ANALYTICAL METHOD FOR EVALUATION OF IPRs

Y.V.S.T. SAI, IRS
DEPUTY COMMISSIONER OF INCOME TAX, HYDERABAD

1. INTRODUCTION:

Intellectual Property Rights (IPRs) are commercial and economic rights granted by the Society to inventors to provide incentive in return for sharing of the fruits of innovation with the society. Management of IPRs at the international level is mainly done by two organizations, WTO (World Trade Organization) and WIPO (World Intellectual Property Organization) in pursuance of agreements like Agreement on TRIPS and treaties like the Paris Convention, the Berne Convention, the WIPO Copyright Treaty, the Patent Law Treaty and the Patent Cooperation Treaty. The mission of these organizations and conventions does not simply stop at granting more and more protection to the inventor but extends to creation and dissemination of works of human mind for the economic, cultural and social progress of all humankind as expressed by WIPO in its mission statement **[1].** The stated aim of WIPO is to contribute to a balance between the stimulation of creativity worldwide, by sufficiently protecting the moral and material interests of creators, on the one hand, and the provision of access to the socio-economic and cultural benefits of such creativity worldwide, on the other hand. However, it is a widely felt concern that in process of granting of IPRs like patents and copyrights, presumptive recognition is given to the rights of the inventors, without seeking any obligation from his side in terms of proving perceptible benefits to the society.

For instance, patents are granted on all accepted applications for a uniform period (in most of the cases 20 years), On qualitative count also, all patents are treated as equal. With the current trend of internationalization, Patent Offices are burdened with the onerous task of distinguishing the products under application with those already available in the world on grounds of "novelty", "non-obviousness" and "utility". Ignorance of national patent examiners about conditions present in other parts of the globe and prior art, lack of technical capabilities to understand the intricacies, unavailability of data, lack of contesting claims

and time constraints may be some of the reasons, for the currently growing trend of grant of thousands of patents in USA that are trivial in nature and too broad in scope. In fact, instead of promoting innovation, such patents could scuttle innovation and hinder competition. Grant of patents on applications with no known uses for the intended products like some of the Genes are also a cause of moral concern. It is also felt that on several occasions, patents are just granted for "discovering" what already exists though it is not the intended purpose of the system. An example of lack of knowledge of prior art could be that of the patent examiners who granted patent on wound healing properties of turmeric. Even a small child in rural India would know that Indians have been using turmeric for thousands of years for wound healing. However, this may not be known to the patent examiners in USA because they are born and brought up in a different cultural milieu. India had to incur huge costs to fight a costly legal battle in this case, may be resulting just from the ignorance of patent examiners of USA. The case of patenting of "ayahuasca" herbal drink in USA as a novel product is another example. Shamans of Amazon basin were preparing this drink for ages and in fact it is part of their culture. It took eight years for the indigenous tribes to notice that such a patent was granted. On notice, they filed suit and even after a prolonged legal battle, they could not win the case. The patent system is being incapable of handling such situations is under crisis. Economists like Lester Thurow hav e expressed serious doubts about the efficacy of the patent system for ensuring a satisfactory rate of innovation at the lowest social cost. Thurow states that patent rights of equal effect and duration should not be granted to inventors who have made different contributions, some of them significant and others less so. He also expresses a concern that how it is possible to ensure that patents actually encourage, rather than hold back innovation **[2]**.

The present patent system, for historical reasons, is highly asymmetric and heavily oriented towards rights on the applicant. With sustained pressures from associations like Pharmaceutical Associations, Software Alliances and Motion Picture Associations, Patent Administrators are contemplating serious actions against alleged violators. At the same no obligation is sought from the inventor, to prove his claim of enormous benefits to the society. Besides, the system simply ignores the underlying contributions of society through prior art, public research and contributions of prior researchers which made the present

invention possible. The system also can't distinguish between utility value of the inventions. The present system offers protection for uniform period and uniform type to all the accepted applications, irrespective of the fact that some of the contributions could be path breaking and some may be too trivial. Distinguishing content and quality of the innovation and providing due recognition based on such distinction is vital for promotion of genuine creativity, which is the cherished dream of society. Further, recognition of the innovation does not merely stop with grant of rights to the innovator. It is the duty of the regulator to ensure that the fruits of the innovation reach the society to the maximum possible extent. Society should also derive maximum benefit in return to grant of monopolistic rights to an individual. Due recognition is also necessary for contributions prior art, traditional knowledge, public research and contributions of prior innovators. Then only, noble intentions and actions would flourish in the society. Innovators should realize that they need the society as much the society needs them. The relation should be based on healthy respect and not on considerations of individual profit and greed. At present, there is no such system in practice, which would conduct a holistic evaluation of IPRs.

Therefore, it is necessary to build an analytical and objective system which would grant due recognition to all aspects of IPRs. In the following sections, we try to explain the characteristics of such a system and try to evaluate such a system against documented data and present a model of IPR implementation based on such system.

2. ANALYTICAL SYSTEM FOR VALUATION OF INTELLECTUAL PROPERTY:

Value of the IP (Intellectual Property) content of an invention can be written as a function of value contributed by the applicant "inventor" who is claiming IPRs on the product and value of "prior art". Symbolically this can be denoted as:

$$V_{IP} = V_a + V_p \text{ Where;} \quad (1)$$

V_{IP} is the total value of the invention under examination, V_a is the value contributed by the applicant "inventor" and V_p is the value of the "prior art". What do we mean by the term value would be discussed in the next section. V_a in turn, is not an independent function and is an improvement over V_p, that is

$$V_a = f_a(V_p) \quad (2)$$

where f_a denotes innovation function reflecting value addition by the applicant "inventor".

Prior Art is again made of two components; one, the indivisible body of knowledge (including traditional knowledge and resources) that could be attributed to an entire community and second, divisible contribution of prior researchers that could be attributed to them individually. One can write:

$$V_p = V_i + V_d \quad \text{Where;} \tag{3}$$

V_i is the value of indivisible body of knowledge (including the traditional knowledge and resources) possessed by the community at large and V_d is the divisible contribution of value attributable to prior researchers. One can easily see that contribution of prior researchers also rests on the indivisible body of knowledge possessed by the society as a common resource and is an improvement of the body of knowledge. Therefore, one can write:

$$V_d = f_d (V_i) \tag{4}$$

Where f_d denotes innovation function reflecting divisble contribution by prior researchers to the body of knowledge and resources. Under conditions of linearity, a function representing addition of value may be described as:

$$f(V_i) = \psi * V_i \tag{5}$$

Where, ψ is a function representing component of value addition and $*$ represents symbol for multiplication.

It is not easy to categorize value addition functions like the one described above. Yet, one may attempt without much damage, to classify inventions in to broad categories. A simple division could be in to three categories, viz., "minor inventions" which add only a small incremental value to the existing body of knowledge, "normal inventions" which add moderate amount of value to the existing body of knowledge and "path breaking inventions" which transform the society and add value in exponential fashion. For the purpose of convenience of mathematical representation of innovation functions or value addition functions for the above three categories, We may choose ψ to be a Natural Logarithmic function to represent minor innovations, Linear function to represent normal innovations

and exponential function to represent path breaking innovations. Any one can choose other types of functions also depending on the suitability to the situation.

Using equations (2) to (4), We can write equation (1) as:

$$V_{IP} = V_i + f_d(V_i) + f_a(V_i + f_d(V_i)) \quad (8)$$

This means that new knowledge arises from existing body of knowledge and resources only , however strong or weak, the link between both would be. This also proves that "inventor" needs the society as much the society needs him. Now let us assume that α and β denote functions of value addition to represent divisible additions made by prior researchers over the indivisible body of knowledge (improvement from V_i to V_p) and value addition made by applicant inventor on "prior art" (improvement from V_p to V_a) respectively.

From the above, we can write equation (8) as:

$$V_{IP} = V_i (1+ \alpha + \beta + \alpha * \beta) \quad (9)$$

From the above equation, it is evident that the final value would contain independent addition terms arising from the present applicant inventor and also due to the divisible contributions of prior researchers as well as addition due to the product of contributions from the present applicant and divisible contributions from previous researchers. All these terms operate on the indivisible body of knowledge available to the community. With the value addition functions, α and β independently capable of exhibiting different behaviours (say M number of types in case of α and N number of types in case of β) , a MXN matrix of classification of inventions could arise .

Measures of innovation change from society to society and nation to nation and one can select suitable functions for α and β to categorize inventions in to the three types of minor, normal and path breaking. If one is "innovative" enough to identify suitable value addition functions, he/she could maintain a fine distinction amongst several categories of inventions. This may depend on the need of the hour and degree of minuteness with which one can measure characteristics of the innovation function.

A general type of innovation function can be deemed to exhibit exponentially varying behaviour and the value addition function could be defined as

$$\psi = e^{\gamma * V} \qquad (10)$$

Where γ denotes the coefficient of innovation. It may be trivial to say, but as γ tends to be zero, the addition to the existing body of knowledge would be nil. Once, we are in a position to distinguish path breaking inventions from minor ones, then we are in a position to apply yardsticks of social benefit on them so that society can choose to offer suitable degree of protection either in terms of period of monopoly or monetary incentive or any other form of protection or compensation to the inventor.

A table of classification of inventions could be prepared from the theoretically computed values of coefficient of innovation. A sample table classifying the inventions into three categories is given below.

TABLE 1: SUGGESTED RANGE OF COEFFICIENTS OF INNOVATION TO CATEGORIZE INVENTIONS

TYPE OF INVENTION	BENEFIT DUE TO ADDITION OF NEW VALUE	RANGE OF COEFFICIENTS OF INVENTION (γ) (derived from $\psi = e^{\gamma * V}$)
Minor	0 to 1 %	0 to 0.1
Normal	> 1 % to 100 %	> 0.01 to ~ 0.7
Path Breaking	> 100 %	> 0.7

Further classification of inventions would also be possible based on the regulatory approach to IPR mechanism which could vary from country to country depending on the socio-economic conditions or an internationally accepted common classification could be derived by international bodies like WIPO or WTO.

3. IDENTIFICATION OF VALUE AND DETERMINATION OF COEFFICIENT OF INNOVATION:

Traditionally income approach, cost approach or market approach are followed in valuation of IP **[3]**. The income approach, which is the most commonly used method, considers the present value of future cash flows to the IP's owner. The cost approach considers the cost to replace or re-create the IP, and the market approach considers the prices obtained in sales, licensing, or royalty agreements for comparable assets in the marketplace. In working out the cash flows, or costs, or prices referred above, information on expected use of the customer is required.

For our purpose, Value addition has be viewed from two angles. From the angle of the inventor, costs incurred by him as direct costs, overheads, opportunity costs in the R&D effort to develop the product would have to be included in the value addition. Apart from this, the inventor would also like to bring in certain speculative component, as reward to the invention. Value addition should also be viewed from the angle of benefit conferred by the inventor on the society. In case of new machines or new utility apparatus, the measurement of value could be in terms of expected new benefits that would be conferred to the society in terms of improvement in accepted yard sticks like rise in existing levels of income, value addition through improvement of skills and so on. In case of items like drugs and pharmaceuticals, the benefit could be in terms of savings of costs imposed by the present methods of medicare. That is benefit is measurable in terms of positive contribution or in terms of savings through removal of negative contributions.

IPRs are commercial rights conferred by the Society on the inventor and therefore, it would be of paramount importance to the society to know what it gets in return for what it is conceding. As referred in traditional valuation methods described above, it is necessary to obtain information on expected use of the customer. The customer being the society here, one should find out, what kind of monetarily quantifiable economical and social benefits would arise out of the invention and what is the sum benefit in monetary units.

Value of invention lies in the utility value of the product to the society. Therefore, it is not very difficult to find out the value of quantifiable benefit to be conferred on the society on account of the invention. For example, quantifiable benefits from the invention of a new drug could be in the form of:

- Value of prevention of deaths;
- Savings in the forms of hospitalization times;
- Savings in the form of elimination of need for costly surgeries; or
- Savings in the form of increase days of productive work which would otherwise have been spent at Hospital;

Out of the above, value of prevention of death could be quantified in terms of

- Modal value of life insurance policy in the population in a particular area or
- Most common amounts of solatium paid in the area by courts in case of accidental and unnatural deaths or
- Ex-graita payments granted by Government in case of loss of death in calamities

In the USA, several studies are conducted on regular basis to assess the benefits of new drugs and treatment procedures and data for the above purpose could be gathered from these studies. In countries like India also, similar studies have to be conducted to gather such data. Some of the sample data is shown in Table 2 below.

TABLE 2: EXAMPLES IN SAVINGS OF COSTS IN MEDICAL EXPENDITURE IN USA THROUGH USE OF NEW DRUGS [4]

Item	Present costs and estimated savings in terms of preventing death, disability, hospitalisation and nursing home care due to new drugs
Heart stroke	Savings of $ 4400 per person on account of disability, hospitalisation
Clot Busting drugs	Savings of $ 6.1 million per thousand treated patients
Ulcer treatment	Savings of $ 224 million
Flu	$285000 saved by Virginia medical program by school vaccination
Chicken pox	Present costs per person are $90 for medical costs and $ 439 for loss of work. With the use of drugs $98 are medical costs and $ 48 lost for loss of work per person. Total savings can be about $ 391 million
Asthma	New corticosteriod therapy saved 24 % of health care costs
AIDS	Savings in treatment cost due to new drugs per patients $8000 per year.
Cancer	Hospitalisation costs per patient reduced from $85000 to $ 55000 with G-CSF (Growth Colony Stimulating Factor)
Migraine	Employers saved $435 per month per employee treated with new drugs
Depression	Affects 18 million persons. Present costs are $ 70 billion. Medical costs declined by $822 per year due to new prescriptions
Hay fever	Affects 13 million persons causing loss of 7.8 % in productivity. Switch from sedating to non-sedating histamines increase productivity by 4.6 %
Routine Influenza	Vaccination can save $ 1.3 billion dollars, Survival rates increase by 22%
Breast Cancer	Surgery costs $ 14000. Cost of surgery avoiding anti-cancer oral drug $1,050.
Multiple Sclerosis	Affects 350000 persons. Present costs are $38 billion, 71 % of the patients are out of work force due to this disease
Arthritis in women	Affects 26 million persons. Present costs are $65 billion. New drugs with no side effects prevent about 7500 deaths every year caused by side effects.
Heart failure	Pills can prevent 50,000 to 100,000 deaths per year. 62 ACE inhibitor drugs save $ 9000 in hospitalisation costs. Total savings $ 2 billion

Based upon the expected benefits that could be conferred by the invention to the society, we would be in a position to categorize the invention into a particular class. Expected benefits could be valued based on data gathered during the trials before making the invention open to the society. In case of drugs, it could at the stage of clinical trials or commercial trials. In case of manufactured products, data could be gathered during trial runs of the machine or utility apparatus. Based on value addition, coefficient of innovation could be derived and the innovation could be placed in a specific category (for instance minor, normal or path breaking). In a forthcoming paper, the authors would try to evolve a scale for categorization of innovations, by creating a reference table against the inventions over which IPRs are already granted in the past. However, a word of

caution to be struck here is such scales could vary from place to place and time to time. International bodies like WIPO and WTO could at best make efforts to maintain a commonly accepted scale containing a minimum number of categories.

4. DURATION OF TERM OF PROTECTION AND DYNAMIC EVALUATION OF IPR:

Once, it is possible to place the invention in a particular category, the term of protection of IPR (patent, copyright etc) could be easily determined. For example, a National Patent Authority may like to grant a term of 3 years to minor inventions, 7 years to normal inventions and 20 years to path breaking inventions. Each class of invention would be entitled for a fixed duration of term of protection. Bodies like WIPO could also evolve internationally accepted norms of duration so that universal acceptance could be gained. Objective determination of duration of protection for a particular class of invention could be finalized after considering benefits conferred by similar inventions in the past.

The job of the regulator would not end after granting a fixed term of protection for the IP. At the time of renewal (say once a year), the actual benefits conferred by the invention to the society should be measured and if the invention is found to be more beneficial, it could be moved into a higher category. In case, the actual benefits fall short of expectations, the invention should be moved into a lower category and the term of patent should be reduced as per entitlement in the new class. If the invention already enjoyed maximum term available for the new class into which it moved in, then the protection should be stopped. This would safeguard the system against exaggerated and false claims. However, unscrupulous persons can get away for at least one year, if no penalty is levied against false claims. Therefore, provision for stiff penalty should be available to deal with false and exaggerated claims and yard sticks to determine what is a "false claim" and what is an "exaggerated claim" have to be evolved. Unfortunately, the present system presumes a right to the inventor without any obligation on his part or penal consequences to him in case of falsity or exaggeration.

5. BENEFITS OF ANALYTICAL MODEL OF CLASSIFICTION OF PATENTS:

The above proposed method of evaluation of IPRs is a distinct improvement over the present method of evaluation in terms of; classification of innovations in to various categories, allows objective considerations to dictate grant of IPRs, dynamic evaluation of IPRs and act as deterrent to false or exaggerated claims. In case of areas like Pharmaceutical industry, this method can show perceptible benefits both to the industry and to the consumers. If we allow evaluation of the IPR to vary from country to country and region to region based on considerations of homogeneity, benefits caused to independent nations can be quantified separately and the innovator could obtain protection from each National Authority in commensuration to the return he is providing to that nation. This would definitely sort out pricing issues. If the inventor wishes to show maximum benefits to the society, then he is bound to price the product at an "optimum" level because that is the point at which maximum benefits would be conferred on the society. It may be mentioned here that protection to IPRs could be viewed as akin to taxation levied by governments and Tax Revenues are known to follow the "Laffer Curve". The "Laffer Curve" for drugs and pharmaceuticals is also bound to yield maximum returns both to the industry and the society at an "optimum" price for which no one should have an objection. In such a case, inventors would be keen to adopt alternate strategies suggested for improving access of the poor to medicines **[5]** like differential pricing policies, voluntary licensing agreements, sales to governments at bulk discounts, involvement in charitable efforts through donation of medicines because they would like to get a longer duration of protection for the invention by conferring larger quantum of benefits on the society. Therefore, there is an inbuilt incentive for industry. From the angle of Nations or Societies, each Nation or Society would be conceding benefits commensurate only to the extent of benefits received by it. Therefore, developing countries need not worry about grant of patents on trivial and frivolous counts to inventors of developed countries, because they would not be granting equal degree of protection on the ground of commensurate benefits for them being small.

6. LIMITATIONS OF THE STUDY AND CONCLUSIONS:

The above study proposes an analytical method, which is flexible, dynamic and capable of adaptation to heterogeneous situations. Through this method, is possible to classify inventions into various categories and advocates different scales of protection to IPRs in terms of say duration of grant of patents based on the class to which the invention belongs. There is no universal classification of inventions and classification may vary from place to place and time to time. The study is therefore limited to that extent and advocates a scale of common minimum categories for universal acceptance. Evolution of such class of inventions is postponed to further study. The study also proposes a method for evaluation of IPRs to offer different time durations of protection commensurate to benefits conferred on society from time to time. The evaluation is also dynamic with flexibility to re-classify the inventions and there by capable of changing the period of protection. The method is dynamic in spatial terms also as it permits separate evaluation of benefits conferred on each nation or homogenous region, so that the nation or region's obligation could be limited only to the extent of benefit derived by it. This would remove anomalies of the present system and introduce an inherently efficient system and removes the asymmetry. The study also proposes safeguard mechanisms so that society is guarded against possible false and exaggerated claims. The method also would increase incentives for industry to follow alternate strategies like differential pricing, voluntary licensing, sale to government at bulk discount, and donation of medicines because inventors would like to get a longer duration of protection showing larger quantum of benefits on the society.

REFERENCES

1. WIPO Intellectual Property Handbook: Policy, Law and Use, WIPO Publication No. 489(E), ISBN 92-805-1004-8, WIPO, 34 chemin des Colombettes, 1211 Geneva 20, Switzerland, 2001.

2. Thurow Lester, “Needed: A new system of intellectual property rights, Harvard Business Review, September-October, 1997

3. Blakely Beth, "Accurately pricing your intellectual property", CNET Networks, Inc., available at www.TechRepublic.com, Sep 5, 2002

4. "The Value of Medicines", Report available at web site www.Phrma.org, Pharmaceutical Research and Manufacturers of America, 1100, 15th Street, NW, WASHINGTON , DC, 2001.

5. Report of the Workshop on differential pricing and financing of essential drugs, WHO and WTO Secretariats, 8-11, April, 2001, Høsbjør, Norway

This document was created with Win2PDF available at http://www.daneprairie.com.
The unregistered version of Win2PDF is for evaluation or non-commercial use only.