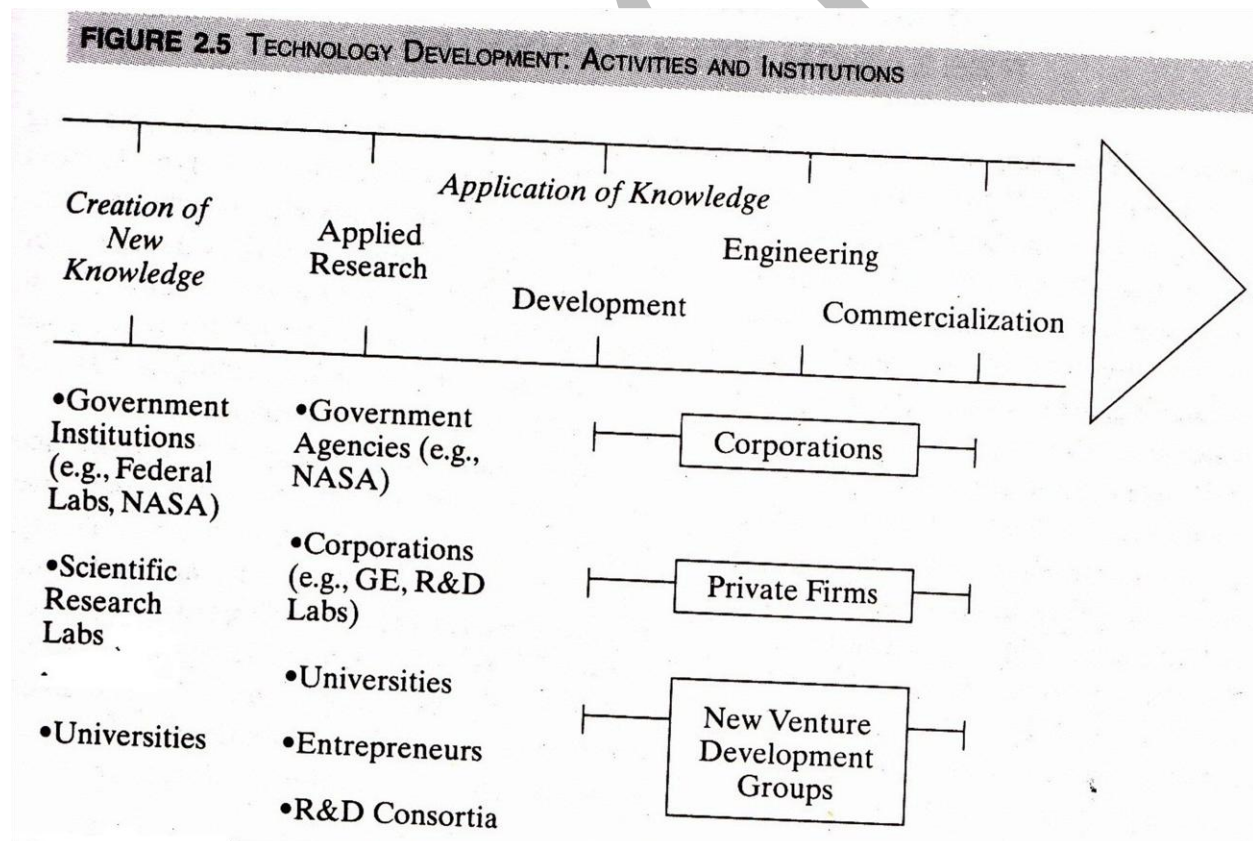


Technology Generation

- Generation of technology is the process by which technology is generated / developed by various entities.
- In communist or socialist countries, the technology is mainly generated by government owned research institutions, universities and other bodies with a very lesser contribution coming from private sector.
- In capitalist countries, the technology is mainly developed by private sector and there is some contribution from government agencies as well.
- In countries with mixed economic system, both government and private sector play a significant role in technology generation.



- The government technology policy framework directly influences technology generation in a nation.

- Thereafter, technology generation depends upon the technology strategy of the organization / enterprise i.e. whether it wants to become technology leader or technology follower?
- The technology strategy of the organization sets the direction for technology development in the organization and to some extent also influences technological strategies of competitors as well.
- At organizational / enterprise level, generation of technology is both an individual & group activity, but its management is solely an organizational responsibility and activity
- Technology develops through a process of Creativity, Invention and Innovation.

Pros of Technological Development

1. Increased Production

Technology has considerably increased effectiveness and helped businesses across many industries. It saves lots of time for everyone from automakers to bakers. The businesses that have encompassed latest tools and technologies can attain a competitive advantage in the market.

2. Easily Accessible

Technology has made our life very easy. We can access many things and services by staying at our home. Whether you need to do shopping, searching for a job, all these things available without leaving your home.

3. Increased Job Opportunities

Development of technology has created a big number of new jobs in the market. In this techno-friendly age, a new group of employers is needed to work efficiently that can maintain and develop the new technology in homes and businesses.

4. Better Communication

Get in touch with your friends and family now becomes very easy. You can talk from one corner of the world to another. It creates an amazing environment and a better understanding between different cultures. There are a number of interesting ways to communicate.

5. Different Learning Methods

Implementing technology into the classroom enables students to explore and access to different ways of effective learning. It may possible that some students learn in a lecture environment, others might be learning better from educational software. When students are given the choice of different learning ways, they will explore and try different tool and techniques and in this way, they learn the best strategies for themselves.

Cons of Technological Development

Besides the many advantages of using technology, there are some disadvantages of it for example:

1. A Social Divide

Implementing technology is expensive in many ways, and be up-to-date with the latest technology is impossible for everyone. This can cause a major social divide among the people who are able and unable to afford these technologies.

2. Make People Lazy

Technology made everything easier in different ways, people are slowly getting forget how to do things in the old-fashioned way (hard work). When you need some information, no need to find a dictionary or going to a library, you can simply type a question and get an answer instantly on the internet. This takes no effort or physical hard work and spending much time on the internet making people inactive.

3. Can be a Distraction

Using technology in the classroom affects learning. When students use tools and technologies in the classroom they might be distracted via things like gaming, social media, browsing etc.

Students are often seen walking with looking down at their phones rather than communicating friends around them. The sad truth is that students are becoming the victims of technology.

4. Privacy

When we use technology in our daily life, privacy is a big issue. It is very important that personal information and data be safe. Different apps and tools ensure privacy measures but are it enough to be safe from potential privacy risk.

In the end, we can say that technology has its advantages and disadvantages. It's up to the users to decide whether the good overshadows the bad. The most important thing is that how we can get best of technology.

Technology Transfer

Technology transfer (TT) refers to the process of conveying results stemming from scientific and technological research to the market place and to wider society, along with associated skills and procedures, and is as such an intrinsic part of the technological innovation process.

Technology transfer is a complex process that involves many non-scientific and non-technological factors, and many different stakeholders. Good or high quality research results are not enough for successful technology transfer; general awareness and willingness both at the level of organizations and individuals, as well as skills and capacity related to specific aspects, such as access to risk finance and intellectual property (IP) management, are also necessary components.

The fundamental steps of the technology transfer process are depicted in the figure below.

Technology transfer covers the complex value chain linking research to its eventual societal deployment. This begins with the discovery of novel technologies at research institutions, followed by the disclosure, evaluation and protection of these technologies. The next steps include marketing, potential licensing agreements and the development of products based on the technical inventions. The financial returns of these products can then, for instance, be used for further research.

- Technology transfer is the practice of exchanging new information on technologies between groups and companies.
- Technology transfer can occur between both groups and companies within a country, as well as between other countries.
- Many groups, such as companies and universities, have a technology transfer department in which technology transfer is handled.
- Another common function of these departments is to find or create a practical purpose for which a technology is used.

Why is Technology Transfer Used

- Technology transfer is used as a means to exchange new information of technologies, expanding knowledge.
- It works in the same way as the ideal that two heads are better than one.
- One individual or group may discover or create a new product, while another previously uninvolved group or individual may find a practical use for that discovery or product.
- It also provides groups, such as third-world countries, with access and knowledge of a technology, further helping to develop that economy.
- This then, as previously mentioned, could prove to further advance the creation or use of a technology.

Kinds of Technology Transfer

(1) Horizontal Technology Transfer

(2) Vertical Technology Transfer

At present transfer of technology (TOT) is primarily horizontal.

1. Horizontal Technology Transfer

Horizontal Technology Transfer is the transfer of a commercialized or operational (usually mature) technology from one organization in a specific socio-economic context to another organization in a different socio-economic context, through intra- firm, cross-industry, or cross-border channels.

It may be possible to horizontally transfer technology at any stage of the technology life cycle

2. Vertical Technology Transfer

- Vertical Technology Transfer refers to the transfer of technology from Basic Research to Applied Research to development and then to production.
- It is a managerial process of passing a technology from one phase of its life cycle to another.
- It is the transfer of an embryonic technology (i.e. a pre-commercialized or generic technology) from an individual or institutional inventor (e.g. a government or university laboratory) to an organization that can either commercialize it into a new product or process or make it publicly available for the practical solution of a problem in society.

Mode of Technology Transfer

A. Informal Technology Transfer

- ...through published matter either in print media....or electronic media....or scientific meeting/symposia...individual exchanges between scientists/researchers
- Process of training scientists in academic research institutions
- Acquisition of critical technical personnel

B. Formal Technology Transfer

- Outright procurement of technology through its sale, licensing or acquisition of the enterprises in which technology is embedded.
- Internal Technology Transfer & External Technology Transfer

1. Internal Technology Transfer

- Such technology transfer where control on the ownership and usage of technology resides with the transferor.
- Transferor normally holds substantial, majority or full equity ownership in the transferee or recipient entity/organization/department.
- ...Involves movement of technology from R & D department to manufacturing units and then to marketing of products/services in the target markets.

2. External Technology Transfer

-Control On The Ownership And Usage Of Technology Usually Does Not Remain With The Transferor And It Passes On To The Recipient..Solely or As Joint Venture
- Successful Transfer Depends Upon The Following Factors
 - ❖ Type & Complexity of The Technology Being Transferred
 - ❖ Transfer Mechanism Selected
 - ❖ Relationship Between Parties
 - ❖ Core Competencies of The Parties.
 - ❖ Organizational Culture of The Parties

Barriers to Internal Technology Transfer

- R & D goal not known to production department
- Stopping current production to test new processes
- R & D dept. Does not understand need & capability of the production dept.
- Production dept resists innovation

- New technologies are not linked to marketing/customer needs

Factors/Reasons Necessitating External Technology Transfer

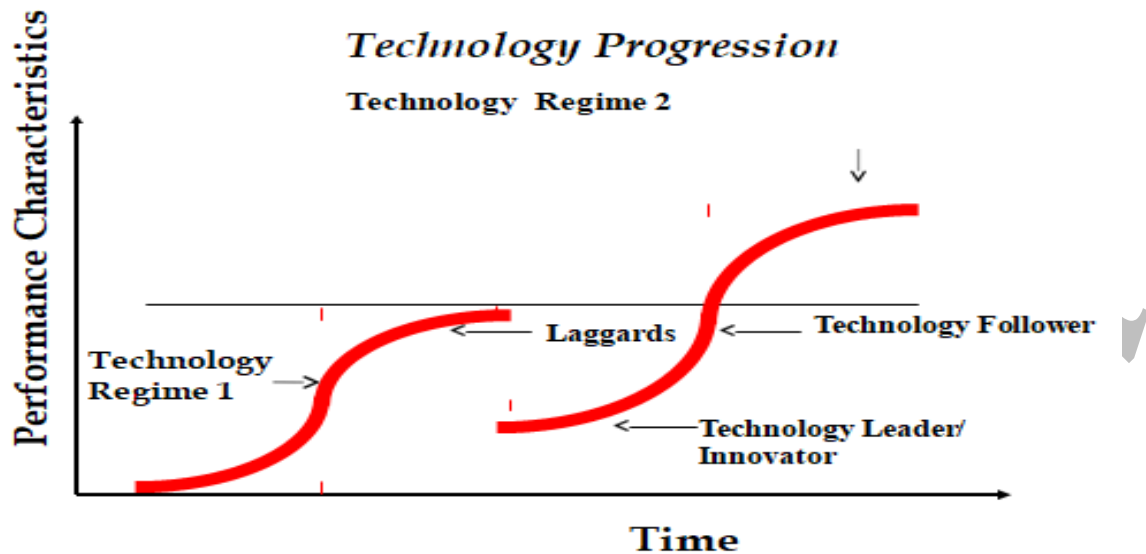
- Saving time and efforts
- To meet growth objectives or competitive goal
- Lack of risk taking ability for innovations
- Lack of internal resources
- Lack of core competency to deal with
- Need to keep up with competitors

Technology Diffusion

- Diffusion is the process by which a new idea or new product is accepted by the market.
- Technology Diffusion means the spread of applications / usage of a new technology and its related products, services or processes from one nation to another; from one entity to another; from one industry to another; from the owner entity to user or supplier; and from current user to the prospective user.
- Technology Diffusion means the study of how, why, and at what rate new ideas and technology spread across the economy.
- Technology diffusion carries wide meaning

In a narrow sense, sometimes, Technology Diffusion is also known as Diffusion of Innovation as technology gets mainly diffused through its new usages or applications in the form of new products, services or processes.

Technology Diffusion



Pattern of Technology Diffusion

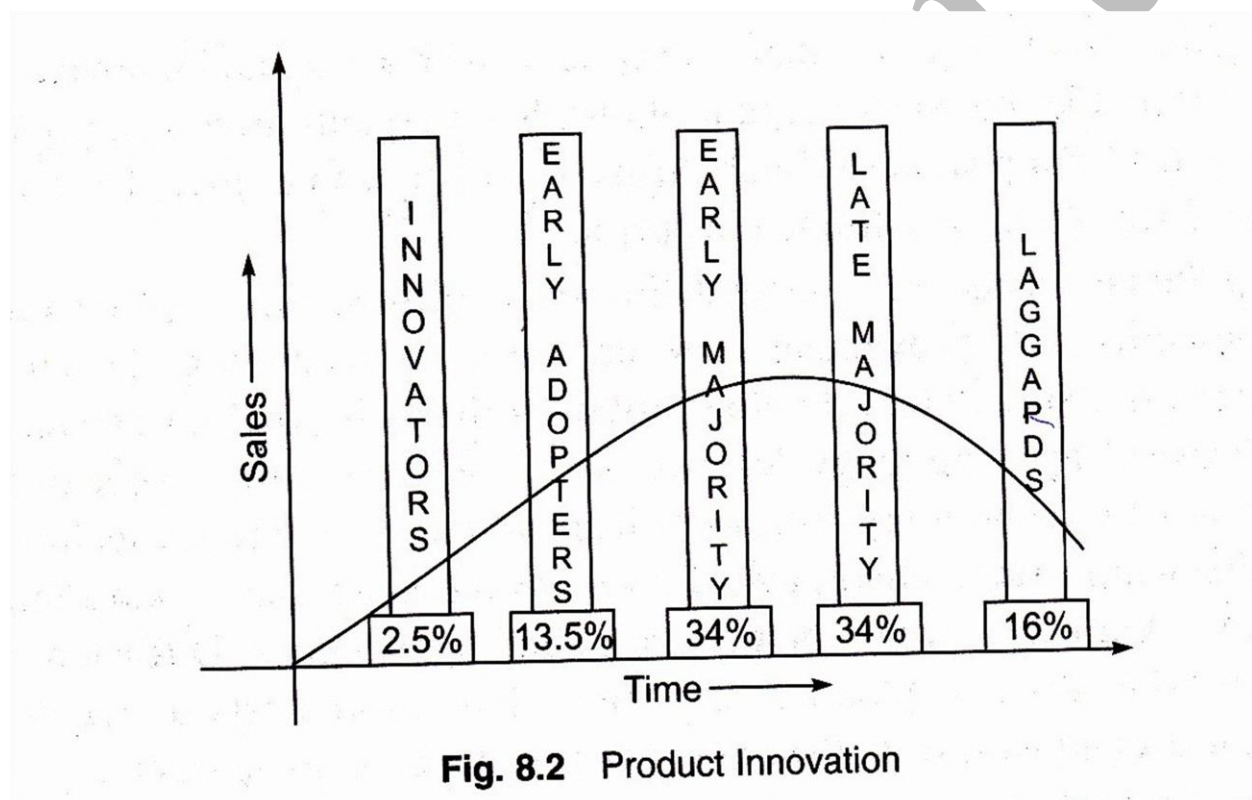
- During the initial stage i.e. innovation stage, technology and innovation gets diffused within the innovative organizations. Such organizations usually follow technology leadership strategy.
- During next stage i.e. consolidation stage, diffusion takes place amongst major competitors.
- During the last stage, i.e. mature technology stage, diffusion spreads to laggards. These laggards are, usually, risk-averse and small organizations or small market players.
- The rate of learning's / spread amongst various entities is influenced by profitability and investment required.

Product Diffusion

Product diffusion is a case of innovation diffusion.

According to Everett M. Rogers, for any given product category, there are five categories of product adopters:

- **Innovators** – venturesome, educated, use multiple information sources, possess greater propensity to take risk (2.5%),
- **Early adopters** – social leaders, popular, educated (13.5%),.
- **Early majority** – deliberate, many informal social contacts (34%),.
- **Late majority** – sceptical, traditional, lower socio- economic status (34%)
- **Laggards** – neighbours and friends are main information sources, fear of debt (16%).



Characteristics of Technology Diffusion

- **Diffusion is not one-way traffic.** The innovator can also learn from imitator.
- Diffusion is **not once- for-all occurrence.** It is cyclical in nature.
- Diffusion **can take place in varying degrees:** IntraFirm - diffusion of lowest degree ; InterFirm- diffusion of medium degree; Economy wide- diffusion of highest degree.

- Diffusion **can take place in variety of forms ... viz product , service or a process: use & production;** stock of technological knowledge
- The **pattern of diffusion i.e. shape of S-curve is Influenced by profitability and investment required,**

NotesGuru