

Challenges of Transitioning From Manual to Digital Registration: A Case of Application for National Identification Card in Arumeru District, Tanzania

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ABSTRACT

This study explored the persistent challenges affecting the shift from manual to digital registration of National Identification Cards in Arumeru District, Tanzania, focusing on how digital literacy, internet connectivity, and cultural or habitual preferences influence citizens' adoption of the online platform. The research problem arose because, despite the national move toward digital registration systems, many applicants continued to experience delays, errors, and frustrations, mainly due to limited technological readiness and inadequate user support. A quantitative cross-sectional design was employed, involving 148 respondents selected through simple random sampling. Data collection relied on structured questionnaires and the analysis involved descriptive statistics, correlations, and regression models. Results showed that digital literacy, connectivity, and cultural resistance each had significant effects on online registration uptake, while transition support strategies exerted a very strong mediating influence that enhanced overall adoption. The study concluded that digital registration cannot succeed without improving user capacity, strengthening infrastructure, and addressing community perceptions. It recommends expanding digital literacy programs, improving rural internet access, and promoting trust building through clear communication.

Keywords: Digital Literacy, Online Registration, Cultural Resistance, Internet Access, Technology Adoption.

INTRODUCTION

Background to the Study

Over the past few decades, many nations have made significant progress in digitizing identity and civil registration systems, aiming to improve efficiency, accessibility, and service delivery. However, transitioning from manual to digital systems has presented various challenges globally. For instance, Bangladesh has faced low levels of digital literacy, particularly in rural areas, which hampers adoption (Rahman, 2023). Similarly, Peru's irregular socioeconomic landscape has hindered the effective implementation of a digital national ID system. In Nigeria, inadequate internet connectivity, insufficient infrastructure, and limited public awareness have delayed the distribution of national ID cards, while public mistrust of data privacy remains a key obstacle (Musoni *et al.*, 2023). Kenya has experienced similar challenges, with concerns about government surveillance and improper use of data toward digital systems (Musoni *et al.*, 2023).

In Tanzania, the transition to digital National Identification Cards (NICs) officially began in 2022, when the National Identification Authority (NIDA) introduced its online registration initiative. This effort was part of the government's broader digital transformation agenda. However, despite this milestone, manual registration processes have continued alongside digital systems due to infrastructural limitations, socio-economic disparities, and inadequate public readiness (Rumatila & Temba, 2023).

Among the major challenges facing Tanzania are limited digital literacy, unreliable internet access, and resistance to change. Many residents, especially in rural areas such as Arumeru District, struggle to navigate online platforms, often relying on intermediaries, which increases costs and delays (Mustafa & Shayo, 2021). Poor internet connectivity and insufficient ICT infrastructure further exacerbate the situation, particularly in

remote regions (Lwoga&Chigona, 2019). Cultural and habitual resistance also poses significant challenges, as many communities' familiar with manual systems are skeptical of digital processes and raise concerns over data security and reliability (Tveit, 2021). The coexistence of manual and digital systems since 2022 has contributed to confusion and inefficiencies in the registration process.

Additionally, Patricia (2021) highlights systemic challenges within Tanzania, including the need to upgrade district registration office capacity, modernize outdated legal frameworks, and address fragmented identity ecosystems. This study aims to explore the specific barriers to transitioning from manual to digital NIC registration in Arumeru District, focusing on digital literacy, internet access, and cultural resistance. By addressing these challenges, the study seeks to enhance digital inclusion and contribute to the efficiency of Tanzania's national identification system.

Statement of the Problem

The problem that this research is seeking to solve is the lack of understanding of the specific challenges hindering the transition from manual to digital national ID registration in Arumeru District, Tanzania. Although the shift to digital registration, initiated in 2022, is part of Tanzania's broader digital transformation agenda, significant barriers persist in Arumeru. These include limited digital literacy, unreliable internet connectivity, and resistance to change due to cultural and habitual preferences. These challenges have resulted in delays, inefficiencies, and confusion as manual and digital systems continue to coexist. Despite the importance of addressing these issues, no prior research has specifically examined the difficulties faced by Arumeru residents during this transition. This gap in localized knowledge limits the ability to design effective interventions tailored to the district's unique socio-economic and infrastructural context.

This study aims to explore the factors impeding the adoption of digital registration systems in Arumeru District. By identifying and addressing these barriers, the research seeks to contribute to improving the transition process, ensuring digital inclusion, and enhancing the effectiveness of Tanzania's national identification system.

Research Objectives

General Objectives

The main objective of the study was to investigate the challenges associated with the transition from manual to digital registration systems for National Identification Cards in Arumeru District.

Specific objectives

This study was guided by the following specific objectives:

- i. To assess the influence of digital literacy on the adoption of online national ID applications in Arumeru District.
- ii. To assess the impact of internet access and connectivity on the adoption of online national ID applications in Arumeru District.
- iii. To assess the effect of cultural and habitual resistance on the adoption of online national ID applications in Arumeru District.
- iv. To examine the mediating role of strategies for enhancing the transition on the relationship between independent variables (digital literacy, internet access, and cultural resistance) and the adoption of online national ID applications in Arumeru District.

Research Questions

The study answered the following questions:

- i. How does digital literacy influence the adoption of online national ID applications in Arumeru District?
- ii. What is the impact of internet access and connectivity on the adoption of online national ID applications in Arumeru District?
- iii. How does cultural and habitual resistance affect the adoption of online national ID applications in Arumeru District?
- iv. What is the mediating role of strategies for enhancing the transition in the relationship between digital literacy, internet access, cultural resistance, and the adoption of online national ID applications in Arumeru District?

Significance of the Study

This study on the challenges of transitioning from manual to digital systems for national ID registration in Arumeru District was of great significant at multiple levels:

This study would contribute to the national development initiatives, especially the Five-Year Development Plan, which highlights digital transformation as a way to enhance efficiency, governance, and service delivery. In line with Sustainable Development Goal 9 (Industry, Innovation, and Infrastructure), which promotes equitable access to information and communication technologies, this study would assist policymakers in designing targeted interventions that ensure inclusive access to digital services by identifying the barriers preventing the successful implementation of digital national ID registration.

This study would also help to bridge the Knowledge Gap since there is a glaring lack of information about the challenges that rural communities, such as Arumeru District, have when implementing digital national ID systems.

The results of this study would contribute to the Social and Economic welfare since NIC very significant in ensuring individuals' access to basic services including healthcare, education, and social assistance programs which requires an effective national ID registration system.

LITERATURE REVIEW

Theoretical literature review

The theory that is particularly relevant to this study is the Technological Acceptance Model the technological. The Technology Acceptance Model (TAM) is one of the fundamental theories of technology that explains how innovations might be accepted by societies and incorporated into their regular economic operations, which was created by Fred Davis in 1989 (Zaineldeen *et al.*, 2020). The theory describes how people's opinions about the uses, advantages, and disadvantages of a specific technology affect their decision to embrace or reject it. This model suggests that people's perceptions of a new technology's utility and usability play a major role in their decision to adopt it (Khafit *et al.*, 2020a). TAM specifically highlights perceived security, perceived usefulness, perceived cost of use, and perceived ease of use as the four main variables that influence technology adoption (Tahar *et al.*, 2020).

The theory stipulates that for consumers to feel comfortable using a technology, they need to be reassured that it is dependable and safe. This situation is known as perceived security. People are inclined to reject technology if security isn't guaranteed because they worry about possible threats like fraud or data leaks (Rafique *et al.*, 2020a). Conversely, the idea that a technology would improve a user's performance or productivity is known as perceived usefulness (PU). Users are more likely to embrace technology if they discover that it makes their tasks easier or adds value (Alsyouf *et al.*, 2023a).

Perceived ease of use (PEOU) is another important component of TAM that measures how much a person believes utilizing the technology would be simple and easy. Even if a technology is helpful, people could be

reluctant to use it if they have trouble understanding or using it (Kumar & Krishnan, 2020a). Clear instructions, an intuitive design, and an easy-to-use interface can all contribute to the perceived ease of use of a product, which will increase its adoption. On the other hand, even if a system has a lot going for it, people may not embrace it if it is difficult to use or complicated (Rafique *et al.*, 2020b).

PU and PEOU work together to influence a person's attitude toward using technology. As per TAM, these mindsets then impact the behavioural intention to employ the technology, which eventually culminates in its actual utilization (Kumar & Krishnan, 2020b). This sequence of events beliefs, attitudes, intentions, and behaviour offers a methodical approach to forecasting an individual's acceptance or rejection of a specific technology (Alsyounf *et al.*, 2023b). Crucially, TAM emphasizes that external elements like system features, user assistance, and organizational support can affect perceived usefulness as well as ease of use.

TAM has been frequently used by researchers to study how users behave when utilizing new technology and information systems (Alsyounf *et al.*, 2023b; Khafit *et al.*, 2020b; Rafique *et al.*, 2020b). TAM is great fit for the study since it offers a structured framework for comprehending the variables influencing the adoption of digital registration systems. TAM assists in the analysis of the technological, infrastructure and human aspects of the shift from manual to digital processes by concentrating on user attitudes and perceptions of the new system.

Empirical Literature Review

Many nations throughout the world have made great progress in digitizing their systems for identity and civil registration in the last few decades (Thiel, 2020). A study by Rahman (2023) in Bangladesh stipulate that, Bangladesh had enormous challenges in transiting from manual to digital systems, especially when it comes to civil registration and national identification. However, the initiatives like the National Identity (NID) project, which aims to digitize citizen data and streamline government services, have helped the nation make headway, but a number of issues have made the move difficult. Rahman (2023), noted that low levels of digital literacy continue to be a significant barrier, particularly in rural areas in Bangladesh where many residents find it difficult to use online services. The digital gap is further exacerbated by poor infrastructure, such as erratic power supplies and internet connectivity.

One major obstacle in India to the successful implementation of the world's largest biometric identity program, Aadhaar, is digital literacy. Its full usage has been hampered by the lack of digital literacy, especially in rural and underprivileged groups, despite its promise to prevent identity fraud and increase access to services (Bhatia & Bhabha, 2017). Many citizens find it difficult to use the digital services connected to the system, access their Aadhaar information, or complete the online registration process. Singh (2023) highlights that although the Aadhaar system has transformed identity verification, there are still issues with digital literacy that prevent many users from taking full advantage of the system's benefits because of their poor proficiency with digital platforms.

According to Neira *et al.* (2024), Peru, especially in rural and mountainous areas with limited access to technology and digital abilities has always being the reason behind the adoption of the online services. Due to low levels of digital literacy, many rural villages lag behind urban regions in the implementation of digital systems. The attempt to switch from manual to online national ID registration systems is hampered by this digital gap.

Again, the low levels of digital literacy in many rural communities in Nigeria make it difficult for them to participate in the online registration process (Eke *et al.*, 2022a). Participation in the digital national identification registration procedure is hampered by the fact that many persons lack the digital literacy needed to use online platforms efficiently. According to Eke *et al.* (2022), insufficient public awareness campaigns together with low levels of digital literacy have impeded the adoption of the online national ID system. Compounding the problem is the difficulty the National Identity Management Commission (NIMC) has had in reaching out to outlying areas with limited internet connection. Large portions of Nigerian society continue to be deprived of the advantages of the online ID system in the absence of focused initiatives to raise awareness and develop digital literacy, which slows the country's overall

The Kenyan government formally introduced Huduma Namba in April 2019 as a component of its National Integrated Identity Management System (NIIMS). The Huduma Namba was another ambitious Kenya national identity program that attempts to unify many government services on a single digital platform (Meng'anyi, 2022a). Despite the potential advantages of better administration and streamlined services, the transition has faced a number of challenges. Musoni *et al.* (2023) argue that when Kenya was moving to Huduma Namba faced some challenges. The findings were in a view that low levels of digital literacy on the national integrated identity management system for Kenya, Huduma Namba, particularly in rural regions. An inability of many residents to comprehend how to use the online registration platforms hindered the program's inclusivity and efficiency. Musoni *et al.* (2023) claim that because many people, particularly those in developing countries, struggled to use the online procedures, a lack of digital literacy increased public suspicion and hostility to the digital ID system. Large portions of the populace were unable to fully benefit from the digitalization of government services due to a lack of training and public awareness, underscoring the significance of raising digital literacy to enable wider adoption. It was also indicated that Huduma Number encountered criticism from the public as a result of the government's failure to adequately inform its people of the benefits of the digital ID card and to include CSOs in the system's development and execution (Meng'anyi, 2022b).

Tanzania is experiencing a digital revolution, as seen by the increasing number of individuals utilizing internet and communication services (Kenechi Okeleke, 2019). Tanzania as any other developing country is not left behind on the transition from manual to online national ID systems which solely align with regional and international trends. The aim of the Tanzanian government to move from a primarily manual registration process to an online platform is to increase accessibility, accuracy, and efficiency (Mustafa & Shayo, 2021a). Despite being well-known and commonly used, manual registration procedures have long been beset by inefficiencies such delays, misplaced records, and data entry errors. By decreasing human error, expediting processing times, and giving residents faster access to registration services especially in urban regions with more powerful digital infrastructure the implementation of an online system aims to alleviate these problems (Saad & Itika, 2024a).

However, Tanzania, like many other developing countries, confronts significant obstacles in putting into place a completely digitized national ID registration system. According to Mustafa and Shayo (2021), a large number of Tanzanians lack internet navigation skills, which makes it difficult for them to apply for national IDs and obtain other necessary services. In remote places with little access to technology and education, the lack of digital literacy is most evident. Because of this, residents in these areas frequently struggle to adapt digital systems and must rely on middlemen to help them, which can result in inefficiencies and extra expenses.

Knowledge gap

The challenges that online registration encounter undermines the government's goal of digital transformation, reflecting a gap in technology adoption and public readiness. Many studies have been conducted elsewhere showing several challenges encountered when the governments were trying to move from the manual to digital/online registration for national identification Card (Eke *et al.*, 2022b; Meng'anyi, 2022b; Neira *et al.*, 2024b; Rahman, 2023b; Singh, 2023b). However, there is no specific study/studies that has/have been conducted at Arumeru district to investigate the challenges associated with the transition from manual to online national ID registration, with particular attention to the ways in which digital literacy, internet availability, and cultural resistance impact the process' efficacy and efficiency. To have a successful shift from manual to online NIC, this gape must be addressed. Therefore, the study intends to support ongoing efforts to update Tanzania's national identity system and encourage digital inclusion throughout the nation by identifying these issues and offering workable solutions.

Conceptual framework

Conceptual framework deals with synthesizing the existing views in the literature concerning a given situation, both theoretical and from empirical findings. In this study, the conceptual framework (Figure 2.1) comprises of three independent variables namely digital literacy, internet access and connectivity and cultural and habitual preferences. Also, the framework has one intervening variable, strategies for enhancing the transition, and one dependent variable, online registration.

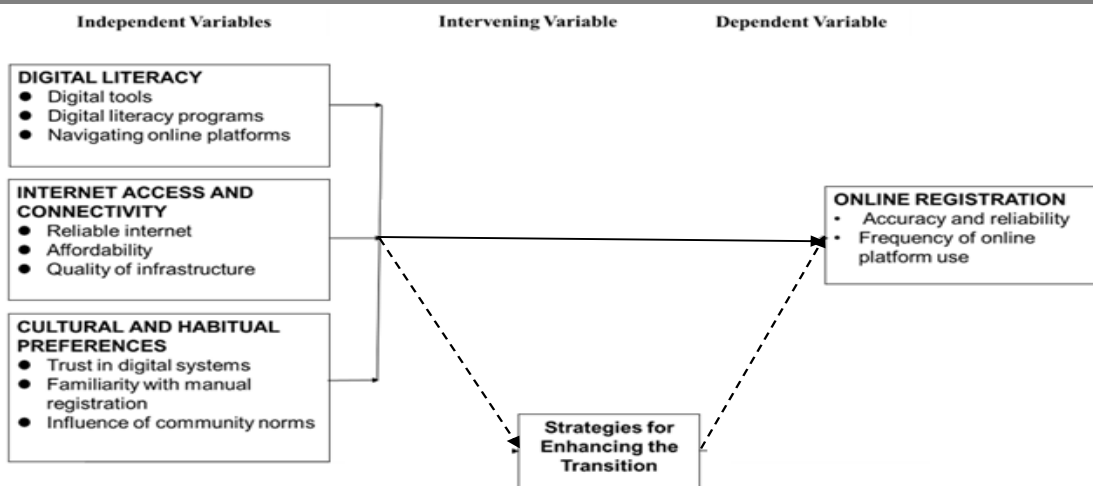


Figure 2. 1 Conceptual Framework (This work)

RESEARCH METHODOLOGY

Research Approach

This study employed quantitative to analyze digital registration challenges and opportunities associated with digital registration systems, providing data-driven insights for improvement and innovation (Saunders *et al.*, 2019).

Research Design

This study was grounded in the pragmatic research philosophy, which emphasizes practical solutions and real-life applicability rather than abstract ideas (Creswell & Creswell, 2018). Pragmatism allowed the researcher to focus on what genuinely works in addressing the challenges surrounding digital adoption in Arumeru.

Study Area

Arumeru District, located in the Arusha Region of northern Tanzania, is predominantly rural with a growing urban population centered on agriculture, tourism, and small-scale commerce (URT, 2019). The district is part of the greater Arusha region, known for its vibrant tourism sector due to its proximity to Mount Meru and Arusha National Park. However, the rural areas face infrastructure challenges, such as limited access to reliable internet connectivity and lower levels of digital literacy (Terry, 2016).

Population and Sample Size

The population for this study included all the people that reported in NIDA Arumeru District office for ID inquiry in one month. Since January 2025, the average monthly inquiry is 237 cases that reported to the office (NIDA-ArumeruS, 2025). To ensure a representative sample, the study adopted a stratified random sampling technique, considering gender. Since the physical data from the district database indicated the average of 50/50 representation, the simple random selection still had minimum bias. Based on (Krejcie & Morgan, 1970) sample size determination formula, a sample size of 148 participants was selected.

Sampling Strategies

The sampling strategy for this study employed a simple random sampling technique to ensure a representative distribution of respondents across gender (West, 2016). This method helped address the diverse population characteristics of Arumeru District, facilitating more accurate analysis of the factors influencing the transition to digital registration. Respondents will be drawn from residents applying for National Identification Card (NIC) and district officials involved in the registration process.

Data collection methods

Since this study used quantitative data collection methods, questionnaires and questionnaires were the primary instruments used for quantitative data collection, as they allow for efficient data gathering from a large sample. These instruments included structured questions focusing on digital literacy, internet access, and cultural resistance (Neira *et al.*, 2024b; Rahman, 2023b).

The primary data were gathered using questionnaires, which were administered by knowledgeable enumerators.

Data Analysis

Descriptive statistics such as frequencies and percentages were used to summarize demographic data, while inferential statistics such as chi-square tests were conducted to explore relationships between variables, such as digital literacy and adoption rates (Musoni *et al.*, 2023c).

To determine the nature and strength of the link between the independent and dependent variables, a correlation analysis was performed. Calculating the correlation coefficient of determination (R^2) revealed how much of the variations in dependent variable could be explained by changes in the independent variables.

Ethical consideration

Ethical issues were taken into account throughout the study in accordance with the MS TCDC postgraduate guideline. Then the researcher asked for permission from the MS TCDC authority to go for the field data. The letter of permission helped to introduce the researcher to the NIDA office in Arumeru district in which the study was conducted. Informed written consent was obtained from all respondents, and transparency was maintained throughout the planning and implementation of the study. All respondents were offered a debriefing session after each interview and were informed that any data concerning them remained confidential and anonymized. Participants were assured anonymity in reports by using pseudonyms during data collection. Additionally, all participants were informed that any unpublished data will be shredded and electronically deleted shortly after the submission of the report.

RESULTS AND FINDING

The influence of digital literacy on the adoption of online national ID applications in Arumeru District

The results (Table 4.4) on digital literacy show that most respondents have limited experience and confidence when it comes to using digital tools. For example, the average score for confidence in using digital platforms is only slightly above 2, which means many people feel unsure navigating online systems. Participation in digital literacy programs is also extremely low, reflected by a mean of 1.56 and a very small spread in responses. This suggests that almost everyone has had little or no exposure to training. Understanding the online national ID application process is also modest, and the wide variation in responses shows that while a few people may understand the system well, many others have little knowledge about how it works. Interestingly, most respondents strongly believe that digital literacy training would make it easier to use the online registration system. Altogether, these findings highlight that digital literacy is still a major barrier to moving from manual to online registration, mainly because people lack confidence, training and awareness.

Table 4. 1: Descriptive Statistics

	N	Statistic	Mean	Std. Deviation	Skewness	Std. Error
How confident are you in using digital tools for online applications?	148		2.04	.764	.581	.199
How often do you use online platforms for daily tasks?	148		2.80	1.498	-.091	.199

Have you participated in any digital literacy programs?	148	1.56	.498	-.248	.199
How would you rate your understanding of the online national ID card application process?	148	2.58	1.443	1.206	.199
Do you believe digital literacy training would enhance the adoption of online national ID applications?	148	1.77	1.017	2.322	.199
Valid N (listwise)	148				

Internet Access and Connectivity on Online National ID Applications

The findings regarding internet access reveal significant challenges that affect the use of online national ID services (Table 4.5). Many respondents indicated that they do not have reliable internet at home, which limits their ability to complete online tasks without interruption. The quality of internet services in the area is also described as inconsistent, and this is supported by moderate mean scores and high variability in responses. A large number of respondents reported experiencing connectivity issues when trying to complete online applications, which confirms that the digital environment is not yet stable enough for smooth online registration. Affordability is another concern, as the average response shows that many people still find internet costs relatively high. Because of these barriers, many respondents rely heavily on public Wi-Fi, which creates additional challenges such as long queues, privacy concerns and limited availability. Despite these obstacles, most respondents strongly agreed that improving internet access would make the online ID application process much easier. This shows a clear demand for better infrastructure and more affordable connectivity.

Table 4. 2: Descriptive Statistics

	N	Mean	Std. Deviation	Skewness	Std. Error
Do you have reliable internet access at home?	148	1.56	.498	-.248	.199
How would you rate the quality of internet service in your area?	148	2.43	1.137	1.128	.199
Have you experienced connectivity issues while completing online applications?	148	2.79	1.331	.322	.199
How affordable is internet access in your area?	148	2.67	1.242	1.237	.199
How often do you use public Wi-Fi to access online services?	148	3.69	1.413	-.942	.199
Do you think improved internet access would facilitate better online national ID application processes?	148	1.56	.882	2.794	.199
Valid N (listwise)	148				

The effect of cultural and habitual resistance on the adoption of online national ID applications in Arumeru District

Table 4.6 shows that cultural habits and community attitudes still play a major role in shaping how people engage with online registration. Many respondents are more familiar with manual registration processes, which they have used for many years. Trust in digital systems remains relatively low, and this skepticism is reflected in low mean scores and strong variation in opinions. A noticeable number of respondents reported that people in their communities often express resistance toward online registration. This indicates that doubts and worries about the digital system are widely shared. Community views about the digital shift are mixed, with some people supporting the transition and others feeling more comfortable with the traditional paper-based approach. Many respondents also believe that community norms influence whether someone chooses to use the online platform or not. Overall, these patterns suggest that cultural preferences, fear of change and long-standing habits strongly shape how residents respond to the move toward online national ID registration.

Table 4. 3: Descriptive Statistics

	N	Statistic	Mean	Std. Deviation	Skewness	Std. Error
How familiar are you with the manual registration process?	148		2.25	.968	.755	.199
Do you trust digital systems over traditional methods for registration?	148		2.02	1.013	1.947	.199
Have you heard of others in your community expressing resistance to adopting online registration?	148		1.67	.472	-.725	.199
How does your community view the shift to online national ID applications?	148		2.94	1.486	.888	.199
Do you believe community norms significantly influence the adoption of online national ID applications?	148		2.63	1.185	.906	.199
How do you perceive the community's attitude towards transitioning from manual to online registration?	148		2.16	1.135	1.302	.199
Valid N (listwise)	148					

Questionnaire Administration Summary

A total of 148 structured questionnaires were distributed to selected respondents in Arumeru District. Impressively, all 148 were fully completed and returned, yielding a 100% response rate. None of the questionnaires were lost, partially filled, or left unreturned (Table 4.7). To accommodate respondents with different levels of digital literacy and access to the internet, all questionnaires were administered in a paper-based format.

Table 4. 4: Questionnaire Administration Summary

Category	Number (n)	Percentage (%)	Remarks
Total Questionnaires Distributed	148	100%	Distributed to selected respondents in Arumeru District

Fully Completed	148	100%	All questionnaires contain responses across sections
Partially Completed	0	0%	None identified
Not Returned	0	0%	All distributed tools were collected
Lost/Damaged	0	0%	No cases reported
Response Rate	148/148	100%	Excellent response rate

Data Analysis and Interpretation

This section presents the analyzed data and interprets the findings on the challenges of transitioning from manual to digital registration for national identification in Arumeru District. The results are linked to the research questions and objectives, followed by a critical analysis to provide deeper insight into the study's outcomes.

The influence of digital literacy on the adoption of online national ID applications in Arumeru District

The analysis was a two-stage one where SLR was performed and then MLR was done to test the intervening/mediating effect of the strategies for enhancing the transition. The regression results (Table 4.8) indicate that the regression equation is:

$$Y = 1.403 + 0.161X, p < 0.051$$

Where Y is the Online Registration and X is the Digital Literacy.

Table 4. 5: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.403	.140		10.054	.000
	Digital Literacy	.122	.062	.161	1.969	.051

a. Dependent Variable: Online Registration

The correlation was shown to be $R = 0.161$ (Table 4.9), and $p < 0.05$.

Table 4. 6: Correlations

		Online Registration	Digital Literacy
Pearson Correlation	Online Registration	1.000	.161
	Digital Literacy	.161	1.000
Sig. (1-tailed)	Online Registration	.	.025
	Digital Literacy	.025	.
N	Online Registration	148	148
	Digital Literacy	148	148

The Pearsons correlation coefficient of determination, R^2 is shown to be 0.019, and $p < 0.051$.

When the mediator was incorporated in the regression, the results are as in Table 4.10.

The regression equation was found to be

$$Y = 0.03 + 0.02X + 0.934M, p < 0.001 \text{ for the mediator.}$$

Where Y is the Online Registration, X is the Digital Literacy, and M is the Strategies for Enhancing Transition.

Table 4. 7: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.030	.066		.450	.653
	Digital Literacy	.015	.022	.020	.687	.493
	Strategies for Enhancing Transition	1.019	.032	.934	31.874	.000

a. Dependent Variable: Online Registration

The correlation was also checked and the results (Table 4.11) show that the Pearson's correlation coefficient (R) between Online Registration and Digital Literacy is 0.161 and its associated coefficient of determination, R^2 is 0.026. The change in the Pearson's correlation coefficient of determination, ΔR^2 is $0.026 - 0.019 = 0.007$.

Table 4. 8: Correlation

		Online Registration	Digital Literacy	Strategies for Enhancing Transition
Pearson Correlation	Online Registration	1.000	.161	.937
	Digital Literacy	.161	1.000	.151
	Strategies for Enhancing Transition	.937	.151	1.000
Sig. (1-tailed)	Online Registration	.	.025	.000
	Digital Literacy	.025	.	.034
	Strategies for Enhancing Transition	.000	.034	.

The findings revealed that digital literacy had a positive impact on the adoption of online national ID applications in Arumeru District ($\beta = 0.161$, $p < 0.051$). This outcome corresponds with the first research question and objective, which aimed to determine how digital literacy influences citizens' engagement in online registration. The correlation analysis ($R = 0.161$, $R^2 = 0.019$) showed a weak yet positive association, meaning that as individuals' digital skills improve, their likelihood of adopting online registration increases. When the mediating variable, strategies for enhancing transition, was introduced, the influence became stronger ($\beta = 0.934$, $p < 0.001$), implying that supportive initiatives such as training and awareness campaigns enhance adoption levels. Critically, the results indicate that insufficient digital skills are a major challenge to embracing online systems, especially in rural communities. Strengthening digital literacy empowers users to navigate registration platforms

independently, reduces reliance on intermediaries, and promotes broader inclusion in Tanzania's digital identification initiatives. These findings are consistent with existing empirical evidence showing that digital skills play a central role in technology adoption. Similar observations are reported by Rahman (2023), Singh (2023), and Mustafa & Shayo (2021), who emphasize that individuals with stronger digital competencies are more confident and willing to engage with online systems.

The findings show that digital literacy plays a positive role in encouraging citizens to adopt online national ID applications. The regression coefficient ($\beta = 0.161$) means that for every unit increase in digital literacy, adoption of online registration also rises, though the effect is modest. The Pearson's correlation ($R = 0.161$) and the coefficient of determination ($R^2 = 0.019$) indicate that about 1.9% of the variation in online registration can be explained by differences in digital literacy. While this may appear small, it is meaningful in communities like Arumeru where many lack digital skills. The results imply that even slight improvements in literacy can reduce dependency on intermediaries, lower costs, and build trust in the system. When people understand and confidently use digital tools, they are more likely to choose the online option, making digital literacy a cornerstone for successful transition.

The impact of internet access and connectivity on the adoption of online national ID applications in Arumeru District

In this case, the analysis passed through two stages where SLR was performed and then MLR was done to test the intervening/mediating effect of the strategies for enhancing the transition. The regression results (Table 4.12) indicate that the regression equation is:

$$Y = 1.275 + 0.186X, p < 0.05$$

Where Y is the Online Registration and X is the Internet Connectivity.

Table 4. 9: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.275	.176		7.255	.000
	Internet Connectivity	.160	.070	.186	2.283	.024

a. Dependent Variable: Online Registration

The correlation was shown to be $R = 0.186$ (Table 4.13), and $p < 0.05$.

Table 4. 10: Correlations

		Online Registration	Internet Connectivity
Pearson Correlation	Online Registration	1.000	.186
	Internet Connectivity	.186	1.000
Sig. (1-tailed)	Online Registration	.	.012
	Internet Connectivity	.012	.
N	Online Registration	148	148
	Internet Connectivity	148	148

The Pearsons correlation coefficient of determination, R^2 is shown to be 0.028, and $p < 0.05$.

When the mediator was incorporated in the regression, the results are as in Table 4.14.

The regression equation was found to be

$$Y = 0.057 + 1.208X + 1.022M, p < 0.001 \text{ for the mediator.}$$

Where Y is the Online Registration, X is the Internet Connectivity, and M is the Strategies for Enhancing Transition.

Table 4. 11: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.057	.074		.778	.438
	Internet Connectivity	1.208	.025	.000	.000	1.000
	Strategies for Enhancing Transition	1.022	.032	.937	31.654	.000

a. Dependent Variable: Online Registration

The correlation was also checked and the results (Table 4.15) show that the Pearson's correlation coefficient (R) for Online Registration and Internet Connectivity was 0.187 and its associated coefficient of determination, R^2 is 0.035. The change in the Pearson's correlation coefficient of determination, ΔR^2 is $0.035 - 0.028 = 0.007$.

Table 4. 12: Correlation analysis

		Online Registration	Internet Connectivity	Strategies for Enhancing Transition
Pearson Correlation	Online Registration	1.000	.186	.937
	Internet Connectivity	.186	1.000	.198
	Strategies for Enhancing Transition	.937	.198	1.000
Sig. (1-tailed)	Online Registration	.	.012	.000
	Internet Connectivity	.012	.	.008
	Strategies for Enhancing Transition	.000	.008	.

The results showed that internet access and connectivity had a significant effect on the adoption of online national ID applications in Arumeru District ($\beta = 0.186$, $p < 0.05$). This finding aligns with the second research question and objective, confirming that internet availability directly influences citizens' ability to register online. The correlation values ($R = 0.186$, $R^2 = 0.028$) revealed a moderate relationship, indicating that better connectivity increases the use of online registration systems. When the mediating variable, strategies for enhancing transition, was included, the relationship strengthened notably ($\beta = 1.022$, $p < 0.001$), demonstrating that improved infrastructure and public sensitization amplify the impact of connectivity. Critically, these findings highlight that poor and unreliable internet remains a major obstacle to digital adoption in rural settings.

Expanding affordable, stable internet access is therefore essential not only for technical inclusion but also for promoting user confidence and widespread participation in Tanzania’s digital identification initiatives.

Internet access and connectivity were found to significantly influence adoption of online registration. The regression coefficient ($\beta = 0.186$) means that for every unit increase in internet availability, online adoption rises correspondingly. The Pearson’s correlation ($R = 0.186$) and the coefficient of determination ($R^2 = 0.028$) show that about 2.8% of the changes in online registration are explained by internet access. In practical terms, respondents with stable connections were more successful in completing applications, while those with poor access faced delays or gave up entirely. This illustrates that access to affordable and reliable internet is more than a technical issue; it directly determines who is included or excluded in the system. As internet infrastructure expands, more people will be able to register digitally with ease, making connectivity a key driver of inclusivity and efficiency in Tanzania’s digital identity transformation. The findings resonate with Singh’s (2023) study in India, which shows that despite the success of the Aadhaar system, many rural citizens remain excluded due to poor internet access. Likewise, Mergenthaler *et al.* (2022) in Pakistan and Obike and Nwabueze (2022) in Nigeria illustrate how weak connectivity and unstable infrastructure slow down digital ID implementation. Similar concerns are raised by Meng’anyi (2022) in Kenya and Lwoga and Chigona (2019) and Materu (2023) in Tanzania, who emphasize that limited internet access continues to disadvantage rural communities in accessing online national ID services

The effect of cultural and habitual resistance on the adoption of online national ID applications in Arumeru District

The analysis was achieved through two stages where SLR was performed and then MLR was done to test the intervening/mediating effect of the strategies for enhancing the transition. The regression results (Table 4.16) indicate that the regression equation is:

$$Y = 1.155 + 0.238X, p < 0.05$$

Where Y is the Online Registration and X is the Cultural and Habitual Preference.

Table 4. 13: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.155	.177		6.528	.000
	Cultural and Habitual Preference	.224	.076	.238	2.961	.004

a. Dependent Variable: Online Registration

The correlation was shown to be $R = 0.238$ (Table 4.18), and $p < 0.05$.

Table 4. 14: Correlations

		Online Registration	Cultural and Habitual Preference
Pearson Correlation	Online Registration	1.000	.238
	Cultural and Habitual Preference	.238	1.000

Sig. (1-tailed)	Online Registration	.	.002
	Cultural and Habitual Preference	.002	.
N	Online Registration	148	148
	Cultural and Habitual Preference	148	148

The Pearsons correlation coefficient of determination, R^2 is shown to be 0.057, and $p < 0.001$.

When the mediator was incorporated in the regression, the results are as in Table 4.18.

The regression equation was found to be

$$Y = 0.044 + 0.008X + 0.935M, p < 0.001 \text{ for the mediator.}$$

Where Y is the Online Registration, X is the Cultural and Habitual Preference, and M is the Strategies for Enhancing Transition.

Table 4. 15: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.044	.073		.606	.545
	Cultural and Habitual Preference	.007	.028	.008	.251	.802
	Strategies for Enhancing Transition	1.020	.033	.935	31.243	.000

a. Dependent Variable: Online Registration

The correlation was also checked and the results (Table 4.19) show that the Pearson's correlation coefficient (R) for Online Registration and Cultural and Habitual Preference was 0.238 and its associated coefficient of determination, R^2 is 0.035. The change in the Pearson's correlation coefficient of determination, ΔR^2 is 0.057-0.035=0.022.

Table 4 16: Correlation analysis

		Online Registration	Cultural and Habitual Preference	Strategies for Enhancing Transition
Pearson Correlation	Online Registration	1.000	.238	.937
	Cultural and Habitual Preference	.238	1.000	.246
	Strategies for Enhancing Transition	.937	.246	1.000
Sig. (1-tailed)	Online Registration	.	.002	.000
	Cultural and Habitual Preference	.002	.	.001
	Strategies for Enhancing Transition	.000	.001	.

The results indicated that cultural and habitual resistance significantly affected the adoption of online national ID applications in Arumeru District ($\beta = 0.238$, $p < 0.05$). This finding aligns with the third research question and objective, which sought to determine how cultural and habitual factors influence online registration adoption. The correlation results ($R = 0.238$, $R^2 = 0.057$) revealed a moderate positive association, showing that reducing cultural resistance leads to greater acceptance of digital registration systems. When the mediating variable, strategies for enhancing transition, was included, the effect became much stronger ($\beta = 0.935$, $p < 0.001$), demonstrating that awareness campaigns and community involvement significantly improve adoption rates. Critically, the study suggests that many residents still prefer manual registration due to trust issues, fear of data misuse, and comfort with traditional methods. Addressing these barriers through education, transparency, and stakeholder engagement is vital for building public confidence and promoting a more inclusive and sustainable shift toward digital identity registration in Tanzania. Again, this argument is supported by Tveit (2021) and Lwoga and Chigona (2019) further confirm that mistrust, limited digital familiarity, and resistance to new technologies especially in rural areas, undermine digital transition efforts.

Cultural and habitual preferences emerged as a stronger influence on adoption compared to digital literacy or connectivity. The regression coefficient suggests that when cultural resistance is reduced by one unit, adoption of online registration improves significantly. The Pearson's correlation and the coefficient of determination ($R^2 = 0.057$) reveal that cultural and habitual factors explain about 5.7% of the changes in online registration, the highest among the three independent variables. This finding reflects the strong pull of familiar manual systems in Arumeru, where scepticism about digital processes, data security, and reliability persists. However, the positive coefficient means that as trust is built and people gradually shift habits, adoption rates rise. Awareness campaigns, community engagement, and transparent communication can therefore help overcome resistance, showing citizens the practical benefits of online systems and making digital adoption more acceptable.

Linking Results to Research Questions and Objectives

Digital Literacy on Online National ID Applications

The study's first objective sought to understand whether digital literacy influences the adoption of online national ID applications, and the findings clearly point to this connection. Respondents who possessed basic digital abilities were more confident in navigating the registration platform, while those with limited skills either struggled to complete the process or relied on intermediaries for assistance.

The statistical results support this pattern. The regression results ($\beta = 0.161$, $p \approx 0.05$) together with the correlation results ($R = 0.161$) indicate a positive relationship between digital literacy and online registration. Although the strength of the relationship is modest, it still shows that digital skills play a meaningful role in shaping how individuals engage with the system. In practical terms, even small improvements in digital literacy can make it easier for users to understand instructions, complete applications, and build confidence in using online platforms.

These findings therefore provide a clear answer to the first research question. They confirm that digital literacy influences the adoption of online national ID applications and that limited skills remain a real barrier for many individuals. Strengthening digital capacity is therefore not just supportive, but necessary for ensuring that more people can participate effectively in digital registration systems.

Internet Access and Connectivity on Online National ID Applications

The second objective of the study was to determine the role of internet access and connectivity in influencing the adoption of online national ID applications. The findings clearly show that connectivity is not simply an enabling factor, but a basic requirement for the effective use of online registration systems. Respondents who reported having stable and reliable internet access were more likely to complete their applications smoothly, without delays or interruptions. In contrast, those living in areas with weak network coverage or high internet costs often experienced difficulties, which discouraged them from using the online system and pushed them back toward manual registration.

The statistical results reinforce this pattern. The regression analysis ($\beta = 0.186$, $p < 0.05$) confirms that internet connectivity has a significant influence on adoption, while the correlation results ($R = 0.186$) indicate a positive relationship between access to internet services and the likelihood of using online registration. Although the strength of this relationship is moderate, it remains practically important, especially in rural settings where connectivity challenges are common.

These findings directly answer the second research question by demonstrating that access to reliable and affordable internet plays a decisive role in determining whether individuals can participate in digital registration processes. Without consistent connectivity, even individuals who are willing and capable of using digital systems may be excluded. The findings suggest that improving internet infrastructure is essential for the success of digital registration initiatives. Expanding network coverage, reducing the cost of internet services, and ensuring stable connections in underserved areas would make it easier for more people to engage with online platforms. In this way, connectivity remains a key factor in promoting inclusion and ensuring that the benefits of digital transformation reach a wider population.

Resistance to Change Due to Cultural and Habitual Preferences

The third objective of the study examined how cultural and habitual preferences influence the adoption of online national ID applications. The findings show that these factors play a powerful role in shaping how people respond to the shift from manual to digital systems. In fact, their influence appears stronger than that of digital literacy or internet access alone, pointing to the deeply rooted nature of behavior and perception within the community.

Many respondents expressed a clear preference for manual registration methods. This preference is closely tied to familiarity. For years, people have relied on face-to-face processes where they can interact directly with officials, ask questions, and receive immediate clarification. In comparison, the online system is often seen as distant and uncertain. Some respondents indicated that they fear making mistakes during the application process, especially when required to fill forms without guidance. Others raised concerns about the safety of their personal information, reflecting a broader scepticism toward digital systems.

The statistical results reinforce these observations. The results ($\beta = 0.238$, $p < 0.05$) show that cultural and habitual factors have the strongest influence on adoption among the variables examined. This suggests that people's attitudes, beliefs, and past experiences play a decisive role in shaping whether they accept or resist digital registration.

These findings therefore confirm the third research question and demonstrate that resistance to change is a critical barrier in the transition process. They highlight that digital transformation is not only about introducing new technologies, but also about addressing people's concerns, building trust, and gradually shifting long-standing habits. Without this social and behavioral adjustment, adoption is likely to remain limited even where infrastructure and digital skills are available. Addressing this challenge, continuous community engagement, clear communication, and reassurance about system reliability and data security are essential in helping people feel more comfortable with the transition.

Enhancing the Transition from Manual to Online Registration (Mediating Role)

The fourth objective of the study examined how strategies for enhancing the transition influence the relationship between the key variables and the adoption of online national ID applications. The findings show that these strategies play a central role in shaping adoption outcomes. Measures such as public sensitization, user support, community awareness campaigns, and targeted digital training were found to significantly strengthen the connection between digital literacy, internet access, cultural readiness, and actual use of the online system.

The statistical results highlight the strength of this effect. The mediating variable recorded a very strong influence ($\beta = 0.935$, $p < 0.001$), indicating that transition strategies have the highest predictive power among all variables considered in the study. This suggests that even when individuals face challenges such as limited digital skills or unreliable internet access, they are still more likely to adopt online registration if appropriate support mechanisms are in place.

This finding provides a clear answer to the fourth research question. It demonstrates that the success of digital registration does not depend solely on infrastructure or individual capacity, but also on how well the transition is managed and supported. When users are guided, informed, and assisted throughout the process, the system becomes more approachable and easier to use. In practical terms, this means that strategies aimed at easing the transition can bridge gaps that would otherwise prevent adoption. Training programs can improve confidence, awareness campaigns can address misconceptions, and user support can reduce frustration during the registration process. Together, these efforts create an environment where individuals feel more comfortable engaging with digital systems. Generally, the findings show that a coordinated approach is necessary for successful digital transformation.

Critical Analysis

A deeper reflection on the results shows that the patterns observed in the study emerged from a blend of technological, social, and infrastructural realities characteristic of Arumeru District. Digital literacy showed a positive yet relatively modest effect because many residents still rely on intermediaries to complete online registration, masking the true influence of their personal skills. An important and somewhat unexpected finding is that, despite the recognized importance of digital literacy, its direct effect on adoption remained relatively weak, suggesting that skills alone are not sufficient without practical support systems. The limited impact of internet access is also understandable, as network reliability varies widely across the district; where connectivity is unstable, even well-intentioned users find it practical to continue with manual registration.

Cultural and habitual resistance surfaced as a stronger predictor because identity registration involves personal information, and many respondents naturally gravitated toward familiar manual processes that feel more tangible and trustworthy. Similar patterns have been reported in Kenya, India, and Nigeria, where skepticism about digital systems and concerns about data privacy slowed adoption. These findings are consistent with studies such as Singh (2023) and Meng'anyi (2022), which highlight the role of trust and perceived risk in shaping technology adoption. These findings therefore align with global evidence that familiarity, trust, and perceptions of risk strongly influence people's openness to new technologies.

The mediating role of transition strategies turned out to be exceptionally strong, suggesting that user attitudes, skills, and resources can be significantly improved when proper support is in place. Awareness programs, hands-on assistance, and clear communication helped bridge the gap between citizens and the new digital system. This confirms the Technology Acceptance Model's emphasis on perceived usefulness and perceived ease of use both of which are shaped by how well users are supported during system implementation. From a practical and policy perspective, this implies that institutions such as NIDA should prioritize user-centered interventions, including continuous training, community outreach, and accessible support systems, rather than focusing solely on technological expansion.

Despite the valuable insights, the study faced limitations. Because data were collected from only one district, the results may not represent the experiences of communities in other regions with different socioeconomic or infrastructural conditions. Self-reported responses may introduce bias, as some participants might have overstated their digital competence or underestimated challenges. The cross-sectional research design also restricts the ability to observe changes in attitudes and behaviors over time. External factors such as temporary internet outages, device availability, or misunderstandings of questionnaire items may also have influenced the responses.

Nevertheless, the findings provide strong evidence that digital transformation is most successful when technical readiness, user capacity, and supportive environments evolve together. The study underscores the need for coordinated interventions that address not only infrastructure and skills but also the emotional and cultural dimensions of digital adoption. Theoretically, this reinforces the view that technology adoption is not determined by technical factors alone, but by the interaction between system design, user perception, and the broader support environment in which the technology is introduced.

CONCLUSION

This study set out to explore the challenges and opportunities of moving from manual to online national ID registration in Arumeru District. The findings point to several clear lessons. To begin with, digital literacy proved to be a vital factor. People with even basic knowledge of using digital tools were able to complete online applications with confidence, while those lacking such skills often relied on intermediaries, which caused delays and additional costs.

Access to reliable and affordable internet *also* played a central role. In areas where internet services were strong, citizens were more willing to register online. On the other hand, poor connectivity discouraged participation and pushed people back to manual registration. Cultural and habitual preferences further shaped choices. Many participants trusted the manual process simply because it was familiar. However, as awareness and trust in digital systems improved, adoption rates also increased.

Most importantly, strategies designed to support the transition stood out as the strongest driver. Initiatives such as training programs, improved infrastructure, and awareness campaigns each had a positive impact, but their combined effect was most powerful. This shows that successful digital transformation requires not only technology but also social investment.

In conclusion, while literacy, internet access, and cultural attitudes all matter, the transition to online registration will only succeed when these factors are addressed together through well-planned enhancement strategies.

RECOMMENDATION

To ensure a smooth and effective shift from manual to online national ID registration in Arumeru District, this study recommends taking a holistic and people-centered approach. Strengthening digital literacy should be a priority, especially for those with limited education, by offering hands-on training and community workshops that make online registration approachable and less intimidating. This recommendation reflects the views of Mustafa and Shayo (2021b) and Lwoga and Chigona (2019) in Tanzania, who argue that digital literacy succeed when citizens are equipped with the skills and confidence to use new technologies. At the same time, improving internet access and affordability, particularly in rural areas, is essential so that no one is left out due to poor connectivity. Again, this recommendation is supported by Singh (2023b) and Neira *et al.* (2024b) in India and Rahman (2023b) in Bangladesh, who show that infrastructure expansion significantly enhances digital identity adoption. Equally important is addressing cultural and habitual resistance: awareness campaigns, open communication, and community engagement can help build trust in digital systems and show the real benefits of online registration. This approach aligns with Musoni *et al.* (2023) in Kenya and Eke *et al.* (2022b) in Nigeria, who emphasize that transparency and stakeholder participation are essential in reducing resistance to digital ID systems. When these efforts digital skills, reliable internet, and trust-building are combined, their impact is far greater, making it easier for citizens to embrace the new system. Policymakers, the National Identification Authority, and community leaders should collaborate closely to implement these strategies in a way that is inclusive, practical, and sustainable. By investing both in technology and in people, Arumeru can achieve a smoother transition, increase online registration, and foster broader digital inclusion.

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