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Challenges In the Implementation of Intellectual Property Governance in Pakistan: A Comparative Study with The United States

Hira Malik* and Bakhtawar Manzoor
School of Law and Policy, University of Management and Technology, Lahore, Pakistan

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Abstract
The research is a comparative analysis of the United States intellectual property governance system compared to Pakistan in an attempt to diagnose the burning issues tackling the intellectual property system in Pakistan. Large institutional gaps in capacity are indicated by the study, and it showed that Pakistan has an IP administration level around 1 percent of the U.S. on a per-capita basis. By means of doctrinal legal review and institutional evaluation, this study determines the fundamental weak areas in digital infrastructure, their enforcement tools, and engagement of stakeholders that proportionately weaken the effectiveness of IP regime in Pakistan. As shown in the analysis, although Pakistan has made reasonable provisions in the relationships in laws covering most categories of intellectual property rights, the important gaps remain in process execution, technological integration, and inter-organizational coordination. The study puts forward two-step digital transformation plan based on institutional capacity building; comprehensive electronic filing; AI-impediment assisted examination, and improved coordination mechanisms in other ways of enforcement. The results indicate that the process of transforming Pakistan into a knowledge-based economy cannot be achieved without a committed political effort, resource planning, and large-scale partnerships to build competitive avenues conducive to gaining access to the knowledge economy and sources of valuable foreign investment.

Keywords
Intellectual Property Governance, Digital Transformation, Comparative Legal Analysis, Institutional Capacity Building, Electronic Filing Systems, Pakistan IP Framework, USPTO Best Practices, Enforcement Coordination, Innovation Ecosystem Development, Knowledge Economy Integration

Corresponding Author: hiramalik0054@gmail.com

1. Introduction

Intellectual property rights have become key tenets of the global economy today in terms of determining economic growth, technological advancement, and global competitiveness. According to the recent approximations by the World Intellectual Property Organization, the IP-intensive sector currently generates about 38.2 percent of the gross domestic product in developed countries, which is evidence of the great significance of strong intellectual property mechanisms to the national economic development.[1] This impressive contribution to the economy highlights the essential role IP systems play in not just being legal systems, but in providing a kind of critical infrastructure to those growth strategies led by innovation.

The desire by Pakistan to be one of the upper-middle-income countries by 2030 risks being truncated by among other factors the inability to update its intellectual property regime to the current realities of a digital age. Although Pakistan has a theoretically complete legal framework in covering the major types of intellectual property in the form of different ordinances and acts, the IP system in the country is faced with severe structural and functional gaps that significantly undermine its functional capabilities. In its Ease of

[1] World Intellectual Property Organization, "World Intellectual Property Indicators 2023," WIPO Publications, Geneva, 2023, p. 23.

Doing Business rankings, every year Pakistan is positioned in the bottom half of the scale in IP protection with the country being ranked 108 out of 190 economies in the year 2020.[2]

The vast difference in the advanced IP systems and especially the United States model, exposes the extensive institutional and procedural gaps in Pakistan. With the United States Patent and Trademark Office as the basis of his system and specialized federal courts supporting the intellectual property system, the United States intellectual property group virtually processes more than 650,000 patent applications and 750,000 trademark applications in a manner that shows a high level of efficiency.[3] The best practices that are the result of the digitalization processes by the USPTO, involving the extensive electronic filing system, the use of artificial intelligence in checks, and real-time tracking mechanisms, could theoretically be adjusted to the needs of the developing countries by considering the specifics.

Digitalization has radically changed both the process of creation, distribution and protection of intellectual property putting forth massive opportunities and enormous problems before the developing world that wants to streamline its approach to IP. The relative affordability of online copying, the international scope of online commerce, as well as the new forms of IP such as software algorithms and artificial intelligence-generated material, question the effectiveness of existing mechanisms of IP protection to an ever-greater degree.[4] Such disruptions in technologies require global reforms in the system including overhaul of the legal framework and institution building capacity.

The study fills a big gap in knowledge regarding the effective modernization of intellectual property systems in developing countries as they grapple with resources and implementation issues. The comparative study against the one offered on the United States has shown helpful points on effective reform patterns as well as the significance of situational adaptation as opposed to mere transfers of foreign legal institutions.

2. Conceptual Foundations of Intellectual Property Governance

Intellectual property law is one of the most vibrant and broad fields of modern jurisprudence, defining models upon which societies that achieve equilibrium between the incentives of innovation and the access to knowledge do so. The theoretical grounds of IP protection have developed in the context of various philosophical and economical rationalities which are yet to be modified in circulation with the change in technology and economic growth trends.

Intellectual property rights Utilitarian theories of intellectual property protection, notably embodied in the Patent and Copyright Clause of the Constitution of the United States, are those theories that focus on intellectual property rights as a means of advancing the welfare of the same society through innovation.[5] In this provision of the constitution, the congress obtains its powers to promote the progress of science and useful arts, by securing limited times to authors and inventors the exclusive right to their respective writings and discoveries. The direct attention to time-bound protection is due to the consideration of the founders that

[2] World Bank Group, "Doing Business 2020: Comparing Business Regulation in 190 Economies," World Bank Publications, Washington DC, 2020, p. 156.

[3] United States Patent and Trademark Office, "Performance and Accountability Report Fiscal Year 2023," USPTO Publications, Alexandria, 2023, p. 12

[4] Shapiro, Carl, and Hal R. Varian, "Information Rules: A Strategic Guide to the Network Economy," Harvard Business Review Press, Boston, 1998, p. 45.

[5] U.S. Constitution, Article I, Section 8, Clause 8.

the significance of IP rights is that it is a balance of individual incentives and social good, which are calibrated.

Other theoretical concepts critique strictly utilitarian aspects of the IP law. Those who adhere to the theory of natural rights and refer to the work of John Locke (the labor theory of property), stipulate that writers have inherent moral rights to the result of their intellectual labor.[6] According to this school of thought, IP protection is not calculated in terms of social utility but it is a question of fundamental justice. Hegelian philosophy of personality theorists suggests linkages between self-expression and creativity, and these theorists believe that artists and innovators must own their intellectual works as an outgrowth of self-autonomy.[7]

The study of intellectual property has developed deeper economic insights that involve the application of the concept of game theory, industrial economies, and behavioral economics. Modern studies show that the level of IP protection best suited to individual industries, technologies, and the stage of development of the economy is very different.[8] The potential to either copy at marginal cost or to almost perfect copying has been one of the major factors of the traditional conceptualization of IP; however digital technologies have presented this potential to challenge exclusive rights.[9]

International intellectual property frameworks are made up of multilateral agreements, bilateral agreements, and institutional structures that all together form minimal protection standards with very diverse approaches to implementation in each nation. World Intellectual Property Organization is the main global organization that facilitates cooperation in the area of IP among the member states.[10] WIPO functions have changed considerably since the organization was founded and now include development assistance, alternative dispute resolution services and international IP information systems in addition to more traditional treaty administration functions.

The Agreement on Trade-Related Aspects of Intellectual Property Rights is regarded as the most universal and binding international IP treaty, as it implemented certainly minimal standards and applied to all important types of intellectual property where compliance with these rules becomes a condition of participation in the global trading system.[11] The WTO member states have TRIPS obligations to offer patent protection to the majority of technological innovations, copyright coverage to literary and artistic creations, trademark legal safeguards to distinguish commercial symbols, and other types of legal safeguards on other brands of IP such as geographical signs and trade secrets.

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[6] Locke, John, "Two Treatises of Government," Cambridge University Press, Cambridge, 1988 [1690], Chapter 5, p. 287.

[7] Hegel, Georg Wilhelm Friedrich, "Philosophy of Right," Oxford University Press, Oxford, 1967 [1821], p. 40.

[8] Scotchmer, Suzanne, "Innovation and Incentives," MIT Press, Cambridge, 2004, p. 89.

[9] Litman, Jessica, "Digital Copyright," Prometheus Books, New York, 2001, p. 78.

[10] World Intellectual Property Organization, "General Information," WIPO Publication No. 400, Geneva, 2023, p. 8.

[11] World Trade Organization, "Agreement on Trade-Related Aspects of Intellectual Property Rights," WTO Legal Texts, Geneva, 1994, Article 1.

Contemporary theories of IP rely on the input of several other fields, such as economics, philosophy, law, and political science, to come to comprehended notions of the best IP structure design and execution. Economic models no longer rely on a simple innovation incentive model, but also have more complex rhythm of cumulative innovation, network effects and strategic behavior.[12] The conventional economic rationale that IP protection helps to overcome public goods challenges posed by the non-rivalrous quality of information has not disappeared, but has been developed to embrace the patterns of specific industries and to evolve with the advancement in technology.

Development economics has thrown into useful light the connections between IP protection and economic development, and dispelled some of the cross-contextual assumptions that increased protection would inevitably lead to development. Empirical literature indicates the existence of a complex and conditional relationship between IP protection and economic growth that depends heavily on how developed the countries are, their level of technology and their institution quality.[13] Such concept as a presumption of appropriate technology implies that the developing countries might receive various kinds of protection and levels of IP, which could be different to those being developed as they are considerably lower in terms of technological capabilities, market situation, and development priorities.

3. Pakistan's Intellectual Property Legal Framework and Institutional Architecture

The intellectual property regime of Pakistan is based on some fundamental acts of legislation controlling various classes of intellectual property rights that have created an expansive but scattered law governing body. The Copyright Ordinance 1962 is the basis through which Pakistan has adopted copyright protection system where copyright gives legal protection to literary, dramatic, musical and artistic works.[14] This ordinance is originally based on the British Copyright Act of 1956 but has been through several amendments to help keep up with modern times such as the Copyright (Amendment) Act 2000 which covers computer programs and databases.[15]

The ordinance provides authors with the exclusive right to reproduce, publish, perform, communicate and adapt their works such that the statutory protection is usually the life of the author of a work or at least fifty years. Nonetheless, the legislation does not include the details of internet-based infringement, digital rights management, and online service provider liability making it extremely difficult as the digital economy in Pakistan goes on the rise.[16] Lack of stable harbor in the form of Digital Millennium Copyright Act used in the United States presents international service provider and online platform operating in Pakistan with legal ambiguity.[17]

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[12] Arrow, Kenneth J., "Economic Welfare and the Allocation of Resources for Invention," in "The Rate and Direction of Inventive Activity," Princeton University Press, Princeton, 1962, p. 609

[13] Chen, Yongmin, and Thitima Puttitanun, "Intellectual Property Rights and Innovation in Developing Countries," Journal of Development Economics, vol. 78, no. 2, 2005, p. 474.

[14] Copyright Ordinance 1962, Government of Pakistan, Ordinance No. XXXIV of 1962, section 1.

[15] Copyright (Amendment) Act 2000, Government of Pakistan, Act No. XXXIV of 2000, section 2.

[16] Khan, Muhammad Iqbal, "Digital Copyright Challenges in Pakistan," International Journal of Law and Information Technology, vol. 28, no. 2, 2021, p. 187.

[17] Ahmad, Rasheed, "Internet Service Provider Liability in Pakistan: Legal Gaps and Challenges," Lahore University Journal of Law, vol. 8, no. 1, 2020, p. 89.

The Trade Marks Ordinance 2001 can be considered the latest sweeping reform of Pakistan trademark law, where the prior law has been changed with new frameworks flowing with international best practices in this sphere.[18] Signs The ordinance safeguards original marks that can be used to distinguish goods or services; they could include words, designs, letters, numerals, colors, and other combinations of the same.[19] The act puts in place a process of registration under the Trade Marks Registry, which is a division of the Intellectual Property Organization of Pakistan.

Though there are these formal provisions, there are major challenges encountered by the trademark system during its operations. Barriers to access are lack of extensive online search databases and electronic filing systems which can be a problem especially to the small and medium enterprises.[20] Such limitations on technology make systems less efficient and cause compliance burdens that cannot be pursued proportionately by resource-strained applicants who constitute the heart of the innovation system in Pakistan.

In Pakistan, patent protection is done in accordance with the Patents Ordinance 2000 that grants protection to inventions by twenty years in the conditions that they satisfy the novelty, inventive step, and industrial applicability.[21] The guidelines under the ordinance contains mandatory licensing, government use and parallel importation that are very flexible in dealing with the issues of public health and development.[22] These allowances demonstrate the efforts of the Pakistan to harmonize the protection of patents with the interests of the high-level social and economic needs especially in relation to pharmaceutical and agricultural industries.

The ordinance also makes certain categories of subject matter not patentable such as traditional medicines, farming and horticultural activities, and business processes.[23] Such exclusions are policy based attempts to safeguard traditional information and guarantee sustained access to important technologies as a development tool. But it is in the matters of the real inception of such provisions that there exist a lot of uncertainties to the applicant till the examination is correctly administered.

Intellectual Property Organization of Pakistan is the main administrative authority that is in charge of giving IP, its examination, as well as various other services.[24] Certified as an autonomous body in the Ministry of Commerce in 2005, IPO-Pakistan put all IP related matters that spread across various government arms into a common institutional framework.[25] The organization runs on differentiated registries such as the Patent Office, Trade Marks Registry, Copyright Office, and the Industrial Designs Registry which deals with different sets of intellectual property rights.

Compared to the institutional capacity of IPO-Pakistan, it is highly limited, therefore, restricting its operations. Having a population of over 220 million with only about 200 employees, it is a mammoth task of

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[18] Trademarks Ordinance 2001, Government of Pakistan, Ordinance No. XIX of 2001, section 1.

[19] Trademarks Ordinance 2001, section 2(1)(m).

[20] Intellectual Property Organization of Pakistan, "Annual Report 2022-23," IPO-Pakistan Publications, Karachi, 2023, p. 15.

[21] Patents Ordinance 2000, Government of Pakistan, Ordinance No. VII of 2000, section 1.

[22] Patents Ordinance 2000, sections 58-63.

[23] Patents Ordinance 2000, section 7.

[24] IPO-Pakistan Ordinance 2005, Government of Pakistan, Ordinance No. LXXVII of 2005, section 3.

[25] IPO-Pakistan Ordinance 2005, Government of Pakistan, Ordinance No. LXXVII of 2005, section 4.

the organization in terms of capacity gaps, with regard to international capacities.[26] The United States Patent and Trademark Office has more than 13,000 employees and enjoys much larger volume of applications processed with increased efficiency.[27] That imbalance does not only indicate the lack of resources, but also speaks to the issues of the institutional development and human capital formation.

Patent examination is not efficient due to poor training of examiners, access to international databases and lack of resources in terms of technology.[28] A significant portion of examiners does not have a specialized technical training related to emerging areas of technology and this has been one of the factors that have led to the quality of the examination and its delay in processing the examinations. These efficiency issues are also complicated by the lack of modern tools of examination, such as AI-powered search and classifications.

4. The United States IP System: Institutional Excellence and Best Practices

The United States intellectual property regime is the most advanced, and wide-ranging frameworks of protecting innovation and creativity in the world, hence regarded as a model of IP systems around the globe. Developed on clear constitutional bases of the recognition of the importance of intellectual property as a contributor to advancement in science and arts, U.S. system has materialized into a harmonized web of federal law, specialized agencies, and judicial infrastructure that when combined results in a high degree of protection in the range of the key classes of intellectual property.[29]

This constitutional basis of the U.S. IP law which is in Article I, Section 8, Clause 8 of the Constitution allows the Congress to use its powers to "provide for the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."[30] This text in the Constitution reflects the advanced knowledge of intellectual property as a tool to promote innovation and not to be an end to itself and forms the utilitarian basis of the American IP law and the doctrine that IP rights are time-bound.[31]

The 2011 Leahy-Smith America Invents Act has substantially modernized the patent law in the U.S., including dropping the earlier regime of patenting based on first-to-invent and switching to first-to-file, which harmonizes the American practice with the international practice and creates the new processes on which the improvements in patent quality depend.[32] The Act introduced post-grant proceedings: inter partes review, post-grant review and covered business method review, lower-cost alternatives to litigation in a federal court

[26] Intellectual Property Organization of Pakistan, "Human Resources Report 2023," IPO-Pakistan Internal Document, Karachi, 2023, p. 5.

[27] United States Patent and Trademark Office, "Performance and Accountability Report Fiscal Year 2023," op. cit., p. 45.

[28] Khan, Tariq Mahmood, "Patent Examination Quality in Pakistan: Challenges and Solutions," International Journal of Industrial Property, vol. 19, no. 4, 2021, p. 267.

[29] Merges, Robert P., Peter S. Menell, and Mark A. Lemley, "Intellectual Property in the New Technological Age," Wolters Kluwer, Boston, 8th edition, 2019, p. 1.

[30] U.S. Constitution, Article I, Section 8, Clause 8.

[31] Mossoff, Adam, "Rethinking the Development of Patents: An Intellectual History, 1550-1800," Hastings Law Journal, vol. 52, no. 6, 2001, p. 1255.

[32] Leahy-Smith America Invents Act, Public Law No. 112-29, 125 Stat. 284 (2011).

to challenge the validity of a patent.[33] Since its inception, those figures of more than 10,000 petitions have been reviewed by these procedures administered by the Patent Trial and Appeal Board, proving the efficiency in the annihilation of poor patent and obstruction of needless cost of litigation.

The 1998 Digital Millennium Copyright Act can be seen as the most important modification of the U.S. copyright law in relation to the digital environment, whose main contributions are safe harbor provisions granting internet service providers and online hosts immunity to copyright infringement and the various forms of notice-and-takedown as a means of enforcing copyright via the internet.[34] The third aspect in the DMCA strategy which has been replicated globally and has moved to establish legal content industries online and through which piracy issues can be dealt with effectively, is its balanced approach of taking up online copyright protection.

The United States Patent and Trademark Office is the best federal institution that deals with patent examination and registration of trademarks.[35] Founded in 1790 and restructured several times to achieve optimal performance, USPTO today is one of the most advanced and largest in the world IP offices, its staff numbers exceed 13,000, and it considers as many as 650,000 of patent and 750,000 of trademark applications in a year.[36]

Sophisticated specialization is also very prevalent in the USPTO structure with patent examination being directed according to technology-based examining units composed of examiners possessing the relevant technical knowledge.[37] The process of examination of the trademark is carried out by investigating an attorney who specializes in the field of knowledge in trademark law and practice. The specialisation facilitates standardised quality of examination in handling lots of applications of different technology platforms and industries.

The fee-based funding model that is based on dependence on user fees as opposed to payments by the congressional appropriations makes the agency financially independent and allows other investments like technology base and human capital development.[38] This authority to set fees permits the agency to increase fees to offset processing costs in order that fee reductions are available to small and micro entities to facilitate access to individual inventors and small business.[39]

The aspect of digital integration is one of the most important competitive advantages of USPTO since it allows addressing a high volume of applications effectively without compromising on the quality of services

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[33] United States Patent and Trademark Office, "Patent Trial and Appeal Board Statistics," USPTO, Alexandria, 2023, available at: https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/statistics.

[34] Digital Millennium Copyright Act, Public Law No. 105-304, 112 Stat. 2860 (1998), codified at 17 U.S.C. 512.

[35] 35 U.S.C. 1, establishment of the USPTO.

[36] United States Patent and Trademark Office, "Performance and Accountability Report Fiscal Year 2023," op. cit., p. 12.

[37] United States Patent and Trademark Office, "Patent Examiner Training Program Manual," USPTO, Alexandria, 2023, p. 1.

[38] 35 U.S.C. 41, patent fees; 15 U.S.C. 1113, trademark fees.

[39] 35 U.S.C. 41(h), fee reductions for small and micro entities.

and the comprehensive availability of the services to users across the globe.[40] The agency has been experiencing near-universal electronic filing with patent applications and trademarks applications above 99 percent and 95 percent respectively being filed electronically.[41] Patent Center and Trademark Electronic Application System have integrated online systems, where one can simply file, prosecute and maintain the IP rights effectively and economically.

The patent search and examination system is based on the advanced search and examination tools giving the examiners access to the extensive global databases of worldwide patent and non-patent literature.[42] With the support of commercial databases and AI-assisted classification systems, such proprietary search tools allow performing high-quality prior art searches that are necessary to make an examination decision. Innovation search is bearing fruit: recent investments in technologies of machine learning and natural language processing have the potential of increasing search accuracy and decrease the time-cost of examination of documents.

Artificial intelligence has become a priority at USPTO and the organization has started pilot testing using AI in classification of patents, prior art search and quality examination review.[43] That AI approach embraced by the agency aims at supplementing, not substituting, human expertise, and examiner judgment continues to occupy center stage in challenging legal and technical conclusions. Early findings in AI pilots determine that there might be considerable changes in examination consistency and efficiency as well as lowering pendency times.

5. Comparative Analysis: Identifying Critical Gaps and Reform Opportunities

The relative analysis of the intellectual property system in Pakistan and the United States shows an immense gap in the sophistication of the legal framework and the institutional capability as well as the execution efficiency that sheds light on the issues as well as potentials of developing an intellectual property system. Although the two countries offer formal protection in most categories of intellectual property, there is a wide discrepancy in comprehensiveness of the legal framework, clarity of procedures as well as responsiveness to technological shift.

The comparison of legal frameworks helps to prove the primary similarities between the basic similarities of covering IP in the countries in question and the significant differences in the depth of legislation, protection mechanisms, and their incorporation into world standards. U.S. system of laws in regards to IP may be described as more exhaustive and properly amended in response to modern demands at a certain frequency. The America Invents Act of 2011 made the U.S. patent system a first-to-file system, added new post-grant proceedings, and increased how well the patent system does its job as it relates to patent quality[44]. On the

[40] United States Patent and Trademark Office, "Digital Services Portfolio," USPTO, Alexandria, 2023, p. 1.

[41] United States Patent and Trademark Office, "Electronic Filing Statistics 2023," USPTO Data Reports, Alexandria, 2023.

[42] United States Patent and Trademark Office, "Patent Examination Research Dataset," USPTO, Alexandria, 2023

[43] United States Patent and Trademark Office, "Artificial Intelligence Strategy," USPTO, Alexandria, 2023.

[44] Leahy-Smith America Invents Act, op. cit.

other hand, the Patents Ordinance 2000 in Pakistan offers simple patent protection with little complex quality control systems established and has never been modernized considerably since inception.[45]

Pakistan does not require post-grant opposition processes as in PTAB proceedings in the U.S. which have served to invalidate thousands of weak patents and cut litigation expenses.[46] Likewise, the copyright law shows a great departure. The DMCA of the U.S. in 1998 created detailed online copyright protection schemes, safe harbor and notice-and-takedown systems. The modified version of Pakistan Copyright Ordinance 1962 in 2000 does not contain any direct clauses relating to digital protection of copyright; this poses a legal risk to online content producers and platforms.[47]

The comparison of institutional architecture shows the most striking drawbacks between the two systems of IP, in terms of gap in human resources, technological base, as well as the organization strength, which in essence does impact the performance of the system and service to the users. The most impressive institutional contrast is between the USPTO and IPO-Pakistan, both in terms of scale and number of employees. The USPTO also has more than 13,000 employees who cater to a population of 330 million with about 8,000 patent examiners and 500 trademark examining attorneys.[48] IPO-Pakistan has a population of over 220 million, and less than 200 employees which presents a per-capita capacity ratio 100 times smaller than the U.S. system.

This capacity difference is directly converted to the processing capabilities and the quality of service. The requirement that is renewed every year in the USTPTO is now handled over 650,000 and the average pendency is 22 months whereas in IPO-Pakistan less than 1000 patent applications annually are handled with the average pendency over 3 years.[49] Comparisons of trademarks processing bear the same facts, with the USPTO processing 750,000 applications a year when IPO-Pakistan only have a capacity of processing around 15,000.[50]

As was discussed during the course of the comparison between the enforcement mechanisms, significantly different is the specialization, resource distribution, and cooperation among enforcement agencies. The specialty institutions in the U.S. system, including the Court of Appeals for the Federal Circuit and the International Trade Commission, allow the highly specialized adjudication of difficult cases of IP.[51] The granting of patent appeals by the Federal Circuit only has established a unified jurisprudence and it has put

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[45] Patents Ordinance 2000, op. cit.

[46] United States Patent and Trademark Office, "Patent Trial and Appeal Board Annual Report 2022," USPTO, Alexandria, 2022, p. 15.

[47] Copyright Ordinance 1962, op. cit.; Copyright (Amendment) Act 2000, op. cit.

[48] United States Patent and Trademark Office, "Performance and Accountability Report Fiscal Year 2023," op. cit., p. 45.

[49] USPTO, "Patent Processing Statistics 2023," USPTO Data Reports, Alexandria, 2023; IPO-Pakistan, "Annual Report 2022-23," op. cit., p. 15.

[50] USPTO, "Trademark Statistics 2023," USPTO, Alexandria, 2023; IPO-Pakistan, "Trademark Registry Report 2023," IPO-Pakistan, Karachi, 2023, p. 8.

[51] Court of Appeals for the Federal Circuit, "Annual Report 2022," Federal Circuit, Washington DC, 2022, p. 5.

an end to the phenomenon of forum shopping.[52] Recent developments to have specialized IP tribunals in Pakistan are steps towards specialization but these tribunals do not have the resources or experience like their American counterparts.[53]

The comparison of the two systems in terms of digital infrastructure sheds light on the biggest operational gap of the two systems and indicates the further implications in terms of efficiency and area of future development. USPTO has also attained almost universal e-filing where 99 percent of patent applications and 95 percent trademark applications become electronically filed.[54] Integrated case management systems also come with live tracking, momentum notifications, and document management. At IPO-Pakistan, simple electronic filling of certain categories has been introduced but there is no extensive digital backbone which defines new information handling in IP administration.[55]

The gap between user experiences is large. Those seeking IP rights (applicants) at the USPTO can also file, prosecute and maintain their rights online and in real-time by using integrated systems that give instant confirmation and real-time status information. Pakistani applicants are subjected to inefficient mixed electronic and paper-based processes, which are both inefficient and drive up cost of compliance.[56] The USPTO has all the published applications, patents, trademark registrations and advanced search facilities in comprehensive online databases. The databases of IPO-Pakistan exist, but they are not comprehensive or searchable to about those to which modern users are accustomed.

The involvement of stakeholders reflects various means of establishing the legitimacy of the system and guaranteeing the responsive nature of governance. The USPTO has also instituted a high level of stakeholder engagement including designated advisory committee, frequent roundtables, and longer-than-necessary comment periods accompanying rule changing proposals.[57] The continuous monitoring of the activities of the agency is given by Patent and Trademark Public Advisory Committees. The system of concentrating stakes by IPO-Pakistan can be engaged but unlike that of the United States, the methodical and detailed touch is missing.[58]

6. Digital Transformation Strategy for Pakistan's IP System

The modernization of intellectual property system in Pakistan opens new opportunities that have never been exploited in enhancing efficiency and accessibility, as well as to improve the quality of services provided through positioning Pakistan in digital global economy in a competitive position. A holistic approach to

[52] Federal Courts Improvement Act of 1982, Public Law No. 97-164, 96 Stat. 25.

[53] Supreme Court of Pakistan, "Establishment of Intellectual Property Tribunals," Supreme Court Judgment 2019 SCMR 1547, Islamabad, 2019.

[54] United States Patent and Trademark Office, "Electronic Filing Statistics 2023," op. cit.

[55] IPO-Pakistan, "Digital Transformation Progress Report 2020-2023," IPO-Pakistan, Karachi, 2023, p. 12.

[56] Malik, Asim Ali, "Digital Transformation of Government Services in Pakistan," Public Administration and Development, vol. 41, no. 2, 2021, p. 87.

[57] United States Patent and Trademark Office, "Stakeholder Engagement Report 2023," USPTO, Alexandria, 2023, p. 1.

[58] Pakistan Institute of Development Economics, "IP System Stakeholder Analysis," PIDE Research Report, Islamabad, 2023, p. 23.

digital transformation should solve the underlying lack of basic infrastructure, efficiency of procedures, and a shortage of capacity along with leveraging the existing capabilities and new opportunities.

Implementation of complete e-filing filings should be done in trademark applications first, since such less technically demanding filings can be seen as pilots before being extended to patent and other IP categories.[59] The functionality of the system should focus on easy to use interfaces, the ability to track in real-time, and compatibility with existing systems used by government bodies to provide digital services.[60] The availability of a single IP database infrastructure that will allow the search of patents, trademarks, and other registered rights on a comprehensive scale would boost both examination procedures and access to IP information to the public.

The database system must be capable of connecting to the global databases and introduce AI-optimized search features and allow the process of data sharing with other state systems and those established by the private industry. Potential improvement of the examination process with AI-assisted examination tools, initially in the form of patent classification and prior art search tools, would go a long way to making the process more efficient and more consistent.[61] The booming technology industry and its university sector may further the need in Pakistan to build proper AI applications that would fit the local needs and environments.

The overall digital services platform should offer end-to-end IP services such as filing, prosecution, maintenance and renewal.[62] Automated fee calculation, payment processing and document management systems should also decrease administrative burden in each practice and increase service quality. In order to support accessibility countrywide in Pakistan, the design of the platform must rely on mobile-first strategies since mobile phone penetration rates are high in the country and the number of smartphone users is growing. The platform should be multilingual and contain guidance materials that would fit the users with different levels of understanding IP. Tying in with other digital government plans in Pakistan, such as the Digital Pakistan initiative, would not only make best use of current infrastructure investments but also be in line with national digitalization agenda.[63]

Digitalization should also involve excellent implementation of cybersecurity that safeguards the government systems and user data. IP information is a good commercial intelligence that needs protection against unauthorized access as well as cyber attacks. Enforcement of the rising data protection laws such as the

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[59] Asian Development Bank, "Digital Government Technology Assessment: Pakistan," ADB Technical Report, Manila, 2022, p. 34.

[60] Digital Pakistan Initiative, "E-Government Services Framework," Ministry of IT and Telecom, Government of Pakistan, Islamabad, 2022, p. 12.

[61] European Patent Office, "Artificial Intelligence in Patent Search and Examination," EPO Technical Report, Munich, 2023, p. 15.

[62] United Nations Department of Economic and Social Affairs, "E-Government Survey 2022: The Future of Digital Government," UN DESA, New York, 2022, p. 89.

[63] Ministry of Information Technology and Telecommunication, "Digital Pakistan Policy and Strategy 2018-2025," Government of Pakistan, Islamabad, 2018.

proposed Personal Data Protection bill in Pakistan would enable the digital IP system to be aligned to the modern privacy regulations as well as fostering confidence by the user on digital services.[64]

The system of execution needs coordination mechanisms resolving the gaps that exist with related agencies because of existing fragmentation of responsibilities. Creation of a National Intellectual Property Enforcement Coordination Center, modeled after the U.S. National IPR Coordination Center, has the benefit of enhancing inter-agency links and afford an intelligence and case management facility.[65] The existing agencies, such as FIA, Pakistan Customs, and provincial police, possessed specialized IP enforcement units that would increase the effectiveness of IP enforcement due to expertise and resources.

7. Implementation Roadmap and Strategic Priorities

To change the IP system in Pakistan, there is a necessity to take a properly sequenced policy of implementation that balances between the aspirations and more conservative constraints on resources and what can be put in place. The breadth of the roadmap comes up with the answer to the capacity defsingle short along with the advantage of technological advancement, which would recognise a permanent institutional enhancement.

7.1 Phase 1: Foundation Building (Years 1-2)

The first phase must be to ensure the establishment of low end infrastructure and capability that would enable its future improvement. The priority that should be implemented involve recruiting and training additional personnel to carry out examinations, installing simple electronic filing systems on trademarks and creation of performance measurement systems.[66] Modernization of the legal framework should begin by making comprehensive amendments of the current laws in progress in a sense that an expansive scope of stakeholders should consult and involve international jurisdictional experts to facilitate the process.[67]

The assembly proceeding should give a sufficient period to objection to the law and rectify it without unleashing the energy to the delivery. Such institutional restructuring as transitioning to a level of financial independence and establishing differentiated exam divisions should not occur in a rush or make institution work as normal as possible but should be strictly done to create the wanted changes that will require approval of members of staff who in turn require the mechanism to be well looked after.[68]

7.2 Phase 2: Digital Infrastructure Development (Years 2-4)

The second step must be related to fully developing digital infrastructure and this must begin with mandatory provision of e-filing of all varieties of IP and then extend to integrated case management as well as

[64] Ministry of Information Technology and Telecommunication, "Personal Data Protection Bill 2023," Government of Pakistan, Draft Legislation, Islamabad, 2023.

[65] National Intellectual Property Rights Coordination Center, "Annual Report 2022," IPR Center, U.S. Department of Homeland Security, Washington DC, 2022.

[66] McKinsey & Company, "Digital Transformation in Government: The $1 Trillion Challenge," McKinsey Global Institute, New York, 2023, p. 45

[67] World Intellectual Property Organization, "Technical Assistance and Capacity Building," WIPO Program Activities Report, Geneva, 2023, p. 34.

[68] Kotter, John P., “Leading Change: Why Transformation Efforts Fail,” Harverd Business Review, vol. 73, no. 2

databases.[69] During this step, online services should also be provided in the maintenance, renewal, and rudimentary enforcement of the IP. The basis of establishing a new system of IP enforcement unit and improved coordinating mechanisms must rely on the early work carried out in Phase 1.[70]

The efficiency would increase due to the inclusion of performance measuring systems and training of the staff implementing the enforcement resulting in the built-up institutional capacity. A limited capacity building initiative must be enabled through international cooperation activities like technical assistance agreements and examiners exchange programs which would strive to preserve the notion that the local practices must be merged with the international best practices.[71]

7.3 Phase 3: Advanced Services and Integration (Years 4-6)

The final action that must be taken should be the focus on the most trendy solutions like the AI-backed examination tools, combined databases, and robust analytical functionalities.[72] It is also necessary to have planning of alternative dispute resolution systems and even the further developed systems of international cooperation in this stage. Retrospective thinking of reforms done in the past would ensure that the actualized reforms have achieved their intended purpose and that there is something further to be implemented that can enhance the changes.

The continuous evolutionary principles would lead to formulation of a capability to constantly enhance the system by regularly evaluating the performance and feedbacks of the stakeholders to meet the changing needs of the user and changes in technology. The future success of the efforts towards reform is in the comfort zone of the vehicle of political will, adequate resource ability and engagement of the stakeholders in greater details and not just the immediate IP community but the business community, legal fraternity, academia and civil society organizations.

7.4 Stakeholder Engagement and Capacity Building

The commitment of the stakeholders and human capital development within the entire innovation ecosystem will make the transformation of IP systems successful. Formal advisory committees to represent the industries, small and medium size businesses, and individual inventors should provide continuous feedback on performance of the system and priority of the reforms.[73] These must as well be accorded with adequate mandates, resources, as well as consistent interaction with the leaders of the IP systems.

Sectoral specific access mechanisms in the context of addressing the needs of the industries of particular priority, e.g., textiles, pharmaceuticals, information technology, or agriculture would ensure that possible

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[69] Gartner Inc., "Digital Government Technology Trends 2023," Gartner Research Report, Stamford, 2023, p. 23.

[70] World Bank Group, "Strengthening IP Enforcement in Developing Countries," World Bank Policy Research Working Paper, Washington DC, 2022, p. 23.

[71] World Intellectual Property Organization, "International Cooperation in IP," WIPO Cooperation Report, Geneva, 2023, p. 15.

[72] Deloitte, "The Future of Government: Possibilities for Digital Government by 2030," Deloitte Center for Government Insights, London, 2023.

[73] United Nations Industrial Development Organization, "IP and Industrial Development," UNIDO Technical Paper, Vienna, 2023, p. 45.

reforms can be capable to respond to real business needs.[74] The concepts of these consultations should be incorporated in policy formulation as well as improvement of operations.

Ability in the area of advanced skills in IP in professional law in Pakistan is to be based on the evolution of diversified training, qualification, and continuing training.[75] Law schools analysis and interaction with the foreign IP associations could assist in accelerating the professional development process and offer the relevant concepts their relevance to the international counterparts. The sustainable capacity would be the long-term effect of integrating a sustainable capacity with the development of a career construction in IP practice through exposing them to specialized coursework in this field of the law in the university in Pakistan.[76]

Raising awareness to the inventors, entrepreneurs, students and the people in general would assist in creating the general awareness in the IP as well as enlightening them on the activities of the IP systems. The access to IP awareness would be through educational partnerships that would be provided by universities, research centers and innovation hubs that would support the present innovation and entrepreneurship training.[77]

7.5 International Cooperation and Knowledge Transfer

Increased coordination with the major IP offices, including WIPO, USPTO and other IP-developed regimes, would provide the corresponding possibilities of assistance, training, and exchange of experience, which supports reforms.[78] There should be some capacity building activities and transfer of personnel in such collaborations. Similar issues may be attributed to the possibilities of mutual learning and sharing of resources using regional cooperation mechanisms that involve the region influencing one another and even to collaborate with the other countries of South-Asia.[79] The difficult remedies of the common challenges like preservation of the traditional knowledge and the digital enforcement could be remedied collectively.

8. Economic Impact and Development Implications

Modernization of the intellectual property system in Pakistan entails far reaching ramifications on the national economic processes, ability to innovate and the competitiveness of a nation internationally. Good IP systems entail important infrastructure that promote knowledge-based economic growth as well as foreign investments attraction and technology transfer. The empirical evidence on the economic value of enhancing the IP system goes beyond the direct value of generating revenue to consider more development related

[74] Federation of Pakistan Chambers of Commerce and Industry, "Business Environment Survey 2023," FPCCI Publications, Karachi, 2023.

[75] International Association for the Protection of Intellectual Property, "Professional Development in IP Law," AIPPI Guidelines, Zurich, 2023.

[76] World Intellectual Property Organization, "IP Education and Training," WIPO Academy Report, Geneva, 2023, p. 23.

[77] Association of University Technology Managers, "AUTM Technology Transfer Practice Manual," AUTM Publications, Chicago, 2023, vol. 1, p. 234.

[78] World Intellectual Property Organization, "WIPO-Pakistan Cooperation Framework 2020-2025," WIPO, Geneva, 2020, p. 8.

[79] South Asian Association for Regional Cooperation, "Regional Cooperation in IP," SAARC Secretariat, Kathmandu, 2023, p. 15.

outcomes such as improving the innovation ecosystems, making industries more competitive globally and connected to international value chains.

The example of a country with international experience proves that a certain effect on innovation performance and economic competitiveness improvement can be gained as a result of investment in modern and efficient IP systems. Pakistan already has the human capital, institutional basis and strategic location to achieve the same level of success, as long as the reform initiatives are given the proper encouragement and even more importantly, continue to focus on the real world changes that result in overall benefit of the innovation ecosystem participants.[80]

Sustained commitment, huge investment, and continuous learning will be necessary to achieve the transformation, yet, the final goal, a modern, efficient, and easy to use system that has the ability to facilitate innovation and safeguard the rights of creators, is something that shall be worth achieving and a significant one in terms of contributing to the economy and societal developments of Pakistan. The effective carrying-out of these reforms would put Pakistan in a favorable position in the global knowledge economy as well as encourage innovation and creativity in Pakistan.

With the help of the comparative analysis with the United States, it is possible to state that, despite the marked differences in existing systems, specific reforms that should focus on institutional capacity, digital infrastructure, and coordination of enforcement can produce transformative effects. The difficulty involved is coming up with implementation tactics that transform international best practices based on law, customs and financial conditions in Pakistan as well as strengthening institutional resilience to promote long-term enhancement.

9. Conclusion

This is a complex look at the intellectual property system in Pakistan in a comparative way that involves the best practices in the United States resulting in a complex geography that needs a complex reform solution that is available. Although Pakistan has relatively complete sets of laws addressing most intellectual property categories, institutional strength, levels of enforcement, the digital infrastructure, and the availability of stakeholder participation building block mechanisms leave much to be desired and thus have a severe impact on system performance.

The study shows that the IP system in Pakistan is functioning at around 1 percent of the per-capita capacity levels of the US and handling applications less than 16,000 applications per year using less than 200 staff members whereas the USPTO processes more than 1.4 million applications with more than 13,000 employees. Such capacity imbalances can be directly transformed into processing delays, quality issues and restricted access to services that deter the use of the IP systems in addition to compromising incentives to innovate.

The main insights signify that modernization of IP systems should be a multi-dimensional process that implies the concurrent enhancement of various aspects, such as updating a legislative framework, increasing the institutional capacity, digitalizing the IP system, and reinforcing enforcement mechanisms. The phased implementation strategy suggested by the study offers a realistic solution of realizing these improvements in

[80] Organisation for Economic Co-operation and Development, "Innovation and Economic Growth," OECD Economic Outlook, Paris, 2023, p. 67.

managing resource constraints and implementation challenges that epitomize the situation in developing countries.

Digital transformation opportunities that have been discovered during the comparative analysis are of particular potential in terms of realizing tremendous efficiency and quality of services. The introduction of electronic filing systems, integrated databases, AI-enhanced examination tools, and online services platforms would be an enormous boost to at least system accessibility by cutting down the cost of operations, as well as increasing consistency.

The factors of international cooperation and knowledge transfer are defined as key to success as they will give access to the technical expertise, training opportunities, and best practice that may speed the process of reform. However, their effective adaptation presupposes a thoughtful approach to regional realities, experience of the law, and possibilities of institutions instead of the transplanting of a foreign practice lock, stock, and barrel.

The economic effects of the modernization of the IP system reach much further than the productivity of the system administration and comprise the development of the ecosystem of innovations, attracting foreign investors, and integrating with global value chains. The move by Pakistan towards a knowledge-based economy hinges very much on the development of IP systems that are effective at protecting and rewarding innovation on the one hand and rendering accessible and efficient services to the various stakeholders.

In the end, the study provides a conclusion that despite the unacceptably large number of aspects in which the IP framework of Pakistan requires improvement, the targeted transformations in the given system, supported by the political willingness to achieve them, available resources, and the involved optimization of stakeholder engagement, would produce a transformative shift that would put Pakistan in the position of a competitive player on the global knowledge economy map. The Roadmap outlined offers a realistic direction in attaining the set goals and acknowledges implementation realities as well as resource limitations.

Subsequent studies are advised to focus on selective implementation experiences, quantify the outcomes of reform impacts, and with respect to the emerging issues, which need considerable attention in the future. The successful adaptation of the modernization of the Pakistani IP system will after all, require a consistent long-term persistence in the institutional development and systematic flexibility in handling the ever-changing technology and stakeholder demands.

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