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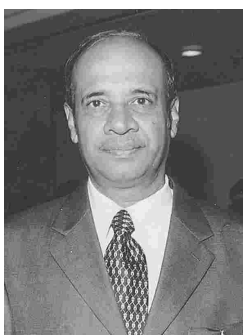
**Ad(d)venture with
Knowledge....
Stepping ahead with
Intellectual Property Rights**

Prof. Prabuddha Ganguli



UGC Golden Jubilee Lecture Series

Chairman's Foreword



The University Grants Commission, an apex body of higher education responsible for the coordination, determination and maintenance of standards of university education in India, is celebrating its Golden Jubilee Year during 2002-2003. As part of the academic activities the UGC has conducted the 'Golden Jubilee Lecture Series' throughout the country by eminent individuals who have excelled in their respective fields and made a mark not only in India but abroad too. These Lectures have mostly been organized in Universities located in remote areas. The basic concept behind organizing these Lecture Series was to bring UGC closer to students, teachers and intelligentsia in that region. It is hoped that these luminaries including academicians, scientists, social scientists and others, with their rich and varied experiences have motivated and enabled the youth of the country to understand things in better perspective.

To reach out to a wider audience, the UGC is presenting these lectures in the form of Golden Jubilee Lecture Series Booklets. I hope students, teachers, educational administrators and the general public at large, will benefit from the vast repository of knowledge of these achievers.

A handwritten signature in black ink, appearing to read 'A. Nigavekar', with a stylized flourish at the end.

Arun Nigavekar

Introduction

This lecture was delivered by Prof. Prabuddha Ganguli at the University of Bhavnagar, Gujarat, India on 13 November 2003 as part of UGC's Golden Jubilee Lecture Series.

Human society has witnessed adventure with knowledge resulting in scientific understanding of the secrets of nature and converting them into technological innovations resulting in metamorphosis of our lifestyles and living. The unprecedented Mind-Machine interface has placed society on a discontinuous trajectory to a future limited only by human imagination and ability to convert then into reality. Societal progress is catalysed by competitiveness resulting from effective overlapping domains of knowledge, creativity, vision and action leading to innovations for rapid diffusion in public domain.

As well-springs of human resource and knowledge our universities with the educational institutions not only have to uphold their primary mission of excellence but also organically nurture the spirit of venture to create responsible partners in the value chain for societal growth.

Knowledge Dynamics... evolving dimensions

Experience of the last few decades has unequivocally established a near coalescence of the generative, application and trading phases of knowledge. Intersection of seemingly unconnected and diverse fields in science and technology have given birth to unforeseen interfaces creating convergence technologies spanning developments in Biotechnology, IT, telecommunications, smart materials, etc.

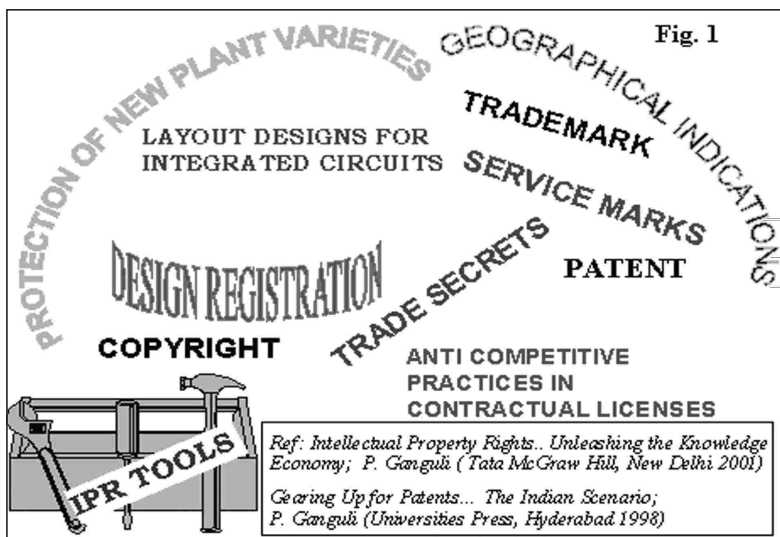
The need to “ad(d) venture” with knowledge is being felt more than ever before. We therefore need realistic legal frameworks that would nurture innovation, provide for ownership of knowledge, facilitate fearless knowledge sharing / transfer / rejuvenation, encourage fair benefit distribution between the innovators and society resulting in enhanced trade and societal advancement. Appreciation of the issues of knowledge ownership and IPR linked issues are now beginning to take a center stage in all knowledge linked activities.

As the knowledge space gets segregated into aggregates of proprietary domains and non-proprietary domains, contemporary knowledge of “prior art” becomes an imperative to ensure that one is either not trespassing into “someone’s owned knowledge space”. It may be realized that when confronted with infringement claims results could be expensive and disastrous. There is no excuse for ignorance of the consequences of IPR!

The academic world has now to come to terms with such realities of knowledge dynamics. Global outsourcing of expertise, cost effective manufacturing, distribution of products and services are new emerging avenues for institutions to establish and foster collaborative linkages in research, contract research, sponsored collaborations, working in cross-functional teams culminating into industry-university joint projects. Working with high-tech companies also involves developing complex licensing agreements. Time is knocking at our institutional doors to evolve effective means of transfer of house-grown technologies to the industry.

Faster innovations, knowledge ownership and its strategic management are assuming crucial dimensions demanding reengineered thinking, newer organisational turf in academics and enterprises for speedy value creation, wealth generation and wealth realization. To meaningfully participate in such activities, academic institutions of today and tomorrow will have to develop among other professional expertise, 21st century techniques in knowledge engineering, information metering, institutional management of their intellectual property with targeted strategic IPR portfolio, transferring intellectual property rights appropriately at optimum value to commercial enterprises.

Figure 1 outlines the various tools of IPR that are used to protect innovations.



Multilateral, Regional and bilateral trade agreements between nations are beginning to influence global generation of knowledge and its movement across borders. Trade Related Intellectual Property Rights (TRIPS) as a part of the bag of 60 agreements within the framework of the World Trade Organisation (WTO) makes it obligatory for the IPR laws in member countries to comply with minimum standards agreed as part of the TRIPS agreement.

IPR Tools and What They Protect

Patents	Protect inventions that are novel, non-obvious and useful. Patents have a term of 20 years from the date of filing a complete specification.
Trademark and Service Mark ® ™	Protect distinctive marks such as words/signs including personal names, letters, numerals, figurative elements (logos), visually perceptible 2D or 3D shapes or their combinations capable of distinguishing the goods or services in connection with which it is used in course of trade. In some countries sounds and distinctive smells can also be registered as trademarks. It can be perpetually renewed from time to time.
Industrial Design Registration	Protect novel non-functional features of shape, configuration, pattern, ornamentation or composition of lines or colors, applied to any article either in two or three dimensional or in both forms by any industrial process or means whether manual, mechanical or chemical, separate or combined which in the finished article appeal to and are judged solely by the eye. This registration has a specific term (initially 10 years and renewable for another term of 10 years).
Copyright ©	Protect creative works that are musical, literary, artistic, lectures, plays, art reproductions, models, photographs, computer software, etc. It is valid for the lifetime of the author and minimum 50 years after the death of the author.
Layout Designs for Integrated Circuits	Scope of protection not only includes the protected chip but also the articles incorporating it. The term of protection is 10 years.

Geographical Indications (GI)	Protect the distinctive names of goods that can be identified as originating or manufactured in the territory of a country, or a region or locality in that territory where a given quality, reputation or other characteristic of such goods is essentially attributable to its geographical origin. The term is initially for a period of 10 years and can be renewed perpetually.
Trade Secrets and Undisclosed Information	Protection to persons/institutions on information lawfully under their control from being disclosed to, acquired by or used by others without their consent in a manner contrary to commercial practices so long as the information is secret and has commercial value because it is secret.
Competitive Practices in Contractual Licenses	Protection against incorporation of restrictive clauses in licensing deals such as exclusive grant back conditions, conditions preventing challenges to validity and coercive package licensing, etc. that may have adverse impact on trade and impede transfer of technology.

The implication of **GI as an IPR instrument** is that it gives rights to the people who produce these products in a specified region to stop others from using the geographical name in marketing the produce which does not originate from that defined area. Examples of such products are wines, champagne, cognac, port, sherry, etc. This has been effectively exploited in Europe but is yet to be put into practice in developing nations where traditional goods (agricultural and non-agricultural) have been in existence for centuries. The provisions are yet to be effectively explored by governments in most developing countries. It may also be noted that once the geographical indication has been registered in a country one must proceed to have it internationally accepted so that it is globally recognized as a geographical indication.

A few examples of geographical indications (GI) that are protected in various countries will help appreciate the concept [source: <http://www.wto.org/wto/new/pu101298.htm> and : *"Intellectual Property Right -- Unleashing the Knowledge Economy"*; P. Ganguli (Tata McGraw-Hill New Delhi 2001)]

<i>Bulgaria</i>	192 local appellations of origin registered, e.g. Bulgarian yoghurt, Traminer from Khan Kroum (wine), Merlou from Sakar (wine)
<i>Canada</i>	Canadian Rye Whisky, Canadian Whisky, Fraser Valley, Okanagan Valley, Similkameen Valley, Vancouver Island
<i>Czech Republic</i>	Beers: Pilsen, Budweis Others: various wines, liqueurs, Saaz hops, Auscha hops, Jablonec jewellery, Bohemia crystal, Vamberk lace
<i>European Union</i>	Wines: Champagne, Sherry, Porto, Chianti, Samos, Rheinhessen, Moselle Luxembourgise, Mittleburgenland Spirits: Cognac, Brandy de Jerez, Grappa di Barolo, Berliner Kummel, Genievre Flandres Artois, Scotch Whisky, Irish Whiskey, Tsikoudia (from Crete) Other products: Newcastle brown ale, Kentish ale, Kentish strong ale, Rutland bitter, Gloucestershire/Herefordshire/Worcestershire cider/perry, Scottish beef, Orkney beef, Orkney lamb, Jersey Royal potatoes, Cornish Clotted Cream, Cabrales, Roquefort, Gorgonzola, Aziete de Moura, Olive de Kalamata, Opperdoezer Ronde, Wachauer Marille, Danablu, Lubecker Marzipan, Svecia, Oueijo do Pico, Coquille Saint-Jacques des Cotes-d'Amour, Jamon de Huelva, Lammefjordsgulerod.
<i>Hungary</i>	Ger (wine), Szatmar (plum)
<i>Liechtenstein</i>	Malbuner (meat products), Balzer (Hi-tech products)
<i>Slovak Republic</i>	Korytnicka mineralna voda (mineral water), Karpatska perla (wine), Modranska majolika (hand-painted pottery), Piest'anske bahno (healing mud)
<i>United States</i>	Idaho, (potatoes and onions), Real

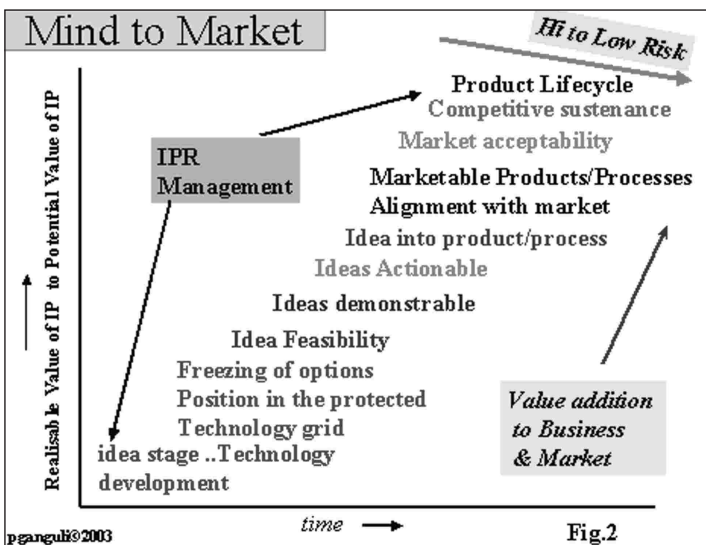
California Cheese, Napa Valley Reserve (still and sparkling wines), Pride of New York (agricultural products), Ohio River Valley (viticulture area)

GI can become a very powerful competitive tool for the communities to collectively get involved in manufacturing and marketing of agricultural goods, foodstuff, handicrafts, traditional arts, etc. In India this area of IPR is yet to be developed and exploited. We should be able to protect our traditional goods and distinctive produce such as Darjeeling Tea, Basmati rice, Cashmere Shawls etc to maximize the value of these products and derive appropriate returns in the global markets.

Integrating IPR with the Innovation Process

Innovations are creations of the mind and their protection using the tools of IPR convert them to intellectual property thereby effectively convert them to intellectual assets that have a potential and realizable value, It should be appreciated that that the realisable value of IP to the potential value of IP increases as the innovation moves up the value chain. The various features of such a value chain as mind goes to market are reflected in the figure 2.

Figure 2



The challenge is to design and operate institutional innovation processes that would preserve intellectual excellence and at the same time be amicably fit into a disciplined formal IPR management system. Such a jigsaw fit would create a platform for our theme “Ad(d)venture with Knowledge Stepping ahead with Intellectual Property Rights”.

Making inroads in the pathway from concepts to markets with proper protection of IPR involves systematic mapping of knowledge ownership grids, planning strategic technology options for research projects and identification of business opportunities, negotiating contracts with prospective funding

agencies and beneficiaries, followed by a set of cascading events such as research reviews, IPR filings, exploring early transfer of technology, licensing, marketing tie ups progressing projects through possible joint developments, etc.

In issues related to traditional knowledge the challenge is to create appropriate frameworks for *extensive use of traditional knowledge* with fair benefit sharing arrangements between the beneficiaries of the knowledge and the communities who have evolved and preserved the knowledge

An area of immense significance is effective utilization of IPR information that is available in the public domain. A major weakness in our educational system is low or no awareness of the strengths of the patent information system. Most researchers and businesses do not have the awareness or competence to use the information that is in patents for their research or business planning activities. Most often it has been noted that researchers have unknowingly repeated work that has already been reported in patents.

For example a patent is one of the most well structured document in which inventions covering all fields of technologies is first reported and archived in organized databases in a classified manner so that they can be easily be retrieved. It is the largest single source of technical information. It is also well accepted that more than 80% of the technical information covering inventions are reported only disclosed in patents and are not reported elsewhere.

Patent information can be used for strategic protection of ones innovations, blocking competitors & ensuring freedom to use inventions. Further it can be used as a rich source of technical information and prevent duplication of efforts if the problems have already been solved, identify emerging technologies, research areas, business opportunities. It can also be used as an enabler for possible collaborators, plan business mergers, strike strategic alliances etc.

It may be noted that under certain conditions the information in patents can be used freely by anyone without paying any royalties or compensation to the patent applicant or patent holder. It is well established that less than 10% of the granted patents are commercialized around the world. Similarly several

patent applications are not taken to the granting stage after they are published in the gazettes. More than 50% of the patents granted in various patent offices around the world are not kept live till the end of their term for non-payment of the annual renewal fees. Such patents become open to the public for use without any obligation of licenses, royalty etc. R&D workers and businesses should be able to effectively exploit this rich technical information source for their product / process, business development and a strategic business planning tool. As patent rights are territorial, the businesses can find out the countries in which the patents have been granted with respect to a product or process and plan their business to avoid those countries for marketing and exploit markets where the patents on these products/processes are not granted. The next few charts illustrate the power of patent information.

Charts illustrating the power of patent information.

<p style="text-align: center;">PATENTS..... INFORMATION MINE</p> <p>BIBLIOGRAPHIC</p> <ul style="list-style-type: none"> . TITLE . INVENTOR . APPLICANT . APPLICATION NO. . SERIAL NO. OF PATENT . DATE OF APPLICATION . PRIORITY DATE . COUNTRY OF PUBLICATION . PRIORITY NO. . PRIORITY COUNTRY . REFERENCES CITED BY EXAMINER . ABSTRACT . NATIONAL PATENT CLASSIFICATION . INT. PAT. CLASSIFICATION 	<p style="text-align: center;">PATENTS..... INFORMATION MINE</p> <p>TECHNICAL</p> <ul style="list-style-type: none"> . OBJECT OF INVENTION <i>The problem one is attempting to solve</i> . PRIOR ART <i>How others have approached the issue or related issues. References are made to the entire "public knowledge domain" including patents, scientific literature, prior use, sale, publicity brochures, news items etc.</i>
<p style="text-align: center;">PATENTS..... INFORMATION MINE</p> <p>TECHNICAL</p> <ul style="list-style-type: none"> . DISCLOSE/DESCRIBE INVENTION <i>... a approach and what is the solution</i> . EXAMPLES WITH SUPPORTING DATA <i>... examples to illustrate working of the invention so that anyone trained in the art can repeat the invention</i> . CLAIMS DEFINING THE MONOPOLY <i>... define the protection boundaries invention</i> 	<p style="text-align: center;">PATENTS..... INFORMATION MINE</p> <p>LEGAL</p> <p>DEALS WITH OWNERSHIP ISSUES</p> <ul style="list-style-type: none"> . ASSIGNMENTS . REASSIGNMENTS . LICENSING . VALIDITY . EXPIRY . GEOGRAPHICAL COVERAGE OF PROTECTION ... OVERLAPPING CLAIMS

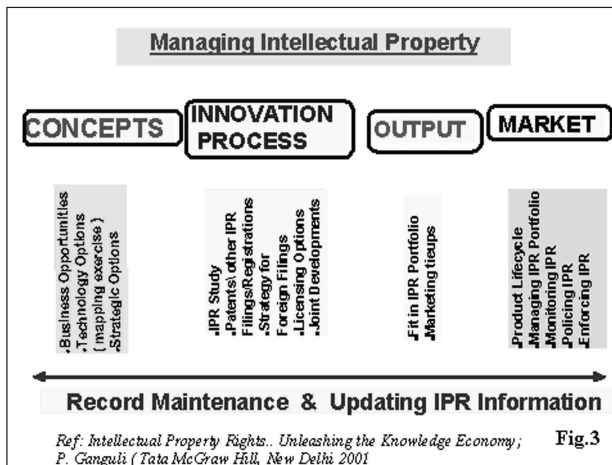
Ref: "Intellectual Property Rights.... Unleashing the Knowledge Economy"
Prabuddha Ganguli; Tata McGraw Hill (New Delhi) 2001

The concept of International Patents Classification (IPC) and the US Patents Classification as subject descriptor codes are of immense significance in the field of patent information and structured searching. For example as per IPC the area of Human Necessities is classified under "A". In this Agriculture is classified under " A01", Food Stuff under " A21-A23", Tobacco under "A24", etc. Subjects within these areas are further classed under sub-classifications. The databases have the patents classified and indexed with respect to these codes so that searches can be conducted using the IPC codes or the US classification codes. The classification system adds classes to its list from time to time to accommodate newer areas of technology as they evolve.

There are several patent information databases in the Internet that can be accessed free of cost. Some of them are the USPTO (www.uspto.gov) , Espacnet (www.european-patent-office.org), WIPO (www.wipo.int), etc. There are several paid databases that provide structured patent information such as the STN, DIALOG, etc.

The innovation process is followed by the output and the market phase that involves complex decision making based on product life cycles, fit of the acquired IPR into the existing portfolio, expenditure on maintenance of IPR, policing, enforcement etc. The sequential process is depicted in figure 3 and must the management and value addition and realization is based on the value chain presented in figure 2 as mind goes to market.

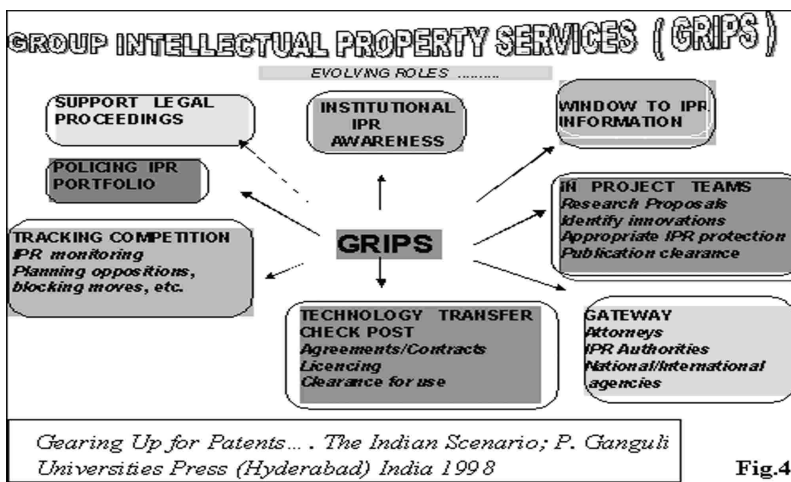
Figure 3



Management of IPR therefore involves innovation and IPR capability development with the creation and implement organisational IPR Policies through targeted IPR servicing cells within the organisation. Such a servicing cell has a comprehensive and coordinating role and is represented in figure 4.

One of the major challenges is to develop and train techno-legal manpower to manage such servicing cells and this should be a priority thrust area for Governments, Human Resource Development Organisations, Technology, Business Management and Law Schools especially in developing and least developing counties.

Figure 4



A few illustrations

The Bayh-Dole Act and its impact on Universities in USA

In the USA, one of the earliest attempts to sensitize and enhance economic utility of academic research was the passage of the Bayh-Dole Act (Public Law 96 - 517). It allows institutions to own the patents that arise out of federally sponsored research (The Rise of IPR in the American University: L. Nelsen, Science, 279, no.5356, 1998). Under this act the universities would not only develop patented technologies, but could license the patents to industry. A provision of the law allowed the universities to retain royalties from such licenses and specified that a fraction of the royalties would be shared as personal income to the inventors. The impact of this Act was that the US patents granted to American Universities rose from 300 in 1980 to 2000 in 1995. Universities granted around 5396 licenses between 1991 and 1995. More than 250 new companies were formed directly through university licenses in 1996 and a total of 1900 companies since the inception of the Bayh-Dole Act in 1980.

The Bayh-Dole Act also catalysed a new approach to the management of science and technology with the setting up of Offices of Technology Transfer (OTT), Offices of Technology Licensing (OTL), etc to act as effective interfaces between the university and the society. The Association of Technology Managers (AUTM) in North America is a body that provides a platform for sharing of experience and knowledge between the various OTTs and OTLs. It also provides guidance on formats for MOUs, licensing agreements, Confidentiality Agreements, IPR Policies, etc.

Figure 5 lists the revenues generated and realized by some of the universities in the USA

Top university-owned patents by revenue generation				
University	Top-selling product	Pharmaceutical partner	Revenue earned in 1997-1998 (\$m/Revenue)	Gross revenue from all licensed patents in 1997-1998 (\$m/Revenue)
Florida State University	Taxol (cancer)	Bristol-Myers Squibb	45	57.3
Stanford University	Recombinant DNA Technology	Non-exclusive license	38.5	43.2
University of California	Hepatitis B vaccine	Merck & Co.	36.1	88.5
Yale University	Zidit (HIV)	Bristol-Myers Squibb	28.2	36
Columbia University	Xalatan (glaucoma)	Pharmacia & Upjohn	26(2001)	61.4; 96(2001)
University of Florida	Trusopt (glaucoma)	Merck & Co.	15.5	19.1
Michigan State University	Cisplatin, Carboplatin (cancer)	Bristol-Myers Squibb	24.3	24.3

Source: Nature Biotechnology, Volume 19, September 2001, Page 882

Fig.5

The US model is amenable to adaptation in other countries.

Valuation of early Technology and commercialization

In January 2000 PPL Therapeutics, with Roslin Institute and Geron Corporation were granted two UK patents covering [March 2000 Volume 18 Number 3 pp 256 – 257] for the methodology of nuclear transfer using a quiescent donor cell to produce cloned nonhuman animals and animal (human or nonhuman) cells (GB2318578), as well as the embryos, animals, and cell lines made using the technology (GB2331751). This technology resulted in the world's first cloned animal (the sheep Dolly). In principle this technology does enable the cloning of a human embryo (and its growth to an early blastocyst stage) and the UK patent grants rights of ownership to those embryos. Geron Corporation paid US \$ 46 million to buy off the two filed patents and set up a JV with the Roslin Institute.

This is a good example of valuation of early technology and the commercialization of filed patents at the appropriate stage of the innovation process depicted in figure 3.

Litigation as a business strategy

Litigations in the IPR vary from challenging the validity of any IPR such as a registered trademark, design, patent copyright etc that potentially could interfere with an organizations innovation process or business interest to enforcement of the rights in case of infringement. In such cases an important issues is a process of due diligence, record keeping etc so that appropriate evidence can be led in the course of the proceedings. Valuation of the IPR is equally important to arrive at a fair and acceptable value for the damages or loss to business injury caused to the organization due to the proceedings.

A few examples will illustrate the power of IPR in realizing the created wealth in organizations

Case Studies

- Honeywell in 1993 won \$ 96 million from Minolta for infringement of Honeywell's auto-focus technology for cameras. Then got licensing deals worth \$ 400 million from other manufacturers.
- Historic judgement of 1990 . Polaroid awarded \$ 900 million from Kodak. Of this \$455 was as lost interest on the damage of \$ 454

Case Study

- **Fonar vs. General Electric (small v big)**
Fonar filed several patents on Magnetic Resonance Imaging Techniques in 1970s. Subsequently GE and Hitachi entered the market
Fonar filed infringement suits.
Hitachi reached out of court settlements.
GE in 1995 was ordered to pay \$ 128.7 million. Interestingly Fonar's annual revenue was only \$17 million.

These examples demonstrate how corporate houses and entrepreneurs have utilized the IPR system with enforcement of their rights to create and retain their competitiveness in the market place.

Looking beyond the horizon

We need to critically examine the parameters, that would create, facilitate and activate a feedback system to establish symbiotic relationships in a continual innovation stream to aid potential reinvigoration of innovation processes in organizations and work for overall social good. National Policies on R&D and Technology, industry & commerce, human resource development, coupled with a strong and enforceable IPR regime would play a major role fruition of such goals.

It is imperative that institutions consider in their efforts to “Ad(d)venture with Knowledge” on their trajectory to excellence and capability building the following key aspects

- Development of integrated organisational Innovation & IPR Policy
- Enhancement of expertise to access the global knowledge base and use of IP information
- Identification of niche areas for collaborative R&D in the context of local and global value creation.
- Creation of technically trained “IPR Attorneys” to write “world-class” patents, Defend institutional IPR, formulate strategies for oppositions/revocations of IPRs, set up systems for identifying of possible IPR infringements to aid the institutional innovation process.
- Exploitation of appropriate models for the valuation of IP assets, effectiveness of “IPR portfolios” based on concepts of return on investments.
- Establishment of Technology transfer/liaison offices within the institution to structure knowledge transactions through licenses, assignments etc. and linking with global IPR Markets
- Formulation and implementing IP and information security due diligence

In the Golden Jubilee year of the University Grants Commission it would be most appropriate to recall the words of poet laureate Gurudev Rabindranath Tagore:

Where the mind is without fear and the head
is held high
Where knowledge is free
Where the world has not been broken up into
fragments
by narrow domestic wall;
Where words come out from the depth of truth
Where tireless striving stretches its arms towards
perfection
Where the clear stream of reason has not lost
its way
into the dreary desert sand of dead habit
Where the mind is let forward by Thee
into ever-widening thought and action
Into that heaven of freedom; my father
let my country awake .

Rabindranath Tagore (1901)

A century ago, Tagore's words appear to echo the spirit of the World Trade Organisation (WTO) and the World Intellectual Property Organisation (WIPO) which are striving to set up structures and the mood for "freer" and "fairer" borderless trade in goods, services and knowledge. Awakened member States of WTO have agreed to comply with various requirements of the Trade Related Intellectual Property Rights (TRIPs) by implementing the minimum standards for obtaining and enforcing intellectual property rights within a specified time frame. Tagore has also very succinctly touched on the philosophy of research and excellence as we recall "*where words come from the depth of truth..... into ever widening thought and action*"

What the developing world needs is a revitalized "mind without fear and with a head that is held high".

To achieve this desired convergence, governments, policy makers, academia, corporate houses, entrepreneurs, industry associations and individuals must view intellectual property rights in terms of its impact on trade, innovation and the entire canopy covering knowledge generation, protection, transmission, and fair benefit sharing. It will require a breakdown of “hardened mindsets and dead habits”, developing respect for intellectual property, an increased awareness of the IPR systems and processes, enhanced appreciation of the strategic implications of IPR as business tools, and managing it with reengineered organisational structures.

In this presentation I have attempted to raise the comfort level of the audience and give him an opportunity to glimpse the rudiments of knowledge dynamics and what it has to offer. I hope this awareness will drive this diverse audience of students, faculty, business leaders, entrepreneurs, administrators, and policy makers, legal practitioners and common citizens to exploit the IPR system to societal advantage.

I also hope that this brief presentation excites the academic community to develop a fearless innovative mind driving him to strive towards IPR perfection to protect his innovations through ever widening thought and patents, and if the policy makers speedup the efforts to provide the appropriate IPR infrastructure and incentives this lecture organized by the University Grants Commission would have more that served its purpose.

Profile

Prof. Prabuddha Ganguli



Spanning a professional career of over two decades with Hindustan Lever Ltd the Indian Subsidiary of Unilever in diverse management positions including research, technology transfer, business planning, factory management and head of information services and patents, he now heads his consulting firm VISION-IPR offering services in IPR management, information security and knowledge management. He is a qualified patent agent in India, author of two books and over 50 publications in the field of IPR. He is Adjunct Professor at the Indian Institute of Technology Bombay, Visiting Professor at the National Law School University at Jodhpur in India and an elected fellow of the Maharashtra Academy of Sciences,. He is IPR consultant to WIPO and several national and international organizations to conduct IPR training programmes in various countries.