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# UNIT 6 TRANSFER

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## Objectives

After studying this unit you will be able to :

- know the meaning of technology transfer and understand the knowhowtransfer modes and the steps involved in,technology transfer.
- understand the planning for technology search, the identification of appropriate technology for the company, and the factors involved in technology transfer and the routes of technology transfer.
- understand the norms for and factors in pricing of technology, mode of payment, agreements made between the licensor and licensee.
- understand the nature of Government's initiative in technology transfer in advanced countries and the reason for tardy growth of industry in developing countries.
- understand the role of regulatory system vis-a-vis competitive growth of industry, and the need for good information system and data bank facilities.

## Structure

- 6.1 Introduction
- 6.2 Models of Technology Transfer
- 6.3 Technology Transfer Modes
- 6.4 Technology Search Strategy
- 6.5 Dimensions of Technology Transfer
- 6.6 Features of Technology Package
- 6.7 Routes of Technology Transfer
- 6.8 Technology Absorption Capabilities of Recipient Enterprise
- 6.9 Competence of Know-how Supplier
- 6.10 Pricing of Technology
- 6.11 Technology Transfer Agreements
- 6.12 Cole of Conduct for Technology Transfer
- 6.13 Government Initiative and Technology Transfer
- 6.14 Summary
- 6.15 Key Words
- 6.16 Self-assessment Questions
- 6.17 Further Readings

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## 6.1 INTRODUCTION

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We have studied the process of Technology Generation and Development in the previous unit. Technology once developed can be used by its developer or owner, or can be transferred to another user immediately or after sometime at any stage till maturity, dictated by commercial expediency. Generally, newer technologies are transferred among the developed countries and matured or nearly matured technologies are transferred from developed to developing countries at the enterprise level. In this unit we shall study the process of Technology Transfer and some of the related issues.

Basically there are two ways of acquiring new technology: develop it or purchase it. The second way of acquiring new technology is commonly called "technology transfer". The important reasons for purchasing technology are : (i) it involves little or no R&D investment; (ii) technology can he used quickly; and (iii)



technical and financial risks are often quite low. There are also good reasons for selling technology, such as (i) increasing return on R&D investments; (ii) technology may not have immediate use; and (iii) technology has already been utilised upto its limit. Therefore, technology transfer occurs because of the existence of "buyers" and "sellers". The sellers are called "transferees" or "licensors" and the buyers are called "transferees" or "licensees" in the technology transfer process.

**Transfer, as defined, means the** acquiring through purchase and use of technology. Therefore, the definition of technology transfer is the acquisition and use of knowledge. There is no transfer of technology unless and until the technical knowledge is put to use. Technology transfer is not restricted here only to scientific or engineering items. The manufacturing, marketing, distribution and customer service are among the factors that are included in technology transfer.

The key factors in technology transfer include :

- **Transplantation of technology** involves shift from one set of well-defined conditions to another set in which at least one key variable may differ. Secondly, the recipient may apply the technology to a different purpose from that of the supplier.
- **A sense of opportunism** prevails in technology transfer, whether justified or not.
- The transfer process embraces a **rich variety of mechanisms and relationships** between recipient and donor (supplier of technology). The process can vary from a routine peopleless passive transfer to turnkey contract where the donor takes the full responsibility for all phases of the contract.
- The **nature of the transferred technology** and how it is transferred are critical to the success of the technology transfer process.

Technology transfer may begin as a solution to someone else's problems. Adoption of such "outside solution to solve an 'inside' problem is technology transfer. The advantage lies in avoiding "reinventing the wheel".

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## 6.2 MODELS OF TECHNOLOGY TRANSFER

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The following Figures (Source : Mogavexo, L.N., and R. S. Shane, 1982, Technology Transfer and Innovation, Marcel Dekker, New York, pp.2-3) illustrate the models of technology transfer :

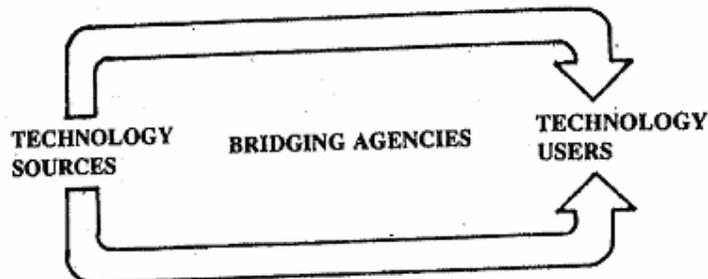
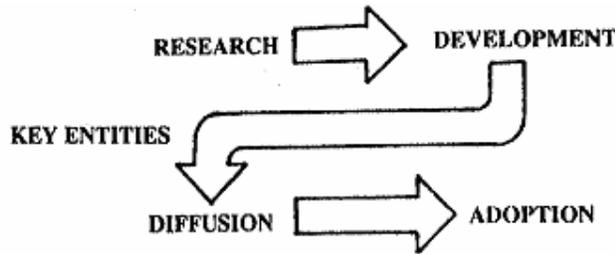
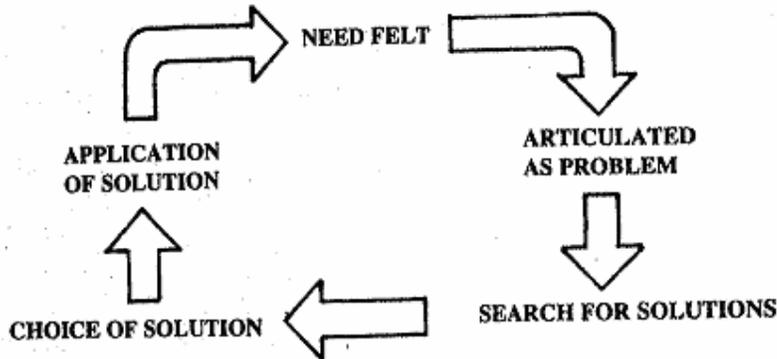


Figure 6.1 : Bridging Agencies



**Figure 6.2 : Research and Development Diffusion Model**



**Figure 6.3 : Problem-Solver Model**



**Figure 6.4 : Technology Transfer Summary Model**

Agencies that try to make technology transfers happen include government departments, financial institutions, industries, technology transfer agencies, consultants, venture capital companies, research companies, and R&D organisations, etc. These are the bridging agencies of Figure 6.1. The users of new technologies comprise private and public sector industries, giant technically oriented agencies such as Indian Space Research Organisation, government departments, Atomic Energy Commission etc. It can be seen that a wide spectrum of participants in the total economy are technology users.

Figure 6.2 illustrates schematically the diffusion of technology from a mission-oriented agency that supports development of technology for purposes of its mission and then arranges for the technology diffusion to other industries by knowledge transfer. This is usually a slow process. Figure 6.3 shows the generation and transfer of technology as a companion of problem solving. Figure 6.4 shows a synthesis of the entire process of technology transfer on a large scale.

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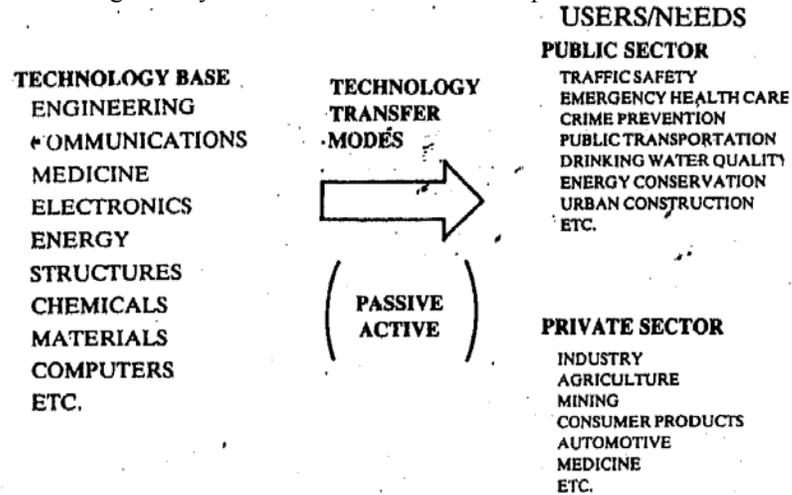
### **6.3 TECHNOLOGS TRANSFER MODES**

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Technology transfer modes have been categorised basically as being passive or active, which refers to the transferor's role in the application of technology to the solution of the user's problem. This is illustrated in Figure 6.5 (Source : Mogavexco, L.N. and R.S. Shane, 1982, Technology Transfer and Innovation, Marcel Dekker, New York, 1982, p. 15). If the transferring mechanism presents the technology to the potential user without assisting the user in its application, namely by a report or oral presentation, then the technology transfer mode is said to be passive, This is actually knowledge transfer. If the transferring activity assists the potential user in the



application of technology, then the technology transfer mode is said to be active. In this process, the transferring activity goes beyond mere interpretation of the transmitted data and advises the potential user on how to apply the technology, or demonstrates the applicability of the technology to the perceived use. There could however be an intermediate also, which may be called semi-active mode in which transferring activity is in between the active and passive modes.



**Figure 6.5 : Connecting Technology with Users**

The three different types of technology transfer modes are discussed in detail (Source for Figures 6.6 to 6.8 : Mogavexco, L.N., and R.S. Shane, 1982, Technology Transfer and Innovation, pp. 16-18).

### The Passive Mode

The passive mode, also called dissemination mode, is illustrated in Figure 6.6. The most familiar and widely used form of passive technology transfer is the published literature. There is no direct communication or assistance from the originator of the technology to the producer of finished consumer item. Yet thousands of products are made and consumed from this form of knowledge transfer. Similar forms of passive technology transfer are self-teaching manuals such as television repair manuals and how-to-do-it guides for home repairs.

### The Semi-active Mode

In the semi-active mode of technology transfer the role of technology transfer agent (in addition to self-education or self-retrieval of elements of technology transfer) is somewhat limited. This is illustrated in Figure 6.7.

The technology transfer agent (consultant or technology expert) screens available pertinent information for product development. Here the role of transfer agent is only that of an interpreter or communicator. He will not actively participate in the application of the technology.

### The Active Mode

The active mode technology transfer carries the process through to an actual demonstration as shown in Figure 6.8. The figure demonstrates various steps involved in the construction of the model or a product from procurement of material to fabrication and assembly. In this mode the technology transfer agent or consultant will be fully involved and acts as a bridge in technology transfer from technology source to entrepreneur or implementing agency.

## Horizontal and Vertical Technology Transfer

Horizontal Technology Transfer implies transfer of technology from one firm to another: Such transfers take place generally between the firms located in different countries, mainly due to reasons of competition and maturity or near maturity of technologies. Vertical technology transfer means transfer of technology from an R&D organisation to a firm. Such transfers are mostly within the country and the technologies are new, and may often require further efforts in terms of establishing commercial viability. Such a transfer involves considerable risk.

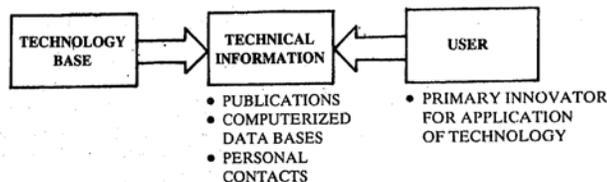


Figure 6.6 : Technology Transfer—Passive Mode

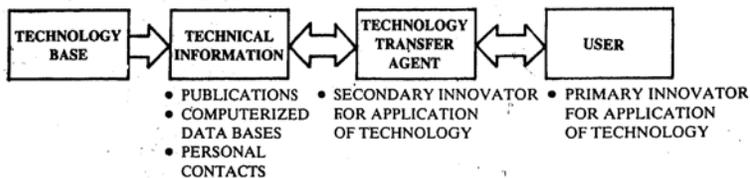


Figure 6.7 : Technology Transfer—Semi-active Mode

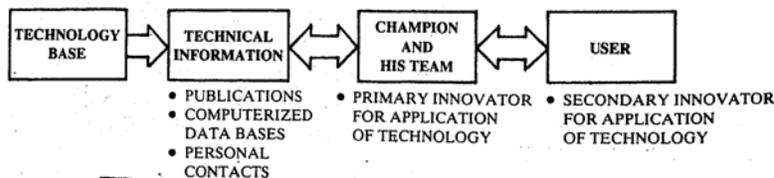


Figure 6.8 : Technology Transfer—Active Mode

## 6.4 TECHNOLOGY SEARCH STRATEGY

Very large companies have a special department or unit dealing with technology transfer and licensing. Medium and small sized firms have no formal department to take care of technology licensing. A company, big or small, may at one time or other, require transferring technology or import of technology from outside. The process of transferring technology either in' or 'out' is subject to both managerial and other resource limitations. Technology search strategy has to be undertaken by the unit to identify suitable technology within the enterprise or import of technology from outside to maintain growth and profitability of the company.

The market conditions in any country are dynamic and can operate in a very ad hoc manner. It should be a major concern for companies to undertake search strategy to identify suitable projects or components for sustained growth. An effort to find a suitable new product and knowledge of the potential licensor of that product may lead to an early decision and successful implementation of the project.

It is useful to define why new products are required, the type of product that is required, its stage of development and whether this product will fit with the existing skills and resources within the firm. The success of seeking a new product will also depend on, among other factors, their technology search strategy and whether the relevant factors are defined and employed at the outset.



A schematic model of this process is shown in Fig. 6.9.

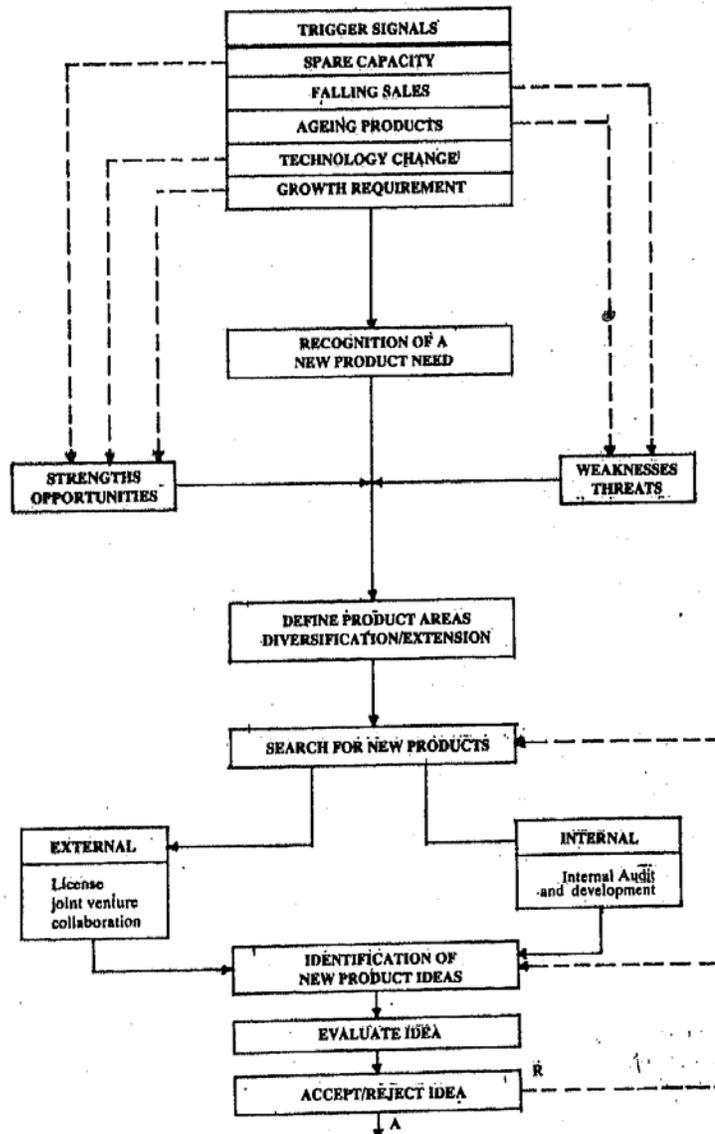


Figure 6.9 : Developing a Search Strategy

An audit of products, citing strengths and weaknesses, may be useful in identifying gaps in the portfolio that could be filled by the use of licensing.

### Recognition of Commercially Viable Products

Any search strategy will identify a large number of potential licensing opportunities but many of them will be unsuitable or inappropriate for a particular firm at a particular time. For a firm with small research and development facilities, any product requiring substantial further development before marketing is likely to prove unsuitable as a potential licensing prospect. Products with a known track record, and substantial marketing and production back-up are likely to be least problematical for smaller firms. A perfect license may consist of a product that :

- has good protection in the licensee market.
- is sold under a well-known trade mark.
- requires no changes in the licensee market. • for which there is a substantial demand.
- is subject to an exclusive agreement.

- has a good 'fit' with licensee operation.
- is transferred under a 'reasonable' technology agreement.
- has assured continued technical and managerial support.

Recognition of commercially viable products is clearly a function of the firm or its consultant. The major advantage of a licensed product over the one produced in-house is that the licensed product might have been tried and tested and found to be successful elsewhere. Hence some of the risks associated with the new product have been reduced to the benefit of the licensee. The major disadvantage is that the technology may be generally matured or even obsolete.

### Outward Licensing

The licensor has to develop a search strategy based upon his knowledge of the market and the characteristics of his product, in identifying suitable licensees for his product. Following the search strategy the licensor will need to take into account the type of the licensee firm and its reputation, its market strength and production capabilities before making a decision. Personal empathy with licensee personnel is also an important factor.

Transfer of, technology under a license agreement comprises the culmination of a multi-stage process carried through by both partners to the agreement. Pre-transfer stages can be tabulated as below :

<b>Licensor</b>	<b>Licensee</b>
i) Marketing strategy defined	Definition of product requirement
ii) Licence decision	ii) Evaluation of 'In-house' or external development
iii) Evaluation of Technology	iii) Decision to licence
iv) Definition of Technology	iv) Search for partners
v) Search of partners	v) Transfer of technology
vi) Transfer of technology	

### Activity 2

Arrange a meeting with an experienced and knowledgeable person in the Engineering or related division of the organisation with which you have been associated. Gather information on he following and analyse as suggested.

- i) How did the organisation go about searching for an appropriate technology acquired in the past?  
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- ii) What strategy is the organisation proposing to follow for technology which is in the pipeline for acquisition? Is it different in any way from the one followed in the past? *What* reasons have accounted for the difference and why?  
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## 6.5 DIMENSIONS OF TECHNOLOGY TRANSFER

The time and resources required to transfer a given technology depend upon :

- what is actually transferred
- the mode of transfer
- the absorption capabilities of the recipient enterprise
- the capabilities and motivation of the supplier enterprise and
- the technology gap between the supplier and the recipient (Fig. 6.10', Source : Asian Productivity Organisation, Tokyo, 1976).

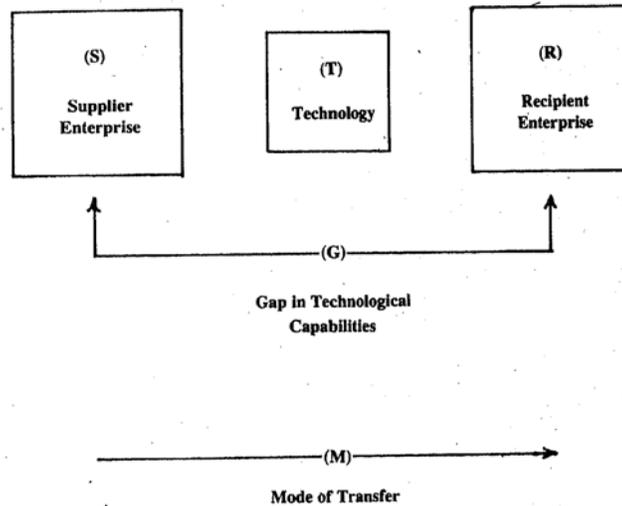


Figure 6.10 : Identification of Technology Gaps

## 6.6 FEATURES OF TECHNOLOGY PACKAGE

The technology package consists of three principal elements namely, product design, production technique and management systems.

**Product design** may range from simple items to highly complex (e.g., automotive) parts. **Production techniques** and plant layout include blueprints and flowcharts, formulas and recipes, process sheets, fabrication instructions, tools and fixture designs, operational procedures and material specifications. **Management Systems** consist of various plans, layouts and technical control systems (along with related marketing and financial controls); Included are plant design and layout, quality control and testing, material procurement, inventory control, equipment maintenance and. repair and machine loading techniques.

The three principal categories of technical information or know-how inherent in technological systems are general knowledge, system-specific and firm-specific knowledge. These various categories of knowledge may be in the form of written materials or may be embodied in technical assistance, on-the-job training or built into fabricating or processing equipment.

**General Knowledge** refers to information common to industry such as blueprint reading, tool and fixture design and fabrication, welding techniques etc.

**System Specific Knowledge** refers to information and industrial capability within a firm that gives it a competitive advantage over rival firms. This knowledge and know-how may consist of special solutions or procedures to a problem, acquired in the previous manufacturing experience in related product or process fields.

**Firm Specific Knowledge** differs from system specific in that it cannot be attributed to a particular production item and usually results from the firm's overall activities in such areas as grey-iron casting or their material fields. This technical knowledge or know-how goes beyond the general level possessed by the industry as a whole.

**Activity 3**

Describe the elements of the “Technology Package” that might be acquired through the technology transfer process by your organisation or a case that you know of.

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**6.7 ROUTES OF TECHNOLOGY TRANSFER**

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The principal routes of enterprise-to-enterprise technology transfer are :

- a) **Licensing or Franchise**  
 Licensing and Franchise arrangements vary from a complete package of instructions, technical assistance and training to mere permission for the manufacture and sale of a product.
  
- b) **Suppliers of Materials and Parts**  
 Suppliers of materials and parts are often willing to provide a full range of technical support, information and manufacturing know-how, and they can be as effective in know-how transfer as in industrial licensing arrangements. The manufacturing of colour TV'sets in India is a classic example of this type. The manufacturers did not have a formal technology transfer agreement but had an understanding with the foreign suppliers of materials and components regarding technical assistance in production.
  
- c) **Equipment Supplier**  
 A variety of technical services are provided by equipment suppliers, including operational and maintenance procedures and even processing know-how (typical in chemical industry). Some technologies are machine based and therefore the know-how is transferred along with supply of plant and equipment.
- d) Outright purchase e.g., of turnkey plants or of complete manufacturing and operating specifications, drawings, know-how, performance data and technical assistance.
- e) Acquisition of the company or business owning the technology.
- f) Joint ventures with the technology owners.
- g) Franchising of trademarks and technical, management, and marketing know-how.
- h) Combinations and variations of any of the above.

**Activity 4**

Which route of technology transfer has been generally adopted for a product in your organisation or that you know of? Discuss the reason as well as merits and demerits.

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## 6.8 TECHNOLOGY ABSORPTION CAPABILITIES OF RECIPIENT ENTERPRISE

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The absorptive capabilities of the recipient enterprise depends upon its resources and capabilities (embodied in technical and managerial skills as well as financial strength) and upon the transfer capabilities of the supplier enterprise. The following are some of the problems encountered by small-to-medium enterprises in technology absorption.

**Service facilities** : Material testing, heat treatment, instrument calibration, engineering standards and quality control procedures.

**Manufacturing** : Material standards and specifications, manufacturing processing procedures, formulas on alloys and compounds, fabrication and use of fixtures, jigs, dies and tools, welding techniques, casting and other metallurgical processes and material substitutes.

**Equipment** : Special equipment designs (heat exchangers, pressure vessels, bearings heating elements) and standardisation of major machine components (gear boxes, machine tools), die casting etc.

Technology absorption aspects are discussed in the next unit.

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## 6.9 COMPETENCE OF KNOW-HOW SUPPLIER

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Transfer capabilities and motivation of the enterprise supplying the industrial technology have an important bearing upon the effectiveness and efficiency of technology transfers. The competence of the transfer agents, including their ability to design an easily transferable technology package, is an important factor. The supplier enterprise and its transfer package represent a combination of documentation, training and technical assistance. Motivation of the technology supplier depends largely on the transfer mode and the potential return the supplier hopes to realise from an effective and efficient transplant.

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## 6.10 PRICING OF TECHNOLOGY

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In most licensing situations payments have to be made by the licensee to the licensor. The payments represent compensation to the licensor for allowing use of industrial property rights or valuable intellectual property by the licensee and providing necessary technical assistance to enable the licensee to produce as per agreed terms. Generally there is likely to be some financial return for proprietary knowledge or other forms of intellectual property to the licensor. The process by which this return is determined and agreed to by both licensor and licensee, is crucial to the licensing process. It is, however, not an area that is always amenable to the application of scientific rules, since licensing negotiations are subject to human factor, supply and demand conditions in the market and bargaining power of both the partners. In addition, pricing and negotiating in general is subject to the extent of support being available to both buyer and seller.

### Categories of Payments

Payments for the technology may be divided into three broad categories, although in practice an agreement may involve a combination of all three : lump sum payment,

royalties and fees.

**Lump sum Payment :** Lump sum payments, by definition, are calculated in advance, though the agreed sum may be paid in instalments. This method maybe appropriate where it is desired to obtain the technology by outright purchase. It may also be a means of obtaining the data on a patented process. Traditional reasons for down payment or lump sum payments are as follows :

- Down payment is a transfer cost representing the specific costs borne by the licensor to prepare a "technology package" for the licensee. Costs could arise from preparing drawings, specification lists, operating manuals, on-site training of personnel etc.
- Down payment acts as a surety, in case licensee defaults on the term royalties, delays in business operations, fails to go into operation after receipt of know-how or undergoes liquidation. By down payment the licensor reduces the risk of surrendering valuable technology.
- It is an advance collection of minimum royalties on estimated turnover of the licensor.
- The licensor may not be in a position to verify licensee's accounts and thus prefers a one time transfer fee.
- The licensed product may be sold internally in the enterprise 'and detailed sales/production records may not be maintained for such sales.

The economic, legal and regulatory environment of the country of the licensee may also influence the collection of lump sum payments. These include stability of national currency or that of exchange rates, regulatory policies of the host country, different levels of taxation etc.

## **Royalties**

Payments are made for the use of all forms of industrial property rights, the ownership rights of which are established by national statutory law (patent', trade mark, copyright), 'civil law (trade secrets), or international consensus (know-how). As a consequence, payments arise in the licensing of industrial property rights because the licensee derives protected benefits from its use. Royalty can be considered a lease payment, not an outright payment.

Royalties may be paid as a percentage of sales value, whether the technology is in the form of know-how or the use of patented equipment/process of production. The ex-factory value of total sale is frequently the basis of calculations. Alternatively, the royalty may be based on the gross value of production.

The rate of royalty may be related to. the net value of production. Whether the royalty is based on sales or value added, payments will increase in an inflationary situation, irrespective of the contribution of technology acquired.

## **Fees**

Fee for technology which may be remunerated specifically include training, whether in the licensor's or in the licensee's works, the position for technical experts required to introduce the technology and fee for expert assistance in the setting up of associated research and development, design and engineering services. Any fees payable for the management of the plant, purchasing of inputs, etc. are a separate matter, to be distinguished from those of technology fees. Fees related to foreign personnel should be calculated on the number of hours of such services which are agreed upon.

The three ways of payment are three alternatives. In the end, it is the total, payment to be made by the licensee by whatever means and over whatever period, that matters



to both the parties.

### Factors Affecting Royalty Rates

In any negotiation for technology transfer, both parties will arrive at their 'reservation' price by some assessment of the costs and benefits they both derive from trade, so that the financial benefits are acceptable to each side. This determines the absolute range over which the price can be negotiated. The process of finalising a specific price depends on the bargaining strength of the two parties, as well as their negotiating skills and general attitude towards risk and uncertainty. These factors will depend on the nature of the intellectual property to be exchanged. Tables 6.1 and 6.2 present the key factors affecting the alternative pricing of intellectual property, first from the point of view of the licensor and second,, from that of the licensee.

From Tables 6.1 and 6.2 it is apparent that various factors on the cost and benefit side of the equation can affect the pricing of a licence and fixing royalty rates. At the outset, the royalty level will be based on an assessment of the respective valuations of both licensor and licensee of these factors. However, that merely sets a maximum and a minimum royalty rate that both would find acceptable. Once it has been established that there is scope for trade, the rest of the pricing decision revolves around the risk preference and bargaining power of, the two parties. Figure 6.11 illustrates this bargaining range. The essence of this table is again to emphasise the existence of an overlapping range within which other factors play an important role.

**Table 6.1 : Factors Underlying Licensor Royalty Negotiations**

TYPE OF PROPERTY \ FACTOR	COSTS	BENEFITS	TIME	RISK	BARGAINING POWER
PATENTS	Cost of development Cost of filing, maintaining and enforcing the patent Costs of transfer in terms of people, materials, time etc. Revenues lost through not directly exporting or working the patent.	Royalty payments Grant backs of developmental knowledge Control of competition	Long agreement (upto 20 years)	Patent infringed Audit of licensee sales is difficult Setting up competition Licensee uses your property to develop his own new products faster than your own.	Tightness of patent Ability to enforce Distinctive nature of product process Existence of other complementary property Ability to directly export or directly invest
KNOW-HOW	No filing and maintenance cost	Same	Much shorter length of agreement	Secrecy problem difficult to control	Same
COPYRIGHT AND REGISTERED DESIGN	No filing and maintenance costs. No development cost.	Same	Variable time	Enforcement of copyright more difficult	Same
TRADEMARK	No filing and maintenance cost. No development cost.	Same	Longer time period	Poor quality products under your trademark	Critical in consumer markets

Table 6.2 : Factors Underlying Licensee Royalty Negotiations

TYPE OF PROPERTY	FACTOR	COSTS	BENEFITS	TIME	RISK	BARGAINING POWER
PATENTS		Royalty fee	Rapid Introduction of product	Long period of agreement	Patent may be infringed	Size of market penetration can provide for licensor
		Alternative costs of in-house development	Gross margin of licensed products	Speed of introduction	Product may be made obsolete	Barriers to export for licensor
		Limitation on markets	Keeping company together in times of recession		Limitation of markets; he can compete in on a 'monopoly' basis	Local market knowledge an advantage
		Costs of inward transfer	Basis for future technical development		Changes in the law of restrictive practice	
		Licensed product may make own products obsolete				
KNOW-HOW		Inward transfer may be more difficult	Access to secret technology other firm will not know about	Can take longer to incorporate than patent Shorter agreement	Firm may be locked into a long-term agreement after secret is widely known	No protection other than secrecy for licensor
COPYRIGHT		No costs of inward transfer	The only way of obtaining some sort of property	Long time period	Easy to break copyright but difficult to enforce and police	Very little for some 'unique' property
TRADEMARK		No costs of inward transfer	Instant market penetration and brand loyalty	Long time period	Trademark is devalued by poor performance of other trademark holders	Very little for some 'unique' property

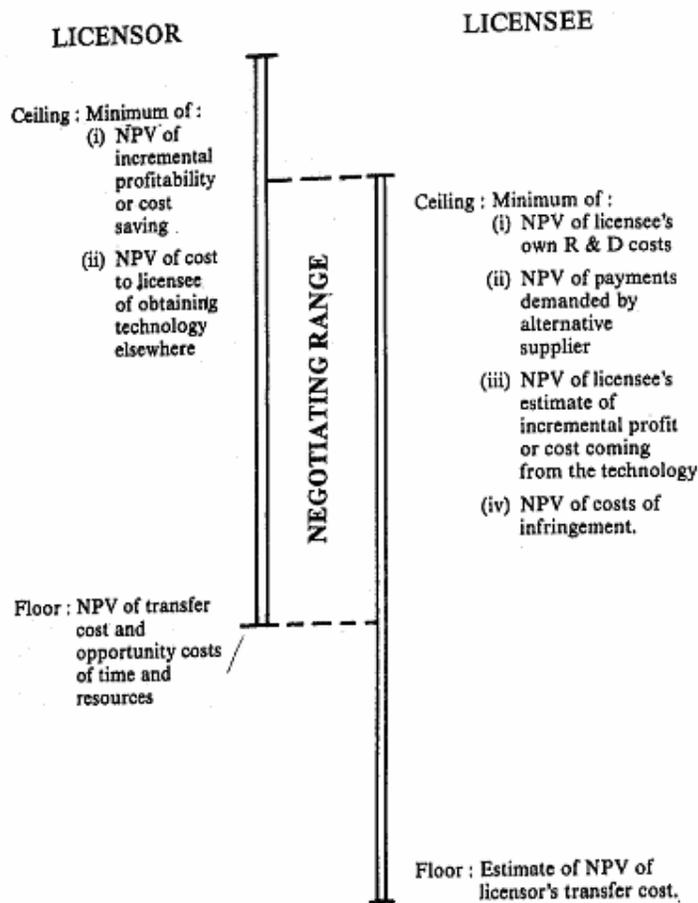


Figure 6.11 : Configuration of Bargaining Ranges

### Commonly Used Intellectual Pricing Methods

Some of the more commonly used royalty rate development models are discussed, highlighting their primary deficiencies.



## **The "25 Per cent" Rule**

Under; this method royalty is calculated at 25 per cent of the gross profit, before taxes, from the enterprise operations in which the licensed intellectual property is used. At best this method of royalty determination is crude. .

Gross profit based upon "generally accepted accounting principles" concept includes the direct costs of production. These include raw material cost, direct labour, manufacturing expenses and depreciation expenses. All of the costs and expenses associated with conversion of raw materials into a final product or service are included. Since this is most likely to be the area of greatest contribution from intellectual property, consideration of the amount of gross profit in setting a royalty is reasonable but it fails to take into account the final profitability that is ultimately realised with the licensed property. Absent from the analysis are setting, administrative and general overhead expenses.

Intellectual property that is part of a product or service which requires little marketing, advertising and selling effort is far more valuable than a product based upon intellectual property that requires the use of national advertising and a highly compensated sales, personnel. Two patented products may cost the same amount to produce and yield the same amount of gross profit, yet one of the products may require extensive and continuing sales support while the other may not. The added costs of extensive and continuing sales efforts make the first product less profitable to the licensee. While the two products may have the same gross profit, it is very unlikely that they would command the same royalty.

The 25 per cent rule also fails to consider the other key royalty determinants of risk and fair rates of return on investment. The "25 per cent rule" is not even useful as a general guide upon which to begin negotiations.

## **Industrial Norms**

The industry norms method focuses upon the rates that others are charging for intellectual property licensed within the same industry. Investment risks, net profits, market size, growth potential and complementary asset requirements are all absent from direct consideration. The use of industry norms-places total reliance upon the ability of others to correctly consider and interpret the many factors affecting royalties.

Changing economic conditions along with changing investment rate of return requirements also are absent from consideration when using industry norms. Even if an industry norms royalty was a fair rate of return at the time it was established, there is no guarantee that it is still valid after some years. Value, economic conditions, rate of return and all of the other factors that derive a fair royalty have dynamic properties. They constantly change and so must their underlying analysis that establishes royalties. Use of established industry norms fails to reflect changing conditions.

## **Return on R&D Costs**

Basing a reasonable royalty on the amount that was spent on development of the intellectual property could be terribly misleading. The amount spent in the development is rarely equal to the value of the property. The millions of rupees spent on research relating atomic energy, space, defence etc. may yield to the Indian Government very little intellectual property.

A proper royalty should provide a fair return on the value of the asset regardless of the costs incurred in its development. The underlying value of intellectual property is founded upon the amount of future economic benefits. Factors that can limit the

benefits include the market potential, the sensitivity of profits to production costs, the period of time over which benefits will be enjoyed and the many other economic factors that were discussed. The development costs do not reflect these factors in any form. Basing a royalty on development costs can completely miss the goal of obtaining a fair return on a valuable asset.

### **Return on Sales**

Royalty based upon a percentage of revenues<sup>i</sup> sales has several primary weaknesses. The first difficulty is the determination of the proper allocation of the profits between the licensor and the licensee. Another area of weakness is the lack of consideration for the value of the intellectual property that is invested in the enterprise as well as a lack of consideration for the value of the complementary monetary and tangible assets that are invested. Finally, this method fails to consider the relative investment risk associated with the intellectual property.

There is no rigid formula for determining the price of intellectual property and thus estimates vary from case to case. The price of know-how/intellectual property normally ranges between 2% to 10% of either the plant and equipment cost or projected turnover production of the unit for a period of 5 years. However, the price would depend, on the estimates of opportunity value and "what the market can bear" Besides, the realisation of price could be divided between lump sum amount and recurring royalty payments. Although it would be in the interest of licensor to realise as much of the price as is possible through lump sum payment, the licensee's interest would be to pay the price only through recurring royalty based on production. Thus, balance has to be struck between these two components.

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## **6.11 TECHNOLOGY TRANSFER AGREEMENTS**

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A Technology Transfer Agreement is a contract between the licensor and licensee, detailing the scope of services and terms and conditions from both sides. Drafting of this agreement is often a highly complex job requiring considerable skill and experience, since the interests of the two parties may sometimes be conflicting. However, the obligations of the licensor and licensee may broadly relate to the following

### **Obligations of the licensor**

- a) Supply of the technical means
- b) Technical assistance to the staff of the licensee
- c) Provision as to the results and consequences of non-satisfaction of the guarantees.
- d) Exclusive and non-exclusive rights
- e) Preservation of secrecy
- f) Title of the licensor
- g) period of agreement
- h) Force majeure
- i) Intellectual property rights
- j) Updated technologies and improvements
- k) Technical information
- l) Training
- m) Help in marketing and exports
- n) Settle nent of legal disputes
- o) Access to R&D



**Obligations of the licensee**

- a) Payment
- b) Secrecy
- c) use of the know-how
- d) Minimum output
- e) Maintaining specified quality or standard
- f) Adequate technical and managerial standards and facilities
- g) Focal facilities for the experts/staff of the licensor
- h) Access to the factory premises as required
- i) Legal disputes

**Activity 5**

Are you aware of any agreement made between the two firms? If so , what were its salient features and how was it implemented?

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There-have been several studies regarding the technology transfer agreement at national and international levels, and even model agreements have been evolved by the UN and national governments in several countries including India. However, these remain only guidelines, and technology transfer is more an expression of mutual faith rather than a legal issue.

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**6.12 CODE OF CONDUCT FOR TECHNOLOGY TRANSFER**

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It is widely felt that firms including transnational corporations (TNCs) in developed countries exploit firms in developing countries while transferring technologies, and unfair practices prevail to the disadvantage of the latter. The United Nations Conference on Technology and Development (UNCTAD) has been making attempts for the last more than a decade, to formulate a commonly accepted code of conduct, taking into account the interests of all the parties concerned. However, this effort has so far not succeeded due to differences between the North and the South, and several issues such as laws of the land, restrictive practices, etc. Nonetheless, the documents that have'been prepared so far have served as guidelines and have created awareness about the various issues which need to be examined while entering into technology transfer agreements.

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**6.13 GOVERNMENT INITIATIVE AND TECHNOLOGY TRANSFER**

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Many Governments in advanced countries encourage the introduction/import of new technologies to help or generate business development and economic growth. In countries, such as Sweden, Japan, South Korea etc., the Governments have instituted programmes of technology search whereby local companies and consultants are encouraged to set up networks of foreign contacts in other advanced countries to identify innovative products that could be made under licence in their country. These initiatives seek to use importation of technology to rejuvenate industries and initiate new product

development. The innovation and economic growth is ultimately bound to follow the path of simulating R&D spending as a way to promote greater product innovation. These countries have excelled in technology innovation and in many cases improved upon the technology. Japan has become a major supplier of sophisticated technology to developing and developed countries.

### **Government Regulations in Developing Countries**

Indiscriminate entry of inappropriate technologies will go against the declared national development objectives/priorities. It is in this context that most of the developing countries have established effective official mechanisms for determining the type of technology suitable to particular circumstances of their economies, and have developed systems and procedures for collection of information and data on technologies so as to strengthen their negotiating strength with the technology suppliers.

The scope of these regulations covers a wide spectrum of issues. All of these include the establishment of a national registry incharge of screening and authorising a particular technological transaction. They define the transaction to be controlled by the registry. Special requirements or criteria like contribution to domestic technological capabilities, training local 'personnel and processing of domestic resources etc. are generally prescribed. Another important aspect relates to policies restricting the direct cost of technology transactions; i.e., a ceiling on remittance of royalties, control of payments for unused patents, direction of the agreement, control on excessive prices etc. The regulatory system does not generally encourage indigenous development and the production is based on second or third generation technologies.

### **Structure for Licensing Service**

The use of licensing to help local development requires four key inputs

- i) Information on licensing opportunities
- ii) A database on potential client companies
- iii) Technical personnel to interpret both the requirements of client firms and the offerings of potential licensors.

(i) and (ii) could partly be provided by recourse to existing resources of a company. Ministry of Science and Technology and a few other ministries have established specialised departments for creation of database. The information is made available to the enterprise to supplement their own information systems.

In India, most of the technologies are transferred from industrially advanced countries through various routes, the more popular being the route through licensing arrangements. There have been over. 12,000 foreign collaborations in the past, 80% of which are from eight developed countries such as USA, Japan, West Germany, France, and Italy. Some of these foreign collaborations had equity participation also, the foreign investments being of the order of Rs. 500 crores per year. There are several instances of transfer of technology from R&D organisations to industry, mostly in areas of low technologies or technologies relevant to Indian conditions. The CSIR has played a major role in this respect, while technologies from Defence R&D, Department of Space, Department Atomic Energy, etc. are also now being transferred to industry. There are very few instances of transfer of technology from one firm to another. In some areas such as chemicals & pharmaceuticals, construction, textiles, steel, hotels, cement and management, India has even exported "technologies and services to other developing countries through licensing arrangements or contractual arrangements or joint ventures. Government is now paying greater attention to exports of technologies and services.



## Indian Experience

The Industrial Policy Resolution of 1948 and the Industrial Policy of 1956 provided the basis for government policy for foreign investment and also in making available to the country the Scientific, technical and industrial knowledge. The transfer of technology was conceived to be a part of the flow of foreign capital and accompanying the technical collaboration.

In 1961 selective foreign private investment and foreign collaboration were introduced. The Policy was to attract foreign capital in those fields in which the country needed development'in pursuance of the plan targets... economic development also for generation of employment..

The policy towards foreign collaboration was further liberalised in 1970 for bridging technological gaps that existed in several sectors of industry. The Industrial Policy Statement of 1977 took note of continued inflow of technology in sophisticated areas. The policy statement gave preference to outright purchase of best available technology and then adopting it to meet the needs of the country.

In the Industrial Statement of 1980, induction of advanced technology was favoured for encouraging exports and production of quality products at competitive prices.

Technology Policy Statement of 1983 was directed toward technological self-reliance. In the acquisition of technology, consideration was given to the choice and sources of alternative means of acquiring it, its role in meeting a major need of the sector, selection and relevance of the product, etc.

The Government of India in its Policy Statement of 1991 liberalised most of the restrictions in technology import. The policy is aimed at encouraging foreign investment upto 100 per cent in most of the sectors with a view to promote exports competition in Indian industry and production of better quality products. The regulatory procedures have been abolished with respect to many industrial sectors to allow free flow of technology.

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## 6.14 SUMMARY AND CONCLUSION

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Technology transfer is a process or activity to acquire technologies and is not a mere transfer of know-how from one person to another, although know-how transfer is an important part in it. There are various models regarding technology transfer. What model will be used would vary from case to case. We discussed various modes of technology transfer. In technology transfer, it is generally expected that transfer activity would stimulate economic and technological development in the economy.

The industrial enterprise should have a continued growth. The growth comes either from internal technology or technology acquired from outside. A technology search strategy is important for technology transfer and is part and parcel of the corporate plan of an enterprise. A company may select appropriate technology/product for manufacture and sign a technology transfer agreement with the licensor. But it should have a suitable R&D infrastructure for absorption and upgradation of the technology. An assessment of licensor's credibility and capacity to transfer the technology would be helpful in ensuring success of the project.

There are various factors which affect the pricing process in licensing. There are various analytical frameworks based on which the licence negotiations can be set.

One of these is to establish a framework of the various terms/matters of the agreement and evaluate licensor/licensee bargaining responses relating to them. However, these can only be regarded as aids to decision making and not as substitutes, since licensing negotiations depend very much on human factors. In licensing, as in many other aspects of business, skilled negotiations are a vital factor in business success.

The objective of technology transfer is to enlarge business opportunities and to maximise profits for the enterprise. The determination of a fair price for technology is important. The different methods of compensation for a technology package were discussed along with factors affecting payment.

In advanced countries market forces dictate technology development and technology inputs. There is relatively unrestricted flow of technology. The experiences of developing countries vary. South Korea has emerged as one of the industrialised developing countries with active support and encouragement provided by its Government. In many developing countries, the Government regulations restrict technology transfer. These restrictions may retard development of industry and hence the economic growth of the country. A country should have a well organised information and data bank system on national and international technology. The necessary information should be made available to industry so that the latter can select the best and competitive technology for induction.

Advanced countries and transnational corporations generally follow restrictive practices while transferring technology to developing countries, mainly, because the latter are in a weak bargaining position. UNCTAD - a UN Agency - has been making efforts for about a decade to evolve a 'code of conduct' for 'Transfer of Technology' to ensure fair returns to all parties concerned but has not met with much success so far.

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## 6.15 KEY WORDS

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**Licensor** : Seller or supplier of technology.

**Licensee** : Purchaser or recipient of technology.

**Technology Transfer** : Transfer of knowledge generally through purchase of technology for use.

**Bridging agencies** : Government departments and promotional organisations acting as support agencies for development and use of technology.

**Active Mode** : Assisting the potential use of technology in transferring and in the application of technology.

**Technology transfer agent** : Someone who will listen to the user's problems and advise on the appropriate technology, e.g., a consultant.

**Search Strategy** : Strategy to find new product/project suitable for license in accordance with overall business strategy.

**Resources** : Financial, managerial, technical resources and material available for implementing the project.

**Technology package** : A package of technology components including detailed procedures and instructions for implementing the project.



**Production techniques :** Manufacturing procedure for a product

**Franchise :** Giving of licensing rights by the technology owner or supplier to the licensee to manufacture a given product.

**Adoption of Technology :** Involves carrying out required changes/modifications in the technology/design acquired from licensor to enable the use of local raw materials and purchase items.

**Royalty :** Financial compensation payable to licensor for use of intellectual property rights, as a percentage of turnover or profits, for a limited period. **Lump**

**sum payment :** One time payment for use of know-how or technology.

**NPV :** Net present value of money.

**Intellectual property :** Knowledge, know-how or technology.

**Intellectual fee :** Financial compensation payable for use of knowledge, know-how or technology.

**Regulations :** Rules and procedures introduced by the government.

**Data Bank :** Collection, storing, processing and dissemination of technical information.

**Information Service :** Technical data made available to the user.

**Licence Agreement :** Contractual agreement to acquire technology from outside agency,

**Code of Conduct for Transfer of Technology :** Fair code or guidelines and norms beneficial to the licensor and licensee.

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## 6.16 SELF-ASSESSMENT QUESTIONS

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1. What is Technology Transfer? What is the impact of technology transfer on industries and economic development of a country?
2. Discuss the role of technology transfer and its key factors, as applicable to an enterprise.
3. Why should we regard technology as a strategic element and a strategic resource?
4. Differentiate between various Models of Technology Transfer.
5. What are the modes of technology transfer? What mode of technology transfer is normally followed in developing countries? Give an example that you know of regarding modes of technology transfer in India.
6. Explain Technology Search Strategy with reference to technology transfer. How is a Technology Search Strategy developed for an enterprise?
7. Give examples of Positive and Active modes of technology transfer.
8. Why should a company go in for technology transfer to manufacture a new product or implementing a new project?
9. Discuss various routes available for technology transfer.
10. *How* does an enterprise select suitable technology for implementation?
11. Discuss the merits and demerits of in-house technology development vis-a-vis import of technology from outside.
12. "The credibility and competence of the licensee are important for effective

- transfer of technology." Discuss. Support the statement through an example that you are aware of.
13. Do you agree that pricing of technology is an important factor in technology transfer? If so, Why? What are the considerations and norms for pricing a particular technology? Give an example.
  14. What is a "technology package" and what are its essential features?
  15. Discuss the role of "intellectual property" as applied to technology transfer.
  16. What are the methods of payment for a technology?
  17. Discuss the merits and demerits of different methods of pricing a technology. What, in your view, is the best method?
  18. What are the factors to be considered while entering into a technology transfer.
  19. For a licensee, which form of payment do you suggest for a technology-one time lump sum or royalty spread over a period of time? Give your reasons.
  20. Discuss advantages and disadvantages of liberalised import of technology.
  21. "Governmental regulations in India have retarded industrial growth in the country." Comment.
  23. Would you suggest free supply of (data bank) information to all as a service?
  24. Discuss the obligations of licensor and licensee in a Technology Transfer Agreement.
  25. What do you understand by Code of Conduct for Transfer of Technology?

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## 6.17 FURTHER READINGS

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