

# Artificial Intelligence and Intellectual Property Laws in Pakistan

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**Abstract:** Unique ideas and creativity are assets of life that are protected by intellectual property laws, and it is not possible to steal somebody's intellectual property as law provide protection to it. This research examines the innovation of AI in IP laws in Pakistan and different aspects of the legal framework and ethical implications, prospects, and challenges. This research work studies the typical intellectual properties with a combination of AI innovations such as copyright, trademark, and patents in Pakistan. The central focus of this research is to detect the growing impact of artificial intelligence (AI) on intellectual property (IP) rights under Pakistan legal system which is critically examined in this research. In order to provide context for their current intersection, this study first examines traditional intellectual property rights and the advancement of AI. It explores important areas such as how AI is becoming recognized in more and more copyrighted works, how it contributes to patent developments, and how it affects trademarks. An analysis of the Pakistan legal framework illustrates the diversity of legal solutions to these emerging issues. The study also discusses the coverage concerns and ethical ramifications that arise after AI integrated into the IP space, also offering insights into possible way. The study offers a perspective on global legal responses and discusses ethical considerations arising from AI's integration into IP law. The current research further provides recommendations for future legal trends and proposes suggestions for policymakers and practitioners are also suggested.

**Key Words:** Artificial Intelligence (AI), Economic and Legal Aspects, Intellectual Property (IP) Laws, Legal System of Pakistan

## Introduction

Currently, the Intellectual Property Organization (IPO) of Pakistan Act, 2012 an integrated piece of legislation that governs the IPR framework. Intellectual property is associated with the creation of a purely human mind. These could be literacy, music, symbols, inventions, solutions, names, images, etc. Intellectual property is intangible in nature and works to prevent the owners from unauthorized use of their work. The benefits of protection are subjected to a certain period. Where it does not allow others to present the same work in their name and also stops them from getting any financial benefits from work.

The future of technology is challenging to predict the current development of artificial intelligence and started a new debate in every field. In this regard, currently two kinds of approaches exist: one considers AI as transcending humanity and the other one considers it as the assistance of man who will solve the problems might humans face. The second approach predicts that there will be an age of machines soon. About three decades ago technology was not as advanced as now it is, as currently it is the fourth industrial era and a lot of machines are already working in every field of life (Dong & McIntyre, 2014). Nowadays artificial intelligence (AI) is holding every aspect of daily life. AI is performing in the discipline of intellectual property (IP) and AI's potential in the IP raises questions about the existing framework and how it will interpret the copyright idea of authorship and inventorship in patents being generated by AI (Lim & D, 2022).

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The aim of Intellectual Property Rights (IPR) is to protect the original creativity resulting from the thinking pattern of the human mind. IPR set an established legal notion where the IPR holder either a natural or legal person have exclusive rights over their authorship or invention. In different jurisdictions of the legal world only natural is recognized and protected as author and inventor under copyright and patent laws. The possibility of allowing AI for innovation and creative work summons the well-established legal norms of IP law (Ginsburg et al., 2002). Can AI-generated work avail the protection under existed framework? Is the present framework sufficient to treat AI innovation or do we need to reshape and interpret the "natural person" by keeping the view of AI? (Hook & S, 2023).

### Working Mechanism of Existing IP Laws and AI

For artificial intelligence to work, data and algorithms are required. Large volumes of data are first collected and put into mathematical models, or algorithms, in a process known as training. The algorithms use the data to find patterns and make predictions. Such types of processing are termed as machine learning. In many cases, human supervises the AI learning process called neural networking, in other cases, it does not require human supervision. This is the most advanced form of AI where it is capable of doing programs on its own in an efficient way with less risk of errors. Artificial intelligence, to put it simply, is the training of machines to think and act like people in order to do tasks automatically and find effective solutions to problems. Natural Language Learning is a kind of artificial intelligence that mimics human comprehension and speech patterns in both written and spoken language (Ellen, 2024).

In artificial intelligence (AI), intellectual property (IP) rights mainly concern patents and copyright laws. Through the rights that patents grant, inventors can restrict who can use, sell, or manufacture their creations for a set amount of time. When artificial intelligence (AI) systems create novel technology, algorithms, or procedures, patent law is relevant. However, because the current legal structure requires a human inventor, granting patent rights becomes difficult when the innovation is solely developed by artificial intelligence. However, unique works of authorship, such as plays, songs, artwork, and literature, are covered by copyright laws. AI encounters copyright law when it produces original content, such as songs, artwork, or articles (Fraser, 2016). The existing copyright laws need a human author, just like patent laws do. This creates complications when handling information created by artificial intelligence. The puzzle of AI's participation in creation and invention, and the ensuing uncertainty surrounding the assignment of IP rights, is one that both copyright laws and patents are attempting to solve. These circumstances emphasize how urgently existing laws must be updated to meet the problems presented by artificial intelligence and its developing capabilities (Craig, 2022).

### Copyright and Authorship in Pakistan

In Pakistan jurisdiction, copyright protection is regulated by the Copyright Ordinance, of 1962 which is duplicated on the English Act of 1914. One of the most significant developments is the regulation of copyright (Amendment Act) 1992, (Amendment Act). Copyright protection was originally limited to fifteen various categories of creativity, namely literacy, music, agricultural work, design, drama, books, newspapers, photographs, cinematography, lectures, and records. Now expand the protection field and add computer software, video films, and audio-visual work (Khan, 2013).

If an invention is given a patent, it is an exclusive right; copyright protection does not apply to ideas, procedures, methods of operation, or mathematical concepts. In nations that have ratified the Berne Convention for the Protection of Literary and Artistic Works (the Berne Convention), copyright protection is unconditional, meaning that it is not contingent upon observing formal requirements like copy deposit or registration. Pakistan has ratified the Berne Convention, signifying that copyright protection is unrestricted by formalities (Gompel et al., 2021).

Anyone who produces an "original work of authorship" is entitled to protection under copyright laws. A description of a machine, for instance, can be protected by copyright, but this does not stop other people from using or selling the equipment. Copyright only protects the expressive form of a work. So, "genuine work for authorship" that exists in some physical form of expression is sheltered by copyright. As long as the impressions can be transmitted by means of devices or other technology, they are not undermining immediately (USLegal, 2015).

## Computer-generated Work (CGW) and Copyright Protection in Pakistan

Copyright Act 1992 provides safeguards to computer-generated work to some extent. This is the only protection provided by law to computer-generated work, regardless of the patent which means patents are excluded from protection. However, the specification of real and authentic work is still demanded under the law, the amended act discusses several infringements and their remedies law divides the categories into two ways infringement by individuals or unauthorized persons and the other one is by company, learned that the infringements by any category are as a criminal matter in Pakistan (Dorji, 2009). Being a signatory to the Berne Convention provides relaxation to the holder for not registering their work but at the same time dispute is deemed as a matter of criminal law. To provide financial benefit law that allows issuing a license to an author and, simultaneously, prevents an unauthorized user from infringement. The right of the author is secured if any unauthorized person uses a computer program without having a copyright license, the author can rightfully prevent that person from using it (Karjala, 1987).

Individuals having vocational education and knowledge of intellectual property rights are keen on incorporating IPR rules and regulations into their corporate affairs, despite of country's IT industry's inadequate infrastructure and poorly executed IPR policies. Compared to societal norms and people's perceived behavioral control over IPR adoption, attitudes have a far greater influence and importance on intents (Botta et al., 2018). Comparably, it is far more crucial to comprehend the strength of the correlation between the notion and respondent behavioral control than it is the other groups among independent variables (Asmi et al., 2016).

## Patent and Inventorship in Pakistan

Patent and inventorship are governed by the Pakistan Patent and Design Ordinance, 2000. At the same time, rules for fulfilling the purposes were introduced in 2003 named The Patent Rules, 2003. Legally speaking, a patent is an authorization given by the government to an inventor that prevents others from using the innovation for profit for an aggregate of time of 20 years starting from the time of registration was filed (Aladdin & Hina, 2022). Pakistan Patent and Design Ordinance, 2000 is quite similar to UK Patents Act, 1977.

## Law Suit: Khawaja Tahir Jamal v AR Rehman Glass

**A Brief Background of Case Law:** Khawaja Tahir Jamal asserted his patent ownership over a new method of producing sheet glass using float glass technology. By opening a float glass manufacturing facility, respondent Glass Company allegedly intended to violate or had already violated Khawaja's patent. Khawaja filed a complaint and requested a stay order to stop Respondent from carrying out the illegal actions. Respondent disputed lawsuit, claiming that Khawaja had not invented float glass technology and had instead secured the patent through fraud and deception. Rehman claimed that Khawaja had no rights to the Pakistani invention since it was a duplicate of a UK patents law and hence fall shorten in uniqueness.

**Verdict of the Case:** The Lahore High Court's Justice Hamid Ali Shah ruled that Khawaja was properly given a patent, which gave him the only authority to manufacture, market, and utilize the invention across Pakistan. Any infringement of this privilege would result in an injunction. He noted that the privileges conferred by a Pakistan's patent are subject to limitation to Pakistan boundary and that state is not a part of either international convention of patent. In a similar vein, Pakistan is not automatically entitled to patent rights obtained in another state. The judge noted that until Rehman filed the counterclaim, Khawaja's patent, which had been issued in 1993, had not been contested (Khawaja Tahir Jamal v/s AR Rehman Glass, 2005). This case law signifies that having the same legal framework at two or more jurisdictions does not prohibit nationals of another state from registering their work that is already granted to the national of another state nor is it protected at both jurisdictions at the same time it requires separate registration at both states, meanwhile this case law highlights the nature of law is prospective rather than retrospective.

AI-generated innovations present unique difficulties for the established patent system. The eligibility criteria are one of the main concerns. AI-generated inventions must adhere to the same criteria as those created by humans, including uniqueness, non-obviousness, as well as online application. However, the use of AI in the ingenious procedure raises

more concerns regarding the criteria's software. Patents on software and algorithms are another. AI as Creators, The foundation of current patent rules is the idea that only people can be innovators. A major change in the law would be necessary for AI to be recognized as an inventor. Unlike the UK and USA, no case has been reported for AI as inventorship in Pakistan, it is hoped that if any such case is reported in a court of law, Pakistan will have the same stance as UK courts due to restriction by law. Although this is still a developing field, Australia has demonstrated a more liberal position, with judges there considering AI's potential for invention. With a patent, an inventor can temporarily bar others from producing, utilizing, or commercializing their innovation. The Pakistani IPO office is not recognizing or functional to file IT or automated based patents. Most AI-related patents must be appealed from abroad. From 2016-2020, there were approximately 2600 AI-based articles attributed to Pakistan (Statista, 2020).

### AI and Trademark in Pakistan

Every business sector has special symbols and logos that make them different from other same manner of businesses, we can say that symbols or logos that can be used to help customers or consumers for identification of their favorite or desired brand are trademarks. The human element is not a problem there but the use of AI in registering and making on the other hand trade secrets and industrial designs are real targeted problems that trademarks could face. These trade secrets work like enzyme catalysts to boost business in the online medium and are also key players in the financial matters of any business. These trade secrets are also known as keywords working mechanism of trade secrets or keywords is based on computer software programming or now the Artificial intelligence inserted that administration of trademarks is running on the algorithms, element of repetition of words, design and colors could be expected that can bring ambiguity in customer mind while shopping. Meanwhile, industrial designs are associated with protecting the decorative or artistic features of an object, including its design, arrangement, pattern, or embellishment. Industrial design law protects the latest and visually attractive designs from illicit copying or imitation. AI's use of trademarks, examining how AI uses trademarks in online platforms, and in e-marketing, resulting in issues such as trademark violations and dilution.

Pakistan's trademarks are regulated through the Trademark Ordinance, of 2001. This legal framework provides about 35 categories for trademark registration for particular goods and services. This enactment protects geographical indication and industrial designs as well. It is obvious when the law protects something or recognizes then also sets limits for its use, in the same manner, trademark infringement also deals under the enactment. When a trademark or a mark that is confusing to customers, diminishes the mark's distinctiveness, or falsely suggests a connection to the trademark owner, it is considered trademark infringement. Online marketplaces and international trade have been made easier by the Internet. On the other hand, it raised the possibility of trademark infringement due to cybersquatting, counterfeiting, and utilization of trademarks by unlicensed sources in social media, field names, and online marketing. Holder of trademarks should aggressively watch the internet and defend their rights. Customers may become confused by this and visit websites other than the legitimate owner of the brand. Non-licensed use of a trademark in on-stream commercial promotion, such as sponsored search results and pay-per-click advertisements, can confuse consumers and damage the reputation of the trademark owner (Gillani & et al., 2020). Misuse of a company's name or emblem on social media can result in trademark infringement. Third-party social media pages impersonating trademark holders might confuse clients and create a negative impression of the actual firm (Niqresh, 2019).

Big IT corporations may become more confident in investing in Pakistan as a result of a legal dispute between online marketplace OLX and the country's biggest car sales website about intellectual property theft and copyright violations. Industry leaders expect the court will offer an explanation of Pakistan's relatively consumer protection, intellectual property, especially copyright laws to indicate prevention for utilization and ongoing forward, even if it does not verdict in favor of either OLX or Pak Wheels (OLX Classified Pakistan Against PakWheels (PVT.) limited, 2018).

### Financial Impacts and Infringement in IP Due to AI Development

Neural networks are the core technology that underpins modern AI applications. Neural network training involves inputting data into the network's input nodes, which are then propagated through successive layers to the output nodes.



Analyzing and adjusting a neural network's parameters can lead to improved performance and better outcomes with repeated training cycles. To construct an image of a fox, and modify the network's settings to produce increasingly similar outputs. Using copyrighted content to train neural networks may result in data tampering, which is considered reproduction. Neural networks can replicate training data. For example, the inputs at that time may accurately recreate all pixels in an image of a fox (Khan et al., 2023). To prevent copyright infringement, use limited sections of copyrighted works, such as brief text samples, and avoid reproducing protected elements. Neural network training and application results may include illegal copying of protected segments from training sources. The neural network's outputs may infringe on the intellectual property rights of training materials, depending on its architecture and environment (Khan et al., 2023).

Illegal copying and distribution of movies, textbooks, and consumer items cost Pakistan an estimated PKR 9 billion (equal to USD 114 million) in revenue each year. The entire amount includes PKR 3 billion (roughly USD 38 million) from movie piracy and an additional PKR 3 billion from consumer product piracy. PKR 1.5 billion (about USD 19 million) has been earned through illegal textbook piracy. In 2007, the Business Software Alliance, in partnership with IDC, identified Pakistan as one of the top countries for software piracy. According to the survey, piracy is prevalent in Pakistan, accounting for 84 percent. Illegal distribution of cable and satellite signals cost legitimate channels \$110 million in 2007 alone. This illegal conduct affected an estimated 4.6 million unauthorized customers. Pakistan is known as a hub for book piracy, with Karachi and Lahore being the leading sources of pirated publications (Mushtaq et al., 2024). AI has the potential to improve production and efficiency by streamlining processes across a range of sectors. AI may assist companies in streamlining operations and enhancing customer service, which will ultimately increase revenue. It does this by automating complicated jobs and offering data-driven insights (College, 2022). According to experts, AI has the capacity to boost productivity across a massive number of industries and considerably increase Pakistan's GDP. PwC analysis estimates that by end of 2030, AI might swell the world economy by up to \$15.7 trillion, suggesting significant economic potential for Pakistan if it uses AI technologies wisely (Hussain, 2023). AI has the potential to make significant economic contributions to Pakistan; it may boost output, provide employment, and improve a number of industries, including healthcare and education. Pakistan must, however, solve issues with infrastructure, talent development, and regulatory frameworks in order to fully realize these advantages. Pakistan can position itself to fully benefit from the prospects provided by AI, propelling economic growth and development in the upcoming years, by investing in technology and education.

### Merits and Demerits of AI Innovation in IP

With the advancement of technology, every field enjoys its pro effects likewise Intellectual Property Office (IPO) is a special domain that promotes the human mind's creativity and incentives. In light of the study, we can say that the IPO is showing flexibility to accept artificial creation with human involvement, however, the legal framework is needed to interpret and amend in such a way as to protect AI and other machine work under intellectual property laws. A recent case study by a renowned intellectual property firm demonstrates the efficacy of AI in trademark findings. The company employed an automated system to examine a massive index of trademarks and find latent issues. The findings revealed a notable depletion in the time and energy necessary for manual forage and increased perfection in addition to lower expenses. Till now no country except the Australian court has opened its door to interpret AI for Patents, but if we study deeply we will learn the positive impacts of AI such as AI systems not only aid in product and service innovation but also serve as a novel way of invention. Numerous examples demonstrate this. Similar reasoning holds for creativity. Artificial intelligence (AI) has the prospective to boost creativity along with spark latest ideas (Cuntz et al., 2024). AI trademark search algorithms are trained on massive set of information of registered trademarks in order to detect ornamentation and resemblance. AI systems do extensive trademark searches and identify potentially conflicting marks by blending powerful natural language processing, and image recognition and also machine learning approaches.

The integration of AI in IP could improve in several ways;

- a) **Enhanced Efficiency:** AI can handle enormous amounts of data fast, saving time and energy on physical searches.
- b) **Improved accuracy:** AI systems may analyze details more precisely, lowering the possibility of human defects.

- c) **Upgrade dimensions:** AI-powered complexes, have the capacity to manage a huge number of reservations, making them more systematic and extensible.
- d) **Less expensive:** Artificial intelligence may lower the expenses of physical searches, such as employment and materials.
- e) **Prudent Decision-Making:** AI-powered complexes, may generate more accuracy and complete findings, allowing trademark owners and examiners to make more informed decisions.

With AI being able to produce literary and creative works, copyright law which previously solely gave rights to human authors about to undergo a revolution. AI-generated works of literature, music, and painting cast doubt on the idea of authorship. Determining entitlement of copyright ownership for AI-created works either the AI, the program developer, or the user who commissioned it, is the main challenge. In determining whether AI inventions satisfy the originality and creativity requirements of copyright law, this challenge calls into question accepted notions of creativity and originality. This entails reassessing these words' legal meanings in light of artificial intelligence. Economic Rights and Moral Rights, reading how rights consisting of reproduction, adaptation, and distribution follow AI-generated works, and whether or not AI must have ethical rights, consisting of the proper attribution and the proper integrity Challenges in the context of trademark would be, what would be strategy if two trademarks share alike number characters but differ in alphabetic? Or what if they look different but have similar phrases? An AI trademark search engine can assist in categorizing and handling these confusing issues utilizing a variety of methodologies and metrics (Rawat, 2021).

In every field, it is preferred that work be done with some machine over doing it manually, it is deemed that work done by machine could be more accurate, efficient, and reliable but in the case of invention and the right for inventorship, human intellects are required to directly involved.

### Legal and Ethical Implications of AI Innovation in IP

The ethical adoption of AI and related intellectual property offices, as well as safe and secure data sharing are the main concerns of all stakeholders, copyright owners, and patent inventors at the national level and worldwide. Globally, the many nations that have embraced AI have developed standards and values for the moral use of AI and associated with IP, as well as a legislative structure to expedite safe and secure data-sharing procedures. To create a trusting atmosphere, regulatory obstacles need to be resolved. Furthermore, consumers have a fundamental right to the security of their data and the constant protection of their privacy. Thus, there is a need for an efficient legal framework that can guide the adoption of AI, associated projects, and data-sharing procedures. The majority of stakeholders ranked a number of dangers related to. Medium to high levels of AI adoption is associated with issues like loss of precision, unfairness, and data pollution as well as privacy invasion and model theft (Ahmad et al, 2020).

The involvement of AI in IP-related decision-making raises concerns regarding the perpetuation of biases in training data. Ensuring accountability and openness is the second stage. The debate over if AI increases or decreases human creativity has significant implications for laws about intellectual property. Achieving a middle ground between the promotion of innovation and safeguarding intellectual property rights is crucial in the AI generation. Supporting the advancement of AI. The development of AI should be promoted by IP law while upholding fair competition and avoiding monopolies. Another is safeguarding human creators. Legal terminology should be updated to reflect AI's involvement in creativity and invention (Kazim & Koshiyama, 2021). At the same time, establish new IP categories. Consider establishing additional IP categories or rights. Most importantly International collaboration. Promoting international collaboration to establish consistent merits and advance toward to AI and IP law (Upadhyay, 2020).

### Recommendations

The authors argue that since AI innovation is still in its infancy, current laws are insufficient to handle the entire situation. IPO is conducting research and consultations to provide reasonable and certain pathways for this innovation, but the fact that AI is growing at an alarming rate makes this situation concerning for state. IPO expedite the legislation or interpret current laws in a way that can provide a friendly pathway for AI to work smoothly and preserve the intellectual



property office's sole goal. Globally, the same thing is required at the same time, and eventually, harmonizing the legal system will be required.

- a) **Promotion of AI Innovation:** Pakistan IPO ought to launch programs to encourage AI innovation in Pakistan, such as financial support for R&D and inducements for companies to invest in AI-related technology. Developing countries are struggling on both ends to meet the national and international perquisites to stabilize themselves. At the same time to meet international standards and attract foreign investment.
- b) **Cooperation with International IP Offices:** To ensure that Pakistan stays competitive in the AI landscape, IPO should work with other IP offices throughout the world to exchange best practices and unify approaches to AI and IP.
- c) **Programmers as Authors:** Since IPO is designed to stifle the creativity of natural persons, it is recommended that in both countries' legal frameworks, legislation should demonstrate an interest in acknowledging AI programmers as entitled to copyright work. The author's scope should include both the human creator and the human who contributed the majority of the work. This leads to additional issues if the coder is granted financial and moral rights. Even with certain incentives, if the product is improved enough to be produced in large quantities, the programmer will retain the copyright to the machine's output, which will deter potential customers from purchasing it. The IPO should consider how the "average consumer" standards for assessing the possibility of misunderstanding may alter as AI becomes more and more integrated into consumer decision-making. Guidance on evaluating the average consumer's attention span and memory impairment is required when exposing them to AI recommendations. The IPO must try to align its AI and trademark rules with international standards and best practices. Different strategies in various jurisdictions could present challenges for businesses, trying to protect their brands globally.
- d) **Establish an All-Inclusive Framework for Economic Impact Assessment:** The IPO should implement a method for assessing the financial impacts of AI-related trademark regulations. Examining how patent and copyright laws affect innovation rates, SMEs' market access, and GDP growth in general can be one way to do this, as suggested in the Intellectual Property and Growth review.
- e) **Make Intellectual Property Accessible to SMEs:** The IPO should develop programs that provide reliable and affordable IP advice tailored to small and medium-sized enterprises (SMEs). This assistance will foster innovation in the AI sector and broaden economic diversity by helping SMEs overcome the obstacles related to intellectual property protection.
- f) **Create a Digital Copyright Licensing System:** A digital copyright licensing system can alleviate barriers for AI developers and promote the growth of digital technology companies by guaranteeing that rights holders are easily identified and reachable.
- g) **Regular Evaluation and Update of IP Policies:** The IPO should commit to routinely reviewing and updating its IP policies in order to stay up with the rapid advancements in AI. By doing this, the rights holders' and consumers' interests will be balanced, and the legal system will remain modern and creative.
- h) **Utilize Information to Support Evidence-Based Policymaking:** The IPO should be given access to relevant data to ensure that choices are based on factual information rather than speculation. This will help achieve a balance between the interests of copyright holders, economic objectives, and social aims.

By implementing these recommendations, the authors hope that the IPO will be able to effectively capitalize on AI's potential to foster innovation, economic expansion, and competitiveness in the IPO while ensuring that intellectual property rights are adequately protected.

## Conclusion

In the light of above all discussion, the authors conclude that the Pakistan Intellectual Property Office and legal framework are fragile to handle the expected challenges. If Pakistan IPO wants to prevent economic loss that is huge in numbers, then at first stance it should amend or interpret its existing law to show flexibility and make place for AI innovations. Moreover, Pakistan is a part of the World Intellectual Property Organization, along with also part of other international treaties that also demand Pakistan's legislation to have a look at its legal framework, to enhance its footprint at the



international level. We cannot deny the unprecedented growth and development of Artificial Intelligence nor can we stop the future advancement and involvement of AI in IP law so time requires to have such a legal framework that protects the sole aim of IP at the same time accept AI involvement to prevent future losses. Pakistan introduced AI policy draft, that aims to take off expected challenges to IPO and show its flexibility to register patent applications with AI in products and solutions by the end of 2026, but these are only aims and motives of Pakistan legislation whereas the need of time is far big. The convergence of AI and intellectual property law holds immense potential for shaping the future of innovation and creativity. However, it brings forth a number of ethical and legal challenges that demand careful consideration. As AI continues to advance, IP law must adapt to provide clear guidance on issues like copyright and trademark infringement, inventorship, and liability for AI-driven actions. Striking a balance between protecting the rights of creators and promoting technological progress will be instrumental in fostering a harmonious coexistence between AI and IP law. By fostering collaboration and understanding, society can harness the power of AI to unlock new possibilities while ensuring that intellectual property remains a safeguarded cornerstone of innovation and progress in the digital age.



## References

- Ahmad, K., Maabreh, M., Ghaly, M., Khan, K., Qadir, J., & Al-Fuqaha, A. (2020). Developing future human-centered smart cities: Critical analysis of smart city security, interpretability, and ethical challenges. In *arXiv [cs.CY]*. <https://doi.org/10.48550/ARXIV.2012.09110>
- Aijaz, S. (2024). *Intellectual Property Rights And Economic Growth: A Case Of Exporting Partners Of Pakistan*. Islamabad: Pakistan Institute of development Economics.
- Allauddin, H., & Anwar, Z. (2022). Critical analysis of patent laws in Pakistan since independence. *Qlantic Journal of Social Sciences*, 3(2), 24–31. <https://doi.org/10.55737/qjss.194663773>
- Anastasia, K., Askanus, T., Kaun, A., Mattoni, A., & Uldam, J. (2023). *Activist strategies for confronting and harnessing digital power*. 94-104.
- Arbi, K. A., & Salman, A. (2009). *Intellectual Property Rights in Pakistan a Breif Situation Analysis*. World Bank Policy Paper Series on Pakistan.
- Artificial Intelligence; The Ethical and legal implications. (2017). <https://nortonrosefulbright.com/en-pk/knowledge/publications/55ecc35d/artificial-intelligence-the-ethical-and-legal-implications>
- Artificial Intelligence: The Ethical and Legal Implication. (2017). Retrieved from nortonrosefulbright: <https://nortonrosefulbright.com/en-pk/knowledge/publications/55ecc35d/artificial-intelligence-the-ethical-and-legal-implications>
- Asmi, F., Zhou, R., & He, T. (2016). Intellectual Property Rights (IPRs) in Software Industry of Pakistan: An Overview of Dual Perspective of Demand and Supply Side. *Journal of Information & Knowledge Management*, 6(10), 46-55.
- Bonadio, E., McDonagh, L., & Dinev, P. (2021). *Artificial intelligence as inventor: exploring the consequences for patent law*. research.gold.ac.uk.
- Botta, A., Ganiger, J., & Damodaran, A. (2018)/ Integrated Intellectual Property Rights (IPR): framework for the state of Andhra Pradesh. *Working Papers*. 539. [https://research.iimb.ac.in/work\\_papers/539](https://research.iimb.ac.in/work_papers/539)
- Buechler., & Alexa. (2022-2023). REVIEW OF INTELLECTUAL PROPERTY LAW. 22(1). Heinonline.
- Cheng, L., Varshney, K. R., & Liu, H. (2021). Socially responsible ai algorithms: Issues, purposes, and challenges. *Journal of Artificial Intelligence Research*, 71, 1137-1181. <https://doi.org/10.1613/jair.1.12814>
- College, S. (2022). *How Artificial Intelligence Improve Economy of Pakistan*. Genuine Technology of Computer college: <https://genuinetechnology.com/how-artificial-intelligence-improve-economy-of-pakistan>
- Craig, C. J. (2022). The AI-copyright challenge: Tech-neutrality, authorship, and the public interest. In *Research handbook on intellectual property and artificial intelligence* (pp. 134-155). Edward Elgar Publishing.
- Cuntz, A., Fink, C., & Stamm, H. (2024). Artificial intelligence and intellectual property: An economic perspective. *World Intellectual Property Organization (WIPO) Economic Research Working Paper Series*, (77). [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4757971](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4757971)
- Dong, X., & McIntyre, S. H. (2014). The second machine age: Work, progress, and prosperity in a time of brilliant technologies. *Quantitative Finance*, 14(11), 1895–1896. <https://doi.org/10.1080/14697688.2014.946440>
- Dorji, T. (2009). Problem of Criminal Offence of Copyright infringement under the Copyright Act.
- Ellen, G. (2024). *What AI Is, Why It Matters, How It Work*. <https://builtin.com/artificial-intelligence>
- Fraser, E. (2016). Computers as inventors-legal and policy implications of artificial intelligence on patent law. *SCRIPTed*, 13, 305.
- Ghulam Murtaza Korai. (2025). *Khawaja Tahir Jamal v AR Rehman Glass*. Scribd. <https://www.scribd.com/document/340705181/Khawaja-Tahir-Jamal-v-AR-Rehman-Glass>
- Gilani, S. R. S., & Rehman, H. U. (2020). The limitation clauses on human rights and fundamental freedoms: The role of the Court of Justice of the European Union (CJEU). *Journal of European Studies (JES)*, 36(2), 83-99. <https://asce-uok.edu.pk/journal/index.php/JES/article/view/146>
- Ginsburg, J. C. (2002). The concept of authorship in comparative copyright law. *DePaul L. Rev.*, 52, 1063.
- Gompel, S. V. (2021). *Survey on Voluntary copyright registration systems*. WIPO Amsterdam.

- Hook, S. (2023). *Moral Rights, Creativity, and Copyright Law: The Death of the Transformative Author*. Taylor & Francis.
- HU, X., & Lovrich, N. P. (2024). *Social Media and Criminal Justice*. Taylor and Francis.
- Hussain, B. (2023, 07 18). *Pakistan can clear economic roadblocks through AI: PwC official*. Business Recorder: <https://www.brecorder.com/news/40253248/pakistan-can-clear-economic-roadblocks-through-ai-pwc-official>
- Jabbar, A. (2023, 09 14). Who Own Copyright in AI ? <https://www.pakistantoday.com.pk/2023/09/14/who-owns-the-copyrights-in-ai>
- Kalwani, M. (2021). Navigating Challenges and Proposing Solutions: The Interplay of Jurisdiction in Artificial Intelligence and Intellectual Property. In *Intellectual Property Rights and Competition Law in India*. Routledge.
- Kanem, D. N. (2017). *UNFPA Annual Report 2017: I have the power to change my world*. UNFPA the Former Yugoslav Republic of Macedonia. <https://northmacedonia.unfpa.org/en/publications/unfpa-annual-report-2017-i-have-power-change-my-world>
- Karjala, D. S. (1987). Copyright, computer software, and the new protectionism. *Jurimetrics*, 33-96.
- Kazim, E., & Koshiyama, A. (2021). The interrelation between data and AI ethics in the context of impact assessments. *AI and Ethics*, 1, 219-225.
- Khan, A. A., Laghari, A. A., Li, P., Dootio, M. A., & Karim, S. (2023). The collaborative role of blockchain, artificial intelligence, and industrial internet of things in digitalization of small and medium-size enterprises. *Scientific Reports*, 13(1), 1656. <https://doi.org/10.1038/s41598-023-28707-9>
- Khan, K. (2013). *Intellectual Property Laws*. Pakistanlaw: <https://www.pakistanlaw.com/>
- Leon, E. A. (2020, 09 16). *Artificial intelligence in the military and Pakistan's IP*. asia IP: <https://www.asiaplaw.com/section/news-analysis/artificial-intelligence-in-the-military-and-pakistans-ip>
- Lim, D. (2022). AI, Equity, and the IP Gap. *SMU L. Rev.*, 75, 815.
- Mannuru, N. R., Shahriar, S., Teel, Z. A., Wang, T., Lund, B. D., Tijani, S., ... & Vaidya, P. (2023). Artificial intelligence in developing countries: The impact of generative artificial intelligence (AI) technologies for development. *Information Development*, 02666669231200628.
- Ministry of Information Technology (2023). *National AI policy Consultation Draft 2023. (m. o. telecommunication, Compiler)* Pakistan. <https://moitt.gov.pk/SiteImage/Misc/files/National%20AI%20Policy%20Consultation%20Draft%20VI.pdf>
- Montagnani, L. (2008). A New Interface Between Copyright Law and Technology: How user-generated content will shape the future of online distribution. *Heinonline*.
- Mushtaq, S. A., Baig, K., Bukhari, S. W. R., & Ahmad, W. (2024). Does Pakistan's Copyright and Antitrust Law Protect Creators of AI-Generated Content? A Comparative Study with European Union Jurisdictions. *Pakistan Journal of Criminal Justice*, 4(1), 55-76.
- Naim, N. (2024). *Developments in Intellectual Property Strategy*. Springer.
- Niqresh, M. (2019). Digital Library and Intellectual Issues--Issues in Copyright and Intellectual Property. *International Education Studies*, 12(1), 114-127.
- Pappachan, P., & Rahaman, M. (2024). Conceptualising the Role of Intellectual Property and Ethical Behaviour in Artificial Intelligence. In *Handbook of Research on AI and ML for Intelligent Machines and Systems* (pp. 1-26). IGI Global Scientific Publishing.
- Rawat, G. S. (2021). *Navigating the Future: AI Trademark Search Revolutionizing Intellectual Property Administration*. Sagacios Research: <https://sagaciosresearch.com/blog/ai-trademark-search-revolutionizing-ip-administration/>
- Shilling, D. (2002). *Essentials of trademarks and unfair competition*. John Wiley & Sons.
- Statista. (2020). *Artificial Intelligence - Pakistan / Market Forecast*. Retrieved from statista.com: <https://www.statista.com/outlook/tmo/artificial-intelligence/pakistan>
- Telecommunication, M. O. (2023). *Draft National AI Policy*. <https://moitt.gov.pk/SiteImage/Misc/files/National%20AI%20Policy%20Consultation%20Draft%20VI.pdf>

- The Challenges to Patentability posed by Artificial Intelligence*. (2023). Minesoft: <https://minesoft.com/the-challenges-to-patentability-posed-by-artificial-intelligence/>
- Ulnicane, I., Knight, W., Leach, T., Stahl, B. C., & Wanjiku, W. G. (2021). Framing governance for a contested emerging technology: insights from AI policy. *Policy and Society*, 44(2), 158-177.
- Upadhyay, N. K. (2020). Impact of Artificial Intelligence on Intellectual Property Rights. *International Young Scholars Workshop*, 09. <https://journals.sdu.edu.kz/index.php/iysw/article/view/192>
- USlegal. (2015). *Authorship in Copyright*. USlegal: <https://copyright.uslegal.com/authorship-in-copyright/>