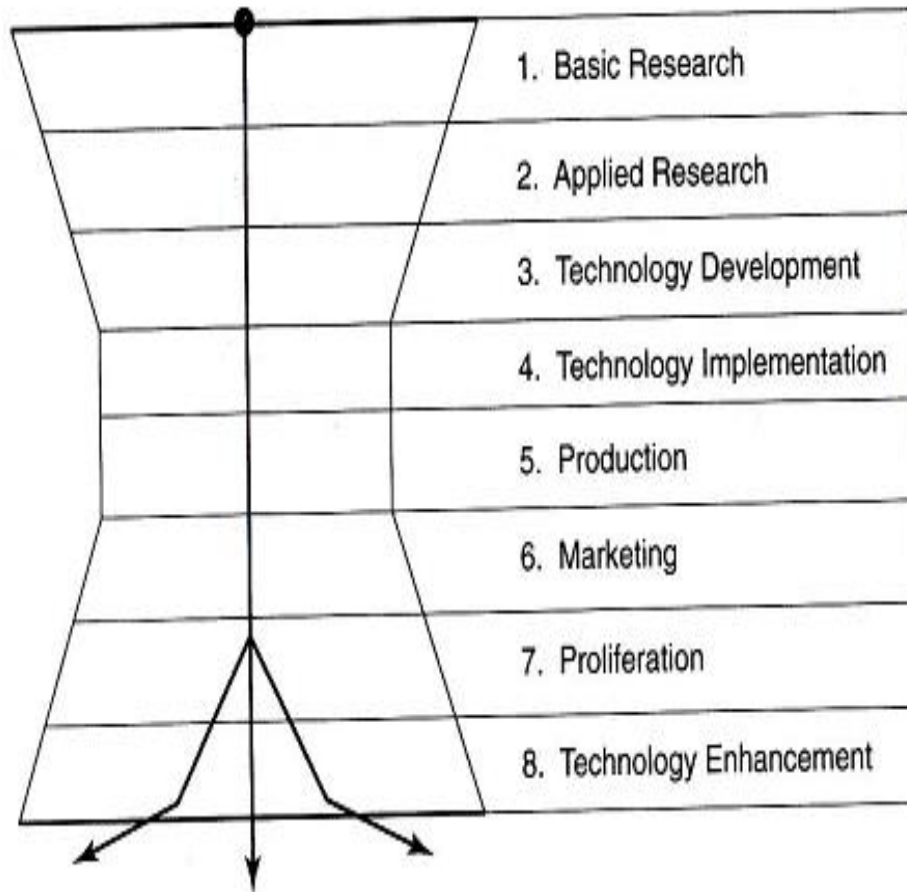
- Running activities that the technology is used widely in the marketplace

Strategies includes:

- Charge higher prices for customized versions
- Raise entry barriers by saturating product niches
- Exploit economies of scale and scope



Stages of Technology Innovation: Technology Enhancement (8)



- Need to find ways to ensure a consistent competitive advantage.

Example: Design for sustainability to increase the life cycle of the technology.



Summary

Technological innovation ~ innovation

Technological innovations may arise from sources within or outside the organization

Innovation process has been viewed as a sequence of separable stages

Two basic variations of innovation models are technology push and market pull



Credit to:
Tarek M.Khalil
Ahmad Nazif Kamar