

Examining The Impact of Digitization on Land Title Registration: The Case of the Gambia.

**Mustapha SAHO, The Gambia, Joseph Kwaku KIDIDO and Farida Daphne ISSAH,
Ghana**

Key words: Land, Land Title, Digitization, Technology, The Gambia

1. SUMMARY

Accurate and efficient land title registration is crucial for economic development, providing legal protection for ownership, improving access to financing, and reducing disputes. This study examines the impact of digitalization on land title registration in The Gambia. The study made use of questionnaires and a focus group discussion to collect data from officials in land title registration institutions as well as estate agents, legal practitioners, landowners, and chiefs. The findings indicated that key positive impacts of digitising land title registration include easier access to records, greater transparency and faster processing times. However, significant challenges impede its progress, including inadequate training, staff resistance and technical issues. The study recommends capacity building and enhanced infrastructure and process redesign to fully harness the potential of digitalization in land administration. The study offers some important insights into how technology can improve efficiency, transparency and security in land transactions, while also revealing challenges that need to be addressed for successful implementation. These findings may be beneficial to legal professionals, businesses and citizens.

Examining The Impact of Digitization on Land Title Registration: The Case of the Gambia.

**Mustapha SAHO, The Gambia, Joseph Kwaku KIDIDO and Farida Daphne ISSAH,
Ghana**

2. INTRODUCTION

In today's rapidly changing world, the significance of accurate and efficient land title registration cannot be overstated (Kusmiarto *et al.*, 2021). Land title registration can be made more efficient through digitization, allowing for systematic collection of records. This approach reduces reliance on manual paperwork, minimizing errors and enhancing data accuracy (Kusmiarto *et al.*, 2021). Digitalization of land title registration also allows for the incorporation of new technological ideas into land records and registries management (Kaushik, 2020). This helps to simplify the procedure, enhance effectiveness, and enhance governance in the field of land registration (Kusmiarto *et al.*, 2021). In the Gambia, the process of digitizing land title registration is currently underway (Toaha *et al.*, 2008). According to available sources, the Gambia is in the process of digitizing its land title registration system (Abubakari *et al.*, 2020). Both Toaha *et al.* (2008) and Abubakari *et al.* (2020) agree that this process involves generating spatial data and transforming physical documents into digital format.

The objectives of this research are to review land title registration, and evaluate how digital land title registration can improve land registration and documentation process in The Gambia. The research also assesses the capacity of land administrators in terms of expertise and workforce, structural systems as well as legal and administrative framework required in the provision of efficient and effective land title registration and documentation process. Meanwhile, existing studies have investigated the potential benefits and difficulties associated with the implementation of digital land administration systems across various countries (Ameyaw and de Vries, 2021). One such study has explored the land administration reforms and institutional structures governing the land registration system in Ghana (Büttir *et al.*, 2021). That paper emphasized the importance of harmonizing policies and laws, as well as restructuring institutions, to enhance the efficiency and effectiveness of the land registration process. Another study on land acquisition challenges in Ghana proposed that digitization, particularly the implementation of blockchain technology, could be a viable solution to address the issues in the land acquisition process (Ameyaw and de Vries, 2021). Similarly, another research examining the digitalization of land administration in Indonesia has underscored the importance of establishing a legal and regulatory framework to support and guide the digitalization process (Bennett *et al.*, 2021). These studies have primarily centered their focus on the digitalization of land title registration experiences in different national settings. In the case of The Gambia however, its Land Title Registration System which is primarily paper-based, has created inefficiencies, shortcomings and fraudulent possibilities. Land market and

2 of 27

land administration is hindered by system's long procedures of title registration, regulatory barriers, and lack of transparency. It is as a result of these indications that there is a need to examine the specific case of The Gambia, a country that has been grappling with land administration challenges.

In the next sections, property rights and land tenure security are discussed. Followed by a discussion on digitalization in land administration, land title registration, and land administration in the Gambia. Subsequently, data collection methods are presented as well as the study findings and discussion. The conclusion is presented in the final section.

3. LITERATURE REVIEW

3.1 Property Rights

Property rights are essential to the successful administration and management of land resources because they give the required legal framework for the appropriate distribution, utilization, and preservation of land (Mwangi, 2009). Safeguarding property rights encourages people to invest in their land and helps to create land markets that free up space for a range of infrastructure projects and sustainable development programs. The relationship between people and land is complex and varies across nations, depending on their unique historical, cultural, and legal contexts. Many countries in the global south, particularly those transitioning from command to market-driven economies, are actively re-engineering their land registration and cadastral systems to provide more efficient and secure means of transacting land (Zevenbergen *et al.*, 2013).

It is reported that secure property rights are the cornerstone of a well-functioning economy, as they enable individuals and businesses to make long-term investments and engage in productive activities (Higgins *et al.*, 2018). Land is a crucial component in addressing numerous development challenges, as it is intricately linked to eight out of the 12 Sustainable Development Goals, including those related to poverty alleviation, food security, sustainable urbanization, gender equality, and climate action. Robust land administration and management systems are essential to enable the delivery of vital infrastructure, such as affordable housing, slum rehabilitation, and transportation networks, which are important for the overall economic and social progress of a country (Tirumala and Tiwari, 2022).

The idea of property rights has grown to encompass digital assets in the era of the internet, such as virtual land and other digital things. Formalizing land ownership through land registration is an important component of property rights (Abubakari *et al.*, 2020). The process of formally recording land rights and interests gives people and communities safe tenure while enabling a range of economic activities. This is known as land registration. It is as a result of this that digital land title registration emerged as a promising approach to clarifying and enforcing property rights and ensuring secure tenure within land administration systems. Researchers stated that transitioning from traditional paper-based record-keeping to digital platforms, the process of documenting and managing land tenure can be streamlined, leading to enhanced transparency and improved governance (Ameyaw and De Vries, 2020). This is to say that digital

land records can provide a more secure and tamper-resistant system for recording and verifying land ownership rights as they are less susceptible to physical degradation, loss, or unauthorized alteration compared to their paper-based counterparts (Daniel and Speranza, 2020).

3.2 Land Tenure Security

Land tenure security is a crucial element of land administration since it directly affects the rights, obligations, and interactions between people, communities, and the government regarding land resources. As defined by FAO (2002), it is the level of assurance that those who utilize land will not be unjustly dispossessed of the rights they possess over it and the advantages that accompany it. Secure land tenure is a cornerstone of land administration that supports social stability, economic growth, and environmental sustainability (UN-HABITAT, 2008). This idea is important for both formal and customary land systems, especially in developing nations where unstable land tenure can cause disputes, inefficiencies in the land market, and investment barriers (Deininger and Feder, 2009).

Planning for land use, environmental management, and urban growth are all impacted by tenure security (Payne, 2001). While landholders may be hesitant to undertake long-term investments in land repair or conservation without security of their continuous access to or ownership of the land, insecure tenure frequently leads to inefficient property use and poor environmental stewardship (FAO, 2002). There are several linkages between land tenure security and economic growth that have been well researched. According to (Deininger and Feder (2009), stable land tenure, especially in agricultural nations, is a major factor in economic growth. Since land may be used as collateral for loans, secure tenure enables landholders to get credit and promotes land development investments, which raise agricultural output and revenue (Feder & Nishio, 1998).

Case studies from different nations highlight its economic advantages. As reported by (Deininger *et al.*, 2007), the introduction of a land certification program in Ethiopia, for instance, greatly enhanced tenure security and encouraged land investment. This in turn raised agricultural production. Conversely, better land use practices and easier access to finance have been linked to the formalization of property rights in Peru through land titling initiatives (Field, 2005). Despite its importance and benefits, it is difficult to achieve land tenure security, especially in developing nations where formal and customary legal systems frequently overlap. Since customary land rights, which are usually based on oral traditions and local practices, may not be recognized by formal legal frameworks, these systems complicate land administration and jeopardize tenure security, resulting in conflicts and instability (Toulmin, 2009). Land tenure security is further complicated by weak government and corruption. Landholders find it challenging to protect and defend their rights due to inefficiencies, corruption, and a lack of transparency in land administration systems. This exacerbates land-related conflicts and impedes economic growth (Deininger and Feder, 2009).

Research has suggested that in order to improve land tenure security, digital land title registration is a modern strategy that has shown great promise. As previously mentioned, conventional land registration systems, which are frequently scattered and paper-based, may be complex, difficult to access, and wasteful. According to Williamson *et al.* (2010), these flaws can compromise tenure security by making it more difficult for landholders to verify their title or transfer land. It is recognized that by increasing the precision, usability, and openness of land information, digitizing land records can help with a number of these problems (Van Oosterom *et al.*, 2009). Systems for digital land title registration can expedite the registration procedure, lessen fraud chances, and facilitate landholders' access to and verification of their land records as well as increasing tenure security.

3.3 Digitization in Land Administration

The notion of digitization has transformed several areas, including the land administration system. It has been reported that effective land management is critical to a country's economic and social advancement because it governs the allocation, use, and care of land assets, which serve as the foundation for a variety of sectors and community development projects (Papaskiri *et al.*, 2021). In recent years, digital technology integration has emerged as a significant facilitator in improving land administration procedures, ranging from data collection to distribution and maintenance (Scaioni *et al.*, 2014). Digitization in land management systems can result in major economic benefits for companies and investors that rely on land-related data. Digital land management technologies enable the processing and analysis of massive volumes of quantitative, qualitative, price, and legal data, allowing for better tracking and modeling of dynamic changes in land use and ownership (Papaskiri *et al.*, 2021).

The rapid evolution of digital technologies has significantly impacted the workflows and processes associated with land administration (Scaioni *et al.*, 2014). Digitization has been reported to enable the integration of various data sources, including surveying, mapping, and land record information, into comprehensive digital platforms such as CAD, ARC GIS, QGIS, and EXCEL (Papaskiri *et al.*, 2021). These digital land management systems facilitate the efficient storage, retrieval, and analysis of land-related data, empowering decision-makers and stakeholders with real-time information to guide their land-use planning and management strategies (Papaskiri *et al.*, 2019). According to Scaioni *et al.* (2014), a critical aspect of the digitization of land administration is the growing emphasis on 3D and 4D digital mapping, which captures the spatial and temporal dimensions of land parcels and built structures. This enhanced level of digital representation enables more informed decision-making, particularly in areas such as urban planning, infrastructure development, and environmental management (Scaioni *et al.*, 2014).

One of the key advantages of digitized land title registration is its ability to enhance the traceability and transparency of property ownership. By maintaining digital records of land transactions, the likelihood of discrepancies, fraud, or unauthorized changes is significantly reduced (S and Sarath, 2020). This digital trail can serve as a reliable reference point for resolving disputes and verifying ownership claims, thereby reinforcing the overall integrity of the land administration system. Beyond enhancing transparency and security, the digitization

of land title registration can also promote greater collaboration and coordination among the various government agencies and departments responsible for land management (Byamugisha, 2021). Consolidating diverse land-related data onto a centralized digital platform can significantly streamline the processes of accessing, cross-referencing, and verifying land information (Byamugisha, 2021). This integration can facilitate more informed decision-making, expedite dispute resolution, and enhance the coordination of land-use planning and development initiatives (Daniel and Ifejika Speranza, 2020).

Traditional land administration systems are challenged with the prevalence of land disputes, often due to unclear or overlapping land claims. Digitization may address this issue by providing a clear, centralized database of land titles, ensuring that ownership records are accurate and up-to-date. The precision and reliability of digital records help reduce the ambiguity that often leads to conflicts over land (Feder and Nishio, 1998). In Ghana, for example, the implementation of a digital land information system has helped reduce land disputes by making it easier to ascertain legitimate land ownership (Bugri, 2008). In speeding up land transactions by automating processes that were previously manual, such as searching for titles, verifying ownership, and recording transfers, digital systems become crucial in terms of efficiency and reliability. This efficiency not only saves time but also reduces costs for both the government and private individuals (World Bank, 2019).

While the digitization of land administration systems offers numerous benefits, it is not without its challenges. Researchers report that the accuracy and reliability of data entry, as well as the long-term preservation of digital records are crucial considerations that require robust data management protocols and institutional capacities. The uneven distribution of digital access and literacy across communities can create a digital divide, potentially exacerbating existing inequalities in land governance (Daniel and Ifejika Speranza, 2020). Daniel and Ifejika Speranza (2020) suggested that in realizing the potential of digitization in land administration, governments and stakeholders must invest in digital infrastructure, develop institutional capacities, foster collaborative efforts, and create awareness to overcome these barriers.

3.4 Global Perspective on Land Title Registration

The digitization of land title registration has been a growing trend worldwide as governments and organizations seek to improve the efficiency, transparency, and security of land ownership records (Sahai and Pandey, 2020). One of the key drivers for this shift has been the recognition that traditional paper-based land administration systems are often plagued by corruption, inaccuracies, and inefficiencies, particularly in developing countries. A study conducted in various countries such as Ghana, Georgia, and Sweden, revealed the broader embeddedness of blockchain-based land registries in non-digital infrastructural modalities and the people infrastructures of informal networks. This study argued that the abstraction of blockchain may obscure the complex layering of formal and informal, institutionalized and grassroots texture of property rights and claims to land (Rodima-taylor, 2021). Existing attempts to blockchain-based land management are usually influenced by a formalistic and top-down vision of land administration procedures, with insufficient emphasis on the real complexity of formalizing and

digitizing property rights. As the countries cases demonstrated, blockchain is an emerging technology that has the potential to create the illusion of increased participation and transparency while also leading to a growing convergence and singularization of plural ownership and use rights, as well as centralized land management in conditions where statutory law does not adequately represent the majority of land users (Rodima-taylor, 2021). As stated by Rodima-taylor (2021), blockchain promises greater interoperability and synchronization, but if land rights lack legitimacy in the real world, does digitization make a difference or perpetuate exclusion and inequality? In line with this, Akingbade (2012) indicated that E-government initiatives for modernizing and digitizing land records aim for better administrative and workflow transparency and for curbing corruption imposed on citizens might be the real solution.

The transition towards digital land registries has taken different forms in the case of Rwanda, where land administration had historically been beset by corruption (Santiso, 2022), the government sought to address these challenges through a comprehensive digital land reform program introduced in 2008. The first phase focused on land mapping and titling, while the second phase, launched in 2012, centered on the establishment of a digital land registry (Santiso, 2022). Similar efforts have been observed in other parts of Sub-Saharan Africa, where the investment case for land tenure security has been compelling (Byamugisha and Dubosse, 2023).

Additionally and beyond the African continent, Indonesia has recognized the importance of completeness in land registration and the efficiency of land-information services as prerequisites for sustainable development and ease of doing business (Aditya *et al.*, 2021). In this context, the adoption of mobile technology and data collection tools aligned with the Land Administration Domain Model standards has been a key focus to improve the quality and efficiency of the land titling process (Aditya *et al.*, 2021). The experience of that of India, efforts to implement blockchain-based land titling systems, illustrates both the potential and the challenges of this approach. The promise of tamper-proof, authentic, and conclusive land titles is balanced against the need to address issues like public key infrastructure, privacy rules, and security concerns (Thakur *et al.*, 2020).

Despite these promising developments, the uptake of digital technologies in land administration has not been without its challenges. While some may have still argued that blockchain technology, in particular, holds potential to enhance the security and transparency of land tenure documentation, the authors caution that technology is not a universal solution. Factors such as the accuracy of data entry, the ability to facilitate data preservation, and pre-existing institutional and legal frameworks can all serve as barriers to the widespread adoption of these technologies (Daniel and Ifejika Speranza, 2020).

3.5 The Gambian Perspective

In Sub-Saharan Africa, digitizing land title registration has proven to be a difficult and complex undertaking, with differing levels of success in various nations. The historical background of

land tenure and administration in the Gambia has greatly influenced the experiences and difficulties related to the digitalization of land title registration. Gambia's land tenure system has been characterized by a mix of customary and statutory land rights, with the majority of land being held under customary tenure arrangements (Bitjoka *et al.*, 2020; Byamugisha & Dubosse, 2023). This has presented a significant obstacle to the implementation of formal land registration and title systems, as the customary land tenure systems are often not easily reconcilable with the requirements of statutory land administration (Siriba & Dalyot, 2017). The slow pace of land adjudication and the inability of existing land information systems to adequately capture the nuances of informal and customary land arrangements have exacerbated the challenges in land registration systems

Land registration process in The Gambia, as similar to other developing countries, and involve a series of steps that cut across both statutory and customary actors. These include approvals, certifications, and associated signatures on various documents. However, the process is often hampered by institutional challenges such as overlapping claims of ownership, unclear registration procedures, and poor collaboration among the various land registration institutions and their stakeholders (Miller *et al.*, 2021). The government departments responsible for land administration, such as the Department of Lands and Surveys, are tasked with maintaining land records, processing land transactions, and issuing land titles or leases (Miller *et al.*, 2021). Traditional authorities, such as chiefs, also have a significant involvement in the land registration process (Abubakari *et al.*, 2020), they are often required to authenticate land ownership and approve land transactions, as they hold customary rights over the land. On the other hand, and similar to Kumasi, Ghana, Gambia's land owners are the primary stakeholders and the recipients of land titles and are responsible for initiating and participating in registration process (Mireku *et al.*, 2016). They play critical role in land title registration process as they have vested interest in ensuring the accuracy and security of land records, as well as the ease and affordability of the process.

The introduction of digitization efforts in Gambia's land administration has aimed to address these shortcomings by leveraging technologies to improve the documentation and management of land rights. However, the adoption of these technologies has been hindered by a range of factors, including the accuracy of data being entered into the system, the ability of the system to facilitate data preservation, and the pre-existing institutional and legal frameworks that may not be fully aligned with the requirements of digital land administration (Lengoiboni *et al.*, 2019). These factors and the absence of infrastructure and digital literacy in some places make it difficult for people to participate fully and reap the benefits of the digitization of land title registration, an issue that has been apparent in the Gambian communities (Daniel and Speranza, 2020). The effectiveness of such projects has been shown to be significantly influenced by the government's political will and willingness to invest in digital technology and build the required institutional capacities. In addressing some of these factors, in 2008 the government amended some legislations to the Land Act 1991. This provides a legal framework for the establishment of a National Land Commission, which shall be responsible for the management and administration of land, and this include the maintenance of a digital land registry (Bitjoka *et al.*, 2020).

Aside the legislative measure, the Gambian government has undertaken several strategic initiatives to digitize its land title registration system. In 2018, the government introduced the Digitization of Land Records project, which aims to create a comprehensive digital land registry (Siriba & Dalyot, 2017). This initiative involves the scanning and digitization of all existing land records, the development of a web-based land information system, and the deployment of electronic land title certificates (Miller et al., 2021). These processes have been supported by various donor-funded projects. For instance, the World Bank-funded Gambia Integrated Financial Management Information System project that has provided technical and financial support for the implementation of the Digitization of Land Records project (Aditya et al., 2021).

Beyond these initiatives, the government has also implemented several pilot projects to test the feasibility of digital land title registration. One such project is the LADM-compliant field data collector for cadastral surveyors, which was introduced in collaboration with international partners. This tool allows for the efficient and standardized collection of land data, facilitating the transition to a fully digital land registration system (Aditya *et al.*, 2021). However, there have also been ongoing efforts to explore the potential of emerging technologies, such as blockchain, to address the limitations of existing land administration systems in Gambia and other parts of Africa (Bitjoka *et al.*, 2020). These efforts have highlighted the potential of these technologies to provide secure and transparent documentation of land rights, particularly in the context of informal and customary land arrangement systems.

4. DATA COLLECTION METHODS

The study employed questionnaires and a focus group discussion as data collection methods. Questionnaires included closed-ended questions with predetermined response options, while open-ended questions were asked during the focus group discussion, allowing respondents to express their views in their own words (Goyal, 2022). It is reported that researchers can enhance their confidence in the accuracy of findings through the use of different methods to explore the same topic; the mixed methods approach offers the opportunity to check the findings from one method against the findings from a different method (Denscombe, 2010). A sample size of 50 respondents was used, including 30 officers from land title registration institutions and 20 participants from a focus group discussion. This size ensured balanced stakeholder representation and manageable data analysis (Denscombe, 2010). Purposive sampling was used to select participants involved in land registration (Guarte and Barrios, 2006). Purposive sampling involves selecting people on the basis of some personal attribute that is relevant to the research purpose. It can be used to secure the best data by selecting people most likely to have the experience or expertise to offer quality information and important insights on the research topic (Denscombe, 2010).

The study collected primary data from land administration officers and a focus group comprising real estate agents, legal practitioners, landowners, and chiefs. An interview guide was used, structured around four key themes: land registration procedures and institutions, the capacity of land administrators for digital registration, the current state of digitization, and the potential benefits of digital land registration in The Gambia. Additionally, secondary data was incorporated from peer-reviewed articles on digitization and the 2023 Audit Report on Land

Registration by the Ministry of Lands and Regional Government to supplement and enrich the primary findings.

The data was analyzed using descriptive statistics and thematic analysis. Descriptive statistics to assess the capacity of land administrators—such as expertise, workforce, and structural systems—as well as the current state of digital land title registration. For qualitative data from key informants, thematic analysis was used to explore how digital land registration may enhance access to land information. The analysis process involved transcribing the data, generating initial codes, organizing data into categories, and identifying recurring patterns aligned with the study’s three objectives for deeper interpretation.

5. RESULTS AND DISCUSSION

5.1 Background of Respondents

Results from the study show that a significant number of the respondents are males representing 88.9% of the total sample with the remaining 11.1% being females. Studies have shown that women are often underrepresented in technical and land related fields (World Bank, 2016).

Table 5.1: Background of the Respondents

Variables	Group	Percentage (%)
Gender	Male	88.9
	Female	11.1
Age	18-25 years	3.7
	26-35 years	55.6
	36-45 years	28.6
	46-55 years	11.1
Education	Postgraduate	51.9
	Tertiary education	48.1
Position/Job title	Cartographer	18.5
	IT Specialist	3.7
	Land Surveyor	29.6
	Land Valuer	18.5
	Legal Professional	3.7
	Other	25.9
Years of experience	1-3 years	14.8
	4-6 years	37.0
	7-10 years	29.6
	Less than 1 year	3.7
	More than 10 years	14.8

Source: Field Survey 2024

A majority of the respondents (55.6%) fall within the 26-35 age group and there is a dominance of mid-career professionals (26-45 years), which aligns with studies that have shown that this particular age range represents the most active workforce (Citaristi, 2022). Respondents have high educational attainment: 51.9% hold postgraduate degrees, and the remaining 48.1% have tertiary education qualifications. This can be attributed to the fact that, with the specialized and technical nature of roles within the land sector, it often pertinent one specializes in said field. Studies by Obeng-Odoom & Ameyaw (2011) emphasized that educational qualifications significantly correlate with competency in land management and valuation professions in Ghana.

Furthermore, the major job roles noted were IT Specialists (3.7%) and Cartographers (18.5%), Land Surveyors and valuers make up 48.1% of the study sample while legal professionals and other roles were relatively rare (3.7% and 25.9% respectively). As seen in table 5.1, the increasing integration of information technology in land administration and geospatial management systems, a trend observed globally as digital tools, GIS, and database management become essential in modern land governance (Williamson et al., 2010). Cartographers and surveyors remain critical, as traditional mapping skills are still required despite technological advancements. Additionally, the highest number of respondents (37.0%) have 4-6 years of experience followed by those with 7-10 years (29.6%). This is consistent with workforce findings that see a peak in productivity and career growth during these years (Citaristi, 2022).

5.2 Capacity Assessment of Land Administrators

This section assesses the capacity of personnel within land administration and their level of performance in handling digital tools for titling and registration. A significant majority of the respondents (51.9%) stated that the department does not have sufficient staff to support the digitalization of land title registration. The subsequent subsections delve more into current personnel's level of skills in supporting the digitalization efforts.

5.3 Skill Level of Staff in Using Digital Tools

Figure 5.1 presents ratings of staff skills in managing digital systems for land title registration across four categories: Excellent, Fair, Good and Poor. Only 7.4% of the respondents rated the staff skills as excellent. A significant 33.3% rated them as good, 37% assessed it to be fair and 22.2% rated their skills as poor. Generally, respondents believe staff skills range between fair and good looking.

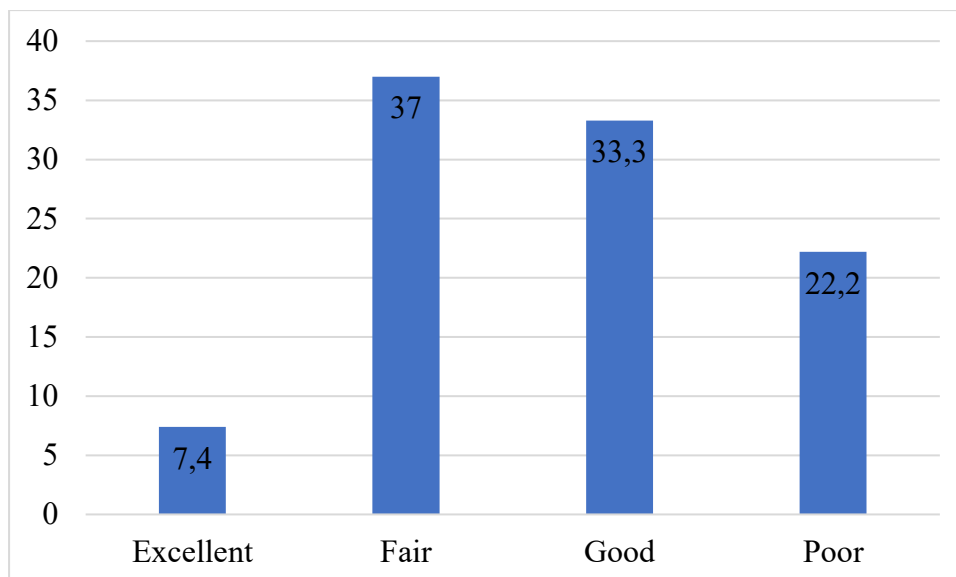


Figure 5.1: Skill Level of Staff in Using Digital Tools for Land Title Registration

Source: Field Survey 2024

This indicates moderate competence but suggests a lack of advanced proficiency required for seamless land title digitalization (Vasileiadou, 2023). Van Oosterom et al. (2020) noted that the integration of digital land systems requires not just technology but also skilled personnel who can adapt to new tools. Limited digital literacy, especially in developing economies, remains a barrier. These findings place emphasis on the need for targeted interventions to improve staff proficiency in handling digital tools for land title registration.

5.4 Level of Staff Training in Handling Digital Tools

The findings show that over half (55.6%) of the staff are categorized minimally trained, indicating little or no training in handling digital tools. Approximately 22.2% of the staff receive occasional training showing some exposure to skill development but not an optimal level. While these group of people may perform basic tasks, they likely lack advanced skills needed for efficiency.

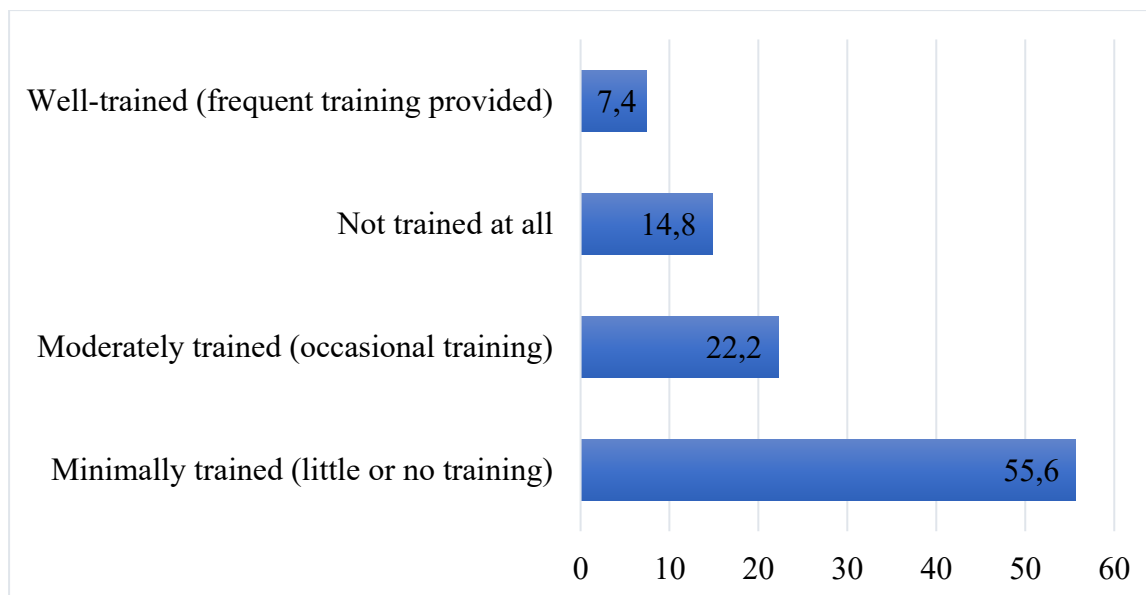


Figure 5.2: Level of Staff Training in Handling Digital Tools

Source: Field Survey 2024

Research by Ameyaw & de Vries (2023) on digital transformation in Ghana's land sector emphasize the critical need for continuous staff training and capacity building to improve efficiency. In addition, a notable 14.8% have no training whatsoever with only 7.4% of the entire staff being well trained. This low percentage can be attributed to inadequate investment in capacity building initiatives. Williamson, (2000) emphasized that well-trained staff significantly enhance organizational performance, particularly in technical fields like land title registration. These findings are not encouraging, and may eventually impede the institution's digital transformation efforts, particularly in complex tasks like land title registration. Again, Williamson, (2000) posits that organizations with frequent training programs experience faster adoption and smoother implementation of digital systems.

5.5 The Current State of Land Registration Digitalization in The Gambia

5.5.1 Material and Technical Resources

Material and Technical Resources can be expressed as the tools, equipment and systems required to support the operationalization of the digitalization efforts. In this subsection, the tools/ equipment was rated by the respondents on a scale of 1 to 3 where 1 is fully available, 2 is partially available, and 3 is not available. Approximately 59.3% of responses were recorded as not having adequate digital equipment with the remaining 4% saying otherwise and some as Partially adequate (25.9%).

Table 5.2: Material and Technical Resources

13 of 27

Resource	Rate of availability			Total
	1	2	3	
Computers with latest software updates	3.7	55.6	40.7	100
Scanners for digital documents	18.5	48.1	33.3	100
Backup systems for digital data	18.5	25.9	55.6	100
GPS Devices for Land Surveying	14.8	63.0	22.2	100
Total	100	100	100	

Source: Field Survey 2024

The data as seen above suggests that resources like computers and backup systems are relatively well supported reflecting the importance of foundational IT infrastructure. Yakhshiboyev et al. (2024) supports this by highlighting the necessity of robust technological infrastructure for successful digital transformation. Updated computers ensure software compatibility and reduce system failures, contributing to smoother operations. Beynon-Davies (2013) emphasize that consistent updates reduce cybersecurity risks and improve system performance, aligning with the full availability reported. However, the partial availability of scanners and GPS Devices points to limitations that can affect productivity and data quality. Dunleavy et al. (2006) indicate that digitalization often stalls when supporting equipment is limited. Similarly, GIS and land surveying experts like Goodchild (2018) emphasize that access to reliable GPS devices is critical for precision in spatial data collection and analysis, which is essential for land management projects.

Despite the positive outlook this may reflect, the 18.5% reporting no availability of scanners and backup systems suggest that digitalization initiatives face challenges in document processing and data presentation. Cordella & Bonina (2012) put forth an argument that incomplete or inconsistent access to essential resources can undermine the intended efficiency gains of digitalization efforts. Overall, almost all of the respondents (96.3%) believe that the current digital infrastructure is not sufficient to support a full-scale digitalization, stakeholders and other state entities must provide a full-scale strategic plan to mitigate this condition.

5.5.2 Organizational Resources

In the context of this study, the organizational resources are the internal capabilities, structures, and support mechanisms that enable an organization or institution achieve its objectives. Consequently, this section presents data on the management support, challenges, technical and financial support within the department. About 96.3% of the respondents were of the belief that the organization does not have ample resources to support the digitalization of land title registration. In the same vein, 74.1% responded “No” to having access to technical support (IT, helpdesk, system developers) when using digital systems with the remaining 25.9% claiming “Yes.”

5.5.3 Management Support

Management support is pivotal for the successful adoption and implementation of digital technologies. The findings revealed that support is primarily lacking or insufficient. The results from Figure 5.3 shows that 48% perceive management as “not supportive.” This may indicate substantial resistance or lack of prioritization from leadership which is likely to hinder progress. According to Kotter (1996), successful organizational change, including digitalization, requires top-down support and a clear vision from leadership. Without active involvement, digital initiatives may face delays, underfunding, or outright failure. This was closely followed by 45% of the respondents who claimed that management is “somewhat supportive” which is indicative of level of acknowledgement. Hughes, (2016) put forth an argument that such lukewarm support often results from competing organizational priorities, unclear goals, or limited understanding of the long-term benefits of digital transformation.

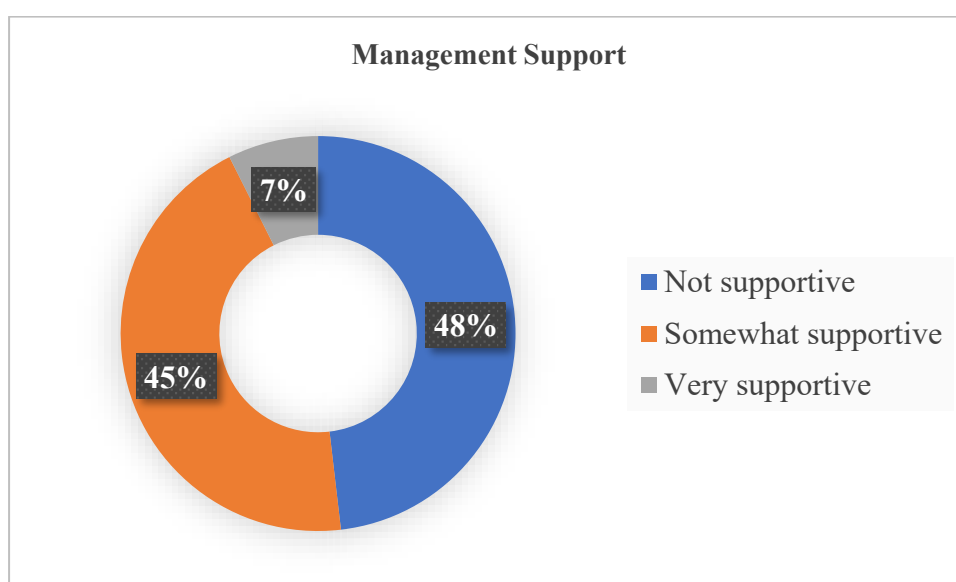


Figure 5.3: Management Support

Source: Field Survey 2024

The low percentage of respondents perceiving management as “very supportive” is notable but very alarming. This limited support suggests a lack of leadership involvement in fostering a digital transformation culture. Research by Venkatesh et al. (2003) emphasizes that active management support, in the form of strategic vision, resource allocation, and consistent communication, is crucial for fostering innovation and overcoming resistance.

5.5.4 Rating the Effectiveness of Inter-departmental Collaboration

This section evaluates the inter-departmental collaboration based on four ranking categories (1= Excellent, 2= Good 3= Fair 4= Poor). A typical example of said collaboration is between

15 of 27

IT and land administration officials. As seen in Table 5.3, a majority of the respondents (44%) rate collaboration as fair or moderately effective. This suggests that some level of interaction or cooperation exists. Notwithstanding, a significant proportion (33.3%) of the respondents are of the view that inter-departmental collaboration is poor or ineffective which highlights the need for communication and coordination across the various departments. Adler & Heckscher (2006) argue that strong collaboration requires trust, mutual goals, and streamlined communication channels, which may be lacking in this case. However, 22.2% of the respondents believe it to be Excellent and Good. Adler & Heckscher, (2018) note that inter-departmental collaboration often suffers from siloed structures, misaligned objectives, or lack of shared resources. In addition, Adler & Heckscher, (2006) propose that collaboration can be enhanced through leadership-driven initiatives, such as creating cross-functional teams, aligning departmental goals, and using technology to streamline communication.

Table 5.3: Effectiveness of Inter-departmental Collaboration

Rank	Percentage
1 = Excellent	11.1
2 = Good	11.1
3 = Fair	44.4
4 = Poor	33.3
Total	100

Source: Field Survey 2024

The findings suggest that inter-departmental collaboration within the organization is largely suboptimal, with only 22.2% rating it as excellent or good as discussed earlier.

5.6 Challenges in Resources During the Digitalization Process

The study also sought to analyze some of the challenges faced throughout the whole digitalization process. Respondents were presented with five options to choose from and other options which were listed in the questionnaire. Lack of skilled personnel (25.9%), lack of training (18.5%) as well as inadequate funding (18.5%) emerged as the key challenges. Miller, (2018) underscores the importance of funding to sustain digital initiatives while Ferreira & Pantidi (2018) highlight training as a critical success factor for technology adoption.

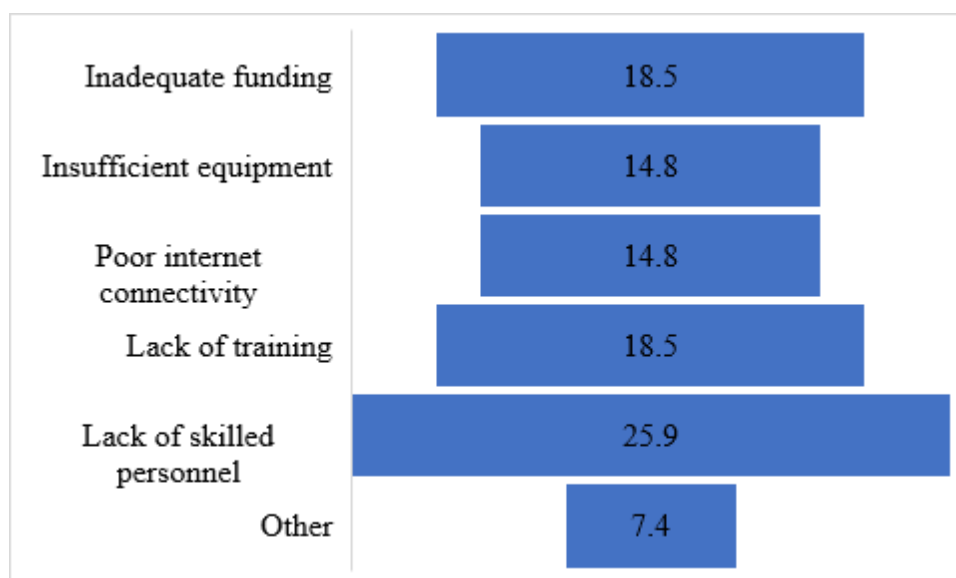


Figure 5.4: Challenges in Resources During the Digitalization Process

Source: Field Survey 2024

Generally, the data reveals that challenges such as inadequate funding, insufficient equipment, poor connectivity, and lack of training and skilled personnel significantly hinder digitalization efforts.

5.7 Evaluating the impacts of digitalization

This section of the study analyses the impacts of digitalization within the workforce of land administration in The Gambia. It began by assessing the efficiency of digitalization as seen in Figure 5.5 as well as the positive and negative impacts or outcomes which will be discussed in the subsequent subsections. Results from the study show that nearly half (48%) of the respondents perceive that digitalization has moderately improved departmental efficiency.

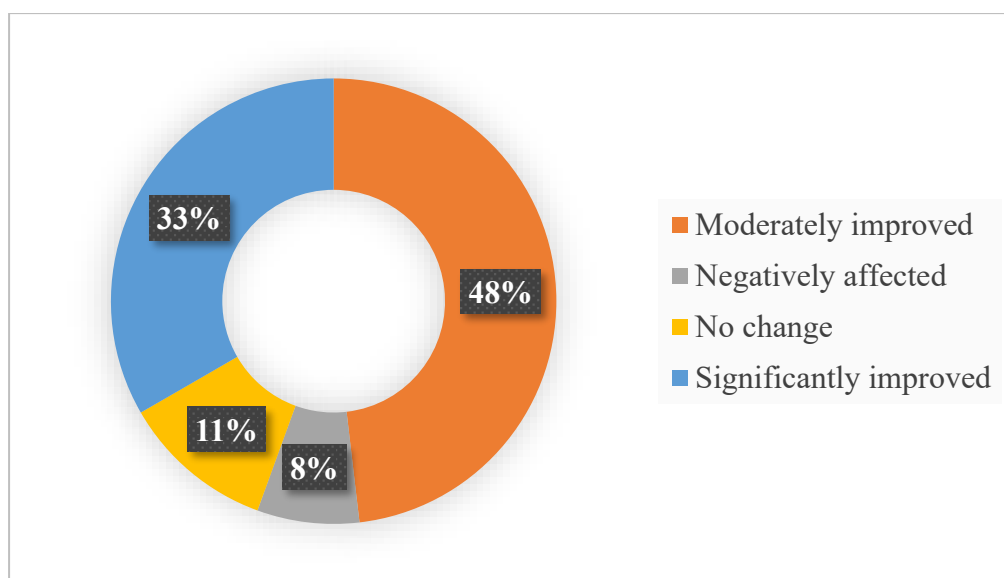


Figure 5.5: Evaluating the efficiency of digitalization within the Institution

Source: Field Survey 2024

This suggests that while digital tools and processes have made their operations more streamlined, the improvements may not have been transformative. This could point to challenges such as partial adoption of digital systems or insufficient training for staff. In addition, a substantial proportion (33.3%) of respondents believe digitalization has significantly enhanced efficiency with about 11% reporting no change.

The impact of digitalization on organizational efficiency varies, depending on the context and how it was implemented. According to Heeks (2006), the effectiveness of digital transformation in public institutions often hinges on factors like infrastructure readiness, user training, and system design. In this case, the high percentages of “Moderately Improved” and “Significantly Improved” responses indicate a generally positive reception to digital tools. Yin et al. (2024) put forth that digitalization typically improves task accuracy, speeds up processing times, and enhances accessibility of information.

The 8% of respondents who felt negatively impacted place emphasis on a key challenge also documented by Dunleavy et al. (2006) who argue that the complexity of transitioning to digital systems can create initial inefficiencies if not carefully managed. This includes scenarios where legacy systems overlap with new technology or staff lack adequate technical skills. With regards to the 11% indicating no change, studies have shown that this could stem from resistance to change or poorly aligned digital solutions that fail to address critical inefficiencies (Volberda *et al.*, 2021).

5.8 Positive Outcomes

18 of 27

Having analyzed the operational efficiency of the digital tools, it was pertinent to discuss the impacts of its usage. Most of the respondents (59.6%) identified easier access to records as the most significant benefit of digitalization. The results suggest that digital tools have enhanced storage, retrieval, and organization of departmental records, thereby reducing time spent searching for information manually. About 18.5% of the respondents noted greater transparency, which can be attributed to improved monitoring, accountability, and visibility processes enabled by digital systems. In addition, a smaller percentage (14.8%) reports faster processing time which indicates that some operations have been streamlined whereas the remaining 7.4% attribute benefits to improved data accuracy which has reduced human error.

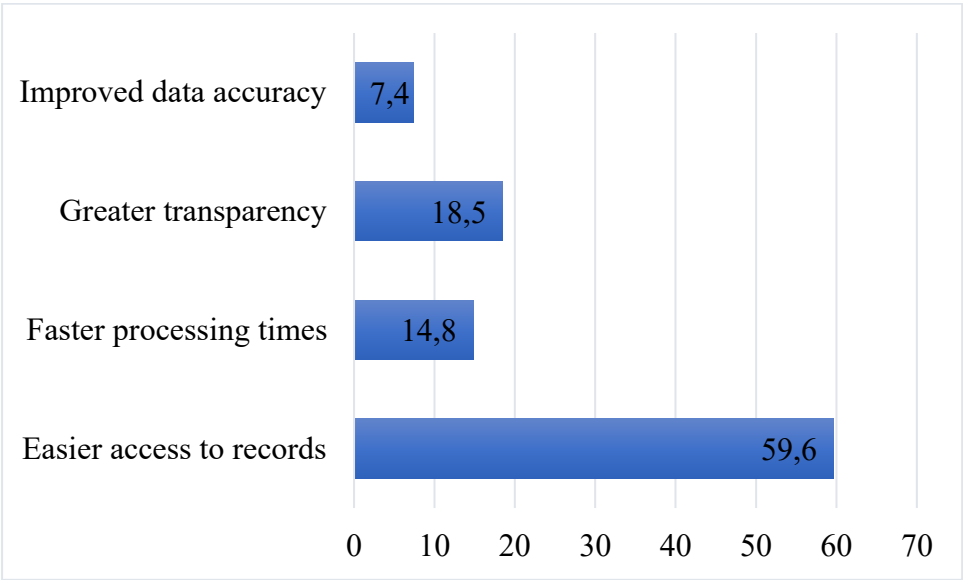


Figure 5.6: Positive Outcomes as a Result of Digitalization

Source: Field Survey 2024

The data above highlights the primary positive impacts of digitalization with “Easier Access to Records”: in the lead. These findings align with that of Milakovich (2012) who emphasized the potential of digital tools to improve information accessibility, particularly in bureaucratic organizations. Digital record systems are often credited with enhancing both convenience and efficiency in retrieving critical data.

Notwithstanding, the lower percentage for “Faster Processing Times” and “Improved Data Accuracy” suggest areas where digitalization has not fully optimized operations within the department. Cordella & Bonina (2012) identify that while digital tools often expedite processes, bottlenecks can persist if workflow integration is incomplete or user adoption is low. The reported improvement in “Greater Transparency” is important as it plays a critical role of digital transformation in public institutions. According to Bertot et al. (2010), digitalization promotes transparency by enabling better tracking of transactions and providing stakeholders with access to relevant information. Also, the relatively low response for “Improved Data Accuracy”

suggests a potential gap in the design of the systems. Zhao et al., (2023) notes that data accuracy improvements often depend on advanced validation processes, real-time monitoring, and user training. During the focus group discussion with some of the legal professionals and landowners, it was reported that

“One of the benefits of digitalization is the fact that it allows accessibility to land titles for the purpose of searches and confirmation of title. In addition, it brought about land security at the moment in Gambia where everyone was a land dealer” (Focus Group Discussion, The Gambia, 2024).

5.9 Negative Outcomes

Inadequate training was highly noted by 40.7% of the respondents, which suggests that users lack the necessary knowledge or skills to effectively use these digital tools which results in inefficiencies. According to Stein (2024), training is a critical success factor in ensuring that staff can effectively use digital systems. Without adequate training, even the most sophisticated systems may fail to deliver their intended benefits. This aligns with Sein et al. (1987), who emphasized the need for ongoing training programs to build confidence and competence in system users.

This was followed by 18.5% of the respondents who cited increased complexity of the process as another negative outcome. This indicates that rather than the technology simplifying the workflow, it has made certain processes more complicated. As Bäckström & Silversved (2021) argue, digitalization must be accompanied by process reengineering to avoid simply digitizing inefficient workflows. Resistance from Staff was ranked third as indicated by 14.8% of the respondents with the remaining 18.5% also attributing some of these negative outcomes to technical issues among others.

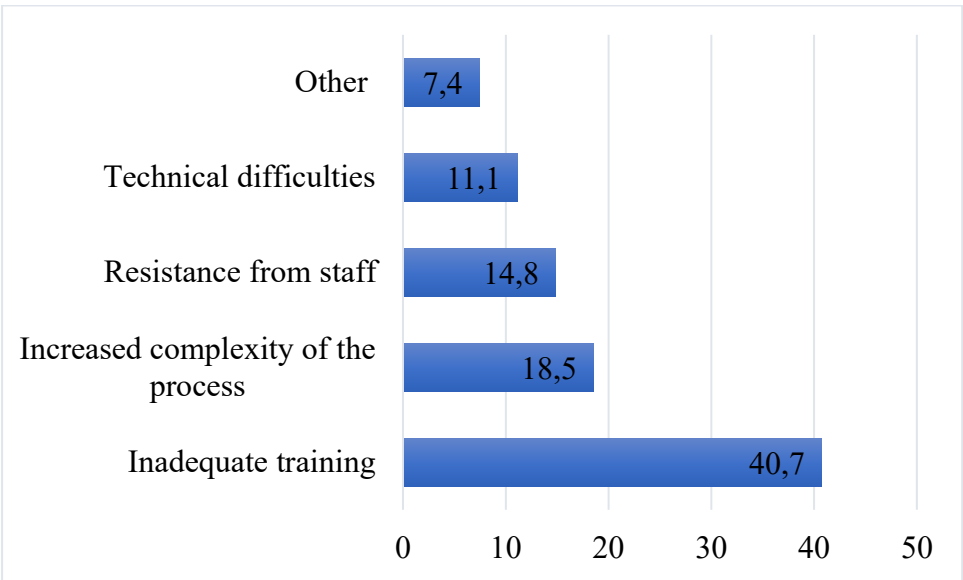


Figure 5.7: Negative Outcomes as a Result of Digitalization

Source: Field Survey 2024

Kotter & Schlesinger (1989) identified employee resistance as a major contributor to organizational change. During the focus group discussion with some of the legal professionals and landowners, it was stated that

“One of the drawbacks of this whole digitalization initiative is the frequent breakdown of the system as well as the absence of internet that disrupts the effective functioning of the registration regime. Also, the system is offline quite frequently. It does not allow for remote access and the method of payment is analog.” (Focus Group Discussion, The Gambia, 2024)

6 CONCLUSION

The study examined the impact of digitalization on land administration in The Gambia focusing on its operational efficiency, workforce capacity, organization transformation and associated impacts. The study discovered moderate improvements in departmental efficiency since land digitalization had streamlined their operations. Another finding is that major positive impacts of land digitalization include easier access to records, greater transparency and faster processing times. However, significant challenges were found to impede land digitalization progress, and these included inadequate training, staff resistance and technical issues.

The study recommends capacity building, enhanced infrastructure and process redesign, to fully harness the potential of digitalization in land administration. By enhancing transparency and improving accuracy, digitalization offers a viable solution to the persistent inefficiencies and challenges with traditional land title registration methods. The study further places emphasis on the need for collaboration among government agencies, community members as well as the integration of advanced technologies. The successful implementation of digitized land registration systems requires a holistic approach that balances technological advancement with human centric considerations. By addressing identified challenges and leveraging the opportunities presented by digitization, land administration authorities can build systems that are sustainable, transparent, and responsive to the needs of citizens and institutions alike. This, in turn, will contribute to broader socio-economic development and the effective management of land as a critical resource. The study has highlighted the transformative potential of digital technologies in modernizing land administration systems.

REFERENCES

Abubakari, Z., Richter, C. and Zevenbergen, J., 2020. Evaluating some major assumptions in land registration: Insights from Ghana's context of land tenure and registration. *Land*, 9(9), p.281. Abubakari, Z. Richter, C. and Zevenbergen, J. (2020), “Evaluating Some

21 of 27

Major Assumptions in Land Registration : Insights from Ghana ' s Context of Land”.

Adewale O. A. (2012), *E-Land Administration in the Context of e-Government in Africa : Adewale Olusola Akingbade*.

Aditya, T. Sucaya, I. K. G. A. and Nugroho Adi, F. (2021), “LADM-Compliant Field Data Collector for Cadastral Surveyors”, *Land Use Policy*, Elsevier Ltd, Vol. 104, p. 105356.

Adler, P. and Heckscher, C. (2006), “Collaborative Community”, *Ask Magazine*, Vol. 23, pp. 41–45.

Adler, P. S. and Heckscher, C. (2018), “Collaboration as an Organization Design for Shared Purpose”, *Toward Permeable Boundaries of Organizations?*, Vol. 57, Emerald Publishing Limited, pp. 81–111.

Ameyaw, P. D. and de Vries, W. T. (2020), “Transparency of Land Administration and the Role of Blockchain Technology, a Four-Dimensional Framework Analysis from the Ghanaian Land Perspective”, *Land*, Vol. 9, No. 12, pp. 1–25.

Ameyaw, P. D. and de Vries, W. T. (2021), “Toward Smart Land Management: Land Acquisition and the Associated Challenges in Ghana. a Look into a Blockchain Digital Land Registry for Prospects”, *Land*, Vol. 10, No. 3, pp. 1–22.

Ameyaw, P. D. and de Vries, W. T. (2023), “Blockchain Technology Adaptation for Land Administration Services: The Importance of Socio-Cultural Elements”, *Land Use Policy*, Elsevier, Vol. 125, p. 106485.

Bäckström, M. and Silversved, N. (2021), “Digitalizing the Workplace: Improving Internal Processes Using Digital Services: A Process Improvement by Digitalization, Emphasizing Chosen Quality Factors”.

Bennett, R. M. Unger, E. M. Lemmen, C. and Dijkstra, P. (2021), “Land Administration Maintenance: A Review of the Persistent Problem and Emerging Fit-for-Purpose Solutions”, *Land*, Vol. 10, No. 5, pp. 1–18.

Bertot, J. C. Jaeger, P. T. and Grimes, J. M. (2010), “Using ICTs to Create a Culture of Transparency: E-Government and Social Media as Openness and Anti-Corruption Tools for Societies”, *Government Information Quarterly*, Elsevier, Vol. 27, No. 3, pp. 264–271.

Beynon-Davies, P. (2013), “Making Faces: Information Does Not Exist”, *Communications of the Association for Information Systems*, Vol. 33, No. 1, p. 19.

Biitir, S. B. Miller, A. W. and Musah, C. I. (2021), “Land Administration Reforms: Institutional Design for Land Registration System in Ghana”, *Journal of Land and Rural Studies*, Vol. 9, No. 1, pp. 7–34.

Bitjoka, G. B. Yves, S. Emvudu, W. and Mbezele, B. B. (2020), “Blockchain Study and Analysis with a View to Optimizing Security on the Aspects of Land Registry”, Vol. 3, No. 2, pp. 27–37.

22 of 27

- Bugri, J. T. (2008), “The Dynamics of Tenure Security, Agricultural Production and Environmental Degradation in Africa: Evidence from Stakeholders in North-East Ghana”, *Land Use Policy*, Pergamon, Vol. 25, No. 2, pp. 271–285.
- Byamugisha, F. F. K. (2021), “Experiences and Development Impacts of Securing Land Rights at Scale in Developing Countries: Case Studies of China and Vietnam”, *Land*, Vol. 10, No. 2, pp. 1–21.
- Byamugisha, F. F. K. and Dubosse, N. (2023), “The Investment Case for Land Tenure Security in Sub-Saharan Africa: A Cost-Benefit Analysis”, *Journal of Benefit-Cost Analysis*, Vol. 14, pp. 272–300.
- Citaristi, I. (2022), “International Labour Organization—ILO”, *The Europa Directory of International Organizations 2022*, Routledge, pp. 343–349.
- Cordella, A. and Bonina, C. M. (2012), “A Public Value Perspective for ICT Enabled Public Sector Reforms: A Theoretical Reflection”, *Government Information Quarterly*, Elsevier, Vol. 29, No. 4, pp. 512–520.
- Daniel, D. and Ifejika Speranza, C. (2020), “The Role of Blockchain in Documenting Land Users’ Rights: The Canonical Case of Farmers in the Vernacular Land Market”, *Frontiers in Blockchain*, Vol. 3, No. May, pp. 1–8.
- Deininger, K. Ali, D. A. Holden, S. Zevenbergen, J. Bank, W. Dc, W. and Sciences, L. (2007), “WPS4218 Rural Land Certification in Ethiopia ”:
- Deininger, K. and Feder, G. (2009), “Land Registration, Governance, and Development: Evidence and Implications for Policy”, *The World Bank Research Observer*, Vol. 24, No. 2, pp. 233–266.
- Dunleavy, P. Margetts, H. Bastow, S. and Tinkler, J. (2006), “New Public Management Is Dead—Long Live Digital-Era Governance”, *Journal of Public Administration Research and Theory*, Oxford University Press, Vol. 16, No. 3, pp. 467–494.
- FAO. (2002), *Land Tenure and Rural Development, Development Southern Africa*, Vol. 4, 707–711 pp, available at:<https://doi.org/10.1080/03768358708439359>.
- Feder, G. and Nishio, A. (1998), “The Benefits of Land Registration and Titling: Economic and Social Perspectives”, *Land Use Policy*, Vol. 15, No. 1, pp. 25–43.
- Ferreira, J. and Pantidi, N. (2018), “Going Digital: Integrating Digital Technologies in Local Community Initiatives”, *Digital Participation through Social Living Labs*, Elsevier, pp. 55–76.
- Field, E. (2005), “Property Rights and Investment in Urban Slums”, *Journal of the European Economic Association*, Vol. 3, No. 2–3, pp. 279–290.
- Goodchild, M. F. (2018), “A GIScience Perspective on the Uncertainty of Context”, *Annals of the American Association of Geographers*, Taylor & Francis, Vol. 108, No. 6, pp. 1476–1481.

- Heeks, R. (2006), “Understanding and Measuring EGovernment: International Benchmarking Studies”, *UNDESA Workshop, “E-Participation and E-Government: Understanding the Present and Creating the Future”*, Budapest, Hungary, pp. 27–28.
- Higgins, D. Balint, T. Liversage, H. and Winters, P. (2018), “Investigating the Impacts of Increased Rural Land Tenure Security: A Systematic Review of the Evidence”, *Journal of Rural Studies*, Vol. 61, pp. 34–62.
- Hughes, M. (2016), “Leading Changes: Why Transformation Explanations Fail”, *Leadership*, SAGE Publications Sage UK: London, England, Vol. 12, No. 4, pp. 449–469.
- Kotter, J. P. (1996), “Why Transformation Efforts Fail”, *Harvard Business Review*.
- Kotter, J. P. and Schlesinger, L. A. (1989), *Choosing Strategies for Change*, Springer.
- Kusmiarto, K. Aditya, T. Djurdjani, D. and Subaryono, S. (2021), “Digital Transformation of Land Services in Indonesia: A Readiness Assessment”, *Land*.
- Lengoiboni, M. Richter, C. and Zevenbergen, J. (2019), “Cross-Cutting Challenges to Innovation in Land Tenure Documentation”, *Land Use Policy*, Elsevier, Vol. 85, No. April, pp. 21–32.
- Milakovich, M. E. (2012), *Digital Governance: New Technologies for Improving Public Service and Participation*, Routledge.
- Miller, A. (2018), “Innovative Management Strategies for Building and Sustaining a Digital Initiatives Department with Limited Resources”, *Digital Library Perspectives*, Emerald Publishing Limited, Vol. 34, No. 2, pp. 117–136.
- Miller, W. Samson, A. Aziabah, A. and Abugtane, F. (2021), “User and Systems Requirement Framework for Electronic Land Registration Systems Decentralisation in Ghana”, Vol. 03, No. 02, pp. 9–19.
- Mireku, K. O. Kuusaana, E. D. and Kidido, J. K. (2016), “Legal Implications of Allocation Papers in Land Transactions in Ghana—A Case Study of the Kumasi Traditional Area”, *Land Use Policy*, Vol. 50, pp. 148–155.
- Obeng-Odoom, F. and Ameyaw, S. (2011), “The State of the Surveying Profession in Africa: A Ghanaian Perspective”, *Property Management*, Emerald Group Publishing Limited, Vol. 29, No. 3, pp. 262–284.
- Van Oosterom, P. J. M. Bennett, R. Koeva, M. N. and Lemmen, C. H. J. (2020), “3D Land Administration for 3D Land Uses”, *Land Use Policy*, Elsevier, Vol. 98, pp. 1–3.
- Van Oosterom, P. Lemmen, C. and Augustinus, C. (2009), “The Social Tenure Domain Model”, *GIM International*, Vol. 23, No. 10, pp. 40–45.
- Papaskiri, T. V. Kasyanov, A. E. Alekseenko, N. N. Semochkin, V. N. Ananicheva, E. P. and Shevchuk, A. A. (2019), “Digital Land Management”, *IOP Conference Series: Earth and Environmental Science*, Vol. 350, No. 1, pp. 0–5.

- Papaskiri, T. V. Semochkin, V. N. Alekseenko, N. N. Krasnyanskaya, E. V. and Zatsepina, E. A. (2021), “Digital Land Management Technologies”, *IOP Conference Series: Earth and Environmental Science*, Vol. 867, No. 1, pp. 0–7.
- Payne, G. (2001), “Urban Land Tenure Policy Options: Titles or Rights?”, *Habitat International*, Vol. 25, No. 3, pp. 415–429.
- Rodima-taylor, D. (2021), “Geoforum Digitalizing Land Administration : The Geographies and Temporalities of Infrastructural Promise”, *Geoforum*, Elsevier Ltd, Vol. 122, No. August 2020, pp. 140–151.
- S, K. and Sarath, G. (2020), “Securing Land Registration Using Blockchain”, *Procedia Computer Science*, Vol. 171, pp. 1708–1715.
- Sahai, A. and Pandey, R. (2020), “Smart Contract Definition for Land Registry in Blockchain”, *Proceedings - 2020 IEEE 9th International Conference on Communication Systems and Network Technologies, CSNT 2020*, pp. 230–235.
- Santiso, C. (2022), “Govtech against Corruption: What Are the Integrity Dividends of Government Digitalization?”, *Data and Policy*, Vol. 4, No. 3, available at: <https://doi.org/10.1017/dap.2022.31>.
- Scaioni, M. Longoni, L. Melillo, V. and Papini, M. (2014), “Remote Sensing for Landslide Investigations: An Overview of Recent Achievements and Perspectives”, *Remote Sensing*, Vol. 6, No. 10, pp. 9600–9652.
- Sein, M. Bostrom, R. and Olfman, L. (1987), “Training End Users to Compute: Cognitive, Motivational and Social Issues”, *INFOR: Information Systems and Operational Research*, Taylor & Francis, Vol. 25, No. 3, pp. 236–255.
- Siriba, D. N. and Dalyot, S. (2017), “Adoption of Volunteered Geographic Information into the Formal Land Administration System in Kenya”, *Land Use Policy*, Vol. 63, pp. 279–287.
- Stein, M. (2024), “Critical Success Factors for User Satisfaction with Online Training Tools for Safety and Security Training in Port Facilities”, *Maritime Policy & Management*, Taylor & Francis, Vol. 51, No. 4, pp. 526–539.
- Thakur, V. Doja, M. N. Dwivedi, Y. K. Ahmad, T. and Khadanga, G. (2020), “Land Records on Blockchain for Implementation of Land Titling in India”, *International Journal of Information Management*, Elsevier, Vol. 52, No. June 2019, p. 101940.
- Tirumala, R. D. and Tiwari, P. (2022), “Importance of Land in SDG Policy Instruments: A Study of ASEAN Developing Countries”, *Land*, Vol. 11, No. 2, available at: <https://doi.org/10.3390/land11020218>.
- Toaha, M. Khan, S. and Registration, A. L. S. (2008), “Automated Digital Archive for Land Registration and Records”, No. Iccit, pp. 25–27.
- Toulmin, C. (2009), “Securing Land and Property Rights in Sub-Saharan Africa: The Role of

- Local Institutions”, *Land Use Policy*, Vol. 26, No. 1, pp. 10–19.
- Vasileiadou, S. M. (2023), “Skills and Competencies in the Digital Transformation Era: The Case of Greece”.
- Venkatesh, V. Morris, M. G. Davis, G. B. and Davis, F. D. (2003), “User Acceptance of Information Technology: Toward a Unified View”, *MIS Quarterly*, JSTOR, pp. 425–478.
- Volberda, H. W. Khanagha, S. Baden-Fuller, C. Mihalache, O. R. and Birkinshaw, J. (2021), “Strategizing in a Digital World: Overcoming Cognitive Barriers, Reconfiguring Routines and Introducing New Organizational Forms”, *Long Range Planning*, Elsevier, Vol. 54, No. 5, p. 102110.
- Williamson, I., Enemark, S., Wallace, J., & Rajabifard, A. (2010), “Land Administration for Sustainable Development. Redlands: ESRI.”, *FIG Congress 2010*, No. December 2013, pp. 1–16.
- Williamson, I. P. (2000), *Best Practices for Land Administration Systems in Developing Countries*, World Bank, Washington, DC.
- World Bank. (2016), “The United Nations Population Division’s World Urbanization Prospects”, *The United Nations Population Division’s World Urbanization Prospects*.
- Yin, Q. Wang, Y. Song, D. Lai, F. Collins, B. and Guo, H. (2024), “The Impact of Digitalization on Operational Risk: An Organizational Information Processing Perspective”, *International Journal of Production Economics*, Elsevier, Vol. 276, p. 109369.
- Zevenbergen, J. Augustinus, C. Antonio, D. and Bennett, R. (2013), “Pro-Poor Land Administration: Principles for Recording the Land Rights of the Underrepresented”, *Land Use Policy*, Vol. 31, pp. 595–604.
- Zhao, N. Hong, J. and Lau, K. H. (2023), “Impact of Supply Chain Digitalization on Supply Chain Resilience and Performance: A Multi-Mediation Model”, *International Journal of Production Economics*, Elsevier, Vol. 259, p. 108817.

BIOGRAPHICAL NOTES

CONTACTS

Mr Mustapha Saho
 Department of Lands and Surveys
 Ministry of Lands Regional Government and Religious Affairs
 The Gambia
 City
 Tel. +
 Email: mustapha.saho@gmail.com

Web site:

Prof Joseph Kwaku Kidido
Department of Land Economy, College of Art and Built Environment
Kwame Nkrumah University of Science and Technology
Kumasi, Ghana
Tel. +
Email: jkkidido.cap@knust.edu.gh; jkidido@yahoo.co.uk
Web site:

Farida Daphne Issah, PhD
Department of Land Economy, College of Art and Built Environment
Kwame Nkrumah University of Science and Technology
Kumasi, Ghana
Email: f.d.issah@knust.edu.gh