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MIP-108
MANAGEMENT OF IPRs

IP Strategies

4

"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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IP STRATEGIES

Expert Committee

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IGNOU

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IGNOU

Ms. Mansi Sharma
Assistant Professor, School of Law
IGNOU

Programme Coordinator: Dr. Suneet Kashyap Srivastava
School of Law, IGNOU, New Delhi

Block Preparation Team

Unit Writer:
Dr. D.P.S Parmar (Unit 11 to 15)
Technical Member
Intellectual Property Appellate Board
Ministry of Commerce & Industry

Content Editor:
Mr. C.M. Gaind
Former Director, NRDC
Senior Patent Attorney, New Delhi

Format & Language Editor:
Dr. Suneet Kashyap Srivastava
SOL, IGNOU, New Delhi

Print Production

Mr. S.Burman	Mr. Tilak Raj	Mr. Yashpal
Deputy Registrar (Pub.)	Assistant Registrar (Pub.)	Section Officer (Pub.)

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BLOCK 4 IP STRATEGIES

Unit 11 of this Block deals with royalties for licensing. In this Unit, topics like types of licensing practices, definition of royalty the method of fixing royalty, the factors affecting royalties etc. are dealt with.

Unit 12 of this Block deals with IP strategy in term of patent strategies, patent hedging, picket fencing, clustering, patent thicket, patent flood and patent trolls.

Unit 13 This Unit deals with patent mapping, data mining, the objectives of patent mapping, purpose of mapping, difference between patent searching and patent landscaping etc. The Unit also covers the freedom to operate.

Unit 14 & 15

Unit 14 of this Block deals with IP and standard, where definition of standard, drawbacks of standard etc are dealt with whereas Unit 15 deals with open source. In this Unit the definition of open source is defined, free and license software are dealt with. It also deals with the impact of free software.

UNIT 11 ROYALTIES FOR LICENSING

Structure

11.1 INTRODUCTION

Licensing is an important and useful ways of exploiting patented technology. Various type of licensing (which you have already studied in Unit 9) is practiced. Exclusive /non exclusive/sole licensing, cross-licensing and patent pools are being used by the patentee to exploit the patents through licensing. All such licenses involves an agreement between the patent holder (licensor) and other interested party (licensee) to allow the latter party to make, sell and use the patented invention on an exclusive or non-exclusive basis, without transferring ownership of the patent with a licensor receiving financial consideration in the form of royalty payments in exchange for the licence. Licensing of unused patents is a vital source of revenue generation by many companies. It is important and useful ways of exploiting patented technology. Licensing patented technology has emerged as major revenue earner for the companies. It is importance for the companies that are looking for tax havens for cheap manufacturing facilities through the licences holder instead of manufacturing at costly locations. The correct estimation of the royalty value of IPRs is increasing becoming daunting yet important task of the companies and their accountants. More importantly for correct assessment of

profitable returns from a patented invention it is necessary to arrive at a most agreeable formula of royalty payments to the licensor by the licensee in license agreements. Most of the inventors /firms face the problem to make a choice the type of royalties, ad valorem or per-unit, assuming uncertainty coming from either the demand side or the cost side. Royalty rate is defines as the payment agreed to be made by the licensee to the licensor for using the intellectual property owned by the licensor. Royalty rates are merely expressions, or mechanical forms of calculation, employed by parties when making decisions or assumptions based upon profitability. In this unit we will study the how the economic returns from IPRS are maximised by adopting different kind of royalty assessment and payment methods; what are the essential determinants of arriving at the royalty of the IPRs? We will also study the structure of royalty clauses, royalty splitting, and royalty stacking. And Calculation of reasonable royalty Rates in Infringements.

11.2 OBJECTIVES

After reading this unit, you will be able to:

- explain royalty payment;
- discuss the various methods of calculating royalty;
- explain the difference between lump-sum payment, running royalty and step down royalty payments;
- explain royalty rate and royalty base; and
- discuss cost based, market based and yield approach in determination of royalty.

11.3 HISTORY

Historically speaking, the term 'royalty' originally was applied to the 'share of the proceeds' that the Kings collected from its subjects for any exploitation of the assets owned by the Kingdom , for instance, mines, oil fields, shipping lanes, geographic territories and the like. By implication it meant to express an acknowledgement that the exploited property remained in the hands of the state. In other words, any exploitation was by a way of lease or franchise without transfer of ownership. Today this concept is extended to exclusive ownership of property in Intellectual Property rights (IPR), which resides in a product, process or system of the individual or firm or corporate or legal entity or government.

Most of the intellectual property based high-tech companies are generating considerable royalties from outward licensing of patented technology. IBM Corps for example started earning around half a billion of annual revenue from licensing royalties by the year 2004. In 2008 and 2009, IBM's reported "licensing and royalty-based fees" averaged 38% of an average reported $1.165B in "IP income". Taxas Instruments is reported to have reported to have earned 800 million as licensing revenue a year by the year 2000.Similarly DuPont, Merck and Amgen also reportedly earned a significant amounts from patent licensing. Over the years patent outward licensing has emerged as one of the most direct method of generating revenue for the patent holder.

11.4 TYPES OF LICENSING PRACTICES

Patent licensing practices differ from one industrial field to another. This is so because there exists differences in the dynamics of innovation and the role of patenting in innovation processes. Various studies were conducted to identify differences across industries with respect to patent licensing. It was observed that licensing is basically concentrated in industries like chemical industry, drugs, electronic and electrical equipment, semiconductors, industrial machinery, equipment industry and computers. It was also found that prior relationship is vital for having new licensing contracts particularly licensing in computer and electronics firms than in chemicals. The exclusivity and restriction clauses are more commonly found in chemical licensing than computers and electronics. Similarly restrictions clauses like field of use, geographic domain and contract length are more common in chemicals than computers and electronics licenses. The practice of Cross-licensing is more prevalent in electronics than in other industries. Other studies also showed that companies will tend to engage in licensing agreements: the closer their technological profiles; the closer their market profiles; the more familiar they are with each other through prior agreements; the higher their prior independent experience with licensing; and the stronger the intellectual property protection in the primary line of business of the licensor. All these factors affect licensing transaction costs and indicate that reducing transaction cost may be more important when licensing occurs across sectors, whereas strategic and competition-related factors may be more important when licensing occurs between firms pertaining to the same industry.

11.5 ROYALTY DEFINED

Royalty is a term used to denote the use-based payments made by the licensee to the licensor as a consideration for the permission to the use of an intellectual property right (IPR). Rate of royalties are agreed by the parties to the license. A typical royalty rate may be based upon as a percentage of gross or net revenues derived from the use of an IPR or a fixed price per unit sold of an item covered by such IPR. A license agreement defines the terms under which intellectual property such as patents, trademarks, and copyrights are licensed by one party to another. Royalty rates are specific to type of IP rights involved. Patent royalty rates depend on the strength of a patent and its value to the products. Patent royalties are usually charged as a percentage of the value of the finished product made by using the patent or percentage of profit from its sale. Similarly trademark royalties may be assessed and divided in a variety of different ways, and are expressed as a percentage of sales volume or income, or a fixed fee per unit sold. Copyright royalty are often very specific to the nature of work and field of endeavor. For example book publishing royalty, music royalty, print (music) Royalty, mechanical royalty, art royalty and software royalty. The correct estimation of the royalty value of IPRs is increasing becoming daunting yet important task of the companies and their accountants. More importantly for correct assessment of profitable returns from a patented invention, it is necessary to arrive at a most agreeable formula of royalty payments to the licensor by the licensee in license agreements.

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

1) Define Royalty.

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11.6 FIXING ROYALTY RATES - THE 25% RULE

This rule was arrived at by comparing the past license negotiations. Accordingly to the finding under this rule, it was observed that a large percentage of royalty negotiations were arrived at a royalty rate that was equal to approximately one-quarter to one-third of the licensee's anticipated pre-tax profits derived from the technology. Further these royalties were calculated against net revenues rather than licensee profits. Therefore this rule was found to be useful to arrive at a rate that will be applied against revenues.

Example : Software Royalty

Consider a case where the parties anticipate that the licensee B will have profit margins of 80%, then by applying 25% rule royalty paid to the licensor A would be in the range of 20-30% of net revenues (before taxes).In other words if profit margins are historically high, the royalty rates are also comparatively high.

This historically 25% rule as discussed above may not always carry prescriptive weight as thumb rule for all technologies. It has been recently criticized as fix royalty rules or standards which do not take into account specific circumstances that will determine the actual value of the patent at issue. Further these critics argue that no consideration is given to the number or value of economic alternatives or the incremental value of using the patented technology over other viable alternatives. Accordingly there are many factors that must be considered in the final determination of its value/rate. They contend that this rule should be viewed as non-negotiable gospel. However in practices reference to the 25% rule in most of the cases is found to be helpful to the parties to understand where, historically, rates for the particular technology or invention have ranged. This in fact checks the parties from making unreasonable proposals. No doubt most licensing professionals prefer to use this rule mainly to establish a range from which the negotiated royalty rate is likely to emerge and which range probably can be considered reasonable based on past cases.

11.7 FIXING ROYALTY RATES - THE 5% RULE

In terms of determining royalties, it so happens that in many industries – from medical devices to electronics and food – negotiations frequently yield a royalty of 5-6% of net sales. For example, a recent study concluded that the "median royalty rate across all industries was 4.5 percent." (This ranged from a low of 2.8% in the Food industries to a high of 8% in Media and Entertainment.) Therefore, when in doubt one can often assume that a royalty in this range will be reasonable.

Example : Food preservation technology royalty

Consider a food technology case. Looking at the past records one will observe that here a licensee expects to generate profits of 4% from using patented technology. If we apply 25% rule the licensor would receive royalty within the range of 1-1.5% of net revenues. This is in contrast to software example as the profit margins here are low therefore, the royalty rate would also be low. In other words, if profit margins are historically low, the royalty rates are also comparatively low.

11.8 TYPES OF ROYALTY PAYMENTS

As discussed above, royalty in license agreements is always a consideration in lieu of something such as the right to use a trademark, patent, know-how, designs, drawings or a combination of them. Typical royalty payments take following basic forms:

Running Royalties (Earned Royalties)

Running royalties are most commonly used in patent and trademark licensing as these IP rights can be exploited without the help of the licensor once the license has been granted. This type of royalty is demanded if the license is only for single product. The royalty consideration here is usually based on production of patented product or on the 'sales value' of the product or profits from the licensed product. It is common to demand minimum and maximum (cut-off) royalty payments by the licensor. The licensor demand minimum royalties if he feels that the licensee may not work the license to its full benefit. In other cases it is seen as an incentive to the licensee to work the patented invention to the full. The maximum or cut-off royalty is adopted where the licensor agrees that a cumulative amount will satisfy the objectives of license and once the target is achieved no further royalties shall be payable. Another option in running royalty is to adopt reducing royalty clause if large volumes are expected in the future. This provision is most commonly found in patent licenses agreements. The running royalty usually are formulated in such a manner that the licensee is required to pay to the licensor a certain percentage of the net turnover achieved by the licensee relating to the licensed patent. This formulation is success dependent and it is directly proportional the volume of commercial success which the licensee achieves with the licensed granted. The running royalty can be determined as a fixed payment per volume sold by the licensee. The royalty comprising a fixed amount of money per unit of product sold is known as a "Fixed Unit Royalty". In this type of royalty calculation it is easy to calculate the royalty amount. This method avoids disputes which may occur when accounting is based on profit. In such case no automatic adjustment to price development particularly to inflation is done. However an additional clause is usually added in the license agreement to make the fixed payment per unit sold dependent on the developments relating to prices like consumer index in the territory of the license. In case the running royalty is formulated as percentage an automatic adjustment to price development takes place thereby making the additional index related clause redundant. So far as the quantum of the royalty rate is concerned there is no fixed rule. In practice these rates are as high as 25% of the profit before taxes. Thus if the profit before taxes is 10% then the royalty charged can be 2.5%. Example is patents relating to machines. In a patent for blockbuster medicine where profit before tax may be 60% one may find royalty rate of 15% or even higher.

Step Up Royalty Rates

By step-up royalty rates means the licensee is required to pay low royalty rates initially at the beginning of the agreement and higher rates later in the agreement or subject to a triggering event like achievement of specified level of production by licensee. This arrangement is beneficial to the licensees as they are not burdened with paying higher royalty rates at the initial stage of production.

Step-Down Royalty Rates

If Step-Down Royalty Rates clause is adopted the licensees is required to pay a declining royalty rate as they ramp up production of patented products incorporating the licensed technology. This arrangement is beneficial to the licensees as it would induce them to aggressively commercialize their licensed technologies.

Minimum Royalties

Minimum royalty clause requires the licensees to pay minimum royalties which in practice discourage the licensee to allow the technology to languish. Further where the minimum royalty is equitable, the licensee is not tempted to design around the patented technology. Sometimes the licensor use this clause as insurance for payment of at least the minimum amount falling which the licensor may possible terminate or modify an otherwise exclusive or sole license into non exclusive license. Another form minimum royalty payments agreed by the licensee is where licensor would receive certain minimum fee per calendar for a certain period of time without the possibility of termination or down grading of license. This arrangement is not beneficial to licensee if the licensed product does not succeed in the market. A minimum annual royalty operates as an alternative to performance obligation. However this provision operates to penalise a licensee who fails to achieve the minimum target without resorting to termination of the license. The cases where the actual royalties based on sales is less than the minimum amount, the balance is payable and termination will occur only if same is not paid. Where actual royalties exceed this amount, no further amount is payable. In other words a minimum annual royalty is an annual consideration that the licensee agrees to pays to keep the licence in force without termination being invoked.

Creditable Royalty Payments

Another method to incentivize the licensee to rapidly commercialize the licensor's technology and to obtain a more attractive royalty rate is to state that initial fees and milestones are creditable against future royalties. License agreements can also stipulate that the fees that the licensee expends maintaining the licensors patent prosecution program are ceditable against future royalties.

Reach through Royalties

Reach-through royalties are a means of determining the value of intellectual property in a licensing contract. These royalties are based on the sale of final end products which either incorporate the licensed technology or are developed using the licensed technology. Reach through royalties are determined not on the basis of sales of products that are derived from a licensor's intellectual property but on the sale of products which are enabled or produced using the licensor's patented research tool. For example if licensor has a research tool such as a transgenic mouse that validates a drug target, and results in the development of a drug for that validated target then at the time of the license negotiation use of mouse form the basis of calculating the royalty. This is done because the research tool was expected to

play a critical role in the validation of the drug and royalty is based on the sales of the product that was developed as a result of that validated drug target. Another aspect which is typical to the reach through royalties is that a royalty is calculated in terms of the sale of a product that is not related to the licensed patent.

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

2) What is meant by reach through royalties?

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Lumpsum Royalties or Downpayments

Lumpsum royalties or Downpayments are taken where the licensor has no involvement with the licensee once the formulae, documentation, designs related to patented technology are provided. In some cases, the lump sum merely represents the 'capitalization' (PV) of a part of the running royalties.

Combined Lumpsum and Running Royalties

This combination of royalties is possible where in the technology transfer contract involves more than one form of intellectual property. If the patented technology is licensed out combining with a knowhow license, this type combination of royalty is demanded. It believed that the lumpsum royalty often works as 'insurance' against misuse of know-how by the licensee and the 'running royalty' act as insurance for the licensee to effect that licensor would provide necessary technology so inputs to maximize income. Alternatively, the running payments may be to spread an otherwise lumpsum component.

11.9 FACTORS AFFECTING ROYALTY RATE ASSESSMENT

As discussed above, the profit sharing ratio arrived between the patentees or the license is normally required to be adjusted to account for mitigating circumstances. The factors that increase the strength of a prospective licensor's share includes presence of :-

1) Enforceable patents
2) Trade secrets and know-how related technology
3) Ancillary trade secrets and know- how, including marketing sights and contacts
4) Established trademarks, house marks, or logos that could promptly contribute goodwill and credibility to the licensee
5) Software programs, advertising support and other expressions of creative work, whether or not protected by copyright
6) An active R&D facility that could reinforce the licensed technology on a regular basis

7) Good past record of successful licenses between the licensor and similar or current licensees

8) Good reputation for diligence in pursuing infringers of its rights and

9) Good reputation for protecting its licensees from independent actions initiated by third parties.

11.10 ROYALTY RATE ASSESSMENT

The IP owner attempting to asses royalty from license would invariably make an effort to justify a high royalty rate based on enormous time, effort, and money spent by him to create and develop the subject technology. On the contrary, the licensees negotiate to treat those expenditures as the proprietor's "sunk-costs." Accordingly licensee seeks to treats such expenditure as irrelevant as for him the technology's future profitability is more important. The element of risk is another determinant for establishing the appropriate royalty rates. If the technology is new, the risk is higher. In such cases the licensor mainly bears the principal risk, since that party usually makes the initial investment required to introduce the subject technology into the market. Introduction of new technology also requires reorganization or replacement of the existing production facilities by the licensee. In situations where no such licensee capital outlays are needed, a high royalty rate would be justified. This high rate may serve to compensate the proprietor for the risks associated with its initial investment. However the parties are required to arrive at consensus about the overall profit potential, to establish a profit-sharing ratio.

From licensee prospective, risk assumption is probably the most contested factor in the entire profit apportionment equation. According to prospective licensees, he must be compensated adequately for taking unusual risks to make substantial investments in new plants and staffing. They may also face serious competition in the relevant market. Therefore they expect patentee to adjust their portion of the profit up from the standard calculations. In order to arrive at mutually accepted royalty payments, parties formulate many royalty formulas to meet their requirements to achieve win-win position for both of them. However one must understand that the agreement to pay royalties is a contractual arrangement that is subjected to close scrutiny by all parties to the contract. The final formula is arrived at by consensus of between the licensee and the patentee. Some of the commonly known formulas are given below.

11.11 COMMON ROYALTY FORMULAS

Many royalty formulas have being used to calculate the royalty from patent licensing activity. Some industries have established different industry customs for payments of royalties and their "standard" amounts. Royalty formulas are being stated in many ways for example " royalty is x percent of Gross Revenues," or " royalty is x percent of suggested retail sales price for goods actually shipped" or " royalty is x percent of net income." Compare these with, " royalty is x percent of wholesale price" and so on. Thus, it is important that one must understand the formula before entering into the contract. Some of the royalty aassessment methods that are being used in patents license relating to textiles, chemicals or auto-component industries and pharmaceuticals are given below.

1) Lumpsum Royalty Payment

The formula for calculating a one time, lump-sum royalty payment is relatively straight forward. It is also termed as 'upfront or signing royalty'. This kind of payment is usually a one-time royalty due upon the signing of the license. It may be down- payment in cash or the licensor may take stock or stock warrants rather than immediate cash.

Royalties represent regular payments for the right to use intellectual property (like trade marks, patents, know-how, books, music etc) for commercial purposes. There are different approaches to calculation of royalties, but the most common method is based on the following formula:

$$R = \frac{r}{100\%} V, \qquad (1)$$

R – amount of a single payment of royalties;

r – royalty rate, %;

V – sales turnover (based on intellectual property).

It can be easily seen from the formula (1) the key component of this algorithm of calculation is royalty rate. Therefore it is necessary to have a clear procedure of calculation of the value of royalty rate in order to use this formula.

Such a procedure exists for trademark and patent licensing where the following method applies:

$$r = \frac{kP_{sup}}{P_{us}} \cdot 100\% = \frac{k(P_{lic} - P_{us})}{P} - 100\%, \qquad (2)$$

Where

k – licensor's share in the licensee's extra-income;

P_{sup} – licensee's extra-income (earned thanks to intellectual assets provided by the licensor);

P_{us} – licensee's regular income (the income that this company would have earned if it had sold the same quantity of similar non-licensed goods);

P_{lic} – licensee's total income.

However, the formula (2) includes an indefinite component that has to be calculated so that this formula could be used. This component is obviously k. Unfortunately there is no generally accepted algorithm of calculation of k, and in real business practice its value is defined according to traditions that exist in the industry. Its average value, according to experts, is around 25%.

2) Running Continuing Royalty Payment

The least understood and most ill defined portion of a licensing contract is where continuing royalties are to be paid. One method of running royalty calculation is found in many patent licensing contracts where the patent holder is often paid a flat dollar and/or cents fee per article manufactured, such as $0.50 per article made and shipped, with yearly increases based on increase in the Consumer Price Index.

3) Royalty Rate Calculation of Profit Sharing Basis

In such type of royalty determination, the parties agree to certain amount of percentage of profit made by the licensee from using the patented invention. This is bases on the premise that licensee is expected to obtain a profit from marketing the patented product which would be some percentage of its sales price. It also expected that such licensed product would fetch a higher price in the market-place for its being either lower cost of production or better quality or superior technology. The royalty terms in such cases are calculated as follows:

ROS = LSEP x POS (A)

Where

ROS = **R**oyalty **O**n **S**ales price

LSEP = **L**icensor's **S**hare of **E**nterprise **P**rofit

POS = **P**rofit on **S**ales (price)

Expression (A) above can be re-expressed as:

LSEP = ROS/POS (B)

Example : A licensor A agreed to receive a 20% share of the enterprise's B (licensee's) profit (LSEP) on a product that sells for Rs.5. Find the royalty rate (ROS) on the sales price when the licensor estimated the licensee's profit is Rs.1.50.

Solution

Sale price of the product = Rs. 5

Expected profit of licensee = Rs 1.50

Profit on Sales price **(POS)** = Rs.1.5/Rs.5.0 = 30%

Licensor's Share of Enterprise Profit **(LSEP)** = 20%

ROS = LSEP x POS

= 20/100 x 30/100

= 6/100 or 6% (ANS)

(The licensor would negotiate to apply a royalty rate of 6% on sale price. In other words he will receive Rs. 0.30 as royalty if product is sold at Rs.5.00)

If we look at equation (B) we find that for a given royalty rate (i.e. ROS), the licensor obtains a greater percentage of the profit on the product with lower profitability and vice versa, the enterprise gives away a smaller share of the profit to the licensor for a product of high profitability.

4) Royalty rate and the technology turnover factor

This is another algebraic method of calculating royalty payments which is based on some form of consolidation of the quantitative variables in a licensing proposal.

(See Manual on Technology Transfer Negotiation, United Nations Industrial Development Organization, Vienna, Austria, 1996 pp.256, 1996).

Let us take the case of a technology license where the royalty rate is 4% on sales value over 5 years, with rights to the licensee to continue operations beyond that period without further payment obligations. Let us assumed that that the annual sales volume and production cost are constant. Table A denotes the scheme of income and cost flow.

Table 11.1: Schematic of incomes and cost flows

Unit:'000Rs

Year →	1	2	3-5	6
Sales	100	100	100	100
Cost of Production	40	40	40	40
Royalty Due,(R)	4	4	4	0
Total Cost	44	44	44	40
Operating Profit (OP_R)	56	56	56	60 (OP)

We can express this relationship algebraically as

LSEP = R / (OPR+R) – C

where:

LSEP = licensor's share of licensee's profit (see Expression A above)

R = Absolute amount of royalty paid

OPR = Profit-before-tax during the royalty-applicable period

C = Total cost

11.12 ROYALTIES CLAUSES /STRUCTURE OF A LICENSE : EXAMPLE PHARMACEUTICALS

In the pharmaceutical sector there are a myriad of ways that royalty terms can be structured. The list below briefly describes some common royalty terms.

1) **Royalty upon sales by a licensee**

In this royalty term, a licensee agrees to pay to a licensor a royalty on the revenue that the licensee receives from the sale of products that are sold. A royalty upon sales is typically expressed as a percentage of the invoice sale price of products that are sold by the licensee. This is the most commonly encountered type of royalty term.

2) **Royalty on sub-license income received by a licensee**

In this term, a royalty is paid upon sub-license income that is received by a licensee. A licensee may grant a sub-license to a sub-licensee, for example, in different territories, or in different fields of application. The sub-licensee will pay a royalty to the licensee, based on the products sold by the sub-

licensee (as in 1 above). The licensee in turn pays a royalty to the licensor, being a percentage of the sub-license income received by the licensee from the sub-licensee.

3) **Royalty on last sub-licensee's sale**

Instead of a licensee paying a royalty on sub-license income, an alternative royalty structure is for the licensee to pay to the licensor the agreed royalty rate on the invoice sale price of products that are sold, on the sales of all products, whether those sales are made by the licensee, a sub-licensee, a sub sub-licensee, or any other licensee further down the licensing chain.

4) **Royalty on sales by affiliates**

In a license to a global licensee, it is not unusual for the royalty model to be adopted to be a royalty upon the sale made by the affiliate companies of the multi national licensee that sells a product on the first occasion to a non affiliate, arm's length purchaser. This is a royalty structure that is not unlike the sale by the last sub-licensee, except that these licenses are customarily expressed to be granted to the multinational licensee, and all its affiliates, which is defined by reference to the extent of control that the licensee has over the affiliate company.

5) **Royalty on sales that would infringe a granted patent**

Sometimes a pharmaceutical licensee is only prepared to pay a royalty in relation to products that are captured by a claim in a granted patent, and is otherwise unwilling to pay royalties. The result is that a royalty is paid only in relation to sales in countries where a patent is granted. Correspondingly, no royalty is paid in relation to sales made in countries where no patent has been granted. The rationale is that in such a country, any competitor can make and sell that product, there being no patent granted in that country.

Whether this is appropriate on any given occasion depends on what global market share the granted patents represent.

For example, if patents granted in approximately 20 countries represent approximately 90% of the global market for a product, and economies of scale and geographical distance between the remaining countries being such that it is unlikely that a competitor will enter the market in the remaining 10% of the global market, it might well be appropriate for royalties to be paid on global sales, without regard to whether the sale is made in a country where no patent has been granted.

6) **Royalty splitting**

Royalty splitting occurs when a royalty is split into components that are referable to different parts of the intellectual property that is licensed. For example, a royalty rate may be agreed at 5%. However, it may be agreed that it would be expressed:

a) as a royalty of 3% upon the sales of products in relation to that part of the intellectual property that is granted patents, and

b) as a separate royalty of 2% upon the sales of products in relation to that part of the intellectual property that is other than granted patents,

such as trade secrets, know how, technical knowledge which complements the claims in the granted patents, and without which either products cannot be manufactured, or cannot be manufactured as efficiently.

There are at least two reasons for seeking a royalty structure that splits royalties into these separate components in this way:

a) by this mechanism, a licensor may obtain royalties in relation to sales made in countries where no patents have been granted

b) in some countries, if a patent should be revoked, that is grounds for the termination of the license, yet, both the licensor and the licensee may prefer to keep the license on foot in relation to the use of know how, for the lesser royalty, until that know how enters the public domain.

11.13 ROYALTY STACKING

This method is useful as it allows the licensee to execute new license agreements for improvements in the patented invention and get a reduction in royalty rates for previous agreements by a specified percentage. This kind arrangement is beneficial to licensees to add on improvements in the products to keep technological advantage over the competitors. This provision is also important for the licensees as they would in position to reduce royalty payments for older technology at negotiated rates while licensing in new technology.

Royalty "anti-stacking" provisions

Rules in "main license" to reduce the royalty rate payable to licensor if the licensee needs to enter into "additional licenses" with third parties in order to commercialise the product:

1) **Reduction clauses**

Example: Clause relating to calculation of second royalty

Reduction of 50% of 2nd royalty

- 1st royalty is 8% (License includes an anti-stacking "reduction clause")
- 2nd royalty is: 4%

First license final royalty rate: $8\% - (4\% \times 0.5) = 6\%$

2) **Floor clauses**

Example: Clause relating to calculation of additional royalty

Additional royalties can be deducted from main royalty, up to a maximum deduction: Main licensor will always get a minimum % (royalty rate)

Royalty will be 8%, with possible reduction in response to stacking (if additional licenses are required), but in any event no lower than 4%.

- 1st royalty is 8% ("Main license" includes an anti-stacking "reduction clause")
- 2nd royalty is: 3%
- 3rd royalty is: 2%

Without "floor" the final royalty rate would be: 8% – 3 % – 2% = 3%

With "floor" the final royalty rate will be: 4%

3) **Ceiling clauses**

- Top limit on all combined royalties. Licensee will only have right to royalty reductions when the aggregate of the stacked royalties reach such ceiling / threshold.
- If a royalty must be paid to a third party, the [previous] rates are adjusted downwards to stay below the limit.

  E.g.: - 1st royalty is 10% (but "main license" includes an anti-stacking "ceiling clause" at 10%)

  – 2nd royalty is: 2%

  – Without "ceiling" Total royalties are 10% + 2% = 12%

  – With "ceiling" "Main license" final royalty rate will be: 10%

- Main licensor would limit reduction to its pro rata share of all royalty rates (i.e., 10% / 12% × 10%= 8,33%)
- 2nd royalty would be: 2% / 12% x 10% = 1,67%

There are typically floors that address the extent to which royalty reductions can fall. Further, the royalty relief can be applied to other stipulations in the license agreement such as the milestone payments that the licensee is obligated to pay to the licensor.

11.14 PATENT POOLS, STANDARDS AND ROYALTY SHARING

A new trend in patent licensing is visible particularly in high-tech industry patents. Patent pools is being seen as a tool to pre-empt IPR fighting on one hand and to allow the contributors to the pool to both own the patent and manufacture the technology, and, accordingly, pay into and get royalties from the pool on the other hand . Though they come in many varieties, pools that feature vertically integrated firms essentially act as large industry cross-licenses. Layne-Farrar and Lerner studied nine patent pools covering various high-tech technologies ranging from 1394 (Firewire) to MPEG-4 (audio visual compression). In 1394 patent pool royalty share of each product was US $0.25 upon the Sale or Manufacture of each 1394 Product. In VISX and Summit pool for Photo refractive keratectomy (PRK) a fee $250 licensing was charged for each time laser eye surgery was performed using equipment covered by either company's patents. The royalties were divided between VISX and Summit according to a set formula. In MPEG 2 royalty was US$ 2.0 for coder or encoder. These pools allowed the members to both collect revenues without having to sue, and also minimize the risk of getting sued by others.

Standards and royalty sharing

Similar trends are reported in formation of standards using patented technology. For example In MIMO (multiple in, multiple out), a technology central to 802.11 standard, there are 634 U.S. patent applications and 255 patents granted by the

U.S. PTO. The royalties for this license begins at $0.55 per licensed product for the first 500,000 units and step down steadily to $0.20 per unit for 10m to 20m units and $0.05 per unit for units above 40m per year. The patents in this pool are held by France Telecom, Fujitsu, Japan Radio Company, LG Electronics, Philips Electronics, and Sony. This is also seen as an attempt to deal with the problem of patent stacking for 802.11 products.

11.15 CALCULATION OF REASONABLE ROYALTY RATES IN INFRINGEMENTS – (US CASES)

i) Georgia-Pacific factors

Whenever an infringement case comes before a court, the task of determining of a reasonable royalty rate payable to patent holder is formidable. This task becomes more challenging in absence of any licensing agreement. However in 1970, in Georgia-Pacific case, court has suggested a conventional template for calculating reasonable royalty rates in such situations. In this case, court established fifteen factors that can be considered as part of a "hypothetical negotiation" between a willing licensee and a willing licensor. These factors can be used to consider what the parties would have entered into a "hypothetical negotiation" if licensing had been pursued instead of infringement. The timing of such negotiation would be the date when infringement occurred.

[Georgia-Pacific Corp. v. United States Plywood Corp., 318 F. Supp. 1116, 166 U.S.P.Q. (BNA) 235 (S.D.N.Y. 1970)]

These Georgia-Pacific factors are:

1) The royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty.

2) The rates paid by the licensee for the use of other patents comparable to the patent in suit.

3) The nature and scope of the license, as exclusive or non-exclusive; or as restricted or non-restricted in terms of territory or with respect to whom the manufactured product may be sold.

4) The licensor's established policy and marketing program to maintain his patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly.

5) The commercial relationship between the licensor and licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promoter.

6) The effect of selling the patented specialty in promoting sales of other products of the licensee; that existing value of the invention to the licensor as a generator of sales of his non-patented items; and the extent of such derivative or convoyed sales.

7) The duration of the patent and the term of the license.

8) The established profitability of the product made under the patent; its

commercial success; and its current popularity.

9) The utility and advantages of the patent property over the old modes or devices, if any, that had been used for working out similar results.

10) The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention.

11) The extent to which the infringer has made use of the invention; and any evidence probative of the value of that use.

12) The portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or analogous inventions.

13) The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer.

14) The opinion testimony of qualified experts.

15) The amount that a licensor (such as the patentee) and a licensee (such as the infringer) would have agree upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement; that is, the amount which a prudent licensee – who desired, as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention — would have been willing to pay as a royalty and yet be able to make a profit and which amount would have been acceptable by a prudent patentee who was willing to grant a license.

ii) The Honeywell modification of the Georgia-Pacific factors

Though the Georgia-Pacific factors provide a good reference and starting point for calculating reasonable royalty but it does not include two economic concepts that are often central in licensing agreements: 1) the anticipated profitability of the technology; and 2) the relative bargaining power of the participants. In order to include this in Honeywell, Inc. v. Minolta Camera Co., the court replaced the twelfth Georgia-Pacific factor with the anticipated profits and losses that the parties reasonably would have anticipated had they consummated a licensing agreement. The court also added relative bargaining position as an important factor while omitting the first two Georgia-Pacific factors relating to established royalties and other comparable agreements from the list. Honeywell analysis represents an important evolution in reasonable royalty rate calculations. The Honeywell factors were found to useful in determining "commercially realistic" royalty rates.

11.16 SUMMARY

The most significant part of any patent licence agreement is that both parties understand what royalties will be based on. The license agreements should clearly define when and how a licensor will be paid a royalty. In order to avoid any disputes on royalty payments, the agreement should also clearly define when royalties are not due. In case of license agreement that allow commercialization

of a product that embodies the proprietary technology of several different companies, and for which royalty payments are due to each of those companies, recognition by the parties of the role each technology performs is required. In such case it is essential to address the question of royalty ceilings, floors, or other mechanisms to avoid royalty stacking. Particularly, the royalty stacking should be recognized and understood by those involved with managing IP in the health and agriculture fields when biotechnology products, services, and research tools are involved. Finally, alternatives to royalty-bearing arrangements should be considered, including the use of lump-sum payments and patent pools. The experts normally will use both mathematical and market research to determine reasonable royalties. However, the methods of royalty calculation stated above would provide useful insights into the rationale behind adopting particular approach in arriving at the fair value of royalty. Which formula would ultimately used be will depend on the technology and other factors surrounding the patents?

11.17 TERMINAL QUESTIONS

1) Explain various types of royalties.

2) What are the commonly used Royalty formulas?

3) What is 'running royalty'?

4) What is royalty staking?

11.18 ANSWERS AND HINTS

Self Assessment Questions

1) Royalty is a term used to denote the use based payments made by the license to the licensor as a consideration for the permissions to the use of an Intellectual Property Rights (IPR).

2) Refer to Section 11.8

Terminal Questions

1) Refer to Section 11.8

2) Refer to Section 11.11

3) Refer to Section 11.13

UNIT 12 IP STRATEGY – PATENT STRATEGIES

Structure

12.1 INTRODUCTION

Intellectual property rights are IP arsenals that allow the companies to use them as tools for prevention of copying and blocking. Patent strategies are primarily categorized into three heads based on the purpose for which patents are used namely: defensive, offensive, and transactional strategies. In offensive category are those companies where patents are actively used to fight off the competitors by regular patenting, strategic patenting, patent blanketing, patent fencing and surrounding one patent with others. Those companies that use patents as defensive instrument in fact do so to ensure the freedom to operate and to avoid patent infringement claims. In these organizations, patents are not considered as one of the key resources of revenue generation. When the companies use patent as status symbol and sign of innovativeness, they are following the transactional strategies to attract the investors or share seekers or cooperating partners. In this unit, we will study the IP strategies of the companies with particular emphasis on patenting. We will also define all tactics such as patent hedging/fencing /clustering/ patent thicket/patent flood, patent trolls and their significance in patent portfolio management and utilization.

12.2 OBJECTIVES

After reading this unit, you will be able to:

- describe the various kinds of patent strategies;
- explain the different patenting tactics followed under each strategy;

- explain patent hedging and fencing;
- describe picket fencing/clustering/patent flooding/patent thicket; and
- explain patent trolls.

12.3 IP STRATEGIES

According to Soininen, patent strategies are typically divided into three categories: defensive, offensive, and transactional strategies Many high-tech organization use patents as defensive tool. This is partly because they believe that best offence is a good defense and partly because they find patent litigations as costly, time consuming, disruptive and risky affair. The basic purpose of this strategy is to make the copying activity difficult and costly exercise. Moreover such patents will lengthen the time of the entry of imitators considerably. For instance drug and chemical industries invariably adopt strategic patenting of a single patent with broad claims with large blocking power. Such broad claims patents are difficult to invent around and costly to reengineer. Similarly all biotechnology patents in pioneer biotech techniques are patent with defensive intent. Most of IT organizations also find them actively participating in the patenting 'arms race'. According to them, the organization, that plan to use their patents defensively, size is all that matters. Higher is the stack of patents, the better it is. Finally as companies grew their patent portfolios, many followed a variant of a "patent everything" approach. With an offensive strategy, company is in the position, where it can fight off competitors by an active utilization of patents.

12.4 TYPES OF IP COMPANIES

According to Flythström, IP companies can be divided into four groups of industrial players based on their IP strength. He presented a framework given in (Figure 12.1 and 12.2) for dividing the companies into sharks, minnows, targets and glass houses depending on their IPR strength and product business strength. This is an illustrative classification of different players in telecommunication markets and it describes the emphasis on patents in the product business.

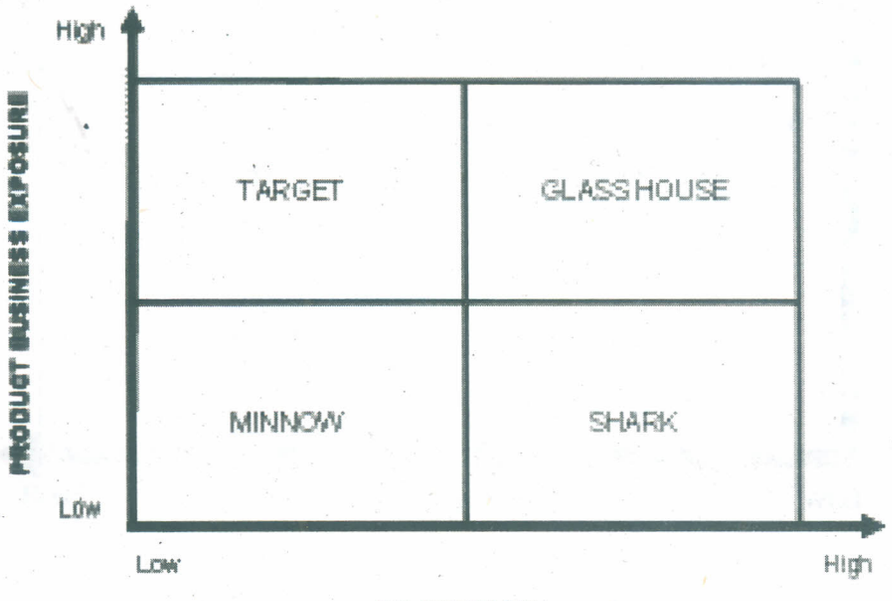

Figure 12.1

1) **Target Companies/Free Rider**

Target companies are also known as Free Rider. These companies have weak patent business but have strong product business. They rely on others for their technology needs. They are susceptible to infringement attack where they do not care to obtain license from the patent holder.

2) **Minnows Companies**

These companies are those newly emerging companies which have a weak patent based business and also have weak product business. However they influence technology selection within the industry. They have potential to develop into a market power.

3) **Sharks/Patent Trolls Companies**

These companies are also known as patent trolls. They have weak product business but posses strong patent portfolio. They do not own patents but buy them to use against vulnerable business. They earn licensing revenues from patents bought from others.

4) **Glasshouse/Product Companies**

These companies have strong patent business and product business. They are patented product companies. They are vulnerable to patent attacks. These companies however seek to bring standardization in the industry by influencing the standardization process.

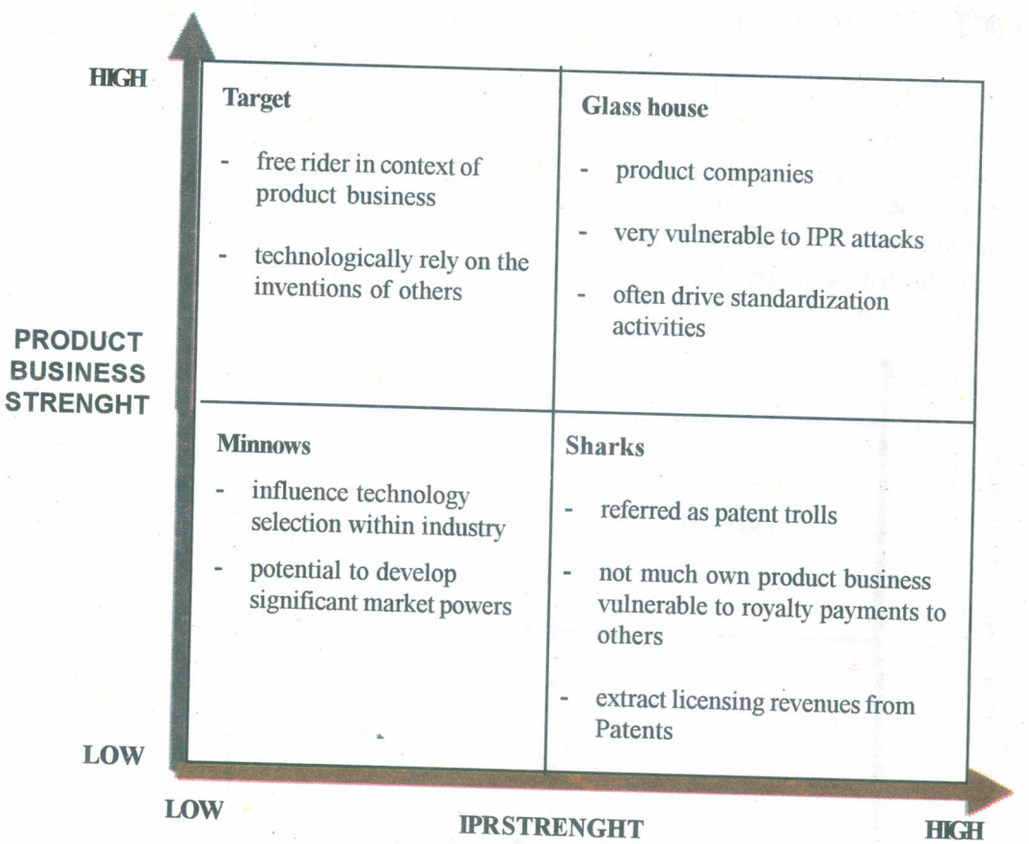

Figure 12.2

12.5 DETERMINANTS OF IP STRATEGY

Before deciding the IP strategy, one must initiate a non financial valuation process wherein a series value determinants are applied to know the strength of patents These determinants include:

1) **Lifecycle Analysis:** This activity **analyse** the returns of the patents in question as usually returns are not constant and they fluctuate in alignment with market-based technology cycles.

2) **Level of Novelty:** The analysis provide the information relating to the technological distance between the patented technology and the prior art. The greater the distance, more valuable the technology would be.

3) **Breadth of a Patent/Exclusion Rights:** The degree of protection in a patent depends on the breadth of the claim. More broad the claim better exclusivity it provides.

4) **Difficulty of Inventing Around:** The more germane is the technology, the better it has the ability to prevent inventing around by the competitors.

5) **Portfolio Position:** If the patent serve as a basis for further patents, it may be useful to have many parents to block the competitors from making further research .

6) **Bargaining Potential:** If the Patents is related to a technology where survival is thought to rest on the cumulative development of complex technologies, it can act as a bargain chip to enter cross-licensing agreements in sectors mutual interests.

Use of these determinants can help in the decision-making process to opt for, defensive, offensive or transitional IP strategy.

12.6 DEFENSIVE PATENT STRATEGY

Many defensive tactics like, patent blanketing, patent fencing and surrounding are being strategically used by these organizations in defensive patenting activity. Besides regular patenting activity, these organization actively adopts patenting techniques known as ever-greening to protect core patent from being infringed by the competitor by minor variations. In single and multiple patent cases, the innovation is protected with one or more patents with minor improvements. There techniques are useful where it is possible to invent around any patent these techniques. This in fact is done to restrict the area of freedom to operate for the competitors in the original patented technology. While deposing before Federal trade commission Robert Kohn, Vice-Chairman of the Board and Director of Borland Software Corporation said his company "filed patents on virtually everything. Any innovation in user interface design, flyover help, and spreadsheet notebooks — I mean, you name it, I had my guys file patent applications". Similar sentiments were expressed by Dick Thurston, Vice President and General Counsel of Taiwan Semiconductor Manufacturing Company Limited when he said "Our goal now is to file about 500 patents a year largely for defensive purposes."

Advantages of defensive patenting

Although companies build patent portfolios for many reasons, defensive motives in particular provide many advantages. These advantages are:

1) It drive the accumulation of large numbers of low-cost patents
2) It prove as deterrent to the patentee considering of suing a company with large patent portfolio
3) It confuse and misguide the competitors
4) It function as scare-crow for possible infringers
5) It saves the cost of litigation
6) It facilitate cooperation through cross licenses and avoiding confrontation between the patent litigants
7) It enhances the IP asset value and bargaining capacity of the organization

Disadvantage of defensive patenting

Although defensive patenting have many advantages, yet it has many drawbacks also. Some of the disadvantages of defensive patenting are listed below:

1) It increase budget for filling patents
2) It diminish the quality of patents
3) It increase the burden of maintenance of Patents
4) It leads to wasteful expenditure where patents are not useful in reality
5) It is difficult to manage large patent portfolio
6) It creates backlog problem for the patent offices.

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

1) What are the advantages of defensive patenting?

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12.7 TYPES OF DEFENSIVE PATENT STRATEGIES

i) **"Picket Fencing"**

Some organizations resort to practice of filing patents on incremental/advancements, in an effort to erect a fence around their basic patent to check and scare their competitors. Some other use the picket fence patents by the filing of numerous patent applications incremental to the patented invention of the competitors technology in order to "fence" or restrict his future mobility plans. Such organizations obtain patents on all commercially viable improvements or small incremental

innovations cover the core technology of a competitor. In other words, putting a fence around the competitor patent is used to serve as a barrier to the effective use of the competitor's core technology. The owner of the picket fence patent is benefited as he will be in a convincing position to adduce a cross-license of patents to acquire the competitor's core technology required its own use.

For example, this practice is rampant in the field of biotechnology where the practice is to claim

1) New mAb technology (broad)
2) mAb CDR sequences (more narrow)
3) Specific mAb clones (most narrow)

Other examples can be found in patents relating to chemicals and pharmaceuticals where patents for new chemical entity are followed by patents on its salts, polymorphs, precursors, hydrates, semi-hydrates, crystalline or other forms of the active compounds.

ii) **"Blanketing" and "Flooding"**

This patent tactics is most commonly followed by biotech and chemical companies. This approach is similar to shotgun approach as in this case also the efforts are made to turn a patent area into a jungle or a minefield of patents but here the approach is more or less systemic as it involves bombarding of every possible step in a manufacturing process with patents. This strategy is useful technologies like bio-tech where uncertainty is high particularly in relation to R&D directions that would be are fruitful or in situations where the economic importance patent is not certain.

iii) **"Surrounding"**

This most commonly used offensive patent tactics where third party interested in cross licensing, the important central patent obtain patents to erect fence or surrounded by other patents, which may not be important but have potential to collectively block the effective commercialization of the central patent. This strategy is applied when an organization does not intend to practice the patents, but it uses them as viable alternatives to block their competitors.

iv) **"Prestige" Strategy**

For big firms obtaining patent is mark of their prestige and leadership in field of technology they operate. These firms believe that strong patent portfolio would help their business and provide the driving push to stay competitive. This approach is applicable particularly to academic and research institutions who are known for filing patent applications to gain recognition of their research work. The researchers usually seek patents to gain recognition for their work and enhance their prestige. The start-ups are also seeking patent protection for emerging technologies to woo potential investors and to gain recognition for the uniqueness of its technology in the market.

v) **"Scarecrow" Strategy**

Some of the patentees do not have any intention to enforce their rights, but instead use it as "scarecrow" to keep competitors away from the scope of their patent protection. The patent portfolio, in such cases, merely act as a tool to keep competitors away from the patentees business. This strategy of often adopted by firms unaccustomed to large-scale patent filings and frequent patent disputes. Big companies are more likely to seek ways to design around the patent. The small

companies on the contrary prefer to keep away from such activity to check investment in expensive design-around analysis.

vi) **Patent Thicket**

The economist Carl Shapiro defined patent thickets as:

"A dense web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology."

A patent thicket refers to an overlapping set of patent rights which require innovators to reach licensing deals for multiple patents from multiple sources.. The term "patent thicket" originates from a litigation case in the 1970s regarding Xerox's photocopier. Case This expression was used first time in the argument in ***SCM Corp. v. Xerox Corp.*** patent litigation case in the 1970s, wherein SCM's central charged Xerox to have constructed a "patent thicket" to prevent competition. Patent thickets are also sometimes called "patent floods", or "patent clusters".

This patent tactics has been applied some organizations to build a defense against competitors to design around a single patent. Such tactics are often used by the software and pharmaceuticals companies. . In this respect, an inquiry by EU finds

"that individual blockbuster medicines are protected by up to 1,300 patents and/ or pending patent applications EU-wide and certain patent filings occur very late in the life cycle of a medicine."

According to Sir Robin Jacob "every patentee of a major invention is likely to come up with improvements and alleged improvements to his invention" and that "it is in the nature of the patent system itself that patent thickets should happen and it has always happened".

Effect of Patent Thickets

1) Patent thickets "obstruct entry to some markets and so impede innovation.
2) It delay or block the market entry of generic products particularly medicines
3) It results in filing numerous patents for the same medicine
4) Cost of patent filing increases
5) It acts as deterrent to the other patentees considering of suing a company with large patent portfolio.

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

2) What is the effect of patent thickets?

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12.8 OFFENSIVE PATENT STRATEGY

According to Cohen, three biggest reasons for patenting are prevention of copying, blocking and preventing suits. Patents therefore create a barrier for imitators. The

use of patents depends heavily on the industry and the overall supervision for infringements lies with patent management team. Litigation is, though, a costly but inevitable way to test a patent. With an offensive strategy, company is in a position, where it can fight off competitors by an active utilization of patents.

Filing Infringement suits

The companies do not hesitate to file infringement suits when competitors copy their patents.

It is well known fact that copycats eat into the earning of the patent holders. There have been cases where copycats have affected the company's sales so much that they have driven the company bankrupt. Conversely it has happened that infringers have been taken to court by patent holders and they have been fined so heavily that their very survival was jeopardized. In the Famous patent dispute between Polaroid and Eastman Kodak in the United States, for instant camera, the damages awarded to Polaroid amounted to over 909 million dollars and Kodak was forced to wind up its manufacturing unit. In a case involving a Japanese camera company (Honeywell v. Minolta), the latter ordered to pay 155 million dollars, ending up in the red for the year as a result. Some other landmark patent suits and amount of damages awarded are listed below:

Landmark patent suits and of amount of patent damages received

1) Polaroid v. Kodak $873.2 million [Instant camera technology]
2) IGEN v. Roche $505 million [Serono patent]
3) Hope v. Genentech $500.1 million[human insulin patent]
4) Haworth v. Steelcase $211 million[Moveable office panel with built-in electronics]
5) Hughes v. Smith $204.8 million [Drill bit case]
6) P&G v. Paragon $178.4 million[Disposable diaper]
7) Exxon v. Mobil $171 million [Metallocene catalyst patent
8) Fonar v. General electric $128.7 Million[MRI technology]
9) RIM v. NTP $612.5 million [Wireless email patents]
10) 3M v. Johnson & Johnson. $ 107 million [3M in its medical casting tape patent]
11) Microsoft Vs Michel Vulpe $ 200 million [i4i XML patent in Microsoft Word]
12) Cordis v. Boston Scientific – $271 million [Stent patent]
13) Eolas Technologies and the University of California v. Microsoft $527million for [Internet Explorer Web browser that allows embedded links]
14) Uniloc USA, Inc. v. Microsoft Corp $537 million [An antipiracy software technology of Uniloc founder Ric Richardson]
15) Rorbert W. Kearns v. Ford $10.2 Million [Intermittent wiper]

These awards bear a clear testimony to the fact that offensive strategies by patents holders are fatal to the business. With an offensive strategy, a company is in a position, where it can fight off competitors by an active utilization of patents.According to a recent study, it was observed that "Japanese companies have filed only 35 patent infringement cases against U.S. and European firms in recent years. By contrast, U.S. and European companies have filed 129 patent infringement cases – 3.7 times as many – against Japanese firms. While opinion is divided on whether the U.S. and European companies are engaging in legal harassment or whether the Japanese companies are failing to protect themselves, this much is clear: the U.S. and European firms are very aggressive about protecting their rights and the Japanese firms would rather settle things quietly."

12.9 TRANSACTIONAL PATENT STRATEGY

This is the most conventional and widely used method for exploiting the patents, which the company find it more lucrative to licence their patented technology. .In Japan, for example, the inventor of process for making the chicken noodles followed this approach to create the market for the noodles In recent years, the licensing of patents has become an increasingly effective and lucrative revenue-generation strategy for innovative technology firms. Basically this IP strategy involves either out-licensing of a patented technology and earning royalties based on the use or cross-licensing patents with other firms to ensure mutually-beneficial outcomes.

1) **Out-Licensing Technology Patents**

Revenue generation from licensing technology-based patents can yield significant returns, both financial and otherwise. Current data suggests that collective domestic U.S. revenues from patent royalties are approximately $50 billion and set to continue to rise.

Benefits of Out-licensing

1) Out-licensing can lull licensees into following a path of research and development that is dictated and controlled by the licensor.
2) It is a powerful means to pre-empt the licensee from gaining the capability to design around the patents.
3) Licensor is in a dominant position to dictate to some degree the licensee's learning ability.
4) It is most effective means for earning revenue

Examples of revenue earned from out licenses

1) Hitachi earned 455 million dollars in patent royalties in 1996.
2) Momofuku Ando, of Nisshin Food Products, obtained patents for his instant-noodle processing technology and then licensed that technology to other companies, so that more of them would enter the market and thus cause the segment to grow.
3) When Nisshin Food Products took a patent for Cup Noodle products it becomes instant success. Initially company though of using this patent to keep other companies out of the market. But it soon changed its IP policy

to avoid being isolated and ostracized within the industry. The company visualised that as large number of companies are competing in the market it would cause the market to grow which will be beneficial to all. Therefore, this company decided to license the technology to others and licensing became the path to the prosperity for Nisshin Food products.

4) When Texas Instruments decided to licensed the Kilby patent for integrated circuits to Japanese companies, it was reported that with 3% royalty fee licensing alone would cost about 727 million dollars a year to the semiconductor market worth 25 billion dollars and for 20 year life of the patent, that will adds up to about 15 billion dollars.

5) In the United States again, IBM's licensing operations are reported to be over 600 million dollars .

6) Companies such as Qualcomm with their licensed CDMA wireless network technology and, Microsoft with a range of new technologies in the biometrics sector, are able to recoup significant royalties from a diverse portfolio.

The above success stories proves that success in sustaining patent revenues goes hand-in-hand with success in the marketplace from those utilizing the license.

2) **Cross-Licensing**

Another form of licensing, which is common throughout the technology sector, is cross-licensing. This is particularly prevalent in sectors where co-development of technology standards is the norm. Moreover in certain sectors the day-to-day operations costs of running the business is so high that no company can afford to risk any form of patent infringement which can be calamitous to the offending firm,. Although this is not always used to establish competitive advantage and market share per se, it proves to be beneficial to all in the selected industry sector. The willingness of the patent holders to cross-license enables everyone in the business to continue to leapfrog technology. Growth of semiconductor industry, telecommunication, personal computer.

Benefits of Cross-Licensing

1) Cross-licensing has proven to be extremely effective in keeping firms at the leading edge of development.

2) It can reduce the risk of infringement and can help mitigate risks of business closure.

3) It creates a collaborative, knowledge-sharing environment in the industry.

4) It allows free exchange of knowledge between competitor firms.

5) It facilitates open exchange of patented technology, which is highly complementary across the industry.

6) It facilitates use of patented technology by many firms in the sector.

7) It allows companies to hold patents that are held by their competitors.

8) Cross-licensing technology patents allow and act as an entry point into new markets which is not possible without it.

9) Cross-licensing also acts as a proxy for otherwise cost-prohibitive product research and development.

10) It saves the companies for paying substantial amount of royalties.

Examples of cross-licensing

1) A good example of this type of licensing approach is found in the semiconductor industry.

2) Cross-licensing deals between Dell and IBM in the PC sector where Dell used its business model patents (covering all aspects of its value chain) to structure a $16 billion cross-licensing deal with IBM to secure cheaper PC components. This saved Dell from paying IBM substantial royalty fees.

3) IBM has in the past secured a strategic foothold in the routers and networks market by structuring a cross-licensing deal with Cisco Systems. In this instance, IBM patents were offered to Cisco in exchange for a $2 billion pact securing the sale of IBM components to Cisco giving the firm an entry point into an otherwise closed market.

4) Microsoft has entered into deals with Toshiba in an attempt to gain a strong position in the Japanese market, an important target for the Redmond firm.

5) Microsoft entered into cross licensing software patent deals with companies such as SAP and Autodesk.

12.10 PATENT TROLLS

Patent troll is a controversial term, susceptible to numerous definitions. Plainly speaking, the patent troll activity is established where non- inventors purchase a patent, often from a bankrupt firm, and then sues another company by claiming that one of its products infringes on the purchased patent. In another variation, the purchaser of patent enforces patents against purported infringers without itself intending to manufacture the patented product or supply the patented service. Such party is usually engaged in only enforcing patents but has no manufacturing or research base. The basic purpose of purchasing patent is to focuses its efforts solely on enforcing patent rights at appropriate time. They assert patent infringement claims against non-copiers or against a large industry that is composed of non-copiers. Patent troll is thus use in a pejorative sense for a person or company that enforces its patents against one or more alleged infringers in a manner considered unduly aggressive or opportunistic, often with no intention to manufacture or market the patented invention. Other related terms to describe such activity are "non-manufacturing patentee", "patent shark", "patent marketer", "patent licensing company", and "patent dealer". These terms are used to describe the patent purchasers who does not manufacture or use the patented invention. Finally, the "patent troll" and all other relative terms represents apparently a class of patent owners who do not provide end products or services themselves, but who do demand royalties as a price for authorizing the work of others.

Examples of Patent troll Attacks

1) **STMicroelectronics acquired Mostek**

STMicroelectronics provides a good example patent troll strategy. This Swiss-based company acquired Mostek, a chip manufacturer owned by United

Technologies, for $71 million in 1985. Seven years later, this acquisition provided the firm with more than $450 million in patent licensing revenues.

2) **Acquisition of Amati Communications by Texas Instruments**

Similarly the acquisition of Amati Communications by Texas Instruments to obtain seminal DSL patents, a leading technology for next generation modems for high speed internet communications. Subsequently, allowed TI to control and dictate the DSL market through this patent based acquisition.

3) **Research in Motion (RIM) v. NTP**

In 2002 a famous legal battle ensued between RIM and NTP, a U.S.-based patent holding company which many perceive to be a patent troll. This in fact threatened to shut down RIM's operations in the US. However a settlement was reached in 2006, with RIM agreeing to pay NTP $612.5 million.

4) **Teles AG**

The German firm Teles AG that appears to have a modus operandi similar to NTP has continued suing firms such as Cisco, Nokia and Deutsche Telecom for infringement of telecommunications technology patents.

5) **InPro Licensing**

Recent examples include court cases brought against Research In Motion (RIM), maker of the Blackberry handheld device, for patent infringements owned by Luxembourg-based InPro Licensing, However In 2003 the English High Court eventually ruled these patents as invalid.

6) **Digitude Innovations**

Digitude Innovations have acquired two Apple patents. This company is now using these to press for royalties or product bans from other tech companies like Amazon, HTC, LG, Nokia, RIM, Samsung, and Sony.

Defense against the patent troll

As the attack of the patent troll became vigorous particularly on big companies, they formed patent defense companies to counteract problems caused by patent trolls in the high technology industry. Example Allied Security Trust and RPX Defensive Patent Aggregation service.

1) **Allied Security Trust**

This trust was original formed in 2008 by 11 members now has 21 members, from Europe, North America and Asia. Some members include Avaya, Ericsson, IBM, Intel, Motorola, Oracle, Philips, Research in Motion, Cisco Systems, Google, Hewlett-Packard, and Verizon. The main objective of this trust is to identify and purchase key patents prior to falling into the hands of patent trolls.

2) **RPX Defensive Patent Aggregation service**

Again in 2008 RPX Corporation introduced the RPX Defensive Patent Aggregation service to help e-commerce, financial services, hardware manufacturing, networking, software, and wireless companies reduce the risk of patent troll assertion and litigation by purchasing patents off the open

market. RPX's client network includes technology leaders in each major sector like consumer electronics and PCs, e-commerce, mobile devices, networking, semiconductors, software, and telecommunications.

Selected members include:

Acer Inc.

Advanced Micro Devices, Inc.

Jawbone (Aliph, Inc.)

Avaya Inc.

Barnes & Noble, Inc.

Brocade Communications Systems, Inc.

Check Point Software Technologies Ltd.

Coby Electronics Corporation

Crate & Barrel Holdings, Inc.

The DIRECTV Group, Inc.

eBay Inc.

Ericsson AB

ESET, LLC

F5 Networks

Fujitsu Limited

Google Inc.

HTC Corporation

Huawei Technology Co., Ltd.

IBM Corporation

Integrated Device Technology, Inc.

Intel Corporation

Juniper Networks Inc.

LG Electronics, Inc.

Mad Catz Interactive, Inc.

Microsoft Corporation

MobiTV, Inc.

Motorola Mobility, Inc.

Nikon Corporation

Norman ASA

Novell, Inc.

OneCommand, Inc.

Oracle America, Inc.

Pantech Co., Ltd.

Pioneer Corporation

QuickLogic Corporation

Rackspace Hosting, Inc.

Red Hat, Inc.

Redpine Signals, Inc.

Research in Motion Limited

Samsung Electronics Co., Ltd.

ShoreTel, Inc.

Six Waves, Inc.

Symantec Corporation

Taiwan Semiconductor Manufacturing Company, Ltd.

TechSmith Corporation

TiVo Inc.

Vivitek Corporation (Luxeon International Holding LTD)

Vonage Network LLC

Walgreen Co.

Zynga Inc.

12.11 SUMMARY

It is well known that many IP based high tech firms are seeking financial benefits from their patents. They use various strategies to gain control over their market share .They follow the direct and indirect ways. Basically their IP approaches are divided into three categories .viz defensive, offensive and transactional. Every approach has its utility. Part of their success has stemmed from their willingness to be in alignment these approaches diligently to structure their long-term IP strategic programs. This foresight will enabled an increase in value of their and help them to obtain fair amount of royalties. This would enable the IP based company to transform the patented technology into a market success. Recently, trend of mergers and acquisitions (M&A) of bankrupt firms holding useful IP has become somewhat commonplace. This has also opened up a new trend in formation of patent troll companies which are on the lookout to buy patents from the patentees or buy patent holding sick firms and use these patents to sue big companies for seeking royalty at later date . These troll firm are formed purely out to seek royalties or damages rather than practicing with, or collaborating on the development of the technology patent. Big companies are associating in formation of Allied Security Trust and RPX Defensive Patent Aggregation service as defense against such patent troll companies.

12.12 TERMINAL QUESTIONS

1) What are the types of the companies based on strength of business product and IPRs?

2) Explain the defensive patent strategies of a company.

3) Explain what is the offensive patent strategy.

4) What is a patent troll?

12.13 ANSWERS AND HINTS

Self Assessment Questions

1) Refer to Section 12.6

2) Refer to Section 12.7

Terminal Questions

1) Refer to Section 12.4

2) Refer to Section 12.6

3) Refer to Section 12.8

4) Refer to Section 12.10

UNIT 13 PATENT MAPPING/DATA MINING/FREEDOM TO OPERATE

Structure

13.1 INTRODUCTION

Patent mapping is emerging as an exclusive state of art of patent analysis procedure to find the quantum of patent activity in particular field of technology. The mapping of patents relating a technology provides technology trends analysis of the patents which is indicative of the future growth and direction of the technology and also infirm leading players, the technological progress that have been made in the defined geographical limits in particular period of time. The data mining is a process to find hidden patterns in the given field of technology from patent and non patent data. Patent mapping/landscaping is a data mining procedure where patent data is used to create a graphical representation of the relevant art pertaining to a particular technology. Basic purpose of this exercise is to find area of the patents in the selected field of technology and demarcate or cull out the area of freedom to operate to avoid any possible infringement action later. In this unit, we will study what are patent mapping, data mining and freedom to operate? How patent mapping is done? What is the objective and purpose of patent mapping? Types of software and patents are available for patent mapping and data mining.

13.2 OBJECTIVES

After studying this unit, you will be able to:

- explain what is meant by patent mapping, data mining and freedom to operate;

- describe how patent mapping is done;
- explain the objective and purpose of patent mapping; and
- explain the types of software and patents available for patent mapping and data mining.

13.3 DEFINITIONS

Before we proceed with this topic, let us understand how these terms has been defined in the literature. Some definitions of patent map /mapping /landscaping available in the literature are referred below:

Patent map:

In Japan Patent Office: Guide Book for Practical Use of "Patent Map for Each Technology Field" (2000) following paragraph define what is understood as patent map–

"Current technological development necessitates conducting searches of patent information to avoid unnecessary investment as well as gaining the seeds for technological development and the applicable fields contained in the patent information. In order to accomplish this, visual representation of related patent information (hereinafter **"Patent Map")** attracts the attention of the persons concerned. A **patent map** is produced by gathering related patent information of a target technology field, processing, and analysing it."

In 2006 in a lecture relating to 'A new visualization method for patent map' SuhJ.H. and Park S.C explained patent map in following manner –

In patent documents, structured items mean they are uniform in semantics and in format across patents such as patent number, filing date, or investors. On the other hand, the unstructured ones represent free texts that are quite different in length and content for each patent such as claims, abstracts, or descriptions of the invention. The visualized analysis results of the former items are called **patent graphs** and those of the later are called **patent maps**, although loosely patent maps may refer to both cases.

According to Yang, Y.Y.et al., paper Enhancing patent landscape analysis with visualization output, published in World Patent Information, 2010. Patent landscape analysis is described in following manner –

"**Patent landscape analysis**...a state-of-the-art [patent] search that provides graphic representations of information from search results"

In WIPO documentation Patent Map is defined as below:

"**Patent Map** is the visualized expression of total patent analysis results to understand complex and various patent information easily and effectively."

EPO FAQ define patent mapping in the following terms:

"**Patent mapping** is essentially the visualisation of the results of statistical analyses and text mining processes applied to patent documents."

A more comprehensive description of patent mapping is found in paper of Palazzoliet al, in Genetica (2010).

"The interest of using patent documents is, therefore, to exploit data extracted from patent databases. Consequently, a pool of patent documents resulting from a search for a specific research topic in patent databases produces not only the patents that protect the technology involved, including competitor models (e.g. SB, piggy Bac, Tol 2...), but also the technologies that can be used to exploit them. These searches, the results of which are known as **patent landscapes,** are performed using dedicated computing tools, and can be exploited at two levels (ws7, Sup. Mat. 1)."

We can therefore define patent mapping as any methods that use patent data to investigate the distribution – along any dimension – of exclusive rights within a given domain of technology. Patent mapping is also described as white space mapping, which uses published patent data to create a graphical or physical representation of the relevant art pertaining to a particular subject area or novel invention.

13.4 PATENT MAPPING /PATENT LANDSCAPING

Patent Mapping /Patent Landscaping is an exhaustive state of art search which gives the graphical pattern of past and present patent activities of the competitors in the technology. This graphical analysis coupled with a competitive intelligence report is found to very useful in providing deep insights into the current state research in the technology domain. It gives information about the pattern of past and present activities of leading players in a given broad-spectrum of a technology. It also identify the key competitors in the domain, their research work, and potentially their strengths and weaknesses etc. Patent mapping can be time period specific. It can pertain to a particular geographical region. It may include a 'white space' and 'gap analysis' which identifies the crowded and safest research areas. It provides insight into new potential areas of opportunities to exploit for improvement of the patented technology. The geographical distribution information in the patent mapping assists in finding the market trends over time duration and helps in forecasting future potential markets.

13.5 OBJECTIVE OF PATENT MAPPING

Typically patent mapping is customised to the need of the person who seeks to do this exercise. Such patent analytical or patent landscape reports are useful for the business strategists, market analyst, and scientists involved in decisions relating to new product development, R&D planning and strategic business development, in order to gain a competitive edge. This exercise helps them to identify the :

- Technology curve and trends of the required technology
- Key players operating in a technology domain
- R&D focus of key industry players
- Seed patents in a technology domain
- Licensing opportunities
- State of the Art
  - Number of Patents in a specific area

- Number of Citations for specific Patents
- Citation map showing the path of citations
- Number of companies with patents in specific areas
- Names of companies with the most patents in specific areas

- Opportunistic technology gaps for licensing, development, or in a geographic area

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

1) Explain the objective of patent mapping.

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13.6 PURPOSE OF PATENT MAPPING

As stated earlier, patent mapping is a technique which reveals useful information relating to a patented technology area. The information contained in the patent map presentations serve as key information to:

1) Monitor technology markets of interest
2) Determine the patents fallen in the public domain
3) Identify the currently active or future competitors
4) Find in what way new innovation is taking place in identified technology
5) Determine other technologies competitors are working on
6) Identify gaps or white spaces in research and development
7) Determine the most valuable patents
8) Identify patents with seminal discoveries and incremental improvements
9) Find licensing / cross licensing partners
10) Visualize dense and lean patented technology area
11) Determine the most prolific inventors; and
12) Determine gaps in implementation business strategy and the patents strategy
13) Identify potential patent portfolios for acquisition
14) Identify existing or potential infringers to be pursued
15) Identify potential technology to be exploited without the fear of infringement

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

2) What is the purpose of patent mapping?

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13.7 PATENT LANDSCAPE SEARCH

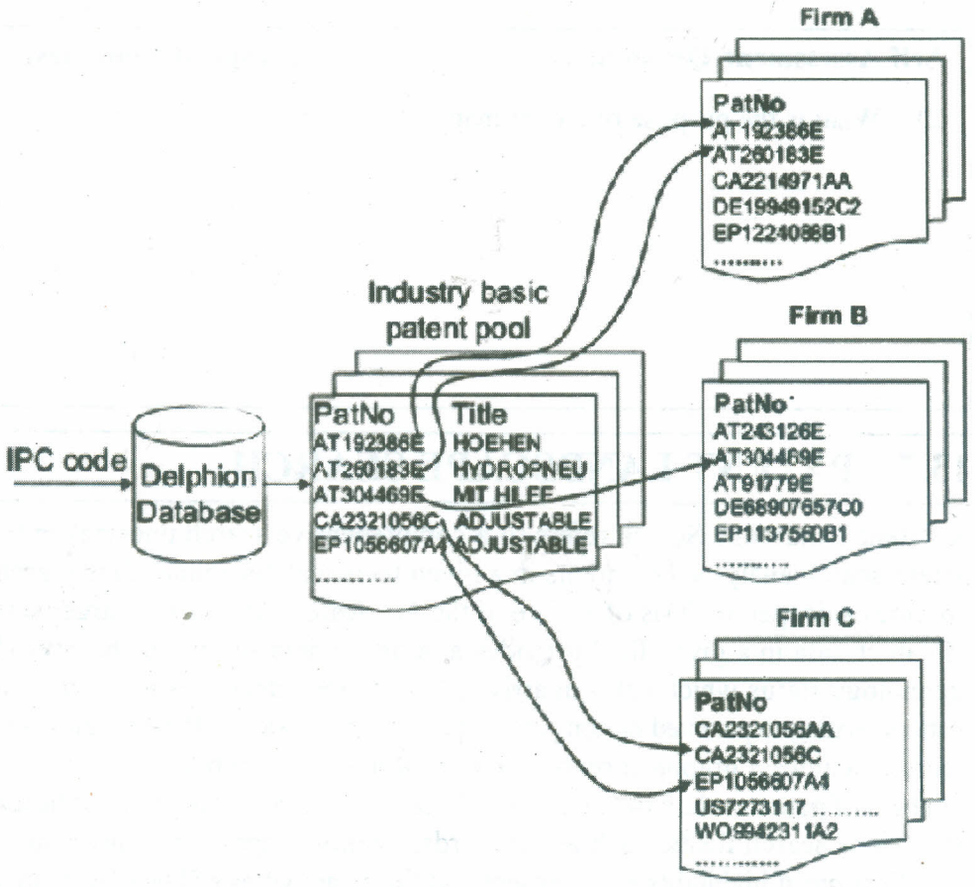
A Patent Landscape Search refers to a comprehensive search undertaken by patent search analysis for patents in a given technical discipline. This search provides a deeper analysis of a State of the Art Search. Analysis of larger sets of patent data in a given field provides a better understanding of the overall technology status which helps in arriving at informed decisions in relation to matters relating to patented or non patented inventions. Basically, Patent Landscape Search includes a graphical representation of interrelation between the large numbers of patents relate to each other. Since the results of this search is based on various search fields, such as keywords, citations, applicants and patent classifications it highlights past, present and future activities of key players in a given area of technology. Thus it reveals information relating to potential patent portfolios for acquisition, existing or potential infringers to be pursued, and potential technology to be exploited.

The Patent Landscape Search can identify –

1) Seminal patents v. incremental patents (through citation analysis)
2) History of a technology's development
3) Visual display of patenting over the years
4) Segregation by assignee and inventors
5) Patent landscape in a specific technology area or market sector or region

Example of patent landscaping by using key words in field of telecommunication.

Key Words of Core Technology	Number of Patents Issued
RAKE Receiver	213
HSDPA	41
Multiple User Direction (MUD)	39
Smart Antenna	128
Turbo	1820
DS-CDMA	103
Joint Detection	44
Baton Handover (BHO)	1
Spread spectrum communication	616



Example of patent landscaping to find competitors relationship with industry basic patent.

13.8 DIFFERENCE BETWEEN PATENT SEARCHING AND PATENT LANDSCAPING

The difference between patent searching and patent landscaping is one of perspective. Patent Searchers are trained to find a needle in a haystack, while Patent landscaper analysts want to identify haystacks from space. A comparison of the two approaches given below illustrates how these professionals would deal with the search, review/analysis, and final presentation of the data discovered.

Difference between patent searching and patent landscaping.

	Patent Searching	Patent Landscaping
1)	Traditional patent searching deals with the micro level, in which very small changes become extremely important and details and precision are imperatives.	Patent landscaping takes a more macroscopic view of the data, using different methods and reaching different conclusions.
2)	Patent searchers are normally concerned with absolute precision sometimes at the expense of recall, especially with regards to data that that is of a cursory interest to the subject of the search Patent analyst may also put together a complicated search strategy and try	Patent analyst may also put together a complicated search strategy and try to be as directed as possible in their searching, but generally want to create a comprehensive dataset for use as the basis for subsequent analytical steps.

	to be as directed as possible in their searching, but generally want to create a comprehensive dataset for use as the basis for subsequent analytical steps.	
3)	Patent searchers will go to great efforts to find the exact references needed by their clients.	Analysts will also use large collections of keywords and database-specific indexing, but they will more likely keep their strategies broad rather than narrowing results to a fine point.
4)	Identifying a single document can sometimes be the goal of the patent searchers.	Identifying the broad data is more or less the target of the patent landscape analyst.
5)	In fact, finding no documents at all may constitute a satisfactory result. It is not uncommon for a searcher to spend days, weeks, or even months working on a single search, looking for a particular piece of information.	The analysis requires the presence of enough data to discover trends and relationships, so patent analysts prefer an overabundance of data as opposed to a lack of it.
6)	Search strategies are often extremely complicated, involving large keyword hedges and the extensive use of database-specific indexing codes. Making the search too specific may bias the data.	Patent landscape analysts use large collections of keywords and database-specific indexing, but they keep their strategies broad rather than narrowing results to a fine point.
7)	Starting with a large collection of data, the searcher will progressively add layers of detail to the search in order to specifically narrow a dataset down to those on-target answers most likely to interest their clients.	It is important to let the data speak for itself, as opposed to having the analysis directed by the searcher's preconceived notions while building the dataset.
8)	In the case of searchers, the analysis and review are usually conducted as a single step.	A patent analyst, on the other hand, will look at review and analysis as separate steps with different objectives and methods.
9)	The single most difficult task for searchers to overcome as they start doing patent analysis may be learning to adjust their natural tendency toward directed, specific searches in order to produce datasets free from bias and subjectivity. Under these	A patent analyst deals with thousands or tens of thousands of documents and, since small details will not be seen across such a vast landscape, takes a more macroscopic view of the data, using different methods and reaching different conclusions.

	circumstances, datasets may grow to several thousand records. Searchers will ordinarily stay away from datasets this large, since previously working with so much information was difficult for end-users to grasp.	
10)	Patent Searchers are required to find a needle in a haystack.	Patent landscape analysts is required to identify haystacks from space

13.9 PATENT DATA MINING

When we are dealing with patent data, we find the explosion of patent data exponentially in current years. More and more countries are undertaking digitization of patent records and information relating is being flooded beyond management. In fact we are drowning in data but starving in knowledge. Data mining is technique of extracting valuable knowledge from the repositories of these data. It involves the not only extraction of the bibliographic data but also its analysis. This means analyzing the bibliographic information contained within patents to examine for example the relationship between patent assignees and International Patent Classification (IPC) codes for a specific area of technology. Mining of this information can reveal the identity of major players in a technology and the area their interest in the specified field. Data Mining is defined as the process of extracting information relating to the pattern of patenting activity in given field of technology. The term data mining according to some data analyst is a misnomer. According to them the correct terms for such an activity could be 'knowledge (mining) discovery in databases', Knowledge extraction, data/pattern analysis, knowledge harvesting, data dredging, data archeology or business intelligence.

Bibliographic data of patent document includes patent number, date of application, IPC classification, inventors/assignees etc. Every patent document uses a standard format for giving the bibliographic information. Even in documents which are not in English language, the basic information is represented by use of INID (Internationally agreed Numbers for the Identification of (bibliographic) Data) codes.

INID codes: Patent offices use INID codes to identify bibliographic data on the front page of patent documents. These two-digit codes, which may be enclosed in parentheses, brackets or circles, came into general use in the 1970s. INID is an acronym for Internationally agreed Numbers for the Identification of (bibliographic) Data.

Some selected INID Codes are given below:

[10] Patent number

[12] Document type

[21] Application number

[22] Date of application

[45] Date of patent

[51] IPC classification

[52] National classification

[54] Title of the invention

[56] References

[57] Abstract

[58] Field of search

[60] Related application data

[65] Published application data

[72] Inventor(s)

[73] Assignee (owner)

[74] Attorney or agent

List of some tools available for data mining

Tool /Software	Software Provider
1) Aureka IPAM system	Aurigin Systems Inc.
2) VantagePoint	Search Technology
3) Technology Watch	IBM/ Synthema
4) Co-Brain and Knowledgist	Invention Machine Corporation
5) SmartCharts	BizInt

13.10 FREEDOM TO OPERATE (FTO)

Broadly speaking Freedom to Operate' (FTO) underlines the ability of an individual or an enterprise to undertake the research, development and/or commercial production, marketing or use of a new product or process with a minimal risk of infringing the unlicensed IP rights of third parties. It is increasingly becoming important for any company that is planning to develop and launch a new product, at an early stage, to ensure their "freedom to operate", i.e. to ensure that the commercial production, marketing and use of their new product, process or service does not infringe the IP rights of others. However an absolute guarantee of freedom to operate will never be attainable but, there are many ways by which companies can minimize the risks and save it from expensive IP litigations. Steps involved in arriving at the decision relating to freedom to operate are :

1) Searching the patent documents

2) Spotting the limitation in patent documents searched

3) Removing the bottlenecks

4) Patent pool

1) **Searching patent documents**

First stage of obtaining a freedom to operate (FTO) analysis begins by searching patent literature for issued or pending patents, and obtaining a legal opinion as to whether a product, process or service may be considered to infringe any patent(s) owned by others. Many private law or IP firms offer such analyses as part of their legal services to clients. Some national IP offices also offers such services for a fee. e.g Swiss Patent Office.

2) **Spotting Opportunities in Patent documents**

Next stage of conducting an FTO search and analysis involves the spotting of opportunities in patent limitations. For example:

- Territorial limitations of patent

  In this analysis, the territory of the searched patented technology is located to ascertain whether it falls in public domain in the territory where the user wish to operate and if it is not protected in there, no permission (or license) would be required from the patent owner to commercialize the product in that territory.

- Limited term of patent 20 years

  This analysis is based on the fact that term of patent protection is for a limited period of 20 years and after the expiry of this period, the patented technology falls in the public domain and may be freely used by anyone. According to one European Patent Office (EPO) estimate, only fewer than 25 percent of all patents granted through the EPO are maintained for the maximum 20 year term. Many patents are allowed to lapse through non-payment of maintenance fees by the patent holders before the 20 years are up." All the lapsed patents fall in public domain and can be used freely.

- Scope of patent limited by claims

  The scope and extent of patent protection is limited by the claims of the patents. A good analysis of patent claims can bring out the aspect of the invention which is not protected. Although it is not easy to determine the scope of a patent with precision, yet it provides the scope for working around the patent to avoid the infringement or even obtain a patent for the improvement. .

3) **Removing the bottlenecks**

Next stage in the FTO analysis is to clear the obstacles based on the patent search reports. Where there is a clear indication of presence of a patented technology which limit the company's freedom to operate, the company can use following options :

1) **Purchasing the patent or licensing in**

First option, which is available with the user, is to seek the outright

purchase of patented technology. In case that is not possible, at least obtain an exclusive license to use the invention .

2) **Cross licensing**

Second option and one of the best option available would be to cross license the technology that mutually beneficial to both of the parties. This is mostly practiced where many key players hold patent on the basic technology and further improvements.

3) **Invent around the patent**

This option is possible where long time benefit is envisaged. Here the key players, having good R&D backup, take up the projects to find improvements in the patented technology and seek patents on the improvements and provide better substitutes for the basic patented technology.

4) **Patent pool**

This option is used by the two or more companies practicing related technologies wherein they put their patents in a pool to establish a clearing-house for patent rights For examples of a patent pool, Sewing machine manufacturers and more recent, DVD Video patent pool formed by *Sony*, *Philips* and *Pioneer* for inventions that are essential to comply with certain DVD-Video and DVD-ROM standard specifications - MPEG etc.

Check list for FTO analysis

The quality FTO analysis is largely dependent on thoroughness and meticulous search of the related documents. However the comprehensive checklist of what must be established during the early stages of the FTO analysis serves as a helpful tool. For example, the list should include:

1) Identification of all possible pertinent patents
2) Finding the prosecution history of each patent and their litigation status
3) Patent applications
4) Finding third-party knowhow and trade secrets if any
5) Finding existing license agreements (for example, trade secret licenses, MTAs, or technology-use licenses
6) Recording all finding and properly maintaining the records.
7) Maintaining records of all searches and including the search terms used . This should include:
   - spreadsheets of all FTO search results
   - records of search terms used
   - databases searched
   - interviews with researchers, with notes
   - notes and annotations by patent counsel

13.11 SUMMARY

Patent mapping is an art of analyzing patent information to discover relationships and trends that would be otherwise difficult to see when working with patent documents on a one-on-one basis. Generally speaking, searching patent information brings up an image of a diligent searcher, pouring over reams and reams of information, looking for the one reference out of hundreds, maybe thousands, to find the right kind of document. This appears to be like the idea of searching for a "needle in a haystack". However, when information professionals are being asked to provide the big picture of a technology, they find patent mapping and data mining tools useful. Since the business decision-makers are more and more concerned with identifying trends and patterns in the field of their interest, they hire professionals for doing data mining and patent mapping who assist them in conducting patent intelligence, patent citation analysis using latest patent mapping tools and provide the reliable FTO reports. If early phases of the FTO analysis are done with disciplined rigor laid out in this chapter, the user would be in a better position in receiving FTO opinion as desired.

13.12 TERMINAL QUESTIONS

1) Differentiate between Patent search and patent landscaping.
2) Write note on patent data mining.
3) Write note on Freedom to operate.

13.13 ANSWERS AND HINTS

Self Assessment Questions

1) Refer to Section 13.5
2) Refer to Section 13.6

Terminal Questions

1) Refer to Section 13.8
2) Refer to Section 13.9
3) Refer to Section 13.10

UNIT 14 IP AND STANDARDS/PATENT POOLS

Structure

14.1 INTRODUCTION

The diffusion of complex technologies like ICT, mobile, MPEG are being coupled with standardization of product and process innovations to facilitate their productions processes as well as for convenience of use by the customers. New technologies at initial stages are limited both by the patents of the innovator and the skilled labour. For the widespread adoption and use, it is required that the tasks involved

in these new technologies become more routine and standardized for enabling their cheaper production using even unskilled labour. In this unit, we will study what is standardisation, how it is beneficial, what are its drawbacks, what is the interplay between innovation and standardization. We will also study the formation of patent pools and their purposes.

14.2 OBJECTIVES

After reading this unit, you will be able to:

- explain what are standards;
- describe how they are useful;
- elaborate the types of standards;
- elaborate drawbacks of standardizations;
- elaborate patent pools; and
- explain patent pools and their interplay with standards.

14.3 HISTORY

Standards

There are several examples of historical standards that have set the way we use products.

QWERTY keyboard for the typewriter designed by C L Sholes in 1860 became universal keyboard standard. Existence of this keyboard design as universal fixture of modern day keyboards of most advanced, sophisticated computers and word processors electronic technology establish this point. Similarly in 1924, an organization the Radio Corporation of America, merged the radio interests of American Marconi, General Electric, American Telephone and Telegraph (AT&T) and Westinghouse, leading to the establishment of standardization of radio parts, airway's frequency locations and television transmission standards.

14.4 STANDARDS DEFINED

Technical standards are referred to as set of rules, guidelines and characteristics for products or related processes and production methods (technical specifications) approved by a recognized body for which compliance is not obligatory. (See WTO Agreement on Technical Barriers to Trade – TBT Agreement – Annex 1, para. 2.) When established by Governments, the standards must comply with the TBT Agreement, but private actors, such as business associations, often require standards that far exceed those required by government agencies.

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

1) Define Standards.

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14.5 PURPOSE OF STANDARDIZATION

The purpose of standardization is to facilitate the harmonization of design and production processes for products and services, and ultimately facilitate international trade. It allows economies of scale, easier understanding among producers and providers, as well as compatibility and interoperability among products and components. Examples of such standards include country telephone codes and passenger safety equipment.

14.6 BENEFITS OF STANDARDS

1) Standards helps in harmonisation of the ways to produce standard goods.
2) Standards act as social facilitator in establishing common understanding of qualitative and technical aspects of particular products.
3) Standards can affect the consumers by so called "network effect", which allows the benefit of a single user to be extended to an unlimited number of users, thus reducing the cost of the learning process and affording economies of scale when targeting consumers.
4) Standards facilitate convergence, adaptability and interoperability among them as it may be possible to innovate above or around the standards
5) Standards set a path for new, better ones.

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

2) How are standards beneficial?

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14.7 DRAWBACKS OF STANDARDS

Standards are not meant to promote innovation. They, at times, discourage inventors and investments in the technology which is standardised. For instance QWERTY key board standard is not the fastest typing method, but it is impossible to change this keyboard layouts worldwide without consumer rejection. Standards have tendency to become universal which may freeze further innovation in the area. This side effect of standards on innovation, manufacture and subsequent trade is further aggravated if the standards are influenced and captured by industries with dominant position in the market. In many cases, access to technologies is made impossible without compiling with the established standards. This makes it almost impossible for new entrants to participate in the market in standardised technical fields. Some may possible argue that stands would defeat the basic purpose of promoting innovation and competition. All the potential benefits of technical standards would in fact benefit the standard makers for being the first to design and market a particular product. This position gets murky if standards are linked to strong IP portfolios in the sector in question.

14.8 DIFFERENCE BETWEEN PATENTS AND STANDARDS

Patents and standards are two different social phenomena. Both of them perform social function of diffusion of new and emerging technology. Major differences between patents and standards are given below:

Patents and standards differentiated

Patents	Standards
1) Patents seeks to promote innovation by inducing investment in Research and inventions	Standards seek to harmonise the way in which the products are designed to produce standard goods.
2) Patents are intended for purely private exclusive use	Standards are intended for public and collective use.
3) Patents seek to reward the inventors for their Intellectual and economic efforts.	Standards are meant to provide a public, free and collective tool for producers and consumers.
4) Social function of a patent is the promotion of technology diffusion, disclosure of technical information on the invention.	Standards act as social facilitator in establishing common understanding of qualitative and technical aspects of particular products and to facilitate convergence, adaptability and interoperability among them.
5) Example : patent for a type writer	Example QWERTY is a universal standard first used for typewriters and now used for computer keyboards.

14.9 *DE JURE* STANDARDS

Standards can be mandatory or voluntary. The former are developed by standard-setting organizations (SSO) at the national (e.g Indian Standard Institute (ISI) or at the international level (such as the International Organization for Standardization (ISO)).Mandatory standards are issued by Governments based on health, safety, security and environmental grounds or to prevent deceptive or fraudulent practices. Standards issued by Indian Standard Institute fall under this category. For example all electrical appliances must obtain the 'ISI mark'/certificate before being sold in the market. Similarly 'Agmark' is necessary for selling food items. The ISI mark and Agmark standards are de jure. Compliance of these standards is preferred. These standards are also known 'technical regulations or technical specifications'.

14.10 *DE FACTO* STANDARDS

Voluntary standards can be applied to any economic activity. They are usually established and adopted by private associations known as standard-setting

organizations (SSOs). These organisations also act as independent public regulatory authorities. Such *de facto* standards have been successfully introduced for good like 'batteries' for electronic products and 'Windows XP' for software.Some voluntary standards can also become *de facto* "mandatory" if their fulfilment is linked to a technology that is dominated by one or just a few private rights holders, or when they are required by public procurement regulations. Some firms can benefit financially from their patents in indirect ways. They put their patents into the public domain or offer non-exclusive, royalty-free licenses in order to foster development of a particular field of business. This approach is being used to establish an industry standard that is beneficial to patent holder in long run. This marketing strategy makes a particular product or process the most economically relevant standard for any competitor in a given field and it results in establishing *de facto* standards in the field of technology

14.11 OPEN AND CLOSED STANDARDS

Standards can also be designed as open or closed. Major differences between open or closed standards are given below:

Open and Close standards differentiated

	Open Standards	Closed Standards
1)	Standards that are developed and evolved through collaborative and consensus-driven processes of the participants.	Closed standards are those standards that are developed and evolved by a company or group of companies in the market.
2)	These standards fall more readily into the realm of public goods. The public access to these standards is limited.	The public access to these standards is limited.
3)	They are made available to the general public without protection of core technology .	These standards are linked to protection of core technologies needed for their effective use.
4)	The documentation of these standards is open to the public and anyone can create a software that implements and uses the standard.	The documentation and specification of these are not available to the public, enabling its developer to sell and license the code to manage their data format to other interested software developers.
5)	They facilitate interoperability among different products or services and are meant for widespread adoption.	They provide natural advantages of lead time or market concentration to the first designer of standards.
6)	Examples XML standard.	Examples Microsoft's Word Format.

14.12 EXAMPLES OF SOME SUCCESSFUL STANDARDS

There are several historical standards that have set the way we use new products. For example, the protocols HTML, TCP/IP, SMTP, POP and FTP are software standards that facilitate the use of internet. Recently formed standards are MPEG-2 Standard (1997), DVD-ROM and DVD-Video Formats I (1998) help to seamless transfer and conversion of interactive media and other forms of digital video delivery and storage, transport and display. Similarly 1394 Standard support and facilitate fast data transfer rate up to 400 Mbps.

MPEG-2 Standard (1997)

In 1997, the agreement amongst the Columbia University, Fujitsu Limited, General Instrument Corp., Lucent Technologies Inc., Matsushita Electric Industrial Co., Ltd., Mitsubishi Electric Corp., Philips Electronics N.V. (Philips), Scientific Atlanta, Inc., and Sony Corp. (Sony) resulted in establishment of MPEG-2 standard which involved technology to compresses digital information. This standard resulted in reduction of spatial and temporal redundancies in the binary data streams, thereby conserving transmission resources and storage spaces for the efficient transmission, storage and display of digitized moving images and sound tracks. This standard allowed interactive media and other forms of digital video delivery, storage, transport and display on high definition television (HDTV), Digital Video Broadcasting (DVB), direct broadcast by satellite (DBS), digital cable television systems, multichannel-multipoint distribution services (MMDS),personal computer video and digital versatile discs (DVD).

DVD-ROM and DVD-Video Formats I (1998)

In 1998, Sony Corporation of Japan (Sony) and Pioneer Electronic Corporation of Japan (Pioneer) Koninklijke Philips Electronics, N.V. (Philips) established a DVD Standard which allowed all interested parties to manufacture components of, use and sell or otherwise dispose of discs and players that conform to the Standard Specification.

1394 Standard

In 1999, Apple Computer Inc., Compaq Computer Corp., Matsushita Electric Industrial Co. Ltd. (Panasonic), Royal Philips Electronics, Sony Corp., STMicroelectronics and Toshiba Corp established the 1394 Standard (IEEE 1394-1995, IEEE P1394a, IEC 61883-1 and IEEE P1394b) which was very fast external bus standard that supported data transfer rates of up to 400 Mbps (400 million bits per second). Product using this standards were Firewire by Apple, i.link by Sony and Lynx by Taxsa Instuments.

14.13 PATENT POOLS

Patent pools, is across licensing arrangement which allows the competing firms to combine their patents relating to a particular technology. It may be defined as the aggregation of intellectual property rights though which the participant firms seeks to avoid costly litigation amongst themselves .For example patent pools relating to tablet computers, smart phones, and video compression technologies. The patent pools intends to assist in shaping the growth of particular technology where

the participants are holding patents which are complimenting each other .For instance patents pools in molecular diagnostic testing for breast cancer and treatments for HIV, cholera, and malaria have encouraged scientific progress in these fields. Thus a "patent pool" is an agreement between two or more patent owners to license one or more of their patents to one another or third parties. Alternatively, a patent pool may also be defined as "the aggregation of intellectual property rights which are the subject of cross-licensing, whether they are transferred directly by patentee to licensee or through some medium, such as a joint venture, set up specifically to administer the patent pool.

14.14 HISTORY OF PATENT POOLS

First private patent pool which came into existence in 1856.This patent pool was for the manufacture of sewing machine which covered many patents owned by consortium called sewing machine combination of sewing machine manufacturers Grover, Baker, Singer, and Wheeler & Wilson. This patent pool operated successfully from its formation in 1856 until its last patent expired in 1877.Over the period of above one hundred and fifty years, many patent pools were formed primarily to avoid litigation amongst the patent holders. Misuse of patent pools to control the price made the glass industry patent pool to face the restriction of the government. In 1917, when the two major patent holders ,the Wright Company and the Curtiss Company, had blocked the building of any new airplanes urgently required for the World War I, an aircraft patent pool was privately formed encompassing almost all aircraft manufacturers in the United States on recommendation of a committee formed by the Assistant Secretary of the Navy (The Honorable Franklin D. Roosevelt).

Examples of some prominent patent pools and patentees involved is given in table below:

Year	Technology	Patentees
1856	Sewing Machine	Grover, Baker, Singer, and Wheeler & Wilson
1902	Float spring tooth harrows	22 firms
1908	Movie Projector	Armat, Biograph, Edison and Vitagraph
1916	Folding Bed making and other similar device	Davoplane Bed Company (7 patents), the Pullman Couch Company (13 patents) and two inventors
1917	Aircraft	All Aircraft manufacturers in the United States
1924	Radio	American Marconi, General Electric, American Telephone and Telegraph (AT&T) and Westinghouse
1929	Gasoline cracking	Standard of Indiana and others

1997	Vedio; MPEG_2 compression technology standard.	The Columbia University, Fujitsu Limited, General Instrument Corp., Lucent Technologies Inc., Matsushita Electric Industrial Co., Ltd., Mitsubishi Electric Corp., Philips Electronics N.V. (Philips), Scientific Atlanta, Inc., and Sony Corp. (Sony)
1998	DVD-Video and DVD-ROM	Sony, Philips and Pioneer
1999	DVD-ROM and DVD-Video formats	Toshiba Corporation, Hitachi, Ltd., Matsushita Electric Industrial Co., Ltd., Mitsubishi Electric Corporation, Time Warner Inc., and Victor Company of Japan, Ltd.

14.15 BENEFITS OF PATENT POOLS

Patent pools are created to provide number of social and economic benefits. These benefits include:

1) Elimination of problems caused by "blocking" patents or "stacking" licenses
2) Reduction of licensing transaction costs
3) Sharing the risks in research and development
4) Facilitating the exchange of technical information or know-how not covered by patents.
5) Patentee is benefited as he would gain greater access to proprietary subject matter of other patent holders.
6) Patentee would have access to affordable prepackaged patent "stacks" that could be easily licensed.
7) Patentees could also derive additional revenue sources for inventions that might not otherwise be developed.

14.16 PATENT POOLS AND MISUSE

In 1912, Supreme Court decision dissolved a patent pool in ***Standard Sanitary Manufacturing Co. v. United States*** which because of antitrust violations. In 1945, another most notorious patent pools was dissolved by *United States* Supreme Court (*Hartford-Empire Co. v. United States).* This glass manufactures patent pool covered ninety-four percent of all the glass made in the United States, which allowed its members to sustain glass prices at unreasonably high levels. Supreme Court found this patent pool as anti competitive and blocking trade. In order to control misuse of such patent pool practices, the Department of Justice closely evaluated all patent pools and created a list of nine patent licensing practices (popularly known as the "Nine No-Nos") in 1962 that were *per se* antitrust violations .Cases of reported misuse of patent pool.

14.17 EXAMPLES OF MISUSE OF PATENT POOLING

Some notorious patent pool alignments are given in Table below. Most these patent pools were found to be anti competitive and hence struck down by courts.

Year	Technology	Patentees
1912	Glass	Hartford-Fairmont, Empire, Corning, Thatcher, Ball, and Owens (Hartford-Empire Co Vs US)(1945)
1902	Float spring tooth harrows	22 firms
1912	Enameling process for sanitary Ironware	Standard Sanitary Mfg. Co. v. United States,(226 U.S. 20 (1912)
1973	Griseofulvin,	Imperial Chemical Industries Ltd. (ICI) and Glaxo Group Ltd. (UNITED STATES v. GLAXO GROUP LTD. ET AL. 410 U.S. 52 (1973))
1998	Photorefractive keratectomy ("PRK"). PRK is a form of eye surgery that uses lasers to reshape the cornea and frees many people from the need to wear glasses or contact lenses.	Summit Technology, Inc. and VISX, Inc

(Summit Tech., Inc. & VISX, Inc., No. 9286 (FTC Mar. 24, 1998))

14.18 NINE NO-NOS TO PATENT POOLING

When the misuse of patent pools came to light, US government issued guidelines for the formation of patent pools and prohibited following nine activities related to formation of patent pools. These were known as "Nine No-Nos" and they were prohibitions against

1) Tying the purchase of unpatented materials as a condition of the license (Tying non patented goods)
2) Requiring the licensee to assign back subsequent patents(Grant back)
3) Restriction of the right of the purchaser of the product in the resale of the product (Resale clause)
4) Restriction of the licensee's ability to deal in products outside the scope of the patent
5) A licensor's agreement not to grant further licenses (sub-license restriction.)

6) Mandatory package licenses (Packaging)

7) Royalty provisions not reasonably related to the licensee's sales,

8) Restrictions on a licensee's use of a product made by a patented process, and

9) Minimum resale price provisions for the licensed products.(resale price limitation)

14.19 PATENT POOLS AND GOVERNMENT CONTROL

According to the US Antitrust Guidelines for the Licensing of Intellectual Property ("IP Guidelines) issued in 1995, **Patent pooling** is pro-competitive when it:

1) Integrates complementary technologies

2) Reduces transaction costs

3) Clears blocking positions

4) Avoids costly infringement litigation

5) Promotes the dissemination of technology.

According to these Antitrust IP Guidelines, the excluding firms from an intellectual property pool may be anticompetitive if:

1) The excluded firms cannot effectively compete in the relevant market for the goods incorporating the licensed technologies

2) The pool participants collectively possess market power in the relevant market

3) The limitations on participation are not reasonably related to the efficient development and exploitation of the pooled technologies

4) The pooling arrangement deters or discourages participants from engaging in research and development

5) The patents in the pool are invalid and had expired

6) There is aggregation of competitive technologies and setting a single price for them

7) An independent expert is not used to determine whether a patent is essential to complement technologies in the pool

8) The pool agreement is disadvantageous to competitors in downstream product markets

9) The pool participants collude on prices outside the scope of the pool on downstream products.

Therefore the patent pools that conform to the above criteria are approved and promoted by the government, industry, and the public, as they provide a win-win situation for all involved. If one of the above factors is not included in the patent pool, it does not necessarily mean that the patent pool is anticompetitive or in

violation of the antitrust laws. It merely means that the patent pool will need to be more carefully scrutinized to find that these patent pools include:

1) A technology standard that is definite and well defined

2) An evaluator/independent expert to determine which patents are essential to the implementation of the standard, thereby defining a group of essential patent holders

3) A license drafted and approved by the essential patent holders that allows the technology to be licensed on a reasonable and nondiscriminatory basis

4) A patent pool administrator appointed by the essential patent holders to handle administrative tasks such as signing up licensees, collecting royalties from the licensees, and distributing the royalties to the essential patent holders

5) The essential patent holders retaining the right to license the patents outside of the patent pool.

14.20 COMMON ATTRIBUTES OF RECENT "SUCCESSFUL" PATENT POOLS

Recent patent pools, such as MPEG-2, DVD, and 1394 pools discussed above seems to have the follow common attributes:

1) All licensors of the patent pool grant non-exclusive licenses to the pool, e.g., the licensors are free to license their patent(s) outside of the patent pool;

2) An independent patent expert evaluates which patents are deemed essential in the formation of the patent pool. There is also some mechanism for future review of the current patents in the pool as well as evaluation of any desired additions to the patent pool;

3) The pool is licensed to any interested party in the technology in a nondiscriminatory manner;

4) All royalty rates are reasonable and distributed based on an agreed upon formula; and

5) All grant back provisions are limited to essential patents and require nonexclusive licenses with fair and reasonable terms. These provisions must be reasonable so as not to discourage further innovation.

14.21 PATENT POOLS AND STANDARDS

A more recent patent pool was formed in 1997, by the Trustees of Columbia University, Fujitsu Limited, General Instrument Corp., Lucent Technologies Inc., Matsushita Electric Industrial Co., Ltd., Mitsubishi Electric Corp., Philips Electronics N.V. (Philips), Scientific_Atlanta, Inc., and Sony Corp. (Sony) to jointly share royalties from patents that are essential to compliance with the MPEG_2 compression technology standard. In 1998, Sony, Philips and Pioneer formed a patent pool for inventions that are essential to comply with certain DVD-Video and DVD-ROM standard specifications. Yet another patent pool was formed in 1999, this time by Toshiba Corporation, Hitachi, Ltd., Matsushita Electric Industrial Co., Ltd., Mitsubishi Electric Corporation, Time Warner Inc., and Victor Company

of Japan, Ltd. for products manufactured in compliance with the DVD-ROM and DVD-Video formats.

14.22 CONCERNS OVER PATENTS, STANDARDS AND TRADE

The case of China

i) **DVD Players case**

China has emerged as dominant manufacturer of DVD players which incorporate standards that require special decoder chips. But the rights to use these chips are owned by the DVD license holders and other foreign-owned technologies. The patents linked to this and other standards requires Chinese DVD player manufacturers to pay royalty fees of about 20 to 50 percent of production costs.DVD players illustrate the power that standards can have in determining who can produce, trade and, ultimately, receive economic returns. Since some of these technologies are off-patent, some companies are selling these product in domestic market without payment of any royalties but those companies which are involved in export would expose them to lawsuits, as well as others border measures. To address these concerns, China has embarked on a proactive strategy which involved developing a domestic standards based on low-cost or indigenous technologies and adaptations. In 2003 China announced a new optical disc format called the Enhanced Versatile Disc (EVD) which was developed by a multi-company partnership involving 25 patents to counter the popular DVD format with a hope that it would establish a new standard in the industry and Chinese companies would be able to make EVD players with more profits and without any royalty payments to foreigners. However this initiative failed for market barrier reasons.

ii) **Wireless Security Standard Dispute**

This dispute involves development of national security standard for WLAN and its mandatory implementation by China. Chinese authority reasoned that the wireless network broadcasts messages using radio is particularly susceptible to eavesdropping. The security flaw of WLAN products has been a major concern for users, especially business users, to adopt the Wi-Fi technology. Though IEEE has been making effort to improve it, the progress is slower than that the market requires. In 2002 Broadband Wireless Internet Protocol Standard Group (BWIPS) China developed its own security scheme for WLAN called WAPI (WLAN Authentication and Privacy Infrastructure). Chinese national WAPI standards excluded the popular Intel Centrino chips due to noncompliance. While its technological advantage has not met serious challenge, its implementation method has got strong objection from international stakeholders in WLAN market. Consequently, application of the standard was suspended after intervention by United States authorities, who considered that such standard was affecting the interest of foreign competitors and prospects for future investments in the area. In the 15th plenary session of the US-China Joint Commission on Commerce and Trade (JCCT) held on April 21, 2004 china agreed with respect to its proprietary WAPI standards to:

1) suspend indefinitely its proposed implementation of WAPI as a mandatory wireless encryption standard;

2) work to revise its WAPI standard, taking into account comments received from Chinese and foreign firms;

3) participate in international standards bodies on WAPI and wireless encryption for computer networks.

Though this brought nationalisation of standards to an end but left few questions unanswered relating to the implementation of national standards.

HD DVD and Blu-ray Disc standard War

Two groups, such as HD DVD promotion group (NEC and Toshiba) and the Blu Ray Disc Group (Sony, Matsushita and others), are making attempts to establish a standard for the new format for high definition favourable to them. Both formats were designed as successors to DVD, capable of higher quality video and audio playback, and of greater capacity when used to store video, audio, and computer data. Blu-ray Disc and HD DVD use same methods of encoding media onto disks resulting in equivalent levels of audio and visual quality, but differ in interactive capabilities, internet integration, usage control and enforcement, and in which features were mandatory for players. The storage capacity of dual-layer HD DVD and Blu-ray Disc is 30 GB of data and 50 GB respectively .

14.23 SUMMARY

Diffusion of new and emerging technologies require formation of a common platform where various technical parameters are standardised to successfully implement all the important and related technical features in the new product .Such standardization results in establishment of cheaper ways of production of new complex products on one hand but on the other hand, create a monopoly and control in hands of few. Government control is, therefore, required to check this kind of misuse of standardisation. Nationalisation and privatisation of standards is continuing. Similarly formation of patent pools resulted in faster availability of new technology to the consumers. However, it is liable to be misused by pool partners if not regulated for anti-competitive activity. An important aspect related to the formation of a patent pools is the issue of standard setting. Governments and industries are joining hands to set standards, particularly in the electronics sector. This standard setting is often viewed as driven by private companies whose primary objective is to ensure the dominance of their technology. When such standards are implemented internationally, they emerge as only commercially viable method of using a technology. This may, in fact, leave no choice with other manufacturing countries (like China) but to implement these standards.

14.24 TERMINAL QUESTIONS

1) What is a Patent Pool? Give examples of Patent Pools.

2) What is meant by misuse of patent pools?

3) What is popularly known as Nine No Nos ?

4) What are common attributes of successful patent pools?

14.25 ANSWERS AND HINTS

Self Assessment Questions

1) Refer to Section 14.3 & 14.4

2) Refer to Section 14.6

Terminal Questions

1) Refer to Section 14.13

2) Refer to Section 14.16

3) Refer to Section 14.18

4) Refer to Section 14.20

UNIT 15 OPEN SOURCE

Structure

15.1 INTRODUCTION

The free sharing of knowledge existed in the society since time immemorial. Cooking recipes have been shared among the cooks all over the world. Similarly software sharing has been around as long as software itself. It was perhaps due to believe of the computer manufactures that their competitive advantages stem from the hardware innovation. They, in fact, did not pay much attention to software as a business asset. In the initial years, data sharing was difficult due to communication barriers. The computer manufactures, therefore, encouraged improvement to the software, from whatever source, just to make their machine more attractive to the potential customers. The concept of open source and the free sharing of technological information is not new but its application to computer business, software and new technology is of recent origin. In this unit, we will study what is open source software , its history and guidelines for use .We will also study the difference between terms such as , 'freeware' and 'free software', and 'open software' and 'open source'. We will also analyse what is purpose behind open source movement?

15.2 OBJECTIVES

After reading this unit, you will be able to:

- explain an open source;
- explain the purpose behind the open source movement;
- distinguish between 'freeware' and 'free software';
- appreciate the difference between free software and traditional proprietary software;
- discuss impact of open source movement on innovation; and
- describe what is OSD.

15.3 HISTORY

The free software movement is one of the most successful social movements to emerge in the past 25 years in software development. Driven by a worldwide community of ethical programmers dedicated to the cause of freedom and sharing, Richard Stallman initiated the free software movement in 1983 with starting of GNU Project. The terms such as "software libre", "open source", and "FOSS", "FLOSS" are associated with the free software movement. It took many years of work, by hundreds of programmers, to develop GNU operating system which is a Unix-compatible portable operating system that would be free software so that users would be free to redistribute the whole system, and free to change and contribute to any part of it. In 1991, GNU Linux, operating system was developed which is used by millions of people around the world, and its popularity is growing. Now several other projects like Apache, Free BSD, Mozilla OpenOffice.org, GNOME are successfully used by many users of computers. By the year 1990 a need for alternative term for free soft ware was felt among the freeware community to partly address the marketing purposes and partly because of a perceived "moralising and confrontational" attitude that had been associated with the term free soft ware. Some users felt this term to be discouraging business adoption. In 1998, the term "open source software" was selected by Todd Anderson, Larry Augustin, Jon Hall, Sam Ockman, Christine Peterson, and Eric S. Raymond. This also lead to foundation of Open Source Initiative(OSI) by Eric Raymond and Bruce Perens to promote the term as part of a marketing program for free software. Stallman and others objected to the use of term "open source software" as they felt that this term does not make people think of the freedoms that the software in question gives users. Later both of the terms "free software" and "open source software" found its fans as well as critics. Now many other terms have been proposed to resolve the conflict. These include "Software Libre" (or libre software), "FLOSS" (Free/Libre/Open Source Software), and "FOSS" (or F/OSS, Free and Open Source Software). It is important to note that all these terms share almost identical license criteria and development practices. The first known use of the phrase 'free open source software' on Usenet was spotted in 18 March 1998. From 1998 onward, these alternative terms for free software came into use. The most common are software libre, free and open source software (FOSS) and free, libre and open source software (FLOSS). In 2005 The Software Freedom Law Center was founded by to protect and advance FLOSS . In February 2002, F/OSS appeared on a Usenet newsgroup dedicated

to Amiga computer games. Similarly in 2002, MITRE Corporation used the term FOSS in their 2003 report on Use of Free and Open Source Software (FOSS) in the U.S. Department of Defense. Other non English terms such as "Swatantra Software" (India), Malayang software" (Philippines) , and "Software Libre" (Europe) were used to represent the free software movement.

15.4 FREEWARE AND FREE SOFTWARE

Free and open-source software is software that is available to the licensed user with the right to use, study, change, and improve its design through the availability of its source code. In the context of free and open-source software, *free* refers to the freedom to copy and re-use the software, rather than to the price of the software. You should not confuse with term 'freeware' with 'free software' as these are different terms. Similarly 'open software' and 'open source' are different terms with distinct meaning. The difference between 'freeware' and 'free software' is given below:

Difference between 'freeware' 'free software'

Freeware	Free Software
1) It is computer software that is available for use at no cost or for an optional fee.	It is computer software that is available for use at no cost or with nominal cost.
2) It is usually provided to the user with one or more restricted usage rights with the author of freeware retaining the rights to copy, distribute, and make derivative works from the software.	It is usually provided to the user with freedom to use, study, change, and improve its design through the availability of its source code.
3) It is distributed for a business or commercial purpose with the aim to expand the marketshare of a "premium" product	It is distributed for a public purpose with the aim to improve the software.
4) This term is commonly used for closed source proprietary software.	This term is commonly used for open source proprietary or non proprietary software.
5) This term means free in terms of price.	This term means to liberty to use.
6) Examples Google Chrome, Adobe Flash Player.	Examples GNU /Linux .BIND

15.5 NEED FOR FREE SOFTWARE DISTRIBUTION

In the initial years of computer usage, it was impossible to use a computer without installing a proprietary operating system, which was required to be obtained under a restrictive license. Clients were not permitted to share software freely with other

computer users and there was no provision to change software to fit his or her own needs as the software owners did not provide source codes. The GNU Project was founded by Stallman to change all that. The main objective of the GNU Project initiated was to provide a complete operating system licensed as free software. The proponents of this movement seeks to ensure that free software distributors respect their obligations to pass on the freedom to all users, to share, study and modify the code. According to them four freedoms associated with free software are:

1) freedom to run the program for any purpose
2) freedom to study how the program works
3) freedom to modify the program
4) freedom to redistribute the modified program provided all these are granted to others

Examples of free software

1) .Linux Kernel
2) BSD and GNU/Linux operating systems
3) GNU Compiler Collection and C library
4) MySQL relational database
5) Apache web server
6) Sendemail mail transport agent.
7) GIMP raster drawing and image editor
8) X Window System graphical-display system
9) LibreOffice office suite
10) TeX and LaTeX typesetting systems.

15.6 FREE SOFTWARE MOVEMENT

The proponents of the Free software movement seek to ensure that software is made available to anybody to use, or to modify by making its source code available to the user. According to them source code of the software shall be published and made available to the public for enabling anyone to copy, modify and redistribute the source code without paying royalties or fees. Thus an open source code is developed through community cooperation. These communities are composed of individual programmers as well as very large companies. Stallman founded the Free Software Foundation in 1985 to support this movement.

The proponent of this movement in software development and uses aims to ensure four basic freedoms to all the software users.

1) the freedom to run their software
2) the freedom to study the software
3) the freedom to change the software
4) the freedom to redistribute copies with or without changes.

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

1) Define the software movement.

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15.7 DIFFERENCE BETWEEN FREE SOFTWARE AND PROPRIETARY SOFTWARE

The basic difference between free software and traditional proprietary software lies in its terms of user and property rights. In the former case users are granted the right to both the program's functionality and methodology whereas in the later case, users rights are subjected to conditions relating to programming code and they are allowed to have only right to functionality of the software program. For example Microsoft Office users only have the rights to functionality. Here user's rights to use software reside in the terms and conditions of use that are imposed by the license of the software.

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

2) Distinguish between free software and proprietary software

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15.8 PHILOSOPHY BEHIND OPEN SOURCE MOVEMENT

The philosophy behind open source approach to software development is to permit anyone to obtain and modify open source code related thereto. The modifications in software are made available to all the software developers within the open source community who are using the software. The identity of every individual contributing in code modification is disclosed and gradual transformation of the source code is documented. In this way, it will be difficult for anyone to establish ownership of a particular bit of code. This will lead to promote the production of high quality programs and cooperation between software developers in improving the open source software development. Open source movement supporter programmers contribute to the open source community by voluntarily writing and exchanging programming code for software development. The term "open source" requires free sharing of the edited code or further edited work. This open source initiative to software development allows anyone to obtain and modify open source code. The further modifications so made are re-distributed

back to the developers within the open source community. This helps in disclosure of the identities of all individuals participating in code modification with documentation of the progressive transformation of the code over a period of time. Though this method makes it difficult to establish ownership of a particular bit of code but it is in consonance with the open source movement philosophy. This open source objectives promote the production of "high quality programs" and enhance working cooperation amongst other likeminded developers to improve open source technologies.

15.9 THE OPEN SOURCE DEFINITION (OSD)

After the foundation of the Open Source Initiative in 1997, a need was felt to fix the criteria for defining open source software. Debian, the producers of the Debian GNU/Linux system, created the Debian Social Contract (See Annexure1). He also framed The Debian Free Software Guidelines (DFSG) (see Annexure 2) which formed the part of this social contract It was initially designed as a set of commitments that user of Debian GNU/Linux system agree to abide by. In 2004, Open Source Initiative taking cue from earlier Debian Free Software Guidelines (DFSG) modified and adapted these terms for distribution of open-source software and published it under the head as 'Open Source Definition.' This was adopted by the free software community as the basis of the Open Source Definition to determine whether or not a software license can be labeled with the open-source certification mark. It stated that Open source doesn't just mean access to the source code. The distribution terms of open-source software must comply with the following criteria:

1) **Free Redistribution**

   The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale.

2) **Source Code**

   The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost preferably, downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately obfuscated source code is not allowed. Intermediate forms such as the output of a preprocessor or translator are not allowed.

3) **Derived Works**

   The license must allow modifications and derived works, and must allow them to be distributed under the same terms as the license of the original software.

4) **Integrity of The Author's Source Code**

   The license may restrict source-code from being distributed in modified form only if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The

license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.

5) **No Discrimination Against Persons or Groups**

The license must not discriminate against any person or group of persons.

6) **No Discrimination Against Fields of Endeavor**

The license must not restrict anyone from making use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business, or from being used for genetic research.

7) **Distribution of License**

The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.

8) **License Must Not Be Specific to a Product**

The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution.

9) **License Must Not Restrict Other Software**

The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.

10) **License Must Be Technology-Neutral**

No provision of the license may be predicated on any individual technology or style of interface.

15.10 EXAMPLES OF OPEN SOURCE SOFTWARE PRODUCTS

Many application software, operating system, Programming languages, Server software have so far being developed through the open source community initiative. Some of the well known examples of the software products developed by the open-source community are given below:

A) **Application software**

	Type	Functionality
1)	7-Zip	File archiver
2)	Blender	3D graphics editor
3)	Eclipse	Development environment comprising an IDE
4)	GIMP	Graphics editor

5)	Inkscape	Vector graphics editor for .svg
6)	Mozilla Firefox	Web browser
7)	Mozilla Thunderbird	e-mail client
8)	NASA World Wind	Virtual globe, Geobrowser
9)	OpenOffice.org	Office suite
10)	LibreOffice fork	Office suite

B) **Operating systems**

	Name	Type
1)	Ubuntu	Computer operating system
2)	FreeBSD	Operating system derived from Unix
3)	Linux	Family of Unix-like operating systems
4)	OpenIndiana	Free Unix-like operating system
5)	Symbian	Real-time mobile operating system
6)	ReactOS	Operating system built on Windows NT architecture
7)	Haiku	Free and open source operating system compatible with BeOS

C) **Programming languages**

Several scripting languages are also developed by open source community. These include Perl, Python, PHP, and Ruby, all of which can be used to help with systems administration tasks or create rich Internet applications. Sun released its Java language and JIT compiler under the GPL, for the use of the open source community.

	Name	Functionality
1)	PHP	Scripting language suited for the web
2)	Python	General purpose programming language
3)	phpMyAdmin	Database scripter's tools
4)	phpPgAdmin	Database scripter's tools
5)	Ruby	Scripting language
6)	Perl	Scripting language

D) **Server software**

	Name	Functionality
1)	Apache	HTTP web server
2)	Drupal	Content management system
3)	MediaWiki	Wiki server software, the software that runs Wikipedia
4)	MongoDB	Document-oriented, non-relational database
5)	Moodle	Course Management system or virtual learning environment
6)	WordPress	Blog software

E) **Database servers**

The open source community has two product MySQL and PostgreSQL in the database server category. Both of these are strong database servers that can handle heavy loads, supporting clustering and including a wide range of enterprise-level features:

	Name	Functionality
1)	MySQL	Database servers
2)	PostgreSQ	Database servers
3)	BIND(Berkeley Internet Name Domain)	Domain name server
4)	DJBDNS	Domain name server
5)	NSD	Domain name server
6)	Mysql Bind /unxsBind	DNS management software

15.11 TERMS USED IN OPEN SOURCE DEFINITIONS

1) Free software Definition

The Free Software Definition was given by Free Software Foundation (FSF) in February 1986. According to this foundation :

The word "free" in their name does not refer to price; it refers to freedom. It gives two freedoms.

First, the freedom to copy a program and redistribute it to your neighbors, so that they can use it as well as you.

Second, the freedom to change a program, so that you can control it instead of it controlling you; for this, the source code must be made available to you.

This definition was written by Richard Stallman to define and distinguish free software as a matter of liberty and not as free from price.

The modern definition has now four points starting from 0. It defines free software by whether or not the recipient has the following four freedoms.

Freedom 0: The freedom to run the program for any purpose.

Freedom 1: The freedom to study how the program works, and change it to make it do what you wish.

Freedom 2: The freedom to redistribute copies so you can help your neighbor.

Freedom 3: The freedom to improve the program, and release your improvements (and modified versions in general) to the public, so that the whole community benefits.

In order to have Freedoms 1 and 3 software supplier is required to make source code available to the user for studying and modifying software. It is practically impossible to modifying software without its source code.

In other words writers (Free Software Foundation) of the software grant permission to make and distribute verbatim copies of the software provided the copyright notice and this permission notice are preserved on all copies.

2) Debian's Open source definition (OSD)

The 'Open Source Definition' was used by the Open Source Initiative to determine whether a software license can be considered open source. The definition was based on the Debian Free Software Guidelines. This definition was not based on the four freedoms of free software from the Free Software Foundation.

3) Free Open Source Software (FOSS)

The Usenet posting in March 1998 find use of the term' free open source software' (FOSS). Again, it appeared on a Usenet newsgroup dedicated to Amiga computer games in February 2002. MITRE used this term in report entitled 'Use of Free and Open Source Software (FOSS) in the U.S. Department of Defense'.

4) Free/Libre/Open source software.(FLOSS)

The acronym FLOSS was coined in 2001 by Rishab Aiyer Ghosh for' free/libre/ open source software.' This term was used to avoid taking sides in the debate over whether it was better to say "free software" or to say "open source software". The European Commission (EC) also used this phrase when they funded a study on 'Impact of Free/Libre/Open Source Software on innovation'.

15.12 FREE SOFT WARE FOUNDATION V. OPEN SOURCE INITIATIVE

The key differences between the free soft ware foundation (FSF) and open source initiative (OSI) are their approach to copyright and appropriation in the context of usage. Some important difference between these approaches is given below:

Free Software Foundation (FSF)	Open Source Initiative (OSI)
1) Founded by Richard Stallman in 1984	Founded by Eric Raymond and Bruce Perens in 1998.
2) Free Software Foundation sees free software as distinct from open source.	Open Source Initiative see free software licenses as part of its broader category of approved open source licenses.
3) The primary obligation of users of free software licenses such as the GPL is to preserve the rights of other users under the terms of the license.	The primary obligation of users of traditional open source licenses such as BSD is limited to appropriation that clearly identifies the copyright owner of the software.
4) Such a license is focused on ensuring that users' rights to access and modify the software cannot be denied by developers who redistribute the software. The only way to accomplish this is by restricting the rights of developers to include free software in larger, derived works unless those works share the same free software license.	Such a license is focused on providing developers who wish to redistribute the software the greatest level flexibility. Users who do not wish to redistribute the software in any form are under no obligation.
5) Free software uses copyright to enforce compliance with the software license. To strengthen its legal position, the Free Software Foundation asks developers to assign copyright to the Foundation when using the GPL license.	Developers can modify the software and redistribute it either as source or as part of a larger, possibly proprietary, derived work, provided the original appropriation is intact. These appropriations throughout the distribution chain ensure the owners' copyrights are maintained.

15.13 IMPACT OF FREE/LIBRE/OPEN SOURCE SOFTWARE ON INNOVATION

In 2006 the European Commission (EC) funded study on the topic 'The impact of Free/Libre/Open Source Software (FLOSS) on innovation and competitiveness of the European Union'. UNU-MERIT Netherlands conducted this study and the report was prepared by a consortium of research institutions headed by UNU-MERIT's Rishab Aiyer Ghosh.

Studying the impact of FLOSS on European competitiveness in ICTs, this study observed that such software is of great importance to the digital industry in Europe and several other parts of the world. They find that it has already reached considerable market share in several fields, including web servers and operating systems. Considerable number of public and private sector organizations use at least some FLOSS products. Some of the important finds of this report are:

- FLOSS applications are top rung products in terms of market share in several markets.
- The existing base of quality FLOSS applications with reasonable quality control and distribution would cost firms almost Euro 12 billion to reproduce internally. This code base has been doubling every 18-24 months over the past eight years.
- The notional value of Europe's investment in FLOSS software today is Euro 22 billion (36 billion in the US) representing 20.5% of total software investment (20% in the US).
- While the US has an edge in large FLOSS-related businesses, Europe is the leading region in terms of globally active FLOSS software developers, and leads in terms of global project leaders, followed closely by North America. Asia and Latin America face disadvantages at least partly due to language barriers, but may have an increasing share of developers active in local communities.
- By providing a skills development environment valued by employers and retaining a greater share of value addition locally, FLOSS can encourage the creation of SMEs and jobs.
- Defined broadly, FLOSS-related services could reach a 32% share of all IT services by 2010, and the FLOSS-related share of the economy could reach 4% of European GDP by 2010.
- Though FLOSS provides ample opportunities for Europe, it is threatened by increasing moves in some policy circles to support regulation that seeks to protect old business models of creative industries, making it harder to develop new ways of doing business.

15.14 THE SOFTWARE FREEDOM LAW CENTERS

1) **The Software Freedom Law Center (SFLC) New York**

In 2005 professor Eben Moglen of Columbia University founded a Software Freedom Law Center (SFLC) in New York to provide pro-bono legal services globally to eligible non-profit open source software projects and developers. This centre provides legal representation and other law-related services to protect FLOSS. This Center has represented many of the most important and well-established free software and open source projects, including the Free Software Foundation, the Apache Software Foundation, the Gnome Foundation, the Samba Team, PostgreSQL, the Plone Foundation, Joomla!, and Drupal. This Law Center would serve as important support for the free and open source communities and for those that benefit from free and open source software in future.

2) **The Software Freedom Law Center New Delhi**

The Delhi centre of SFLC has been launched in 2010 to

- Provide free legal aid and prepare litigation defenses, in connection with the development, acquisition, distribution and usage of Free and Open Source Software.

- Organise and facilitate free access to computer education for slum children and slum dwellers.
- Facilitate the acquisition of free and open source software for the masses.
- Advocate against software patents.
- Organise seminars, conferences, workshops, interactive sessions for disseminating knowledge relating to legal issues concerning Free and Open Source Software among the masses.
- Engage in policy work at different Government levels, aiming to promote open standards, fair use provisions of copyright and protecting digital freedoms.

15.15 SUMMARY

Open source movement find it early usage as early as in 1950 and 1960 when IBM released its first operating systems and other programs in the SHARE user group that was formed to facilitate the exchange of software. Open source usage on Internet began when the Internet was just a message board. It has now progressed as an effective tool in sharing forms like a Web site. Consequently many Web sites, organizations and businesses organization are now promoting the open-source sharing of everything from computer code to mechanics of improving a product, technique, or medical advancement. The terms "FLOSS" and "FOSS" may have come under some criticism but movement of free sharing of information can be understood only with clearly understanding the terms 'free software' and 'open source.' The open source movement has contributed in development of various products which otherwise would have involved high cost and enormous efforts and time .The establishment of software Freedom Law Centers would provide support for the free and open source community for undertaking new projects for development of useful open source products in future.

15.16 TERMINAL QUESTIONS

1) Define open source?
2) Explain what is known as open source .Give examples of open source products ?
3) Explain the function and objectives of the establishment of The Software Freedom Law Centers?

15.17 ANSWERS AND HINTS

Self Assessment Questions

1) Refer to Section 15.6
2) Refer to Section 15.7

Terminal Questions

1) Refer to Section 15.9
2) Refer to Section 15.10
3) Refer to Section 15.12

ANNEXURE 1

Debian Social Contract

Social Contract with the Free Software Community

1) Debian will remain 100% free

We provide the guidelines that we use to determine if a work is free in the document entitled *The Debian Free Software Guidelines*. We promise that the Debian system and all its components will be free according to these guidelines. We will support people who create or use both free and non-free works on Debian. We will never make the system require the use of a non-free component.

2) We will give back to the free software community

When we write new components of the Debian system, we will license them in a manner consistent with the Debian Free Software Guidelines. We will make the best system we can, so that free works will be widely distributed and used. We will communicate things such as bug fixes, improvements and user requests to the upstream authors of works included in our system.

3) We will not hide problems

We will keep our entire bug report database open for public view at all times. Reports that people file online will promptly become visible to others.

4) Our priorities are our users and free software

We will be guided by the needs of our users and the free software community. We will place their interests first in our priorities. We will support the needs of our users for operation in many different kinds of computing environments. We will not object to non-free works that are intended to be used on Debian systems, or attempt to charge a fee to people who create or use such works. We will allow others to create distributions containing both the Debian system and other works, without any fee from us. In furtherance of these goals, we will provide an integrated system of high-quality materials with no legal restrictions that would prevent such uses of the system.

5) Works that do not meet our free software standards

We acknowledge that some of our users require the use of works that do not conform to the Debian Free Software Guidelines. We have created contrib and non-free areas in our archive for these works. The packages in these areas are not part of the Debian system, although they have been configured for use with Debian. We encourage CD manufacturers to read the licenses of the packages in these areas and determine if they can distribute the packages on their CDs. Thus, although non-free works are not a part of Debian, we support their use and provide infrastructure for non-free packages (such as our bug tracking system and mailing lists).

[Version 1.1 ratified on April 26, 2004. Supersedes Version 1.0 ratified on July 5, 1997.]

ANNEXURE 2

The Debian Free Software Guidelines (DFSG)

1) Free Redistribution

The license of a Debian component may not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license may not require a royalty or other fee for such sale.

2) Source Code

The program must include source code, and must allow distribution in source code as well as compiled form.

3) Derived Works

The license must allow modifications and derived works, and must allow them to be distributed under the same terms as the license of the original software.

4) Integrity of The Author's Source Code

The license may restrict source-code from being distributed in modified form _**only**_ if the license allows the distribution of patch files with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software. (This is a compromise. The Debian group encourages all authors not to restrict any files, source or binary, from being modified.)

5) No Discrimination Against Persons or Groups

The license must not discriminate against any person or group of persons.

6) No Discrimination Against Fields of Endeavor

The license must not restrict anyone from making use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business, or from being used for genetic research.

7) Distribution of License

The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.

8) License Must Not Be Specific to Debian

The rights attached to the program must not depend on the program's being part of a Debian system. If the program is extracted from Debian and used or distributed without Debian but otherwise within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the Debian system.

9) License Must Not Contaminate Other Software

The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be free software.

10) Example Licenses

The **GPL**, **BSD**, and **Artistic** licenses are examples of licenses that we consider free.

[Note The concept of stating our social contract with the free software community was suggested by Ean Schuessler. This document was drafted by Bruce Perens, refined by the other Debian developers during a month-long e-mail conference in June 1997, and then accepted as the publicly stated policy of the Debian Project.

Bruce Perens later removed the Debian-specific references from the Debian Free Software Guidelines to create The Open Source Definition.]

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