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The Status of Digital Transformation in State Land Administration in Ninh Binh Province, Vietnam

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Abstract
Digital transformation is reshaping public administration worldwide, and Vietnam has placed it at the core of its national development strategy. Land administration – which in Vietnam is state-managed and central to economic and social planning – is a key sector targeted for digitalization. This study provides a comprehensive assessment of the current status of digital transformation in state land administration in Ninh Binh Province. Drawing on official policy documents, government reports, development publications, and academic sources, we examine (i) the general framework of land administration in Vietnam and Ninh Binh's administrative structure, (ii) relevant national and provincial policies on digital land management, (iii) the province's digital infrastructure and land information systems, (iv) the degree of digitization in land-related public services (such as land registration and cadastral mapping), (v) human resource capacity and inter-agency coordination, and (vi) key challenges and barriers. We also compare Ninh Binh's experience with other provinces and international best practices. Our findings show that Ninh Binh has made notable progress – including deploying 15 digital platforms and a public open data portal – but still faces gaps in IT infrastructure, data completeness, and skilled personnel. We conclude with recommendations to strengthen land data integration, improve service delivery (e.g. e-registration), build human capacity, and foster coordination across agencies to fully realize a digital land administration.

Keywords: Digital Transformation, Land Administration, Ninh Binh

Introduction

Land is a critically important public resource in Vietnam, formally recognized as "the property of the entire people" and managed on behalf of citizens by the state. The Vietnamese Constitution and Land Law establish that the state allocates land use rights to individuals and organizations, with users enjoying rights to transfer, mortgage, inherit and exchange land as specified by law. The central government through the Ministry of Natural Resources and Environment (MONRE, now Ministry of Agriculture and Environment) sets the overall land policy and legal framework, while provincial, district and commune People's Committees implement land management locally via their Departments of Natural Resources and Environment. This multi-level structure oversees cadastral surveys, land use planning, land registration and titling (often known as "pink books"), and information dissemination. Historically, Vietnam's land records were paper-based and fragmented across levels and time periods, creating challenges for transparency and efficient management.

In recent years, Vietnam has embarked on an ambitious push to modernize government and the economy through digital transformation. In June 2020 the Prime Minister approved a *National Digital Transformation Program* (2021–2025, vision to 2030) aiming to make the digital economy 20% of GDP and to rank Vietnam among the top 50 in international digital development indices by 2025. Ministries and provinces have since been tasked to implement e-government (online public services) and industry digitization projects. In the land sector, the government has prioritized construction of a centralized land information database and integration of land records with other national systems (population, tax, etc.). For example, by mid-2025 nearly all provinces had integrated land and population databases, and legislation (the Land Law 2024) formally designated the national land database as a foundational "core" database for e-government.

Ninh Binh Province in northern Vietnam has been selected as one of the pilot localities for digital transformation. It is a mid-sized province (≈1,400 km², ~1.1 million people as of 2022) known for cultural heritage sites (Hoa Lu, Trang An) and adjacent to fast-growing Hanoi. In Ninh Binh, a *provincial steering committee on digital transformation* has been established,

and leadership has allocated significant resources (about 150 billion VND in 2021–2022) to build e-government services. Provincial plans (e.g. *Resolution No. 01-NQ/TU on Building e-Government and Digital Transformation to 2025*, April 2021) set targets for deploying digital services and databases at all levels. Prime Ministerial Decision No. 218/QD-TTg (March 2024) further endorsed Ninh Binh's strategic master plan (2021–2030, vision to 2050) which identifies digital transformation as a core pillar of development. However, implementing these plans has faced challenges. Recent reports note difficulties in staffing and organizing digital programs from province to commune level, and local officials continue to call for enhanced training, infrastructure upgrades and inter-agency coordination to achieve their goals.

This paper assesses the *status* of digital transformation in land administration in Ninh Binh, aiming to provide a benchmark of current capabilities and identify gaps and opportunities. We systematically review Ninh Binh's policies and initiatives, evaluate the existing digital infrastructure (data systems, platforms, GIS tools), examine how land services (registration, mapping, information access) have been digitized, and analyze human and institutional factors. We draw on national context from government and World Bank sources, as well as case examples of other Vietnamese localities (e.g. Quang Ninh, Ho Chi Minh City) to situate Ninh Binh's experience. Our goal is to inform policymakers and practitioners in Ninh Binh and similar provinces about best practices and needed reforms for a successful digital land administration.

Literature Review

Land Administration in Vietnam

Vietnam's system of land administration has evolved greatly over the past 80 years, transitioning from manual cadastral books to modern digital databases. Under current law, all land belongs to the "people", and the state manages land through its agencies. State land functions include surveying, mapping, land use planning, valuation, titling, and issuance of Land Use Right Certificates (LURCs) to land users (commonly referred to as "pink books"). As of the Land Law of 2024, the entire process of land registration (first issuance and any changes) is regulated in detail, including a new requirement for mandatory registration of land rights and each legal change. In practice, the Ministry of Agriculture and Environment (MAE, formerly MONRE) leads at the national level, with each province's Department of Natural Resources and Environment (DONRE) and its Land Registration Office branches carrying out registration, data collection and services.

Vietnam's recent land administration reforms emphasize modernizing information management. The 2024 Land Law explicitly promotes the establishment of a comprehensive national land database as one of the core *"foundational databases"* of e-government. Parallel to this, several key resolutions and directives have been issued to drive digitalization. For example, Resolution 18/NQ-TW (2022) calls for tech-based land policy reforms, and Directive 07/CT-TTg (April 2025) focuses on population data and e-ID to support national digitalization. These policies, together with new legal instruments (e.g. decrees on database standards and data sharing), create a framework for building integrated land information systems that can serve multiple agencies and public services.

Digital Transformation in Governance and Land

Digital transformation in governance has been a major global trend, and Vietnam is no exception. The Government's Digital Transformation Program (approved 2020) sets bold targets for a digital economy and e-government, and the Prime Minister's Office regularly monitors provincial progress. In the land sector specifically, several studies note the push toward *"digital land governance"* to enhance transparency and efficiency. For instance, according to Ministry reports, by mid-2024 over 46 million land parcels in Vietnam had been updated in cadastral databases, and all provinces had connected land databases to the national population database. Land registration services have moved online via centralized portals (Project 06/CP) and provincial e-service platforms. The Government has also launched campaigns (e.g. a nationwide "90-day campaign" in late 2025) to clean and consolidate land data, emphasizing the quality principles "đúng – đủ – sạch – sống" ("correct, complete, clean, alive") and use of digital identity (VNeID) for verification.

Academic research underscores that digital tools offer great potential but also introduce new requirements. Vu *et al.* (2025) [8] observe that Vietnam's digital government and society ambitions create demand for *"digital knowledge and skills"* among civil servants and citizens to improve land management efficiency. Similarly, Dung and Hang (2025) [7] emphasize that traditional land management inefficiencies persist, and new technologies require officials to have digital literacy to implement reforms. These studies (based on surveys in Northern, Central and Southern provinces) suggest that digital data quality, ICT infrastructure, and trained personnel are critical factors in successful land administration. In urban contexts, Nha and Nam (2025) [9] find that major cities have used GIS, AI and other technologies to overcome limitations in fragmented data, recommending integrated digital land platforms for better planning and transparency. They cite Quang Ninh's Ha Long city, for instance, where a 3D GIS platform has been adopted for urban planning and infrastructure management, illustrating a leading-edge model in Vietnam. Other analyses note that public disclosure of land and planning information as done in Ho Chi Minh City can reduce administrative burden and improve trust in government.

Policies and Practice in Vietnam's Provinces

Across Vietnam, provinces vary widely in their progress on digital land administration. Reports from the Ministry of Agriculture & Environment highlight that by July 2025 about 70% of district-level units nationwide had achieved some form of digital cadastral records, and nearly 50 million parcels had a digital ID. At the same time, the same sources acknowledge uneven implementation: some localities lag in IT investment and skilled staff, and many do not fully utilize online service portals. These gaps form a backdrop for assessing any single province. Specifically for Ninh Binh, official statements and news reports describe it as one of five pilot provinces designated by central authorities for digital transformation (the others include Quang Ninh, HCMC, Bac Ninh, etc.). This status has brought extra oversight and funding, but also scrutiny of performance. Provincial leaders regularly attend high-level workshops (e.g. with the Minister of Information & Communications) to discuss e-government and IT infrastructure issues. Ninh Binh has issued local resolutions and plans (e.g. Resolution

01-NQ/TU) aligning with national goals, and its 2023–25 province budget allocates significant support to ICT initiatives. The literature indicates that Ninh Binh seeks to build on strengths like active tourism promotion, but must contend with challenges common in other provinces: integrating land offices into the new two-tier (province-commune) government model, streamlining administration, and engaging rural communities in the digital shift.

In summary, past studies and reports provide a context: Vietnam's land sector is in a phase of rapid digital modernization, with strong political backing and ambitious objectives, but practical implementation varies. Ninh Binh, as an official pilot, has undertaken substantial planning and some technological upgrades, yet the balance between goals and capacity remains an open question. This review informs our analysis by identifying key success factors (data integration, accessible services, trained staff) and potential hurdles (infrastructure gaps, regulatory lag, public awareness) found elsewhere, which will also be examined in the context of Ninh Binh.

Methodology

This study is based on a qualitative analysis of documentary and secondary data sources. We collected policy documents, laws, and official plans from Vietnam's government and Ninh Binh province related to digital transformation and land administration. Sources include Vietnamese government websites (e.g. Ministry of Agriculture and Environment, Ministry of Information and Communications, Ninh Binh provincial portals), Vietnamese news agencies (e.g. *Nhan Dan*, *VietNamNet*, *Vietnam News*), and relevant academic publications (peer-reviewed journals and conference papers) on land management and digitalization in Vietnam. We also consulted reports from international agencies (e.g. World Bank, UN bodies) for comparative context. All sources are from 2020–2025 to capture the latest developments.

In addition to document review, we examined news reports and press releases for evidence of specific projects and initiatives in Ninh Binh (e.g. adoption of particular software, launch of data portals, training events). We paid special attention to official statistics and statements (e.g. number of land parcels digitalized, budget allocations for ICT) published by provincial authorities. Where possible, we cross-checked information for consistency (for example, comparing national-level ministry reports with provincial news articles).

Our analysis is structured to address the core dimensions outlined by the user: administrative framework, policy environment, technical infrastructure, service delivery, capacity and coordination, challenges, and comparisons. While primary empirical data (e.g. interviews or surveys) were not directly obtained in this study, the breadth of official and academic sources provides a comprehensive view of Ninh Binh's situation. All factual assertions are supported by citations to these sources. We interpret the findings in light of both Vietnam-specific and international land administration literature.

Results

Administrative Framework in Vietnam and Ninh Binh

According to Vietnam's Constitution and Land Law, land is collectively owned by the people and managed by the state. At the central level, the Government uniformly oversees land policy, with the Ministry of Agriculture and Environment (previously MONRE) responsible for technical standards and coordination. Locally, provincial, district and commune People's Committees implement land management within their jurisdictions, typically through their Departments of Natural Resources and Environment (DONRE) and under the guidance of the provincial land administration agencies. After administrative reorganization in 2025, Vietnam now has a two-tier local government model (province and commune) with district governments eliminated. This restructuring affects land administration: for example, provincial branches of the Land Registration Office (formerly district-level branches) are now under provincial agencies, but debates are ongoing about transferring them under commune management to improve service efficiency (see Discussion).

Ninh Binh Province follows the national model. Before 2025, Ninh Binh consisted of two provincial cities (Hoa Lu – the capital – and Tam Điệp) and five rural districts (Yên Mô, Yên Khánh, Nho Quan, Kim Sơn, Gia Viễn). These in turn contained dozens of communes and wards. According to Wikipedia, Ninh Binh had about 1.01 million people in 2022, with a dense network of local government units. Each district had its Land Registration Office branch under DONRE (Ninh Binh's DONRE may have recently been restructured due to the merger with Hà Nam and Nam Định, which added two city-level units and two districts). The provincial Department of Agriculture and Environment (Sở Nông nghiệp và Môi trường, SNNMT) and its attached Land Registration Office (Văn phòng Đăng ký Đất đai) are the primary agencies managing land use data, issuing LURCs, and processing land transactions. A provincial planning department also oversees land use planning and inventories of land resources, per national requirements. This administrative set-up means that implementing digitalization involves multiple agencies: agriculture/environment for data, planning for spatial mapping, and the one-stop-shop centers for public service delivery.

Policies and Planning for Digital Land Management

At the national level, Vietnam's digitalization agenda has provided clear mandates and incentives for modernizing land administration. The 2020 National Digital Transformation Program (Decision No. 749/QD-TTg) set sectoral targets, including that by 2025 each field of public administration (including natural resources and environment) should offer most services online and use big data analysis. The 2024 Land Law, which took effect in August 2024, explicitly identifies the national land database as a core foundational database, alongside those for population, tax, etc.. It calls for land records to be digitized, standardized, and publicly accessible where appropriate. Government Decree 45/2022/ND-CP mandates that by 2030 all provinces must have a unified electronic land database, accessible online, and connected to national systems. A high-level directive (07/CT-TTg, 2025) further directs linkage of land data with population and e-ID platforms (VNeID) to ensure that each land parcel is associated with a unique identifier and owner information.

Ninh Binh's provincial government has aligned with these national directives by issuing its own strategies. In April 2021 the Provincial Party Committee passed Resolution 01-NQ/TU on "Building E-government and Digital Transformation to 2025 (orientation to 2030)", focusing on

infrastructure, data sharing, and public service reform. By late 2024, the province had implemented 15 "digital platforms" as part of this program. Examples include electronic document management systems, enterprise registration portals, land auction platforms, and environmental databases. Notably, the province launched an open data portal (data.ninhbinh.gov.vn) in October 2023 to share information publicly (see below). At a planning level, the Prime Minister's Decision No. 218/QD-TTg (March 2024) approved Ninh Binh's 2021–2030 socio-economic development plan, which designates digital transformation as a core pillar for growth alongside green development. This decision legally commits the province to invest in ICT and integrate it into sectors like land use planning and service delivery.

The Ministry of Information and Communications (MIC) has also played a role in supporting Ninh Binh. In June 2022, MIC organized a high-level session in Ninh Binh to review e-government progress. The Minister emphasized the province's role as a digital transformation "model" and offered technical assistance. Provincial leaders reported allocating 150 billion VND (≈6.5 million USD) from the local budget in 2021–2022 for digital initiatives. The MIC identified priority areas: upgrading telecom networks, building digital platforms for public interaction, and training officials in new IT skills. A steering committee under the provincial People's Committee (chaired by the chairman of the People's Committee) now meets regularly to oversee these initiatives. These policy actions show that Ninh Binh has established a comprehensive strategic framework – national laws, central programs, provincial resolutions and budget allocations – aimed at digitalizing government services including land administration.

Digital Infrastructure, Databases and Platforms in Ninh Binh

A key indicator of digital transformation is the development of underlying IT infrastructure and information systems. At the national level, the Ministry of Agriculture & Environment reports that Vietnam had, by mid-2024, built digital cadastral databases in 455 of 705 district-level units, covering over 46 million land parcels. All provinces were expected to have digitized their existing land records and connected them to national systems. Ninh Binh's progress can be understood in this context.

According to provincial sources, Ninh Binh has largely completed the conversion of its historical land records into digital format. By 2025, each of its districts reportedly has a basic cadastral database, and the province connected these to the national system. One indicator of infrastructure maturity is the proportion of land parcels with a digital ID (a unique identifier). As of August 2025, Vietnam as a whole had updated roughly 49.7 million parcels with digital IDs. While we lack breakdowns by province, Ninh Binh is known to participate fully: it reported meeting the national requirement to authenticate over 90% of residents and land parcels in its core database.

The province also invested in networking and hardware. High-speed broadband and 5G coverage have expanded to most urban and semi-urban areas. According to a recent news report, over 90% of commune offices now have fiber-optic connections or 4G/5G services, enabling online applications and videoconferencing. However, sources note that network quality still lags in more remote communes, a point we return to under Challenges.

On the software side, Ninh Binh has deployed multiple platforms for data management and public service. Notably, it built a provincial data center that integrates land, population, and civil servant databases. The province's open data portal (data.ninhbinh.gov.vn), launched in late 2023, publishes datasets across 11 fields (land, population, healthcare, etc.). By mid-2024 this portal had attracted about 50,000 visits and hosted over 1,500 datasets. The portal includes land price tables, zoning maps, and statistics on land use, allowing citizens and businesses to query information without needing a physical visit to government offices. This transparency measure aligns with national e-government goals.

Geographic Information Systems (GIS) are a vital part of digital land infrastructure, and Ninh Binh has begun integrating GIS tools into its planning. The provincial planning department maintains a digital base map, and is using software (in line with the national TKKK2024/TKOnline platforms provided by the ministry) to compile a 2024 land-use status map. As of August 2025, Ninh Binh had completed the required communes' mapping under this national program, similar to other leading provinces. On the tourism side, local agencies report using 3D visualization tools for heritage site management (e.g. for Tràng An and Hoa Lư Cultural sites)en.qdnd.vn. Although these applications are not strictly "land administration", they indicate growing local capacity in geospatial technologies. In summary, Ninh Binh has the basic digital infrastructure and core land databases in place, and is leveraging them via portals and GIS, but the full breadth of "smart" functions is still under development.

Digital Land Services and Transparency

The digitization of specific land-related public services is a practical measure of progress. Vietnam's national policy calls for all routine land administration procedures to be simplified and supported by existing data. For example, a directive requires that any citizen applying for a certificate (first issuance, transfer, mortgaging, etc.) should not have to submit duplicate data if that information already exists in a national database. In practice, Ninh Binh has begun reforming procedures accordingly. In late 2024, the provincial registration office published online guidelines explaining that citizens do *not* need to replace older red "sổ đỏ" certificates with the new ones after administrative reorganization, indicating awareness of consolidated data uses. Moreover, the province has digitized many service forms and accepts some applications online (through the national National Public Service Portal and provincial one-stop systems), though full end-to-end e-procedures are still works in progress.

Land registration issuing LURCs – is the most common land service. Ninh Binh's Land Registration Office has developed an electronic dossier system so that staff can process applications digitally once documents are scanned and uploaded. They have also started sharing data with the provincial tax department so that taxes on transactions (e.g. registration fees, land use fees) can be calculated automatically from the land database, as envisioned by national reforms. This linkage means that, for example, when a user sells land, the new owner's registration data will instantly update the tax records. Ninh Binh also participates in the national "Project 06/CP" e-government

system of MONRE, enabling citizens to make some requests online via a central portal. However, many land procedures (like surveying or certificate printing) still require some in-person steps or submission of paper documents at local centers.

Cadastral mapping and planning are increasingly digital. The provincial Planning Department no longer relies solely on paper maps; recent land-use planning for 2021–2030 was drawn and stored in GIS software. This allows planners to overlay infrastructure projects and evaluate land use changes on-screen. Public access to maps has improved: basic land parcel maps (at least outline shape) for some areas are available on the open data portal, which the public can view without special software. This is significant for transparency and for developers who need up-to-date zoning information. By comparison, other provinces (like Quang Ninh) have gone further by integrating 3D urban models and smartphone apps, but Ninh Binh's steps are solid for its size.

In terms of information transparency, one major achievement is the aforementioned open data portal. Additionally, Ninh Binh's DONRE regularly publishes land statistics and reports online (e.g. average land prices, inventory results). News articles mention that nearly 100% of land valuation plans for 2024–25 have been made public via digital channels. Local websites also provide basic cadastral maps per commune, addressing a previous gap when citizens had to physically inspect paper maps. Furthermore, the province encourages digital land information through a recent "Land Data Cleaning" campaign: officials have been mobilized to use VNeID (national e-ID) and digital platforms to verify landholder data, aiming to make the land database "accurate, complete, clean and alive" by the end of a 90-day effort. While data quality efforts are ongoing (see Challenges), these initiatives suggest that Ninh Binh is embracing the model of transparent, data-driven land administration laid out in national policy.

Human Resources and Inter-Agency Coordination

A major factor in digital transformation is the capacity and coordination of the workforce. Ninh Binh has devoted attention to this: the provincial ICT steering committee includes leaders from all line departments (finance, planning, education, etc.) along with DONRE, to ensure cross-sector alignment. District-level "Digital Transformation Steering Teams" have also been formed to implement directives locally. Training programs have been launched: for example, workshops in 2023 taught thousands of civil servants how to use new e-government systems. The province has also sent delegations to study trips (e.g. to Quang Ninh and HCMC) to learn best practices in digital land management.

Despite these efforts, officials acknowledge capacity gaps. The Nhan Dan report notes "many difficulties in organizing the apparatus and personnel to do digital transformation work from the province to the commune level". In particular, commune governments (vulnerable to staff shortages) struggle with new ICT demands. Telecom companies report still needing to provide more training on cyber security and data handling for local staff. The District and Commune Public Service Centers, established under administrative reforms, often lack dedicated land specialists, so the provincial land department has had to assign officers to support them on a part-time basis. Interviews cited in media emphasize that digital skills among the existing workforce need upgrading: officials must learn not only new software, but also data analytics and citizen-centric service design. In response, the province's digital strategy explicitly calls for ongoing training in digital literacy and cybersecurity for all staff levels.

Inter-agency coordination has improved but is not seamless. A positive development is that Ninh Binh has established data-sharing agreements between DONRE (land) and other agencies. For instance, the land registry now automatically shares ownership change data with the Tax Department (as noted above) and with the Finance Department for infrastructure funding. The provincial People's Committee has instituted a regular review mechanism to resolve any conflicts between land planning and other sector plans (e.g. forestry or irrigation). Furthermore, as of 2024, Ninh Binh has aligned its land administration with the new two-tier governance: it has already "arranged funding" for the structure where commune governments take over some land use certification tasks. (Nationwide, there is an ongoing push to devolve certain land registration functions to communes, with guidance on staffing and processes.) Overall, while better than a few years ago, Ninh Binh still needs to strengthen the communication channels between its planning, land registration, and service units, especially as processes become electronic.

Challenges and Barriers

Several technological, legal, institutional and cultural challenges remain in Ninh Binh's land sector digitalization. Technologically, although basic broadband coverage is high in urban centers, "telecommunications infrastructure is not synchronized with traffic infrastructure and urban infrastructure", meaning that some remote areas still have unreliable connections. This slows fieldwork (e.g. using mobile GIS apps) and e-service delivery. The province also notes that its digital platforms are not yet fully integrated: for example, the local public service portal does not yet seamlessly connect to the land database, so certain online forms still require manual data entry by officials.

Data completeness and quality are a concern. Despite the national land database mandate, some legacy issues persist in Ninh Binh's data. Registers contain records from various periods (some in old map coordinate systems) that must be reconciled. During a recent data audit, Ninh Binh found overlapping titles and mismatches between land and population IDs for about 10% of parcels. The "90-day data cleaning" campaign is intended to address this, but it reveals that input from citizens (e.g. scanning old certificates) and coordination with the national population database are labor-intensive tasks.

Legally and institutionally, the transition to the two-tier government model has created uncertainty. As noted in national discussions, keeping Land Registration Office branches at the provincial level is seen by some as misaligned with the new commune-centric model. In Ninh Binh, the Land Registration Office was initially under the provincial DARD (Agriculture & Rural Development), but with recent reorganizations it has come under SNNMT. How to allocate responsibility for registrations and how to reassign staff to communes are still being worked out. Moreover, while national policy encourages a full separation of regulatory and service roles – with land planners at one office and certificate issuance at another – in practice local

officials often wear multiple hats due to limited staff. This blurs accountability and slows innovation.

Cultural and procedural barriers also exist. Many citizens, especially in rural areas, are not yet comfortable with online procedures or do not trust electronic signatures. Outreach campaigns are underway (e.g. via the "digital village" project) to improve digital literacy, but uptake is gradual. On the administrative side, some officials remain accustomed to paper-based processes ("we used to stamp everything by hand" was a common refrain), so there is resistance to fully abandoning old workflows. Ensuring the legal basis for new IT applications (e.g. digital signatures, cloud storage of documents) has required new regulations and training on data protection.

Finally, budget constraints and competition for priorities pose challenges. While Ninh Binh has invested in digital infrastructure, funding for land administration IT must compete with other needs (education, healthcare, etc.). The report noted that Ninh Binh allocated about 1% of its budget for digital transformation, which is significant but still stretched across many projects. Maintaining and upgrading hardware and software licenses for land databases requires ongoing resources. In summary, Ninh Binh's challenges mirror those faced by many provinces: technological gaps, legacy data issues, evolving administrative models, and the need to cultivate a digital culture among staff and citizens.

Discussion

Ninh Binh's case illustrates both the opportunities and complexities of digital transformation in land administration. On the positive side, the province has leveraged national momentum and its own strategic focus to build a foundation of digital land management. Its leadership support and early adoption of policies have given it a head start over some other provinces. For example, having implemented 15 digital platforms and an open data portal (with thousands of users) by late 2024 puts Ninh Binh ahead of many localities of similar size. The fact that 90% of core databases (residents, land parcels, civil servants) are digitized and authenticated suggests that the province has achieved near-universal coverage of foundational data. Moreover, Ninh Binh's innovation in establishing a "digital village" model (in Yen Hoa commune) – which was recognized by the UN Food and Agriculture Organization shows creative integration of technology at the grassroots. In some respects, Ninh Binh is on track to become a model province as intended.

Compared to national averages, Ninh Binh seems to have higher levels of service digitization. The Ministry of Agriculture and Environment reported in mid-2024 that 455 districts nationwide had completed cadastral databases (≈65% of districts). Ninh Binh's 8 pre-2025 districts have fully digitized land records, putting it at 100% for its own scope. Furthermore, all provinces have connected land and population databases, and Ninh Binh is confirmed among those that have done so. In terms of online services, while most provinces have launched portals, anecdotal evidence suggests that Ninh Binh's portal is relatively comprehensive, offering multiple e-services and collecting substantial usage. The province's proactive publicity (e.g. state news coverage, information kiosks) may contribute to higher citizen engagement than in some regions where awareness is lower.

However, Ninh Binh also exemplifies common shortcomings. The challenges noted earlier (infrastructure, data, HR, legal adaptation) have parallels across Vietnam. For instance, many provinces have struggled to adequately staff commune-level offices after administrative reforms. Studies have found that nationwide, one key bottleneck is the shortage of "digital civil servants" – officials who can manage big data and cyber security on the job. Ninh Binh's recognition of this issue (and its efforts to train staff) is thus aligned with best practices. Likewise, linking land and tax data is a national policy, but only about 49 provinces had done so by mid-2025; Ninh Binh's early connection with tax authorities is commendable. But as with other provinces, full integration (e.g. one-stop shops that eliminate any physical transfer between offices) remains a future goal.

International comparisons also offer insights. In many countries, digital land administration includes online portals for all transactions, mobile GIS apps for field surveyors, and high-quality mapping systems. Vietnam lags top performers (such as Singapore's eGov Land Units or New Zealand's Landonline) but is on a fast path. The Vietnamese initiatives, including in Ninh Binh, reflect global best practices: unique parcel IDs, integrated databases, and e-services. Experts have noted that transparency is key; for example, Ho Chi Minh City's focus on publishing land data has been hailed as reducing red tape. Ninh Binh's open data approach could similarly ease citizens' information needs and reduce back-office workload. The widespread use of a national ID (VNeID) to tie individuals to land records is also in line with global trends in leveraging digital identity for land governance.

On the other hand, challenges such as legacy record reconciliation and rural connectivity are also seen internationally. Many land administrations undertake "data cleaning" campaigns as Vietnam is doing. The idea of an inter-agency "digital village" to empower rural residents is innovative and aligned with participatory e-government models seen in some developing countries. If Ninh Binh can scale this model, it may stand out as a best-practice example in Southeast Asia.

In summary, Ninh Binh has built a solid, if partial, digital land administration system. It excels in commitment and some technical capacity but shares with peers a need for deeper integration and capacity-building. Its strengths – political will, clear planning, proactive public data release – can be leveraged further, while its weaknesses highlight specific areas for improvement. The following Recommendations address these issues in detail.

Recommendations

Based on our analysis, we propose the following measures to enhance digital transformation in Ninh Binh's land administration. Each is supported by the needs and best practices identified above:

- **Complete and clean the land database:** Ensure that all parcels have correct digital IDs linked to up-to-date owner data. The ongoing 90-day land data cleaning campaign should be fully supported: localities should use digital tools (including VNeID verification) as planned. Any remaining "old" paper records must be digitized or archived, and inconsistencies (overlaps, mismatches) need resolution via field surveys and community verification. This creates the foundation for reliable e-services.

- **Upgrade IT infrastructure and connectivity:** Continue improving broadband and 5G coverage to underserved communes so that digital services are uniformly accessible. Provision of computers and secure networks at commune offices must be guaranteed. This will enable field officers to use mobile GIS/data apps and allow citizens to submit land transactions online from home.
- **Integrate systems and data sources:** Develop or procure middleware to link the various platforms (land database, tax system, public service portal, planning GIS). Aim for a "single-window" experience: a farmer applying for land use rights should never have to re-enter data already in the system. Integration with national e-gov projects (e.g. National Public Service Portal, VNeID platform) should be accelerated.
- **Enhance online public services:** Build on the open data portal by adding online application forms for all land procedures (certificate issuance, transfers, mortgages). Introduce e-payments for fees to complete end-to-end digital transactions. Publish procedures and progress-tracking online so users can monitor their application status without clerks.
- **Focus on user training and support:** Continue and expand training programs for civil servants on new systems, cybersecurity, and data privacy. Consider a certification for "digital land officers." Also offer guidance to citizens, such as tutorials or community workshops, to familiarize them with e-services and digital records. The success of the "digital village" pilot suggests peer support models; replicate this in other communes.
- **Strengthen legal and institutional frameworks:** Align local regulations with the new two-level government model. For example, clarify the role of commune governments in land registration (once national guidelines are finalizedbaochinhphu.vn) and ensure adequate staffing (perhaps additional Vice Chairman posts or land clerks at commune level as needed). Issue clear standards for digital documents and archiving at the local level to prevent legal ambiguities.
- **Improve inter-agency coordination:** Form a joint working group of DONRE, Finance, Planning, and district authorities to regularly review digitalization progress. Use performance metrics (e.g. percentage of procedures done online, database accuracy scores) to drive accountability. Encourage agencies (e.g. tax, cadastral) to cross-train staff so they understand each other's data.
- **Learn from benchmarks and share lessons:** Study leading examples such as Ha Long's 3D GIS for planning and Ho Chi Minh City's data disclosure practices to identify transferable tools or techniques. Collaborate with other provinces in the Red River Delta region to share software or jointly host training (economies of scale). Engage international donors or technology firms (as in Can Tho's smart city project) for technical advice or investment.
- **Ensure sustainability and evaluation:** Establish an ongoing review of digital land administration effectiveness. Use indicators like user satisfaction, processing time, and incident response rates. Adjust strategies based on feedback. Also budget for system maintenance and upgrades beyond initial implementation.

Implementing these recommendations will help Ninh Binh close remaining gaps and move toward the goal of a fully digital, transparent and efficient land administration. Given that land is a central asset for citizens and the economy, improving its management has broad benefits: it will reduce administrative costs, prevent land disputes, and encourage investment. Ninh Binh's proactive stance (e.g. digital village, open data portal) indicates a readiness to innovate; with the above measures, the province can become a leader in digital land governance in Vietnam.

Conclusion

This study has examined the current state of digital transformation in the land administration of Ninh Binh Province. We find that the province has made significant progress under the national digital agenda: it has digitized its cadastral records, linked databases (residents, land, civil servants) at high rates, launched multiple e-government platforms including an open data portal, and restructured land registration to align with new administrative levels. These advances are backed by clear policy mandates and substantial local investment.

At the same time, several challenges persist. Information technology infrastructure is uneven, especially in remote areas. Data quality issues from legacy records require ongoing cleaning efforts. Human resources, particularly at commune level, remain stretched in adjusting to digital workflows. The two-tier government reform has created transitional uncertainties about the roles of Land Registration Offices. Finally, citizen adaptation and trust in online land services are still evolving.

Addressing these issues will require sustained effort. The recommendations outlined above – strengthening infrastructure, integrating systems, expanding e-services, investing in people, and enhancing coordination – follow directly from the province's identified needs and international best practices. Ninh Binh's active role as a pilot for digital transformation suggests it has both motivation and support to improve. If the province can overcome the remaining barriers, it is well positioned to transform its land administration into a model of digital governance.

Enhancing digital land administration in Ninh Binh will not only streamline government procedures but also empower citizens, foster transparency, and attract investment. The experience of Ninh Binh, documented here, can also offer lessons for other Vietnamese provinces and similar emerging economies seeking to modernize land governance. Continued monitoring and evaluation of Ninh Binh's initiatives will provide valuable feedback for policymakers, ensuring that digital land systems fully serve the interests of the people and the economy.

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