



IP management in the landscape of disruptive technologies: A boost and strategy in AI and machine learning driven era

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Abstract

Change is inevitable. Continuous innovation is the driving force behind change. The modern lifestyle of the 21st century is a result of gradual advancements and discoveries. Technological advancements such as big data accessibility, machine learning applications, and computing hardware enhancements are leading to a new era of technological transformation. Intellectual property (IP) has become increasingly significant on a worldwide scale.

The economy of a developed country heavily depends on innovative ideas created by researchers. Lawmakers have long acknowledged the need for intellectual property rights to safeguard the creative labor of individuals and companies. Intellectual property rights also allow companies to recoup their expenses related to research and development. Tools for intellectual property protection, such as patents, motivate firms to innovate and ensure their intellectual property rights are safeguarded. Patents for software-related inventions serve as a form of recognition and compensation for the researchers' time, effort, and financial commitments. Many companies are recognizing the need for intellectual property management due to the significance and worth of patents and intellectual property. IP management is a method used to safeguard intellectual property. Ensuring proper management of IPs is crucial for the success of a company or individual. Innovators are confident that their expenditures and profits on innovations are secure and well-managed. This leads to companies hiring companies to boost investments in innovation, as most inventions are driven by the pursuit of profit. AI is revolutionizing the management of intellectual properties. AI is now being used in IP Management and is expected to be more widely adopted in the future. There is a growing need for enforcing intellectual property rights, as it serves as a guarantee of the validity of the solutions. Efficient IP management can stimulate economic growth and enhance socio-cultural welfare. An efficient intellectual property (IP) management model is crucial for driving increased and secure advances in technologies, ultimately shaping the future of the world's businesses.

Keywords: Intellectual property (IP), IP Management, Artificial Intelligence (AI), IP management strategy, IP audits.

Introduction

Effectively handling intellectual property (IP) in the technology sector is essential for safeguarding and monetizing innovation. These encompass trademarks, patents, copyrights, and trade secrets. Technology businesses must establish a well-defined intellectual property strategy to safeguard their ideas and deter intellectual property violations by others. Tasks may involve doing routine intellectual property audits, submitting patent and trademark applications, and enforcing stringent confidentiality agreements with employees and partners. Companies must be cognizant of and adhere to international intellectual property laws and regulations, and they should also take measures to assert their intellectual property rights as required^[1].

Innovations that shake up established markets and paradigms are known as disruptive technologies, and they often render older goods, services, and business models useless. When new ideas, goods, or services enter the market, they often alter established sectors in profound ways. Advantages such as cheap cost, high efficiency, or easy accessibility help disruptive innovations win over niche markets before displacing more established alternatives. The introduction of cellphones, for instance, caused waves in many other markets, including those dealing with photography, navigation, and phone calls. These phones revolutionised consumer behaviour and market dynamics by integrating several functions into one^[2].

The significance of intellectual property in the technology sector

Intellectual property (IP) is crucial in the technological sector for safeguarding and monetizing innovation. IP in the IT business pertains to legal rights concerning intellectual creations including innovations, works of literature and art, names, images, and symbols utilized in trading. Common types of intellectual property in the technology sector are patents, brand names, copyrights, and trade private information.^[3]

Effectively overseeing intellectual property in the technology sector is essential for safeguarding and monetizing innovative ideas. It is advisable for tech organizations to perform routine intellectual property audits to recognize and safeguard their intellectual property assets. They should apply for patents and trademarks to safeguard their innovations and enforce stringent confidentiality agreements with colleagues and collaborators to protect proprietary information. Companies must be conscious of and adhere to worldwide intellectual property legislation and rules and regulations, and they ought to take action to protect their intellectual property rights as needed^[4].

Moreover, IP strategy is crucial in the technology sector in order for companies to profit from their creativity. For instance, companies might license their patents or trademarks to distinct businesses or develop novel business strategies based on their intellectual property. This might

serve as a substantial revenue stream and enable organizations to maintain competitiveness in the market ^[5].

Obstacles at the Crossroads: Problems arise when innovative technologies and intellectual property overlap

- 1. Advancing Technology Rate:** Rapid development is a hallmark of disruptive technologies, particularly those centred around AI. It is becoming increasingly difficult for existing IP standards to keep up with the rapid growth of AI algorithms as well as applications. Innovation may stall, or disputes over intellectual property may arise due to this disparity.
- 2. The issue of copyright and identification of creative works:** This is raised by AI, which may autonomously develop content, innovations, and solutions. For instance, who owns the rights to an AI-created artwork or the patent for an AI-made solution? Intellectual property ownership is called into doubt by these kinds of problems.
- 3. Patenting Qualifications:** The question of whether ideas created with AI may be granted patents is a contentious one. The question of whether or not innovations created by AI algorithms solely may be patented as individual ingenuity is a contentious subject for patent examiners worldwide.
- 4. Rights Management and Innovative AI:** Creative AI technologies, including those that produce music, art, or literature, combine human and machine creativity. The requirement of originality on the part of copyright law is undermined by AI producing content independently. It is a challenging task to balance creators' rights and the dissemination and utilization of AI-generated content.
- 5. Safety of Data and Trade Secrets:** Since AI is so data-dependent, data security and trade secrets are legitimate worries. One of the most pressing issues in intellectual property is preventing the loss or misuse of private AI simulations, model training information, and computations ^[6].

Why IP control is crucial?

The inherent motivation for those working in the scientific and innovative fields who generate and create new information.

- Higher visibility in one's field.
- Financial incentives are shared among employees.
- New technical developments will occur at a quicker rate.
- A monetary benefit for intellectual property is guaranteed.
- Preserving research conducted by the public sector.
- Genuine and original items will always be available because of this.
- A quicker pace of technological adoption A sui generis method can be used to protect plant varieties.
- Article 27.3(b) of TRIPs provides for Plant Variety Protection (PVP) ^[7].

It is via public-private partnerships (PPPs) that innovations may be commercialised, paving the way for innovation.

The Function of AI and ML in Intellectual Property Strategies

A new age of innovation has arrived with the rise of AI and ML, and this new era has completely revolutionized the way IP policies are considered and implemented. They are changing the face of intellectual property (IP) and serving as instruments for the development of new goods and services. An evaluation of current IP protection methods and strategies is warranted in light of the serious concerns raised by more advanced AI and ML technological advances, which call into question long-held assumptions about originality, ownership, and the creative process ^[8].

Both the inventors and the owners of intellectual property see AI and ML as opportunities and threats. The independent characteristics of these advancements can entangle authorship and the inventor's rights. Still, they also provide powerful tools for searching through massive data sets for patterns that might lead to discoveries, which could speed up the process of discovery and patenting. Opinions vary on whether AI-generated innovations should be eligible for patent protection; some see AI-generated innovations as IP, while others see them as non-IP ^[9].

Methods used by IT companies to safeguard their intellectual property

To maintain innovation and stop others from infringing on their ideas, IT companies need to safeguard their IP. Undertaking frequent IP inspections, filing patents & trademarks, enforcing stringent confidentiality commitments, and adhering to global IP rules and regulations are all ways that technological organisations may safeguard and preserve their intellectual property. Maintaining a routine IP audit entails systematically reviewing all of a company's intellectual property assets, such as copyrights, trade secrets, patents, and trademarks. This helps companies learn about and secure their intellectual property assets ^[10]. The use of trademarks and patents is a powerful tool for protecting ideas and stopping others from making money off of them. A trademark lets buyers know who made a product or provided a service, whereas a patent gives an inventor temporary exclusive rights.

Non-disclosure agreements (NDAs) and confidentiality agreements are legal documents that forbid the sharing of sensitive information. Businesses in the technology sector would do well to implement NDAs for their workers, business associates, and investors to safeguard proprietary information and trade secrets ^[11].

Tech businesses need to be well-versed in and compliant with all applicable worldwide intellectual property rules and regulations to safeguard their intellectual property rights. There will be a global defence of their intellectual property assets thanks to this. Businesses in the IT industry may generate substantial income by licencing their intellectual property (IP) to other companies. Patent, trademark, and copyright licensing are all possible formats for this. Another way that companies might use their intellectual property is to come up with new ways of doing business ^[12].

A technological company's growth plan often includes Mergers and Acquisitions (M&A) deals, which can pose challenges when it comes to intellectual property (IP). However, such deals must incorporate IP concerns. Reviewing any IP-related endeavours, identifying the prospective company's IP resources, and assessing the

strength of their IP holdings are all part of this process. IP can also be hacked through cyberattacks, and thus, companies need to also have an adequate cybersecurity plan in place to ensure that their IP is not used, disclosed, altered, destroyed, or interfered with without their consent ^[13].

The Role of Intellectual Property Protection

There has been an incredible rate of change in the terrain within the past 20 years. According to the UNCTAD's The Technology and Innovation Report 2023, the cutting-edge or possibly disruptive technology sector is expected to experience explosive growth, going from its current valuation of USD 1.5 trillion to an astounding USD 9.5 trillion by 2025. Within this framework, AI stands tall as a titan. Forecasts put the value at \$191 billion by 2024, up from \$65 billion in 2020. The revolutionary power of AI is impossible to ignore, with 438,619 articles covering the years 2000–2021. And second, we have the IoT, which is expected to grow from \$130 billion in 2018 to over \$1.5 trillion in 2025. It proves its relevance with 139,805 articles covering the years 2000–2021. Another important frontier, big data, is projected to grow from \$32 billion in 2017 to \$157 billion in 2026 ^[14].

Protecting intellectual property rights is critical in this dynamic environment. Robust intellectual property protection is becoming more important to encourage innovation, compensate inventors, and maintain the pace of these revolutionary technologies as they proliferate.

Strategic alliances and ventures into freshly opened markets are only two examples of the new possibilities, outcomes, and pathways made possible by disruptive technology. Such innovation will undoubtedly disrupt long-standing markets, forcing out long-standing competitors and changing the face of whole industries. Consequently, businesses must take all necessary measures to prevent the theft or piracy of their ideas in the future. The sensible course of action here would be to retain the services of solicitors who are versed in intellectual property law ^[15].

Patents serve as safeguards for innovations in the innovation ecosystem. An inventor can protect their ideas and creations as their own by obtaining a patent, which grants them a monopoly right. Because it gives innovators a short-term monopoly on their creations, the protection is necessary to encourage innovation. For a set amount of time, usually twenty years, it lets creators show off their innovations to the world while retaining exclusive rights to use, manufacture, or license them.

As trailblazers in their fields, disruptive innovators rely heavily on IP protection. Particularly vulnerable to imitation are their disruptive goods. Without intellectual property protection, competitors might unfairly take advantage of inventions without investing in R&D. The purpose of intellectual property (IP) protection is to ward off these dangers and provide a safe haven for inventors to fund research projects. Because of this, they are motivated to challenge established standards, break with tradition, and introduce groundbreaking concepts ^[16].

Intellectual property protection serves as more than just a legal buffer; it encourages investment, which in turn spurs innovation. A strong IP portfolio increases the likelihood that investors will put money into new ideas. The promise of exclusivity lowers the risk of investing in novel technology and increases the chance of return on investment.

Self-Driving Cars and Intellectual Property

Many corporations, from digital startups in Silicon Valley to vehicle manufacturers in Detroit, are putting money into an emerging technology that will make autonomous cars a reality. Improved sensors, more accurate global positioning systems (GPS), enhanced operating and safety software, and enhanced crash-avoidance surveillance systems are just a handful of instances of such innovations.

Companies that put money into innovations often make the case that autonomous vehicles will make city driving easier, safer, and less congested. Cars that drive themselves are the wave of the future, according to businesses, and they expect their widespread use to happen sooner than most customers think. According to a forecast by the Boston Consulting Group, the worldwide market for autonomous vehicles will reach \$42 billion by the year 2025. When it comes to the development of fully automated cars, intellectual property is crucial. Companies are acquiring patents for robotic car control mechanisms, copyright laws for software systems with greater integration, and trademarks for new businesses associated with autonomous cars. Motor manufacturers, rather than IT giants in Silicon Valley, were in charge of developing over 22,000 new autonomous car technologies worldwide between 2010 and 2015. In 2017, the Consumer Electronics Show in Las Vegas had the greatest automotive participation historically with 128 firms tied to automakers ^[17].

Collaboration and cooperation are beginning to be recognised as beneficial by companies, despite the deluge of self-driving vehicle intellectual property filings. Automobile manufacturers are stepping up their collaboration with both industry rivals and Silicon Valley tech companies. This is because they believe they can gain an advantage by working with some of the brightest brains in electronic programming, robotics, and automation. To make self-driving vehicles a reality, technology companies and automakers would essentially need to work together. Opportunities for assessing value concerns in the electronic goods, technologically advanced, and vehicular sectors abound with the development of self-driving automobiles and associated technologies ^[18].

Tesla Motors

The world's most famous automaker, Tesla Motors, is best recognised for introducing groundbreaking automotive technologies; it is this innovation that has helped build the Tesla brand into what it is presently. Tesla did more than merely produce groundbreaking vehicles; it utterly transformed the automotive industry ^[19].

In a patent that was submitted a few years back, Tesla sets out the basics of how to use the other vehicles on the road as ground-based navigational satellites in software. According to Tesla, this device would allow the business to enhance the location accuracy of its fleet even in regions with weak GPS signals. The automobile company's patent history reveals that, despite the usefulness of GPS signals transmitted by space-based satellites, the accuracy of GPS receivers can be affected by factors such as satellite geometry, signal blockage, atmospheric conditions, ionospheric disruption, and more. Technology that significantly improves location accuracy is urgently needed, particularly because it will be used extensively by autonomous or self-driving cars ^[20].

“Technologies for Vehicle Positioning” is the name of the patent that details the software that allows vehicles to communicate the necessary signals and location data. As a result of the procedure, the vehicles may communicate their whereabouts to one another and function like GPS satellites in Earth’s orbit. An explanation given in Tesla’s patent is that the software is very adaptable, as it is capable of functioning with several network protocols. When used in conjunction with driverless vehicles, this more accurate locating system might be invaluable. All of the innovators who worked on the patent filings were also on the autopilot team, so it’s evident that Tesla intended for it to be used by the system for autopilot.

On top of that, Tesla unveiled a patent called “Enhanced Object Detection for Autonomous Vehicles Based on Field View” to make its autopilot cameras better at detecting objects in pictures. The invention describes a system wherein the vehicle’s image sensors are installed in various spots. For instance, the vehicle’s forward-image sensors can take a photo of an actual spot as it draws near. An important point to make is that these kinds of photographs rarely feature important items like pedestrians, cars, barricades, or autonomous vehicles.

Another patent that Tesla received not long ago was for “Estimating Object Properties Using Visual Image Data.” The goal of this innovation, as outlined in their patent, is to make vision sensors for mass-market autonomous vehicles easier and cheaper to produce. This method enables a vehicle to detect and gauge the proximity of nearby objects by utilising the vehicle’s visual data in conjunction with machine learning. An invention that utilises two neural networks to determine object distances exclusively from picture input is detailed in Tesla’s patent. For object distance calculations, the first neural network makes use of pictures captured by cameras surrounding a vehicle.

Tesla is now much more equipped to automatically categorise visual data thanks to the patent. Applying this method would undoubtedly hasten the development and distribution of updates and improvements to Tesla’s comprehensive self-driving and autopilot suites, as labelling is perhaps the most labour-intensive component of making this technology. Potentially game-changing for fully autonomous vehicles is Tesla’s patent-pending arrangement. When compared to rivals like Waymo, Tesla’s image-based fully autonomous driving technology is light years ahead. Nevertheless, based on the accounts of a few beta testers, Tesla’s fully autonomous technology has shown encouraging results thus far ^[21].

The Need for Strategized Protection

When dealing with inventions that cause significant disruption, traditional approaches to intellectual property (IP) may not cut it. Traditional approaches, such as isolating individual innovations through patenting, could fall short when faced with the diversity of disruptive technology. There is no way to patent individual components of disruptive breakthroughs since they come as interconnected systems. Therefore, disruptive inventors need a comprehensive plan to safeguard their creations ^[22].

The field of intellectual property protection for revolutionary inventions places a premium on being proactive. Everything boils down to keeping a constant eye

on the competitive scene, looking for danger signs, and adjusting tactics as needed. Patents, confidential information, literary rights, and key partnerships are all part of proactive intellectual property administration. The focus here is on swiftly fixing any IP problems that crop up ^[23].

As a matter of strategy, it is essential to have a robust IP portfolio. Disruptors care not just about protecting their groundbreaking innovations but also about associated technology that may offer them an advantage in the market. For innovators looking to strengthen their market position through licensing or partnerships, a robust IP portfolio can be both a boon and a bane.

Proactive Steps from an Indian Perspective

India is rapidly establishing itself as a formidable competitor in the global innovation economy. Innovations that shake things up are coming out of India’s vast researcher, scientist, and entrepreneur skill pool. Our influence spans several sectors, including healthcare, renewable energy, information technology, and biotechnology.

The Indian government understands the importance of protecting intellectual property. Good programs like the “Make in India” initiative and the National IPR Strategy, which work to encourage innovation and protect intellectual property rights, have emerged and grown in recent years, attesting to this. Streamlining patent assessment processes, encouraging new businesses to launch, and bolstering innovation in key industries are all examples of such measures.

In this age of rapid, game-changing advancements, teamwork is becoming more important. To improve information exchange and joint research, Indian universities are teaming up with their foreign equivalents. India is becoming an important player in the worldwide ecosystem for innovation because of its many incubators, technology parks, and collaborative innovation centers, which are fostering a mindset of innovation and producing intellectual property. A change towards a comprehensive IP strategy and proactive management is necessary as a result of the reshaping of industries brought about by disruptive breakthroughs. India’s government initiative, collaborative efforts, and proactive innovation strategy all highlight the importance of strategic protection in an ever-changing environment ^[24].

Protecting Intellectual Property in the Era of Rapid Technological Change

Effective and relevant intellectual property (IP) management is essential in today’s fast-paced digital world, when technology is advancing at a dizzying rate. Because new technology is blurring the lines between who owns what and who controls it, the old structures and procedures that have done a decent job of protecting creations and innovations are coming under attack. The environment is changing in profound ways, from the goal of blockchain technology to decentralise intellectual property registries to the possibility of AI producing works of art independently of human creators. To keep up with the rapid pace of technological change, IP managers need to be able to see what’s coming next and adapt quickly.

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