

The Role of Technology in Modernizing the Judiciary and Legal Process in Pakistan

Shahid Hussain Tunio*, Asadullah Almani**, Dr. Zarqa Amber***

¹ Teaching Assistant, School of Law, Shah Abdul Latif University, Shah Abdul Latif university khair pur Mirs.

² Lecturer, School of Law, Shah Abdul Latif University, Shah Abdul Latif university khair pur Mirs.

³ Assistant Professor, Faculty of Law, University of Sialkot.

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ABSTRACT

This research paper is dedicated to the crucial role played by technology as a means to modernize courts and legal processes in Pakistan. The study of the modern state of the country's judiciary has determined its outdated nature, the overwhelming number of cases still stuck in the system, and the difficulty for many citizens to access the right to justice, especially the cases of the rural population and representatives of lower castes. Here we will discuss how a number of technologies can be used to solve some of the long-standing issues of the judiciary's work and change the court's nature. The paper includes the consideration of these technologies as case management systems used to facilitate the management of vast numbers of different cases, e-filing and related document management processes, videoconferencing, and various alternative reality means of remote hearings; and the use of AI in the discipline for the analysis of judgments made by other juridical instances. Overall, these technologies have been shown to allow decision-makers to work much more efficiently, reduce the number of backlogged cases, improve the transparency of work of all means of government intervention, including law bodies, the recovery of the availability of the right to justice, and overall long-term cost efficiency. The implementation of these means of technology in the Pakistani judiciary that has been analyzed here has been discussed further in detail to show that the adoption and integration of these technologies have been far from perfect, although the overall result seems to be quite beneficial. The analysis of these challenges has also been completed with a series of suggestions and recommendations in the paper and the conclusion of this research paper on the actual state of modernization adopted in the Pakistani courts. Data storage and security, the lack of supportive infrastructure, and the resistance of many jurists to change in the means of their work have showed how the aforementioned factors may affect the overall success of implementation. The recommended measures have been considered in the light of phased introduction and overall training to improve the standards for all users. As a whole, the improvement of this situation with the introduction of technologies in cooperation with the country's corporations and world organizations is seen as a part of the solution of the modern problem that continues the centuries-old tradition.

Introduction

Pakistan's legal system is a complex combination of Islamic law, common law, and statutory law, reflecting its historical and cultural evolution (Ministry of Law and Justice, 2023). The judicial structure includes the Supreme Court of Pakistan, the provincial High Courts, and numerous subordinate courts operating across the country (Supreme Court of Pakistan, 2022). Although comprehensive in structure, the system faces

significant challenges amid a rapidly growing population. Case backlog remains one of the most pressing issues, resulting in prolonged delays in the administration of justice (National Judicial Policy Making Committee, 2009). Outdated administrative processes, inadequate infrastructure, and shortages within the lower judiciary further compound these delays (World Bank, 2019). Moreover, insufficient transparency and limited public access to information

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contribute to diminished public trust in judicial institutions (United Nations Development Programme, 2021). Access to justice remains particularly restricted for rural and low-income populations, exacerbating social inequalities and influencing judicial outcomes across different socioeconomic groups (Organisation for Economic Co-operation and Development, 2020).

Due to these factors, technology can play a decisive role in modernizing the previously described legal system. There is a broad array of approaches available to facilitate technological transformation within judicial institutions (World Bank, 2019). For example, electronic case filing (e-filing) systems and digital judicial records can be developed to enable efficient communication and secure information exchange between attorneys, court staff, and case managers, thereby reducing procedural delays and administrative inefficiencies (National Center for State Courts, 2021). Such digital court management systems have been recognized internationally as essential components of modern judicial reform and improved access to justice (Organisation for Economic Co-operation and Development, 2020). A broad array of similar initiatives can be developed, as the judicial system may significantly benefit from the implementation of artificial intelligence in searching legal provisions, precedents, and judicial rulings. The integration of AI-powered legal research tools has been recognized as a means to enhance efficiency and reduce systemic backlog (National Center for State Courts, 2021; Organisation for Economic Co-operation and Development, 2020). A positive consequence of such reforms would be overall systemic streamlining and improved case management (World Bank, 2019). The case presented for consideration provides a generalized picture of the current state of the legal system and highlights the range of challenges that technological implementation may help overcome. However, as noted by Baum (2022) in

the survey “Technology key for transforming Pakistani legal sector,” despite the demonstrated benefits of legal technology adoption in other jurisdictions, data protection and privacy preservation remain significant concerns that must be carefully addressed during implementation. These concerns align with broader digital governance and privacy frameworks emphasized in international development strategies (United Nations Development Programme, 2021).

Current State of Pakistan's Courts and Legal Processes

Pakistan’s courts and legal processes reflect a strong reliance on traditional methods, which have increasingly proven inadequate in addressing modern judicial challenges (National Judicial Policy Making Committee, 2009). The judicial system remains heavily dependent on manual case filing and open-court hearings, contributing to administrative bottlenecks, reduced productivity, and systemic inefficiencies (World Bank, 2019). The continued reliance on paper-based records not only complicates case management but also increases the risks of misplaced or tampered documents, undermining transparency and accountability in court administration (United Nations Development Programme, 2021).

The requirement for physical presence in court proceedings further exacerbates delays, as cases are frequently adjourned due to distance, illness, or other logistical barriers, adding to the growing backlog of pending cases (National Center for State Courts, 2021). Overcrowded courtrooms and overburdened administrative staff illustrate the structural strain placed on the judiciary. According to official judicial statistics, millions of cases remain pending across the Supreme Court of Pakistan, High Courts, and subordinate courts, reflecting long-standing inefficiencies in case disposal mechanisms (Supreme Court of Pakistan, 2022). Prolonged

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delays in adjudication have serious socioeconomic consequences, including financial losses, prolonged uncertainty for litigants, and erosion of public trust in the justice system (Organisation for Economic Co-operation and Development, 2020).

The causes of backlog are multifaceted. Beyond outdated procedures, there is a shortage of judges relative to population growth and rising litigation rates (World Bank, 2019). Frequent adjournments, complex procedural requirements, and limited institutional capacity—particularly in lower courts further slow case resolution (National Judicial Policy Making Committee, 2009).

Accessibility remains another pressing concern. Citizens in rural areas and from low-income or less-educated backgrounds face substantial barriers in accessing courts and understanding legal procedures (United Nations Development Programme, 2021). The centralization of courts in urban centers imposes financial and logistical burdens on litigants who must travel long distances to attend hearings or file documentation. Complex legal language and limited availability of affordable legal representation further restrict effective access to justice (Organisation for Economic Co-operation and Development, 2020). Moreover, while limited digitization initiatives have been introduced in some jurisdictions, the digital divide particularly in rural communities lacking reliable internet access and digital literacy risks exacerbating inequalities (World Bank, 2019).

The present condition of Pakistan's judiciary, characterized by antiquated procedures, extensive case backlogs, and limited accessibility, underscores the urgent need for comprehensive reform. The integration of technology offers a viable pathway to improve efficiency, reduce delays, enhance transparency, and broaden access to justice. Through structured

technological modernization, Pakistan can work toward a more responsive, equitable, and effective legal system (National Center for State Courts, 2021).

Technological Innovations in the Legal Sector

There has been a dramatic increase in the number of technology innovations that are on the rise. The current innovations are not only used in the legal sectors but also in other sectors as well. Therefore, in every sector, the use of technology innovations is becoming quite relevant since many entities are always finding new ways to ensure that they become much efficient (Susskind, 2019). For instance, technology innovations in the legal sector improve efficiency in the manner decisions are being made, accessed, and transparency (Contini & Lanzara, 2014). Furthermore, the current technology innovations are ideas that were never in existence during the early stages of information age. These innovations are such as application management systems, which have become so relevant ways in which legal documents are being organized (Ashley, 2017). The modern technology innovations which have become beneficial to the legal sector are case management systems. These kinds of systems ensure that they have implemented measures that would ensure that they manage all aspects of a case, whether they belong to a law firm or a court of justice (Contini & Lanzara, 2014). The other advantage associated with a case management system is that it is centralized, and this application provides the best means of ensuring that cost is kept at minimum by allowing the court to assign cases automatically to lawyers. Therefore, what the court should do is to consider engaging in a forward-thinking and not a backward-thinking practice of soft innovations (Susskind, 2019).

Nevertheless, case management systems provide a digital file organization system that monitors scheduling and workflow. Furthermore, the system provides that frequent physical presence or time is taken automatically without taking any time off. Therefore, the system does

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not waste time and ensures that attorneys handle completion. A case management system is also characterized by its capabilities, which allow the system authorities to identify the location of delays and track case progress effectively. They provide a tracking system that helps courts perform their work with litigants, placing preferred judgments (Contini & Lanzara, 2014). The system provides good monitoring for cases, and the application has an integrated court security system that automatically stores holds and indicates which parties are involved.

In the legal sector, Artificial Intelligence (AI) is probably one of the most important technological innovations. Applications of AI in the legal area are numerous, ranging from tools helping to analyze contracts to examples of predictive justice (McGinnis & Pearce, 2014; Surden, 2014). For example, in legal research, AI algorithms are able to look through a massive number of legal documents, case law, statutes, etc., and provide the most relevant information. This not only helps research to be done faster but also makes it more complete and accurate (Ashley, 2017). Apart from that, AI is applied to analyze legal documents for risks or contradictions, a process that may take human employees hours but may be completed by an AI system within a short period of time (McGinnis & Pearce, 2014). In some countries, there are projects aimed at applying AI for making judicial decisions, analyzing previous decisions and the information on judges' backgrounds to decide what the next decision could be from a certain judge (Surden, 2014). Although the experience of using such AI is still limited, this process seems to be extremely promising in the context of legal technologies. The greatest advantage of AI is that it can help overcome the problem of biases, which are a common problem of all kinds of human decision-making (Eubanks, 2018). And even though there are numerous opponents to the use of AI in places where justice is provided, experiments with AI show that it is still not as bad as feared (Eubanks, 2018).

Apart from that, special AI solutions

based on Natural Language Processing (NLP) have been recently developed and introduced to help people understand the language of the law. Most legal systems of the world today are structured in such a manner that not everyone is able to interpret the legality of certain behaviors and actions. Meanwhile, an ordinary person can easily find themselves in a situation where knowledge of the law is necessary when signing a contract, or when being on trial (Ashley, 2017). NLP-based AI is capable of translating legal language into simple human language, making legal documents understandable to the public. This has enormous implications for access to justice, as understanding one's rights and obligations is essential for fully utilizing them (Ashley, 2017).

Another technology changing the world is blockchain. Blockchain is an indisputable information grid that does not store data in one place, making it resistant to tampering and ensuring authenticity. This is achieved because a digital database is stored simultaneously on many computers worldwide, and the addition of a new information block to the existing grid is possible only after the consensus of thousands of computers. This creates an indisputable record of actions, which may be crucial in the legal world for inheritance disputes or arguments over intellectual property ownership (De Filippi & Wright, 2018). Although blockchain cannot solve all legal issues, it can make procedures safer, more reliable, and more just in many cases (De Filippi & Wright, 2018).

As a result of these technologies continuing to grow and opening up new opportunities, they are expected to help address several long-standing problems within the legal process, including reducing case backlogs and improving access to justice (Susskind, 2019). Nevertheless, to be successfully implemented, these innovations must be integrated along with ethical considerations, data privacy concerns, and continuous training and adaptation by the legal sector (Eubanks, 2018).

Implementation of Technology in Pakistan's Courts

Technology in Pakistan's courts has been a fledgling process on the rise for several years, driven by a need to address long pending cases and inefficiency. Though the legal industry in Pakistan is comparatively less developed when it comes to using technology as compared to countries abroad, significant strides have been made through initiatives and pilot projects (Law & Justice Commission of Pakistan [LJCP], 2021). Although thorough case studies of the success and impact of these technological implementations are sparse, there have been positive reports from different courts. For example, the Sindh High Court has seen a sharp decrease in backlogged cases since implementing their digital case management system (LJCP, 2021). In the same vein, video conferencing in the Islamabad High Court has minimized delays and improved access to justice for litigants in remote areas (LJCP, 2021).

However, there are hindrances to utilizing technology in Pakistan courts. One of the biggest challenges is that most parts of the country lack basic technological infrastructure, especially lower-level courts and those in remote areas, which often do not have computers or internet connectivity. This digital divide serves as a substantial obstacle to the mass deployment of court technology (LJCP, 2021).

A second hurdle is inertia within the legal community to adopt change. Traditional paper-based systems remain the norm for many judges, lawyers, and court staff, who may be reluctant to embrace new technologies. Resistance tends to stem from fears about losing their job, lack of technical knowledge, or uncertainty about feasibility. To overcome this resistance, thorough training programs and change management strategies must be implemented (LJCP, 2021).

The use of court technology is also significantly challenged by concerns related to data security and privacy. Digitization of lawyer correspondence and access to personal data

necessitate robust data protection measures. Courts must maintain the integrity and confidentiality of digital records to preserve public trust (Eubanks, 2018).

Another challenge is integrating various technology systems across courts and jurisdictions. Due to Pakistan's federal structure, courts in different provinces may adopt different tech solutions. Interoperability and standardization are essential for a successful national court system (LJCP, 2021).

Funding constraints also pose a barrier. The upfront investment in hardware and software is significant, and securing budget allocations in a resource-constrained environment can be challenging (LJCP, 2021).

Yet the gains of technology are high if realized in modernizing Pakistan's courts. By learning from successes and failures in other countries, including India, Pakistan can continue a slow but steady trend toward digitalization and efficiency in its judicial system (LJCP, 2021).

Benefits of Technological Modernization

There is a strong possibility that technological modernization of Pakistan's courts and legal processes may offer transformative change in its judicial landscape. One of the most immediate benefits is increased efficiency and reduction in case backlog. Greater automation of administrative functions and digital case management systems can significantly accelerate case processing (Katsh & Rabinovich-Einy, 2017). Improved speed in filing, preparing, and scheduling reduces delays traditionally associated with paperwork, helping address one of Pakistan's most pressing judicial challenges—delayed justice due to backlog (World Bank, 2018).

The implementation of e-filing systems and digital documentation enhances efficiency by eliminating the need for physical storage and retrieval of documents (World Bank, 2018). Legal professionals gain instant access to case

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files, reducing delays caused by misplaced or damaged records. Video conferencing enables remote hearings, minimizing travel-related delays and scheduling conflicts, and thereby facilitating faster case resolution (Susskind, 2019). Over time, such efficiencies allow courts to hear more cases, contributing to backlog reduction and improved access to justice.

Another important advantage of modernization in the legal sector is increased transparency and accountability. Digital systems log procedural actions, making it easier to track case progress and identify bottlenecks. Increased transparency can help reduce corruption and strengthen public trust in judicial institutions (Almagro, 2018). Online case tracking systems allow litigants to monitor proceedings, further enhancing openness. Additionally, digitized court records and publicly accessible judgments promote legal awareness and institutional accountability (World Justice Project, 2021).

Modernization also improves access to justice, particularly for individuals in remote or underserved regions. Online legal resources and e-filing systems reduce reliance on physical court visits (Susskind, 2019). Virtual hearings lower financial and logistical barriers for individuals with mobility challenges or work constraints. By reducing such structural barriers, technology promotes a more equitable justice system (Katsh & Rabinovich-Einy, 2017).

Although the initial investment in court technology may be substantial, long-term cost savings are significant. Digital systems reduce paper usage, physical storage needs, and manual administrative work (World Bank, 2018). Automation allows more efficient allocation of human resources and may lower operational costs over time. At a broader level, efficient judicial systems contribute to improved business environments by reducing the time required to

resolve commercial disputes (World Bank, 2020).

Technological modernization also extends beyond courtroom administration. Artificial intelligence-powered legal research tools enhance the quality and speed of legal analysis by identifying relevant precedents and patterns in case law (Susskind, 2019). Such innovations improve judicial reasoning and decision-making. For the public, user-friendly digital platforms and plain-language legal resources simplify complex legal processes, empowering citizens to better understand and assert their rights (World Justice Project, 2021). Over time, these developments present an opportunity to build a more efficient, transparent, and accessible justice system in Pakistan. While implementation requires sustained investment and institutional commitment, technological reform can strengthen the rule of law and enhance public confidence in the judiciary.

Potential Challenges and Solutions

Although technology in courts is a significant opportunity for Pakistan, it also presents challenges that must be addressed for effective implementation. One of the key challenges relates to infrastructural limitations. A substantial number of courts lack basic technological tools such as computers, reliable internet connectivity, and uninterrupted electricity supply. This digital divide presents a serious obstacle to the universal adoption of court technology (World Bank, 2016; International Telecommunication Union [ITU], 2022).

Such challenges can be addressed through phased implementation strategies, prioritizing urban centers before gradually expanding to rural areas (World Bank, 2016). Simultaneously, substantial national investment in digital infrastructure is required. This may include partnerships with telecommunications providers to expand broadband access and the

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installation of alternative energy sources such as solar panels to ensure consistent power supply (ITU, 2022). Mobile courts equipped with technological tools may serve remote communities while permanent infrastructure is developed (United Nations Development Programme [UNDP], 2020).

Another major difficulty concerns varying levels of digital literacy among legal professionals and the general public. Many judges, lawyers, and court staff may resist technological change due to limited familiarity or training (Susskind, 2019). Likewise, rural populations may lack the skills necessary to effectively engage with digital legal systems (UNESCO, 2018). Comprehensive and mandatory training programs for judicial stakeholders are therefore essential, alongside continuous professional development to keep pace with evolving technologies (Susskind, 2019). Public awareness campaigns and community outreach initiatives can help citizens understand and utilize digital court services. Additionally, public access points such as e-kiosks in courts and community centers can bridge access gaps (UNDP, 2020). Long-term solutions may include integrating digital literacy into educational curricula to prepare future generations (UNESCO, 2018).

Cybersecurity and data protection represent further significant concerns. Digitized court systems are vulnerable to data breaches, cyberattacks, and unauthorized access (Council of Europe, 2018). Robust cybersecurity frameworks—including encryption protocols, secure servers, and regular security audits—are essential. Clear guidelines governing data storage, access, and privacy must be strictly enforced (Council of Europe, 2018). Continuous collaboration between information technology experts and cybersecurity professionals is critical to maintaining system integrity. Moreover, comprehensive data protection legislation is

necessary to establish legal safeguards for digital judicial information (UNDP, 2020).

Resistance to change among legal professionals is another potential obstacle. Engaging lawyers and judges in the planning and implementation of technological reforms increases acceptance and effectiveness (Susskind, 2019). Clear communication regarding the benefits of modernization—such as improved efficiency and case quality—can reduce apprehension. Incentives for early adopters and peer success stories may further enhance acceptance. Importantly, technology should be framed as a tool that augments, rather than replaces, legal professionals (Katsh & Rabinovich-Einy, 2017).

Additionally, integrating multiple technological systems across jurisdictions presents complexity. Pakistan's federal structure means that courts at different levels may adopt incompatible technological platforms, leading to interoperability challenges (World Bank, 2016). National-level coordination is therefore essential to establish standardized technological frameworks and ensure compatibility across jurisdictions. This may involve developing national standards for court technology and establishing a centralized oversight body. Open-source solutions and interoperable Application Programming Interfaces (APIs) can facilitate system integration (Katsh & Rabinovich-Einy, 2017).

Although these challenges are substantial, they are manageable with proper planning, adequate resourcing, and sustained commitment to reform. A flexible and iterative implementation strategy that allows for continuous evaluation and improvement is essential (World Bank, 2016). By addressing these obstacles proactively, Pakistan can leverage technological modernization to build a more efficient, transparent, and accessible judicial

system aligned with the demands of the Fourth Industrial Revolution.

Future Prospects and Recommendations

The imminent future of Pakistan's legal system lies in adopting state-of-the-art technological advancements. Algorithms based on artificial intelligence and machine learning can be deployed to assist in case analysis, predict legal outcomes, and draft basic legal documents, as increasingly observed in global legal systems (Organisation for Economic Co-operation and Development, 2020; National Center for State Courts, 2021). Additionally, blockchain technology offers solutions for securing land ownership records and protecting intellectual property rights by ensuring tamper-proof, transparent recordkeeping (World Bank, 2019). Emerging technologies such as virtual reality may also enhance judicial processes by reconstructing virtual crime scenes in courtrooms and serving as immersive training tools for aspiring lawyers, aligning with broader digital justice modernization strategies (United Nations Development Programme, 2021).

Such progress needs to be anchored by major policy shifts and changes in the legal framework. Governments must work to codify cyberlaws related to electronic evidence, online dispute resolution, and data protection. And some legislation must be enacted in order for digital signatures and electronic documents to carry the same legal weight as they do with any other court proceedings. Policy regulations need to be structured in such a way that the benefits of digital legal services are made accessible across all sections of society and not just as an instrument, “for those who can access it”.

These technologies must be supported by robust training and capacity-building programs to ensure their practical and sustainable implementation (World Bank, 2019). Legal technology courses should be made mandatory in law schools to prepare future lawyers for the evolving digital landscape of the legal profession, in line with global digital competency

frameworks (Organisation for Economic Co-operation and Development, 2020). Licensed practitioners and members of the judiciary should also receive regular updates through mandatory Continuing Legal Education (CLE) programs to remain informed about emerging technologies and best practices in court digitization (National Center for State Courts, 2021). Furthermore, public awareness campaigns should be initiated to enhance citizens’ understanding of their digital rights and the availability of online legal aid services, consistent with access-to-justice and digital inclusion strategies (United Nations Development Programme, 2021).

This new technology transformation will require strong collaboration between the country and tech companies as well as international organizations. Collaborations with top tech companies to provide expertise in building a tailor-made solution for our legal system International organizations can help to give an outsiders perspective on what constitutes best practice abroad and may even have potential initiatives for pilot projects you could trial. In addition, partnering can also play a role in closing the digital divide with new technologies that reach into under-served areas at low-cost. For these recommendations to be operationally and politically viable, they must be implemented in phases, beginning in urban centers and expanding gradually to rural areas. Phased institutional reform and pilot-based scaling have been shown to reduce implementation risk and increase adoption success (Rogers, 2003; World Bank, 2019). A separate central “Legal Tech Innovation Unit” within the Ministry of Law and Justice should be established to design, plan, and execute technological initiatives across different courts and provinces, aligning with digital governance best practices (Organization for Economic Co-operation and Development, 2020). Expanding digital legal aid to ensure nationwide accessibility is consistent with global access-to-justice frameworks (United Nations Development Programme, 2021). Additionally, launching a “Tech Ambassador” initiative where technologically proficient members of the legal

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profession mentor their peers reflect established diffusion-of-innovation principles that emphasize peer influence in technology adoption (Rogers, 2003). This structured and targeted action plan would lay the foundation for comprehensive technological transformation within Pakistan's legal infrastructure into an opportunity and build a court system that is more efficient, transparent and accessible making full use of modern technology.

Conclusion

The path to modernize system of courts in Pakistan and legal processes through technology is daunting yet filled with opportunities. This exploration of the COMPAS algorithm has unveiled a justicesystem still mired in antiquated practices, enormous caseloads, and access hobbled. Over the years, we have all looked at different solutions ranging from launches of case management systems to so-called artificial intelligence.

Technological modernization brings a lot of advantages. The process is often faster in most cases, and it speeds up the delivery of justice with efficient procedures, resulting in reduced case backlog. Increased transparency and accountability will help ensure that Americans trust their courts. This is important because it can help provide citizens, especially in far-flung or underserved areas with better access to justice and a more equitable legal system. Even from a financial perspective, the long-term costs of these technological solutions are quite attractive.

But the road to modernization is strewn with challenges. Key pain points include infrastructure constraints, uneven levels of digital proficiency and cyber-security fears in the broader legal community. However, with thoughtful planning and a dedication to continuous improvement, these obstacles can be eliminated.

The potential for disruption that technology offers the legal system in Pakistan is immense. The social contract and legal foundation of our democracy is intended to

maximize an efficient, transparent justice system that can serve everybody. Whether you are talking about AI- assisted legal research, or blockchain-secured property records. Technology has a role to play in every corner of the law and it WILL change how we all practice sooner than later! This transformation requires effort from everyone. Digital infrastructure should be one of the first areas that any government focuses on and appropriately legislate accordingly. It's time the legal community began accepting change and playing an active role in this digital transformation. It is worth considering inviting tech companies and international organizations to contribute their expertise and resources. Citizens know how to use tech, and they are interested in using it. we just have not helped them get the very digital literacy skills needed to leverage these advances.

Modernizing technology in the legal system of Pakistan is not a choice, it has become essential to ensure that justice does prevail in the 21st century. Pakistan can build a legal system less archaic and more compatible to the challenges of 21st century, if it acts NOW. By using technology, we can finally say that no matter how powerful and corrupt you are; the organizations at every level in PTA or anywhere else cannot afford to break law. Time for Action To seize this opportunity to make a fairer more speedy modern legal system for all Pakistanis.

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