

The IP-Safe Organization

Bringing Awareness, Automation, and Scale to IPR Creation

TATA
CONSULTANCY
SERVICES

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IN BRIEF

The IPR strategy of a large organization needs to maintain a fine balance. It should enhance the environment for serendipitous discovery and at the same time, create intellectual property that aligns with the organization's business goals. The bigger and more diverse a company is the greater the challenge. Ensuring process rigor is also important in creating high quality IP that generates value and reduces risk.

Generating IPR is effort-intensive. Therefore, scaling operations with a small team requires ingenuity.

TCS' steadily growing IP portfolio outlines the company's business strategy, innovation and areas of expertise. TCS' approach of 'Safe to Create, Safe to Protect, and Safe to Use' sensitizes all associates to IPR—ours and others. While employing a rigorous process to create sustainable and high quality assets, TCS' IP& E Group has come up with several innovations of its own.

There is a steep increase in the value of intangible assets to any business. According to a 2017 report from the World Intellectual Property Organization (WIPO), "Overall income from intangibles in the 19 manufacturing industries increased by 75% from 2000 to 2014 in real terms".¹ The implied market value of intangible assets of S&P 500 companies is at an average of 84% according to a 2015 survey (up from 68% in 1995).² Intellectual

property (IP) is a substantial part of intangible assets. However, the value of IP from a trade perspective lies not in its individual worth, but in a strategically designed, optimally aggregated, and well-managed IP portfolio. Hence, management of an IP portfolio is crucial to business.

Understanding the nature of a portfolio that is necessary, aligning it to business strategy, sensitizing each individual in the organization,

1 WIPO, World Intellectual Property Report 2017: Intangible Capital in Global Value Chains, 2017. Available at http://www.wipo.int/edocs/pubdocs/en/wipo_pub_944_2017.pdf

2 Ocean Tomo, Annual Study of Intangible Asset Market Value from Ocean Tomo, LLC, March 5, 2015. Available at <http://www.oceantomo.com/2015/03/04/2015-intangible-asset-market-value-study/>

Fact File

TCS Research: IPR

Outcomes: IP-Safe Organization

Principal Investigators: Santosh Mohanty

Academic Partners: TSDSI, CII

Techniques Used: Machine Learning, Network Analysis

Industries Benefited: All Industries

Patents: 4 filed, 1 granted

Papers: 9

and scaling a resource-intensive IP support system are areas that deserve attention if an enterprise hopes to succeed. This is specially so since knowledge and technology form the backbone of every industry. A payment product can come from a bank or a fintech firm; a health monitor can come from a medical equipment company or a digital watchmaker. This makes the technology IP space crowded with diverse players. Understanding novelty and staking claim involves effort that an inventor cannot manage without support.

TCS filed its first trademark in the year 1985 and its first patent in 1994. But the company realized that IP cannot be left to individual effort, but had to be an organic movement within the enterprise. This led to the creation of our group, the TCS IP & Engineering (IP&E) Group. We actualize TCS' vision of an IP-safe culture that ensures the company catalyzes innovation, accrues a sustainable IP for itself, and respects partner IPs. This has not reduced the company's commitment to open source to which it contributes significantly each year. In fact, we help inventors and users understand the IP implications even within open source.

Creating a Portfolio

TCS views an IP portfolio of an enterprise as a set of multiobjective clusters of its standalone patents or a set of patents. It believes that these need to be appropriately interlinked and optimized with respect to technology, temporal sustainability, and its areas of business. It believes that both top-down and bottom-up approaches are required to get a sustainable IP portfolio for the enterprise. The IP&E Group has set the following goals toward achieving the stated objective:

- Encourage and actively support innovation activities and subsequent IP protection of such innovations in the business units.
- Encourage TCS' business units to build IP assets that are aligned to the organization's priority and the unit's asset roadmap, and support them through associated engineering services.
- Protect the IP rights emerging out of the IP assets.
- Leverage existing IP of TCS in building IP assets.
- Institutionalize an IP-Safe culture in TCS.

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Aligning IP creation to business strategy

Optimizing an enterprise's IP portfolio is a complex task. IP, strategic to the company must be created. But clearly, serendipitous discovery must be encouraged. The enterprise must gain in business value; it must be protected against risks such as litigation, and changes in the business environment. Optimization must take into account the emergence of new technologies as well as the dynamic valuation of standalone patents.

For creating the sustainable and optimized IP portfolio, we employ a decision support methodology of screening patents and compatible key players, matching criteria based on an Identify-Analyze-Position model sequence. The Identify-Analyze-Position model sequence ensures the patent portfolio meets the multidimensional objectives, which include maximizing the total value of the portfolio and minimizing the risk to the portfolio simultaneously. The Identify-Analyze-Position model

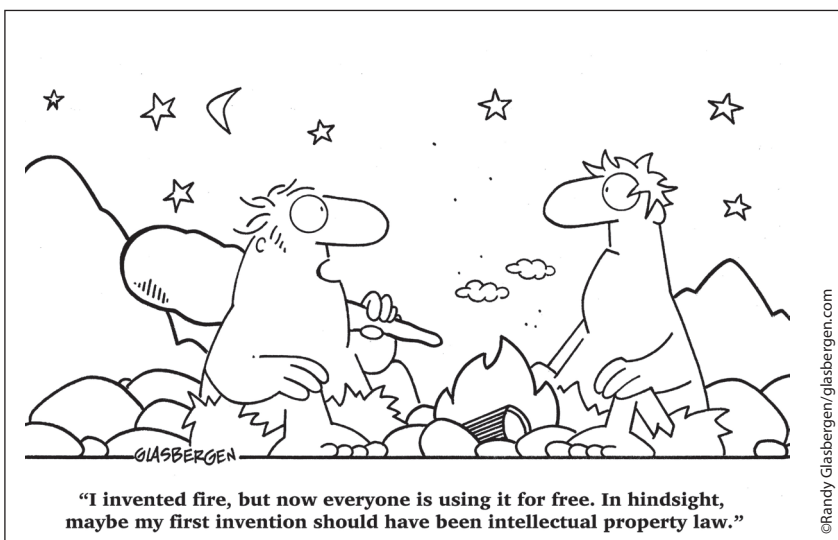
incorporates competition and interplay between diversification and correlation of IP assets towards positioning the enterprise for scenarios encompassing various strategies, such as promoting, flooding, fencing, strengthening, surrounding, and patent networking strategies. We have been granted a patent in this area.

Sensitizing the individual and safeguarding against risks

An organization-wide commitment to promote, protect, and profit from IP must enthrall employees to be inventors and create IP. Campaigns proliferating messages—such as 'Know Your IP', 'Respect Others' IP', 'Be an Inventor, Create IP', 'Ensure Right Access and Right Usage', and 'Stay Clean'—have sensitized TCS associates to become IP aware and appreciate IP creation, protection, usage, and risks.

We have worked hard at generating ideas, maturing an idea collaboratively, and identifying IP that can be protected and leveraged in the market. This has resulted in TCS filing an average of over 450 patents every year for the past 6 years.

We have a robust internal monitoring system that aims at building a trustworthy and agile ecosystem for TCS' IP—from ideation to offering—with the motto 'Safe to Create, Safe to Protect, Safe to Use', and to respect the IP and confidential information of TCS, its customers, partners, and third parties through transparency and compliance. Realizing this objective enables TCS to protect its IP and reinforce the right use of TCS, its customers, and third party IP in its global operations.



Automating IP management with tools

A truly creative person is more involved in the spontaneity of their work and may not want to put in the spadework required for intellectual property rights (IPR) creation and documentation. Getting the idea into a form suitable for patenting and generalizing is extremely difficult and usually requires a good patent attorney. In addition, checking for 'prior art' and obtaining a 'freedom to operate' opinion are very difficult. Timeframe involved in the patent filing process is also a challenge.

TCS IP&E Group steps in with a cross-functional expertise of people across engineering, science, law, and management. Yet to scale services to an organization of over 400,000 employees, the group relies on digital systems: the TCS' IPR Management System (IPRMS) and IP Asset Registry (TIPAR) to manage the influx of patents, copyrights, and trademark-filing requests.

IP Processes and Workflow

TCS' IPRMS manages IP-related data and automates IP-related processes and workflow. It covers patents, copyrights, and trademarks. IPRMS provides information, knowledge, administration and insights related to IP and IP rights.

It's 'ease of use' facilitates an IP adoption culture in the organization. PRMS is conceived, designed, built, and managed by the IP&E group.

Determining 'State-of-the-Art'

We use a three-stage process to identify and develop unique ideas for IP protection and many of the process steps are automated.

- **Patent eligibility:** A patentability questionnaire guides the inventor through the

requirements for patenting. The inventor has to state whether the idea is an algorithm, a technical advancement over similar methods, an abstract idea (such as a business method), or has seen prior disclosure. If the answer is yes to any of these, the idea may require a revisit or be rejected. The exercise stimulates inventors to generate further ideas that have better chance for patenting. A questionnaire for now, it will soon become an interactive and intelligent chatbot.

- **Prior art search:** Prior art search matches an invention's salient concepts and features with various kinds of recorded IPR: global patents, including TCS' own, and the claims of each; articles, books, and other publications available electronically in the public domain; and unpublished but accessible work. Whether an idea is novel or self-evident is thus determined, and a formal search report helps the inventor to examine and comment on the findings. Currently, the IP&E Group members conduct this specialized task by accessing specialized databases, internet, and other sources. We are automating this process, including feature extraction, identification of concepts and synonyms of an invention from technical documentation, and formation of search strings that can be applied to target data stores.
- **Patentability involving collaborative invention mining (CIM):** Invention mining is performed through a CIM tool incorporated into the IPRMS. The objective is to achieve greater maturity in inventions, in patentability (novelty, non-obviousness,

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and industrial utility) and business sustainability. This process considers the outputs of patent eligibility and prior art search, and proceeds. Then it ensures appropriate levels of novelty, non-obviousness, and utility through collaborative discussions between inventors, IP&E Group members, and subject matter experts (SMEs). Patentability scoring measures the merits of each feature of the invention. The process also involves maturation of the invention’s business sustainability characteristics. The features are progressively rearticulated and readjusted through repeated rounds of examination and scoring. One outcome of this exercise is an invention score that indicates the resultant final maturity of an invention and, in turn, patentability. Another outcome is clear identification and maturation of the invention’s claims through a hierarchical ‘claim tree’ that eventually helps drafting the patent’s claims.

IPRMS. This objectively values an IP asset from various standpoints— fair market value (from the financial investor’s viewpoint), acquisition value (for the strategic buyer), fair value (for the auditor), market value (for the competitor), liquidation value (for the banker), and current value (for the owner). The valuation principles defined in the IVSS patent help define valuation parameters in alignment with enterprise IP commercial strategy, develop, or adopt an appropriate method for quantitative valuation, and define and establish an appropriate approach for qualitative valuation and a valuation process appropriate to the enterprise.

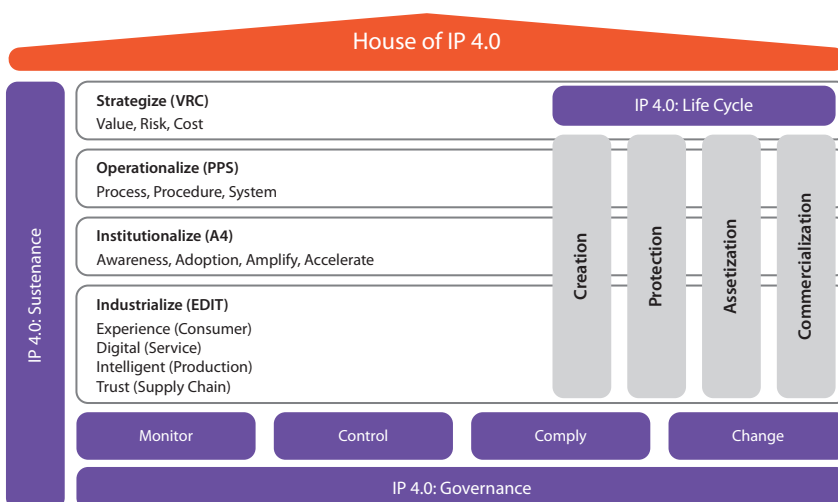
Mapping patents to technology domains and products

TCS has deliberately kept its business unit categories distinct from its domain classification of its patent portfolio. The Business Aligned Clusters (BACs) emerge from the latter, presently number 42, and include domains such as Nanomaterials, eSecurity, Big Data Analytics, and Internet of Things (IoT). All TCS patents are mapped to the BACs. Because the business units (BUs) need to be aligned with market trends and customer needs, this results in changes in BU organization more frequently than in the technology and functional domains. However, for all practical purposes, there is little actual need for the BACs to undergo significant changes. Even if there is, it would be due to the rise of newer, evolving technologies—the frequency of change is low over time. The BACs can thus be considered as a permanent classification that maps all IP created across TCS’ business.

Valuating an invention or patent

The Invention Valuation and Scoring System (IVSS) is a unique tool in the

The mapping of patents to the BACs helps align them to products



and solutions taken to market. The IP&E Group encourages product development groups to browse TCS' granted patents through an IPRMS interface that provides their summaries and abstracts, allows users to identify from among them the patents of interest, and extract those details. Users can thus explore the creation of products or solutions that align with their product roadmap or incorporate granted patents into an existing roadmap. TCS periodically runs campaigns that offer incentives for associates to utilize granted patents in their customer offerings. The response to such campaigns has been positive, with high-quality offerings being created. Quite frequently, the creation of patents—rather than their germination from isolated ideas—are prompted by the creation of products and solutions that have components that are patentable. In fact, the IP&E Group encourages product development groups to identify novel elements within such offerings and file them as patents or copyrights to protect

the IP that the assets comprise which, in turn, enhances their value.

The group has filed several patents on various aspects of IP management including: "System to Manage Patents in an Enterprise"; "Collaborative System and Method to Mine Inventions"; "Invention Valuation and Scoring System"; "Managing Sustainable Intellectual Property Portfolio of an Enterprise" (granted); "Systems and Methods for Generating Strategic Competitive Intelligence Data Relevant for an Entity".

The way forward

As TCS and its customers move to an Industry 4.0 world, ecosystem play will become more important. Our customers will explore new technologies that may overturn premises of older technologies. We plan for "IP 4.0" where more automation and machine learning will enable a smoother IP lifecycle management from IP creation, through IP protection and IP assetization to IP commercialization.

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Santosh Mohanty

Mohanty is VP and Head of components engineering group in TCS. Mohanty's chief responsibilities lie in strategizing and building intellectual property that lead to solution, service and process models to enhance organizational performance. His research interests include digital adoption strategies, IP portfolio management, enterprise architecture, service-oriented architecture, Internet of Things, analytical modelling, business analytics, and data management. He is associated with many professional institutions. He is a member of the industry strategy team at the World Economic Forum. He has served as a member of the Confederation of Indian Industry's National Committee on Intellectual Property. Mohanty holds a PhD in mathematical sciences and an MS in computational mathematics from Northern Illinois University.





Shekhar Guha

Shekhar Guha is Head of Intellectual Property Core Services for Tata Consultancy Services (TCS). He is responsible for promoting the IP Lifecycle phases of IP Creation, IP Protection, IP Assetization, and IP Commercialization across the organization through well-defined stages of Strategizing, Operationalizing, Institutionalizing and Industrializing of the above lifecycle phases. Mr. Guha has been a prolific speaker at many prestigious global IP forums and conventions and has authored multiple publications on various aspects of IP Management. He has been instrumental in exercising IP thought leadership across the organization and in the global ecosystem. Prior to this role Mr. Guha was P&L owner for large accounts, customers and geographies that included delivery and sales ownership. Mr. Guha also has vast expertise in data management and business intelligence. He has a Bachelor's degree in Instrumentation and Electronics as well as in Mathematics from Jadavpur University, Kolkata.

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