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Indira Gandhi National Open University
School of Law

MIP-108
MANAGEMENT OF IPRs

Economics of Intellectual Property 1

"शिक्षा मानव को बन्धनों से मुक्त करती है और आज के युग में तो यह लोकतंत्र की भावना का आधार भी है। जन्म तथा अन्य कारणों से उत्पन्न जाति एवं वर्गगत विषमताओं को दूर करते हुए मनुष्य को इन सबसे ऊपर उठाती है।"

— इन्दिरा गांधी

"Education is a liberating force, and in our age it is also a democratising force, cutting across the barriers of caste and class, smoothing out inequalities imposed by birth and other circumstances."

– Indira Gandhi

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MIP-108
Management of IPRs

Block

1

ECONOMICS OF INTELLECTUAL PROPERTY

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MIP-108 MANAGEMENT OF IPRs

In this Course we will be dealing with the management of IPR. The concept of management of IPRs gained momentum since the beginning of the era of knowledge based economy.

Many economists and management thinkers suggested various management approaches and financial instruments to guide the IP managers for proper utilization of intangible assets. As a result companies had to hire professional IPR managers to optimize the returns of intangible assets for their companies.

This Course consists of four blocks.

Block 1 – Economics of IP

Block 2 – Valuation of IP

Block 3 – Commercialization of IP and

Block 4 – IP strategies

Different blocks of this Course will deal with the different aspects of management of IPs.

Block 1 will deal with the economics of IP wherein the concept of IP management, need for IP management, approaches to IP management and attributes of a good manager will be dealt with. Also this block will cover topics like changing concepts in IPRs values, Economic nature of IPRs, Economic relationship of innovation with industry & society. We have tried to cover the important topics like conception of idea, method of inventing, stages from mind to patent and last but not the least the financing of IP.

Block 2 will cover the different theories and approaches of IP valuation, qualitative and quantitative evaluation approach, econometric approaches to valuation, types of valuation, method of valuation, intellectual property audit etc.

Block 3 will cover the commercialization aspect of IP, wherein the concept of intellectual property and its commercialization will be dealt in wholly. This block also deals with licensing, where the topics will relate to different forms of licensing like voluntary license, compulsory license etc. We will also deal with portfolio development and licensing, cross licensing etc.

Block 4 of this Course deals with IP strategies wherein the block will cover topics on royalties patent strategies, patent mapping, patent pool and open source.

1 Block = 30 hrs of study

4 Block = 4 x 30 hrs of study = 120 hrs of study

You need to dedicate 30 hrs of study for each blocks.

Good Luck and Happy reading!

BLOCK 1 ECONOMICS OF INTELLECTUAL PROPERTY

Unit 1 of this course deals with the economics of IP. This Course consists of four units. The first Unit of this Course deals with the overview of Intellectual Property Management. In this unit we will studying about the concept of IP management, history of brand management, intellectual property assets, Intellectual capital management, strategic management of IP, approaches of Intellectual property management and the factors affecting intellectual property management behaviour.

Unit 2 of this Block deals with the economic concept of IP, wherein economic of patents, IPRs as a source of Economic value, Economic nature of IPRs, Theories on effects of Patents etc are dealt with.

Unit 3 of the Block covers topics like conception of an idea, differences between an idea and invention, actual methods of invention, formulation of objective solution, critical analysis of their solution etc are dealt with.

Unit 4 of this Block deals with the financing of IP. This Unit covers issues like sources of IP financing debt finance, govt grants, equity, etc.

UNIT 1 OVERVIEW OF INTELLECTUAL PROPERTY MANAGEMENT

Structure

1.1 INTRODUCTION

Emerging trends in the growing demand for knowledge-based products and services have changed the global economy environment considerably. The importance of knowledge as competitive advantage factor is bringing forth knowledge management issues at the fore fronts in every organization. Given that there is no consensus on what knowledge actually is, many do admit that knowledge has emerged as a critical competitive factor in business today. It is now well established that knowledge accumulation, its transformation into legal protection, exploitation and valuation is crucial in the management of intellectual capital. You may have heard a lot about the business strategy and IP strategy of the leading successful multinational organizations. There are many business models and approaches that these organizations adopt for their sustainable growth in the trade. On the contrary, the approaches to IP strategy seem to be focused mainly on its importance to the organization. In this unit we will study how knowledge is transformed into intellectual

property or intellectual assets of the organization. We will also study how the knowledge management is effective in leveraging the market value of the organization and how it is useful in creating competitive advantage for the organization. In this unit, we will study the IP strategy of the organization and various approaches to its implementation and development. We will also take stock of the various essential components of the IP management and their interplay in formulation of a sound IP management strategy of an organization, what is IPR management, its advantages for an organization, and essential elements of IP management?

1.2 OBJECTIVES

After reading this unit, you should be able to:

- identify the importance of managing IP;
- explain the different types of Intellectual capital;
- distinguish between human capital, structural capital and relational capital; and
- analyse the basic elements of IP management strategy.

1.3 CONCEPT OF IP MANAGEMENT

The concept of management of IPRs is gaining ground since the beginning of the era of knowledge based economy. Until the end of eighties, the management policy of the organizations were focused on the management of what was known as 'brick and mortars of industry' i.e. land, labour and capital. Beginning of nineties saw the emergence of 'pro IPR era'. Today, the new economic concepts like 'knowledge economy', 'knowledge capital' and 'intellectual capital' are finding place in the board room discussions. Not ten, fifteen years ago, patents were treated as rather a mercantile item. Patentee held them like gold to have good value in future. They were not taken as 'asset to make perform' but were viewed as an 'asset to keep', like building where trespassers were not allowed. In fact the companies began paying attention to intangible assets around the '70s, and now it's at its peak. One reason for this was the expenses to keep and enforce them became unmanageable due to significant growth in number of patents in different countries. Perhaps then, the idea to sell or lease out some unused patents, struck in the minds of some innovative IP managers. Though this was a new beginning in intellectual property rights yet it was not a new thinking to sell or lease out a property which one cannot use immediately. But its application to intangible property raised many pertinent issues for IP managers. One of biggest accounting challenge faced by the IP managers was to find the actual value or acceptable value of a patent or brand. Many economists and management thinkers suggested various management approaches and financial instruments to guide the IP managers for proper utilisation of intangible assets. Consequently many companies hired professional IP managers to optimize the returns of intangible assets for their companies.

1.4 HISTORY OF PATENT MANAGEMENT

Historically speaking intangible asset which played significant role in world economy internationally was the patent ownership. During the pre war period the Europeans

companies dominated the scene, but the U.S. emerged as the stronger patent player after the post war. The Japanese learned about it when they were hard hit to pay a lot of royalty to U.S. companies for its intellectual properties. Initially U.S. companies focused mainly on holding the patents and manufacturing internally. But later these companies went on to realize the importance of patents as money spinners and emerged as leaders in out-sourcing the technology through licensing and franchising activity. The idea of licensing, asserting patents, and creating third party patent pools is basically invented by US companies. Earning through enforcement of patent right gained momentum as many courts pronounced heavy penalties on the infringers. Who can forget the Polaroid vs Kodak patent infringement suit where Kodak paid $925 million to Polaroid and where Kodak was forced to close down its instant camera business? In another historical suit between Fonar and GE Medical Systems, Fonar received $110 million from GE Medical Systems for infringing on the rights of two patents for MRI inventions developed by Fonar's chief executive Dr. Raymond Damadian. In other word Intellectual property is made valuable by its successful enforcement.

1.5 HISTORY OF BRAND MANAGEMENT

Similarly idea of earning through brand value gained importance. In no other moment in history, has brand assets been as lucrative and profitable as now. Branding is a multi-billion industry at present.Who can dispute the awareness of the Coca-Cola Company about the value of this intangible asset? Coca-cola brand is estimated to be worth US$68 billion. Similarly the MARLBORO trademark is worth $40 Billion worldwide. As the awareness of the importance of brand as valuable resource spread more and more international companies joined the fray to cash their band assets. This trend was particularly visible in 1990 when many knowledge based companies joined the international trade arena.The brand value global top-10 most powerful brands is given in Table 1.1.

Table 1.1: The global top-10 most powerful brands

Rank	Company	Brand Value [US $ billions]
1	Google	$100.0
2	Microsoft	$76.3
3	Coca-Cola	$67.6
4	IBM	$66.6
5	McDonald's	$66.5
6	Apple	$63.1
7	China Mobile	$61.3
8	General Electric	$59.8
9	Vodafone	$53.7
10	Marlboro	$49.5

1.6 IMPORTANCE OF INTELLECTUAL PROPERTY ASSETS

In the knowledge based economy the IP assets are emerging as key business assets of the organizations. In the study conducted on the components of S&P 500 (Standard & Poor 500) market value (source Ocean Tomo) it was observed that between 70-90% of the market value of the public companies is attributed to its IP assets. Ocean Tomo 300 Patent Index based on the 10- year performance of the companies further demonstrated that companies with comprehensive IP portfolio outperform the companies without IP base in terms of their market evaluation. Tom Carson innovation Asset group rightly observed that "the management of IP assets can no longer be considered a discretionary function, nor it can is solely the domain of the legal department. It must be treated as the core component of the business strategy. Intellectual property has demonstrated to have material impact on the valuation of the public companies." Recent survey by PricewaterhouseCoopers (PwC) indicated that over 80% of the executives believe that the importance of intellectual capital to the value of their companies will increase over the next three to five years. With IP contribution over 80% towards the market value of the public company, one would expect alignment of IP strategy with the business strategy as top priority of the senior business management. But in reality, intellectual property remains a poorly managed asset. However one look at the balance sheet of the IC rich companies like Microsoft ,it is observed that its market value exceeds its book value by over 13 times. Similarly when you look at a large company like General Electric, a conglomerate; and you will see that the book assets only represents about 10% of GE's market value. Same is true for the market value of the IC giants like Google, Netflix, Apple etc. You will observe the 'big-gap' between the value of their tangible assets and their market value. One may question where is the other big gap of assets? In reality the big gap assets represent the human capital, intellectual property, quality, and all those other forms of knowledge that generate the cash flows for these companies. Book values and market values of some leading companies are given Table 1.2.

Table 1.2: Book value and market value of some leading companies

Organization	Book Value	Market Value
Google	$ 19 billion	$197 billion
Netflix	$290 million	$12.8 billion
Apple	$55 billion	$272 billion
General Electric	$19 billion	$194 billion

1.7 INTELLECTUAL CAPITAL MANAGEMENT MOVEMENT

In 1980 Hiroyuki Itami a Japanese Management professor in his book "Mobilizing Invisible Assets" was first to kick start the concept of intellectual capital management as a discipline of research study. He was first to study the effect of *invisible assets* on the management of Japanese corporations. Later in 1986, David Teece

of UC Berkeley in his article "Profiting from Technological Innovation" laid foundation of suggesting several ideas that were key to management capability for extracting value from innovation and gelling it with the economist's view of technology commercialization. This article and subsequent work of Teece identified sources of value in technological innovation, the mechanisms for converting value into profits, and the steps necessary for commercializing innovation. It was Karl-Erik Sveiby a Swedish professor, who spear headed the Swedish movement of knowledge management and intellectual capital management in 1990. He was first to divide the intellectual capital into customer capital, individual capital, and structural capital. His concept was adopted by many Swedish companies in1993 while preparing their annual reports. Later in 1995, Leif Edvinsson Corporate Director of Intellectual Capital at Skandia AFS, a Swedish insurance company, inspired by Sveiby work clubbed these intangible assets into one group and named them as 'intellectual capital' while writing first annual report supplement for Skandia. His work added new dimension to the study of these 'hidden assets' in the intellectual capital management. Intellectual property rights management is complex and dynamic process. On one hand it requires the critical assessment of the Intellectual Capital (IC) of the organization and on the other hand it calls for protection and exploitation of the Intellectual Property Rights derived from the Intellectual Capital. This requires strategic approach to management of Intellectual Capital (IC) of the organization and Intellectual Property (IP) derived by it. Before we proceed further let us understand the meaning of the terms 'Hidden Assets', 'intellectual capital' and 'intellectual property'.

1.8 CONCEPT OF HIDDEN ASSETS

The traditional accounting logics fail to explain the dramatic difference in the market value of these organizations as compared to their actual financial assets. Scholars used practice of accounting of Intellectual Capital as part of the organization capital, though a new but acceptable economic phenomenon, to explains the high market value of these high-knowledge organizations. IC has now emerged as important strategic asset for sustainable competitive advantage. IP assets emerging as the major element in valuing the market worth of the organization, intellectual capital is viewed as important source of wealth and competition. End of nineties saw this inclusion as major determinant for assessment of the market value of an organization. Over value of knowledge based companies like Google, Netflix, Linkedin, Apple, and General Electric is based on the value of their intangible assets for determining their market value which in fact was many times over their hard assets value. Traditional economist observed this 'big-gap' between the value of their tangible assets and their market value. Similarly the increasing big gap between intangible vis-à-vis tangible assets for most industrial sectors has been affirmed by various researchers.

1.9 STAGES IN INTELLECTUAL CAPITAL MANAGEMENT (ICM)

Success of business basically depends on how it is managing its intellectual capital. No doubt successful managers are managing their intellectual capital (IC) one way or another. This does not indicate that they have concrete intellectual capital management (ICM) plan or strategy. Managing IC on the basis of common business ingenuity is not adequate to build the IC management competency. This

requires converting this art of management to systemically applied principles and planned processes that can be easily predicted, tested, measured and perfected like other scientific methods. Only then can it be substantially transformed from being an art to becoming a science. Once these methods become scientific they can be easily repeated. Before we proceed further let us identify the stages involved in ICM. For better understanding we can divide it into five stages.

Ist Stage-Establishment of Human Capital: First stage represents the stage where the knowledge resources are obtained, sustained, and managed for value creation. This stage is responsible for establishment of the Human capital for the organization. During this stage organizations start hiring skilled professionals, and motivated them to solve business problems and providing competitive solution for the progress of the organization. Management of human capital is essential for converting knowledge resources into valuable intellectual property assets.

2nd Stage - Establishment of innovation Capital: This represents the stage of innovation and value addition. Innovation of better processes and new product is a continuous and non stopping exercise of every successful organization. Every vigilant manager seeks to find better ways of production by reducing costs of production or increasing the speed of production. Intelligent managers keep eye on developing new products or improving the existing product to stay as competitive market leader.

3rd stage - Creation of Intellectual property Capital: This represents creation, maintenance and auditing of intellectual property assets and liabilities. Innovation capital of the organization is immense. A successful manager is one who rightly finds and selects the inventions which have high economic value. All these inventions are protected by patents or designs for future exploitation. He also take stock of the existing IPRs for purpose selecting the only useful for payment of annual annuities and dropping ones which are not in use. The purpose of payment of annual annuities is not only to keep those which are useful but also those patents in force which are created or obtained for proper fencing of a valuable invention.

4th Stage - Exploiting and Enforcement of Intellectual Property Rights: This stage represents Intellectual Property Management for value extraction and maximization of returns for IPRs like patents, designs, trademarks or copy rights. Here the IP manger takes decision to license the technology or file suit relating to infringement of IPRs to earn revenue for the organization through sale, royalty or received damages.

5th stage - Re-pooling of profits for R&D: This stage is important for the organization as it provides the required resources for future R&D projects. Usage of earning from sales, royalty etc. in various organizational activities is the function of top management. IP Manager uses such earning from sales, royalty etc. to reward the professional workers engaged in research and development for not only sustaining market dominance of organization but also diversification of its sphere of activity.

Though many successful organizations apply ICM to advance this goal but there is no one size which is appropriate for all method of ICM. One of the most acceptable ICM model is given in Fig. 1.1.

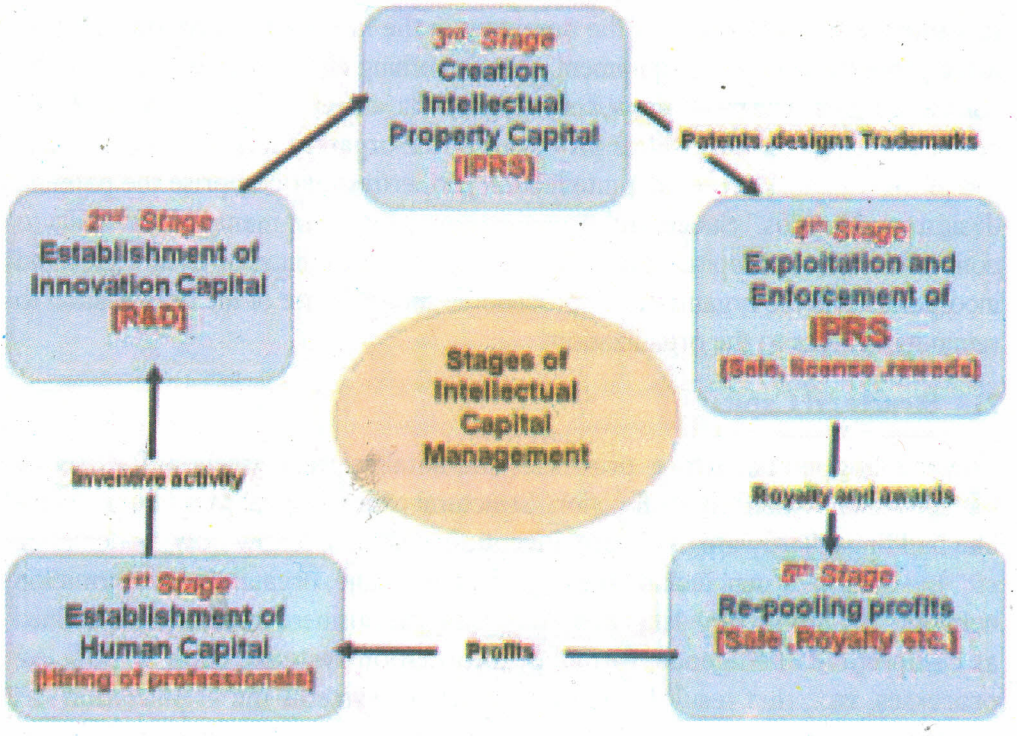

Fig. 1.1 : Stages of Intellectual Capital Management

1.10 INTELLECTUAL CAPITAL DEFINITION

Intellectual capital is defined as the collective knowledge documented or otherwise of the individuals in an organization which is responsible for producing wealth, multiplying the output of physical assets and gaining competitive advantage. Intellectual Capital (IC) is the intangible asset of the organization comprising collectively of all the resources and assets that does not form part of traditional accounting system. According to Klein and Prusak Intellectual Capital is defined as intellectual material that can be formalized, captured and leveraged to produce a higher value asset. This term is synonymous with Intangible Capital or hidden assets or knowledge Capital. Sullivan defined Intellectual Capital as Knowledge that can be converted into profit. Intellectual Capital is crucial for knowing the value and the competitiveness of an organization.

There are varieties of ways in which Intellectual Capital has been defined but the scholars unanimous divided Intellectual Capital into three elements.

1) Human Capital

2) Structural Capital

3) Relationship/Relational Capital.

1) Human Capital

Human capital of an organization is the combined human capability of its employees in solving business problems and providing competitive solution for the progress of the organization. Human capital also covers how effectively the management uses its human resources as source of creativity and innovation. Human capital is defined as the collective value of the organization's intellectual competencies, knowledge, and skills. Human capital covers employees' professional knowledge, skills, and experience. This intellectual capital is not owned by the organization. It goes with the employee as he leaves the organization. Human capital is central

to value the market assets of the company in the knowledge economy. If you leave property, plant, and equipment, there's nothing else in the company but the human resource. The professional knowledge, skills, and experience of the employee define and execute the business processes of the organization. Human capital is therefore, valuable in creating intellectual properties that comprise the patents, designs and brands. Successful organizations adopt best management skills to convert the Human capital into structural capital like patents /other IP rights and incorporate it in the organizations' procedures and structure of the organization to retain its benefits to the organization.

2) Structural Capital

The enabling infrastructure, processes and databases are essential for driving human capital to perform its function. Structural capital includes traditional things like buildings, hardware, software, inventions, patents, Know how, trademarks, etc. In addition, it may include the organization image, organization information network, and proprietary databases. According the business directory it is defined as competitive intelligence, formulas, information systems, patents, policies, processes, etc., that result from the products or systems the organization has created over time. It does not reside in the heads of the employees. It is this Intellectual capital which always remains with the organization even if the employee leaves the organization. It basically covers patents, techniques, procedure, business methods that enhance the delivery of goods and services. Structural capital is one of the three types of intellectual capital. It can be further divided into three types of capitals (a) Organizational capital (b) Innovation Capital and (c) Process Capital.

a) **Organizational capital** includes the organization philosophy and systems for leveraging the organization's capability. IC managers formulate the policy and philosophy of the organization that forms the basis of their decision making in relation to enhancing the competence of the organization. This also provide overall direction to all employees and prompt them to improve their performance to meet the standards set to achieve the desired goals .

b) **Innovation capital.** It is defined as the ability of an organization to produce valuable change in the transition from a knowledge-based company to an innovation based company. It may cover the patents obtained by the organization for (a) Machine: apparatus or device with interrelated parts that work together to perform the invention's designed or intended functions, (b) Manufacture: all manufactured or fabricated items, (c) Process: chemical, mechanical, electrical or other process that produces a chemical or physical change in the condition or character of an item and also covers chemical compounds or mixtures having properties different from their constituent ingredients. Innovation capital covers all intellectual properties and intangible assets of the company. Intellectual properties are protected commercial rights such as patents, designs, trademarks, knowhow, trade secret and copyrights.

c) **Process capital** covers all the techniques, procedures, and programs that implement and enhance the delivery of goods and services of a company. Production managers in every organization lay down certain plans and procedures that must be adopted by production team to meet the timelines and quality of goods. At times these plans and procedures are re-adjusted to meet the requirements of improved techniques. All the recorded or unrecorded changes form part of the process capital for future reference to

the production team. When such improvements in techniques are substantive, they may be converted into innovation capital.

3) Relationship/Relational Capital

Relationship /Relational Capital consist of brands, licenses, franchises, and customer interactions and relationships. It also covers customers, suppliers, networking skills with industry and government. This capital is useful in building the brand equity of the organization and improving the image of the organization. Cordial customer relations with better customer satisfaction in fact assist in enhancing brand loyalty. All consumer goods producing organization has a sound relational capital base.

The intellectual capital and its type are given in Figure 1.2.

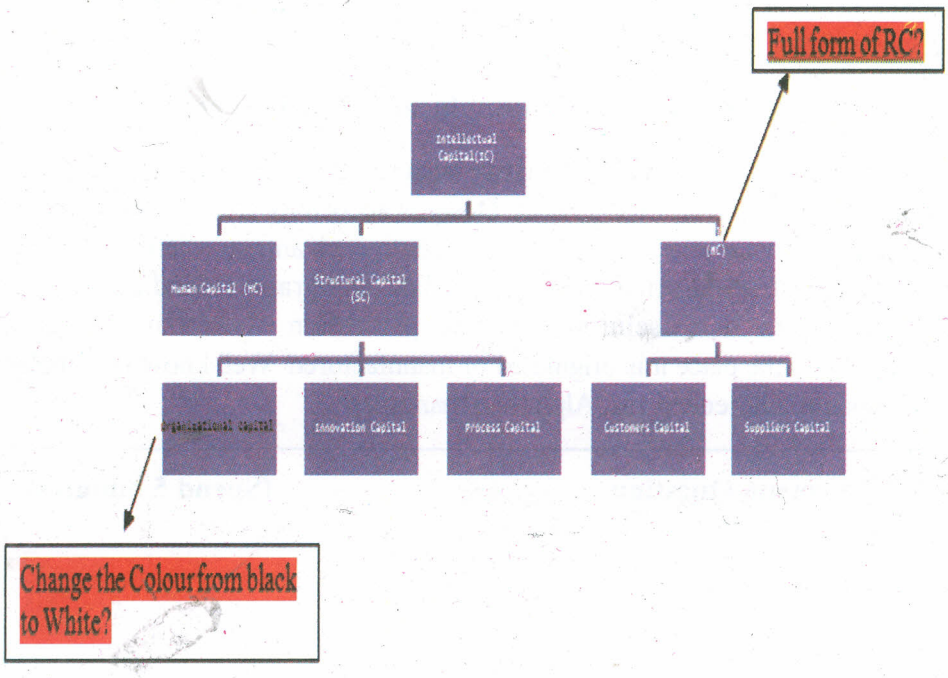

Fig. 1.2 : Types of Intellectual Capital

1.11 INTELLECTUAL PROPERTY

What is Intellectual Property?

Intellectual property is the intangible asset of the organization comprising of legal and non legal assets. Intellectual assets of the organization covers all the legal rights like patents, designs, trademarks and copyrights, and non legal rights like trade secret, knowhow, non disclosure agreements etc. held by the organization. Since organizations differ in their goals, different IP strategies must be formulated for achievement of intellectual property policy objectives relating to the management of the IP assets held by the organization and converting IP into IP Asset.

Non legal assets

These assets comprises of that component of intellectual property which can be legally protected and enforced under the law. Under Legal assets organization may have registered assets such as Patents, Trademarks, Designs, Copyrights and agreements.

Non legal assets

The non legal assets of the organizations may comprise of unregistered but recorded assets. Under these assets organizations may have lab note books, trade-secrets, software, databases, confidential information, and non-disclosure agreements.

Widely known IPRs: Patents, Trademarks and Trade secret

Patents, Trademarks and Trade secret are widely and well recognized IPRs in the trade community. While Patents are essential for competitive advantage and establishment of monopoly in inventions and innovations, trademarks are useful tool to reap the advantage of the monopoly gained through goodwill and established market position in goods and services. Trademarks are also useful where product life cycle is short. Trade secret essentially represents the strongly guarded secrecy about the product formulations e.g. Coca-Cola. Trade secret in some cases is closely guarded secret information relating to trade.

Lesser known IPRs: Designs, Geographical indications etc

Designs, Geographical indications, layout designs, and plant breeder's right are lesser known and sparsely used IPRs. Designs according to business world is only differential that matters for gaining competitive advantage where companies are competing at equal price and functionality. Geographical indications are community rights. It is useful in providing protection where the product is characterized by the place it is originated or manufactured. Well known examples are Champaign, Darjeeling tea, Alphonso mango etc.

Self Assessment Question **(Spend 5 minutes)**

1) Explain human capital.

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2) What is meant by innovation capital?

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1.12 NEED FOR INTELLECTUAL PROPERTY MANAGEMENT

Management of intellectual ingenuity of an organization is critical for the growth of an organization. It requires the strategic management of the Intellectual capital and IP capital of the organization. In the knowledge based economy the financial assets are no longer sufficient to value the 'market worth' of the organization. The traditional accounting logics fail to explain the dramatic difference in the market

value of these organizations as compared to their actual financial assets. Scholars used practice of accounting of Intellectual Capital as part of the organization capital, though a new but acceptable economic phenomenon, to explains the high market value of these high-knowledge organizations. IC has now emerged as important strategic asset for sustainable competitive advantage. This requires strategic approach to management of Intellectual Capital (IC) and more specifically studying various approaches to patents Management.

1.13 APPROACHES TO PATENT MANAGEMENT

Managing patents assets is more than just acquiring the formal IP rights. Creating and sustaining patents requires policies decisions to be taken at management level. The importance of patents as a tool to stay ahead in the competitive market with advantage for organization depends on the interested field of activity, its business model and interplay with the strategies of its competitors. This calls for including IP considerations while designing business models and planning marketing strategies. Five basic patents management approaches according to Chiesa and Gilardoni can be classified as aggressive, active, selective, and passive and reputation based depending on the patent intent of the organisations..

Aggressive Approach

This approach is called aggressive as the patent intent is for increasing bargaining power. Followers of this school believe in obtaining multiple blanketing patents besides the strategic patents. The IP management of these firms supports the 'mind to market' goal while emphasizing on the importance of each innovation where new or more patents are desired. These firms file thousands of patents and patent applications as they consider patents as tools to maximize value by balancing the potential risks and opportunities in the consolidating their technology supremacy. (Example Computer industry – IBM)

Active Approach

This approach is called active as the patent intent is defensive and aims at revenue maximization. Patent strategy followed by this school is surrounding the main patent to safeguard the developed technologies and protect the R&D investment from competitors. For these firms patent is its most important assets. These firms protect their basic invention outflanking patents and also cover possible future applications. These firms file as many patents as possible in one technological field. Patents are used as 'scare crows' to ward of competitors. (Example Biotech firms – Newron)

Selective Approach

This approach is called selective as patent intent here is offensive and patent strategy is visionary. For the followers of this school IP activities are strategically focused, looking outside the company and into future lines. They consider patent as instrument to spread know-how that will allow the followers to fill the gap between them and the leaders. Company following selective approach to IP is broadly focused on the technologies that can be developed and patented in anticipation of some future use. These companies are averse to patent short cycle products but extensively patents inventions covering technologies likely to be useful to the competitors. (Example Electronic companies – Intel)

Passive Approach

This approach is considered passive as the patent intent is defensive with patent strategy revolving around single patent with an intention to bring down the cost of production. This IP management behavior is typical to particular industrial sector that immature and has low growth rate. Companies following this approach files few patents and make continuous assessment to find where it has more patent protection than necessary. A continuous review of selected patent allows the company to determine whether the annuity payments can be terminated without effecting their strong technology position.(Example Petrochemical sector – Snaprogetti)

Reputation Based Approach

Lastly, companies adopting a reputation-based approach to IP management believe patents as instrument to bolster a company's public image. This in fact is an imaginative approach to patent intent. For these companies, obtaining large number of patents with sole objective to create a pile patent portfolio bigger than their competitors and appear as a technologically strong enterprise. The companies having this behavior adopt a blanketing patent strategy which according to Chiesa and Gilardoni can be considered as the result of a wrong realization of on aggressive approach. (Example semiconductor industries)

1.14 FACTORS AFFECTING IP MANAGEMENT BEHAVIOUR

Most of the Companies are willing to extract full value from their intellectual property capital. They invariable take adequate steps to develop an IP strategy for their business and seek to integrate it within their overall business strategy. At times part of a company's valuable IP may not require formal registration but may call for other measures of protection (e.g. confidentiality agreements, Non disclosure Agreements). Legally protected IP is not worth much unless it is adequately exploited. From the above discussion it is possible to identify several elements driving companies to follow particular IP behavior. Particularly it depends upon the factors which are industry specific or firm specific. These factors are:

1) Size of the organization/firm
2) Role of IP in the organization/firm
3) Field of activity
4) Strength of R&D
5) Capacity to take risk
6). Relevance of IP in industry
7) Competitive environment
8) Innovation pattern in the industry
9) Life cycle of the product
10) Financial resources – firm's liquid assets

Self Assessment Question **(Spend 3 minutes)**

3) Mention the factors affecting the IP management behaviour.

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1.15 THE BENEFITS OF IPR MANAGEMENT

Intellectual property assets are recognized as the most important assets of many of the world's largest icon companies. It has been the dominant factor in laying the foundation of their market dominance and continued profitability. It plays a significant role valuation of assets in mergers and acquisitions. IP rich companies are increasingly using licensing routes to transfer these assets to low-tax and cheap labour jurisdictions. No doubt future winners will be those companies who own and effectively manage intellectual property assets such as patent portfolio, brands etc. No sector has remained untouched by IPRs .The benefits of good IPR management include:

1) Increased returns on capital
2) Increased share value
3) Better aligned intellectual property development or acquisitions and business strategic objectives
4) Better estimation of the value of the capital tied up in intellectual property
5) Increased ability to take informed decisions about intellectual property development or acquisition
6) New and diverse revenue streams from intellectual capital especially from underused intellectual capital
7) Valuable intellectual capital within a large portfolio to be protected fully identified and IP with no significant value earmarked for selling or abandonment.
8) Optimized and lowered overall costs associated with intellectual capital development or acquisition, protection, and utilization
9) Increased IP literate work force for progressive growth of the organization
10) Competitive market standing

1.16 ATTRIBUTES OF GOOD IP MANAGER

Successful IP management in an organization depends on a good and able IP manager. Some of the key attributes of an individual to become a successful in the task for developing and implementing a coordinated company IP strategy are given below. These antibodies are identified by experts in IP Management.

1) His position

First and foremost requirement of a good IP Manager is his proximity to the top management. Basically his position in the company makes him effective IP manager. A manager in the company with authority to implement change is most successful IP manager. Therefore higher in the hierarchy of the organization an IP manager is placed, the better he would be in a position to influence the decision making process relating to IP management. However if the task of managing the IP strategy development and implementation is left to junior manger he may face many problems like (1) lack of awareness about the company direction and goals (2) lack of authority to implement changes (3) lack of support for change within the organization (4) his inability to muster the teams to develop and implement strategies.

2) Negotiation skills

Second primary requirement of good IP manager is his ability to negotiate. Negotiation skills are important for the implementation phase of an IP strategy as it involves demonstrating how valuable it would be for the organization in terms of generating revenue or saving expenditures, when he is making a case for introduction of a new IP management system, or seeking funds for a competitor patents portfolio review or justifying filing patents internationally or launching a new IP incentive program etc. His negotiation skill would take him long way as convincing seniors on IP issues is seen as wastage of useful time by senior managers of the organization.

3) Ability to identify and convert the tacit intellectual assets into explicit IP assets

In an ideal setting of a company all individual departments are designed to work very effectively in isolation and perform well to achieve good returns for the company. But in an IP based organization the challenge faced by the IP Manger is to identify the individuals of various departments and bring them together through appropriate connections to maximize the brainpower of the organization. The successful IP manager must be able to effectively bring teams together, and provide the environment for creative interactions. This ability is key to convert the tacit knowledge of the individual into explicit Knowledge asset for the organization.

4) Skills for planning and forecasting

Good IP manager should also be a visionary as economist planner. He must have the ability to forecast the future situation pertaining to intellectual property in his company vis-à-vis existing and prospective competitors. Every manager does not have the ability to plan and guessed IP future of their company. This skill is acquired by good legal training and sound business knowledge. Planning for and forecasting future IP scenarios is a real art. It requires intelligent gathering and analysis of market and competitive intelligence.

We also do a fair amount of "war gaming" and "white space" work which we have found has helped clients effectively plan for the future.

5) Sound legal background

Last but not the least a good IP manager can effectively develop and implement an IP strategy if he has sound knowledge of national and global IP systems. He must have some formalized legal training on IP matters. He may not be a patent Attorneys but must have all attributes mentioned above.

Self Assessment Question **(Spend 3 minutes)**

4) What is meant by negotiation skills?

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1.17 SUMMARY

Over last 30 years focus on Intellectual Property has shifted form a side-line concern to the fore-runner of business. Patent rich companies have high market value than the companies without patent. Brand value has also emerged as business strategy to gain competitive market positions. Best IP managed companies are emerging as business leaders. Management of IP strategically not only consolidates research and development position but also facilitate revenue generation. IP rights are now being increasingly used as more offensives and aggressive competitive weapons. Intangible IP assets are also being recognized as economic assets of the company besides being powerful tools for protecting business interests. Strategic management of IP assets creates advantages such as 'lock in of customers' (market penetration); 'lockout of competitors' (market control) and license-in and license-out (market sharing). There is no "one size fit all" IP management strategy. Different approaches to IP managements are popular in the industry.

1.18 TERMINAL QUESTIONS

1) Define Intellectual capital?
2) Explain what is meant by hidden assets of an organization?
3) Explain the various stages in Intellectual capital management?
4) Explain with illustrations various approaches to patent management.

1.19 ANSWERS AND HINTS

Self Assessment Questions

1) (a) (b) Refer to Section 1.10
2) Refer to Section 1.10
3) Refer to Section 1.14
4) Refer to Section 1.16

Terminal Questions

1) Refer to Section 1.3 and 1.10
2) Refer to Section 1.8
3) Refer to Section 1.9
4) Refer to Section 1.13

UNIT 2 ECONOMICS OF INTELLECTUAL PROPERTY

Structure

2.1 INTRODUCTION

Intellectual property rights denotes the legal doctrines that regulates the uses of different kind of human intellectual creations like ideas, inventions, creative and coined words, images and insignia. Copyright law provide protection to original forms of expression such as poetry, literary works, novels, movies, musical compositions and computer software programs. Patent rights protect inventions. Trademarks law recognise creative and coined words, images and symbols applied on the goods manufactured or supplied and services rendered by, particular persons or firms. Trade-secret law protects commercially valuable information (soft-drink formulas, confidential marketing strategies, etc.) that companies attempt to conceal from their competitors. The economic and cultural importance of these laws is gaining significance all over the world. This is also evident from the major changes in the intellectual property regimes of many countries during last two decades. The trend of strengthening intellectual property rights has been extended to the international arena first by signing of TRIPS agreement and now being debated in the WTO and WIPO meetings. Lawmakers throughout the world are still busy in reforming their IP laws either to meet TRIPS requirements or harmonising them with each other. Consequently most of the firms believe that fortunes of their businesses success depend heavily on intellectual-property rights. Over the years many theories of intellectual property have been put forth by many scholars and economists. The principal philosophical theory applied to the protection of utilitarian works – that is, technological inventions – has been utilitarianism. Utilitarian theorists contend that the creation of intellectual property rights is the most appropriate means to promote innovation. Non-utilitarian theorists on the other hand assert that the creators have moral rights to control their creative work. In this unit we will study the basic purpose behind granting of intellectual property rights by the state, economic policy changes relating to IPRs, theories of patents, economic significance of IPRs, global trends in economic impact of IPRs. We will also study the basic principles of economics of patents in particular.

2.2 OBJECTIVES

After reading this unit, you should be able to:

- identify the economic concepts in IP;
- explain the economic importance of IPRs;
- explain the economic nature of IPRs;
- identify the difference between invention and innovation;
- learn the economic theories of IP; and
- explain the theories on effects of Patents.

2.3 HISTORY

Establishment of modern patent systems in the first half of nineteen beginning with France in 1791 and ending with UK in 1852. During next twenty five years fierce debates in many European countries about the reform, even abolition, of their patent systems, prevailed among the commercial circle and economists. The

abolitionist lobby however faded away by mid-1870s, as most European countries retreated to tariff protection and free trade movement no longer held sway. However, amidst this debate we saw the strengthening of harmonization efforts which culminated in conclusion of the first international agreement on IPRs, the Paris Convention 1883.This marked the beginning of national treatment and open the gateway for patent protecting simultaneously in all countries of the Paris Union.

Patent Controversies to TRIPS

If we trace the history of patent system related policy changes we will come across five waves of policy changes since the beginning of "Patent Controversy" of the 1850s and changes in response to the changes triggered by the 1993 Uruguay Round agreements.

First period between 1850-1860 – This was the period of 'patent controversies' which triggered the debate on value of patent protection with many nations considered abolishing the patent system altogether and number of others nations weaken the aspects of the existing system.

Second period between 1880-1890 – During this period the Paris Convention of 1883 was adopted with establishment of Paris Union. This convention helped in establishment of international standards for treating patent application from other countries. This period also witnessed strengthening of patent system in various countries.

Third period in the 1920 – Patent Policy change during this period was driven by European nations who took various steps to ensure the harmonized patent protection across various nations.

Fourth period between 1960-1980 – This period was characterised by two important policy changes. First one related to scaling back of the protection offered to the patentee by some of the developing nations. For example India passed Patents Act, 1970 for allowing process patents in food, drugs and chemicals instead of product patents. Second policy change related to further harmonization of the procedural issue in patent matter when we saw the establishment of patent Cooperation Treaty in 1970. Another paralleled development was establishment of regional patent systems. Establishment Organisation Africaine de la Proprie Intellectuelle commonly known as OAPI (1st January 1964) and African Regional Industrial Property Organisation (ARIPO) were the examples of such regional cooperation. In 1973 we saw the establishment of the European patent system when European Patent Convention was signed and which culminated into establishment of European Patent Office in 1978. In the international scenario Convention on establishment of World Intellectual Property Organization was also signed during this period to promote the development of measures designed to facilitate the efficient protection of intellectual property throughout the world and to harmonize national legislation in this field. India Joined WIPO in 1975 a year after it was declared as Specialized UN agency in 1974.

Fifth period during 1990-2010 – This period earmarked the strengthening of patent protection mechanisms by nations in view of signing of the TRIPS agreement in 1994. This period also resulted in establishment of minimum standards of patent protection. An amendment of Indian Patents Act 1970 in 1999, 2002 and 2005 was result of this policy changes.

2.4 ECONOMIC OF PATENTS

Since early 1980s patent policy in various IPR regimes has been strengthened, broadened and extended to areas and sectors where earlier patents where either denied or not applied for due to fear of denial. Grant of patent to genetically modified microorganism in 1980 (***Diamond v. Chakarborty*** 447 US 303.100 s. ct. 2204) and business method in 1999 (***State Street Bank v. Signature Financial Group*** 525 US 1093, 1195 ct 88L) by Supreme Court in United State pushes the boundary of patenting beyond the traditional limits.The Bayh-Dole Act of 1980 of United States and various such legislative initiatives in other jurisdictions have pushed government-funded research in universities and government laboratories to effectively apply for patents. Earlier such research results were normally placed in the public domain. These policy shifts have in fact resulted in establishment of new paradigm in economics of intellectual property.

Self Assessment Question **(Spend 3 minutes)**

1) What do you understand by economic of patents.

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2.5 CREATIVITY AND ECONOMIC GROWTH

Economic growth of a society is linked to the proper utilization of resources by making them more valuable though creativity. Creativity of people is propelled by reward, recognition and riches. Human urge to live healthy, comfortable and stylish life is central to spin his desire of creating new products. Economic strength of society is measured by its innovative capability. With limitation of borders and resources, mad race is on to generate more economic value per unit of raw material in shortest possible time. The power of ideas to drive economic development and growth has emerged as propeller in economic agenda of national policies on development. Economists firmly believed that power of creativity and innovations generation have been a more powerful determinant of speed of productivity in the knowledge based economy than either increases in capital investment or improvements in the skills professional workers.This shifted the principle of development from 'economy of scale' to 'economy of speed'. It is in this context the IPRs are viewed as new valuable resources which defies the law of diminishing returns. According to economists grant of property rights in fact allows ensuring incentive and securing fruits of labour for creation of such valuable economic assets that are not a public good. In other words, granting of property rights in way leads to ensuring the transition of 'ideas in mind' into 'valuable economic assets in the market'.

2.6 IPRs AS SOURCE OF ECONOMIC VALUE

In era of digital age the 'Land, labour, capital' popularly known as 'brick and mortar' has been replaced by 'Knowledge Assets' as sources of added value for

an organization. Traditional drivers of product such as land, labour and capital have reached their limits to be valuable for the organizational growth. In twenty-first century knowledge and information is recognized as intellectual capitals which drive the wheel of success of any organization competing for market space of their products and services. In other words hardware based analog age is being replaces by software based digital age. With internet making access to information one click away, all barriers to knowledge are being removed. Consequently production strategy of 'mass production with limited variety 'prevalent in eighties are being replaced by 'small production with multiple products'. Even the development principle of the organization switched from 'economy of scale' in eighties to 'economy of speed' now. It emerged that every bit of increase in knowledge assets added to marginal increase in the performance of the organization. In other words knowledge assets are governed by 'law of increasing returns'.

Table 2.1 below depicts the paradigm shift in global economy and Intellectual property especially when one looks at the factors responsible for the performance of the organization during 1980 and 1990 with reference to the sources for added value, production strategy and development principles of the organizations.

Table 2.1

Paradigm shifts in global economy & Intellectual Property			
Factors	**1980**		**1990**
Sources For Added Value	Land, labour, Capital	⇒	Intellectual capital
Production Strategy	Mass production- limited variety	⇒	Small production-Multiple products
Development Principle	Economy of scale	⇒	Economy of speed
⇓			
Intellectual capital emerged as vital source of wealth and competitiveness			

2.7 CHANGING CONCEPTS IN IPRs VALUES

Let us look back and see what could have happened when the first inventive idea would have flashed the genius amongst the nomads who used to defend themselves from wild animals by hand only. Perhaps one person might have picked up a broken log accidentally to ward off the wild animals which may have resulted in killing that animal due to sharp edges of the log. This is how the first possible invention came into existence in the nomad society. This invented price weapon would have earned him fame and reward like additional wives and nothing more. It would have remained his price property so long as he had not given that to any other person. But disclosure of this technical idea might have stimulated many other people to invent better weapons. These intellectual creations with technical value were covertly protected by their owners in the society. This resulted into competition to produce better and improved goods amongst many inventors leading

into battle for supremacy in the market. States devised various ways to protect the inventors. With changing time the idea to grant exclusive privileges to the inventor gained impetus with its applicability within the state. Expanding of the market for innovative goods across the boarders resulted in demand for economic protection of the rights of the nationals of other jurisdictions against copy-cats. The cry for such demand became louder amidst the opponents of exclusive privilege when foreign exhibitors declined to participate in the Hungary-Vienna International Exhibition of Inventions in early 1873, because of fear that their ideas might be stolen and be used for commercial purposes. This prompted the Congress in Vienna to enact a temporary but secure protection for the intellectual property rights of exhibitors. In 1880, a diplomatic conference was held in Paris where a draft convention was created to pave the way for establishment of international system for protection patents. This system was useful in extending the control over the invented goods in other jurisdictions. With establishment of free trade between the nations, a need was felt by many policy makers to tune the IP laws to suit their national requirements. Emergence of classic patent law of 1970 is a good example of such policy. Consequently the IPRs evolved into a powerful tool for economic advancement. Debate on stronger or weaker IP protection gained moment in GATT negotiations. Developed countries propagated a notion that IPRs are barriers to free trades and succeeded in establishment of minimum standards. Now strength of the country was measured not on the basis of the natural resources it possesses but on the strength of IPRs it holds. IPRs are now seen as having economic value for the purpose of expending market for generation of maximum returns from IPRs. In fact, the relationship between innovation and intellectual-property rights is well established in modern economics. The researchers have found that the virtually all of the inventions which ultimately hastened economic development and lifted living standards especially new technologies and manufacturing processes were developed in societies with strong intellectual property protections, most notably the United States, Germany , Japan and other European Countries. This progressive trend of changing IPR value is given in Figure 2.1.

Fig. 2.1

2.8 GROWTH OF IP ACTIVITY

The rise of intangible assets over the past 20 years was accompanied by a fast increase in patenting activity particularly in the US, Europe, Japan, China, South Korea and India. With growth of trade, competition between same kinds of goods increased and so is the illegal copying. New IP based companies started emerging fast to create new space for them rather than fighting for existing market space. Since the value of the intellectual property embodies in innovative ideas in computers software, communication, and music industry to patented pharmaceuticals, biotechnology and information technologies invention is enormous, IP has emerged as a tool to measure economic advancement of a country. One of the estimates shows that in U.S. alone intellectual property today is worth between $5 trillion and $5.5 trillion, equivalent to about 45 percent of U.S. GDP and greater than the GDP of any other nation in the world.

2.9 INTELLECTUAL PROPERTY RIGHTS AND ECONOMIC DEVELOPMENT

The role that IP play in global economic is far greater today than in the brick and mortar era. Nations natural resources no longer bear a close relationship to how fast it develops and grows. For example, the economic output and *per capita* incomes grew faster in South Korea during last decade with relatively few natural resources, than in Brazil or India with abundant natural resources. No difference of opinion basically exists amongst economists about the crucial role played by the IP in economic growth and development. It is also true that everyone has an interest in promoting innovations for the simple reason that most of the benefits are enjoyed by those who use them. For example, the benefits to the users of Windows operating system around the world the far exceed Microsoft's profits or that new drugs for cancer or heart or diabetes provide much greater benefits to those who use them than the profits earned by innovating companies. As Paul Romer, one of the world's leading experts on economic growth, has written, "The knowledge needed to provide citizens of the poorest countries with a vastly improved standard of living already exists in the advanced countries. If a poor nation invests in education and does not destroy the incentives for its citizens to acquire ideas from the rest of the world, it can rapidly take advantage of the publicly available part of the worldwide stock of knowledge. If, in addition, it offers incentives *in the form of IPR protection* for privately held ideas to be put to use within its borders its citizens can soon work in state-of-the-art productive activities *and gain extensively economically* (emphasis added)".

2.10 INVENTION AND INNOVATION DIFFERENTIATED

Economists like Roberto Mazzoleni and Richard Nellson have noted that patents can serve two different economizing functions. First function of the Patents is to promote invention and second function relates to promotion of innovation. At time it can do both of these functions. Latter two more functions such as 'patents induce commercialization' and 'patents enable orderly exploitation of invention' was added by economists.

You may feel that invention and innovation are two sides of same coin. But in reality it is not so, there is much dissimilarity between them. In view of this it is essential to distinguish invention from innovation. Major difference between invention and innovation are given below.

Difference between invention and innovation

Invention	Innovation
1) The invention refers to initial acts of creation of something new.	1) The process of bringing new creation to market is termed as innovation.
2) Invention activity leads to is transformation of novel notions into substantial ideas.	2) Innovation activity leads to reach the end user or making them marketable.
3) Invention is idea plus practical application.	3) Innovation is invention plus exploitation .
4) All inventions are new.	4) All innovations are not new.
5) It is the primary attempt to bring that idea into practice.	5) When an idea for making a new product or a process for the market occurs it is innovation.
6) Invention's concern is a singular product or process. Example MP3	6) Innovation involves an amalgamation of various products or processes. Example iPod is product of aesthetics, ease to use and graceful ergonomics using basic invention of MP3 player.
7) Example IBM computer	7) Example IBM Personal Computer
8) Invention is practical and can be assessed or felt by the people.	8) Innovation is a modern idea which can be applied to the present situation.
9) Inventors are seekers.	9) Innovators are finders.
10) Invention has no guaranty for commercial success.	10) Innovation has everything to do with commercial success.

Self Assessment Question **(Spend 3 minutes)**

2) How is invention different from innovation?

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2.11 ECONOMIC NATURE OF IPRs

Let us now examine the nature of goods that we are dealing with. It basically involves what Paul Romer an American economics means characterising the rivalrous nature of goods. There exit a more sophisticated version of the "intellectual property, which is popular among economists which asserts that "ideas are non-rivalrous" as once the first copy of an idea is made public it becomes a public good. A good is called non-rivalrous, or a public good, if its consumption by one person does not restricts the ability of others to consume it. Economics of Intellectual property requires understanding this economic character of IPR protected goods.

So long as ideas are abstract they fall under public goods category as they can be used by more than one person at a time and easily duplicated. Since idea cannot be physically owned and possessed, its use by those who develop it does not preclude others from using it at the same time. For example use of Pythagoras theorem by one person does not limit its use by other at same time. So long as ideas are shared they would be subjected to common use. Thus ideas that animate economic innovations are "non-rival goods. But ideas are invariably excludable as there is human tendency to keep them secret if they have economic value. To take argument further let us see what happens if we recognize that the economic entities over which property can be exercised are non rival and excludable. Once ideas are made excludable the problem of free-riding by any one is solved. Grant of Intellectual Property Rights by the State according to the economists is an instrument for making ideas a 'non-rivalrous good' into IPRs a 'excludable non -rivalrous good'. Any violation of this right would amount to theft and person responsible for such act would be subjected to enforcement remedies available under various civil and criminal proceedings. In other words, granting of property rights in a way leads to ensuring the transition of 'ideas in mind' into 'valuable economic assets in the market'. It is the economic value imbedded in the ideas that makes the prospect of earning future returns from them dependent on legal property rights and protections. In other words the returns from innovations cannot be secure without legal protections for the new ideas that animate them. According to economists grant of property rights in fact allows ensuring incentive and securing fruits of labour for creation of such valuable economic assets that are not a public good. This dynamic is evident in the results of a recent survey of American R&D executives, who reported that without patent protections, 60 per cent of the projects which ultimately produced discoveries in pharmaceuticals would never have happened.

2.12 ECONOMIC THEORY AND APPROACHES TO IPRs

The four approaches that currently dominate theoretical writing about intellectual property are Utilitarianism; Labour Theory; Personality Theory; and Social Planning Theory. These theories draw their prominence and support from lines of argument that have long figured in the intellectual property law, constitutional provisions, case reports, preambles to legislation, and so forth. The dependence of theorists on ideas formulated and popularized by judges, legislators, and lawyers is especially obvious in the case of utilitarianism. We will now study each one in detail.

2.13 UTILITARIANISM AND NON-UTILITARIANISM THEORY OF IPRs

In view of established natures of IPRS let us now examine the ever deepening and widening theoretical landscape of intellectual property. There exit a marked division in the principal applied by naturalist and utilitarian approaches. The philosophical theory applied to the protection of utilitarian works – that is, technological inventions – has been utilitarianism. The proponents of this theory believe that the creation of intellectual property rights is most appropriate means to promote inventive activity. Non-utilitarian theorists on the other hand emphasize that creator' has moral rights/natural right to control their work.

Utilitarianism Approach

The most familiar utilitarian guideline that lawmakers' follows when shaping property rights is the maximization of net social welfare. In order to achieve this in the context of intellectual property, lawmakers have to strike a delicate balance between, on one hand, the power of exclusive rights to stimulate the creation of inventions and works of art and, on the other, the inherent tendency of such rights to curtail widespread public enjoyment of those creations. But distinctive characteristics of most intellectual products, Landes and Posner argue, are that they are easily replicated and that enjoyment of them by one person does not prevent enjoyment of them by other persons. This create a danger that the creators of such products will be unable to recoup their "costs of expression" (the time and effort devoted to writing or composing and the costs of negotiating with publishers or record companies), because they will be undercut by copyists who bear only the low "costs of production" (the costs of manufacturing and distributing books or CDs) and thus can offer consumers identical products at very low prices. Awareness of that danger will deter creators from making socially valuable intellectual products in the first instance. Utilitarian's believe that this economically unfavourable outcome can be avoided by granting the exclusive right to the creator for limited time to make copies of their creations. With these incentive social benefits relating to the new creations can be enjoyed by the creator or the user of new creations. IPRs laws therefore serve this utilitarian purpose where the happiness of the greatest number of people in the society is considered the greatest good. Example US IPR laws

Non-utilitarian Approach – Labor Theory

According to John Locke proponent of this approach a person who labours upon resources that are either unowned or "held in common" has a natural property right to the fruits of his or her efforts – and that the state has a duty to respect and enforce that natural right. The resources here referred to facts and concepts that seems in some sense "held in common" and where labour seems to contribute to enhance the useful value of the finished products. Locke further argued that a person may legitimately acquire property rights by mixing his labour with resources held "in common" only if, after the acquisition, "there is enough and as good left in common for others" .Accordingly the acquisition of property through labour is legitimate if and only if other persons do not suffer thereby any net harm."Net harm" for these purposes includes such injuries as being left poorer than they would have been under a regime that did not permit the acquisition of property through labour or a constriction of the set of resources available for their use —

but does not include a diminution in their opportunities to acquire property rights in unowned resources by being the first to labour upon them. According to Nozick, the Lockean theory is not violated if it is construed in this fashion. Although by the assignment of a patent right to an inventor public access to the invention would be limited but the invention would not have seen the light of the day at all without the efforts of the inventor. In other words, consumers are helped, not hurt, by the grant of the patent. Example US IPR laws and judicial pronouncements/ opinion in Mazer v. Stein like "Sacrificial days devoted to . . . creative activities deserve rewards commensurate with the services rendered."

2.14 KANT AND HEGEL APPROACH - PERSONALITY THEORY

According to this approach private property rights are crucial to the satisfaction of some fundamental human needs and policymakers should thus strive to create and allocate entitlements to resources in the fashion that best enables people to fulfil those needs. Thus intellectual property rights may be justified to shield the creators from appropriation on the ground that they created social and economic conditions conducive to creative intellectual activity which is important to human flourishing. Example European IPR laws, The French and German copyright regimes, Visual Artists Rights Act of US.

2.15 PROPRIETARIAN /SOCIAL PLANNING APPROACH

This approach is not as familiar as the other three approaches referred above however it gained importance in propagating that intellectual property rights can and should be shaped so as to help foster the achievement of a just and attractive culture. This approach appears to be similar to utilitarianism in achievement of the end results however it differs from it by its inclination relating to the visions of a desirable society richer than the conceptions of "social welfare" deployed by utilitarian's.

2.16 PATENT AS REWARDS

Whether acquiring an IPR for a particular creation of knowledge is an example of making a non-rival good excludable? If your answer is yes then economists are particularly interested in this feature of IPR. According to them, those who take risk to invest in R&D to produce new and innovative goods do expect profitable returns. IPR allows the creators of innovative goods to appropriate the returns of their innovations. Undoubtedly, the IP owner seeks profitable returns on their investments to bring their innovative products in public use. How this reward can be secured, basically depends on the economic policy of the states on IPRs.

2.17 PATENT AS NATURAL RIGHTS

Proponent of this theory believes it is the duty of the society under natural law to protect the inventor as well as reward him for his inventive efforts .According to them it would be immoral to allow free use of the work of the inventor without his consent and without payment of compensation or reward. The rationale behind this proposition is that society must secure its people the reward for the services

rendered by them which are useful to the society. They treat patent rights as natural property rights of the inventors and grant of patent legally mandate the society to recognize and protect this property right. A person who devoted his time, money and efforts to create innovative things has natural right to claim it as his own and he has right to get compensation for its use by the society. They viewed grant of patent as the best way to reward the inventor.

2.18 THEORIES ON EFFECT OF PATENTS

According to William Buxton "innovation is far more about prospecting, mining, refining and adding value to 'gold' than it is about alchemy". According to another school of thought invention has nothing to do with commercial success - whereas innovation has everything to do with it. Many economists seek to answer the real question whether or not our intellectual property system should be encouraging invention or innovation? It in this context the understanding of economic theories of patenting becomes important. Broadly speaking four theories of patent protection have been identified based on the purpose it serves. Of course these purposes are not necessarily mutually exclusive the patent policy of any country is based on these four theories. While theory 1 is today the most familiar, Theories 2 and 3, like Theory 1, have been around for a long time. Theory 4 is, however, relatively new. However, the main objective of describing four quite different theories about the effects of patents that, we will discuss below are currently at play in the debates relating to patent policy.

Theory 1 - Patents Motivate Invention - Invention Motivation Theory

Theory 2 - Patents Induce Disclosure and Wide Use of Inventions – Invention dissemination or Innovation Theory

Theory 3 - Patents Induce the Development and Commercialization of Inventions –Invention commercialization theory

Theory 4 - Patents Enable Orderly Development of Broad Prospects – Exploration control theory

2.19 THEORY 1 - PATENTS MOTIVATE INVENTION - INVENTION MOTIVATION THEORY

The invention motivation theory is traditionally most popular theory on economic role of patent law. This theory presumes that anticipation of patents motivates the inventors for making useful invention. Since patent protection allows appropriability it internalizes the positive externalities. This positive externality promotes inventions by enhancing the incentives for inventors for their investment for in inventing activity. The incentives of patent protections also have a negative externality in the form of access costs, which may result in under utilization of the useful invention. Accordingly the proponent of this theory believes that patents should be granted only when the tradeoff between incentives to invent and access costs militates in favor of the former. Invariably this situation occurs particularly in respect of risky or expensive inventions. No doubt inventors may be deterred from investing in these types of inventions without patent protection. If without patent protection lack of full appropriability of the benefits of invention leads to free rider issues, the grant of patent with full appropriability may lead to wasteful patent races. This theory assumes that the patent lure is essential for producing efficient invention

This implies that no patents are necessary for inventions which would be otherwise invented even if no patent protection were available. For example patents are simply not necessary to encourage the invention of new Internet business methods. Amazon.com had enjoyed a head-start advantage over its competitors as a result of being the first company to sell books over the Internet. Similarly, Yahoo and eBay had first mover advantage over competitors in respect of Internet search engines and on-line auction respectively.

2.20 THEORY 2 - PATENTS INDUCE DISCLOSURE AND WIDE USE OF INVENTIONS - INVENTION DISSEMINATION OR INNOVATION THEORY

According to this theory role of patent protection is to encourage wider use of the invention. Some Economists prefer to further sub-divide the innovation theory in to its four constituent parts based on the purpose it serves. According to them purpose of granting patent is not only to stimulate invention but also to encourage innovations by performing four functions namely. First patents put the information relating to inventions in public domain by advertising it through official Gazette/ Journals. Second, it facilitates the licensing of the patented inventions. Third, patents enable patentee to seek capital markets to get development financing and lastly patents helps in the development and commercialization of inventions.

1) Advertising function

According to this theory inventors are likely to be more willing to advertise their invention when protected under patent rather than with a protection as a trade secret (non-patent). Patents Act mandates the patentee to disclose the know-how embodied in the patent. This means public would have access to knowledge about the technology which would not have been disclosed otherwise and kept secret.

2) Licensing function

Patentee may not be able to foresee all possible uses of their invention before hand or they may not to in financial sound position to develop and implement their own inventions. Patentee in such a situation seeks to license out their inventions. However, the patentee must realize the gains associated with the disclosure function before the patent expires. The patent holder must decide to license her patent to other interested parties. According to innovation theory, inventors are likely to be more willing to license their inventions when protected under patent rather than with a protection as a trade secret (non-patent). Further the royalties obtained from licensing by the patentee encourages him to actively seek industry partners to commercialize their latest inventions and technologies. Patent protection and exclusive licensing in fact, provide the necessary incentives to the patentee to seek ways of exploiting their inventions. The industry armed with legal protection is more likely to invest in the development of a marketable product from a promising invention or new technology covered by patents.

3) Development function

Patents induce orderly development of new technology. This is relevant to the granting of patent on the inventions generated by the Government Funded research.

Break through inventions like cancer drugs, internet, World Wide Web, biotech inventions; etc would not have seen the light of the day if they were not patented by the government funded laboratories. Patenting of federally funded research results under the Bayh-Dole Act in US and other similar legislative measures in other countries have provoked a sea change in development of breakthrough technologies all over the world.

4) Commercialization function

The transfer of technology from patentee to industry in the form of the commercialization of invention /research results faces an inherent problem of costs and incentives. Patents are crucial as they provides exclusivity over the commercialization of an invention or new technology which act as an incentive to industries to invest in taking a new technology from mind to the market with 'trade-off' of a legal monopoly over the exploitation of the said product. The British Parliament extended James Watt's steam engine patent, a patent on an invention already made, under the argument that to do so would spur commercialization.

2.21 THEORY 3 - PATENTS INDUCE THE DEVELOPMENT AND COMMERCIALIZATION OF INVENTIONS - INVENTIONS COMMERCIALIZATION THEORY

According to the proponent of this theory patents induces commercialization of initial inventions which would otherwise have limited commercial value. This so because the proponents of this theory believe that patents on inventions are lucrative enough to attract funds required for their development and commercialization. Another interpretation of this theory which justifies it is that patent right gives its original patent holder such as university or small firm or individual inventor an incentive to offer its inventions to clients that can develop and commercialize them. This also applicable where holding of a patent may motivate an inventor to approach and work with a variety of different potential developers if negotiation fails with one investor. Proponent of Theory 3 asserts that development on the seed invention will not proceed at all without patent protection. Theory 3 focus on the development and commercialization of university inventions is relevant in view of recent surge in university inventing activity in the biomedical area (particularly biotechnology), electronics, and software and dominance lucrative university lucrative university licenses in these fields.

2.22 THEORY 4 - PATENTS ENABLE ORDERLY DEVELOPMENT OF BROAD PROSPECTS - EXPLOITATION CONTROL

The theory differs from Theory 3 in that an initial discovery or invention is viewed as step-board for whole range of follow-on developments or inventions. Many university "inventions" falls under this category. Under Theory 3 we talk about one inventive seed product .The prospect theory rest on the premise that a broad patent on a prospect opening invention permits the development of the full range

of possibilities to proceed in an orderly fashion. However there might be very high social costs to granting a broad initial patent that gives monopoly rights on the exploration of the prospect. This may perhaps limit the number of diverse inventors who would otherwise be motivated to work on the prospect in anticipation of a profitable invention in future. Merges and Nelson citing the cases of the Selden and Wright patents in the fields of, respectively, automobile and aircraft technology indicated that - with respect to at least a few important technological developments - broad definition of pioneer patents has led to litigation and likely has forestalled the pace of technical advance. Theory 4 applies particularly in two kinds of contexts. One where seed invention is far away from practical application (Biotechnology) and second where technological advances within a prospect are strongly connected or what Merges and Nelson call as cumulative technology.

2.23 ECONOMIC RELATIONSHIP OF INNOVATIONS WITH INDUSTRY AND SOCIETY

The relationship of innovation arising out of research and development and cash flow of commercialization accrued to the inventor is given in Figure 2.2. Similarly the as society gains new products it pays the industry for commercialization of invention. Industry pays royalty /remuneration to inventors. This cycle is repeated every time new products are created commercialized for the use and benefit of the society.

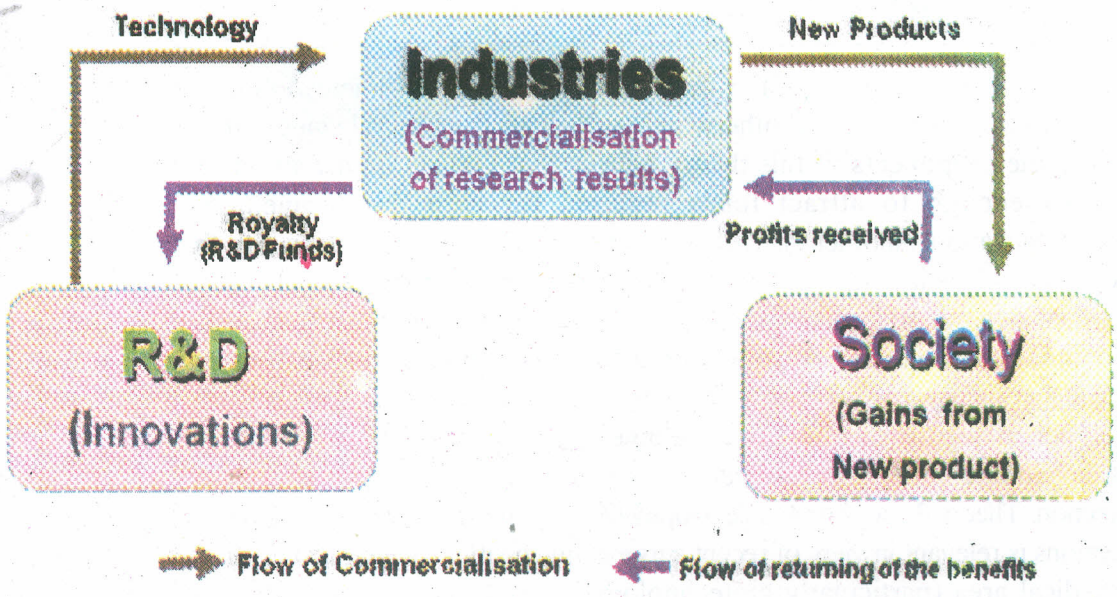

Fig. 2.2

2.24 SUMMARY

To understand the economics of intellectual property one must requires understanding the nature of IPR protected goods. It basically involves what Paul Romer said 'characterising the rivalrous nature of goods. The different theories on IPRS and the contexts they assume in economic terms sometimes explicitly but often implicitly. The nature of the task in this unit calls for us to discuss, or at least intellectually classify, a large number of writings on the effects of patents. With selective literature survey our main object of describing four quite different theories

about the effects of patents was to bring out the theories that are currently are at play in the debates about patent policy. Aacquiring an IPR for a particular creation of knowledge is an example of making a non-rival good excludable and economists are particularly interested in this feature of IPR. According to them those who take risk to invest in R&D to produce new and innovative goods do expect profitable returns and all the economic theories do support such trends in IPR policy paradigms. All the IPR policies are designed to balance the private profits with public good in general.

2.25 TERMINAL QUESTIONS

1) Explain the economic nature of IPR goods.
2) Differentiate between invention and innovation.
3) Explain Utilitarianism and Non-utilitarianism theory of IPRS.
4) What is Social planning Approach of IPR.
5) Write note on Theories on effects of Patents.
6) Explain the relationship of innovations with industry and society.

2.26 ANSWERS AND HINTS

Self Assessment Questions

1) Refer to Section 2.4
2) Refer to Section 2.10

Terminal Questions

1) Refer to Section 2.4
2) Refer to Section 2.10
3) Refer to Section 2.13
4) Refer to Section 2.23

UNIT 3 STAGES IN INTELLECTUAL PROPERTY ASSET CREATION

Structure

3.1 INTRODUCTION

Millions of Ideas flash in our gray matter every minute. Some ideas find expression in shape of novels, painting, sculptures, stories, films, music which are covered by the copyright the moment they are expressed. Some ideas remain abstract and find place in research finding and writing. Those ideas which find practical application are converted into what we call as inventions or innovative designs. Trade requires identification of source of goods and services. The coined and imaginative words, figures and marks find expression in the trade marks. All these innovative and distinct expressions require protection from being imitated and copies. Since time immemorial business houses and societies have been pitted against each to gain economic supremacy. This is partly because economists have advocated for legitimizations of the ideas that accord societal benefits. Legitimate Patent, Trademark and Copyright war are being fought vigorously for gaining legitimate control over the innovative expressions. Every State provides some kind of protection to all such expressions through well designed intellectual property laws. In this unit we will study how ideas are converted into intellectual property rights such as patents, designs, trademarks and copyrights. We will also study what is the difference

between ideas, invention and innovation. We will also study the distinction between patents, designs, trademarks and copyrights. We will take stock of the stages involved in creation of Patent rights.

3.2 OBJECTIVES

After reading this unit, you will be able to:

- appreciate conception of idea;
- distinguish between Idea and invention;
- explain the types of inventors;
- discuss the actual method of inventing; and
- explain the stages involved Stages from mind to patent.

3.3 CONCEPTION OF AN IDEA

With so many technical problems glaring at the face of mankind finding a good idea is as difficult as climbing a hill without climbing tools and technique. It is all the more difficult if the hill which you wish to climb is not attempted by any one. Art of inventing a technical solution to a problem rests with finding a good idea. An idea without a tangible solution to that problem is not useful to the society. The real challenge for every inventor to cross the first stage of inventing is the conception of the idea which not only identifies the need but also suggests the best possible workable solution. For the successful inventors obstacles are regarded as things to be overcome, instead of backing down in face of them. Before we proceed further let us see who our present day inventors are?

3.4 PRESENT DAY INVENTORS

Inventors can be divided into two classes' individual inventors and group inventors. Individual inventors are those who work alone relying on their own means and resources. They include class of inventors such as old fashioned 'Yankee inventors' who worked in cut and try manner relying on his native ingenuity. We may call them free-lance inventors or casual inventors who invent by chance or by fluke of luck. We may call them professional inventors when they make invention as their profession. One of the recent study proved that independent inventor's inventions are normally tended towards hardware/tool, household products, industrial/commercial products, novelty items and toys/games/hobbies. Inventors who established a company to commercialize their inventions were most likely to achieve sales. However, inventors who licensed their inventions were more likely to achieve higher sales levels than those who commercialized them only via their own company, or by selling their inventions outright. Burgleman *et al* (2004) alluded independent inventors in their model of technological innovation, but the role of these 'idiosyncratic tinkerers in a garage' was not detailed. However it is clear that independent inventors worldwide have made important economic contributions. We cannot forget individual inventors like Wilbur and Orville Wright for their exploration of flying machines, Edwin Armstrong for FM radio, Sir Frank Whittle, recognized as the father of modern jet propulsion, and Hugh Le Caine who pursued his now widely regarded inventions in electronic music and sound generation. The first patent for an implantable pacemaker was issued in 1962 to

independent inventor Wilson Greatbatch. Frampton Ellis invented his athletic shoe, first patented in 1981, using personal savings. Adidas eventually purchased one of his lines. Computer-related innovation has benefited greatly from the efforts of independent inventors. Shumpei Yamazaki's inventions related to semiconductors have netted nearly yen 50 billion in license fees. Schrage (2003) pointed out that Bill Gates of Microsoft, and Linux originator Linus Torvalds, both began as hobbyists. Spin-offs from the inventive activity of Gates and Torvalds have spurred the phenomenal growth of PC industry. The personal computer, according to Postrel (1996), 'restored the myth of the garage based tinkerer'. Other such inventors included Raymond Kurzweil (artificial intelligence), Jerome Lemelson (industrial robotics) and Stanford Ovshinsky (amorphous semiconductors). Other most famous and well known individual inventors who made revolutionary invention during early industrial progress are Thomas Alva Edison, Howe inventor of sewing machine, Whitney inventor of cotton–gin, Goodyear inventor of vulcanized rubber, Morse inventor of telegraph and Morse code , Westinghouse inventor of air brakes and so on. Inventions like Duracell batteries by Samuel Ruben, Polaroid film by Edwin Land, and Xerox photocopying process by Chester Carlson were other important innovating contributions made by these great individual inventors during early twentieth century.

Group Inventors are those who are hired inventors working in cooperation with others in large industrial organization or universities or government institution. Former category known as industrial inventors consists of foreman, manager, mechanic, chemist or engineer working in the organization. They invent as a matter of routine as problems arise in their work. Later category comprising of researchers, professors and teaching and non teaching staff working in universities/ government research Labs called as institutional inventors/researchers. They are basically engaged in fundamental research and at times come up with useful inventions.

3.5 THE DIFFERENCE BETWEEN AN IDEA AND AN INVENTION

The dictionary defines an invention as "a device, contrivance or process originated after study and experiment." An idea is defined as "a formulated thought or opinion." It in this context study of concept of idea and its conversion into tangible assets gain importance. Ideas are not convertible into gainful assets provided they are taken care right from the point of their conception. All ideas are not invention. A good idea can lead to invention. Difference between idea and invention is given below:

Table 3.1: Difference between Idea and Invention

Idea	Invention
1) Idea is defined as a formulated thought.	Invention is defines an as "a device, contrivance or process originated after study and experiment.
2) Idea is recognition of a problem or need	Inventions not only identify a problem or need, but also provide practical solution for it.
3) Ideas are not patentable	Inventions are patentable

With this deference in mind an invention require further study and experiment on the idea. If indentified idea is a tangible solution to a problem it can be selected for the next stage of inventing activity. In case the selected idea is just the recognition of a problem it does not precede further if there is no immediate need for its solution. If the question is asked that 'is there any product available that could solve this problem?, then it is only an idea which is not identifying a real solution but just the need for a solution. Unfortunately, most of time, many inventors make the same mistake confusing their "identification of a problem" for an actual solution, thus waste time, energy and money focusing on the problem rather than on the possible solution. The real challenge with inventing is not just identifying a need, but also figuring out a solution. This may seems like common sense however, you may come across hundreds of inventors who thought they had an invention, when in fact they had an idea without a well-defined solution.

Self Assessment Question **(Spend 3 minutes)**

1) How is an idea different from invention?

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3.6 ACTUAL METHOD OF INVENTING

Actual method of inventing is not as simple as it appears once the invention comes to existence. Inventors knowingly and unknowingly perform many mental and physical activities before an idea finally turns into an economic significant invention. Some of these activities are given below.

1) Observation of a need or difficulty.
2) Analysis of the need.
3) A survey of all the available information.
4) A formulation of all objective solutions.
5) A critical analysis of these solutions for their advantages and disadvantages.
6) The birth of the new idea leading to an invention.
7) Experimentation to test out the most promising solution and selection and perfection of the final embodiment by some or all of the previous steps.

3.7 IDENTIFICATION OF NEED

The first and most essential step in the process of invention is the identification of the new latent or unfulfilled social or practical need or difficulty. It is this definite recognition of a want which spark genius in the inventor to initiates the entire inventive activity. The persistence and the effort which the inventor takes to meet the demand of this challenging need are triggered by foreseeable future incentives and financial benefits arising out of its social importance to the society. With this assumption in the back his mind the inventor willingly goes through the entire inventive process to its completion so as to produce a practical and successful

invention. The experiment of a want and the striving to satisfy this want probably constitute the basis of all human activity. All of the invention today basically aims to satisfy fundamental human wants or to meet the needs created by existing inventions. A problem or difficulty may also be brought to his notice by others in the course of his business. Alternatively someone may pose a problem which defies solution at present. Possible a curt article in journal or review of the existing products may point to an unsatisfied need by a casual remark.

3.8 ANALYSIS OF NEED

The analysis of need in the inventive process is a special phase of fundamental human activity. After identifying the need the inventor look for new physical and chemical principles in order to apply them in a useful from to satisfy human wants or he may study the inventions which are already in use in the industries in order to improve them so as to better satisfy society needs. The majority of the inventions made today fall under the latter class.

3.9 SURVEY OF AVAILABLE INFORMATION

The third step of the inventive process followed by nearly all the inventors consists in a survey of all available information bearing on the problem at hand. Once the inventor identify the need after a careful study and analysis of existing apparatus, processes or conditions, he then undertake a survey with the object of seeing how they could be improved, either by radical changes or by improving certain parts of the apparatus or process. This occurs frequently in the life of inventor during the regular course of his everyday work. The inventor is inherently attentive to observe shortcomings and defects. He may observe that the devices that are being used are crude, costly and inefficient. The machinery in use may be weak and faulty in operation. The inventor then make a survey of highly competitive or even a neglected or backward field which seems to have possibilities for development. In scientific terms the inventor is a careful and keen observer who is on the alert to note defects or needs whether they are obvious or apparent, or dormant and not particularly apparent.

3.10 FORMULATION OF ALL OBJECTIVE SOLUTIONS

The next stage consists in a thorough analysis and study of the result to be obtained which has been perceived or noted in view of the survey carried out by the inventor. It is equally important for the inventor to not only perceive the need/ problem but also to have a clear idea of the objective solution relating thereto. Some inventors put their thoughts in writing and state as clearly as possible just what they want to accomplish. They also keep list of alternative solution handy to switch over to other viable solution as and when required.

3.11 CRITICAL ANALYSIS OF THE SOLUTION FOR THEIR ADVANTAGES AND DISADVANTAGES

Next stage involves critical analysis of the possible solutions. The inventor in this stage first observe the possible alternatives and then analyse what he observes in order to eliminate all irrelevant and non-essential details and clearly formulate the

essential elements of his problem before he can proceed further. He then formulates what he proposes to do. For example the solution to problem identified by him may be achievable by simplification of known machine or process. It may lies in increasing the efficiency of operation or reducing the expense of the manufacture or cutting down the number of operation stages on a machine or permitting the automatic operation of a machine to prevent loss of life and property and so on. He then looks for pros and cons of his formulated idea for the solution before he proceeds further to test his invention for practical application and viability.

3.12 THE BIRTH OF THE NEW IDEA, THE INVENTION

How an idea props in the mind of the inventor (rich or poor) is puzzling. Brilliant idea can strike inventors at anytime and anywhere. For instance, the drying of saving leather on the face of an inventor while reading an interesting story in a newspaper lead to the invention of light and airy soap chips. Idea of Velcro struck Mestral when he found burrs (seeds) clinging to the fur coat of his dog and his pant. Melting of chocolate in the pocket of Raytheon Corporation engineer Dr. Percy Spencer while working with microwaves, lead to the invention of microwave oven. Discovery of mold on waste Petri dishes meant for throwing formed the basis of Alexander Fleming's discovery of penicillin. Eleven year old Frank Epperson, while mixing white powdered flavouring with soda and water left a stirring stick in it on the porch overnight and woke up to invent a frozen 'Ice Pops' that he called "Popsicle" and he patented it after 18 years. It takes more than merely a good idea to be successful in producing a patentable and marketable product.

Self Assessment Question **(Spend 3 minutes)**

2) Explain the birth of new idea with your own example.

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3.13 STAGES FROM MIND TO PATENT

There are a number of stages involved before the invention reach from mind to patent. Let us examine what are the stages one must cross to convert invention into an IP asset.

1) Conception of idea
2) Reduction of idea to practice
3) Commencement of diligence
4) Patent Search
5) Market survey
6) Drafting of Patent specification

7) Filing of Patent application

8) Prosecution of Patent application in Patent Office

9) Grant of Patent

10) Payment Of annuity

1) Conception of idea

As discussed above the conception of an idea is essentially the primary and essential step in process of inventing. Mere conception is not enough sufficient to prove the ownership over the idea in legal terms. Therefore let us understand what this term conception means to patent office. For this purpose let us examine USPTO manual which define this term in details with is implication on the patent disputes.

Conception as defined in US Patent Law Manual

In US where 'first to invent' system is followed the question of 'first conceiver' is invariably asked in many patent dispute. USPTO Guidelines to the examiner in 2138.04 define conception as follows:-

"Conception has been defined as "the complete performance of the mental part of the inventive act" and it is "the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention as it is thereafter to be applied in practice."

It is well settled practice in US that in establishing conception an inventor must show possession of every feature recited in the invention claimed, and that every limitation of the invention must have been known to the inventor at the time of the alleged conception. Conception of idea is required to be proved by corroborating evidence. It is essential for conceiver of the inventive idea to maintain compete dominance over the invention. He must retain control over the work of making the invention down to the successful testing, selecting or rejecting even where the inventor may consider and adopt ideas, suggestions and materials derived from many sources like : a suggestion from an employee, a hired consultant or a friend even if the adopted material proves to be the key that unlocks the problem. Such problem may not exist in countries following 'first to file' system. However conception and sustaining an idea requires patience, passion and perseverance of an inventor. For the purpose of proving 'first inventor' acts of conception, reduction to practice and diligence must be demonstrated.

2) Reduction of idea to practice

Creativity does not end with conception of idea. Once the idea is conceived it seeks passion of the creator to think the unthinkable, to articulate the untested, to experiment with the unknown to animate inventive idea. This requires reduction of the idea into practices. Mere publication of an article is not a constructive reduction to practice of the inventive idea. Constructive reduction and actual reduction must be proved by evidence to prove the conceived idea was reduced to practice. The filing of a patent application is sufficient evidence to prove conception and constructive reduction to practice of the subject matter described in the application. Constructive reduction to practice is proved when a patent application on the claimed invention is filed. No further evidence is required either for conception or actual reduction to practice when inventor is relying on the content of the patent application.

3) Commencement of diligence

Next stage in the process stage is called diligence stage. The diligence requirement in a way points to the continuation of activity of reduction of invention to practice which may end up in filing of the patent application. The period during which diligence is required must be accounted for by either affirmative acts or acceptable excuses. Any intervening period inactivity is fatal unless accounted for by genuine reasons or acceptable excuses. US Court generally reviewed cases on excuses for inactivity including vacation extended by ill health and daily job demands, and held lack of university funding and personnel are not acceptable excuses. So are the excuses of budgetary limits, voluntarily laying aside inventive concept in pursuit of other projects are found to be not an acceptable excuse. It is pertinent to note that the above discussion is limited to US practice as it is applicable in US. However the principle enshrined therein find place in many judicial pronouncements in other jurisdiction also. Therefore mere conception of idea is not enough, it must be followed by reasonable diligence to reduction to practice for gaining 'first inventor' advantage.

4) Patent search

After getting an inspiring patent idea next stage involves carrying out patent search. An internet free patent search engine sites would be sufficient for the beginner. However, many paid and specialized databases are used by big companies to carry out patent searches. This is also essential in view of mandatory requirement of giving prior art in many jurisdictions Prior art disclosure is not mandatory under Indian patent law however all the inventors do give this information to clearly bring out the inventive feature of the claimed invention. Prior Art search also helps in preventing re-inventing wheel and save incurring wasteful expenditure on inventions which are not novel. List of useful Patent Databases as available in website of The Patent Information Users Group, Inc. (PIUG) an International Society for Patent Information a not-for-profit organization for individuals having a professional, scientific or technical interest in patent information.(see Annexure I)

5) Market research

The next stage of the 'mind to market' is to find the potential target market for patent idea. It is important place where your invention will be tested by consumers. The consumer would decide whether you have a winner or loser. Failure to do market survey may land you with list of absurd patents like birds diapers, toilet timer, dog chastity belt so and so forth.

6) Drafting of patent specification

Next stage involves drafting of the patent specification. It constitutes one of the most difficult tasks partly because it requires describing the invention in clear and sufficient technical terms and partly because it involves drafting of legal instruments with accuracy which is called as claims. Inventors often make mistakes that may prove fatal for obtaining or defending patents. US courts over 100 year's courts starting with ***Topliff v. Topliff***, 145 U.S. 156, has marveled at how difficult it is to draft a patent application and observed that

"The specification and claims of a patent, particularly if the invention be at all complicated, constitute one of the most difficult legal instruments to draw with accuracy, and in view of the fact that valuable inventions are often placed in the

hands of inexperienced persons to prepare such specifications and claims, it is no matter of surprise that the latter frequently fail to describe with requisite certainty the exact invention of the patentee, and err either in claiming that which the patentee had not in fact invented, or in omitting some element which was a valuable or essential part of his actual invention."

Chief Justice Earl Warren in ***Sperry v. Florida***, 373 U.S. 379, also made same observation when he noted that "it also involves participation of the inventor in the drafting of the specification and claims of the patent application,..... citing ***Topliff v. Topliff***, 145 U.S. 156, 171 and stated that which constitute[s] one of the most difficult legal instruments to draw with accuracy ....."

Still further, it was recognized by the United States Court of Appeals for the Federal Circuit in 1988 in ***Laitram Corp. v. Cambridge Wire Cloth Co.***, 863 F.2d 855, when Chief Judge Howard Markey explained:

"This appeal again illustrates one of the many difficult dichotomies that lurk in the lacunae of patent law. On one side rests the very important, statutorily-created necessity of employing the clearest possible wording in preparing the specification and claims of a patent, one of "the most difficult legal instruments to draw with accuracy." On the other lies the equally important, judicially-created necessity of determining infringement without the risk of injustice that may result from a blindered focus on words alone."

Again in Chef America v. Lamb-Weston Federal Circuit decision (2004) also drives home this point that how important it is to choose right words in order to make sure that chosen words are exactly what they intend or mean to say. The sole issue before the court in this appeal was to decide what was the meaning of the following language was in a patent claim:

"heating the resulting batter-coated dough to a temperature in the range of about 400° F. to 850° F."

Court held that "the question is whether the dough itself is to be heated to that temperature (as the district court held), or whether the claim only specifies the temperature at which the dough is to be heated, i.e., the temperature of the oven (as the appellant contends). We agree with the district court that the claim means what it says (the dough is to be heated "to" the designated temperature range) and therefore affirm."

In this instantly famous case the Federal Circuit had to interpret the meaning of the phrase "heating the resulting batter-coated dough to a temperature in the range of about 400° F. to 850° F." What should have been said was "heat the oven to a temperature in the range of about 400° F. to 850° F." Because what was said literally required the internal temperature of the dough to reach between 400° F. to 850° F., the patent owner had a useless patent. Inventors need to know that what they say will be interpreted literally. nventor has great latitude to define the invention, but because it is up to the inventor to define the invention, the court will not fix what is to be said even when everyone obviously knows what you most likely meant.

7) Filing of patent application

Once the patent speciation is drafted next stage involves filing of the application in national and other jurisdiction based on the marketing interest of the patentee.

Inventor may use Patent Cooperation Treaty route if protection all over the world is desired. The inventor cannot jump at once to file application everywhere as he may face problem of funds to do so. Cost of filling PCT application in India is given in annexure II .Additionally fee for filling national application will be required for each national phase entry. Forms and Fee for processing patent application in India is given in Annexure III.

8) Prosecution of Patent application in patent office

National examination of application is taken up based on the national laws. However the purpose of examination of the application is to check the novelty, inventive step and industrial applicability of the invention. In all the national laws the examination reports stating the patentability or otherwise of the invention is issued by patent office. The applicant himself or his authorized agent can prosecute the application before the patent office. If the reply to the examination report is found satisfactory the patent office would allow the application to proceed for grant .In case application is refused the applicant can file appeal against the order of the authorities'. In some jurisdiction like in India pre-grant representation against the grant of patent can also be filed. Such cases are invariable decided after hearing both the parties.

9) Grant of patent

Once the patent application is found to be in order for grant the application are granted with issue of patent certificate also known as 'letters Patent'. After the grant patents are advertise in the official gazette or journal for the information of general public for filing post-grant opposition if any.

10) Payment of annuity

Every national law requires payment of annual charges called as renewal fee or annuity for keeping the patent in force. All the entries such as payment of fee or change of ownership/assignment of the patent are recorded in the patent register which is the legal evidence to prove the existence of a patent. Fee for renewal of patent in India is charged after 2nd year of the term of the patent which is 20 years from date of filing application. Year-wise breakup of the Renewal fee for patent in India is given in Annexure IV.

3.14 SUMMARY

It takes lot of efforts, time and money of the patentee to take his idea from the stage of conception, invention, and innovation to market. Patentee has to pass through various stages like observation and identification of a need or difficulty; analysis of the need; survey of all the available information; formulation of all objective solutions; critical analysis of these solutions for their advantages and disadvantages; formulation of the new idea, the invention; experimentation to test out the most promising solution and selection and perfection of the final embodiment by some or all of the previous steps. Similarly various activities are required to be performed to obtain a patent on the invention.

3.15 TERMINAL QUESTIONS

1) Explain with example what are the types of inventors?
2) Define the term conception of idea.
3) Give stages involved in mind to Patent.

3.16 ANSWERS AND HINTS

Self Assessment Questions

1) Refer to Section 3.5

2) Refer to Section 3.12

Terminal Questions

1) Refer to Section 3.4

2) Refer to Section 3.3

3) Refer to Section 3.13

Annexure I

List of Patent Databases as available in website of The Patent Information Users Group, Inc. (PIUG) an International Society for Patent Information a not-for-profit organization for individuals having a professional, scientific or technical interest in patent information.

Table of Contents

Multi-national patent databases

Alexandria - Extensible, global storage facility for high quality scientific, technical, and business information. Initially populated with patent data, Alexandria provides a multilingual collection of documents from over 70 patenting authorities available in a single ST36-based XML format created by merging and normalizing data from different sources (Fairview Research/IFI Claims Patent Service).

Aureka - enterprise-wide IP research, analysis and management platform (Thomson Reuters).

CAplus - Most authoritative worldwide coverage of patent information in many scientific disciplines (Chemical Abstracts Service).

Delphion (Thomson Reuters) Intellogist Report, Intellogist Comparison Table.

DEPATISnet - provides free access to bibliographic data from an expanding number of issuing authorities (CH, EP, FR, GB, JP, US, WO) as well as full-text German patents and patent documents in PDF format. (German Patent and Trademark Office (DPMA)).

Derwent World Patents Index - The most comprehensive and extensive database of value-added patent documents published in the world. (Thomson Reuters) Intellogist Report.

Designs in orbit.com - Global industrial designs search and watch service covering BX, CA, CH, CN, DE, ES, EU, FR, GB, JP, KR, RU, US, and WO. (Questel).

Dialog - An online information service with more than one billion unique records including in-depth repositories of scientific and technical data, patents, trademarks and other intellectual property data.

EAPATIS - Eurasian Patent Organisation web database with free access (with registration) to abstracts and bibliographic data to EAPO patents, and paid access to full specifications of patents from 30 issuing offices, including EAPO, all former Soviet Union nations, and Soviet Union patents and invention certificates back to 1924.

edital.com - Search trademarks, domains, and designs online and cover more than 250 registers. Elaborate statistics and insert your legal opinion directly online with the help of the wizard.

Equerion - Equerion offers back-files, monthly updates or the development of new patent/trademark databases of official IP data from any Latin American countries plus several other regions. All these contents and databases are available in XML format and they are ready to be distributed, licensed, acquired or embedded in a wide range of ways. For more information about existing/on-development databases (e.g. Argentina, Brazil, Chile, Colombia, Greece, Mexico, Panama, Paraguay, Peru, Portugal, Uruguay, United States and Venezuela), please go to www.equerioncorp.com/ipdatabases.

Esp@cenet - EPO Service to search and download patents.

European Patent Foundation - a continuously updated database of all patent applications filed in the European Union since 1978, in an easy to understand and search platform.

IFI Claims - Search access to US patents and published applications via in-depth indexing of chemical patents and text searching of utility patents with extensive standardisation of company names. Also IFI CLAIMS Citation and CLAIMS Current Patent Legal Status databases.

Innography - Correlated patent, litigation and business search and analysis.

INPADOC - Patent Family and Legal Status.

IP.com - The Intellectual Property Library is a free international database of over 10 million patent and patent-related publications.

IPEXL Patent Search - A free patent search service with a focus on Asian patent offices and multilingual support.

Linux Foundation Patent Commons - database of IT patents which the proprietors have pledged not to enforce if open-source conditions are met.

MAREC - MAREC is a subset of the commercial grade Alexandria repository, a global storage facility for high quality scientific, technical and business information. MAREC consists of 19 million patent documents in different languages, normalized to a highly specific XML format (IRF).

MARPAT on STN - Complex, but robust, database of chemical Markush structures from patents; used for comprehensive patent retrieval through structure searching (CAS)

MicroPatent - PatentWEB and TrademarkWEB (Thomson Reuters)

Nordiskapatent - free database allowing searching of patents from Denmark, Norway, Sweden and Finland. Only available in the local languages.

orbit.com - This advanced version of QPAT is the new IP platform for any specialist looking for immediate answers and best practices. Very user-friendly, Orbit.com combines the most comprehensive coverage and powerful interface. Search Questel's famous FamPat database and key content, and cover 60+ million documents grouped in 40+ million inventions with 18+ million images from 90+ patent authorities PLUS 20+ full texts integrating the legal status, all in native

or machine-aided translated English. In addition to the express and regular search interfaces, search citations, legal status, and industrial designs, order worldwide file histories and patent copies, monitor patent and legal status, analyze graphs and stats, and manage your portfolio. ALL IN ONE. (Questel) . for orbit.com. for FamPat

PatBase - A comprehensive full text searchable patent database covering over 30 million patent families (Minesoft)

Patent Fetcher - Free U.S. and Foreign patent publications in PDF form. .

Patent Imaging Corporation's Patent Bank

Patent Integration - This service packages provides a standard patent searching of 16 million U.S., Europe, International publication and Japanese patents, a visualizing patents population on the basis of text-mining technology, and a creating rich patent chart.

Patent Lens - free database from the Australian Cambia organisation, offering full text and status searching of WO, EP, AU and US patents.

Patents.com - A comprehensive free patent search site

PATENTSCOPE® Search Service - Free full-text search and first publication worldwide of PCT international applications from 1978 to present as well as access to PCT file contents and national phase entry data for 40+ offices. National patent collections available for ARIPO, Argentina, Brazil, Cuba, Israel, Mexico, Morocco, Republic of Korea, Singapore, South Africa, Spain, and Viet Nam including full-text search and document images for many collections. (World Intellectual Property Organization) .

PATONline - Technical University of Ilmenau subscription database with documents from DE, EP, WO, US, JP, DD, FR, RU, SU, and GB.

PharmaValet- A database of approved US and Canadian drugs and their associated patent information. Extensive search capabilities by drug or patent. Features include: expiration, approval, and extension dates, Patent Family and Legal Status (containing SPC and Patent Term Extension info), synonyms and chemical structures, therapeutic class, integrated paragraph IV data, and more.

PROPIS - subscription database from P & TS of Switzerland, offering both patents and non-patent technical and scientific literature.

QPAT - Online service for IP specialists looking for the most comprehensive coverage, powerful search access, and strategic analysis possibilities. With FamPat and PlusPat databases, cover 60+ million documents grouped in 40+ million inventions with 18+ million images from 90+ patent authorities PLUS 20+ full texts integrating the legal status, all in native or machine-aided translated English. In addition to the express and regular search interfaces, search citations and legal status, order worldwide file histories and patent copies, monitor patent and legal status, analyze graphs and stats, and manage your portfolio. (Questel)

SurfIP (IP Office of Singapore) - International free patents, trademarks and designs search service with a bias towards Asia.

STN International - premier online database service providing science, technology, and patent information.

Thomson CompuMark - Trademark and Copyright (Thomson Reuters)

Thomson Innovation - a single, integrated solution that combines intellectual property, scientific literature, business data and news with analytic, collaboration and alerting tools. (Thomson Reuters)

TotalPatent - 30 full-text and 100 bibliographic patent authorities, searchable in original language or English machine translation; 50+ million PDFs that are searchable, bookmarked, multi-page, and condensed; 40 million patent families; multiple search options including a true semantic search that works with your search expertise and gives you full transparency and control of the concepts it suggests; integrated and linked to a variety of related solutions including PatentOptimizer™, Chisum on Patents, BizInt Smart Charts for Patents, SciVerse Scopus™, and more. (LexisNexis)

WIPS - Subscription database from Korea offering patents from various major nations.

Single-authority patent databases or online official journals

In alphabetical order of country or international body.

Albania Bulletin of Industrial Property - since 2004

Argentina - Patent database

Argentina - Searchable Patent Journal. Issues since 2004.

Armenia - Patent database

Auspat - Newest Australian patent search and status database to gradually replace older systems

AU Published Patent Data Searching - Previous official Australia database still required for some older documents.

Australia patent specification server - access to A, B, or C specifications by number only

Australian Official Journal of Patents - old law patent journal for applications before 5th July 2002

Supplement to Australian Official Journal of Patents - new law patent journal for applications after 5th July 2002.

Austria Publications Server - search by number or IPC

Austria status database - search by number only, more data may be available with paid subscription

Belgium - status database

EPATRAS (Belgium) - status and translations of EP patents valid in Belgium

Recueil des Brevets d'Invention (Belgium) - Belgian official journal (1997 - 2008)

Belize Intellectual Property Journal (2003 to date)

Brazil patent databases: select "Pesquisar Base de Patentes" for normal patent database, "Pesquisar Base de Patentes em Aniversario" to search patents expiring on a single day or within a date range.

Revistas da Propriedade Industrial (Brazil) - last 500 issues of official journal Canadian Patent Database

EPOLINE - Online European Patent Register - online access to status and legal data of EPO documents from A publication on. Does not cover national phase status details for which it is necessary to check the relevant national authority status databases.

Republic of Ireland SPC database - search by number, date, product and applicant.

Indian patents - Web site http://www.ipindia.nic.in/ Includes Patents since 1911 and Patent office Journals since 2005 and status of the applications.

Italian Patent and Utility Models (FILDATA Web Site)

Italy SPC Bulletin - monthly announcements of application and grant.

Japanese Industrial Property Digital Library (IPDL) - includes Patent Abstracts of Japan, with searchable English-language titles and abstracts since 1976, and status and automatic full-text translation into English since 1990. Also includes the online Patent & Utility Model Gazette, from which it is possible to retrieve specifications of all Japanese patents and utility models since the beginning of the Japanese IP system, but by number only.

JP-NETe - All bibliographic and abstracts with full citation and legal status information of Japanese unexamined patents dating back to 1989 are available in English language with no time lag in publication date; see World Patent Information 31 (2009) 131-134 for more information.

Korean Intellectual Property Rights Information Service (KIPRIS) - A free patent information search service covering all Korean IP information (English abstracts of Korean patents since 1979 and machine translation of Korean patent & utility model publications since 1983) of the Korean Intellectual Property Office (KIPO) and patent information of EP, JPO, USPTO and WIPO. (Korean Institute of Patent Information (KIPI)).

IP Philippines Patent Online Search System (PHILPAT) - contains Invention, Utility Model, and Design patents dating from 1948. Abstract information for patents under new law (1998) in about 50% of records.

Slovakia SPC database - English language search form

Slovenia SPC database - English language search form

Swissreg - databases of all forms of IP in Switzerland, select from left of screen. "ESZ" = SPC.

UK Intellectual Property Office SPC search - Retrieve information on UK Supplementary Protection Certificates by patent or SPC number only.

PatentSurf.net(USA) - Surf U.S. patents by discovering natural relationships

USA Patent term extensions lists - US equivalent of SPC, official database

USPTO Databases - Main US official patent database site, with separate databases for granted patents and published applications. Also includes design patents (US equivalent of registered designs), plant patents, defensive publications, and statutory invention registrations.

Single Technology Databases - Biotechnology

CAS Registry BLAST - A specialized platform using NCBI BLAST to search the biological sequence content of the CAS Registry database. CAS Registry includes sequences indexed both from the patent and non-patent literature content of CAplus. CAS Registry BLAST is accessible via STN Express. (STN).

DNA Data Bank of Japan - published nucleotide and/or amino acid sequences for genes. Includes patent information.

DNA Patent Database (USA) - free Georgetown University database of US DNA patents.

Entrez cross-database search - by the US National Center for Biotechnology Information. A resource for searching various free databases, including nucleic acid and protein sequences from patents.

European Bioinformatics Institute metasearch page - search various free databases on different types of biological information, including EP patent abstracts and nucleotide and protein sequences from patents.

Federal Bio-Technology Transfer Directory (searchable archive; not longer updated)

GENESEQ - A patent sequence database produced by Thomson Reuters, containing nucleic acid and amino acid sequences from patents since 1981 from 41 worldwide patent-issuing authorities, including WO, US, EP, JP, DE, IN and CN. Each record contains standardized terminology and bibliographic data, enhanced titles, English language abstracts, and manually-captured sequence information. (Thomson Reuters).

GQ-PAT - A patent sequence database containing nucleotide and protein sequences taken from patent databases from global patent offices (EPO, USPTO, WIPO/ PCT), publicly available bio-sequence databases and web resources including GenBank® from the US National Institutes of Health, the Nucleotide Sequence Database (EMBL-Bank) from the European Molecular Biology Laboratory, and the DNA Data Bank of Japan (DDBJ). (GenomeQuest). on GenomeQuest.

Patent Lens sequence search facility - A utility provided by CAMBIA, using NCBI BLAST to search sequences from US patent publications.

Patome - A patent sequence database containing sequence data in patents from WO, EP, US, JP, with annotation and analysis data.

PCTGEN (World Patent Application Biosequences database) - A patent sequence database comprising information on nucleic acid and protein sequences submitted to the World Intellectual Property Organization (WIPO) by patent applicants. The database is based upon data provided by the WIPO Published Sequence Listings web service. (FIZ Karlsruhe).

PSIPS (USA) - USPTO site to download sequences too long to include in full in patent specifications.

USGENE - A patent sequence database providing search access to all available peptide and nucleotide sequences from published applications and issued patents of the United States Patent and Trademark Office (USPTO). Sequence data are available in USGENE within 3 days of publication by the USPTO. The SequenceBase Corporation is the producer of the database.

WIPO Published Sequence Listings - nucleotide and protein sequence listings in WO applications.

Single Technology Databases – Pharmaceutical

Electronic Orange Book (USA) - American Food and Drug Administration free public database of approved drugs, often including key patent numbers and expiry dates.

DrugPatentWatch.com - Comprehensive information on drug patents and their expirations. Datasets include annual sales, patent expirations, failure to pay maintenance fees, ex parte and inter partes reexamination, interference, disclaimer, and Paragraph IV challenges.

FDA Suitability Petitions (USA) - lists of substances submitted for approval as generic drugs

Genericsweb - site for the generic pharma industry has subscription patent databases concentrating on pharmaceutical patents, with particular stress on tracking patent and SPC expiry dates.

Health Canada Patent Register - information on drug patents in Canada.

Medicine Information Central Patents (UK) - UK National Health Service database on drug patents in the UK. Registration required.

Orange Book Companion (USA) - subscription database on legal and regulatory information on drugs approved in the US, including details of related patents.

Single Technology Databases - Other than Life Sciences

DoE Patents (USA) - database of patents held by the US Department of Energy

Meta-search Tools

IPEstonia Patent Search Toolbar - Free patent and other prior art search tool and collection of free online patent databases. Includes more than 100 patent and non-patent information searchfields; intellectual property link directory to patent search engines and databases, supporting tools for patent information searching and analyzing, IP information providers, IP forums, groups and communities, tools for trademark, brand and domain name searchers; national patent, trademark and design databases, patent classification finders. In addition RSS feeds of WIPO, EPO and other IP news, IP Tweets.

Patent Pal - a free patent information toolbar providing search access to over 30 unique patent related search systems such as Google Patents, FreePatentsOnline, Esp@cenet, WIPO, Pat2Pdf, and the USPTO MPEP, links to other foreign patents databases.

Annexure II

The List of PCT Fees, for Indian Applicants to be paid at Receiving Offices in India while applying for PCT applications (from 01/01/2011)

(Amounts as on 01/01/2011)

Transmittal and International filing fees#

RO	Transmittal fee	International filing fee	Fee per sheet over 30	PCT-EASY reduction	Competent ISA(s)
IN	INR 8,000 INR 2,000 (Filing by Individual)	USD 1367*	USD 15*	USD 103*	AT AU CN EP SE US

Fees for preparing certified Priority Document and transmission to IB of WIPO Rs. 4000/- (For Individual Rs.1,000/-).

International Search fees# (from 01/01/2011)

ISA	Search Fee(USD)
AT	2326****
AU	1837
CN	314
EP	2,443****
SE	2,443****
US	2,080

International Preliminary Examination fees* (from 01/01/2011)**

IPEA	Preliminary Examination Fee	Handling Fee*
AT	EUR 1675	EUR 150
AU	AUD 550** 780	AUD 213
CN	CNY 1,500	CNY eq CHF 200
EP	EUR 1,760	EUR 150
SE	SEK 5,000	SEK 1,390
US	USD 600** 750	USD 206

— Payable to RO/IN [CHENNAI, DELHI, KOLKATA, MUMBAI as per applicable Jurisdiction].

* — The fee is reduced by 90% where applicant or each applicant (where two or more applicants) is a natural person and is a national of and resident in India.

** — This amount will be applicable when Search is done by the same ISA.

*** — Payable to IPEA in the currency prescribed by it.

****— The fee is reduced by 75% where applicant or each applicant (where two or more applicants) is a natural person and is a national of and resident in India.

Note - For further information in respect PCT related matters, kindly visit WIPO Website at http://www.wipo.int/pct/en/

Annexure III

Forms and fee for prosecuting Patents applications in India

Number of the Relevant Form	On What Payable	Amount of Fees (in rupees)	
		Natural Person(s)	For other than Natural Person(s).or Jointly with Natural Person(s)
1	2	3	4
1	On application for grant of a patent	1000 Multiple of 1000 in case of every multiple priority. -100 (each sheet of specn. -in addition to 30) - 200 (for each claim in addition to 10)	4000 Multiple of 4000 in case of every multiple priority. - 400 (each sheet of specn. -in addition to 30) - 800 (for each claim in addition to 10)
2	Provisional/complete specification	No fee -100 (each sheet of specn. -in addition to 30) - 200 (for each claim in addition to 10)	No fee - 400 (each sheet of specn. -in addition to 30) - 800 (for each claim in addition to 10)
3	Statement and undertaking	No fee	No fee
4	Request for extension of time	300 per month	1200 per month
5	Declaration as to inventorship	No fee	No fee
6	Claim or request regarding any change in applicant for patent	500	2000
7	Notice of opposition on grant of a patent	1500	6000
8	Request or claim regarding mention of inventor as such in a patent	500	2000
9	Request for publication	2500	10000
10	Application for amendment of patent	1500	6000

11		1500	6000
12	12	1500	6000
13	13	500 1000 200	2000 4000 800
14	14	1500	6000
15	15	1500	6000
16	16	1000	4000
17	17	1500	6000
18	18	2500 3500	10000 14000
19	19	1500	6000
20	20	1500	6000
21	21	1500	6000
22	22	2000	No fee
23	23	1000	No fee
24	24	1000	4000
25	25	1000	4000
26	26	No fee	No fee
27	27	No fee	No fee

Annexure IV

Renewal of Patent under Section-53- Schedule of fee

Entry No.17 of the First Schedule

	Amount of fees (in rupees)	
	For natural person(s)	For other than natural person(s) either alone or jointly with natural person(s)
	Rupees	Rupees
Before he expiration of the 2nd year from the date of patent in respect of 3rd year	500	2,000
Before he expiration of the 3rd year in respect of the 4th year	500	2,000
Before he expiration of the 3rd year in respect of the 5th year	500	2,000
Before he expiration of the 4th year in respect of the 6th year	500	2,000
Before he expiration of the 5th year in respect of the 7th year	1,500	6,000
Before he expiration of the 6th year in respect of the 8th year	1,500	6,000
Before he expiration of the 7th year in respect of the 9th year	1,500	6,000
Before he expiration of the 8th year in respect of the 10th year	1,500	6,000
Before he expiration of the 9th year in respect of the 11th year	3,000	12,000
Before he expiration of the 10th year in respect of the 12th year	3,000	12,000
Before he expiration of the 11th year in respect of the13th year	3,000	12,000
Before he expiration of the 12th year in respect of the 14th year	3,000	12,000
Before he expiration of the 13th year in respect of the15th year	3,000	12,000
Before he expiration of the 14th year in respect of the 16th year	5,000	20,000
Before he expiration of the 15th year in respect of the 17th year	5,000	20,000
Before he expiration of the 16th year in respect of the 18th year	5,000	20,000
Before he expiration of the 17th year in respect of the 19th year	5,000	20,000
Before he expiration of the 18th year in respect of the 20th year	5,000	20,000

UNIT 4 FINANCING OF INTELLECTUAL PROPERTY

Structure

4.1 INTRODUCTION

Inventing is costly business. No doubt knowledge is an asset but hard money is essential to convert it into socially acceptable inventions. All inventors require funds for their inventive activity. It is difficult to find such funds.Even in large firms, IP managers have more feasible projects but due to fund constrain these projects are either forced to be postponed or altogether abandoned by them. One of the possible reasons for this state of affairs is low expected returns due to an inability to capture the profits from inventions. Another reason could be the uncertainty and risk associated with the project. Last but not the least the over-optimism of IP managers about the success of their projects. In this unit we will study the extent of the problem and different sources of IP financing and use IP as finance earner.

4.2 OBJECTIVES

After studying this unit, you will be able to:

- explain the financial resources used by earlier inventors;
- discuss the types of funds are available to the inventor;
- explain the availability of funds is linked to risk factor;
- describe the various sources of IP finance;
- analyse Government Grants as IP financing source; and
- describe IP as collaterals for bank loans.

4.3 HISTORY

Individual inventors

In the eighteenth and nineteenth centuries, most of the innovative research was carried out by individual inventors. Let us look back and see what was the profession of some of the most great and revolutionary inventions made by men in early nineteenth century. Morse, inventor of telegraph was a landscape painter; inventor of spinning–frame, Richard Arkwright was a barber, power-loom was invented by a clergyman, Edmond Cartwright; steamboat inventor Robert Fulton was a portrait painter; James Watt who invented steam engine was maker of scientific instruments; cotton gin was invented by a lawyer Eli Whitney; Bell was a school teacher for deaf and dumb when he invented telephone; Hydraulic engine inventor William Armstrong was a lawyer. The nineteenth century was the golden era of individual inventions. It was during this period inventors like Thomas Edison and Alexander Graham Bell established new industries from their inventions. Indeed, independent inventors continued to contribute many important innovations throughout the early twentieth century, including Samuel Ruben's Duracell batteries, Edwin Land's Polaroid film, and Chester Carlson's Xerox photocopying process. Thus, individual, "post-heroic" inventors remained an important, though less visible, source of inventions in the early twentieth century .We know that all the individual inventors of yesteryears used their own resources for financing their inventive activity. In a well-known case, in 1920 the Westinghouse Electric and Manufacturing Company purchased Columbia University Professor Edwin Armstrong's radio patents for feedback detection and the superheterodyne circuit for $350,000. Inventor of safety pin Walter Hunt invented and patented it in 1849 to pay back his debt of $15 and later sold his invention in $400 (patent No. 6,281). But in the modern high-tech world, many innovators follow much the same pattern as McCormick, Whitney, Bell, Edison and the Wright brothers. The breakthrough in computer software is also example of individual breakthrough. Three examples of independent inventors in this filed in addition to Bill Gates are Steve Jobs founder of Apple Computer with Steve Wozniak, Inventor World Wide Web Tim Berners-Lee, whose invention of hypertext links to connect information stored in different documents Father of the WWW and Shawn Fanning, inventor of Napster file-sharing software. The pattern of individual inventions which prevailed with prominent US inventors was that they made no important innovation after the first breakthrough. In many cases they followed litigation route to gain revenue from their patented invention. In other case they emerged as cooperate leaders

to commercialize their own inventions with others. Many computer innovators followed similar patterns, some of them faded from the scene or, other like Bill Gates, became a corporate titan, rather continuing as a cutting-edge innovator.

History – Corporate inventors

However, beginning in 1900, several large firms like General Electric, Du Pont, AT&T and Texas Instruments established the first research and development (R&D) laboratories with hired teams of scientists who developed new products but all the resulting patents thereof were assigned to these companies. Some of scholars believed that establishment of many corporate research labs sound as death knell to individual inventing activity. However Jack Kilbys' invention of Integrated circuit while working in Texas instrument can be mentioned as his individual contribution. Some corporate leaders like Jobs head of Apple Computer and Pixar Animation Studios, became a visionary corporate leader who recognized, encouraged and marketed outstanding technological innovations by others. Marketing of the computer mouse, developed at Xerox's Palo Alto Research Center and the use of its associated point-and-click technology in the Apple Macintosh is one of the example of this pattern. Ken Olsen, for example, founder of Digital Equipment Corporation had revolutionized the computer industry in the 1960s by producing minicomputers that sold for a tenth the price of IBM's main frames.

4.4 SOURCES OF IP FINANCING

Many inventors are born every day but in reality most of the inventions never get off the ground or remain unknown because of a lack of adequate funding. There are a variety of ways that independent inventors can secure financing. The sources of finance for 'innovation to market' can be divided in five independent and equally critical segments:

1) Initial and unorthodox sources of funding

2) Equity

3) Debt finance

4) Combination of equity and debt : Mezzanine

5) Government Grants

Self Assessment Question **(Spend 2 minutes)**

1) What are the major sources of IP financing?

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4.5 INITIAL AND UNORTHODOX SOURCES OF FUNDING

1) Self, friends and relative

This kind of fund is most difficult to arrange as risk involved is very high. Therefore individual inventor and even at time corporate inventors find this fund scares. Individuals may be willing to invest small, affordable amounts. However this is a time-honored tradition in some cultures and could be the best way to raise funds. They are also known as backers in financial circles. Most of the start-ups with consumer items find friends and family help handy. Hugh Le Caine independently pursued his inventions in electronic music and sound generation. But Robert Kearns who patented intermittent powered wipers was not so successful as he spent years in litigation against Ford Motor and Chrysler for using his idea before he won multimillion-dollar litigation. He demonstrated the system to Ford Motor Company, which introduced automobiles with intermittent wipers in 1978. Other automakers soon followed. Goodyear inventor of vulcanization of rubber could not found angel investor and failed to market his invention. He rather found himself fighting infringement battle in courts against all the formerly frustrated rubber barons, in the US and abroad, who began stealing Goodyear's process. Goodyear ended up spending most of his time and money in court and when he died in 1860, Goodyear's American debts totaled $200,000.

2) Personal credit cards

Some of the inventor use the cash advance line on a credit card as an unsecured line of credit which at times are little expensive .The inventor normally look for credit cards with slow interest rates and cash advance fees. Mark Fasciano and Ari Kahn of FatWire Company selling web content management system software contributed $20,000 from their credit cards to pay for the equipment and services to start this innovative software company. A recent Arthur Anderson survey of small and mid-sized businesses revealed that nearly 50% of all small businesses use credit cards in some capacity to get up and running.

3) Private funds and Customer advance

Example Sir Frank Whittle used private funds to invent modern jet propulsion mechanism. FedEx and Apple Inc. were able to grow because of private equity. Jobs CEO of Apple Inc sold his Volkswagen micro-bus and Wozniak sold his Hewlett-Packard scientific calculator, to raise $1,300 to start their Apple Computers. With that initial capital and credit lines with local electronics suppliers, they set up their first production line in Job's family garage. On this basis the Apple Corporation was founded.This kind of advance is available where the market for the innovative product is big and lot of prospective buyers are willing to give advance.

5) Delay of payments

This method provide useful circulation fund during the period for development and realisation of sale. But such type of credit is available where the entrepreneur has good market standing.

6) Entrepreneur's savings

For example, Wright brothers for example used proceeds from their bicycle shop to invent flying machine.

7) Profit reinvestments

This is the most common method for funding IP. Most of the icon companies reinvest certain percentage of their profit into generating more IP portfolio. Example IBM, Apple, Uniliver, Nokia etc.

8) Second mortgage

This is the oldest method of find fund for financing the new innovative venture at low scale. Now even the second mortgage of patents is possible to obtain loans. Sometimes antiques, jewelry, collectibles, stocks, or real estate are used to obtain loan for getting startup funds

4.6 EQUITY

Funds from Potential business partners : Pre-seed and seed capital

Third source of fund is partnership with an existing business. It is a good way to get investment in the form of money or other resources. Samuel More inventor of telegraph found businessman Alfred Vail to fund his projects which later found support from many governments in Europe for establishment of telegraph network. But if the relationship is unequal, the venture is risky such partnerships end as Vail left More at very early stage of development of telegraph project for some more profitable business. Bessemer inventor of steel was successful to team up with W & J Galloway, a British manufacturer of steam engines and boilers, based in Manchester, England to manufacture steel in Sheffield from 1858. They established Henry Bessemer & Co. with capital input around £12,000 with Bessemer and Longdon contributing £6,000, Allen contributing £500 and the Galloways £5,000. Similarly the inventors of the hugely successful quiz board game Trivial Pursuit® when turned down by every company approached friends and offered $500 and $1000 shares to raise all the money they needed to launch it.

Private investors often known as 'business angels'

Other possible sources of funds for individual inventors are some willing private individuals. These private investors are some time called as 'angle investors' or 'business angles'. But most of these investors look for three things: effective management, a good product and a worthwhile market. They may be willing to take a large risk, but in return they want a large reward. A convincing business plan will be essential, and the angel may insist on taking a close personal interest in the business. An Angel Investor is willing to invest in innovative startups with a rider for receiving a good chunk of the equity in business. For Example George Eastman inventor of photographic film and Kodak camera found Henry A. Strong as angel partner who invested money in the infant concern Eastman Dry Plate Company which with more shareholder became what is known today as Eastman Kodak Company.

Venture Capital

Venture Capitalists like angle investors look for highly profitable, very fast growing, early to mid-stage ventures. They seek almost immediate returns on their money, which often include funds from wealthy individuals and institutional investors, pension funds etc who looking for a high rate of return. In return of the fund support they normally seek control in the management by bring in their own people as directors. Securing funds from venture capital firms is also challenging.

India is fast catching up with the West in the field of venture capital and a number of venture capital funds have a presence in the country (IVCA). In 2006, the total amount of private equity and venture capital in India reached US$7.5 billion across 299 deals. Venture capitalists usually like to invest in "hot" industries like high-tech, bio-tech, pharma, Internet, etc. and the companies that are poised to go public.

Successful Corporate Ventures

American Research and Development Corporation. (ARDC) is credited with being first major venture capital success story when its 1957 investment of $70,000 in Digital Equipment Corporation (DEC) fetched over $355 million after the company's initial public offering in 1968 which represented a return of over 500 times on its investment. In fact the public successes of the venture capital industry in the 1970s and early 1980s (e.g., Digital Equipment Corporation, Apple Inc., Genentech) gave venture capital investment firms much needed confidence to invest in IP based startups.

Digital Equipment Corporation

In 1957, Ken Olsen with his MIT colleague, Harlan Anderson, took a decision to start their own firm. They approached American Research and Development Corporation (ARDC), an early venture capital firm founded by Georges Doriot. ARDC agreed to invest venture capital of $70,000 in Digital Equipment Corporation (DEC). In the 1960s, Olsen received patents for a saturable switch, a diode transformer gate circuit, an improved version of magnetic core memory, and the line printer buffer. When the company when public in 1968 the estimated worth of the initial investment of ARDC was over $355 million. This venture succeeded in establishment of this company which now worth.

Apple Computers

Steve Jobs with a friend, Steve Wozniak started Apple Computer which later emerged as a leader in the field of personal computing. Apple's two young entrepreneurs received help from a chip industry veteran and ex-Intel manager named Mike Markkula, who helped them to bring a venture capitalist named Arthur Rock to invest in this nascent but fast growing firm. Mike Markkula invested $92,000 in Apple to share third ownership in the company. A bank loan of $250,000 was also obtained. With the help of Mike Markkula, Apple secured $600,000 in venture funding which helped Apple to grow bigger than IBM. When apple goes public in 1980 Apple's stock offering had generated more capital than Ford Motor's had in 1956 and instantly created about 300 millionaires – more than any company in history up to that point. . Of Apple's 1,000 employees then, more than 40 became millionaires because of their stock options. Steve Jobs, holding 7.5 million shares, was worth about $217 million dollars. Steve Wozniak holding with four million shares was valued at $116 million dollars. Mike Markkula's seven million shares were worth about $203 million.

Genentech

Herbert W. Boyer inventor of using of recombinant DNA technology to produce commercial medicines with Robert A. Swanson, a venture capitalist established Genentech in 1976. Genentech became first and later most successful biotech icon company to produce new products such as human insulin, interferons, human growth hormone and thrombolytic agents.

Other Examples

Venture capital played an instrumental role in developing many of the major technology companies of the 1980s. Some of the most notable venture capital investments were made in firms that include: Tandem Computers,., Electronic Arts, Compaq, Cisco, Microsoft and Avis. Among the highest profile technology companies with venture capital backing were Amazon.com, America Online, E-bay, Intuit, Macromedia, Netscape, Sun Microsystems and Yahoo.

4.7 DEBT FINANCE

Bank Loans : short or long term loan, unsecured or micro loans.

Friends and family may be useful in funding the inventors in the initial stages of the development of the invention. However they are often not able to provide the large sums of money needed to get a new invention cross the valley of death. The innovators then turns to Banks for securing short or long term or unsecured or micro loans . Bank fund is not available to every dreamer innovator. At times bank loans are difficult for startups but this is emerging as most valuable and reliable source to meet the need of financial requirements of the inventors. Like venture capitalists banks give loan to hot tech startup that is likely to be profitable or whose management has a successful business tract or the inventor has a sound and viable business plan.

There are two main financial institutions available for loans for entrepreneurs in India.

1) Industrial Development Bank of India (IDBI)

2) Industrial Finance Corporation of India (IFCI)

The Industrial Development Bank of India is the head institution in the area of long term industrial finance. It was established under the IDBI Act 1964 as a wholly owned subsidiary of RBI and started functioning on July 01, 1964. Under Public Financial Institutions Laws (Amendment) Act 1976, it was delinked from RBI. IDBI is engaged in direct financing of the industrial activities. The objectives of the Industrial development bank of India are to create a principal institution for long term finance, to coordinate the institutions working in this field for planned development of industrial sector, to provide technical and administrative support to the industries and to conduct research and development activities for the benefit of industrial sector. On the State level finance is available loans can be availed from

1) State Financial Corporation (SFC)

2) State Industrial Development Corporation (SIDC).

4.8 COMBINATION OF EQUITY AND DEBT: MEZZANINE

Mezzanine finance is defined as a hybrid of debt and equity financing where the lender the rights to convert to an ownership or equity interest in the company if the loan is not paid back in time and in full. It is usually used to finance the expansion of existing companies. However in order to receive mezzanine financing, a entrepreneur must have a established reputation and product, a history of profitability and a viable expansion plan for the business.

4.9 GOVERNMENT GRANTS

Apart from above resources public financial sources like government grants, is becoming popular among the inventors for commercialization of their inventions. We will now discuss grants as source of IP finance. Academics in universities, technical institutions and other public and private research and development specialized organizations receives government grants for equipment and staff (graduate students and technicians) salaries. There are grants also available for academic collaborations with industry to promote successful commercialization of innovative products. For example in India Union Grant Commission, Department of Science and Technology, National Research Development Corporation are providing project based seed fund for development and commercialization of inventions.

4.10 GOVERNMENT SPENDING ON R&D ACTIVITIES WORLD WIDE

According to a report of World Economic Forum, India rank low on the world map of R&D spending. Global R&D funding of selected countries in 2006 based on Global R&D report 2007 is given in Table 4.1.

Table 4.1: Global R&D funding, 2006

Countries	R&D, PPP (US $ billion)	R&D as % of GDP	R&D as % of World
United States	343	2.76	32.70
Asia	387.2	2.02	36.90
China	141.7	1.61	13.50
Japan	136.7	3.4	13.00
India	38.8	1.03	3.70
Europe	264.3	1.88	25.20
Rest of world	23	1.11	2.20
Total	1049.4	2.08	100.00

As per same report share of total global R&D spending of the selected countries in 2006-2007 is given in Table 4.2.

Table 4.2 : R&D spending as % of world

Countries	2006	2007
United States	32.70	31.4
Asia	36.90	38.8
China	13.50	15.6
Japan	13.00	12.8
India	3.70	3.7
Europe	25.20	24.6
Rest of world	2.20	2.2

This indicates that USA is clearly the global leader in R&D spending. India is also emerging as one of the major country with 3.7 % share in global spending on R&D activity. According to this report Government is the major source of funding in India, Brazil, and Hungary (see. Figure 4.1)

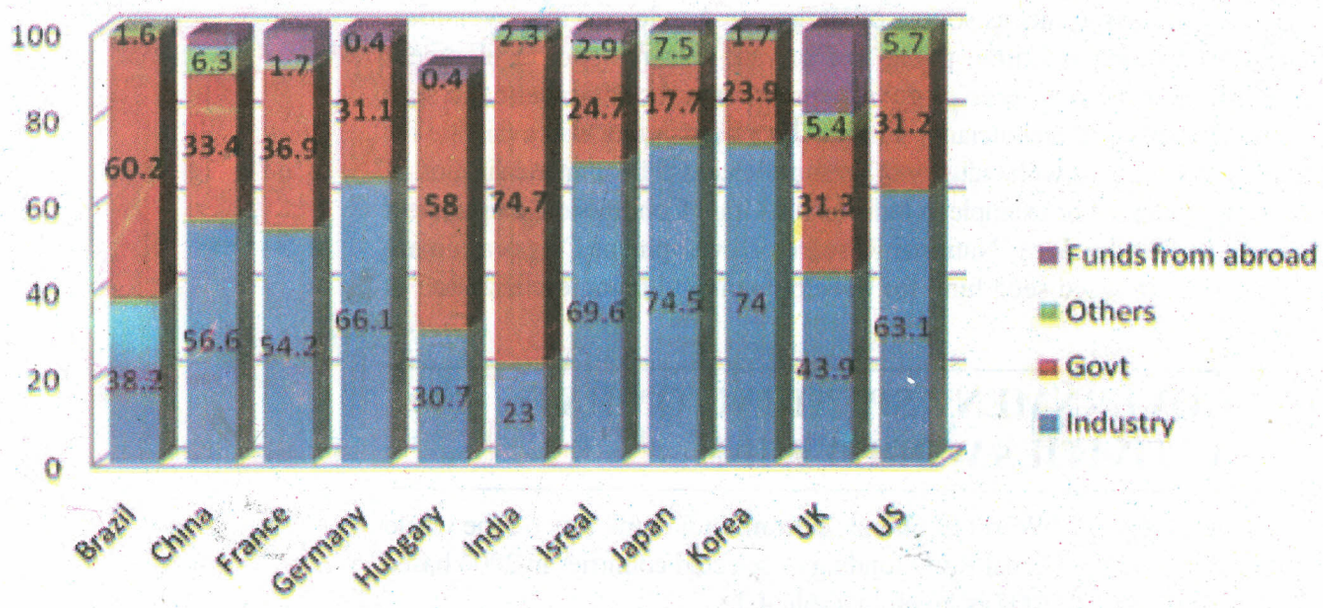

Fig. 4.1 : Exhibits sources of R&D funding (%) in selected countries

4.11 SCIENCE AND TECHNOLOGY ALLOCATION IN INDIA FOR XI PLAN

Given below is the extract of statement made by Union Minister for Science & Technology and Earth Sciences, Shri Kapil Sibal, in the Lok Sabha in March 2008.

"According to the official statistics, 0.8 per cent of the GDP is spent on Research & Development in Science and Technology in the country.

The Government has taken various measures to increase the expenditure on Science & Technology in the Country. These measures include higher allocation for scientific research from Plan to Plan for setting up of new institutions for science education and research, creation of centres of excellence and facilities in emerging and frontline areas in academic and national institutes, induction of new and attractive fellowships, strengthening infrastructure for R&D in universities, encouraging public-private R&D partnerships, national awards for outstanding R&D etc. Accordingly, the Government have enhanced XI plan allocation for Scientific Departments to Rs.75,304.00 crores from Rs.25,301.35 crores during X Plan."

4.12 STAGES OF INVENTION AND INVOLVEMENT OF FUND PROVIDERS

These fund providers apart from own resources includes private funds from business angles, corporate partners, venture capitalists, public funds from equity and banks. Figure 4.2 represent the sequence of events and likelihood of involvement of these fund providers in journey of patented invention to functional innovation and establishment of viable business.

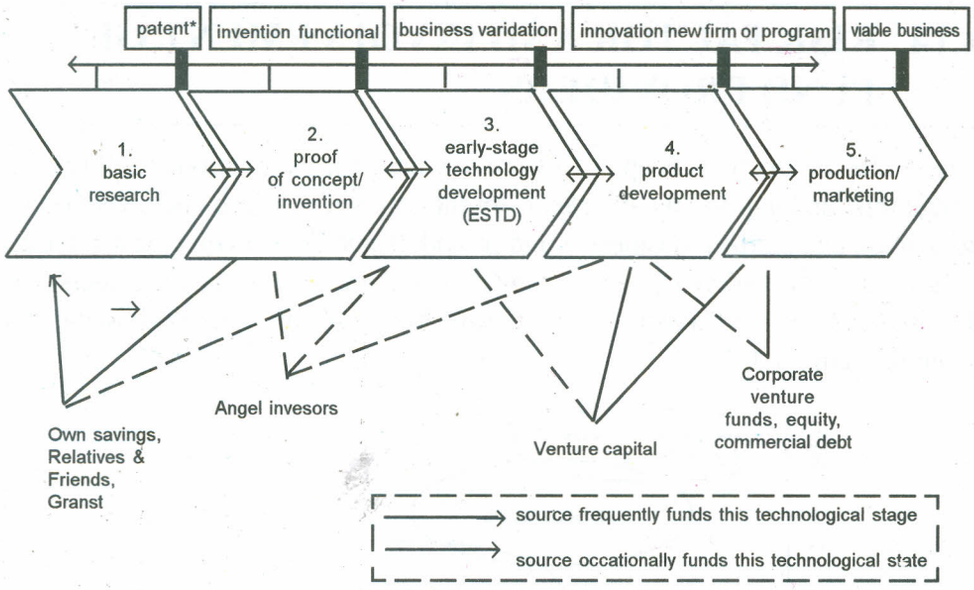

Fig. 4.2

Self Assessment Question **(Spend 3 minutes)**

1) What does funding gap mean?

.....

.....

.....

.....

4.13 FUND GAP - "VALLEY OF DEATH"

In reality the inventor's journey from idea to market is not only long but also infested with paucity of funds. In the early stage inventors use their own saving or take loan from relatives and friends. Beyond these recourses there exists a funding gap. This money crunch which in majority of the cases pushes the innovative ideas into what Vern Ehlers called "Valley of Death". It is graphically depicted in Figure 4.3.

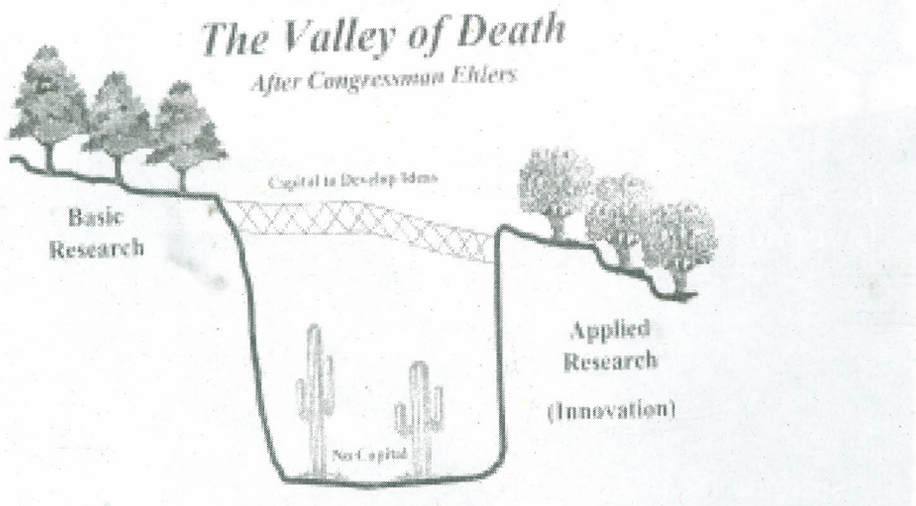

Fig. 4.3

4.14 RISK FACTOR AND INVOLVEMENT OF FUND PROVIDERS

The 'Valley of Death' is deep however every inventor uses various resources to bridge this fund gap to take his idea from the stage of research and invention to innovation and start-up business. Fund providers and their involvement is based on the risk involved at stages from basic research, invention, early technical development, product launch, business growth till viable business establishment is given in Figure 4.4.

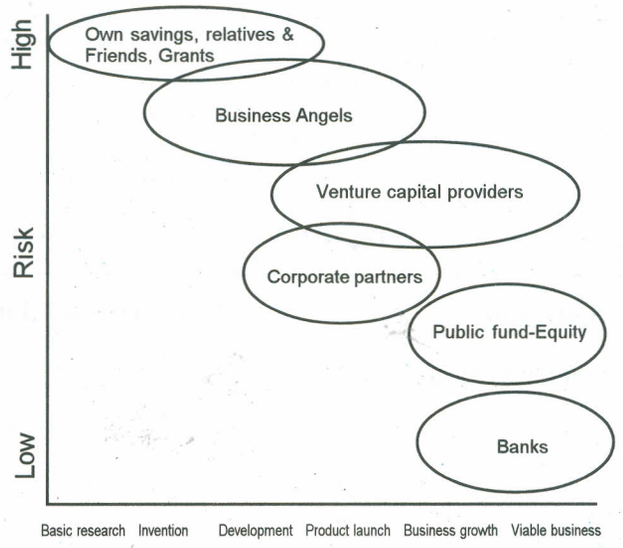

Fig. 4.4

4.15 JOURNEY OF INVENTION INTO "THE DARWINIAN SEA"

Even when the inventor is able to bridge the gap of funds required for early stage of technology development (ESTD) and cross valley of death safely he finds himself to land in what Branscomb called "The Darwinian Sea". Here actual struggle for survival in the sea of technical and entrepreneurship risk begins. The struggle of invention to innovation is represented by Figure 4.5.

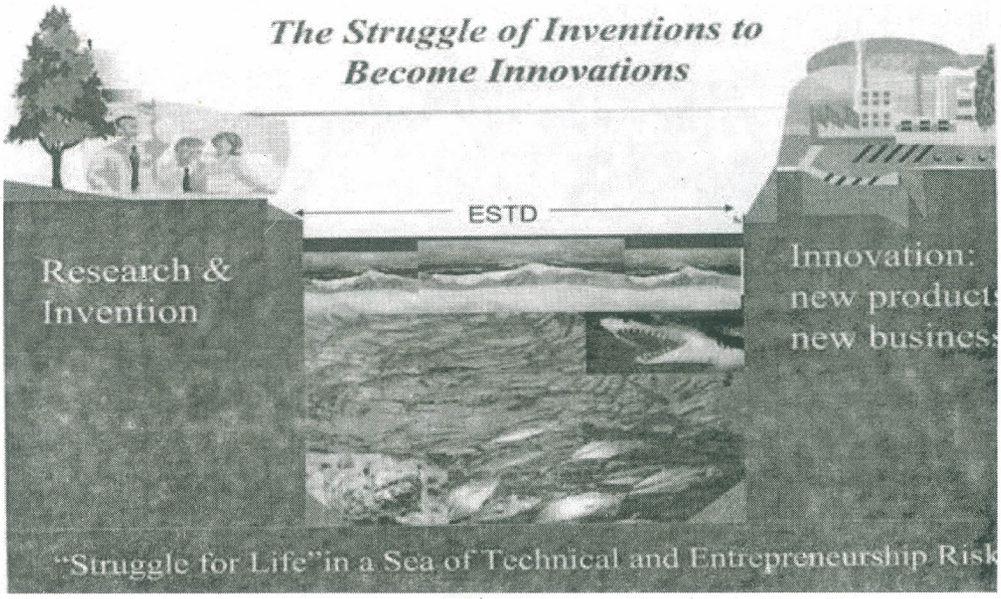

Fig. 4.5

4.16 JOURNEY OF INVENTION FROM "VALLEY OF DEATH" TO "THE DARWINIAN SEA"

Crossing of the valley of death only to arrive in the waters of the Darwinian sea is depicted by Figure 4.6.

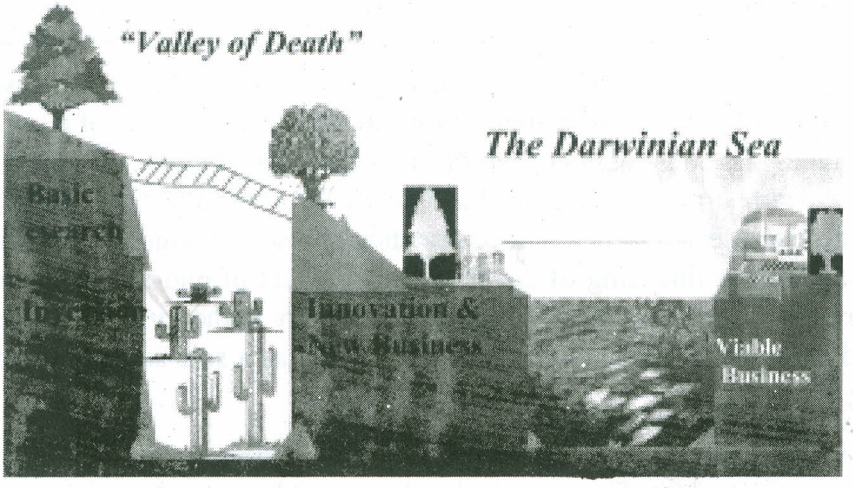

Fig. 4.6

4.17 ESTIMATE OF FUNDS REQUIRED FROM VARIOUS RESOURCES

Having understood the process of invention development and stages of the involvement of the fund providers let us see what percentage of fund is required to start a new business. Table 4.3 provides a rough estimate of funds that would be required by inventor for startups.

Table 4.3

Source of Fund	Percentage
Own saving	74%
Family and Friends	5%
Angel investors	7%
Corporate Partners	6%
Venture Capitals	5%
Equity	3%

4.18 USE OF IP TO SECURE ACCESS TO FINANCIAL MARKETS

As we have seen above many patent holders (Apple, Genentech) where able to exploit their patents as a means of tapping into external sources of financing particularly in attracting venture capital investments. They are also now being increasingly used as assets for securing funds from traditional financial markets via

bank loans and securities markets. Banks in Japan and Germany are beginning to accept patents as collateral for bank loans. Yet But use of IP as collateral for bank loans has remains limited to these countries so far.. The recent survey done by EC of 50 European commercial banks revealed that none of them accepts intangible assets as collateral for loans.

4.19 USE OF IP AS COLLATERAL FOR BANK LOANS

The Development Bank of Japan, implemented a loan system in 1995 which allows the patents and patent applications, as well as copyrights of computer programmes and contents, as collateral. This Bank has granted more than 250 loans to venture firms.. Similarly the Landesbank Rheinland-Pfalz in Germany has also stared to accepted technical documentation of research projects as additional collateral for the financing of development projects of mid-size companies. Furthermore, Germany's Federal Financial Supervisory Authority (BaFin) recently offered banks the possibility of accepting patents as a sole security for bank lending.

This trend is visible in the IP policy of large and small firms for securing funds for expansion. But smaller firms that lack other tangible assets to secure outside financing use IP as collateral. In fact ownership of a strong IP portfolio send positive signal to investors about technological advantage of the firm over its competitors.

4.20 SUMMARY

Financing of Intellectual creations like inventions is essential to make the idea reach the market. Financial resources availability to feed this staving but promising innovation market is growing. These financial resources are diverse and many but difficult to get in view of the demand for high returns growing from friends fund, bank loan to venture funding alike. This result in making the availability of IP finances an expensive affair. With capital requirements growing for startup companies, dependence on one financial source is not enough. Similarly companies seeking large up-front capital requirements cannot be financed by cheaper alternatives such as debt. Undoubtedly venture capital is most prevalent in the fast-growing 'hot technology' like life sciences or biotechnology fields or information, internet, nanotechnology. Finally as discussed above one of the greatest perils in transition of idea to market is the "Valley of Death," which is literally filled with the carcasses of cash-starved innovations and equally interesting are the success stories of those who find angle investors to swim across the Darwinian sea to land on oasis of commercially profitable venture.

4.21 TERMINAL QUESTIONS

1) What is meant by initial and unorthodox sources of funding?

2) Explain innovation crossing 'valley of death' safely to land in "The Darwinian Sea".

3) What is meant by debt finance?

4.22 ANSWERS AND HINTS

Self Assessment Questions

1) Refer to Section 4.4

2) Refer to Section 4.13

Terminal Questions

1) Refer to Section 4.5

2) Refer to Section 4.15

3) Refer to Section 4.7

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