INTELLECTUAL PROPERTY RIGHTS, ARTIFICIAL INTELLIGENCE & MACHINE LEARNING - WEAVING TOGETHER THE FUTURE OF MICRO, SMALL, AND MEDIUM ENTERPRISES

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Abstract

Micro Small and Medium enterprises have been gaining a lot of traction over the years and particularly since the outbreak of COVID, the government has believed that the only way to prosper is to 'Make in India'. MSMEs have been recognized as the backbone of the Indian economy & a significant contributor to the GDP of India. Although the government has encouraged the MSMEs through various schemes and incentives, these enterprises usually fall prey to large multinational corporations, the primary reason being, the lack of IP protection. The main aim of this article is to explain the impact IP assets can have on the growth of an MSME, highlight the various challenges that are faced when it comes to procuring important IP assets for the development of the business, and emphasize the role technology such as Artificial Intelligence and Machine Learning can play in eliminating the various challenges in IP administration & management, thereby giving the MSMEs an equal opportunity to capitalize on their IP assets. The paper also sheds light on the various initiatives currently being implemented in the IP industry by several countries. Having analyzed various AI-based initiatives by other countries, the authors argue that the Indian IP system needs to incorporate similar AI-based tools in it's IP regime with an intention to automate its processes & eliminate the repetitive & time-consuming parts, thereby making IP more approachable as an asset for MSMEs.

Keywords: MSME, Intellectual Property Assets, Innovation, Artificial Intelligence, Automation, and Globalization.

INTRODUCTION

Innovation, as a realm, is understood in a wide spectrum and is a common symbol for change, something novel, expressing itself as new products, innovative technologies, non-traditional services, or unconventional management methods.[1] The Schumpeter[2] Innovation theory classifies 'invention' and 'innovation' in different brackets, and emphasizes on an **innovation to mean a significant contribution to an already existing product, process or service.** With **innovations closely related to entrepreneurship** in the Modern economy, this remains the most efficient way for Small & Medium sized enterprises to thrive & develop in the market. The Startups & Micro Small and Medium Enterprises(hereinafter referred to as **MSMEs**) play a significant role in 7driving the economy, contributing to job creation, exploiting newer technologies, and creating inclusive societies which allows every section of the society to prosper & make a sufficient living. Although countries & regions differ significantly in the degree to which innovative businesses are created and aided to prosper,[3] Innovative businesses are definitely a global trend. The Indian ecosystem has been promoting the setting up & growth of the startups & MSMEs through innovation & design, and has been introducing various initiatives that cover a wide array of sectors including agriculture, manufacturing, social sector, healthcare, and education, among others. **From the simplification of procedures to fast-track patent examinations**, the Indian government has been constantly pushing towards a stronger foothold of innovative businesses while stressing primarily on protection of their intangible properties, i.e., their Intellectual Property Rights.

Intellectual Property Rights (hereinafter **'IPR'**) have been in existence since 1957, and play a crucial role by contributing enormously to the national economy. Intellectual Property (IP) being intangible has become an integral part of society. From an ordinary citizen to a big Multinational Corporation, it has successfully catered to various needs of different entities in the society. IPR is

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[1] Sikora J & Uziębło A, *'Innovation in the enterprise – an attempt to define'* 351 (2(2) *Management and Finance* 2013).

[2] Śledzik K, *'Schumpeter's view on innovation and entrepreneurship'* Stefan Hittmar (ed.), *Management Trends in Theory and Practice* 89 2013).

[3] Breschi S, Lassébie J, *et.al,, 'A portrait of innovative start-ups across countries'* 02 (OECD Science, Technology and Industry Working Papers, OECD Publishing, Paris, 2018)

primarily of 3 types: Trademarks, Copyrights, and Patents. These 3 types differ in nature and application. Trademarks help in creating a brand of a product or company, Copyrights help in protecting the literary or artwork of any skillful artist, and Patents help in safeguarding the process and the working of a particular invention. [4]

Over the years, the benefits of IPR have been reaped by consumers in the form of innovative commodities and by Companies in the form of safeguarding their reputation in the global market. **However, these benefits have not been enjoyed by one class of enterprises that have been gaining momentum since their inception in the society** i.e. is the MSMEs. The MSMEs were introduced by the Government of India (hereinafter '**GoI**') under the *Micro, Small, and Medium Enterprises Development Act 2006*, and they mainly engage in the manufacture and production of goods and commodities. The GoI launched the MSMEs intending to make it an integral part of the Indian economy, while also furthering the generation of employment opportunities **in the rural and backward areas.** Employing over 60 million people in the country, this sector contributes to **8% of the Indian GDP.**

Although contributing to the country's GDP, the MSMEs have failed to identify the need for intellectual property protection at their early stages. This important step to establish a brand in the market has been missed out on by this sector. Owing to the small scale of operations of these enterprises, understanding the nature and application of intellectual property rights becomes a vexatious task. Apart from the lack of funds and knowledge of the existence of such protections,[5] the process of registering the IPR is extremely elaborate and tedious. Hence, the small-scaled enterprises are at a disadvantage and thereby at the mercy of the big and established corporations.

However, with the advent of technology and growing support from the government, the MSMEs are gaining recognition as a major segment in the global economy, which in turn brings us to the

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[4] Uzair Ahmed Khan 'Introduction to Intellectual Property' *IP Leaders available at* :https://blog.ipleaders.in/introduction-intellectual-property/ (last visited on 15th October 2021)

[5] Spithoven A, Vanhaverbeke W, *et.al., 'Open innovation practices in SMEs and large enterprises'* 537 (Small Business Economics 41/03, 2013).

crux of the article. Having these IP rights protected at the micro to small scale level allows credibility and speedier growth of the economy, as well as establish visibility and improve market awareness of the enterprise. Technology has made the protection of these rights considerably easier with global recognition. The fast-paced growth of technology and integration of Artificial intelligence and Machine learning has made IPR more accessible.

Through this article, we intend to **propose ideas and a means by which Artificial Intelligence (AI) and Machine Learning (ML) (hereinafter 'AI/ML') can be incorporated as tools to bridge the gap between the MSMEs and IPR.** Although these technologies have largely been accessible to the big corporations, the article recognizes the various impediments that are faced by the MSMEs when it comes to procuring an IP asset and how AI/ML can be used to eliminate these obstacles and make the process less tedious and cumbersome.

THE NEED TO INCORPORATE IPR INTO THE REALM OF MSMES

A. THE SURGE OF MSMES IN THE ECONOMY

The Indian economy has faced a major setback because of the COVID 19 pandemic, and to revive the economy and reduce the deficit in the balance of trade, the government propagated the slogan 'Make In India'. It laid down the vision of becoming self-reliant, helping the economy to recover from the current crisis. To do this, it was important for the government to strengthen various MSMEs in the country. There are different definitions of the term MSME varying from country to country. The most commonly used terms to differentiate MSMEs from large manufacturing units are the number of employees, total net assets, sales, and investment level. Before analyzing the relationship between IPR and MSME, the authors define the classification of an MSME in India.

In accordance with the provision of Micro, Small & Medium Enterprises Development Act 2006[6], the MSME are classified as below:

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[6] Micro, Small, and Medium Enterprises Development Act, 2006 (Act 27 of 2006) , s.7(1)(a).

(i) A micro enterprise, where the investment in plant and machinery or equipment does not exceed **one crore rupees** and turnover does not exceed **five crore rupees**.

(ii) A small enterprise, where the investment in plant and machinery or equipment does not exceed **ten crore rupees** and turnover does not exceed **fifty crore rupees** and,

(iii) A medium enterprise, where the investment in plant and machinery or equipment does not exceed **fifty crore rupees** and turnover does not exceed **two hundred and fifty crore rupees**.[7]

According to the MSME Development Act 2006, the level of investment is considered as a major factor to differentiate between micro, small, and medium enterprises. According to the Act the recent ceilings on investment for enterprises to be classified as micro, small and medium enterprises are as follow

Classification	Manufacturing Enterprises	Service Enterprises
Micro	25 lakhs	10 lakhs
Small	5 crores	2 crores
Medium	10 crores	5 crores

The MSMEs have played a significant role in the economic and social development of the country. For a growing sector it's very important to pay attention to procurement of IP assets in order to sustain in the long run. The next part of the article shall focus on the various intellectual properties that can be protected for the growth of a developing business.

B. VARIOUS INTELLECTUAL PROPERTY'S IN NEED FOR PROTECTION

IPR is really critical for any business to foster in the long run. **Wolfgang Starein explains it with the help of an illustration. A small manufacturing company has developed a new product, which is, in many ways, superior to competing products existing in the market. This product**

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[7] Ministry of Micro, Small and Medium Enterprises, Annual Report 2020-21, para 1.2.3.

is characterized by several new distinctive designs and is marketed under a new brand name. To advertise the new product, the company creates or uses its website, in addition to putting out a radio advertisement with a distinctive jingle. Such a company could protect the new **functional features through a patent or a series of patents, the new design through industrial design registration, the associated technical drawings,** and its **website through copyright**, the **associated knowledge through trade secrets**, the **brand name through trademark registration**, etc. In other words, the small company has a great deal of IP, which could be protected and used through a combination of **32 different types of IPRs.**[8]

A National Study conducted under the WIPO Development Agenda[9] reveals the impact Intellectual Property can have on MSMEs. Through a survey conducted on patent applicants from **1995-2004 by Patent Facilitating Centre, TIFAC,** under the **Department of Science and Technology, Government of India in 2009-10** as a part of the study, it was analyzed that **12% of the accepted patent holders did not have a valid address, and out of the available applicants, only 15.79% responded.** Out of the positive responses, it was analyzed that over **47% of respondents belonged to MSMEs.** Further, **53% had invested in trademarks, 40% protected their designs & 49% benefited from an increase in revenue from patent protection**, with 62% continuing to maintain their patents to grow their capitalization value. Although the data isn't current, it must be analyzed that the benefits reaped by the MSMEs through IP protection is evident. With over 49% of the limited applicants stating the material benefits assumed through patent protection as well as other IP assets, it becomes all the more essential for MSMEs to invest in IP assets & management, and capitalize on their intangible assets.

IPR has played a pivotal role in ensuring there isn't any kind of knowledge drain or information leak in the market by big companies that might hamper their position in the market. IPR as a tool is not only important or relevant for giant companies but also to the MSMEs that are slowly

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[8] Wolfgang Starein, *'A Tool to Enhance Competitiveness of SMEs'* 7 (Journal of Intellectual Property Rights 437 2002).

[9] R Saha, *'National Study on Intellectual Property and Small & Medium Sized Enterprises in India'* 49 (WIPO Development Agenda 2012).

developing and growing in number since their inception. However, unlike big companies, MSMEs that are venturing into every industry, are less equipped with IPR protection. MSMEs are playing a sizable role in the national economy and to continue to contribute to the GDP, they shall innovate and develop new products or processes to meet the demands of the dynamic market, in cases like these the benefits of IPR comes in clutch.

Understanding the importance of the IP system is an integral part of an MSMEs business plan, it is a crucial part of an MSMEs success in the market. Given the rapid globalization, the MSMEs need to recognize the value IP brings to the business, and learn how to optimally manage the IP to sustain and foster growth. IPR enables MSMEs to have exclusivity over the exploitation of their innovations. Exclusivity confers control and creates an incentive for investment[10], collaborations, licensing, and thereby provides a solid business platform for advancing a coherent global strategy.

For MSME that are newly established, it is highly pertinent to consider the various types of IPRs that can be availed to protect their position in the market. In the illustration discussed before, every activity that the manufacturing company performed was done to be distinctive in the market and to promote its identity in the market. By doing so, it not only attracts the attention of different consumers but also various competitors. The market is growing at a very fast pace with every industry witnessing a boom in the businesses and firms being established. This has led to a constant battle between the companies to occupy a dominant share in their market, by focusing on growing and retaining their customer and client base. Without any kind of IPR protection, establishments such as MSMEs are at the mercy of such powerful corporations, which renders them incapable of having control over their decisions.

India is a fast-growing economy, and there is a growing concern as to how stronger IP protection can boost the economy. Various IPs have different functions and serve different purposes for MSMEs.

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[10] Dr. Guriqbal Singh Jaiya, *'The Importance of Intellectual Property (IP) for Enhancing the Competitiveness of Small and Medium-Sized Enterprises (SMEs)'*, WIPO SME Division, Baku, June 2003, *available at* :*wipo_ip_bak_03_www_34145.pdf* (last visited on 10th Sep, 2021).

i) Patents: Patents are the most commonly ignored IPR by MSMEs. Patents have been useful in increasing the performance of various MSMEs. Although Patents are less incorporated by MSMEs it has been ascertained that if MSMEs did invest in getting patents, it considerably improves the innovation and financial performance of the enterprise. **Spithoven and his colleagues have found that MSMEs normally tend to patent those innovations that are likely to be successful, whereas when it comes to large firms they have sufficient resources and personnel to afford to patent all their innovations.** MSMEs owing to lack of funds and resources make patenting a one-time event.[11]

A prominent example explaining the role of Patents is **Dr. Reddy's** which **began its journey as an MSME**. Dr. Reddy's Research Foundation was **established in 1993** with the objective of discovering new therapies and just within a few years of research, they were successful in developing **three important formulations** which were **later licensed to a pharmaceutical company in Denmark known as Novo Nordix** through a **landmark agreement** which earned an international reputation to DRF. **DRF attributes all his success to patent production. Dr. Reddy's is an example that the Economic Success of companies can be measured in terms of the IPs they create, protect and leverage.**

ii) Industrial Design and Trademark: A Trademark or brand name is a distinctive sign which identifies certain goods or services that are manufactured or produced by a particular person or enterprise. Industrial design is just an ornamental or aesthetic design of a product or article. Industrial designs and Trademarks are those rights which are considered important to launch a product or service in the market. It was found by **Jensten and Webster that industrial designs are the most popularly used IP right among the MSMEs.** Trademarks on the other hand are on the similar lines as patents when it comes to availability and quantity of data. Another advantage of having a trademark as a right is that it generates one of the highest IP revenues.

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[11] *Supra* note 5.

In a report made by **Agostini, Filippini, and Nosella[12]**, it was **found that small companies having the rights over at least one trademark tend to show higher performance**, which is more than can be said for an MSME with no trademark. **Trademarks are relatively cheaper when compared to other statutory IPR, causing MSMEs to invest more in trademarks to act as innovation indicators**. However, despite knowing the benefits that **trademarks entail for MSMEs the percentage of MSMEs that have invested in trademarks are far lesser than large companies.[13]**

A pivotal example of an **MSME is OYO**. A firm that started out as **Oravel Stays in 2012**, was **renamed as OYO in 2013 & trademarked with the Indian IP Registry in 2015**. Having started as **budget hotels**, the company has now expanded into becoming a **multinational hospitality chain of leased & franchised hotels, homes** and living spaces with a presence across **80 Nations** including **India, UAE, Nepal, Malaysia, UK, US, China, Japan, Saudi Arabia, Mexico, Brazil, Sri Lanka, Indonesia, and Vietnam, among others.** Having trademarked its wordmark & device, and leveraged their knowledge & creative expression early in their stint, Oyo was able to blitz the market and establish their standing in the hospitality market while setting themselves apart from the competition on a global scale.

iii) Copyrights: Creative, artistic work and expression of ideas are protected with the help of Copyrights. The use of Copyrights is widespread across all industry sectors. **In a research conducted by Thoma and Bizer,** they have **classified protection mechanisms for MSMEs into three clusters: an informal protection group, a copyright oriented group, and a non protection group.** They went on to highlight that the copyright oriented group also focuses on trademarks and industrial designs as protection mechanisms. Hence it can be concluded that the **use of copyrights in MSMEs is also linked to higher use of related IPR such as industrial designs.[14]** To establish the importance of protection of copyrights among the MSMEs further, the

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[12] Agostini L, Filippini R, *et.al.*, *'Protecting intellectual property to enhance firm performance: does it work for SMEs?'* 96 (14(1) *Knowledge Management Research & Practice* 2016).
[13] *Id.* at 99.
[14] Thomä J, and Bizer K, *'To protect or not to protect? Modes of appropriability in the small enterprise sector'* 35 (42/01 *Research Policy* 2013).

case of **"People Tree v. Dior"** is a prime example.[15] **People Tree, a small Indian art collective** & store that **creates unique & original artwork and printed garments filed an infringement claim against Dior for a specific artwork** that was **reproduced by the latter without due authorization.** As per **Section 2(c)** of the **Copyright Act**, a work of **"artistic craftsmanship"** would become an **"artistic work"** within the meaning of the Act, and qualify for protection under the Copyright Act, provided they are original. **People Tree had an original copyright-protectable subject-matter of their '*drawings of the yoga positions 'Natrajasana' and 'Padmasana' surrounded by the lotus flower'*** which was reproduced by **French fashion designer, Christian Dior in his Cruise 2018 collection**, that resulted in the infringement of People Tree's **copyright over the yoga design.** Although the parties chose to settle the dispute **through an out-of-court settlement**, it is pertinent to understand the importance of such protection in the case of such MSMEs. With their artwork, designs, and every other copyrightable subject matter protected, it would strengthen the foothold of the MSMEs & allow them to compete with the big companies on equal footing in case of any infringements.

So far we have established that IP assets play an essential role in the long run of an MSME, however, in **reality procurement of IP assets is easier said than done.** The IP Administration system in India suffers from severe flaws which makes it extremely difficult for anyone to begin and complete the journey on procuring an IP asset.

EXISTING IMPEDIMENTS IN THE IP INDUSTRY

The IP Office in India that is incharge of providing Trademarks, Copyrights and Patents to various applicants over the years has remained ineffective with respect to examination, administration and registration of IP assets, due to the red-tapedness, lack of technological innovation, and sufficiently trained staff. With respect to Trademarks, it is not just important to create a strong trademark, but also ensure that the trademark one has created is not used by anyone else in the world as their brand. Obtaining trademarks is currently considered to be a lengthy & tedious

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[15] Sreyoshi Guha, 'People Tree v. Dior: IP Infringement, Cultural Appropriation or Both?', *SpicyIP*, 1 February, 2018, *available at* :People Tree v. Dior: IP Infringement, Cultural Appropriation or Both? | SpicyIP (last visited on 18 August 2021).

procedure where for any trademark to get registered **it takes 8-24 months, on an average.**[16] One of the common problems faced by startups or new small businesses is that the moment they begin to operate using a trademark, they are bound to receive a desist notice or infringement or passing off case in Court by another brand owner with a similar mark. The **Indian courts attach a greater importance to prior use rather than prior registration**[17], which means the business that has adopted or used the trademark earlier will get an injunction from the court, whereas the other business owner is caught in the web of litigation proceedings.

One of the reasons for this incident to occur is **substandard status of examination of the applications.** Once a trademark is filed, the Registrar is duty-bound to carefully examine it. He is obligated to examine the application and identify any Section 9 or Section 11 objections under the Trademarks Act 1999. **Section 9 refers to absolute grounds of refusal whereas, Section 11 refers to the relative grounds of refusal.** The Registrar must analyze that the applicant's mark is not similar to any other prior registered mark. There have been several instances where a mark that fails to clear the test of Section 9 and Section 11, thereby one that isn't distinctive or already exists in use, have been accepted and advertised, just for the mark to be later opposed by a third party, inturn delaying the process of registration further.

Year	Applications Advertised	Oppositions Filed	Cases Disposed
2014-2015	81,959	14,540	12,091
2015-2016	1,17,408	18,910	38,846
2016-2017	3,33,673	33,882	23,902
2017-2018	4,23,030	43,450	41,535
2018-2019	3,96,063	51,975	50,828

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[16] Prasad Karhad, 'Trademark Registration India' Patent In India, *available at* : https://patentinindia.com/trademark-registration-india/ (last visited on 20 August 2021).
[17] Trade Marks Act, 1999 (Act 47 of 1999), s. 34.
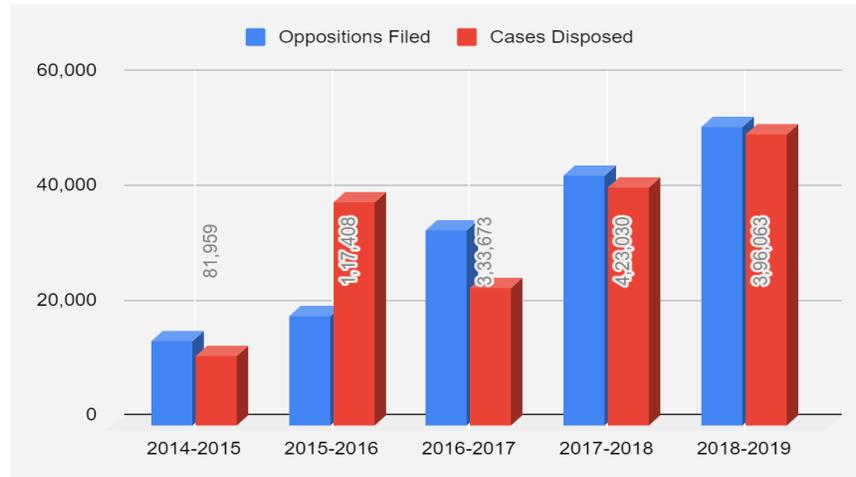
(Source: Annual Reports of Trademark)

As seen in the above graph, the number of Oppositions filed have been increasing every year. Thousands of applications go through the cycle of Oppositions and Counter statements and if it cannot be settled it goes for a show cause hearing. This tends to delay the registration of the trademark of an applicant and also discourages an applicant from filing for an effective trademark in future. With the fear of being opposed due to the improper examination of the Registrar as to the validity & possible enforceability of the mark, the MSMEs tend not to invest their already low amount of funds towards identifying & protecting their IP assets.

As far as MSMEs are concerned the Registry has failed to maintain specific data with respect to the number of applications Filed, Objected, Opposed, Abandoned and Registered with respect to trademarks, patents or designs. Not having a proper metric for the data pertaining to MSMEs, many applications are either refused or abandoned and do not see the end of the registration process.[18]

With respect to Patents, conducting a patentable search before filing for an application is extremely important. It helps the applicant to identify any prior art that is similar to the novelty or inventive step of a particular invention. The patentable search involves thoroughly studying different kinds

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[18] *Supra* note 10.

of patents belonging to the class of goods associated with the applicant's invention. While performing a search using different search techniques, thousands of results are produced and the applicant has to carefully examine each and every result, as neglecting any relevant patent application could open doors to future patent litigation.

However, performing a suitable and relevant patentable search before filing a patent application is not the only extensive challenge faced when it comes to registering a patent. After filing a provisional patent application, the application undergoes strict scrutiny to determine whether to accept or reject the application, but there is a big delay from the time of filing the application to releasing the First Examination Report (FER). The Patent Offices are criticized for not promptly processing the applications, however, the reality of the matter is it is easy for anyone to file as many applications at any particular point in time, but the Patent Offices have the duty to process every single application carefully before granting a patent. This has not only taken a toll on the prompt prosecution of an application but has also discouraged people from applying for patents due to the extremely delayed process. [19]

Although these problems continue to persist, in the current digital era it is important to reflect on the changes that technology has brought in the legal fraternity. In times of pandemic several legal professionals have resorted to technological tools to continue the administration of justice. Technology such as AI and machine learning has snatched several jobs in various sectors and it is critical to note that these jobs are the ones that require repetitive, mechanical and easy replicable skills and not the ones that are creative, challenging and original. The same can be leveraged by the IP industry, with the current problems faced by the IP sector with reference to examination or the struggle of performing an effective prior art search, or maintaining a database of information pertaining to the applications filed by various MSMEs. AI can possibly eliminate the workload of

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[19] Joginder Singh and Piyush Sharma, 'Compensating delay in granting of patents', LexOrbis, *available at*:https://www.lexorbis.com/compensating-delay-in-granting-of-patents/ (last visited on 14 August, 2021).

IP professionals, thereby making the process of procuring an IP completely cost effective and time saving.[20]

ARTIFICIAL INTELLIGENCE AND IPR

The role IPR plays in the advancement of various businesses, particularly MSMEs is extremely significant. The pandemic impelled several MSMEs to adopt a digital mode of operation to sustain the economic setback dealt to their industry. The digital space is vast, and for companies making the shift in the face of a natural calamity, it becomes extremely difficult to adapt and learn. Although the 21st century is considered to be the Information Age, one marked by the rapid adoption of new-age technologies, we have yet to come a long way. Artificial Intelligence, a term whose inception dates back to 1956 has proven to have the potential to maximize the performance of businesses in every sector. **Machine Learning, a branch derived from AI, has made considerable strides in automation largely relying on data analysis**.

The lucrative ML algorithm uses historical data as input to predict new output values without any explicit programming. Whereas, AI is a program that enables computers and machines to mimic the activities performed by an ordinary human, such as data analysis, problem-solving, and many more. This program is so advanced that it has proved to be extremely useful for performing different business activities. Understood to be a **study of 'intelligent agents'** by well-known scientists & researchers **Russell & Norvig**, they analyze that AI implements **a function that maps perceived sequences to actions**, that **perceives its environment and takes actions that maximize its chance of achieving its goals**.[21] Big corporations have begun investing in AI to automate customer interactions, improve the personalized shopping experience on their websites, perform data mining and data analysis and in some cases also assist in the recruitment process.

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[20] Prof. Padmanabha Ramanujam, 'Changing Dimensions of Law Schools in India', BWEducation, *available at* http://bweducation.businessworld.in/article/Changing-Dimensions-Of-Law-School-In-India/13-05-2021-389569/ (last visited on 14 August, 2021).

[21] Stuart J. Russell and Peter Norvig, *'Artificial intelligence: A Modern Approach'* (4th Ed. Hoboken:Pearson, 2021).

Over the decades, through rigorous scientific research & technological development, Machine Learning and Artificial Intelligence have developed to a level where it has become an indispensable part of our day-to-day lives. Being implemented from conducting a basic internet search to detecting frauds & compliance with procedures in the Fin-tech industry, Machine Learning & Artificial Intelligence have been increasingly being used to replace the menial, repetitive, time-consuming and rubber-stamp work, which does not need the creativity, intelligence, or supervision of a human being. In this part, the authors will shed light upon the prevalent uses of AI/ML across various verticals, and analyze how these algorithms can be implemented successfully in the field of IPR.

Artificial intelligence has been primarily used to detect & unleash actionable insights in a world of massive, unstructured data, providing a competitive edge on the business front. By automating manual, time-consuming tasks, the businesses have been able to focus on high-value & result-driven work, whereas the AI can be trained in detecting patterns that highly trained professionals can overlook. The current applications of AI & ML include copyright detection systems, fraud detection, data security, language mining, marketing, online search, recommendations, and security screening among others.[22] **A few examples of the current applications that can be adopted to make the IP industry more efficient have been analysed by the authors.**

Youtube constantly feeds their **Copyright management tools** and Content ID algorithm to detect & identify copies or potential copies of copyrighted content, AI/ML is being used to flag copyrighted material by owners, control its use & monetize it.[23] This considerably reduces the time spent by individuals in manually sorting the data to check for any copyright violations & also allows for a leeway for mistakes. This use case can be implemented to sort out & detect any patent prior arts or registered trademarks. Closely related tool, **Google Jigsaw**, which has been designed to **detect & remove any content that promotes terrorism or jeopardizes national security.**[24]

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[22] Karthick Hariharan, 'How to make Artificial Intelligence work for your Organisation', LatentView, *available at* :https://www.latentview.com/how-to-make-artificial-intelligence-work-for-your-organization/;How Data Science, AI, and Machine Learning Work Together (latentview.com) (last visited on 10 August 2021).

[23] Saadatpanah P, Shafahi A, *et.al., 'Adversarial attacks on copyright detection systems'* 8307, (PMLR, 2020)

[24] Google Jigsaw 'Jigsaw' *available at* :https://jigsaw.google.com/ (last visited on 12 August 2021).

This has made protecting & maintaining the security of the States significantly easier. In the IPR field, this can be used to remove & alert the applicant about any sort of irregularities in their applications.

However, these systems have not addressed the security issue, which have been theoretically proved with a proof of concept[25] by conducting adversarial attacks on the system & fooling it. Although in a learning stage, AI/ML can learn to adapt from these attacks & implement a stronger, denser neural network to protect the rights of the individuals & entities. Another use case of AI/ML that has great potential, is the AI-powered content marketing platform **GPT-3**, which creates **100% original copy** through a combination of several ML algorithms. Copy for businesses remains as the key tool to communicate with their customers, and with AI being able to create original content would reduce the burden on the companies to come up with engaging content.

With AI being able to create novel content, it could be extremely elevating for the IP industry & MSME entities to gain assistance to create original trademarks & wordmarks to establish their brand. Moreover, AI/ML has seen increased implications in the Fin-Tech industry with ML algorithms analyzing millions of data points within seconds & identifying anomalous or non-compliant transactions, as well as conducting due diligence through a primary tool developed by Merrill Corporation.[26] The IP sector suffers from time-consuming & delayed examinations as recognized in the previous part, this use case of AI/ML can be programmed to assist in the reduction of the inaccurate examinations.

Yet another application of **AI is a Recommender system**, which are widely-used applications of ML that are mainly based on historical data that ranks items based on relevancy & thereby makes suggestions to the users accordingly. These systems can be further divided into 2 categories -

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[25] Rohan Taori, Amog Kamsetty, *et.al.,* "Targeted adversarial examples for black box audio systems", arXiv Preprint arXiv:1805.07820 (In Press, 2018) ; Seyed-Mohsen, Pascal Frossard *et.al.,* "Universal adversarial perturbations" 1765, *Proceedings of the IEEE conference on computer vision and pattern recognition* (In Press 2017).

[26] Laura Powers, 'Industry-First Redaction Tool Revolutionizes Due Diligence', Merrill Corporation, *available at* :https://www.datasite.com/us/en/company/news/press-releases/industry-first-redaction-tool-revolutionizes-due-diligence.html (last visited on 15 August 2021).

content based & collaborative filtering. Adopting the content-based recommender system into the IP regime would enable the system to make recommendations based on the input received by it. AI can also be implemented in generating names using a recurrent neural network which is trained using an online database or a text-file containing hundreds of thousands of words, using which the algorithm can generate original ideas that emulate the training data. This has widely been used in relation to brand names, logos relevant in a specific category, although the viability of it becoming "brand material" still remains with the entities opting the recommended names. The authors believe the aforementioned applications of AI/ML in favor of IPR would create a successful framework for the future of IPR in every sector, while also assisting the entities that are unable to reap the benefits of AI/ML due to the financial restraints.

Given the various existing implementations of AI/ML, **it can be understood that the registration & management of IP can greatly benefit from the use of AI from the search to the prosecution phase.** Transforming the entire process of IP administration using AI would allow the automation of repetitive tasks, assistance to the personnel & advising the users at scale. With the increasing number of applications of cross-domain IP rights registrations, the AI-enabled system would allow the IP industry a cost-effective & effort-saving solution. **One key example of how AI/ML has been implemented in the IP regime is WIPO's State-of-the-art AI-powered Image Search Tool.** Although limited to the historical training data, this **tool uses deep machine learning to identify a combination of concepts within an image for efficient trademark searches** within the **WIPO Global Brand Database**. **Collaboration between trusted organizations remains key to the success of the digitization of IP Management** as it provides a large database to generate quality training data, which is extremely essential for the success of an AI-enabled system.

Digitizing the filing procedures by converting image data of past paper filings into text data by using an AI-based character recognition function (which includes converting handwritten documents into text data) remains a priority for the Indian IP ecosystem. Additionally, AI & ML can further be used to classify patent & trademark applications based on **heuristic algorithms** (techniques designed to solve a problem efficiently rather than the traditional, time-consuming

methods, where it approximates the exact solution)[27] that preliminarily examine the incoming applications & route them to appropriate examiners, **Natural Language Processors (**an automatic computational processing of human languages which enable computers to process human language in the form of text or voice data and to 'understand' its full meaning, complete with the speaker or writer's intent and sentiment)[28] **& K-Means Clustering Algorithm** (an unsupervised learning algorithm that is used to solve the clustering problems in machine learning, which groups the unlabeled dataset into different clusters, belonging only one group that has similar properties)[29] among others can be utilized to examine the applications & predict objections, semantic/smart search ML algorithms can be used to detect linkages between citations, applications & current state of the art furthering a much efficient Patent prior art search, Image search systems that can be trained using the database of the pre-existing registered images can be implemented to conduct image searches for trademarks, patents & design. Additionally, using AI & ML to manage the helpdesk services would allow the users to avail education & assistance 24x7. Considerable efforts have been made by the United States Patent and Trademark Office (USPTO),[30] European Patent Office,[31] the UK IP Office[32], Japan[33] and the Australian IP Department[34] with respect to the introduction of AI initiatives in the IP industry.

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[27] Pearl, Judea, "*Heuristics: intelligent search strategies for computer problem solving*." 3 (United States: Addison-Wesley Pub. Co., Inc., Reading, MA., 1984).

[28] IBM Cloud Education, "Natural Language Processing (NLP)", *IBM Cloud Learn Hub*, 2 July, 2020, <What is Natural Language Processing? | IBM> (last visited on 19 Sept 2021).

[29] Forgy, Edward W. "*Cluster analysis of multivariate data: efficiency versus interpretability of classifications*". 768-769 (Biometrics. 21 (3), 1965).

[30] United States Patent & Trademark Office, "Emerging Technologies in USPTO Business Solutions" USPTO, *available at* :https://www.wipo.int/edocs/mdocs/globalinfra/en/wipo_ip_itai_ge_18/wipo_ip_itai_ge_18_p5.pdf (last visited on 10 August 2021).

[31] European Patent Office, "ICT Strategies and Artificial Intelligence for IP Administration" EPO, *available at* : https://www.wipo.int/edocs/mdocs/globalinfra/en/wipo_ip_itai_ge_18/wipo_ip_itai_ge_18_p8.pdf (last visited on 10 August 2021).

[32] Graham Rivers-Brown, "UK IPO : The Quest for Digital" UK IPO, *available at* : https://www.wipo.int/edocs/mdocs/globalinfra/en/wipo_ip_itai_ge_18/wipo_ip_itai_ge_18_p2.pdf (last visited on 12 August 2021).

[33] Japan Patent Office, "Outline of JPO's Activities" JPO, *available at* : https://www.wipo.int/edocs/mdocs/globalinfra/en/wipo_ip_itai_ge_18/wipo_ip_itai_ge_18_p9.pdf (last visited on 12 August 2021).

[34] Robert Bollard, "IP Australia Artificial Intelligence Initiatives" IP Australia, *available at* : https://www.wipo.int/edocs/mdocs/globalinfra/en/wipo_ip_itai_ge_18/wipo_ip_itai_ge_18_p7.pdf (last visited on 10 August 2021).

IP Australia stands as a primary example of a **fully digitized service delivery agency** in the Australian Federal Government. Utilizing AI-based tools **across verticals customer support, examination process, patent auto-classifier, & smart assessment toolkit**, these tools have allowed them to **increase digitally conducted customer transactions to 99.6% from 12% in 2012.**[35] Another country that has imbibed technology in their IP industry is the US through **training deep learning systems** in the trademark sector which can predict design codes of a new trademark image & a patent term library generator as well as **AI-assisted patent searching**. Another relevant example that can be analysed to capture the uses of AI to solve the current impediments in the IP regime is the 4th generation, Single IPO platform proposed by the UK Intellectual Property Office.

The **UK IPO has utilized AI-based tools and processes to eliminate two major problems that our Indian system currently faces as well; 1) The business problem**, which includes overburdening of the system (as discussed above, the ratio of the applications filed to granted remains bleak) with extensive demand & improving business agility to market, and 2) **The Technology problem**, which entails again hardware & software, poorly documented systems, & reliable data. Finding a solution, they have created a multi-channel platform that manages documents, data, analytics, communications & generation of the same through a multi-cloud-based platform.[36] A further analysis of the AI initiatives in the IP system brought forward the initiatives taken by **Japan**. **By utilizing AI for the purposes of answering questions by users, digitizing filing procedures, conducting searches for patent prior art & trademarks,** and assignment of patent & trademark classifications, Japan has trained the algorithm in a manner that would **eliminate the extensive, manual & time-consuming work of the examiners.**[37]

Having analyzed the various AI & ML initiatives taken in the Intellectual Property sector in the last decade in several countries, the future looks toward IP management **becoming fully**

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[35] *Id.*, IP Australia's Digital Transformation.
[36] *Supra* note 32.
[37] *Supra* note 33 at 3-1.

automated & self-driven. Although AI seems to be a far-fetched possibility for MSMEs, it has played an important role in the administration of IP for various companies. AI applications have been increasingly deployed in the administration of applications for IP protection because of their extremely effective and efficient ability to classify patents, copyrights, and trademark applications, conducting a search through a large database with respect to any prior art, and performing machine translations that allow users to understand the contents of different patent applications submitted all over the world.

The intersection of AI & IPR[38] presents a two-faceted impact, i.e., **one, as an asset of research or a sorting mechanism**, and on the other hand, **limits innovation and creativity.**[39] With AI & ML having such a distinct impact in the management of IP, bringing its benefits to the largest contributing sector in India, MSMEs is the most feasible & economically viable solution to foster the development of our economy. Although, the challenges such as an extreme dearth of highly-trained professionals knowledgeable in AI & IPR, lack of sufficient & accurate data, and uniform AI guidelines to assist IP offices across the globe remain, it can be addressed as the industry grows, which can be said to still be in its infancy stage. However, to bring the benefits of AI in conjunction with the benefits of IP protection to MSMEs, there can be collaborative efforts made by the Government as well as private entities to develop databases, neural networks & sophisticated algorithms that can make it easier for businesses to protect their intellectual properties without a large investment of funds or time. Adoption of AI would allow streamlining of the process of filings, pre-examination to avoid possible objections, and novelty searches, thereby reducing the time-consuming & repetitive workload, and allowing the entrepreneurs the opportunity to receive protection over their rights without being delayed due to the overly burdened system, and the non-existent IPR dispute resolution division in India.

Although recently, the **Delhi High Court has taken a progressive step towards setting up an Intellectual Property Division (IPD) which will specifically deal with cases related to**

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[38] Renard Castets Celine, *'The intersection between AI & IP: Conflict or Complementarity'* 141, 143 (51 IIC, 2020).
[39] Calvin Nathan & Leung Jade, *'Who owns artificial intelligence? A preliminary analysis of corporate intellectual property strategies and why they matter'* (Future of Humanity Institute, 2020).

intellectual property, several hurdles need to be overcome such as pan-India adoption of specialized forums for IP-related dispute resolution which is in-line with the global practices, and digitization & implementation of AI/ML to simplify & expedite the process of IPR registration, prosecution, assignment & redressal. Inclusion of technology in the IPR practices can transform the MSME industry by affording them the freedom to become aware & protect their intellectual property with ease through the assistance of a virtual handyperson, who is available 24x7 to guide them & educate them about the various benefits that their business can avail through the protection of their intellectual property rights.

CONCLUSION

The authors of this article after an in-depth analysis of the realm of intellectual property conclude that the inclusion of Artificial Intelligence and Machine Learning in the furtherance of protecting intellectual property can become a boon not only for the MSME businesses but also improve the IP administration of the State. The implications of AI/ML adopted by other countries propose a foreseeable future toward an automated, and AI-enabled IP ecosystem. The article intends to urge the IP office of India to adopt the various initiatives, bringing the Indian IP system to par with international practices. AI/ML can be utilized to eliminate various existing impediments that hamper the process of providing Intellectual Property Rights to thousands of applicants, as well as educate & promote the protection of IP among the MSMEs. MSMEs & startups play a crucial role in growing our economy, and simplifying the procedure of filing applications for the protection of IPR through an efficient AI-enabled system would incentivize the MSMEs to bolster the confidence to create & protect their intellectual properties. The current system is time-consuming, lowly monitored, inefficient, and presents an abysmal state of examination, and it is proposed through this article that AI/ML can be adopted to minimize these problems while also making the entire process of IP procurement efficient. AI/ML can also be adapted to maintain a database about IP assets of MSMEs thereby ensuring that many MSMEs avail the benefits of the schemes developed for their upliftment and invest in the procurement of various IP assets. With several countries introducing AI/ML into the IP system, it is high time for India to adapt to these changes & develop a high-functioning and efficient system which can aid & foster the growth of the IP

industry, not just for the high-economy large-scaled companies, but also for the medium & small-scale industries, alleviating the GDP & standard of living as a consequence.