



# **Seminar**

# **STMIK & STIE IM**

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# Management of Technology

The Key to Competitiveness and  
Wealth Creation

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- Technology can be defined as all the knowledge, products, processes, tools, methods, and systems employed in the creation of goods or in providing services.
  - Technology is the way we do things.

# Technology consists of :

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- # Hardware : Struktur phisik dan bentuk logis dari suatu peralatan atau mesin yang digunakan untuk melakukan suatu tugas.
- # Software : Pengetahuan bagaimana menggunakan hardware sesuai dengan tujuan tertentu.
- # Brainware : Beberapa alasan logis untuk menggunakan teknologi dengan cara-cara tertentu (know-why).
- # Know-how : Pembelajaran atau perolehan pengetahuan atau keahlian teknis, yang berhubungan dengan bagaimana menjalankan sesuatu dengan baik.

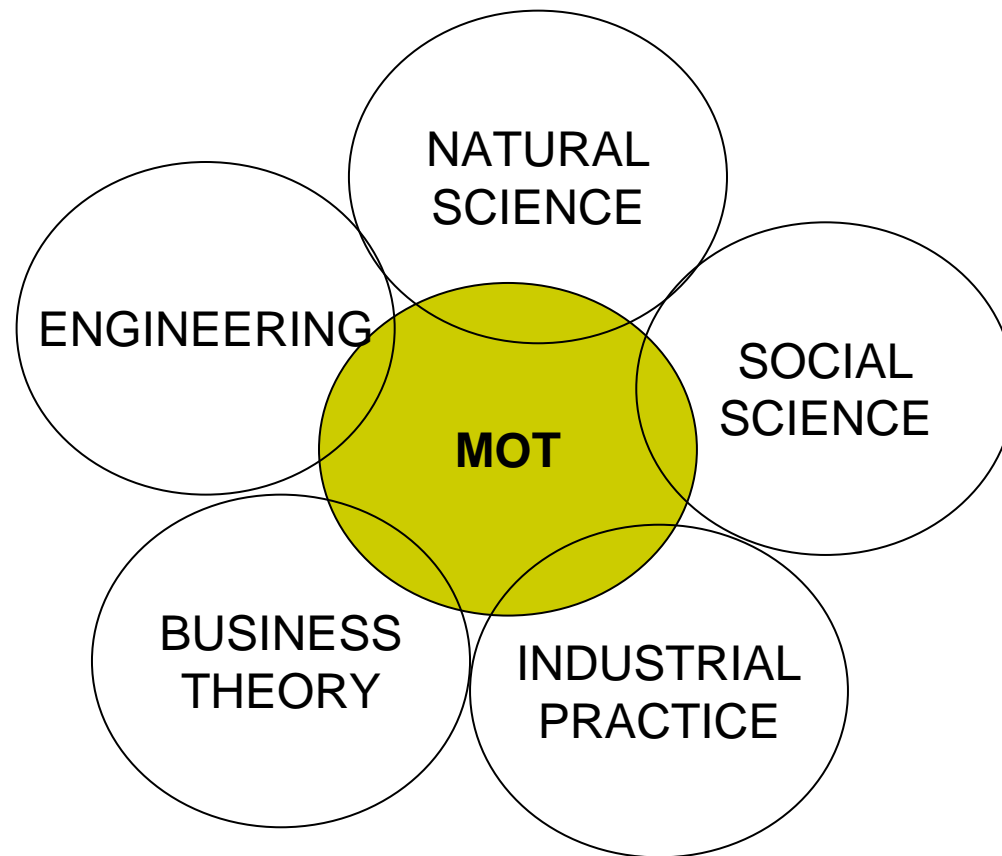
# Classification of Technology :

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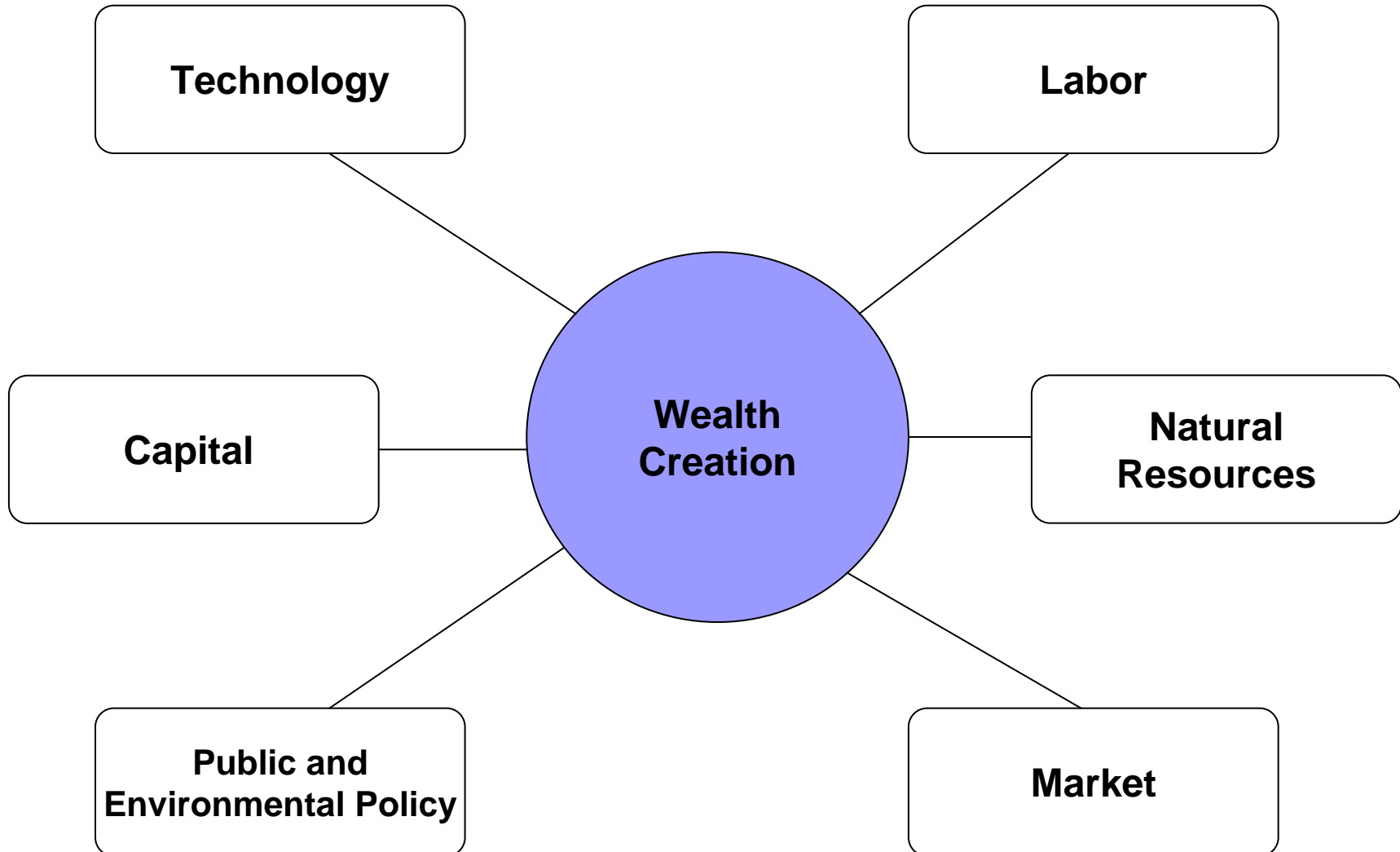
- New Technology
- Emerging Technology
- High Technology
- Low Technology
- Medium Technology
- Appropriate Technology
- Codified versus Tacit Technology

# Management of Technology

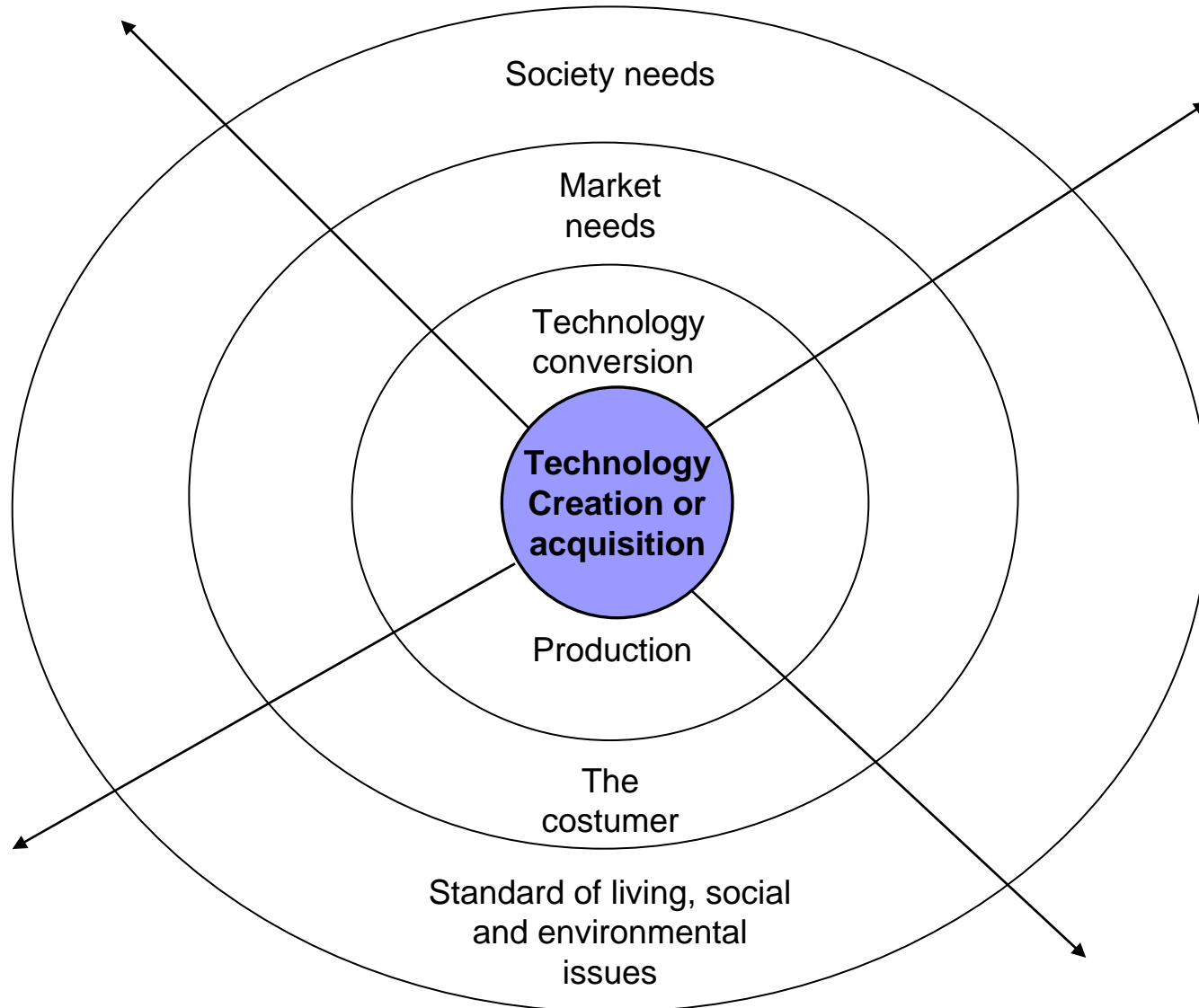
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# Factors Contributing to Wealth Creation



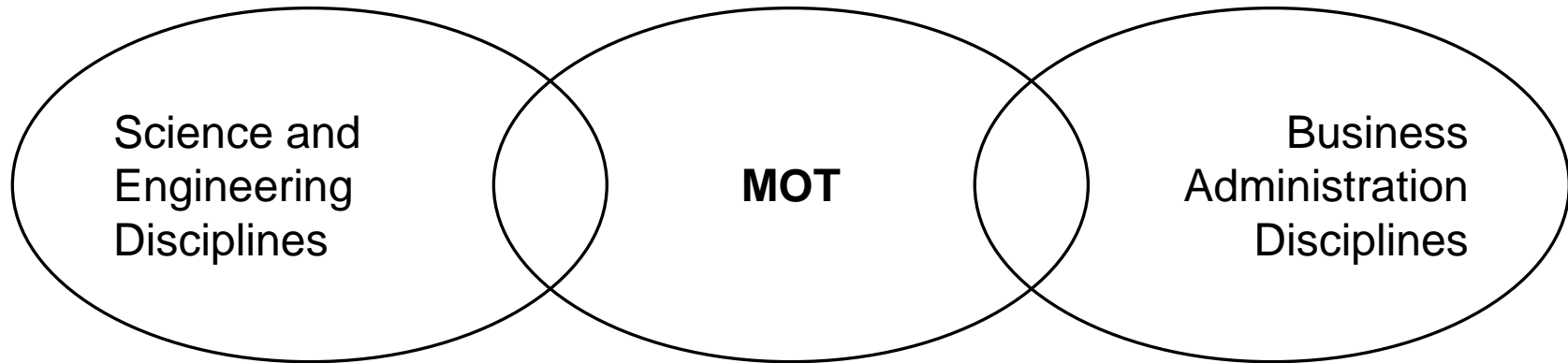
# Spinning Out Technology



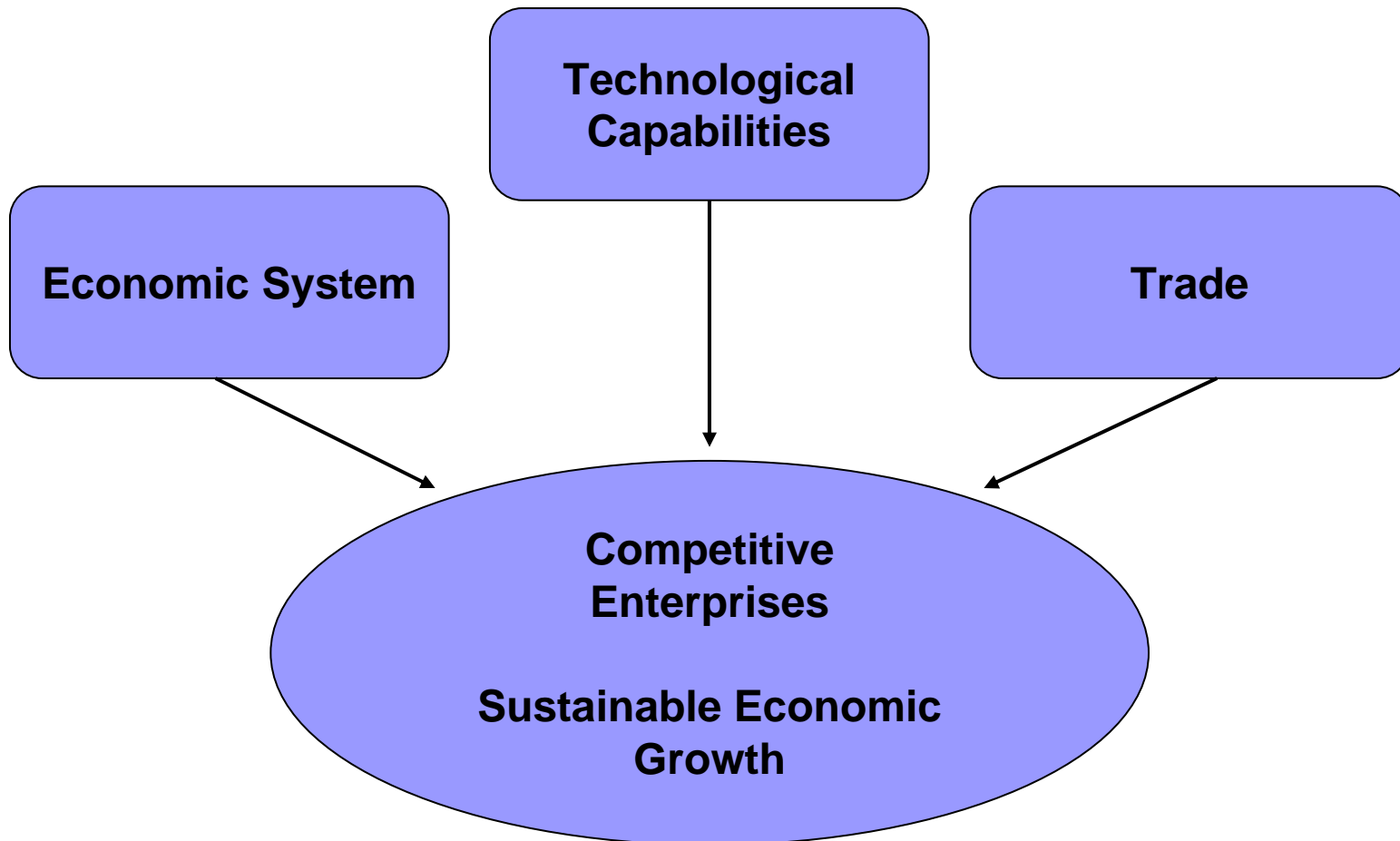


# Core Knowledge Needed for MOT

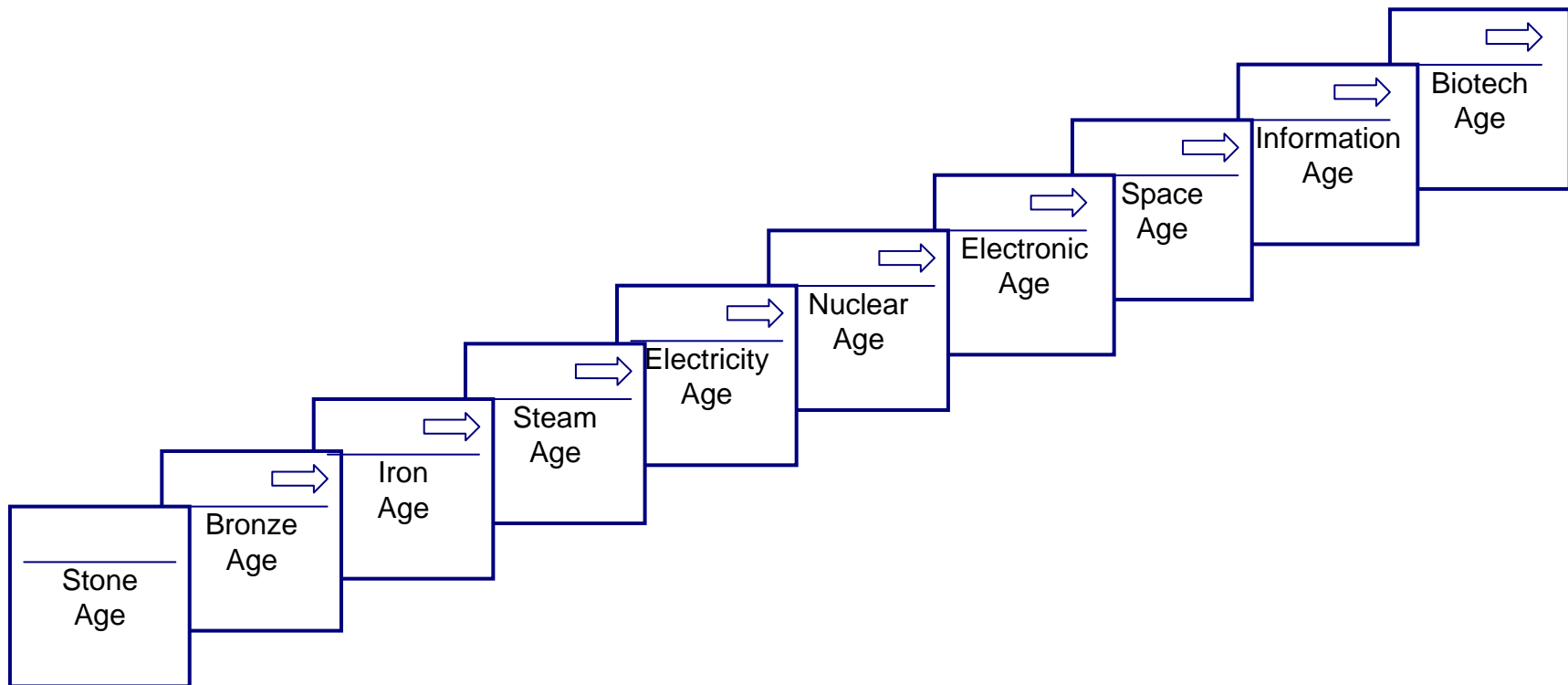
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# Technology and Sustainable Growth



# Evaluation by Age of Technology



# The Creation of Wealth





# Technology and National Economy

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- ❑ Developed economics are identified with countries that properly use technology for the creation of wealth.
- ❑ When technology is applied to add value to resources and provide marketable products and service, wealth is increased.
- ❑ The management of technology creates wealth and prosperity.
- ❑ Certainly managing technology well at the high end may create a greater reward in terms of improvements in the standard of living.

## Khalil (1993)

However, proper management of low or medium-level technologies can still create a certain competitive advantage and be effectively used wealth creation.

# The Creativity Factor

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- Technology is an expression of human creativity.
- Managing technology involves continuous effort in creating technology, developing novel products and services, and successfully marketing them.
- This requires great creativity along with a system designed to exploit it.
- It also requires an investment in research and development.

# Invention

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- Is either a concept or the creation of a novel technology.
- It could be a product, a process, or a previously unknown system.
- Invention occur as a usults of human ingenulty and imagination. They occur only sporadically, by chance or through trial and error to satisfy a need.
- In modern times most inventions have followed scientific discoveries.

# Innovation

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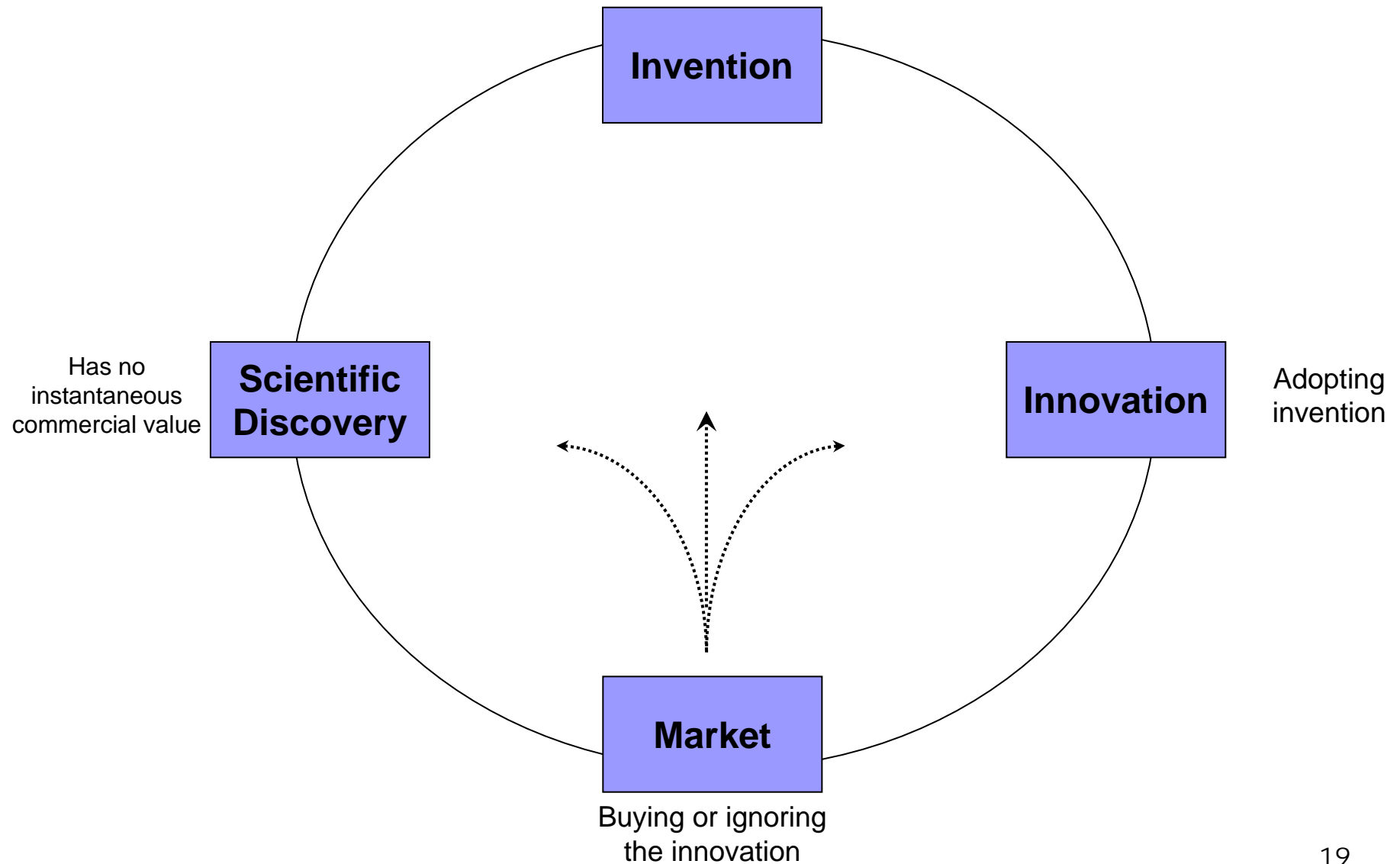
- Involves the creation of a product, service, or process that is new to an organization.
- An innovation may be a change in industrial practice, which improves productivity.
- The innovation process involves integration of existing technology and inventions to create a new or improved product, process, or system.
- Innovation is can be classified either as :
  - Radical, or revolutionary, innovations,
  - Incremental, or evolutionary, innovations.

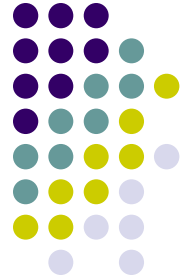
# Creativity and Innovation

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- Innovation is associated with the creation of value or the satisfaction of a customer need.
- Creativity is the engine of innovation.
- The essence of creativity is combining two or more ideas to arrive at an entirely new one.

# Bringing Innovation to Market





# Productivity, Effectiveness, and Competitiveness

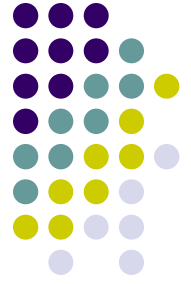


# Productivity

- Productivity = 
$$\frac{\text{Output (GDP)}}{\text{Input (total hours worked)}} = \text{\$/hour worked}$$

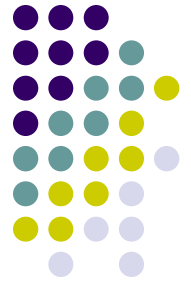
- On a national level, productivity is a very important factor in raising the standard of living.
- Standard of living is often associated with a population's per capita income.

$$\text{Per capita income} = \frac{\text{GDP}}{\text{Total population}} = \text{\$/person}$$



# Effectiveness

- Implies the ability to achieve desired goals;
- Is about producing or being capable of producing results;
- A manufacturing organization is effective if it increases sales, achieves a large market share, and increases profitability.



# Competitiveness

- Indicates the standing of a country or a company in relation to a known group.
- The competitiveness of a company compares the firm's output to the outputs of its competitors and indicates its standing in the marketplace.
- A company is competitive when it maintains a profitable status while producing a product or service that meets the tests of the marketplace.



# The New Paradigms

- Drastic changes in the business environment.
- There is a search for new paradigms that are suitable for this new environment.
- A paradigm is a frame work of ideas that establishes the general contex of analysis.
- MOT is technology as a creator of wealth.
- An overriding concern is the highly dynamic conditions that exist for manufacturing and service organizations. Conditions dictates by changes in technology and by the global business environment.

## Changing Trends in Industry

Factor	Traditional	New
Life cycle	Long life cycles	Short life cycles
Innovation	Few innovations	Continuous innovations
Competition	Expected competition Competitors are the enemy Cooperation not allowed	Stronger competition Alliance with competitors accepted
Market	Expected market Local market	Uncertain market Global market
Quality	Quality is desirable	Quality is imperative (a hygiene factor, a survival factor)
Production	Mass production Produce in large lots No commitment to suppliers Large inventories Fixed manufacturing	Customized production Produce in small lots Suppliers are partners Reduce inventories (JIT) Flexible manufacturing
Organization	Large corporations vertically Integrated companies Bureaucratic organizations Financial methods control the organization	Smaller plants; companies rely on outsourcing Nimble organizations Financial methods to serve the organization's objective



# Resources

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- Methods of Performance Assessment
- The Measure of Performance of a Technology
- The Measure of Benefits from R&D Activities
- New Tools for Optimizing Decisions
- Alliances as Alternatives to Rivalry



# The Business Environment

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- The integration of technological and strategic plan.
- The impact of third parties on technological change.
- Increasing the user's influence in the selection and application of technologies.
- Decreasing social resistance to the introduction and adoption of technology in the workplace
- Distributing the benefits from new technologies to gain acceptance



# The Structure and Management of Organizations

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- Factors leading to reorganization of technological activities in firms.
- Evaluating the impacts of reorganization on technical activities.
- The effects of different organizational structures on the efficiency of the product development cycle.
- Facilitators and inhibitors of technological innovations and transfers within organization.
- Documentation of the decision processes leading to organization changes.



# Project Planning and Management

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- Project portfolio selection
- Initiation of innovative ideas in organizations
- Human problems in project management
- Postmortem analyses of projects

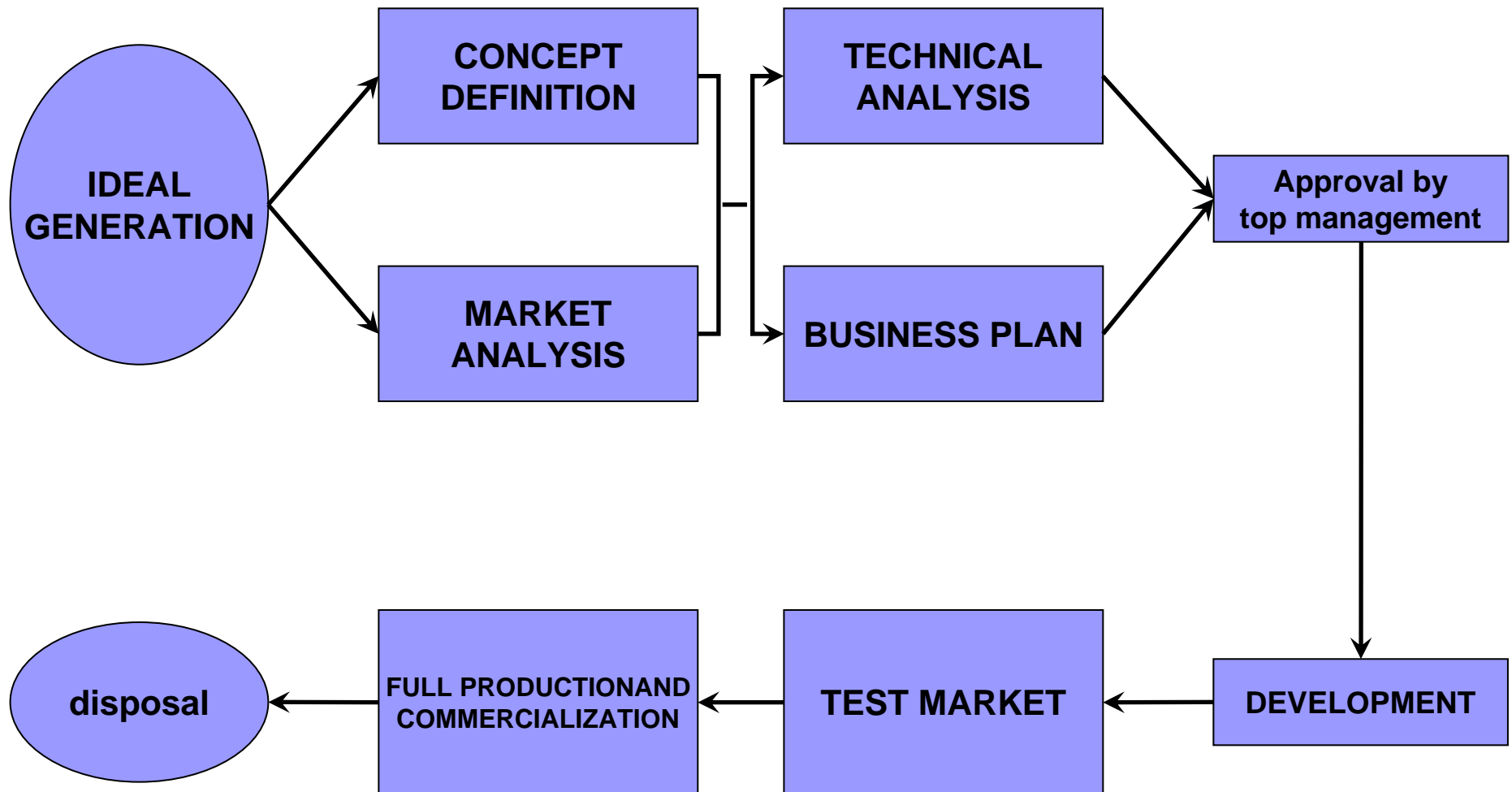


# Management of Human Resources

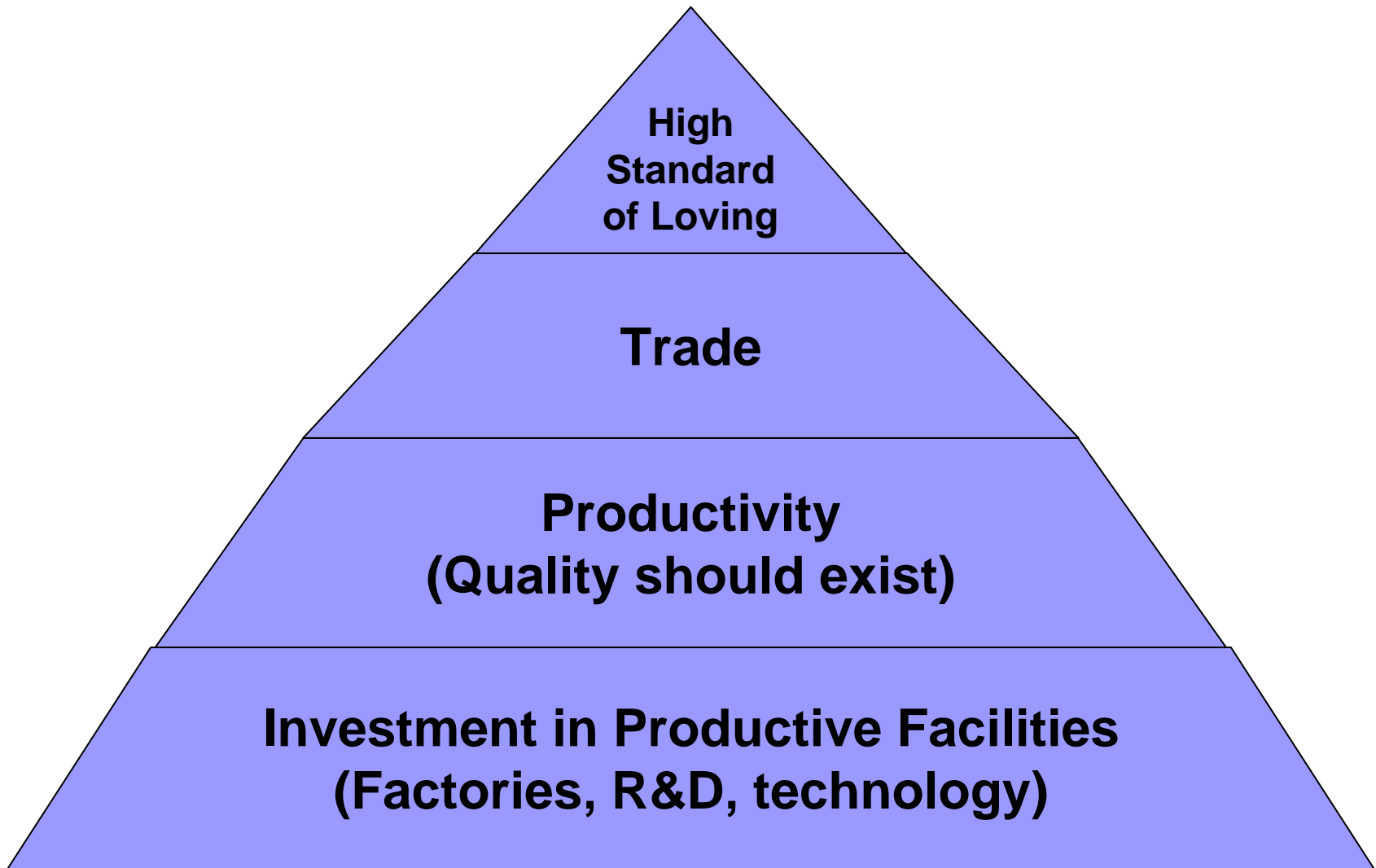
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- The effects of technological change on the skill requirements of the workforce.
- Matching and training the skilled workforce to meet the requirements of new technologies.
- Obsolescence of professional staff and the continuing need for professional development activities.
- The role technological gatekeepers and internal entrepreneurs.
- Social consequences of technological

# The Process of Technological Innovation



# The Competitiveness Pyramid

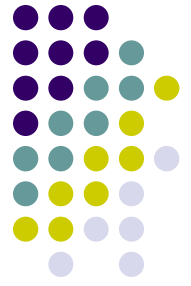




# The strategic management model

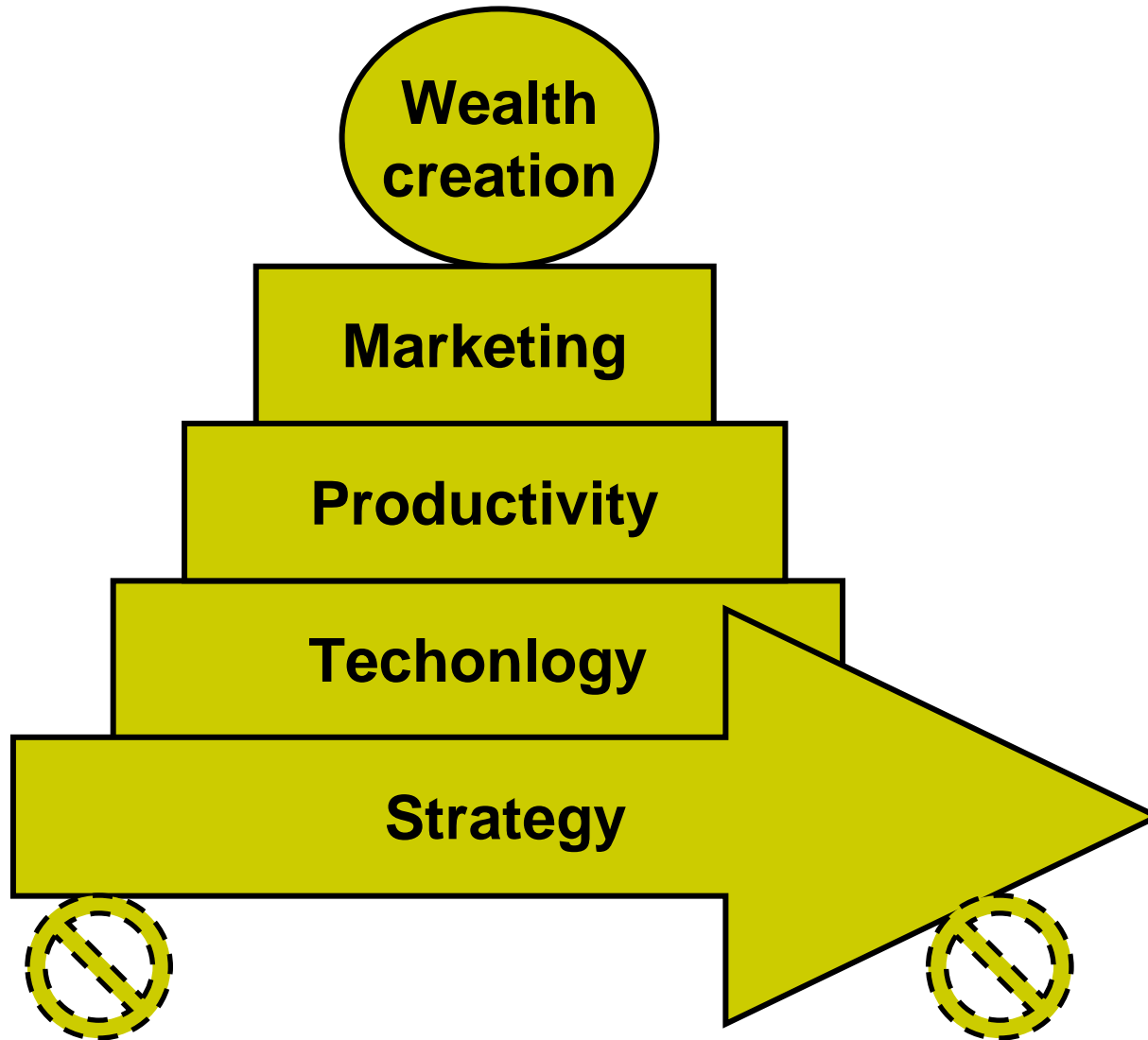
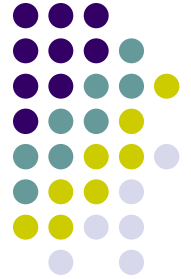
- Environmental Scanning
  - External
  - Internal
- Strategy Formulation
  - Mission
  - Objectives
  - Strategies
  - Policies
- Strategy Implementation
  - Program
  - budgets
  - Procedures
- Evaluation and Control
  - Performance

# Technology strategy formulated using the following steps



1. Identify all the distinct technologies and sub-technologies in a value chain.
2. Identify potentially relevant technologies in other industries or under scientific development.
3. Determine the likely path of change of key technologies.
4. Determine which technologies and potential technological changes are most significant for competitive advantage and industry structure.
5. Assess a firm's relative capabilities in important technologies and the cost of making improvements.
6. Select a technology strategy, encompassing all-important technologies that reinforce the firm's overall competitive strategy.
7. Reinforce business-unit technology strategies at the corporate level.

# The Vehicle for Creating Wealth





# Core Competencies

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- Develop, cultivate, and enhance the company's core competencies.
- Deploy core competencies as widely as possible throughout the company's products and services.
- Align all other activities in the company around the areas of competencies to create synergy.
- Develop an optimal plan for technology integration and outsourcing.
- Build barriers to competitors' entry into the company's areas of competencies.
- Overcome temptation for short-term gains rather than long-term strategic positioning.

# Terima Kasih