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**School of Mechanical and Chemical Engineering**
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# Course: Entrepreneurship for Engineers

## Chapter Three

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# 3. International Technology Transfer and multinational Enterprises, Innovation

## 3. 1 Technology Transfer Regulation, promotion , usage and adoption by MSEs

- ✓ *The National Technical, Vocational Training and Education strategy of Ethiopia (2007,pp5-6), indicated that one of the objective of this strategy is to create a system where by the colleges and institutes shall be the center of technology transfer.*
- ✓ *Hence, the colleges and institutes shall imitate and transfer new, best and appropriate technologies to the companies (MSMEs) to improve their competitiveness in the global market. Appropriate technologies shall be designed to solve local problems and contribute to the national economic development.*

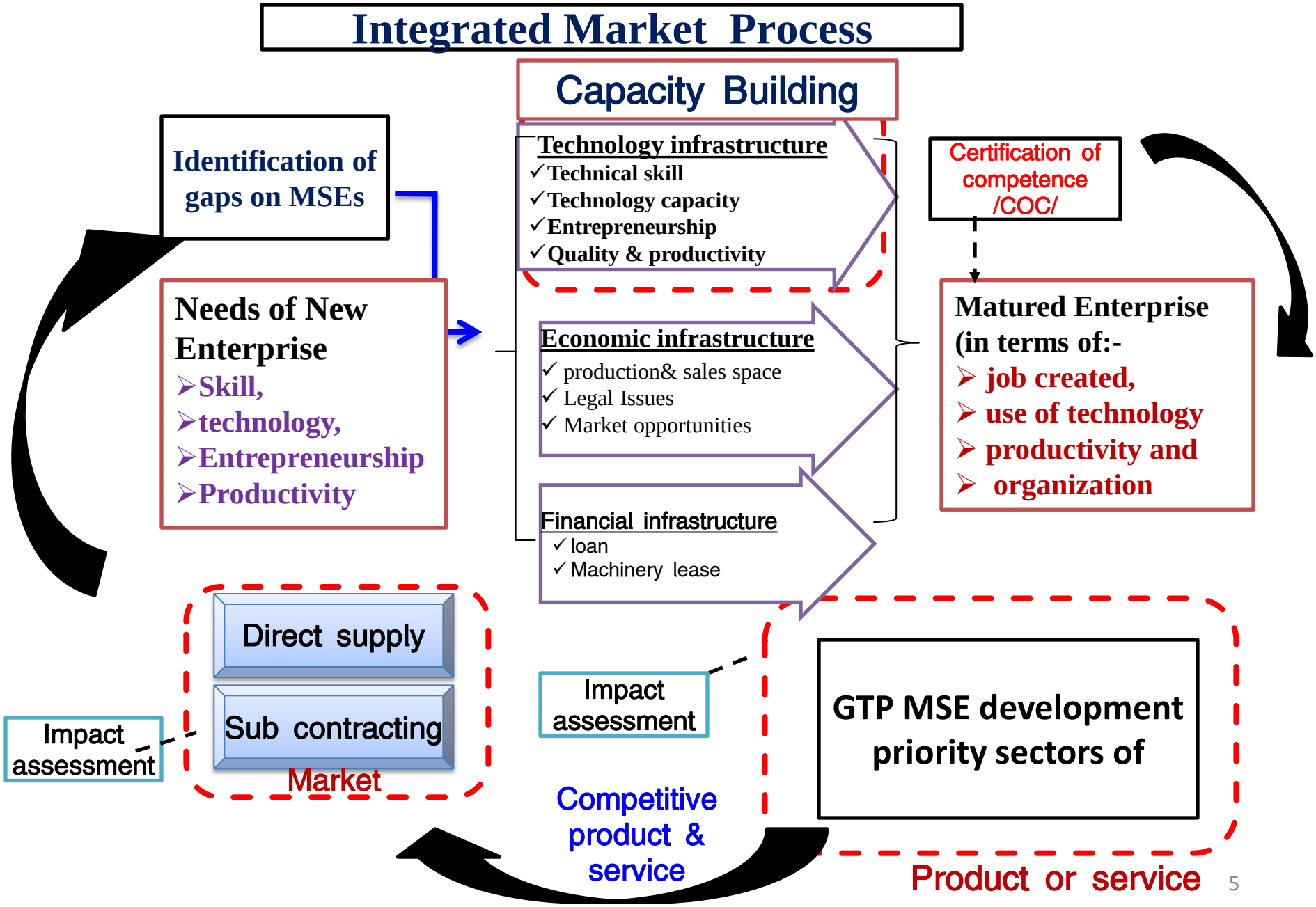
## 3.1 Technology Transfer Regulation, promotion , usage and adoption by MSEs

- ✓ *Industry Extension service(IES) shall be provided to micro and small enterprises (MSEs) upon identification and documenting their problems to build their capacity on the basis of need assessment.*
- ✓ *IES shall be based on market orientation and prioritization of the existing enterprises and model enterprises.*
- ✓ *IES includes need assessment, provision of training, consultation, technology development and transfer, documentation and scaling up of best practices.*

## 3.1: Technology Transfer Regulation, promotion , usage and adoption by MSEs

- ✓ *Industry extension framework includes four packages including 1)Entrepreneurship, 2)technology, 3)skill training, 4) "Kaizen".*
- ✓ *Technology transfer stakeholders includes successful companies, collages , universities, Micro and Small Enterprise development and job creation office, Small and medium manufacturing office.*

# 3.1. Industry Extension Framework in Ethiopia



# 3.2 What is Technology Transfer(TT)?

**Technology transfer** is the transmission of knowledge in a continuous, frequent, and strategic manner, which is applied to researching in technological agencies, laboratories, universities, and any institution capable of generating knowledge (Solleiro,2008 and Urbano,2013).

Access to technology has constituted an important instrument in the economic growth of countries and organizations Omar (2010), Wang (2010b), Audretsch et al. (2014), Huuck (2015) and Kundu (2015) because it promotes changes in society, creating new needs and satisfiers.

# 3.2 What is Technology Transfer(TT)?

- ✓ *Lundvall (2010), Wang (2010a), Hall et al. (2014) and Diebold (2015) stated that a country has a competitive advantage that depends on knowledge and technology transfer.*
- ✓ *Woerter (2012) notes that companies get involved in transfer activities in order to update and modify its knowledge base and consequently, improve their competitiveness.*
- ✓ *TT is conceiving of a new application for an existing technology (Reisman,1989) or as a process conceiving research into economic development (Feulner,1992) in Pillip,2017).*

# 3.2 What is Technology Transfer(TT)?

- TT is a mechanism in which industrialization process and economic development can facilitated.
- **Technology Transfer has been used to refer to the following**
  1) Licensing of intellectual property right to manufacturer
  2) Reduction of Idea to practice in a prototype-
  3) The process of recording concepts of technology "know-how" in a professional paper or patent application (Dakin,1991).
- However, TT involves invention, intellectual property or product commercialization ( Jolly,1998).

# 3.2 What is Technology Transfer(TT)?

- Transfer of foreign technology is the crucial source of innovation for developing countries(Correa ,2007).
- Within TT transforming technology to product involves generating ideas ,reducing these ideas into practice( prototypes) ,then testing and refining prototypes till they become ready for production and commercial distribution (Pillip,2017).
- Hence, TT is the process for applying known technologies to new and noble application (Pillip,2017).

# 3.2 What is Technology Transfer(TT)?

- Transformation of technology to product involves three critical events

1) **idea** (identification of new discovery or existing technology and match it to a new or novel application area but yet not tangible development),
2) **prototype-** technology embodied in hardware, software, a process or a system) and
3) **product**-when the prototype is refined, ready for production and distribution in the market place( Roger,1995).

## 3.2.1 Why Technology Transfer? Joseph Phillip,(2017)

1. **Technology Innovation improves product**

- products have not only useful features but also limitations (i.e, the need for new /improved value).
- Thus, to improve the feature and functions of their products to meet existing and new demands, companies should either develop new technologies from internal resources or seek opportunities to incorporate externally developed technologies. Those options must be cost-effective to be economically feasible so that companies shall target their market.

## 3.2.1 Why Technology Transfer? Joseph Phillip,(2017)

2. **Technology Transfer offers cost effective innovation**

- The objective of technology is to apply technologies from any source to develop new or improved product feature and function in a cost effective manner.
- Companies need systematic process in handling procedures in acquiring external innovations may be in the form of ideas for technology, prototype or product to insure cost effectiveness.

## 3.2.2 Stages of technology transfer process? (López and Mauricio ,2018)

❖The technology transfer stages depends on their realities, such as observations and experiments for research activities often lead to discoveries and inventions by researchers, Entrepreneurs. Rating necessary patent search and analysis technology market and competition to determine the marketing potential of the invention.

- **Protection:** the process in which the protection for an invention can be performed pursued by patents, but may also involve other methods, including copyright and intellectual property, trademarks and contractual restrictions on use.

## 3.2.2 Stages of technology transfer process? (López and Mauricio ,2018

- **Marketing:** candidate companies which have the expertise, resources, and necessary relations to bring the technologies to market are identified. This may involve association with an existing company or create a new company or start-up or existing businesses. The licensee performs the necessary steps to develop a product or service fully marketable investments. This step involves regulatory approvals, generating sales network, and marketing support, staff training, and other activities and organized among them, and have established the following: the existence of necessity, return on investment, investment appraisal, supplier and resources identification, development, technology commercialization, transfer and implementation and management life cycle.

## 3.2.3 Two Forces initiating TT (Phillip,2017)

**1) Supply push**

When the TT is initiated by someone who has knowledge of technology and who is seeking to apply that technology to a new product- the technology supplied is pushing towards the market place in search of unsatisfied demand( Paul,1989). Ex. Inventors, researchers.

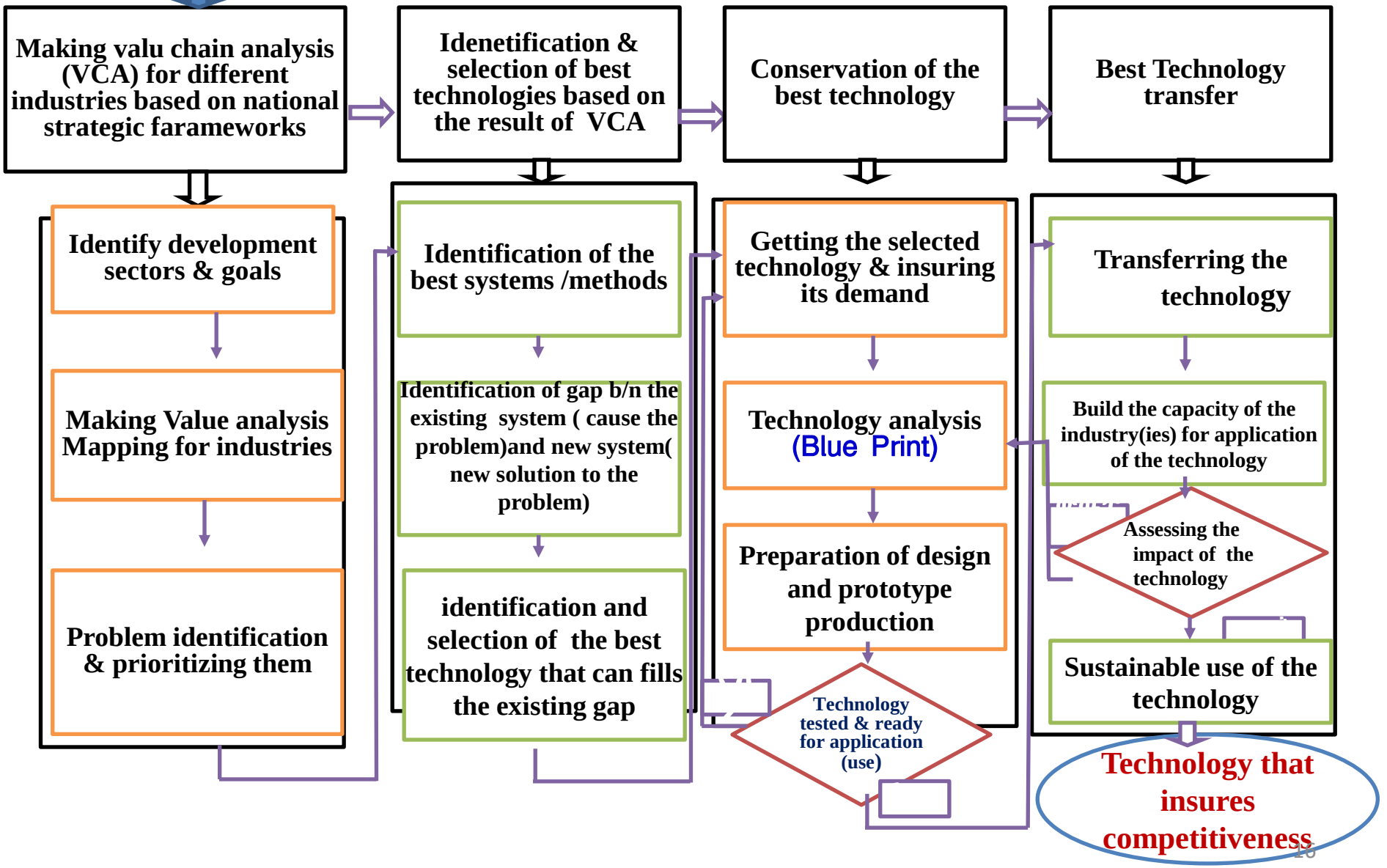
**2) Demand pull**

When the TT is initiated by who have knowledge of unsatisfied demand for a product and who is seeking appropriate technology to satisfy the demand- the demand for the product is pulling a technology towards it(Von Hipple,1986).

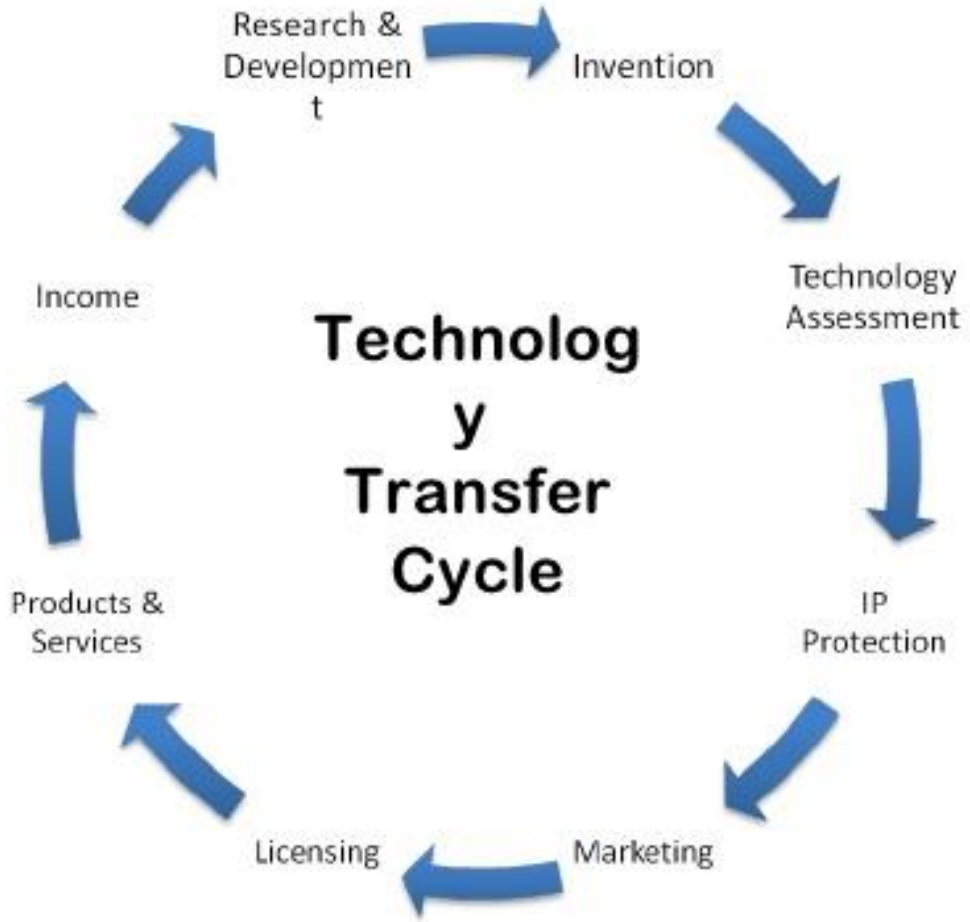
- They supply push and demand pull which are two sides of the same coin. Discuss how?

# Technologies required for competitiveness

## 3.3 Diffusion and Mechanisms of Technology Transfer process & MSE



# Technology Transfer Cycle



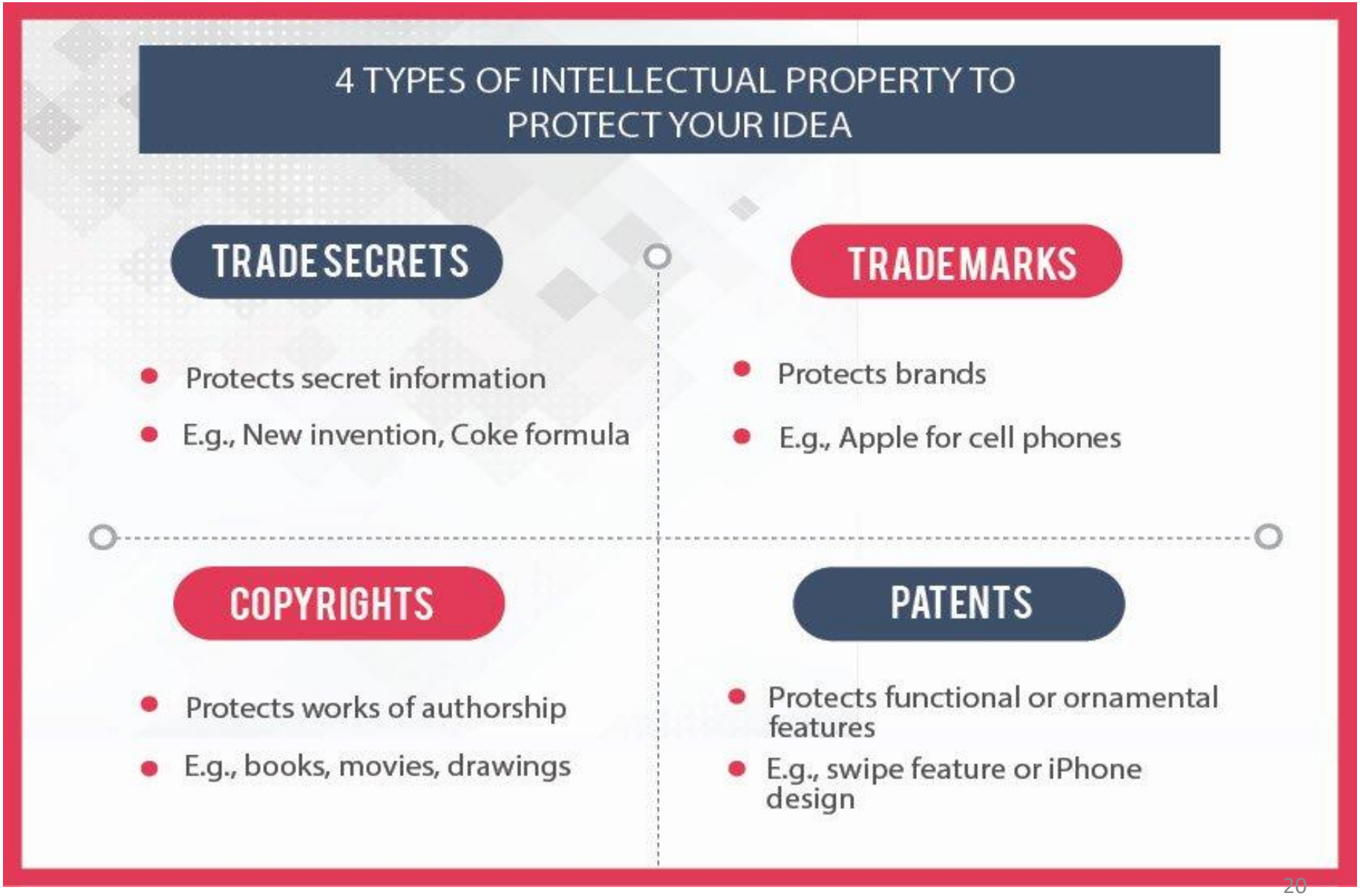
## 3.4 Intellectual Property Rights and the Appropriateness of Technology

- ✓ *The national Science and Technology Policy of Ethiopia in 1993 the and Patent Proclamation in 1995 recognizes the positive link between IPRs and economic development.*
- ✓ *The Ethiopian Intellectual Property Office and the Ethiopian Science and Technology Commission (now reorganized as Ministry) are the main actors in the enforcement of the policy and the IP laws.*

## 3.4 Intellectual Property Rights and the Appropriateness of Technology

- ✓ Intellectual property law regulates the creation, use and exploitation of mental and creative labor. it is a general area of law that encompasses copyright, patents, industrial designs and trademarks (Habtamu,2012).
- ✓ Intellectual Property Rights (IPR) protects the most valued of all creations — the human mind. The human mind invents, creates, and develops a new product. IPR protects the creator's interests and sees to it that they get exclusive rights over their products and receive the benefit from their product. The product can be anything from a new invention to a literary work or even symbols (K. Hemant,2019).

# 3.4 Intellectual Property Rights and the Appropriateness of Technology



# Four types of major IPRs

1) **Trade mark (TM)**:

- ✓ TM is any visible sign capable of distinguishing goods or services of one person from those of other persons; it may include words, designs, letters, numerals, colors or the shape of goods or their packaging or combinations thereof. It is a unique sign that helps us to identify a product.
- ✓ TMs are useful as they prevent counterfeiting. Furthermore, trademarks promote trade activities and are legally protected all over the world. They can include symbols, drawings, 3D images, as well as holograms and other non-visible signs. Eg.

# Q-What does these symbols stand for?



TOYOTA
Volkswagen

HYUNDAI

# Four types of major IPRs

## 2) patent:-

It is a property right granted to an inventor for an invention. The right conveyed by a patent is the power to exclude others from making, using, or selling an invention for a set period of time. The U.S. **Patent** and Trademark Office (USPTO) grants **patents** for inventions that meet statutory criteria. There are three different kinds of patents: utility patents, design patents and plant patents.

1) *Utility Patents*: The most common type of patent, these are granted to new machines, chemicals, and processes.
2) *Design Patents*: Granted to protect the unique appearance or design of manufactured objects, such as the surface ornamentation or overall design of the object.
3) *Plant Patents*: Granted for the invention and asexual reproduction of new and distinct plant varieties, including hybrids (asexual reproduction means the plant is reproduced by means other than from seeds, such as by grafting or rooting of cuttings). **https://smallbusiness.findlaw.com/intellectual-property/what-is-a-patent.html**

**Examples of Patentable Items.** These categories include practically everything made by humans and the processes for making the products. Examples of things that are patentable include:

- Computer software and hardware;
- Chemical formulas and processes;
- Genetically engineered bacteria, plants, and animals;
- Drugs; Medical devices;
- Furniture design;
- Jewelry;
- Fabrics and fabric design; and
- Musical instruments.

**https://smallbusiness.findlaw.com/intellectual-property/what-is-a-patent.html**

# Four types of major IPRs:

## 3) What's Copyright?

- It is a collection of rights automatically vested to you once you have **created an original work.** These rights include the right to reproduce the work, to prepare derivative works, to distribute copies, to perform the work publicly, and to display the work publicly.
- A copyright owner is authorized to keep or transfer the rights to one or more people through licensing, assigning, and other forms of transfers.
- The power of copyright allows you to choose the way your work is made available to the public. /

# 4.Trade secrets

# 4) Trade Secrets

# The 7 'Musts' of Trade Secrets

**HAZEL**
Trade Secret Management

## 3.4 Intellectual Property Rights and the Appropriateness of Technology

**Why guaranteeing IPRs?**

- ✓ The protection of intellectual property is important not only for promoting innovation and creativity but also for developing employment and improving competitiveness.
- ✓ The protection of intellectual property should allow the inventor, or creator to drive a legitimate profit from his/her creation or invention; allow the widest possible dimension of works, ideas , new know how. At the same time it should not hamper freedom of expression, free movement of information including internet. However, without effective IPRs innovation and creativity are discouraged and investment diminished.

## 3.4 Intellectual Property Rights and the Appropriateness of Technology

✓ **Major growth effects of IPRs include the following:** effective protection and enforcement of IPRs

(1) stimulates private innovation by providing incentive through entitling monopoly right to exploit his invention and then recover the cost of research and development

(2) the new knowledge is employed in the productive activity of the country and hence leading to higher incomes, employment and competitiveness in the economy as a whole.

(3) provides incentive for inventors to disclose their new knowledge to others and

(4) the information disclosed by patent stimulates invention by other technical community, i.e., stimulating innovation around patents.

# Entrepreneurship for Engineers:2020