

Beyond Traditional Paper Boundaries: Analyzing the Digitization of Land Record in Khyber Pakhtunkhwa

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Abstract: *This paper presents a comprehensive evaluation of land record digitization efforts in Khyber Pakhtunkhwa (KP). By examining the achievements, gaps, and challenges encountered, the paper aims to identify strategies for enhancing the success and reliability of the digitalization process. Through qualitative research methods, including interviews, field visits, and literature reviews, the paper highlights significant advancements such as the implementation of GIS, legislative reforms, and increased transparency in land management. However, it also identifies persistent challenges, including incomplete digitization, infrastructure limitations, and security concerns. To address these challenges and establish a robust digital system, the study recommends several key strategies. These include improving data quality and accuracy, enhancing the capacity and training of officials, and implementing robust security measures. By addressing these critical areas, KP can effectively harness the potential of digitalization to modernize land management and promote efficient, transparent, and reliable land record systems.*

Keywords: Digitization, Board of Revenue, Geographical Information System (GIS), Manual system, digital system, Patwari system, transparency, accessibility, efficiency, land management, data security

Introduction

The history of land administration and revenue generation in the Indian Sub-continent can be traced back to the 13th and 14th centuries when the first Indian Sultan, Ala Uddin Khilji started the registration and administering of the land record (Ali, 2013). Successive rulers initiated and maintained the land record tradition throughout their reigns and extracted land revenue such as Sher Shah Suri of the 16th century who introduced fixed crop rates that significantly improved the measurement of land records (Thakur, Dutta, Khadanga, & Venkatesh, 2005). Akbar, the most powerful emperor of the Mughal Empire in the 17th century, brought substantial reforms in the land administration such as determining different classes of lands and revenue estates (Ali, 2013). The Mughal Empire was followed by British rule during which the land administration system was enhanced to raise more land revenues (Marshall, 1975). Because of the complication in the uniform implementation of laws across the sub-continent, the British government introduced and modified state-specific regulations over nearly 90 years (Thakur et al., 2005). In Pakhtun Areas of today, Khyber Pakhtunkhwa, the journey of land record keeping dates

back to the 16th century, when Sheikh Mali, a renowned historian and revenue expert, meticulously compiled the land records of the Yousafzai region in Swat. His pioneering work, known as "Daftar-e-Sheikh Mali," laid the foundation for land record management in the region and introduced an innovative land distribution system called "Wesh" (Ali, 2013).

Recognizing the importance of land records, subsequent rulers such as Sher Shah Suri and Akbar implemented systematic approaches to land categorization, measurement, and revenue assessment. During the British Raj, the government introduced scientific land record systems, conducting extensive cadastral surveys to demarcate land boundaries and record ownership details, thereby establishing a strong groundwork for land administration.

Following independence, Pakistan adopted the Land Revenue Act of 1873 to regulate land surveys, record-keeping, and revenue collection. In the North-West Frontier Province (NWFP), now Khyber Pakhtunkhwa (KP), the first land settlement was completed in 1926 across select districts. However, the traditional manual land record system faced significant challenges, including labor-intensive processes, time-consuming operations, and frequent errors in record-keeping. These outdated methods hindered efficient land administration, leading to disputes, delays in transactions, and limited access to resources for the poor.

To address these challenges, the transition to digital land record systems became imperative. Digitization involves converting physical land-related documents into digital formats, which enhances efficiency, accuracy, accessibility, and transparency. By adopting centralized databases and streamlined processes, digital systems enable more effective land administration.

The digitization of land records in KP began in 2012, initiated in two phases: the first focused on seven districts (Peshawar, Mardan, Abbottabad, Buner, Kohat, Bannu, and D.I. Khan), while the second targeted an additional 12 districts. This initiative aimed to modernize the land management system and address the limitations of the manual system. However, it encountered cultural, institutional, and technological challenges, including institutional resistance, technological limitations, economic constraints, bureaucratic inefficiencies, and political obstacles—issues also observed during land record digitization in Punjab.

To improve the digitization process, it is essential to address the accuracy and completeness of paper records while enhancing the capacity and training of government officials. Implementing robust security measures and ensuring inter-departmental coordination are also vital. The Khyber Pakhtunkhwa Land Revenue (Amendment) Act of 2014 facilitated the digitization process by introducing cross-verification of records and establishing Service Delivery Centers (SDCs).

Major issues in land record management include record deterioration, time-consuming retrieval processes, and high transaction costs, which disproportionately affect the poor and hinder economic development, social cohesion, and governance. Investments in improvements can promote transparency, reduce corruption, and enhance governance; however, the full potential of land record digitization in KP remains unrealized.

This research aims to fill the gap in comprehensive studies evaluating the land record digitization process in Khyber Pakhtunkhwa by identifying successes, gaps, and challenges encountered over the years. It also proposes policy measures to overcome these obstacles and establish a state-of-the-art land record management system in the province.

Land Record Digitization in KP – An Assessment

The need for land record digitization in KP arose from problems in the Traditional Land Record System, including inaccuracies, time-consuming manual maintenance, challenges in record retrieval, discrepancies, and inefficiencies in obtaining land titles and mutation processes (Khan Roshan, 2017; Shank, 2006; European Property, 2020; UN Habitat Report, 2012). To address these issues, the

government aimed to make land records transparent and publicly accessible through digitization, leading to improved accuracy, efficiency, and effective land management (Shank, 2006; World Bank, 2017).

Despite significant progress in digitization efforts, the system in KP has not been fully operationalized due to various social, economic, administrative, and institutional challenges. These obstacles have resulted in an incomplete, unreliable, and inefficient digital system, compromising data security and protection. Consequently, the land record system has not been fully computerized, leading to disputes and legal conflicts. This study will address these challenges and identify strategies for establishing an accurate, efficient, and secure digital land record system in KP.

An efficient land record system is crucial for secure land tenure, good governance, and optimal land utilization in Khyber Pakhtunkhwa. The significance of digitization in this context is immense. Despite government efforts, a robust system has not yet been established. This study presents a comprehensive analysis of the achievements, gaps, and challenges faced during the digitization process, offering valuable insights and policy recommendations to create an efficient and reliable digital land record management system in KP.

The digitization project has achieved significant milestones, including increased accessibility, reduced processing times, and enhanced transparency (Beg, 2022). However, it also encountered challenges such as technical issues, data accuracy concerns, and resource constraints (Board of Revenue, KP, 2024). The impact of digitization on land transactions, dispute resolution, and revenue collection has been positive (Beg, 2022). Future directions will focus on achieving comprehensive coverage, enhancing data accuracy, and utilizing emerging technologies for further system improvement. The initiative to digitize land records in Khyber Pakhtunkhwa (KP) is a complex project/task with notable accomplishments and significant challenges.

This study employed a qualitative methodological approach, incorporating both primary and secondary data collection. However, given the nature of the topic, digitization as a relatively new intervention, the research primarily relies on firsthand qualitative data gathered through in-depth interviews. In-depth interviews were conducted with 30 key stakeholders, with 10 interviews carried out in each of the three selected districts of Khyber Pakhtunkhwa: Buner, Nowshera, and Karak. These stakeholders included Land Owners, Representatives from Services Delivery Centers (SDCs), Officials from the District Administration and Lawyers and legal advisors working in the selected districts.

Data analysis employed a thematic approach and triangulation to ensure validity. Interview transcripts were analyzed to identify recurring themes and patterns related to digitization experiences, challenges, and opportunities. Triangulation involved comparing findings from interviews with those from document reviews and observations to strengthen the research's credibility.

The findings are categorized into achievements and gaps, followed by challenges faced during the digitization process. This balanced review aims to inform future strategies, as outlined in the policy recommendations section.

Achievements of Land Record Digitization

In KP, the digitization process began with the Khalsa Circle Project in 2005 but faced resistance and was not completed. Later, in 2013, the computerization of land records was launched in seven districts, and in 2015, it was extended to 12 additional districts. The phased approach allowed testing and refinement of digital systems before scaling up the implementation (World Bank, 2017). Currently, 57 Service Delivery Centres (SDCs) are operational across 19 districts, utilizing the Land Record Management Information System (LRMIS) for land-related processes. The digitization process has aimed to achieve a comprehensive and integrated digital land record management system (World Bank, 2017).

The land record digitization initiative in Khyber Pakhtunkhwa (KP) has made significant strides in modernizing land management, with approximately 64.44% of land records now digitized (**Annex-A: Table on Status of Districts with Digitized Land**). This transition has not only enhanced the reliability of data but also mitigated the risk of data loss due to disasters, streamlining access to land records and improving transaction transparency (Personal Communication, May 30, 2024).

One of the most impactful outcomes of digitization has been the legislative amendments aimed at adapting land ownership and record-keeping laws to current realities (Personal Communication, June 13, 2024). These reforms have simplified bureaucratic processes, thereby increased operational efficiency and enhanced the quality of public services (Personal Communication, June 11, 2024). Such changes have raised greater public trust and improved customer service (Personal Communication, April 7, 2024).

From a financial perspective, the digitization process has positively influenced revenue generation by ensuring more efficient and accurate record-keeping. This has led to an increase in land-related fees and taxes, while simultaneously minimizing human error and corruption, thereby supporting better financial management (Personal Communication, June 11, 2024; June 30, 2024).

Another significant achievement is the effort to eliminate the traditional Patwari culture, which has long been associated with corruption and inefficiency (Personal Communication, June 15, 2024). By reducing reliance on human intermediaries, the digitization initiative has enhanced transparency in land administration. However, this shift necessitates comprehensive training for current staff to manage digital operations effectively (Personal Communication, June 25, 2024).

Operational efficiency has also seen marked improvement, as demonstrated by the issuance of 4,116 mutations and 14,916 *Fards* since January 2024 (Personal Communication, June 30, 2024). This enhanced efficiency has significantly reduced the time required for citizens to obtain essential land ownership documents (Personal Communication, June 30, 2024).

The implementation of the Land Record Management Information System (LRMIS) has resulted in a notable absence of litigation against Service Delivery Center (SDC) reports since its inception. This lack of disputes indicates the reliability and accuracy of the digitized system, fostering trust in the land record system and alleviating the judicial burden associated with land disputes (Personal Communication, June 15, 2024).

Furthermore, the digitization initiative promotes secure and transparent land management by reducing illegal activities and enabling real-time information sharing (Personal Communication, March 02, 2024). The system streamlines property transactions, facilitates registration processes, and maintains accurate ownership records, which are crucial for identifying tax evaders (Personal Communication, March 20, 2024).

The digitized land record system also offers enhanced protection of property rights through accurate and tamper-proof records, providing legal safeguards against disputes and fraud (Personal Communication, April 25, 2024). Real-time cadastral mapping capabilities assist in detecting and preventing encroachments, allowing timely interventions by authorities (Personal Communication, May 23, 2024). Additionally, the provision of transparent land history reduces litigation and conflicts by making relevant data easily accessible (Personal Communication, June 25, 2024). Transitioning to paperless solutions simplifies land management through e-payment options, complaint portals, and online access, thereby promoting sustainability (Personal Communication, May 25, 2024).

In terms of governance and public service delivery, digitized records facilitate quicker access to information, enabling faster resolution of land-related issues (Personal Communication, June 30, 2024). They contribute to more efficient land-use planning and decision-making for urban development and environmental conservation (Personal Communication, May 30, 2024). Reliable records also attract

investors, thereby boosting real estate activity and economic growth (Personal Communication, April 13, 2024). The transparency afforded by the digitization process reduces property fraud and disputes, leading to fairer transactions (Personal Communication, March 30, 2024). Moreover, the process accelerates land acquisition for government projects, enhancing planning and development efforts (Personal Communication, June 11, 2024).

Finally, the implementation of a Geographical Information System (GIS) in new settlements, particularly in the newly merged districts (NMDs) and the Malakand Division, marks a significant technological advancement (Personal Communication, April 5, 2024). This system creates a highly accurate, spatially referenced database of land parcels, facilitating efficient land management and enhancing land-use planning (Personal Communication, May 15, 2024). The use of GIS minimizes disputes and reflects KP's commitment to modernizing land administration with cutting-edge technology (Personal Communication, June 1, 2024).

To sum up, the achievements of the land record digitization program in KP over the past 15 years are noteworthy, representing significant advancements in public administration through technology. While considerable progress has been made, ongoing efforts are essential to fully digitize the remaining land records and reinforce e-governance principles for the benefit of the citizens of Khyber Pakhtunkhwa.

Gaps in Land Record Digitization

Despite the significant progress made over the past 15 years in the digitization of land records in Khyber Pakhtunkhwa (KP), several challenges and barriers impede the system from realizing its full potential.

One of the primary issues is the incomplete transition to e-governance. Although advancements have been made, the digitization of land records in KP has yet to fully integrate e-governance principles. This gap limits efficiency, transparency, and accessibility within the system. Persistent delays in transaction processing and difficulties in accessing records underscore the urgent need for a gradual integration of digital services and the automation of existing processes. Furthermore, effective training for staff and public education are essential components for ensuring a smooth transition to e-governance (Personal Communication, June 2, 2024).

The decentralized nature of land records in KP poses additional challenges, resulting in a lack of unified control and standardization. Presently, only select Service Delivery Centers (SDCs) are linked to the Central Land Record Management Information System (CLRMIS) and Land Record Management Information System (LRMIS). This fragmentation complicates data retrieval and policy implementation, suggesting that the establishment of a centralized database accessible to all SDCs could greatly enhance efficiency (Personal Communication, March 25, 2024).

Integration issues among key stakeholders—such as banks, the National Database and Registration Authority (NADRA), and the courts—further exacerbate inefficiencies within the system. The absence of a robust data-sharing platform that addresses security and privacy concerns significantly hampers the effectiveness of the digitization initiative (Personal Communication, April 30, 2024).

Currently, SDCs are limited in their service offerings, primarily issuing Fard and Mutations. This restriction creates inconveniences for users who may need a broader range of documents. Expanding the services provided at SDCs while ensuring quality is vital, alongside prioritizing the digitization of all land records to improve both access and accuracy (Personal Communication, April 30, 2024).

The role of Patwaris, who possess valuable expertise in identifying property locations, remains persistent and somewhat problematic. An over-reliance on these intermediaries can hinder the modernization of land record processes and compromise objectivity. Implementing digital tools for property mapping and reducing the discretionary powers of Patwaris could enhance both the accuracy and fairness of land records (Personal Communication, May 5, 2024).

Infrastructure limitations also present a significant hurdle. Many SDCs operate in facilities that lack the technological infrastructure necessary for effective digitization. Thus, improving physical infrastructure and investing in secure digital systems are crucial steps toward modernization (Personal Communication, June 2, 2024).

Another major issue is the complexity of the existing payment procedures. The current multi-step process complicates user experiences and slows transaction speeds. Streamlining the payment process and incorporating online payment options could substantially improve the overall system (Personal Communication, March 25, 2024).

The exclusion of the Khyber Pakhtunkhwa Information Technology Board (KPITB) from the maintenance of software systems is a significant oversight. This exclusion limits opportunities for innovation and upgrades, suggesting that involving KPITB could foster new ideas and promote sustainable improvements (Personal Communication, April 25, 2024).

In several districts, including Charsadda, Swabi, Bannu, and D.I. Khan, the digitization process remains incomplete. This incompleteness leads to disparities in access to services and the quality thereof, highlighting the necessity for focused efforts to ensure equitable service provision across all areas (Personal Communication, June 8, 2024).

The continued use of archaic Sanskrit and Persian terms within digital records poses another challenge. Such terminology can confuse users who may not be familiar with these languages. Transitioning to more universally understood language, while still preserving cultural heritage, could greatly enhance accessibility for a broader audience (Personal Communication, March 25, 2024).

Reliance on traditional cadastral maps, which are still maintained on cloth, complicates the processes of updating and sharing information. Moving to digital Geographic Information System (GIS) maps could enhance accuracy and usability, allowing for better integration with other geographic data and providing a comprehensive view of land use and ownership (Personal Communication, June 30, 2024).

The digitization process has also revealed gaps in the technical capacity of revenue staff, indicating a need for training and capacity-building programs. Such initiatives are essential for equipping personnel with the necessary skills for effective system implementation (Personal Communication, May 10, 2024).

A notable gap in the digitization effort is the lack of public awareness and engagement. While strides have been made towards modernization, many citizens remain unaware of the benefits and importance of the digitization initiative. Comprehensive public awareness campaigns are lacking, leaving many to underestimate how digitization can enhance land management and simplify transactions (Personal Communication, June 17, 2024).

To address technological skepticism—particularly in rural areas—targeted engagement programs are necessary. Community members have expressed concerns about the technology, which may impede their willingness to adopt the new system (Personal Communication, June 3, 2024).

The current system also lacks user-friendly interfaces and support in local languages, which presents challenges for users from diverse backgrounds, especially those who are less literate (Personal Communication, June 30, 2024). Furthermore, vulnerable groups—including women, the elderly, and marginalized communities—often lack tailored awareness initiatives to help them navigate the digitized land record system effectively. This oversight may exacerbate existing inequalities, limiting the benefits of digitization for these groups (Personal Communication, May 3, 2024).

Building trust and credibility in the digitization process is essential, yet currently under-addressed. Collaborating with local representatives and community leaders could enhance community buy-in and highlight the benefits of the initiative (Personal Communication, June 30, 2024). Establishing accessible

help centers staffed with trained personnel would also assist individuals facing challenges in using the digital land record system, providing the necessary support to navigate the platform effectively (Personal Communication, March 21, 2024).

Transparent communication regarding the digitization process, its objectives, and benefits is crucial for fostering public trust and confidence. Clear messaging can mitigate skepticism and encourage community support (Personal Communication, May 24, 2024). Additionally, the government should actively encourage community participation in decision-making processes and establish feedback mechanisms to address concerns and drive continuous improvements in the system. Engaging the public in this manner enhances accountability and responsiveness (Personal Communication, April 23, 2024).

In summary, addressing the gaps in public awareness and engagement is vital for the successful digitization of land records in KP. By implementing targeted awareness campaigns, facilitating user access, and fostering community involvement, the government can improve land management, enhance public trust, and ensure equitable distribution of the benefits of digitization among all citizens.

Issues and Challenges

Drawing on both secondary data and primary data from field interviews with key stakeholders, the following challenges have been identified:

- i. **Decentralized Land Record Management Information System (LRMIS)** The decentralized architecture of the LRMIS hampers the provision of web-based services, thereby restricting landowner profiling, data analytics, and information reporting for policy decisions. This lack of centralization not only limits efficiency but also creates barriers to comprehensive data utilization.
- ii. **Absence of Web-Based Access** The current system does not facilitate web-based access to various informational and transactional services, making it difficult for users to engage with the system remotely. This absence complicates land transactions and adversely affects the overall user experience.
- iii. **Payments Limited to National Bank** Payment options are confined to transactions conducted exclusively at the National Bank of Pakistan (NBP) branches, with no alternative banking options or online payment methods (e.g., debit or credit cards) available. This limitation can lead to inconvenience for taxpayers and potential delays in transactions.
- iv. **No Queue Management and Token Reservation System** The lack of a reservation system for services at Service Delivery Centers (SDCs) creates significant queue management issues, particularly given the limited physical space available at these centers. This results in user frustration and extended wait times.
- v. **Non-Responsive Board of Revenue (BOR) Website** The existing BOR website offers limited functionality concerning Information, Education, and Communication (IEC) materials. This deficiency hampers citizen facilitation and increases the number of repeat inquiries due to the unavailability of readily accessible information.
- vi. **In-Person Visit Required for Issuance of Fard and Mutation** The requirement for landowners to physically visit SDCs for the issuance of Fard and mutations, without the option for online processing, poses significant accessibility challenges, particularly for individuals with mobility issues or those residing in remote areas.
- vii. **Considerable Processing Time for Mutation Transactions** The processing of mutation transactions is prolonged by the necessity for spot verification by Patwaris and authentication by authorized revenue officers, who are often not consistently available. This results in delays that extend the overall processing time for land transactions.

- viii. **Manual Selection in LRMIS of Fees and Taxes** The manual selection of applicable taxes and charges by computer operators at SDCs leads to inefficiencies. The absence of automated property value calculations based on collector valuations prolongs processing times and increases the potential for errors.
- ix. **Lack of Technical Capacity and Human Resources** Staff at SDCs frequently lack the necessary technical expertise in revenue matters and computer skills. Furthermore, some SDCs are inadequately staffed, which leads to inefficiencies in service delivery.
- x. **Ownership and Frequent Posting Transfers of Project Staff** Frequent staff transfers diminish ownership and accountability for the digitization initiative, resulting in inconsistencies and a lack of continuity in operations.
- xi. **Technical Hurdles During Digitization** The digitization process has encountered various technical challenges, including the absence of a suitable database for land transfers, acquisitions, and unresolved court cases. These hurdles complicate data management and hinder progress.
- xii. **Ensuring Data Quality and Completeness** Maintaining data accuracy and completeness remains a primary challenge throughout the digitization process. Inconsistent data can undermine the reliability of the entire system.
- xiii. **Infrastructure Limitations** Inadequate access to reliable electricity, internet connectivity, and transportation facilities—especially in remote areas—poses significant obstacles to effective data collection and service provision.
- xiv. **Securing Data Privacy** Protecting sensitive information and ensuring data privacy are critical concerns. The digitization initiative must implement stringent measures to safeguard user data against potential breaches.
- xv. **Incomplete Settlements and Reliance on Manual Processes** Slow progress in incomplete land settlements and ongoing ownership disputes hinder the digitization process. Continued reliance on manual processes, particularly in areas lacking formal land transactions, complicates efforts to integrate land records with administrative systems.
- xvi. **Technological Issues** Despite advancements in accessibility and efficiency, certain technological issues persist in the digitization of land records, necessitating ongoing improvements to the system's infrastructure and software.
- xvii. **Lack of Funds** Financial constraints have significantly impacted the digitization project, causing delays in implementation and functionality. Insufficient funding limits the capacity to address critical challenges and expand services.
- xviii. **Community Engagement Challenges** The digitization project suffers from inadequate public engagement, awareness, and education initiatives. Technological skepticism, particularly in rural areas, combined with limited accessibility and a lack of focus on vulnerable groups, undermines the overall effectiveness of the initiative.

The digitization of land records in Khyber Pakhtunkhwa faces numerous challenges that require concerted efforts to address. By acknowledging these issues and implementing targeted strategies to overcome them, stakeholders can work towards a more effective and inclusive land management system. Prioritizing public engagement, enhancing technical capacity, improving infrastructure, and ensuring data privacy will be crucial in facilitating a successful digitization process.

Conclusion

The digitization of land records in Khyber Pakhtunkhwa (KP) offers a transformative opportunity to

improve the efficiency and accessibility of land management systems. By moving from a manual to a digital framework, the burdens placed on staff are alleviated, and the cumbersome processes associated with record access are streamlined. This initiative not only diminishes the monopoly of traditional systems, such as the Patwari system, but also reduces the potential for errors and tampering in records, providing a secure means of preserving land information for years to come.

The transition to a digital system eliminates the need for excessive paperwork, minimizes manual errors, and enables rapid access to information. These enhancements pave the way for greater efficiency in land administration and management. Furthermore, digitized records foster transparency and accountability, ensuring that details related to land ownership, transactions, and histories are readily accessible. This increased transparency serves as a deterrent against fraud, land disputes, and corruption, as information becomes traceable and easily verified.

The availability of digital land records online offers significant convenience for individuals, government officials, and stakeholders, resulting in considerable time and resource savings. A well-established digital system can also bolster investor confidence by ensuring that land ownership and transaction data are reliable and easily accessible, thereby mitigating investment risks and attracting further investment to the region.

Moreover, digitized land records serve as an invaluable resource for urban planning, infrastructure development, and land-use management. Policymakers can utilize this information to make informed decisions regarding land allocation and zoning, promoting sustainable urban growth. The digitization of land records can also enhance the efficiency of land revenue collection, facilitating online payments and automated reminders that reduce delays.

However, the successful implementation of this digitization initiative relies on meticulous planning, adequate infrastructure, robust data security measures, personnel capacity building, and effective public awareness campaigns. Continuous updates and maintenance of the system are essential to ensure its accuracy and effectiveness over time. By addressing these considerations, stakeholders can fully realize the benefits of a digitized land record system, creating a more efficient, transparent, and accountable land management framework for Khyber Pakhtunkhwa.

Policy Recommendations

To address the identified challenges and improve the efficiency and effectiveness of the land record management system, the following recommendations have been developed based on stakeholder feedback and literature review:

1. Capacity Building and Training

To ensure the successful implementation of the digitization project, it is crucial to enhance the technical expertise and knowledge of the staff involved. Comprehensive training programs for computer operators should focus on technical aspects and a deep understanding of land revenue laws and regulations. Regular refresher training sessions will keep staff updated with technological advancements. Establishing Key Performance Indicators (KPIs) for Service Delivery Centre (SDC) staff will help measure their performance and progress towards organizational goals, ensuring efficient digitization processes.

2. Public Awareness and Engagement

Enhancing public awareness about the benefits of digitization is essential for the project's success. Aligning the revenue staff module with the new digital systems will ensure that staff understand and effectively utilize digitized records. Conducting awareness campaigns and educational programs will inform users about digitization advantages and provide training on accessing and utilizing digitized records. Tailoring these strategies to different stakeholders,

including women and marginalized communities, will promote inclusivity and better engagement.

3. Optimizing SDC Layout and Facilities

The layout and facilities of Service Delivery Centres (SDCs) significantly impact workflow and service quality. Designing SDCs with organized reception areas, ergonomic workspaces, secure storage, and meeting rooms will enhance efficiency. Implementing robust security measures to protect sensitive data and user-friendly interfaces will instill confidence among users regarding the safety of their information, encouraging adoption of digitized land record services.

4. Data Security and Integration

Ensuring robust data security measures is paramount to maintain the integrity of the digitized land record system. Implementing encryption for sensitive data, user access controls, comprehensive audit trails, and regular backups will safeguard against potential breaches. Integrating land-related databases will facilitate seamless data sharing, reduce redundancy, and provide stakeholders with up-to-date land record information.

5. Continuous Monitoring and Improvement

The digitization process should be continuously monitored, with feedback from users and stakeholders collected to identify areas for improvement. Regular evaluations will enhance the effectiveness of the digitized land record system, ensuring that it adapts to meet the evolving needs of stakeholders and incorporates necessary improvements.

6. Addressing Financial Constraints

Allocating sufficient funds for the digitization project is critical for its successful implementation and long-term sustainability. Exploring public-private partnerships and securing investments from external stakeholders can enhance the project's financial viability. Conducting a comprehensive cost-benefit analysis will further justify fund allocation, demonstrating potential returns on investment. Efficient financial management and monitoring mechanisms will ensure transparency and optimal resource utilization.

7. Centralizing LRMIS and Web-Based Access

Centralizing the LRMIS system architecture will enable web-based services, allowing for landowner profiling, data analytics, and information reporting for policy decisions. Providing web-based access to various informational and transactional services will enhance user convenience and efficiency, reducing the need for physical visits to government offices.

8. Enhancing BOR's Website and Diversifying Payment Options

Improving the functionality of the Board of Revenue's (BOR) website is crucial for enhancing user experience. The website should provide comprehensive information and educational material for better citizen facilitation. Additionally, diversifying payment options beyond the National Bank—such as accepting debit/credit cards—will offer users more convenient payment solutions, contributing to a smoother digitization process for the citizens of Khyber Pakhtunkhwa.

By implementing these recommendations, the digitization of land records in Khyber Pakhtunkhwa can overcome existing challenges, enhance operational efficiency, and ultimately provide better service to the public.

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Annexure – A: Table on Status of Districts with Digitized Land

S#	Phase	District	Total Mauzas	Notified Mauzas	Operational Mauzas	Current %age	Notified Pending	Manual Pending
1	I	Mardan	176	176	176	100%	0	0
2	I	Buner	167	167	167	100%	0	0
3	I	Kohat	145	145	145	100%	0	0
5	II	Tank	87	87	87	100%	0	0
4	I	Abbottabad	242	242	227	94%	15	0
6	II	Hangu	49	45	41	84%	4	4
7	II	Shangla	111	100	90	81%	10	11
8	I	Peshawar	203	189	154	76%	35	14
9	II	Swabi	158	118	103	65%	15	40
12	II	Lakki	167	123	105	63%	18	44
10	II	Nowshera	99	74	61	62%	13	25
11	II	Haripur	366	257	217	59%	40	109
13	I	Bannu	241	197	139	58%	58	44
14	II	Swat	202	142	113	56%	29	60
15	II	Karak	122	85	65	53%	20	37
16	II	Charsadda	205	115	108	53%	7	90
17	II	Battagram	104	50	50	48%	0	54
18	I	DI Khan	390	221	143	37%	78	169
19	II	Mansehra	274	132	95	35%	37	142
			3508	2665	2286		379	843