Intellectual Property Audit for Efficient Intellectual Property Management of an Organisation

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Abstract--**Intellectual property (IP), as a key intellectual asset of an organization, empowers the organization to collect the complete value of their intellectual input. In this era of rapidly changing IP regimes, it is the need of time to identify and efficiently utilize intellectual assets owned by an organization. Hence it has now become a prerequisite for organizations to develop the expertise and capability not only to create IP through R & D, but also to manage the same. Intellectual Property Management (IPM) is a multifaceted discipline concerned with IP generation, protection, and exploitation catering to fast changing market demands across the globe. This basically deals with the policy formulation, designing the strategies for acquiring, protecting and exploiting the technology developed. First step to develop effective IPM system is IP Audit. Systematic approach of IP audit assesses overall intangibles generated, maintained and exploited by an organization. Therefore, a thoughtful and methodical approach for IP audit is the need. The objective of this paper is to develop an approach for conducting IP audit by effectively enlisting the varied intangible properties owned by an Organization. This will help an organization to strengthen the IPM. The nature of this research is exploratory. Method adapted for study is combination of literature survey, expert opinion and case study.**

I. INTRODUCTION

Intellectual Property Management (IPM) is a multifaceted discipline. Many countries, industries, and firms have realized the need to integrate intellectual property (IP) with business strategy. They are concentrating on effective utilization of IP through a robust IPM. Management of IP is undergoing major changes and gaining rapid recognition. There are various tools available for IPM and IP audit is one of the tools available. IP Audit is cataloging of an organization's IP assets. It is a crucial analysis of each and every IP owned by an organization including organizational capital, human capital, and relational capital to provide a comparable report of total input and output which clearly reflects core capabilities of an organization that can be used to achieve competitive advantage.

II. LITERATURE REVIEW

This section is divided into four parts: The first part provides a brief review of literature pertaining to IP. Second part covers literature on IPM of an Organization. Third part covers literature on IP audit. Fourth part highlights the research gap.

A. Brief review of literature pertaining to IP

In the knowledge dominated economy, IP is occupying significant position. The field of IP is changed tremendously over last 20 years, with notable increase of patenting in new fields like biotechnology, software and business methods [7]. In comparison with the 1980s, new patent applications in the US to domestic inventors were doubled by the late 1990s; biotechnology and software patents have doubled between 1990 and 2000 and largest 100 universities tripled their annual patent output from 1984 to 1994 [5]. Expenditure on research and development by small and medium-sized firms (fewer than 5,000 employees) has doubled between 1987 and 1997 [33]. Global acceptance and utilization of IP leads to more innovation and economic strength of Nation in future [9]. Stronger IPRs in developing countries will increase imports significantly [16]. An efficiently operating IP system is critical to spur innovation and bring new services and products to the marketplace faster [20].

IPs are a key consideration when an organization is planning its entry-mode decision into international market. The estimated value of IPs can be in billions of dollars requiring protection from misuse. For example, the *Tropicana* trademark, an intangible asset, is valued at more than U.S. $1 billion [10].

IP has made its way in the accounting book of an organization. Two new accounting standards, FASB (Federal Accounting Standards Board) 141 and 142, were introduced in the United States (US) of America from the year 2002-03. These new standards require all companies with US GAAP (Generally Accepted Accounting Principles) requirements to identify and value their IP and to include those valuations on their balance sheets to provide investors with greater certainty regarding the value of those corporations [3].

IP has been defined in various ways. According to WIPO (World Intellectual Property Organisation), IP is the creation of mind such as inventions, literary and artistic works, and symbols, names, images, and designs used in commerce [10]. IP is the commercial application of innovation and creativity for improving and enriching lives at both the practical and cultural levels. In law, IP refers to a legal entitlement, which sometimes attaches to the expressed form of an idea, or to some other intangible subject matter. Intangible assets when protected by law become IPR and confer right to owner. IPRs are one of the intangible assets of which almost all can be enforced through the law. We have combined IPRs and intellectual capital(IC) and suggested the classification of intangible assets as in Fig. 1.

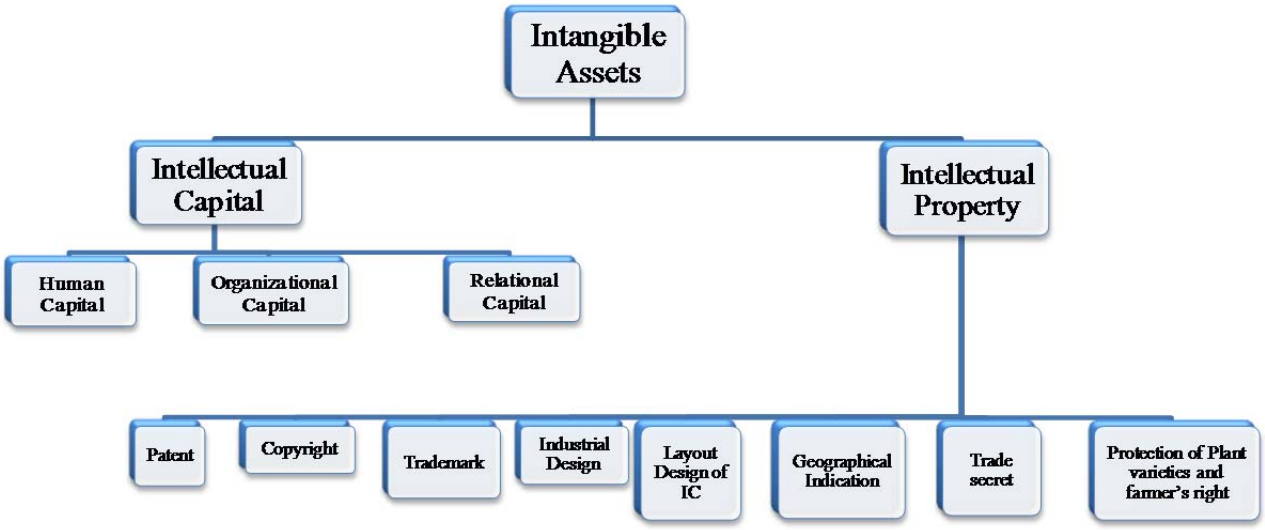


Figure 1: Types of Intangible Assets and IPRs

Various scholars suggested classification of intangible assets. Intellectual Capital (IC) of firm is divided into Human capital, structural capital, intellectual assets and business assets [30]. Intellectual assets (IA) are classified as human, organizational and codified assets [14]. Relational capital is one of the IAs and is defined as all resources linked to the external relationships of the institution such as customers, suppliers, R&D partners, Government, etc. [24]

B. Literature on IPM of an organization

IAs are gaining ground as a measure of corporate viability and future performance. The increasing curiosity of shareholders, investors, analysts and tax authorities, is encouraging companies to provide disclosure of a company's intangible assets in the balance sheet. WIPO has reported that 67 percent of US companies own technology assets that they fail to exploit (assessed at between US $115 billion to US $1 trillion). Rather than accumulating IP Assets, company may put it up for sale or license. IBM realized US $1.7 billion in revenues from patent licensing in 2000 alone. Texas Instruments realized US $500 million. Total worldwide revenues from patent licensing increased from US $10 billion in 1990 to US $110 billion in 2000 [10]. A report issued by PricewaterhouseCoopers (PWC) in 1999 found that the global IP licensing market have totaled more than US $100 billion. The International Anti-Counterfeiting Coalition estimates that Fortune 500 companies spend an average of between US $2 million and US $4 million each year in their attempts to fight counterfeiters and is due to inefficient IP due diligence practice [10]. On average, 40 percent of the value of a company – that tied up in its intangible assets – is not shown in any way on its balance sheet [31]. WIPO have stated that private firms in the US have been investing about one trillion dollars annually over IP and other intangible assets [10].

Developing and protecting intangible assets is extremely important for Nation. Countries like Venezuela and Saudi Arabia are rich in natural resources but have made poor investments in their people and systems. As a result of this they produce far less output per person than countries such as Singapore and Taiwan which have invested heavily in human and information capital and effective internal systems [3].

Economy of the country is dependent on IP. Scientists have to see their work in the context of the economy of their country, because universities and state-subsidized research institutes with their research and development activities are the spur for new products. The investment in knowledge needs to be made accessible to the business world, in keeping with the following definition: research means transforming money into knowledge; and innovation means transforming knowledge into money [10].

The extent of IP protection and management varies across national, industry and firm level. Key Responsibilities of IPM System include IP generation, IP portfolio management, IP valuation, competitive assessment and strategic decision making. The two major functions of IPM are creation and extraction of 1) Portfolio as protective view; and 2) Portfolio as business assets view. [30]

IPM can be defined as the use of IP, either alone or in combination with other resources of the firm, to achieve the firm's strategic objectives. For exploitation of these IP assets, organizations need to understand the available IP assets [2]. A measure hurdle in IPM is the identification of IP. IP audit is a proactive approach for organization to know their IP assets and value of these IP assets.

C. Literature on IP audit (IPA)

IP audit is one of the IPM practices which help managers to understand the potential intangible assets owned by the organization. "If we know it, we can manage it", is the mantra with which organizations are performing IP audit

though it is not statutory. IP audit management is performed at two levels as internal management and external management. Internal management of IP is about running of the IP department and managing its interaction with other departments. External management of IP is primarily focused on how an organization interacts with other organizations' IP and vice versa.

IP Audits can be of two types depending on scope as broad IP Audit and narrow IP Audit. This is dependent on situation specific. Another classification of IP audit can of three types depending on purpose as general purpose IP Audit, event Driven IP audit and focused (limited purpose) IP audit.

In general, auditing implies assessment (either self or external) of the practices used through comparison with known best practice. As such, an IP audit can have two dimensions: a process audit and performance audit. Process audit focuses on such questions as whether the individual processes necessary for IP generation, protection and exploitation are in place and the degree to which best practice is used and implemented effectively. Performance audit focuses on the outcomes of each individual core and enabling process and of the overall process of IP audit and the impact of this on competitiveness.

IP audit critically examines and evaluates the strengths and weaknesses in the procedures used to protect each intangible asset and secure appropriate IP rights. It helps to minimize issues involving third party rights. Its purpose is to uncover under-utilized IP assets and help in strategic business planning. It is helpful before a significant acquisition of a technology or product, cross licensing, attracting venture capital. It is helpful for analyzing critical situation in a life cycle of organization. IP Audit is also appropriate in conjunction with development of a major new product. It is helpful for accomplishing successful IPO, understanding law compliance, blocking competition, establishing next-generation power in neighboring markets [10].

Since 1990, businesses have been conducting IP audit. Experts had suggested various approaches to perform IPA. A holistic audit of managing IP is suggested for IPM in Government agencies and a large public sector agriculture R & D agency. The framework highlights some well developed IPM practices within Queensland Department of Primary Industries (QDPI) [29]. ICU framework is suggested for the management, measurement and disclosure of IC within universities and research centers [24]. Balanced score card implementation for IP rights management is available for IPM in a public research institution [28]. Considering firms, Baldwin's study corroborated that the use of IPRs increases with the size of firm, the use of intellectual protection varies significantly between industries [1]. The inter-industry differences in the use of IPRs are at least in part determined by the technology sector, the nature of the products, their stage in the life cycle and competitive conditions [8].

WIPO had given extensive IP Audit tool at Country level which touches various aspects of intellectual assets of the country as plans, policies, Human capital, Small and Medium Enterprises (SME), Incentive and Innovation promotions, Market identification and strategy, IP laws and regulations, IP administration, public awareness, professional education in IP, university research and development programmes, cultural assets, tourism, traditional knowledge, and so on in detail [32].

An example of good systems and practices can be found in Dow Chemical which conducted its first organization-wide audit of IP assets in 1994. Dow achieved an immediate savings of USD 50 million in taxes and maintenance fees on unneeded patents, and earnings in licensing revenues skyrocketed from USD 25 million to more than USD 125 million[25]. Researchers have suggested model for IA management as IPM excellence audit system [15], Technical model [31]. IPA process can be divided into three phases considering IP Audit as IP management, benchmarking and opportunity identification [6]. Bader et al had provided success factors for managing IP in the financial services. There is IPM system for academic institute proposed by researchers [11]. Table 1 covers the literature available on IA management.

D. Research Gap

It is very clear from literature survey that IP researchers and practitioners are realizing the critical role of IP audit to manage their IP portfolio effectively. Researchers have proposed IPM excellence audit system, balanced score card system etc. for IA management. Researchers have used various approaches as AHP, case study approach, inventory approach, and IP analytics approach. These approaches are difficult to implement as they require understanding of laws and processes of IA management. Considering the enormous importance of IPRs and ICs, self assessment audit tools or frameworks is dire need for organizations. In this paper authors have proposed "**IP AUDIT FRAMEWORK"** for efficient IPM.

III. METHODOLOGY

The methodology employed for this study is a combination of literature survey, case study and expert opinion. Literature survey was done keeping in mind the relevance of the topic under study. Case Data is collected through interview of R & D personnel and secondary data from records of the academic unit reports about patents, copyright and annual reports. Case analysis and synthesis has been developed based on valuable inputs, insights shared by key personnel, data received and IP analytics.

TABLE 1: IP AUDIT LITERATURE

Sr. No.	Research paper / White paper/ Law firm report title	Authors	Method/Framework / process developed	Type of IP/IC considered	Methodology	Major Focus	Comment	Year
1	Performing an Intellectual Property Audit of Copyrights **[9]**	David Hayes	___	Copyright	Inventory approach	Copyright related issues are highlighted	Not suggested any method or framework or process	1997
2	A holistic audit of managing intellectual property **[29]**	Paul Steffens, Michael Waterhouse	Intellectual Property Management Domains	Framework to conduct a holistic audit of an organization's IP management practices and capabilities-The four overlapping domains of the framework are: IP Generation; IP Rights; IP Uptake and Corporate Support.	Case study approach	Focus on IPM	Framework developed seems broad based	2000
3	The Intellectual Property Audit **[19]**	Nouvelles, L	Not developed	Focus on nine areas- Patents, contracts with independent contractors, employment contracts, trademarks, licenses, trade secrets, copyrights including organization handbooks, training, and inventions	Inventory approach	Inventory approach	Not suggested any method or framework or process	2003
4	Intellectual Property Auditing: A Road to Riches **[3]**	Sharyn Ch'ang and Marina Yastreboff	Proprietary IP audit methodology	IPRs -not explicitly mentioned any IP	Inventory Approach	Suggested three stages Method	Suggested methodology is broad based	2003
5	Strategic IP portfolio management: Technology appraisal using technology heat map. **[17]**	Miyake, M., Mune, Y., and Himeno, K	Technology heat map	Patent	IP analytics approach	Suggested interlinkage between IPM, Business strategy and R & D strategy	Patent landscaping is commonly used by organisations	2004
6	Intellectual property audit **[18]**	Stuart Meyer and Rajiv Patel	Audit Process	IPRs -not explicitly mentioned any IP	Inventory Approach	Suggested key issues to be addressed as ownership, infringement etc.	Not suggested any method or framework or process	2005

7	The University of the XXI century : intellectual capital as a new answer for management **[24]**	Sanchez P., R. Castrillo, S. Elena	ICU framework for the management, measurement and disclosure of IC within universities and research centers.	IC- Human Capital, Organizational capital, Relational capital	Case study approach	IC management	Extensive analysis of ICs and provided indicators as financial and nonfinancial. - Little focus on IPR	2006
8	Intellectual property audit checklist **[27]**	Alan R. Singleton	Checklist	IPRs-Patent, Trademark, Copyright	Inventory Approach	To take stock through questionnaire	Not suggested any method or framework or process	2007
9	Development of audit system for intellectual property management excellence **[15]**	Tak-Wing Liu, Kwai-Sang Chin	IP management excellence audit system	IPM audit. Considered enabling criteria and performance indicator criteria.	literature review, questionnaire survey, AHP approach, and Evidential Reasoning	Organizations will know the strength and weakness of their current IPM practice	Focus on IPMA not IPA	2010
10	Balanced score card implementation for IP **[28]**	Bernhard Smandek, Andreas Barthel, Jens Winkler and Peter Ulbig	Balanced score card (BSC) system for IP management	IP asset- Not specified any IP	Case study	Optimization of licensing income generation & cut costs, simultaneously realize macro-economic technology transfer tasks.	Indicators suggested are Not explained	2010
11	Patent portfolio audit **[6]**	Susan E. Cullen	Suggested phases of portfolio audit, IPM workflow, Benchmarking workflow, opportunity identification workflow, external and self reference mapping,	Patent	—	Objective stated-how an IP Audit can be used to manage the IP lifecycle	Suggested Process flow	2010

IV. PROPOSED IP AUDIT FRAMEWORK FOR EFFICIENT IPM

Here we propose "IP Audit Framework for efficient IPM" as shown in Fig. 2. The framework will facilitate systematic enlisting of IPRs and ICs owned. By concentrating on single project, micromanagement of IPRs and ICs can be achieved. With this framework, expected output in terms of IPRs can be anticipated and strategic planning for execution of project can be designed by technology /project manager without the assistance of legal or IP department. This framework can be applied at kick off stage to define outcomes and then audit can be done annually or biannually depending on the technology/ project under consideration.

The framework covers all types of IPRs and ICs as stated in the fig. 1. Exhaustive list considering patent and copyright is given on right and left side of the framework respectively. Under patent category along with application and granted patent number, technology market size documentation is expected, to know the total market available for that particular technology. This tentative market size will help in licensing or selling negotiation and early collaboration. Possibility of Trademark and Industrial design is considered and can be listed next to patent column. To give due credit to all inventors involved , it is suggested to enlist the involvement of all inventors under human capital and is to be noted next to copyright column as stated in the framework. If there is an involvement of any external partnership due record can be maintained and necessary legal documentation must be created. This can be noted at the center in the framework as relational capital. If there is any trade secret or knowhow, due care must be taken to protect it. Once IP portfolio is mapped then valuation of IPs is next important step. In the framework valuation related preliminary indicators are provided. This will give idea about probable revenue which can be generated through project.

This basic level IP audit framework will assist technology/project manager to strengthen the management and decision-making process by recognizing and addressing key internal and external factors that affect the effective utilization of IPRs and ICs.

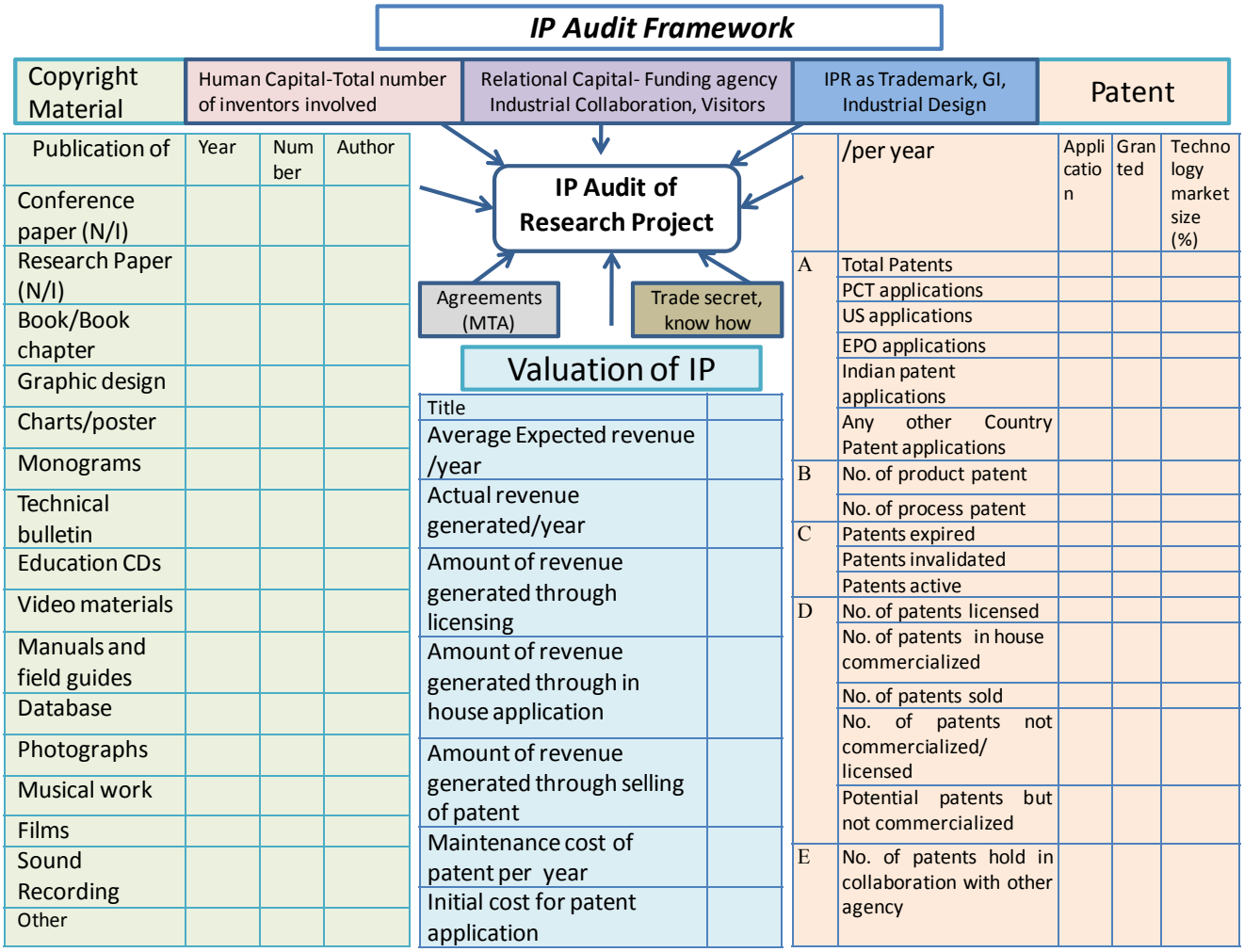


Figure 2 –Proposed IP Audit Framework for efficient IPM

V. CASE DISCUSSION

The above proposed "IP Audit Framework" is applied to an academic unit. For Case study one of the academic Unit of Institutes of National Importance (INI) is considered. INI is a status that is conferred to a higher education institution in India by an Act of parliament. INI is an institution which serves as a pivotal player in developing highly skilled personnel within the specified region of the country/state. The reason for selecting this particular institute is that the institute under consideration is having enough IP awareness with IP management strategy. The unit follows IP policy established at Institute Level. IP policy of the institute is thorough and addresses issues regarding ownership, inventor ship, authorship, material transfers, various agreements, technology transfer, commercialization, and profit sharing and so on .The institute owns almost all types of intellectual property. Identifying and collecting intangible assets owned by an Institute is cumbersome process. Therefore for this study only one academic unit is considered

Case Study-Single Academic Unit of INI

A. Introduction

The academic unit under consideration was established in the year 1958 and is one of the largest academic units in terms of number of faculties, students, research activities and other curricular and extracurricular activities. The unit is known for research projects in robotics, fluid dynamics, heat pumps, cryogenics, nuclear engineering, fracture mechanics, Combustion, CFD (Computational Fluid Dynamics), CAD-CAM (Computer Aided Design-Computer Aided Manufacturing) and other areas in mechanical engineering field. Unit is practicing industrial consultancy, sponsored research, collaborative R & D and technology incubation. The faculties have been active in offering consultancy services to industries. The unit offers academic programmes leading to B. Tech., M. Tech. and Ph.D. degrees.

B. Physical security and legal document maintenance

Though institute is a public institute, considering physical security regarding laboratory access and protection of confidential information, a due care is taken by the unit. Laboratory notebook maintenance practice is followed to record research work and it is the intellectual property owned by the Institute. The unit consults with institute legal and IP panel whenever necessary. Every employee, staff, student have to sign nondisclosure agreement (NDA) as per policy of the Institute. The institute staff and faculty as part of appointment procedure signs NDA. If there is any involvement of third party all required agreements, protocols are followed by the department.

C. Human Capital

The faculty members are grouped under three broad specializations – Design engineering, manufacturing engineering, and Thermal & Fluids Engineering. At present (2011-12), the department have 41 core faculty members and 8 visiting faculties along with 200 UG students, 245 PG students and 63 permanent supporting staff. Graphical representation in Fig.3 gives the details of student strength of respective years.

D. Organizational Capital

The academic activities are supported by 27 laboratories. The unit had focused research in five areas: Computational Mechanics, Nuclear Thermal Hydraulics; CIM (Computer Integrated Manufacturing); Refrigeration, Air conditioning and Cryogenics; and MEMS, NEMS and Mechatronics. Unit offers specializations in three areas as design, manufacturing and thermal engineering. Department owns 213 courses. The academic unit received various recognitions and awards as shown graphically in Fig. 4.

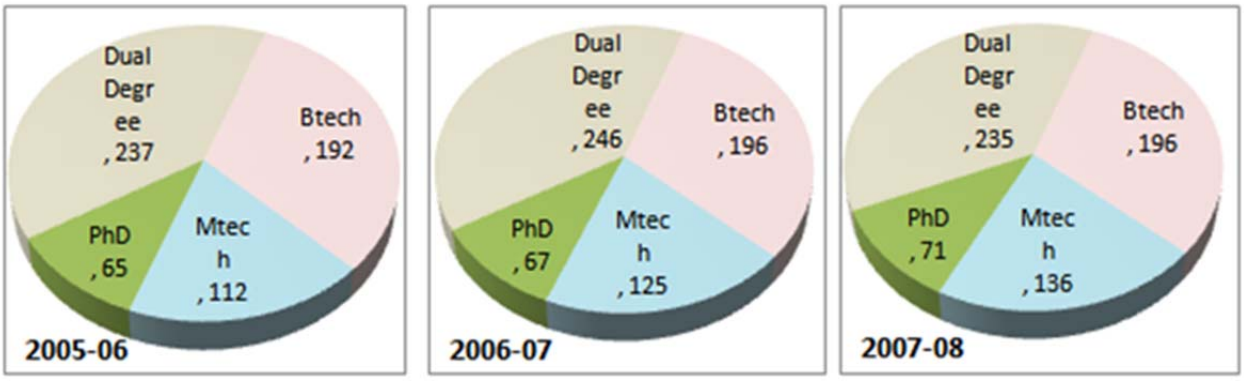


Figure 3 - Graphical Representation of Human Capital in respective years.

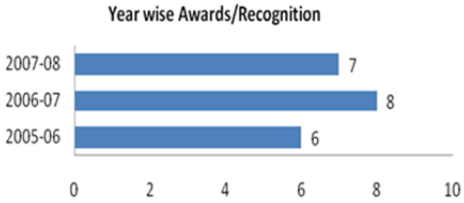


Figure 4 - Graphical Representation of Organizational Capital-Awards/Recognitions

E. Relational Capital

As suggested by Sanchez, relational Capital is the external relationship of the institution such as customers, suppliers, R&D partners, Government etc. Fig. 5 presented below gives details about the relational capital of the department. Relational capital considered here is collaboration of the department with external partners for consultancy projects, research projects and visitors to the department. Visitors include experts, alumnus. The total number is presented against the academic year.

F. IPRs-Patent and Copyrights

IPRs considered are patents and copyright material. Fig. 6 represents mapping of overall projects which had undertaken in respective years against IPRs generated.

G. Application of IP Audit Framework to Academic Unit:

IP Audit of the academic unit is conducted for the academic years 2005-06, 2006-07 and 2007-08 using proposed "IP Audit Framework". There is limit to data due to Institute's confidential information policy. The available data which is presented above in graphical manner is applied in the framework.

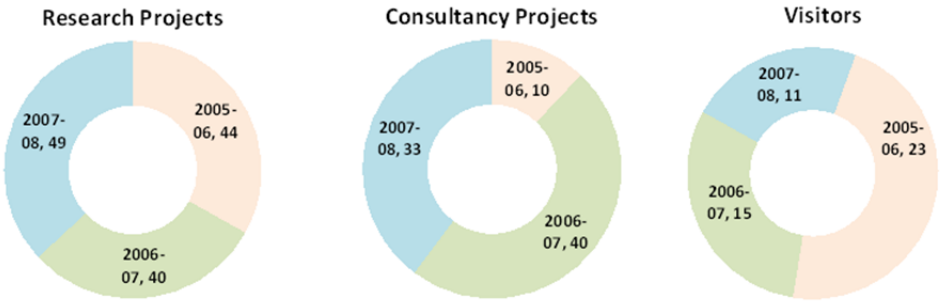
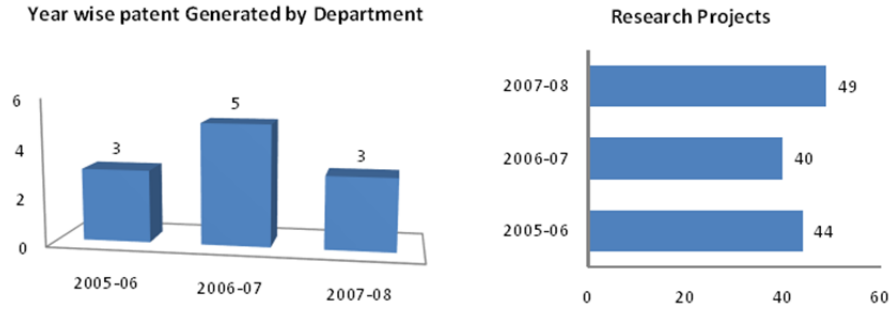


Figure 5 - Graphical Representation of Relational Capital in respective years.



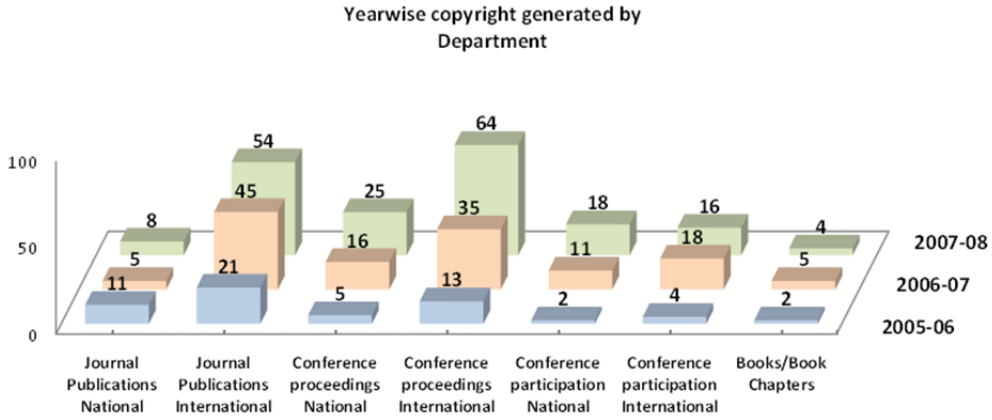


Figure 6: Mapping of IPRs and research projects

IP Audit Framework 2005-06

Copyright Material	Human Capital- Research Scholars 65 + Faculty 41	Relational Capital-Research Projects-44, Consultancy Projects -10 Visitors-23	IPR as Trademark, GI, Industrial Design **NIL**	Patent

IP Audit of Research Project

Agreements (MTA)

Trade secret, know how

Publication of	National	International	Author
Conference paper (N/I)	5	13	*
Research Paper (N/I)	11	21	*
Book/Book chapter	2		*
Graphic design	*	*	*
Charts/poster	*	*	*
Monograms	*	*	*
Technical bulletin	*	*	*
Education CDs	*	*	*
Video materials	*	*	*
Manuals and field guides	*	*	*
Database	*	*	*
Photographs	*	*	*
Musical work	*	*	*
Films	*	*	*
Sound Recording	*	*	*
Other	*	*	*

Valuation of IP

Item	$/INR
Average Expected revenue /year	*
Actual revenue generated/year	*
Amount of revenue generated through licensing	*
Amount of revenue generated through in house application	*
Amount of revenue generated through selling of patent	*
Maintenance cost of patent per year	*
Initial cost for patent application	*

	/per year	Application	Granted	Technology market size (%)
A	Total Patents	*	3	*
	PCT applications	*	*	*
	US applications	*	*	*
	EPO applications	*	*	*
	Indian patent applications	*	3	*
	Any other Country Patent applications	*	*	*
B	No. of product patent	*	*	*
	No. of process patent	*	*	*
C	Patents expired	*	*	*
	Patents invalidated	*	*	*
	Patents active	*	*	*
D	No. of patents licensed	*	*	*
	No. of patents in house commercialized	*	*	*
	No. of patents sold	*	*	*
	No. of patents not commercialized/ licensed	*	*	*
	Potential patents but not commercialized	*	*	*
E	No. of patents hold in collaboration with other agency	*	*	*

Figure 7: IP Audit Framework application –Academic year 2005-06

IP Audit Framework 2006-07

Copyright Material	Human Capital-Research Scholars-67 + Faculty 41	Relational Capital-Research Projects-40, Consultancy Projects -40 Visitors-15	IPR as Trademark, GI, Industrial Design **NIL**	Patent

IP Audit of Research Project

Agreements (MTA)

Trade secret, know how

Publication of	National	International	Author
Conference paper (N/I)	16	35	*
Research Paper (N/I)	05	45	*
Book/Book chapter	05		*
Graphic design	*	*	*
Charts/poster	*	*	*
Monograms	*	*	*
Technical bulletin	*	*	*
Education CDs	*	*	*
Video materials	*	*	*
Manuals and field guides	*	*	*
Database	*	*	*
Photographs	*	*	*
Musical work	*	*	*
Films	*	*	*
Sound Recording	*	*	*
Other	*	*	*

Valuation of IP

Item	$/INR
Average Expected revenue /year	*
Actual revenue generated/year	*
Amount of revenue generated through licensing	*
Amount of revenue generated through in house application	*
Amount of revenue generated through selling of patent	*
Maintenance cost of patent per year	*
Initial cost for patent application	*

	/per year	Application	Granted	Technology market size (%)
A	Total Patents	*	05	*
	PCT applications	*	*	*
	US applications	*	*	*
	EPO applications	*	*	*
	Indian patent applications	*	05	*
	Any other Country Patent applications	*	*	*
B	No. of product patent	*	*	*
	No. of process patent	*	*	*
C	Patents expired	*	*	*
	Patents invalidated	*	*	*
	Patents active	*	*	*
D	No. of patents licensed	*	*	*
	No. of patents in house commercialized	*	*	*
	No. of patents sold	*	*	*
	No. of patents not commercialized/ licensed	*	*	*
	Potential patents but not commercialized	*	*	*
E	No. of patents hold in collaboration with other agency	*	*	*

Figure 8: IP Audit Framework application –Academic year 2006-07

IP Audit Framework 2007-08

Copyright Material	Human Capital-Research Scholars-71 + Faculty 41	Relational Capital-Research Projects-49, Consultancy Projects -33 Visitors-11	IPR as Trademark, GI, Industrial Design **NIL**	Patent

IP Audit of Research Project

Agreements (MTA)

Trade secret, know how

Publication of	National	International	Author
Conference paper	25	64	*
Research Paper	08	54	*
Book/Book chapter	04		*
Graphic design	*	*	*
Charts/poster	*	*	*
Monograms	*	*	*
Technical bulletin	*	*	*
Education CDs	*	*	*
Video materials	*	*	*
Manuals and field guides	*	*	*
Database	*	*	*
Photographs	*	*	*
Musical work	*	*	*
Films	*	*	*
Sound Recording	*	*	*
Other	*	*	*

Valuation of IP

Item	$/INR
Average Expected revenue /year	*
Actual revenue generated/year	*
Amount of revenue generated through licensing	*
Amount of revenue generated through in house application	*
Amount of revenue generated through selling of patent	*
Maintenance cost of patent per year	*
Initial cost for patent application	*

	/per year	Application	Granted	Technology market size (%)
A	Total Patents	*	03	*
	PCT applications	*	*	*
	US applications	*	03	*
	EPO applications	*	*	*
	Indian patent applications	*	*	*
	Any other Country Patent applications	*	*	*
B	No. of product patent	*	*	*
	No. of process patent	*	*	*
C	Patents expired	*	*	*
	Patents invalidated	*	*	*
	Patents active	*	*	*
D	No. of patents licensed	*	*	*
	No. of patents in house commercialized	*	*	*
	No. of patents sold	*	*	*
	No. of patents not commercialized/ licensed	*	*	*
	Potential patents but not commercialized	*	*	*
E	No. of patents hold in collaboration with other agency	*	*	*

Figure 9: IP Audit Framework application –Academic year 2007-08

H. IPR score for the academic unit

Here we propose the IPR score calculation system. IPR score for particular academic unit for specific time period can be calculated by using the weight age unit suggested for each IPR. Weightage is assigned considering the academic institute. Table 2 gives details about the units against each IPR. Being an academic institute copyright is by default activity of the institute so we have assigned weightage of 1unit to one copyright output. Keeping copyright as benchmark, weightage is assigned to other IPRs for example patent activity requires more efforts so weightage assigned to patent is 3 units. Similarly other IPRs are assigned with unit value.

TABLE 2: IPR CREDENCE

IPR	Credence (Unit)
Patent	03
Copyright	01
Industrial Design	02
Trademark	1.5
Layout Design of IC	02
Geographical Indication	1.5
Plant variety and Farmer's Right	03
Trade secret	00

IPR score for each academic year is calculated using IPR credence. In the academic year 2005-06, total copyright output observed is 54 and patent output is 3. Therefore IPR score for academic year 2005-06 is 52 + (3*3) = 61.Similarly the IPR score is calculated for other academic years and presented in the table 3. It suggests that academic unit is more focused on copyright activity than patenting activity. It can be noted that there is maximum copyright activity in academic year 2007-08 to give high IPR score. It can also be observed that IP score is increasing gradually which is positive indication.

TABLE 3: IPR SCORE

Academic Year	**IPR Score (unit)**
2005-06	**061**
2006-07	**121**
2007-08	**164**

IV. DISCUSSION

Considering today's scenario of intellectual property and its management at global level, it is becoming mandatory for academic Institutes to change their focus from knowledge sharing to knowledge capitalization. Efficient IPM practices facilitate conversion of knowledge to capital. First step in IPM is IP audit. The proposed IP Audit framework application for determining IPRs and ICs stock helped to understand the status of the academic unit. It is observed that framework gives snapshot and provides insight over the IP status. This helps in quick decision making process. The proposed framework is first step to start the IP audit.

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