African Journal of Social Issues 7 (1): 2024
Available online at https://Ajosdemar.com;
https://www.ajol.info/index.php/ajosi

DOI: https://dx.doi.org/10.4314/ajosi.v7i1.25

p-ISSN 2672 – 5142; e-ISSN 2734 – 3324

Original Research

ANALYZING THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) ON GOOD GOVERNANCE IN TANZANIA.

CORETHA Komba
Department of Social Science and Humanities, Mzumbe University- Dar es Salaam Campus College, Tanzania

Email: ckomba@mzumbe.ac.tz

ABSTRACT
This study evaluates the impact of Information and Communication Technology (ICT) on good governance in Tanzania, amidst challenges such as limited technology access, low digital literacy, and regulatory constraints. Employing a survey research design with a descriptive approach, the research engaged 384 public officials selected via stratified sampling. Data collection was executed through questionnaires, and analysis encompassed descriptive statistics, a probit model for determining ICT adoption determinants, and an ordinary least squares (OLS) model to assess the effects of ICT adoption on governance. The results underscore the critical role of ICT, especially mobile communication services and internet usage, in enhancing governance. The probit model findings reveal that factors like age, working experience, and regulatory environment significantly influence ICT adoption, suggesting that both personal and contextual attributes drive technology uptake. Meanwhile, the OLS model indicates that increased ICT adoption correlates strongly with improved public service accessibility, greater transparency, and enhanced citizen participation in governance. However, responses vary concerning ICT's role in promoting accountability and effective decision-making, highlighting areas with mixed perceptions and suggesting the need for nuanced approaches to leverage technology fully. These insights underscore the necessity for comprehensive strategies and informed actions, stakeholders can effectively utilize ICT to improve transparency, enhance citizen engagement, and boost overall governance effectiveness.

Keywords: Information and Communication Technology, good governance

INTRODUCTION
Over the past three decades, the concept of "good governance" has gained significant prominence in global development discourse. Academics, such as Huan & Ho (2017), have explored the intrinsic link between effective governance and economic prosperity. A prevailing view posits that the constrained economic development observed across Africa is deeply intertwined with governance deficiencies. This perspective has led to international pressure on African nations to

adopt and institutionalise principles of good governance. Development assistance from donor organisations, as highlighted by Kyriacou (2016), often comes with strings attached, requiring adherence to governance standards that underscore transparency, accountability, participation, and corruption reduction.

In recent years, the potential of Information and Communication Technology (ICT) to bolster governance has become increasingly recognised, particularly in Africa, where governance quality remains a critical concern (Kanevskaia, 2019; Kitole & Genda, 2024). Despite considerable investments in ICT infrastructure across the continent (Njoh, 2018), the bulk of research focusing on the impact of ICT has traditionally centred on economic outcomes within Western contexts (Wyche & Olson, 2018; Palvia, Baqir, & Nemati, 2018; Kitole & Sesabo, 2022; 2024). This Western-centric research paradigm has left a noticeable gap in understanding the specific impacts of ICT on governance within the African context, thereby limiting effective policy development and the inclusion of African perspectives in global discourse (Lin, 2018).

The scholarly narrative acknowledges multiple dimensions of governance including accountability, transparency, rule of law, and public participation (Zuber, Blickenstorfer, & Groth, 2017). Among these, corruption is particularly salient, acting as a significant barrier to the establishment of effective governance structures (Gisselquist, 2012). Africa's struggle with corruption is well-documented, with the continent scoring an average of thirty-three percent on the Corruption Perception Index, where a higher score indicates lower levels of corruption. This contrasts sharply with Europe’s average of sixty-six percent and the global average of forty-three percent (Macchia, 2016). Such statistics underscore the pervasive challenge of corruption in Africa relative to other regions globally.

The lack of transparency prevalent in many African governments fosters an environment conducive to corruption (Ejiogu, Ejiogu, & Ambituuni, 2019). The resultant information asymmetry prevents citizens from effectively monitoring and holding public officials accountable, which is crucial for combating corruption. Empirical evidence consistently shows that transparency correlates strongly with reduced corruption levels; governments that operate transparently tend to exhibit lower corruption rates compared to those with opaque practices (Cicatiello, DeSimone, & Gaeta, 2018).

In Tanzania, like many other regions globally, the adoption of ICT presents a transformative opportunity to enhance governance practices and foster socio-economic development (Rwigema, 2020). However, despite recognizing the critical role of ICT in promoting good governance, numerous challenges hinder its effective utilisation in the country (Mwantimwa, 2019; Kitole & Utouh, 2023). Although there has been significant progress in developing ICT infrastructure and increasing internet penetration rates, translating these advancements into measurable improvements in governance remains an elusive goal (Poncian, 2020; Kitole, Tibamanya, & Sesabo, 2024).

The disparity in internet connectivity between urban and rural areas exacerbates access issues, further marginalizing vulnerable populations and creating uneven opportunities for engaging with government services. Thus, there is an urgent need for a comprehensive analysis of

ICT's impact on governance in Tanzania. Such analysis is vital for informing evidence-based policy interventions that address the existing systemic challenges. By understanding the specific dynamics within the Tanzanian context, policymakers can devise targeted strategies to harness the full potential of ICT to enhance transparency, citizen participation, and service delivery. Moreover, insights from other East African nations grappling with similar issues could provide valuable lessons and best practices, contributing to enhanced governance outcomes across the region.

THEORETICAL FRAMEWORK

The Technology Acceptance Model (TAM), developed by Fred Davis in 1989, serves as the theoretical basis for this study on the impact of Information and Communication Technology (ICT) on good governance in Tanzania. TAM suggests that the likelihood of technology adoption and usage is influenced by two key perceptions: the ease of use and the usefulness of the technology.

In the Tanzanian governance context, TAM helps us understand that for ICT initiatives aimed at enhancing governance to be successful, stakeholders (including government officials and the public) must perceive these technologies as both easy to use and beneficial. For instance, if electronic government systems are user-friendly, citizens are more likely to utilize them for services like filing taxes or registering property, which enhances transparency and reduces opportunities for corruption. However, TAM primarily focuses on individual perceptions, potentially overlooking broader influences such as organizational, cultural, and political factors that play significant roles in governance. For example, even if a technology is perceived as useful, organizational resistance or lack of digital literacy can hinder its adoption.

Practical Examples in Tanzania can be considered for certain component for example in Citizen Engagement: If citizens find online platforms for public feedback on legislative changes easy to use and informative, their participation in governance processes is likely to increase. On the other hand, Government Efficiency: when Government officials might more readily adopt digital record-keeping systems if they perceive these systems as improving efficiency and accountability in administration. Generally, while TAM provides a valuable framework for evaluating the potential success of ICT in governance, acknowledging its limitations and integrating a broader array of factors are crucial for a comprehensive analysis in the Tanzanian governance context.

METHODOLOGY

Research Design

This study adopted a survey research design to explore and characterize specific phenomena by gathering information directly from participants. Surveys are particularly effective in obtaining a snapshot of current attitudes, perceptions, and conditions across a broad participant base. According to Kothari (2019), surveys are indispensable tools for researchers aiming to delve into various dimensions of a phenomenon. Furthermore, Kitole et al. (2023), highlight the utility of surveys in assessing the prevailing states and traits of a population.

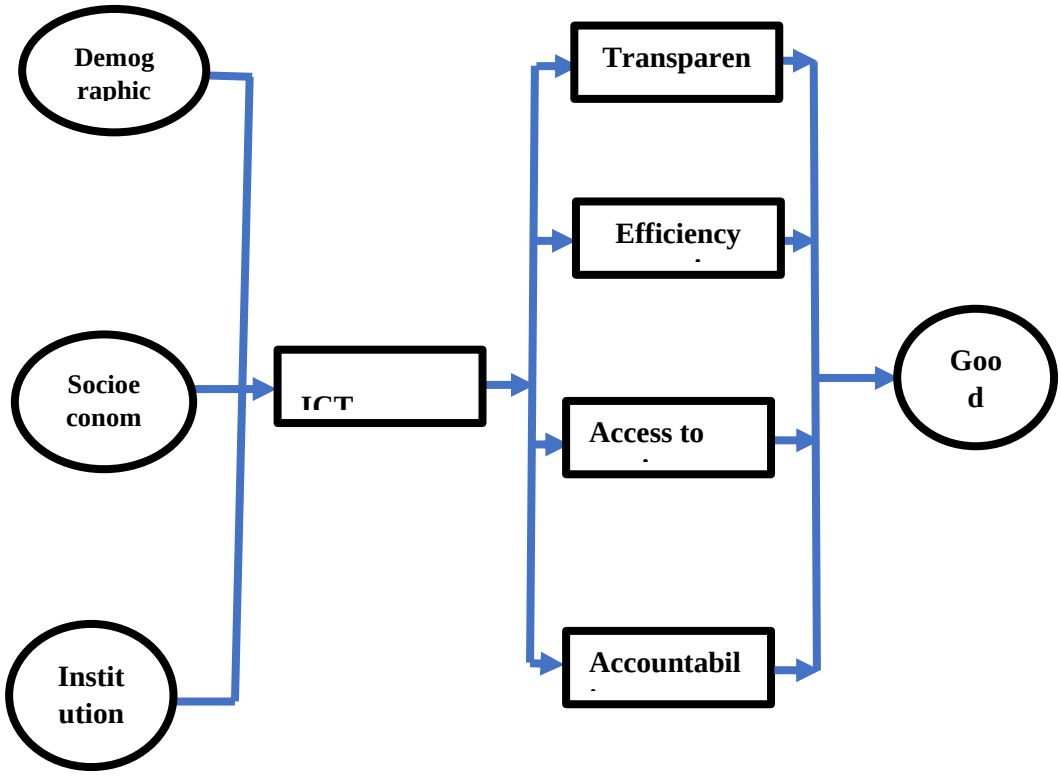
Data Sources, Sample, and Sampling Technique

Table 1: Sample size for each administration population

Administrations	Population	Sample size
Government of Tanzania (Parliament of Tanzania)	393	100
Tanzania Revenue Authority (TRA)	200	50
Tanzania Electric Supply Company Limited	300	30
Tanzania Ports Authority (TPA)	150	20
National Health Insurance Fund (NHIF)	100	40
Tanzania Communications Regulatory Authority (TCRA)	50	25
Tanzania Investment Bank (TIB)	80	15
Tanzania National Parks (TANAPA)	200	24
Bank of Tanzania (BOT)	100	35
Tanzania Postal Bank (TPB)	70	25
Total	1743	384

The selected sample size in Table 1 was obtained using stratified sampling technique where a researcher listed down the above administrations as separate strata based on their organizational structures and functions. The total sample size of 384 respondents was divided among the different strata based on their proportional representation within the population. This was determined based on factors such as the size of each administration and its significance in the context of the study. Within each stratum, respondents were randomly selected to participate in the study using techniques such as simple random sampling or systematic sampling. This ensured that each member of the population within the stratum had an equal chance of being selected.

Figure 1: Conceptual framework



Analytical modelling

This study utilized descriptive analysis to provide a comprehensive overview of the current state of ICT implementation in governance in Tanzania. Descriptive analysis involves summarizing and presenting data in a meaningful way to describe the characteristics of the sample and the variables of interest. Moreover, the probit model have been used to estimate determinant for the adoption of the ICT in various government institutions to facilitate an increase governance.

Therefore, for Probit model, the study considered an equation which describes the ICT adoption is therefore given such that;

$$y_i^* = \beta w' + \mu_i \quad where\ \mu_i \sim (0, \delta^2) \ldots\ldots\ldots (1)$$

y_i^* is the dependent variable which assume unobservable status, β represents the independent variable, w' represents the coefficient of the independent variable and μ_i is the error term with standard normal distribution. Basing on this function, the probit model is delivered to analyse determinants or factors affecting ICT adoption among government officials in Tanzania. Since y_i^* is unobservable, what we observe is $y_i$which takes only two values as described in equation 2

When $y_i^* > 0, y_i = 1\ if\ ICT\ adopted$ $\ldots\ldots\ldots (2)$
When $y_i^* \leq 0, y_i = 0\ if\ ICT\ not\ adopted$

Because the probability that the government officials adopt ICT is greater than zero $(y^* > 0)$

$$prob(y = 1) = prob(y_i^* > 0) \ldots\ldots\ldots (3)$$

Or less than or equal to zero $(y^* \leq 0)$

$$prob(y = 0) = prob(y_i^* \leq 0) \ldots\ldots\ldots (4)$$

The likelihood of ICT adoption is herein presented by unobservable factors through the dependent variable as follows:

$$Government\ official\ adoption\ of\ ICT = \begin{matrix} 1\ if\ ICT\ adopted^* > 0 \\ 0\ ifICT\ not\ adopted^* < 0 \end{matrix} \ldots\ldots\ldots (5)$$

If $y_i^* = 0$ then $y = 1$ implying that ICT is adopted. Therefore, the probability that ICT is adopted is based on the assumption that the probability density function of e_i assumed being$f(\mu_i)$ which results in the creation of new parameter

$$Prob(y_i = 1|x|) = \int_{-\propto}^{x'\beta} f(\mu_i)du = F(x_i'\beta) \ldots\ldots\ldots (6)$$

$$Prob(y_i = 1|x|) = 2\pi^{-\frac{1}{2}} \exp\left((-\beta x_i)^{\frac{2}{2}}\right) \ldots\ldots\ldots (7)$$

Now, based on the variables used in this study the Probit model is therefore presented as;

$$Y_i = \beta_0 + \beta_1 X_i + \beta_2 D_i + \mu_i \ldots\ldots\ldots (8)$$

Whereas the β_0 is the constant term while β_1 and β_2 are the parameters that will be estimated in the probit equation. On the other hand, X_i are the covariates while D_i represents group of all dummy variables used in this study. Now, since the Probit model is well addressed under the marginal effects which help to explain the extent of effects of ICT adoption, then equation 8 is therefore transformed in order to get the marginal of variations in the repressors as shown at equation 9:

$$\frac{dy}{dx_i} = \beta_i \emptyset(\beta_1 + \beta_n) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.. (9)$$

RESULTS

Descriptive statistics

The demographic characteristics reported in Table 2 provide a detailed breakdown of the age groups and years of working experience of the participants involved in the study. This information is crucial for understanding the distribution of the sample population and assessing the representativeness and reliability of the findings. The results show a diverse age range among the 384 participants. The majority of participants fall within the 31-40 age group, representing 31.25% of the total sample. This is followed closely by the 41-50 age group, which comprises 26.04% of the participants. Both the 20-30 and 51-60 age groups each make up 18.23% of the sample, indicating a significant representation of younger and older adults. The smallest group is those aged 61 and above, accounting for only 6.25% of the participants. This distribution suggests that the study predominantly involved middle-aged adults, with fewer participants in the youngest and oldest age brackets.

Regarding working experience, the distribution also highlights a range of employment durations among the participants. Those with 5-10 years of experience form the largest segment, constituting 31.25% of the sample. This is indicative of a relatively experienced workforce, yet still within what could be considered early to mid-career stages. The next largest group includes individuals with 11-15 years of experience, accounting for 23.44%, followed by those with less than 5 years (20.83%), which suggests a good mix of newer and moderately experienced professionals. Participants with 16-20 years of experience make up 15.63%, while those with more than 20 years are the least represented at 8.85%.

Table 2: Demographic characteristics

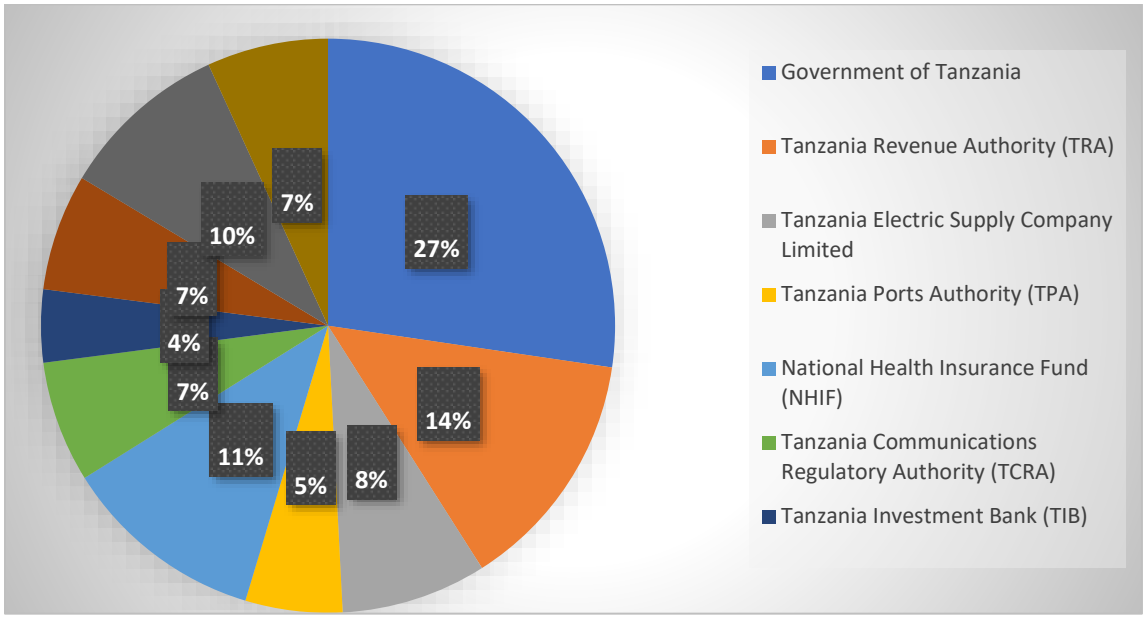
Age Group		**Number of Participants**	**Percentage**
20-30		70	18.23%
31-40		120	31.25%
41-50		100	26.04%
51-60		70	18.23%
61 and above		24	6.25%
Total		**384**	**100%**
Years of working experience	Less than 5 years	80	20.83%
	5-10 years	120	31.25%
	11-15 years	90	23.44%
	16-20 years	60	15.63%
	More than 20 years	34	8.85%
Total		**384**	**100%**

Moreover, Figure 2 provides a detailed visualization of ICT usage across various public institutions in Tanzania, depicted through the distribution of respondents in a government-led study. The pie chart indicates that the Tanzania Revenue Authority (TRA) leads with the highest usage of ICT, representing 27% of the respondents. This substantial percentage suggests that the TRA is heavily reliant on or actively integrates ICT in its operations, likely due to the nature of its functions which require efficient and secure processing of financial and tax-related data.

Following the TRA, the Tanzania Communications Regulatory Authority (TCRA) accounts for 14% of the ICT usage among the surveyed institutions. This indicates that a significant portion of ICT usage within public agencies pertains to communication regulation and oversight, highlighting the TCRA's role in managing and ensuring the reliability of ICT frameworks within public sectors.

The high percentages associated with both the TRA and TCRA suggest that these institutions not only prioritize ICT usage but also serve as benchmarks for technology integration within the Tanzanian public sector. The emphasis on ICT in these entities likely reflects their critical functions in governance and regulatory enforcement, necessitating advanced technological adoption to enhance operational efficiency and service delivery. Overall, the distribution of ICT usage as reflected in the percentages from Figure 2 underscores the varying degrees of technology integration across Tanzanian public institutions, with the TRA and TCRA playing leading roles in the adoption and application of ICT solutions.

Figure 2: ICT usage across public institutions in Tanzania.



Impact of Information and Communication Technologies on good governance

The findings from Table 3 indicates a positive perception of mobile communication services' impact on governance. Notably, a significant majority of respondents recognize these services as beneficial for enhancing government transparency and citizen participation. Specifically, over

60% agree or strongly agree that mobile services improve transparency, with an average rating of 4.1. Additionally, nearly 80% of respondents acknowledge their role in boosting citizen participation, reflected in a mean score of 4.25.

The results also show strong support for the role of mobile communication in improving access to government services and operational efficiency, with agreement levels exceeding 60% and mean scores of 4.15 and 4.2, respectively. These findings emphasize the effectiveness of mobile technologies in making governmental processes more efficient and accessible. However, opinions vary more on issues related to accountability and decision-making. About 50% of respondents believe mobile services enhance government accountability, with a mean score of 4.05. Meanwhile, 60% feel these services contribute to better decision-making, evidenced by a mean score of 4.1.

Table 4: The Impact of mobile communication services on good governance

Statement	SD	D	N	A	SA	Mean	Std Dev
Improve government transparency.	12	30	60	150	132	4.1	0.75
Enhance citizen participation in governance processes.	8	20	40	160	156	4.25	0.8
Facilitate better access to government services and information.	10	25	45	140	164	4.15	0.78
Increase accountability among government officials.	15	35	55	130	149	4.05	0.72
Improve the efficiency of government operations.	9	22	48	155	150	4.2	0.77
Contribute to better decision-making processes in government.	11	28	52	145	148	4.1	0.7

Key: SD- Strongly Disagree, D-Disagree, N-Neutral, Agree, SA-Strongly agree

The results in Table 5 provide insights into respondents' perceptions regarding the impact of the main telephone line—primarily the internet—on good governance across various dimensions. The data indicates a strong consensus that the internet significantly enhances transparency in government activities, evidenced by a mean score of 3.73. This reflects a widespread belief that online platforms are crucial in promoting transparency within governmental processes, thereby fostering greater trust and accountability.

Furthermore, there is a robust agreement on the role of internet access in enhancing citizens' participation in governance, as shown by a mean score of 3.85. This suggests that respondents view internet connectivity as essential for increasing citizen engagement and involvement in decision-making processes, potentially leading to more inclusive and representative governance structures.

Additionally, while general agreement exists on the internet's role in improving the accessibility of government services, demonstrated by a mean score of 3.91, opinions are more

divided regarding its effectiveness in facilitating government accountability. The mean score for accountability stands at 3.65 with a relatively high standard deviation of 0.96, highlighting varied perceptions and the complexity surrounding the effectiveness of online tools in promoting accountability within governmental institutions. This variation suggests areas that might benefit from further exploration and analysis.

Table 5: Impact of main telephone line on good governance

Statement	SD	D	N	A	SA	Mean	Standard Deviation
Enhance transparency in government activities.	24	36	72	144	108	3.73	0.92
Improves citizens' participation in governance processes.	16	32	64	160	112	3.85	0.88
Government services are more accessible through the internet.	20	28	60	156	120	3.91	0.86
Online platforms facilitate accountability of government officials.	28	40	68	148	100	3.65	0.96
The internet helps in combating corruption within government institutions.	32	24	56	152	120	3.88	0.85
Internet usage contributes to the efficiency of government services.	18	30	62	164	110	3.84	0.87

Key: SD- Strongly Disagree, D-Disagree, N-Neutral, Agree, SA-Strongly agree

Table 6 provides a comprehensive view of the perceived impact of internet usage on various aspects of good governance through the lens of respondents' experiences with the main telephone line. The result indicates a relatively positive perception of the main telephone line in enhancing communication between citizens, with a mean score of 3.79 and a standard deviation of 1.15. Despite some disagreement, a majority of respondents (262 out of 384) either agree or strongly agree that the telephone line facilitates better communication, underscoring its role in connecting citizens more effectively.

The results are notably positive regarding the telephone line's role in facilitating access to government services, with a mean score of 4.02 and a standard deviation of 1.08. This reflects a strong consensus among respondents that the internet, through the main telephone line, significantly enhances the public's ability to access government services, potentially streamlining interactions and improving service delivery.

Opinions on whether the main telephone line improves transparency in governance are more mixed, as indicated by a mean score of 3.75 and a higher standard deviation of 1.2. Although a substantial number of respondents (256 out of 384) agree or strongly agree that transparency is enhanced, the higher variance suggests divergent views on this aspect, highlighting areas where improvements could be made. Moreover, there is a generally positive view on the main telephone line's impact on increasing accountability among officials, with a mean score of 3.94. The results suggest that many respondents believe the internet can be a tool for fostering greater accountability

in governance, though, like transparency, opinions vary somewhat as reflected by the standard deviation of 1.1.

Additionally, the role of the main telephone line in enhancing citizen participation also receives positive feedback, with a mean score of 3.85. Most respondents feel that the internet helps engage more citizens in the governance process, which is crucial for a more inclusive and participatory governance structure. Also, the results show that highest mean score, at 4.1, relates to the telephone line's contribution to the rule of law, with a relatively low standard deviation of 1.06. This suggests a strong agreement among respondents that the internet plays a significant role in upholding and reinforcing legal standards within governance frameworks.

Table 6: Impact of internet usage on good governance

Statement	SD	D	N	A	SA	Mean	Std Deviation
The main telephone line enhances communication between citizens	14	36	72	172	90	3.79	1.15
The main telephone line facilitates access to government services	10	24	60	164	126	4.02	1.08
The main telephone line improves transparency in governance	20	40	68	160	96	3.75	1.2
The main telephone line increases accountability among officials	16	32	56	152	128	3.94	1.1
The main telephone line enhances citizen participation	18	28	64	168	106	3.85	1.16
The main telephone line contributes to the rule of law	12	20	52	156	144	4.1	1.06

Key: SD- Strongly Disagree, D-Disagree, N-Neutral, Agree, SA-Strongly agree

Determinants for ICT Adoption among Public Institutions in Tanzania

Table 7 presents the results from a probit model analyzing the determinants of ICT adoption, highlighting the importance of various factors in influencing this process. Each variable is assessed for its impact, with robust standard errors provided in parentheses and significance levels indicated.

Age shows a positive association with ICT adoption, with an estimate of 0.103 and highly significant at the $p<0.01$ level (standard error = 0.0142). This suggests that older individuals might be more inclined to adopt ICT than previously thought, possibly due to increasing familiarity and necessity. Working Experience is another strong positive influencer, with an estimate of 0.244, significant at the $p<0.01$ level (standard error = 0.0134). This indicates that individuals with more working experience are likely to adopt ICT, perhaps due to greater exposure to technology in professional settings.

Table 7: Probit model on the determinant of ICT adoption

Variables	Estimates
Age	0.103***
	(0.0142)
Working Experience	0.244***
	(0.0134)
Years of schooling	0.274***
	(0.0105)
Technology costs	0.808***
	(0.00771)
Government policy	0.508***
	(0.0077)
Perceived usefulness	-0.299***
	(0.021)
Compatibility	0.368***
	(0.00978)
Easy to use	0.0931
	(0.0134)
Technical support	0.527***
	(0.00742)
Regulatory environment	0.921***
	(0.0216)
Observations	384
R-squared	0.316

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Years of Schooling also positively impacts ICT adoption, with a coefficient of 0.274 and a significance at the $p<0.01$ level (standard error = 0.0105). Higher educational attainment seems to correlate with a greater likelihood of adopting new technologies, likely due to enhanced skills and understanding of technology. Additionally, Technology Costs surprisingly show a large positive effect on adoption, with an estimate of 0.808 and significant at the $p<0.01$ level (standard error = 0.00771). This might imply that higher costs are not a deterrent but could be associated with higher-quality or more valued technology that people are willing to invest in.

Moreover, Government Policy has a substantial influence, with a coefficient of 0.508 (standard error = 0.0077), indicating that supportive government policies can significantly encourage ICT adoption. Also, Perceived Usefulness is notably the only variable with a negative coefficient, -0.299, significant at $p<0.01$ (standard error = 0.021). This counterintuitive finding suggests that higher perceptions of usefulness might actually be associated with lower adoption rates, perhaps indicating a saturation point where perceived benefits do not translate into practical usage.

Nonetheless, Compatibility shows a positive coefficient of 0.368, significant at $p<0.01$ (standard error = 0.00978), reflecting that technologies compatible with existing systems are more likely to be adopted. Also, Ease of Use has a positive but smaller influence on ICT adoption, with an estimate of 0.0931, not reaching the standard levels of significance (standard error = 0.0134). This indicates that while important, ease of use might not be as critical a determinant as other factors.

Technical Support is another strong determinant with a coefficient of 0.527, significant at $p<0.01$ (standard error = 0.00742), underscoring the importance of available support for users in adopting technology. While Regulatory Environment shows the strongest positive impact with a coefficient of 0.921, significant at $p<0.01$ (standard error = 0.0216). This suggests that a favourable regulatory environment is crucial for encouraging ICT adoption. Overall, the model explains about 31.6% of the variance in ICT adoption among the individuals observed (n=384), indicating a moderate fit. The significance of most variables at the $p<0.01$ level suggests robust findings across a range of determinants, from personal attributes to policy and support mechanisms, shaping ICT adoption trends.

Effects of ICT adoption on governance

Table 7 presents the Ordinary Least Squares (OLS) estimates analyzing the effects of Information and Communication Technology (ICT) adoption on governance, specifically measuring the increase in the number of people attending public institutions. The model's R-squared value of 0.676 indicates that approximately 67.6% of the variance in the dependent variable is explained by the predictors included in the model, suggesting a strong explanatory power.

The results show that ICT adoption has a significant positive effect on the attendance at public institutions, with an estimated coefficient of 0.492 ($p<0.01$, standard error = 0.001). This implies that higher levels of ICT adoption in public institutions are strongly associated with an increased public engagement in these institutions, likely due to improved service delivery and accessibility enabled by ICT.

Moreover, working experience of staff within these institutions also positively impacts attendance, with an estimated effect of 0.095 ($p<0.01$, standard error = 0.001). This suggests that more experienced personnel could enhance the efficiency and attractiveness of public services. Similarly, the educational background of the staff plays a significant role, with an estimated coefficient of 0.174 ($p<0.01$, standard error = 0.010). Higher education levels among public institution staff are indicative of better service provision, which can attract more visitors.

In contrast, technology costs have a negative impact on attendance, with an estimated coefficient of -0.104 ($p<0.01$, standard error = 0.001). This suggests that higher costs associated with technology might deter public institutions from fully implementing or utilizing ICT, thereby affecting public attendance. Additionally, supportive government policies significantly boost attendance, evidenced by a coefficient of 0.257 ($p<0.01$, standard error = 0.001). This underscores the importance of policy frameworks that encourage or mandate ICT use in public governance.

Table 7: OLS estimates on effects of ICT adoption on governance (increased number of people attended in public institutions)

Variables	Output
ICT Adoption	0.492***
	(0.001)
Working Experience	0.095***
	(0.001)
Years of schooling	0.174***
	(0.010)
Technology costs	-0.104***
	(0.001)
Government policy	0.257***
	(0.001)
Perceived usefulness	0.194***
	(0.000)
Compatibility	0.167***
	(0.002)
Easy to use	0.0931*
	(0.013)
Technical support	0.266***
	(0.007)
Regulatory environment	0.481***
	(0.006)
Observations	384
R-squared	0.676

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Moreover, the perceived usefulness of ICT solutions has a substantial positive effect, with a coefficient of 0.194 ($p<0.01$, standard error = 0.000). When ICT tools are seen as beneficial, they are more likely to be embraced by both the staff and the public, enhancing service delivery and participation. Also, Compatibility, Ease of Use, and Technical Support: These variables also show positive effects. Compatibility of ICT with existing systems has an estimated impact of 0.167 ($p<0.01$, standard error = 0.002), ease of use has a smaller but significant effect of 0.0931 ($p<0.1$, standard error = 0.013), and technical support displays a coefficient of 0.266 ($p<0.01$, standard error = 0.007). Each of these factors contributes to more effective and user-friendly ICT environments, which can facilitate greater public attendance.

Finally, a conducive regulatory environment has one of the strongest positive effects, with a coefficient of 0.481 ($p<0.01$, standard error = 0.006). This indicates that regulations that support or enhance ICT usage in public governance can significantly increase public engagement and trust in these institutions. Overall, these results highlight the multifaceted impact of ICT on improving

governance by increasing public attendance at institutions. The significant coefficients across multiple variables suggest that a holistic approach involving technology adoption, supportive policies, and staff training is critical for maximizing the benefits of ICT in public governance.

Discussion

The analysis of the determinants of ICT adoption and its effects on governance provides a multifaceted understanding of the role of technology in public institutions. Leveraging the Technology Acceptance Model (TAM), which emphasizes the importance of perceived usefulness and ease of use, the findings from both tables demonstrate how these factors significantly influence the decision-making process regarding technology adoption (Wang et al. 2019; Macintosh & Whyte, 2019). The positive coefficients associated with perceived usefulness, compatibility, and ease of use underscore the necessity for technology solutions to be user-friendly and aligned with existing systems to ensure higher adoption rates.

Further examination reveals that age and working experience are also critical in influencing ICT adoption, suggesting that both younger and older individuals within public institutions see value in adopting technology, potentially due to the increasing recognition of its benefits across different age groups. This is complemented by findings that more experienced workers are likely to adopt new technologies, possibly because they recognize the potential efficiencies these technologies bring (Alampay et al. 2017; Gichoya et al. 2018).

However, the study also highlights significant barriers to technology adoption, such as the costs associated with new technologies. These financial constraints are particularly pronounced in the public sector, where budget limitations are common (Hameed et al. 2019; Kamunge et al. 2020; Dimoso & Andrew, 2021; Kitole et al. 2024). Moreover, the regulatory environment plays a crucial role; a supportive regulatory framework is shown to significantly encourage the uptake of ICT. This aligns with Institutional Theory, which suggests that the institutional context can greatly influence organizational behavior and technology acceptance.

On the impacts of ICT adoption on governance, the results indicate a generally positive perception of the internet's role in enhancing various facets of good governance, including increasing public attendance at institutions, improving transparency, and fostering greater citizen participation. However, the findings also point to the complex nature of governance challenges, particularly in how technology is used to enhance accountability and transparency (Chen et al. 2019; Zhang et al. 2021; Kitole, 2023). Despite the positive impacts, there is variability in the perceptions of technology’s role in improving governance, suggesting that while technology can facilitate greater access to services and enhance legal adherence, its effectiveness in promoting accountability remains less certain.

These insights highlight both the successes and challenges of integrating technology into governance processes (Esteves et al. 2017; Bonsón et al. 2019; Theodory & Kitole, 2024). They suggest that a holistic approach, which includes not only the adoption of technology but also strategic management, supportive policies, and continuous evaluation, is critical for maximizing the benefits of ICT in public governance. For policymakers and governance stakeholders, these

findings underscore the importance of fostering an environment that reduces technological costs, enhances user support, and ensures that regulatory frameworks are conducive to the effective use of technology in public administration (Wang et al. 2019; Macintosh & Whyte, 2019).

CONCLUSION

The findings collectively emphasize the significant role of information and communication technologies (ICTs), particularly mobile communication services and internet usage, in shaping good governance practices. There exists a widespread acknowledgement among respondents of the positive impact of these technologies on various dimensions of governance, including transparency, citizen participation, and efficiency in governmental operations. This consensus suggests that ICTs serve as powerful enablers, facilitating access to information, promoting citizen engagement, and streamlining administrative processes within governmental frameworks.

However, despite the overall positive perception, emerge in respondents' views, particularly concerning accountability and decision-making processes. While there is general agreement on the beneficial influence of ICTs in these areas, variations in responses hint at existing challenges and areas for improvement. These findings emphasize the need for continued exploration and targeted interventions to address barriers and maximize the potential benefits of ICTs in governance. Future research endeavors should aim to delve deeper into these nuanced perspectives, considering contextual factors and identifying strategies to optimize ICT utilization for governance enhancement in the digital age. Through comprehensive approaches and informed interventions, stakeholders can effectively leverage ICTs to foster transparency, citizen participation, and overall governance effectiveness.

Policy implications

The findings presented regarding the positive impact of information and communication technologies (ICTs) on good governance carry significant policy implications for governments and policymakers. Firstly, recognizing the widespread recognition among respondents of the beneficial influence of mobile communication services and internet usage on governance, policymakers should prioritize investment in ICT infrastructure and digital literacy programs. This entails ensuring widespread access to reliable internet connectivity and mobile communication networks, particularly in underserved and rural areas, to bridge the digital divide and promote inclusivity in governance processes.

Secondly, the strong consensus on the role of ICTs in enhancing transparency, citizen participation, and government efficiency underscores the importance of incorporating digital tools into governance frameworks. Policymakers should explore opportunities to integrate ICT platforms into administrative processes, such as e-government portals and digital service delivery mechanisms, to enhance transparency, streamline operations, and increase citizen engagement. Moreover, initiatives to promote open data policies and digital transparency can further strengthen accountability mechanisms and foster public trust in governmental institutions.

However, the variations in perceptions regarding accountability and decision-making processes highlight the need for targeted interventions to address governance challenges effectively. Policymakers should prioritize efforts to enhance digital accountability mechanisms, such as online reporting systems and transparency portals, to hold government officials accountable for their actions and decisions. Additionally, fostering digital literacy and civic education programs can empower citizens to actively participate in governance processes and hold their representatives accountable, thereby promoting democratic governance practices.

Generally, the findings underscore the transformative potential of ICTs in shaping governance practices and improving service delivery to citizens. By leveraging ICTs effectively and addressing associated challenges, policymakers can foster a more transparent, participatory, and accountable governance system that better serves the needs of all citizens. Therefore, investing in ICT infrastructure, promoting digital literacy, and integrating digital tools into governance processes are crucial steps towards achieving sustainable and inclusive governance reforms in the digital age.

REFERENCES

Alampay, E., Ligeralde, A., Rago, L., Garcia, A., Uy, J., & Canlas, J. (2017). Mobile technology for good governance in the Philippines: Findings from three projects. *The Electronic Journal of Information Systems in Developing Countries,* 81(6), 1-18.

Bonsón, E., Royo, S., & Ratkai, M. (2019). Citizens' engagement on local governments' Facebook sites. An empirical analysis: The impact of different media and content types in Western Europe. *Government Information Quarterly*, 36(2), 1-15.

Chen, C., Rong, Y., & Zheng, W. (2019). Online public participation, government accountability, and decision-making effectiveness: Evidence from China. *Government Information Quarterly*, 36(3), 1-11.

Kitole, F.A., & Genda, E.L. (2024). Empowering her drive: Unveiling the resilience and triumphs of women entrepreneurs in rural landscapes, *Women's Studies International Forum*, Volume 104, 2024, 102912, ISSN 0277-5395, https://doi.org/10.1016/j.wsif.2024.102912

Cicatiello, L., De Simone, E., & Gaeta, G. L. (2018). Cross-country heterogeneity in government transparency and citizens' political efficacy: A multilevel empirical analysis. *Administration & Society*, *50*(4), 595-623.

Kitole, F.A., & Utouh, H.M.L. (2023). Foreign direct investment and industrialization in Tanzania admixture time series forecast analysis 1960 - 2020, *Applied Economics Letters*, DOI: 10.1080/13504851.2023.2211324

Dimoso, R.L., & Andrew, F. (2021). Rural Electrification and Small and Medium Enterprises' (SMEs) performances in Mvomero District, Morogoro, Tanzania, J. Bus. Sch. 4 (1) (2021) 48–69, https://doi.org/10.26677/TR1010.2021.717

Kitole, F. A., Msoma, L. J., & Sesabo, J. K. (2024). Navigating the economic landscape: a comprehensive analysis of government spending, economic growth, and poverty reduction

nexus in Tanzania. *Applied Economics Letters*, 1–5. https://doi.org/10.1080/13504851.2024.2302902

Ejiogu, A., Ejiogu, C., & Ambituuni, A. (2019). The dark side of transparency: Does the Nigeria extractive industries transparency initiative help or hinder accountability and corruption control? *The British Accounting Review*, 51(5), 100811.

Kitole, F.A., & Sesabo, J.K. (2024). The Heterogeneity of Socioeconomic Factors Affecting Poverty Reduction in Tanzania: A Multidimensional Statistical Inquiry. *Soc* (2024). https://doi.org/10.1007/s12115-024-00957-x

Esteves, M. J., Pereira, R., & Rodrigues, L. (2017). Citizens' participation in government decision-making through social media: An empirical study. *Government Information Quarterly, 34(3),* 524-535.

Kitole, F.A., Lihawa, R.M. & Nsindagi, T.E. (2023). Agriculture Productivity and Farmers' Health in Tanzania: Analysis on Maize Subsector. *Glob Soc Welf* **10**, 197–206. https://doi.org/10.1007/s40609-022-00243-w

Gichoya, D., Kimani, S., & Abate, A. (2018). Mobile governance: Factors influencing e-service delivery in Kenya. *Journal of Public Affairs, 18(1),* e1664.

Kitole, F.A., & Sesabo, J.K. (2022). Smallholder Livestock Keepers' Breeding Choices and Its Implication on Poverty Reduction in Developing Countries: Empirical Evidence from Tanzania. *Glob Soc Welf* **9**, 241–251 (2022). https://doi.org/10.1007/s40609-022-00252-9

Hameed, A., & Bhutta, U. (2019). Role of digital governance in public sector transformation: A case of Pakistan. *The Electronic Journal of Information Systems in Developing Countries,* 85(6), 1-20.

Kamunge, M. B., Zsofia, L., Musa, A., & Olatunji, O. (2020). A review of the role of digital technologies in enhancing governance in Africa. *Computers & Society,* 50(2), 24-37.

Kanevskaia, O. (2019). Governance of ICT Standardization: Due process in technocratic Decision-making. *NCJ Int'l L.*, *45*, 549.

Kitole, F.A. (2023). Economics of Agricultural Development: World Food Systems and Resource Use,, Agrekon, 62(2), 194-196, DOI: 10.1080/03031853.2023.2181831

Kitole, F.A., Sesabo, J.K., & Lihawa, R.M. (2023). Instrumental variable approach on analyzing risk factors associated with noncommunicable disease prevalence in Tanzania: a nonexperimental design. *Health Sci Rep,* 6:e1585. doi:10.1002/hsr2.1585

Kyriacou, A. P. (2016). Individualism–collectivism, governance and economic development. *European Journal of Political Economy*, *42*, 91-104.

Lee, J., Kim, Y., & Lee, J. (2020). The impact of online platforms on government transparency: An empirical analysis of local governments in South Korea. *International Journal of Information Management, 50,* 56-67.

Lin, Y. (2018). A comparison of selected Western and Chinese smart governance: The application of ICT in governmental management, participation and collaboration. *Telecommunications policy*, *42*(10), 800-809.

Kitole, F.A., Mbukwa, J.N., Tibamanya, F.Y., & Sesabo, J.K. (2024). Climate change, food security, and diarrhoea prevalence nexus in Tanzania. *Humanit Soc Sci Commun*, 11 (1), 1-13. https://doi.org/10.1057/s41599-024-02875-z

Macchia, M. (2016). 12. The Rule of Law and Transparency in the Global Space. *Research Handbook on Global Administrative Law*, 261-281.

Macintosh, A., & Whyte, A. (2019). The promise and perils of digital governance in the global South. *Government Information Quarterly*, *36(4)*, 1-10.

Mwantimwa, K. (2019). ICT usage to enhance firms' business processes in Tanzania. *Journal of Global Entrepreneurship Research*, *9*(1), 46.

Njoh, A. J. (2018). The relationship between modern information and communications technologies (ICTs) and development in Africa. *Utilities Policy*, *50*, 83-90.

Palvia, P., Baqir, N., & Nemati, H. (2018). ICT for socio-economic development: A citizens' perspective. *Information & Management*, *55*(2), 160-176.

Kitole, F., Lihawa, R., Sesabo, J., & Shitima, C. (2023). The dynamism of communication technology adoption, market information and welfare: Evidence from Nile perch (Lates niloticus) fish market, Mwanza, Tanzania. *Lakes & Reservoirs: Research & Management*, 28, e12433. https://doi.org/10.1111/lre.12433

Poncian, J. (2020). ICT, citizen engagement and the governance of extractive resources in Tanzania: Documenting the practice and challenges. *The Extractive Industries and Society*, *7*(4), 1498-1510.

Rwigema, P. C. (2020). Digital technology and its relevance to political and social economic transformation. Case study of East African Community Region. *The Strategic Journal of Business & Change Management*, *7*(4), 1402-1436.

Kitole, F.A., Tibamanya, F.Y., & Sesabo, J.K. (2023). Cooking energy choices in urban areas and its implications on poverty reduction, *International Journal of Sustainable Energy*, 42(1), 474-489, DOI: 10.1080/14786451.2023.2208680

Theodory, T.F., & Kitole, F.A. (2024). Does rural water resource outcry elevate communities' conservation for livelihoods in a pooled resource? A case of Mvomero district, Morogoro region, Tanzania. *Sustain. Water Resour. Manag.* **10**, (2), 1-19 https://doi.org/10.1007/s40899-024-01070-x

Wang, Y., Chang, Y., & Li, Y. (2019). Digital platforms and government accountability: An empirical analysis of e-government adoption in China. *Information & Management*, 56(3), 427-439.

Wyche, S., & Olson, J. (2018). Gender, mobile, and mobile internet| Kenyan women's rural realities, mobile internet access, and "Africa rising". *Information Technologies & International Development*, *14*, 15.

Kitole, F.A., Tibamanya, F.Y., & Sesabo, J.K. (2024). Exploring the nexus between health status, technical efficiency, and welfare of small-scale cereal farmers in Tanzania: A stochastic frontier analysis, *Journal of Agriculture and Food Research*, Volume 15,100996, ISSN 2666-1543, https://doi.org/10.1016/j.jafr.2024.100996

Zhang, Y., & Sun, X. (2020). Exploring the effects of e-government service quality on public trust and satisfaction: An empirical study in China. *Government Information Quarterly*, 37(1), 1-12.

Zuber, A., Blickenstorfer, C., & Groth, H. (2017). Governance, transparency, and the rule of law. *Africa's Population: In Search of a Demographic Dividend*, 367-384.