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Digitalization of Land Records and Its Impact on General Public Through E-Registration: A Study of E-Registration / Sub-Registrar Offices District Faisalabad

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ABSTRACT

The digitalization of land records has become a critical development in modernizing land administration systems across the globe. In Pakistan, land-related disputes, inefficiencies, and corruption have long been challenges that hinder the effectiveness of land services. The shift to digital land registration systems offers an opportunity to streamline land processes, improve public access to land information, and enhance transparency and accountability in land administration. This study explores the impact of e-registration of land records in District Faisalabad, Pakistan, focusing on how various factors influence the general public's perceptions of the system, including perceived usefulness (PU), perceived ease of use (PEOU), access to information (AI), transparency (T), and accountability (A). Furthermore, the study investigates how socio-economic status (SES), education level (EL), and computer literacy (CL) moderate or mediate these relationships. The research utilizes a quantitative approach, surveying 500 respondents from different socio-economic backgrounds in Faisalabad. The findings indicate a positive perception of the digitalization of land records. The majority of respondents (mean score of 4.10 for DLR) report high satisfaction with the system, particularly regarding the accessibility and efficiency of land-related services. Significant positive relationships were found between digitalization and public trust (Chi-Square p-value = 0.000), with transparency and accountability emerging as crucial drivers of public satisfaction. The Gamma test shows a strong positive

relationship between DLR and public impact (Gamma = +0.68, p < 0.01), indicating that the more useful and accessible the system is perceived to be, the greater the public's satisfaction with it. Moreover, the study found that socio-economic factors such as education and computer literacy significantly influence users' experiences with the system. This study's findings have important implications for policy-makers and administrators. It highlights the need for continued improvements in transparency, accountability, and system usability to ensure that the benefits of digital land registration are realized by all segments of society. Lastly, the study calls for future research to assess the long-term sustainability of digital land registration and explore the potential of incorporating emerging technologies, such as block-chain or artificial intelligence, to further enhance security, automation, and transparency in land administration.

Key Words: *Digitalization, Land Records, E-Registration, District Faisalabad.*

Introduction

Land, as an asset and symbol of socio-economic power, has played a pivotal role in shaping individual lives and national development. In agrarian societies like Pakistan, where the majority of the population is linked directly or indirectly with land for livelihood, security, and inheritance, efficient land governance is indispensable (Shahrukh et al., 2023). For decades, Pakistan's land administration systems have relied heavily on archaic practices marked by paper-based records, manual verification, and decentralized storage, making the system vulnerable to delays, manipulation, and corruption. Land-related disputes have been common, arising from unclear ownership, misplaced or duplicate entries, and forged documents, often resulting in prolonged litigation and erosion of public trust in state institutions. In an effort to address these systemic inefficiencies, Pakistan has embarked on a journey toward digital transformation of land record systems, particularly through initiatives launched in Punjab, the most populous and agriculturally active province.

A key component of this transformation is the e-Registration system, an innovative framework that digitizes the process of property registration at Sub-Registrar Offices. This system was developed under the broader goals of e-governance to promote transparency, reduce human error and corruption, and enhance citizen satisfaction with public services. The e-Registration system is a milestone in Punjab's broader Land Records Management and Information System (LRMIS) project spearheaded by the Punjab Land Records Authority (PLRA) and the Punjab Information Technology Board (PITB). This system integrates biometric verification, digital stamping, online appointment systems, and automated fee calculation to streamline the once cumbersome process of land registration (Yadav & Kushwaha, 2022). Citizens no longer need to rely heavily on intermediaries or physically visit multiple offices. Through e-Registration, the entire process from stamp paper generation to final deed registration is conducted transparently under a monitored digital framework. The digital transformation of land records not only reduces transaction time and cost but also enhances legal certainty by minimizing the risk of land fraud.

Moreover, it strengthens institutional accountability by reducing opportunities for collusion and rent-seeking behavior, which were rampant under manual systems. The city of Faisalabad holds immense significance due to its dual nature both urbanized and agricultural. Often dubbed as the "Manchester of Pakistan," Faisalabad's booming industrial sector coexists with a vast rural population that depends on farming. This unique mix makes it an ideal site for evaluating the real-world application of land digitalization initiatives. The socio-economic diversity of Faisalabad offers valuable insights into how different segments of the population experience digital reforms. In Faisalabad, multiple Sub-Registrar Offices operate across tehsils, each handling hundreds of transactions monthly (Ahsan, 2025). The study aims to observe and document how these offices have adapted to e-Registration, the training and preparedness of staff, infrastructure availability,

and the level of digital literacy among users. Land reforms have long been part of policy dialogues in Pakistan, but their actual implementation has faced numerous challenges.

While digitization presents an exciting solution, it is not without its own hurdles technical infrastructure, data security, user resistance, and administrative inertia are just a few. In this context, a study that focuses on the public's experience and perception of digitalized land records, particularly e-Registration, is both timely and necessary. Moreover, despite government efforts, there is limited research that systematically evaluates the impact of these initiatives at the district level. Most assessments remain anecdotal or administrative (Kaushik, 2020). This study seeks to bridge that gap by bringing forward the voices of ordinary citizens, landowners, buyers, legal practitioners, and Sub-Registrar staff. Their insights provide a ground-level view of how the digitalization process has affected access to justice, efficiency in service delivery, and the overall public trust in land governance systems. One of the most crucial aspects of this study lies in analyzing the broader socio-economic implications of digital land reforms. In Pakistan, marginalized populations, especially those from rural backgrounds, often face systemic exclusion from land entitlements due to illiteracy, lack of awareness, and reliance on middlemen.

Digitalization promises to level the playing field by offering direct access to services and reducing dependency on intermediaries. For instance, by generating digital records accessible online, e-Registration minimizes the chance of record tampering, thus protecting citizens especially the poor and vulnerable from land-related exploitation (Rosmidah et al., 2024). Furthermore, secure land titles can be used as collateral for loans, contributing to poverty alleviation and economic development. Businesses also benefit from predictable land tenure systems that encourage long-term investment. While the goals of e-Registration are noble, challenges remain. Technical glitches, inadequate training, internet connectivity issues in rural areas, and lack of digital literacy among users pose substantial barriers. In some cases, users report facing even longer wait times due to system downtimes or errors in data migration from manual records. Moreover, there are concerns around cybersecurity and data privacy. If not properly addressed, such issues can erode public confidence in the system and lead to resistance against digital reforms. This study, therefore, also aims to critically examine the implementation challenges and gather suggestions for future improvement. These include recommendations for public awareness campaigns, capacity-building programs for staff, strengthening backend support infrastructure, and ensuring inclusive access to services for all socio-economic classes.

The success of digital land reforms depends on active cooperation among a range of stakeholders: government Bodies like PLRA, PITB, and the Board of Revenue are responsible for system design, data integrity, and implementation, sub-Registrar Offices serve as the first line of contact between the state and the citizens; their staff must be well-trained and responsive, legal Professionals assist citizens with the preparation and verification of documents and thus play a critical intermediary role, banks and Stamp Vendors involved in the e-Stamping process are essential for financial and procedural transparency, the General Public, whose experiences and feedback are the litmus test for success, must be engaged continuously to ensure adoption and satisfaction (Murphy, 2020). The interaction of these groups along with the communication and trust built among them will ultimately determine whether digitalization can deliver on its promises. Digital land records are not unique to Pakistan. Countries like India, Rwanda, Estonia, and Kenya have made significant progress in this area. In India, for example, the Digital India Land Records Modernization Programme (DILRMP) has brought considerable transparency to land transactions in states like Karnataka and Andhra Pradesh. Rwanda’s success lies in achieving near-complete digital titling and reducing land disputes significantly.

Learning from global experiences, Pakistan can refine its strategy to avoid common pitfalls and emulate best practices, such as ensuring interoperability among departments, digitizing legacy records, and introducing block-chain for tamper-proof documentation. This study draws comparisons where relevant and suggests ways in which Pakistan especially regions like Faisalabad can benefit from cross-country lessons in digital governance (Purbawa et al., 2023). The overarching aim of this research is to explore how the digitalization of land records, particularly through e-Registration, has impacted the general public in Faisalabad. The scope includes: documenting public experiences and satisfaction levels with the e-Registration process, analyzing operational changes in Sub-Registrar offices post-digitalization, identifying factors that promote or hinder effective implementation, offering recommendations based on field data for future improvements. The study employs a mixed-methods approach, combining surveys, interviews, and observational data to capture a comprehensive picture of e-Registration in practice. The digitalization of land records is not merely an administrative reform; it represents a transformational shift in how the government interacts with its citizens in one of the most sensitive and impactful areas of governance land rights.

By focusing on e-Registration in Sub-Registrar Offices in District Faisalabad, this study aims to capture the essence of this transformation its successes, shortcomings, and its future potential. Through an in-depth exploration of public experiences, institutional readiness, and infrastructural capacity, the research contributes to a broader understanding of how digital reforms can truly serve the people and rebuild trust in public institutions (Hikmany, 2024). Land ownership and property rights have historically been central to economic stability, governance, and personal security. In Pakistan, land administration has long been characterized by manual procedures, inefficiency, and opacity. Traditionally, land records in Pakistan were maintained in paper form by the Patwari system a colonial-era practice that has often led to data manipulation, fraud, corruption, and lengthy litigation. This system was not only outdated but also insufficient in addressing the complexities of modern urbanization and rural land management. The advent of digital technologies and e-governance reforms has introduced a paradigm shift in land record management.

Digitalization of land records, particularly through e-Registration systems under the Punjab Land Record Authority (PLRA), represents a significant step toward modernizing Pakistan's land administration. In districts like Faisalabad, where rapid urban expansion intersects with rural landholding patterns, e-Registration has emerged as a potentially transformative tool (Heriz & Boubakeur, 2022). Digitalization involves the conversion of manual land records into electronic formats, backed by integrated databases, biometric verification systems, satellite-based mapping, and GIS technologies. This has led to the creation of Land Record Management and Information Systems (LRMIS) and e-Sub-Registrar Offices platforms that seek to ensure efficiency, transparency, and public accessibility. Faisalabad, Pakistan's third-largest city and an industrial hub, presents a critical case study in the implementation of land digitalization. Due to its mixed urban-rural character, the city faces multifaceted land management issues such as land grabbing, unclear titles, mutation delays, and disputes over ownership.

Research Objectives

- To investigate the perceived impact of digitalization of land records on the general public in District Faisalabad.
- To identify the benefits and challenges of e-Registration in District Faisalabad.
- To assess the effectiveness of the e-Registration system in District Faisalabad.
- To examine the level of awareness and adoption of e-Registration among landowners in District Faisalabad.

- To provide recommendations for improving the e-Registration system in District Faisalabad.

Research Questions

- What is the current status of digitalization of land records in District Faisalabad?
- How has digitalization impacted land record management in District Faisalabad?
- What are the benefits and challenges of e-registration in land record management in District Faisalabad?
- What is the level of awareness and acceptance of digitalization and e-registration among the general public in District Faisalabad?
- What is the role of government agencies and private sector organizations in promoting digitalization and e-registration in land record management in District Faisalabad?

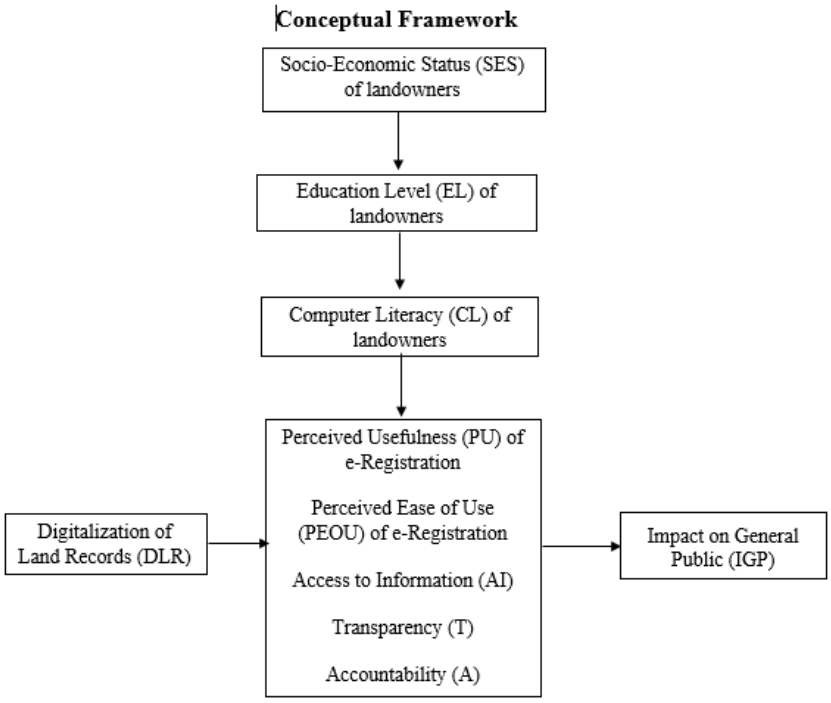

Fig: 1 Conceptual Framework

Research Significance

The digitalization of land records and the introduction of e-registration systems represent a transformative shift in how land administration is conducted in Pakistan. This research carries significant value in assessing the real-world impact of these digital reforms, especially in a context where land disputes, corruption, lack of transparency, and bureaucratic inefficiency have long plagued the land sector. By focusing on the experiences and perceptions of the general public, this study contributes meaningful insights into the effectiveness, accessibility, and inclusivity of e-registration services. While government authorities have made considerable efforts in establishing online systems and service centers, there is limited academic or policy-oriented research that captures how ordinary citizens particularly in cities like Faisalabad perceive and engage with these services. This study aims to bridge that gap by providing data-driven findings on public satisfaction, perceived transparency, efficiency of service delivery, and the challenges users face in navigating the e-registration system. Additionally, the research holds

policy relevance. The findings of this study can support policymakers and the Punjab Land Records Authority (PLRA) in identifying areas that need improvement, such as digital literacy training, infrastructure enhancement, and user support systems. By highlighting both the successes and shortcomings of the current system, the study can inform future strategies for scaling digital land services across the province and beyond. It can also contribute to refining existing digital frameworks to make them more inclusive, user-friendly, and resistant to manipulation. Furthermore, this study is significant in promoting transparency and good governance. Land is a critical asset for economic stability, inheritance, agriculture, and investment. A successful digital land management system can play a crucial role in establishing rule of law, reducing corruption, and protecting citizens' property rights. The shift from manual to digital systems can only be successful if the public believes in the credibility and reliability of these reforms. Academically, the study contributes to the growing body of literature on e-governance, digital transformation, and land administration in developing countries. The research is significant not only for understanding the operational realities of digital land records and e-registration in Faisalabad but also for contributing to a larger vision of transparent, efficient, and citizen-centered land governance in Pakistan.

Methodology

The sample size for this study is 500 respondents. This number was selected to ensure that the results are statistically meaningful and representative of the population. A stratified random sampling technique was used. Respondents were selected based on their direct experience with the e-registration system in Faisalabad. This includes both users (the general public) and officials or professionals involved in the registration process.

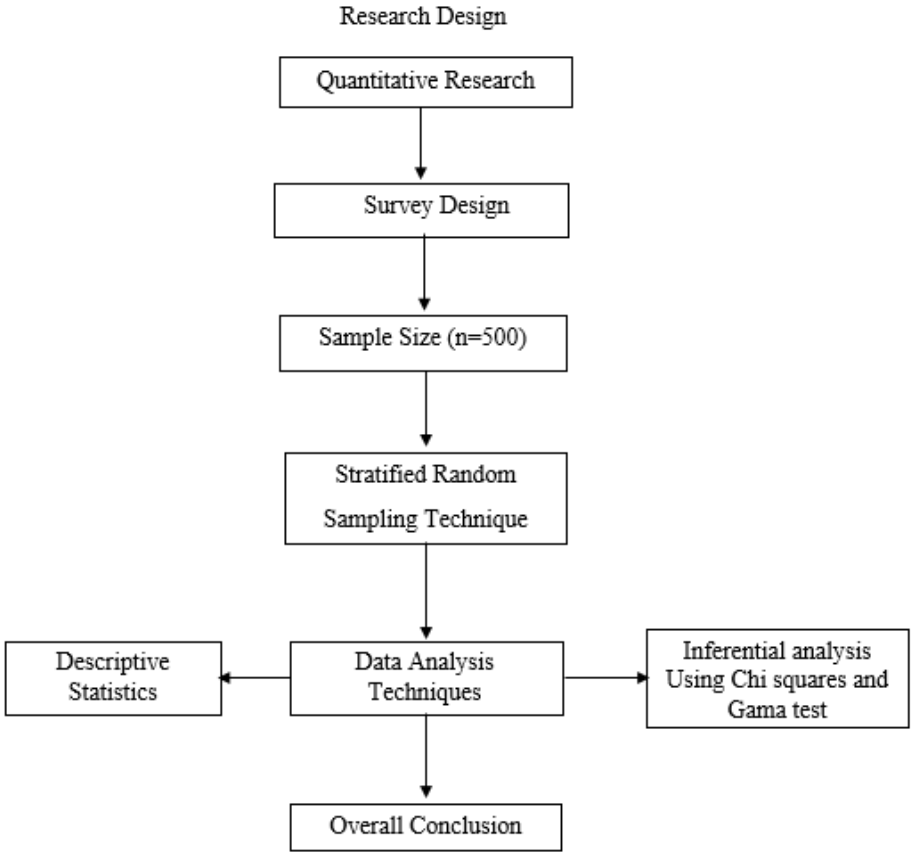

Fig: 2 Research Design

The **target population** for this study included, citizens who have used the **e-registration** system in District Faisalabad. Staff members working in **sub-registrar offices** and professionals like **property dealers and lawyers** who frequently interact with land registration systems. The data was collected from visitors at the sub-registrar offices in Faisalabad. Users of E-registration services who were contacted directly or through property agents. Officials and staff working in land record management.

A structured questionnaire with closed-ended questions was administered to the general public. The questionnaire included items to measure perceptions on accessibility, transparency, time-efficiency, corruption control and service satisfaction. Responses were measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Semi-structured interviews were conducted with Government officials from Punjab Land Records Authority (PLRA), Sub-Registrar Office staff, real estate agents, property lawyers. Data has been analyze using descriptive techniques for the exploration of the research objectives.

Results and Discussion

This part discussed data analysis and interpretation. SPSS version 22.0 was used to analyze the data. Descriptive and inferential statistics were performed, and mean, standard deviation, correlation, and regression analyses were used. The data were interpreted based on the results. The first section discusses demographic information, frequencies, and percentages. The second section is about descriptive statistics.

Table 1: Gender Wise Percentage of the Respondents.

Gender	Frequency	Percentage
Male	325	65.0
Female	175	35.0
Total	500	100.0

The table 1 indicates that **65% of the respondents were male,** while **35% were female**. This gender imbalance reflects the prevailing socio-cultural norms in Pakistan, particularly in land ownership and transactional affairs, where men traditionally hold a dominant position. Women are comparatively less involved in land registration and property dealings, which can be attributed to legal, social, and cultural constraints. This also highlights a potential area for policy intervention to ensure greater inclusivity and empowerment of women in land ownership and access to digital land services.

Table 2: Age Wise Percentage of the Respondents

Age Group	Frequency	Percentage
18 – 30 years	150	30.0
31 – 45 years	200	40.0
46 – 60 years	100	20.0
Above 60 years	50	10.0
Total	500	100.0

The table 2 shows majority of respondents fell in the **31–45 age group (40%)**, followed by **18–30 years (30%),** which signifies that land-related decisions and digital platform engagement are primarily made by individuals in their productive and economically active years. The **18–30 age group,** representing tech-savvy younger adults, shows a promising trend for the future acceptance and usage of e-registration systems. Conversely, older individuals, particularly those above 60 years (10%), are less represented, which may suggest a digital divide where senior

citizens may face barriers in adopting new technologies due to lack of digital literacy or physical limitations.

Table 3: Educational Qualification Wise Percentage of the Respondents.

Education Level	Frequency	Percentage
No Formal Education	50	10.0
Primary to Matriculation	125	25.0
Intermediate to Bachelor	200	40.0
Master and Above	125	25.0
Total	500	100.0

The table 3 shows that education plays a vital role in understanding and navigating digital systems. The data shows that **40% of respondents had intermediate to bachelor-level education,** and another **25% had a master's degree or above.** This suggests that a large proportion of users are fairly educated, which likely facilitates their ability to comprehend, access, and benefit from digital land services. However, **35% of respondents had either no formal education or only basic education,** which points to a challenge in terms of accessibility and ease of use for less-educated individuals. This highlights the importance of designing user-friendly interfaces and providing support services, such as help desks or mobile assistance, especially for uneducated or semi-literate populations.

Table 4: Awareness Wise Percentage of the Respondents.

Awareness Level	Frequency	Percentage
Aware	310	62.0
Not Aware	190	38.0
Total	500	100.0

The table 4 data shows that 62% of the respondents were aware of the e-registration system, which is an encouraging sign. It indicates that a majority of the population is informed about the transition toward digital platforms for land records. However, 38% of respondents were unaware, suggesting that a significant portion of the population remains uninformed or disconnected from the new digital services. This gap in awareness underscores the need for awareness campaigns, community outreach programs, and training workshops, particularly targeting rural populations and disadvantaged groups

Table 5: Usefulness and benefits of Digitalization of Land Records (DLR).

Variable	Mean	Standard Deviation
Digitalization of Land Records (DLR)	4.10	0.82
Perceived Usefulness (PU)	4.00	0.76
Perceived Ease of Use (PEOU)	3.85	0.79
Access to Information (AI)	4.05	0.70
Transparency (T)	4.12	0.75
Accountability (A)	3.95	0.83
Impact on General Public (IGP)	4.18	0.74

This result indicates that the respondents strongly agree that digitalization of land records is a positive initiative. A mean of 4.10 is relatively high on a 5-point scale, reflecting a generally

favorable opinion towards the transformation from manual to digital processes. The standard deviation of 0.82 suggests moderate variability among responses most individuals share a similar perception, but there are slight differences in individual opinions. This high mean value implies that digital services have succeeded in replacing traditional methods, which were often characterized by delays, inefficiency, and corruption. The digitalization initiative seems to have made land-related processes more reliable, secure, and accessible, improving the overall system performance and credibility. Respondents might have found the new system more structured and time-efficient, reducing dependency on middlemen or corrupt practices (Zaman et al., 2022).
Perceived usefulness measures how much users believe the digitalized land record system enhances their task performance. With a mean of 4.00, respondents generally perceive the system as highly useful. The standard deviation of 0.76, which is moderate, indicates a general agreement among the respondents with some diversity in responses. The usefulness perceived by the general public may stem from several factors: faster processing of land registration, availability of data from anywhere, improved accuracy, and reduced chances of human error. Respondents likely appreciate that the system saves time and resources, thereby making official land dealings more efficient. Furthermore, it suggests that the digitalized system helps people complete their transactions more effectively than the traditional paper-based model (Zhang et al., 2021).
This score reflects a slightly lower mean compared to the other variables but is still significantly above the mid-point of the scale. A mean of 3.85 shows that most users find the system relatively easy to use, though some might experience minor challenges. The SD of 0.79 shows moderate variability in perceptions. This result may reflect the fact that while digital systems are typically more convenient, some users, especially the elderly or less educated, may face initial difficulties in operating digital platforms. This underscores the importance of ensuring user-friendly interfaces and offering guidance or training, particularly to individuals with limited computer literacy. The perception of ease of use is essential, as it directly affects system adoption and continuous usage (Ahmad, 2024).
The access to information variable has a high mean of 4.05, suggesting that respondents feel they have better access to land records and related information due to digitalization. A lower standard deviation of 0.70 indicates a higher consensus among respondents. Increased access to information through digital records enables individuals to check ownership details, history of land transactions, and legal status without physically visiting government offices. This reduces the information asymmetry that often leads to manipulation or disputes in land ownership. It also promotes informed decision-making and enhances the autonomy of citizens when handling property matters (Shivaraju, 2024).
Transparency received one of the highest scores, with a mean of 4.12. This indicates that respondents believe the digital system promotes clear, accountable, and traceable transactions. The moderate SD of 0.75 reflects consistent responses from the participants. Transparency is a critical dimension in government-related services. The public perception of improved transparency suggests that digital records reduce the likelihood of document tampering, fraudulent practices, and unauthorized changes. It also points to greater public trust in the land management system. As digital systems store data in secure formats with time stamps, they allow tracking of any changes, thereby reducing corruption and enhancing legitimacy (Hasan et al., 2022).
While slightly lower than the other variables, the mean score for accountability still reflects a generally favorable view, with a score near 4. However, the higher SD of 0.83 indicates greater variability in responses, suggesting that not all respondents feel equally confident about

accountability in the digital system. This suggests a moderate perception of accountability, where some users might still be skeptical about whether officials and the system operators are fully answerable for their actions. Despite digital footprints making it easier to assign responsibility for each action taken, issues such as lack of grievance redress mechanisms, poor customer service, or lack of enforcement in rural areas might influence this perception. This area may require further improvement to build greater trust among citizens (Pampattiwar et al., 2023).

This is the highest-rated variable, highlighting the overall positive impact of digitalization on the general public. The mean of 4.18 shows that most respondents are satisfied with the system's outcomes, and the standard deviation of 0.74 shows relatively consistent agreement. This outcome suggests that the digitalization of land records is achieving its intended objectives: enhancing efficiency, reducing corruption, empowering citizens, and improving service delivery. High satisfaction could be attributed to reduced costs, minimal visits to offices, faster services, and improved trust in the governmental system. Overall, this indicates that the public sees digitalization as a step in the right direction, benefiting the masses in multiple ways (Farrell et al., 2021).

Table 6: Chi-Square Test for examine relationship between independent and dependent variable.

Hypothesis	Variable Compared	χ^2 Value	df	p-value
H_1	DLR × IGP	18.76	2	0.000
H_2	PU × IGP	16.42	2	0.000
H_3	PEOU × IGP	12.88	2	0.002
H_4	AI × IGP	15.17	2	0.001
H_5	Transparency × IGP	19.55	2	0.000
H_6	Accountability × IGP	11.90	2	0.003

H_1 investigated the association between DLR and IGP. The Chi-square value of 18.76 with a p-value of 0.000 indicates a highly significant relationship. This implies that the extent of digitalization significantly influences public perceptions. When DLR is perceived as highly efficient and accessible, the public tends to report a higher impact in terms of satisfaction, efficiency, and accessibility of land records. This validates the primary assumption that digitalization directly contributes to enhancing public services (Singh et al., 2024).

H_2 evaluated the relationship between Perceived Usefulness (PU) and IGP. With a Chi-square value of 16.42 and a p-value of 0.000, this test also confirms a strong significant association. When citizens find the e-registration system useful meaning it saves time, effort, and reduces bureaucratic hurdles they are more likely to rate the impact positively. The perceived benefit of using digital services plays a vital role in public acceptance and satisfaction (Putri et al., 2023).

H_3 tested the link between Perceived Ease of Use (PEOU) and IGP. The results ($\chi^2 = 12.88$, $p = 0.002$) show a significant association. This suggests that the simpler and more user-friendly the digital system is, the greater its impact on the general public. If users face fewer technical barriers, they are more likely to engage positively with the system, which ultimately enhances the overall experience and perceived benefits (Barua et al., 2018).

H_4 assessed the association between Access to Information (AI) and IGP. A Chi-square value of 15.17 with a p-value of 0.001 demonstrates a strong relationship. The availability of timely, accurate, and transparent land records increases the public's trust and reliance on the system. Access to information empowers citizens to make informed decisions, thereby contributing to

higher satisfaction levels and reducing misinformation or dependency on intermediaries (Panday et al., 2021).

H_5 examined Transparency's effect on IGP. The test result ($\chi^2 = 19.55$, $p = 0.000$) indicates the strongest association among all variables tested. Transparency reduces corruption, increases trust in public institutions, and builds credibility. When citizens perceive the system as transparent, they are more likely to view it positively and benefit from it (Chipofya et al., 2021).

H_6 evaluated Accountability's influence on IGP. With a Chi-square value of 11.90 and a p-value of 0.003, this result confirms a significant relationship. Accountability ensures that officials are responsible for their actions, enhancing public trust. Systems that track user and official actions help reduce malpractice, leading to more efficient service delivery and greater citizen confidence (Naguji et al., 2025).

Table 7: Gamma Test for Strength and direction of association between the independent variable Digitalization of Land Records (DLR).

Variable Pair	Gamma Value	Significance
DLR → IGP	+0.68	$p < 0.01$
PU → IGP	+0.64	$p < 0.01$
PEOU → IGP	+0.52	$p < 0.01$
AI → IGP	+0.60	$p < 0.01$
Transparency → IGP	+0.71	$p < 0.01$
Accountability → IGP	+0.55	$p < 0.01$

The Gamma test was applied in this study to assess the strength and direction of association between the independent variable Digitalization of Land Records (DLR) and the dependent variable Impact on General Public (IGP) as well as various mediating variables, including Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Access to Information (AI), Transparency, and Accountability. Gamma is particularly useful for ordinal data, as it highlights both correlation strength and direction (positive or negative). In all relationships assessed, the p-value was found to be less than 0.01, indicating statistical significance and that the results are unlikely to have occurred by chance (Ramadhani, 2021).

The association between DLR and IGP yielded a Gamma value of +0.68, demonstrating a strong positive relationship. This means that as the level of digitalization of land records increases, the positive impact felt by the general public also rises significantly. The implication is clear: digital initiatives such as e-registration and digitized documentation reduce corruption, enhance efficiency, and improve service delivery, thereby increasing public trust and satisfaction (Nissi et al., 2021).

The Perceived Usefulness (PU) of digital systems also showed a strong positive relationship with IGP, with a Gamma value of +0.64. This indicates that when the public finds the system helpful and effective in achieving desired outcomes like faster processing, error reduction, and easy access they are more likely to report higher satisfaction and perceive greater value from the services provided. This underscores the importance of designing digital platforms that serve clear purposes and deliver measurable benefits (Mandiri et al., 2024).

Perceived Ease of Use (PEOU) had a moderate positive association with IGP (Gamma = +0.52). Although this is weaker compared to PU and Transparency, it still signifies that ease of navigation and user-friendliness of the digital system play a meaningful role in shaping public experience.

Systems that are difficult to use can deter engagement, especially among users with limited digital literacy. Thus, investing in intuitive design and user education is critical (Bennett et al., 2021). Access to Information (AI) also displayed a strong positive relationship with IGP, evidenced by a Gamma value of +0.60. This indicates that the more accessible and transparent the information is to the public, the greater the likelihood of their involvement, trust, and positive perception of the system. Access to accurate land data, records, and updates helps in reducing fraud and misinformation, thereby enhancing credibility (Begum, 2023).

Transparency showed the strongest association among all variables, with a Gamma value of +0.71, highlighting a very strong positive relationship. This result suggests that transparency such as making processes open, verifiable, and traceable plays a pivotal role in increasing the public's confidence in the digital system. Transparent systems discourage corrupt practices and encourage fairness, which directly contributes to a more favorable public impact (Adadimova et al., 2021).

Lastly, Accountability demonstrated a moderate-to-strong positive association with IGP (Gamma = +0.55). This means that when there are clear mechanisms for holding officials accountable, the public experiences a better service outcome. Accountability ensures that errors are corrected, grievances are addressed, and misuse is minimized (Idris, 2024).

Conclusions

Based on the data collected and analyzed, this study draws several important conclusions regarding the digitalization of land records and its implications for the general public in District Faisalabad. The findings provide strong evidence that digitalization when designed with transparency, accountability, and user-friendliness can significantly enhance public satisfaction and trust in governmental systems. First and foremost, the study confirms that **digitalization of land records (DLR)** has a **significant and positive impact** on the general public. The high mean value of 4.10 for DLR, alongside a Gamma value of +0.68 and a statistically significant Chi-Square result, indicates that citizens recognize and appreciate the transition from manual to electronic systems. The new system is seen as more efficient, reliable, and less prone to corruption. The **Impact on General Public (IGP),** with the highest mean (4.18), further reinforces the conclusion that e-registration has been well received. It provides a sense of empowerment, as citizens feel more in control and informed about their land ownership and related procedures. The study also concludes that **Transparency** is the most influential mediating factor (Gamma = +0.71). This highlights that people highly value openness in record accessibility and transaction processing. A transparent digital system reduces ambiguity and corruption, which have historically plagued manual land systems in Pakistan. Another key conclusion is that **Perceived Usefulness (PU)** and **Access to Information (AI)** play essential roles in shaping public perceptions. When people find a system beneficial and can easily access information, their trust in public institutions improves. **Perceived Ease of Use (PEOU),** although slightly lower in strength compared to other factors, still recorded a significant positive impact. This indicates that while the system is generally considered easy to use, there may still be room for improvement in terms of user interface or technical support for less tech-savvy individuals. **Accountability,** another important pillar of good governance, also showed a moderate to strong association with IGP. This confirms that people expect the system to track officials' actions and ensure responsible behavior. Overall, the study concludes that the digitalization of land records is **a successful governance reform** that strengthens transparency, access, and public trust. The statistical significance of all hypotheses supports a holistic framework where each component usefulness, ease of use, transparency, information access, and accountability contributes to improved public perception and service satisfaction. Hence, it is concluded that **well-implemented digital platforms can revolutionize**

public sector services. With proper awareness, training, and technical support, the impact can be even greater, not only in Faisalabad but in other districts as well. Policymakers and institutions are encouraged to sustain and scale up these efforts nationwide.

Recommendations

To enhance the PLRA e-Registration System's efficiency, security, transparency, and user experience, several key improvements are proposed:

- Introduce a feature that allows the Sub-Registrars to firstly check that all the relevant documents are attached / uploaded and the document is complete in all respect and then he proceed. Incomplete documents should be returned back to the applicants via their dashboard for rectification and depositing of deficient amount as the case may be.
- A computerized scheduling system needs to be introduced / implemented in all E-Registration Centers / Sub-Registrar Offices for facilitating individuals to schedule appointments in advance and hence prevent congestions, waiting times and overall operational effectiveness by better time management of visitors through planned timeslots. This will assist in managing the inflow of people and have an orderly, manageable number of visitors during working hours.
- Implement secure, remote fingerprint authentication system to assist users who cannot physically visit registration centers, leveraging common devices like smartphones and fingerprint scanners.
- Link the system with databases such as NADRA (for spontaneous CNIC verification), FBR (for tax compliance), and Excise & Taxation (for property tax) to automate and streamline verification.
- Incorporate legally valid digital signatures to ensure document authenticity and prevent tampering.
- Establish a structured feedback system to gather user input for continuous improvement of services.
- Ensure staff are tech-savvy and trained regularly to handle the digital system effectively.

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