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Faida Paison
School of Education, Kigali Independent University ULK, Kigali, Rwanda

Jean d'amour Abayisenga
School of Social Sciences, Kigali Independent University ULK, Kigali, Rwanda

Corresponding Author:
Faida Paison
School of Education, Kigali Independent University ULK, Kigali, Rwanda

Evaluating the effectiveness of e-governance in addressing corruption within decentralized entities

Faida Paison and Jean d'amour Abayisenga

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Abstract
This study assesses the effectiveness of e-governance in reducing corruption in decentralized governance, focusing on Karongi District, Rwanda. It explores four main areas: the current use of e-governance tools, their impact on corruption, citizen participation, and implementation challenges. Using a mixed-methods approach, data were collected from 120 participants through structured questionnaires. Results show that 85.9% of respondents believe e-governance enhances transparency, accountability, and public service delivery. Citizen involvement is found to be key in combating corruption. However, challenges such as poor digital infrastructure, low digital literacy, and weak stakeholder coordination hinder full implementation. The study calls for increased investment in digital tools, improved citizen engagement, and stronger institutional collaboration. It also recommends further research on how citizen feedback via e-governance platforms can improve governance outcomes in decentralized systems. Overall, the research highlights the potential of e-governance to foster integrity and efficiency in local governance.

Keywords: E-Governance, corruption, decentralization, transparency, accountability

Introduction

In nowadays digital era, governments across the world are moving to digital technology to enhance transparency and accountability in service delivery (Balaji, 2025) [10]. E-governance, which employs digital platforms and online systems, is increasingly recognized as a mean of reducing corruption in decentralized government structures (Udoh, 2024) [33]. However, questions remain about whether it consistently strengthens service delivery and minimizes inefficiencies, since corruption still persists in some of the local government institutions (Adam, 2020) [3]. Implementation challenges such as weak infrastructure, poor internet connectivity and resistance to change further complicate progress (NSAMA *et al.*, 2024) [25]. Expert analysis is therefore essential to guide policymakers in reinforcing anti-corruption approaches, as effective e-governance promotes transparency, accountability, and sustainable development goals (Suresh Kumar, 2024) [30].

Globally, e-governance has reduced corruption by automating processes, digitizing transactions, and encouraging citizen participation, thereby limiting opportunities for bribery (Udoh, 2024) [33]. The UN's E-Government Development Index (EGDI) shows that countries with advanced systems achieve higher transparency and reduced corruption (Adams & Paul, 2023) [4]. Examples include Singapore's GeBIZ procurement platform, which helped secure 84% in the 2024 CPI (Lim, Vigonte & Abante, 2025), Estonia's e-ID and online tax system raising its CPI to 76% in 2023 (Ikromov, 2023) [13], and South Korea's OPEN system allowing citizens to monitor administrative procedures (Min, 2023). Research further highlights that e-procurement, e-tax systems, and open data improve efficiency, fairness, and accountability (Abou ElSeoud, 2024; Lazor *et al.*, 2024) [17]. Still, challenges such as cybersecurity risks (Udoh, 2024) [33], bureaucratic resistance, limited infrastructure, and digital illiteracy persist (Kibria & Hong, 2024) [16].

In Africa, the adoption of e-governance has been uneven. Kenya, South Africa and Nigeria for instance, introduced reforms to enhance transparency, but outcomes remain limited by poor infrastructure, low digital literacy, and weak political will (Ademuyiwa & Adeniran, 2020) [5]. The AU's Digital Transformation Strategy (2020-2030) seeks to accelerate adoption, yet the 2024 Ibrahim Index of African Governance (IIAG) showed anti-corruption

gains of only +0.6 points across 21 countries. While Angola progressed, South Africa and Mauritius declined (van de Venter, 2021) [34]. Still, successes in Kenya, Rwanda and Zambia through e-procurement and e-tax systems highlight the potential for improved accountability (Udoh, 2024) [33]. Within the East African Community (EAC), Rwanda and Kenya lead through IremboGov and e-Citizen platforms, though gaps in ICT infrastructure and legal frameworks remain (Adams & Paul, 2023) [4].

Rwanda has distinguished itself under its Vision 2050 and the National Strategy for Transformation (NST2), with institutions such as Rwanda Governance Board (RGB) and the Office of the Ombudsman leading reforms (Tubanambazi & Ruvuna, 2021) [32]. Transparency International (2024) reported Rwanda's CPI rising from 53% in 2023 to 57% in 2024, ranking 43rd globally and first in the EAC. Key initiatives such as Umucyo e-procurement and IremboGov have improved service delivery and transparency (Sibomana, 2024) [28]. At the local level, Karongi District has adopted the Financial Management Information System (FMIS) to strengthen oversight of public funds. Despite progress, challenges such as infrastructure gaps, poor internet connectivity, digital illiteracy and some resistance from officials still hinder full effectiveness (Udoh, 2024) [33].

Therefore, the current study seeks to evaluate the effectiveness of e-governance as an anti-corruption instrument in decentralized entities, with a focus on Karongi District in the light of strengthening transparency, accountability and service delivery thereby supporting good governance and sustainable development at the local government level (Nambassa & Nurmandi, 2024) [24].

This research intended to achieve the following specific objectives:

1. To assess the current state of e-governance tools implemented in Karongi district.
2. To examine the effectiveness of e-governance in reducing corruption within decentralized entities of Karongi district.
3. To determine the role of citizens' participation in e-governance processes in fighting against corruption within Karongi district.
4. To identify challenges in the implementation of e-governance as an anti-corruption effort in Karongi district.

Although no prior research has examined Karongi District specifically, existing studies conducted in Rwanda and globally offered useful insights into e-governance as a tool against corruption within decentralized systems. This study bridges that gap by providing a localized assessment of how e-governance contribute to reducing corruption in Karongi. It uncovers key infrastructural, social, and institutional constraints limiting their effectiveness, while underscoring the central role of citizen participation. The study further delivers context-specific recommendations to relevant stakeholders, aimed at strengthening e-governance mechanisms in addressing corruption.

2. Literature review: This section deals with the review of the available literature related to the research under study. It further explores theoretical frameworks, particularly Good Governance Theory (GGT), Unified Theory of Acceptance and Use of Technology (UTAUT) and Anti-Corruption Theory (ACT) aim at providing a deep understanding of the foundational theories and models that shape e-governance effectiveness in the light of addressing corruption within decentralized entities.

2.1. E-governance effectiveness and evaluation frameworks: E-governance refers to the use of ICT to improve service delivery, strengthen administration, and enhance citizen engagement (Balaji, 2025) [10]. It functions across G2C, G2B, G2G, and G2E domains (Aziz & Sallow, 2022) [7], and its effectiveness in curbing corruption depends on combining technology with capacity building and citizen participation (UNDP, 2024). Evidence from the Vietnam PAPI highlights modest improvements in corruption control and increased use of e-service portals, while in Rwanda, Transparency International (2022) reported persistent bribery in institutions such as Traffic Police (16.4%) and local governments (10.6%). Moreover, the 2024 Auditor General's report showed that decentralized entities fully implemented only 55% of recommendations, reflecting gaps that make platforms like Irembo and Umucyo critical for reducing face-to-face interactions and promoting accountability.

Measuring e-governance effectiveness relies on indicators such as transparency, accountability, efficiency, citizen satisfaction, and corruption reduction (Udoh, 2024) [33]. Transparency improves access to information, accountability ensures officials are held responsible, and efficiency is measured by time and cost savings, while citizen satisfaction and reduced corruption confirm system's impact. The Technology Acceptance Model (TAM) assesses perceived ease of use and usefulness, while Public Value Theory (PVT) evaluates broader outcomes like trust and equity. Recent evidence shows tangible progress, with e-governance by 2024 raising efficiency by 35%, cutting bureaucratic delays by 40%, and improving transparency according to 60% of citizens (Sharamanzi, 2024) [29].

2.2. Corruption in Rwanda decentralized governance

Although decentralization in Rwanda aims to bring services closer to citizens, it also creates corruption risks due to weak oversight and high discretionary powers at the local level (Mukahirwa, 2024) [22]. Transparency International and RGB reports confirm persistent challenges, with the 2020 Corruption Perception Index indicating that 30% of citizens encountered corruption, especially in procurement and employment. The National Integrity System Assessment the same year found that 25% of procurement officers in decentralized entities engaged in bribery and kickbacks (Adam, 2024) [2].

Still, progress is visible. The 2024 Bribery Index showed an 18.5% drop in bribery encounters compared to 2023, reflecting stronger enforcement and accountability (Transparency International Rwanda, 2024). Legislators are now promoting e-recruitment to tackle nepotism in hiring processes. Moreover, digital financial systems like IFMIS have strengthened public resource management. The 2024 Auditor General's report noted a 60% decline in unlawful expenditures (from 6.45 to 2.25 billion Rwf) and a rise in unqualified audit opinions to 92%, showing improved compliance thanks to digital tools.

2.3. E-governance as an anti-corruption tool

E-governance is increasingly recognized as a key anti-

corruption mechanism, particularly in decentralized contexts where discretion and weak oversight fuel malpractice. By automating processes, standardizing procedures, and reducing human interaction, systems like e-procurement, e-recruitment, and online portals enhance transparency and reduce corruption risks (Balaji, 2025; Udoh, 2024) [10, 33]. These platforms allow transactions to be tracked, promote compliance, and make operations visible to both the public and auditors.

Citizen empowerment is another critical dimension. Digital platforms grant communities real-time access to government information and services, strengthening oversight and trust. When decisions and allocations are traceable, informal networks lose power, and institutional integrity is reinforced (Suresh Kumar, 2024) [30]. Rwanda's flagship tools IremboGov, Umucyo, and e-tax exemplify this shift, showing how technology can build transparency and efficiency even in decentralized units like Karongi District (Sharamanzi, 2024) [29].

2.4. Mechanisms for integrating e-governance in addressing corruption: Integrating e-governance against corruption requires concrete mechanisms. First, e-procurement platforms digitize tendering, ensuring fairness and reducing bribery, favoritism, and nepotism by making tender processes public (Suresh Kumar, 2024) [30]. Second, e-recruitment and HRM systems reduce nepotism through merit-based hiring, automated shortlisting, and transparent interviews (Hasanah & Jauhari, 2024) [12]. Third, citizen reporting platforms allow communities to directly flag corruption or service delivery failures, increasing civic oversight. Moreover, training programs for both public officials and citizens covering digital literacy, ethics, and data use are essential to maximize system use and prevent manipulation (Asimakopoulos *et al.*, 2025) [8]. These mechanisms, when effectively integrated, not only strengthen transparency and accountability but also ensure e-governance tools are socially accepted, institutionally supported, and resistant to abuse.

2.5. Theoretical review

The current study is grounded in Good Governance Theory (GGT), introduced by the World Bank (1989), stresses principles such as transparency, accountability, rule of law, participation, responsiveness, and efficiency. E-governance platforms in Rwanda, such as IremboGov, e-procurement (Umucyo), and e-tax, directly advance these principles by reducing face-to-face interactions, standardizing processes, and creating verifiable digital records. Evidence shows that these tools enhance transparency and citizen satisfaction (Nuwagaba, 2021; Udoh, 2024) [26, 33]. Under GGT, however, success depends on accessibility, auditability of transactions, and supportive institutional incentives.

Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh, Morris, Davis & Davis (2003), explains adoption of technologies based on four factors: performance expectancy, effort expectancy, social influence, and facilitating conditions. Applied to e-governance, UTAUT shows that systems only reduce corruption if citizens and officials perceive them as useful and easy to use, supported by infrastructure, training, and community endorsement. Rwanda's programs like digital ambassadors and helplines improve these conditions, boosting adoption and reinforcing anti-corruption benefits (Sharamanzi, 2024; Balaji, 2025; RGB, 2024) [29].

Anti-Corruption Theory (ACT) per se draws on several traditions, including Public Choice (Buchanan & Tullock, 1962), Collective Action (Olson, 1965), Institutional Theory (Meyer & Rowan, 1977), and Transparency and Accountability theory (Heald, 2006). These emphasize mechanisms such as reducing information asymmetry, creating audit trails, automating processes, and enabling citizen oversight. Rwanda's e-procurement (Umucyo) and e-title systems illustrate how automation constrains discretionary power and aligns officials' incentives with public interest (Mukamurenzi, 2020; Indama, 2022; Atiq, Salim & Mahmood, 2023; Tan & Crompvoets, 2022) [23, 14, 9, 31].

However, the above-mentioned theories agree that e-governance effectiveness is conditional; Critical challenges such as poor infrastructure development, limited digital literacy, high costs, weak enforcement, and lack of feedback channels undermine impact (Tubanambazi & Ruvuna, 2021) [32]. Without adoption (UTAUT) and institutional support (GGT & ACT), digital platforms cannot fully reduce corruption. Therefore, for Karongi District to integrating these theories together, it offers a comprehensive approach as they ensure that e-governance initiatives are technologically effective, socially accepted, and institutionally reinforced, maximizing their potential to address corruption.

3. Methodology

3.1. Research Design

The research design provides the framework for answering study objectives, defined as the plan for data collection, analysis, and interpretation (Busetto, Wick & Gumbinger, 2020) [11]. This study utilized a mixed-methods approach, combining both quantitative and qualitative methods to provide a comprehensive understanding of how effective e-governance addresses corruption within decentralized entities, a mixed-methods approach allows researchers to triangulate data from different sources, enhancing the validity and reliability of the findings.

3.2. Population and sample

According to Ahmad, Alias and Razak (2023) [6], a study's population includes everyone who meets certain criteria and from whom data can be collected to draw relevant conclusions. In this research, the population consists of all individuals and stakeholders involved with e-governance in public service delivery within Karongi District. To gather meaningful yet manageable data from 338,000 populations of Karongi, the study used Yamane's (1967) formula.

The sample size categories purposively include Karongi district officials, ICT officers or technical staff, Civil Society Representatives and Anti-Corruption Actors and finally, Ordinary citizens or end-service users.

3.3. Data collection instruments

The study employs both interview and questionnaires as primary data collection instruments, consisting of both open-ended, structured and semi-structured questions to gather information on e-governance and corruption (Ranganathan & Caduff, 2023) [27]. These questionnaires include a mix of Likert scale items, multiple-choice, and ranking questions to measure respondents' views on e-governance mechanisms and effectiveness where responses

on the five-point Likert scale range from Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree, with equal intervals assumed (Muda, Zamri & Lin, 2024) [20]. Moreover; Qualitative data from thematic analysis were thematically assessed to identify key perceptions on e-governance's effectiveness and its role in addressing corruption. Data are collected through email, in-person interviews and online distribution to ensure optimal accessibility.

3.4. Validity and reliability: To establish validity of the instruments the researchers used panels of experts in digital administration and anti-corruption consultancy who provided considerable comments for improvement. To establish reliability of the instruments, a pilot study from 15 respondents along with Cronbach's alpha test were used to assess the internal consistency of the instruments. The following table displays the Cronbach alpha results by each objective. Values above 0.7 are generally considered acceptable (Izah, Sylva & Hait 2023). The reliability results are summarized as in table 1.

Table 1: Reliability Statistics (Cronbach's Alpha)

Variables	Number of Items	Cronbach's Alpha (α)	Comment
Availability and Usage of E-Governance Tools	3	0.78	Accepted
Effectiveness of E-Governance in Addressing Corruption	6	0.84	Accepted
Citizen Participation in E-Governance	6	0.81	Accepted
Challenges to E-Governance Implementation	7	0.86	Accepted
Overall Questionnaire Reliability	22	0.83	Accepted

Source: Primary data, 2025

3.5. Data analysis

In this study, data processing followed systematic stages of coding, editing and tabulation to transform primary data into an analyzable format. Responses were coded into numerical variables for clarity, then edited for data cleaning and ensure completeness (Jaeger & Rasmussen, 2021) [15]. The tabulated data was imported into SPSS version 28.0 for advanced statistical analyses, including descriptive and inferential statistic tests. These steps enhanced the reliability and validity of findings on e-governance's effectiveness in addressing corruption within Karongi District.

3.6. Ethical considerations

Participants were provided with detailed information about the study objectives, procedures, risks, and benefits before obtaining their consent to participate.

4. Findings related to the research objectives

This section deals with the findings of the study and their equivalent discussions, which derive from data gathered from Karongi district officials, ICT officers, CSO's representatives, Anti-corruption actors and end-service users. The analysis of this data aligns closely with the predefined-specific objectives of the study, providing valuable insights into various aspects of how effective e-governance address corruption within Karongi decentralized entity.

4.1. To assess the current state of e-governance tools implemented in Karongi district

The first objective of this study was to assess the current state of e-governance tools implemented in Karongi in addressing corruption. It mostly proves how e-governance instruments are available, used and further assess the level of exposure to information to help minimize opportunities to corrupt practices in decentralized governance of Karongi district.

4.1.1. E-governance tools' availability and usage

This study aimed to assess the current level of availability and usage of e-governance tools in Karongi district. To achieve this objective, the respondents were asked to rate the items that describe the digital governance instruments, its accessibility and usage by using five-point Likert scales namely 1=Very low, 2=Low, 3=Neutral, 4=High, 5=Very High.

Table 2: The current level of availability and usage of e-governance tools

Rating Level	Description	Frequency	Percentage (%)
Very Low	E-governance tools are rarely available or used	2	1.40
Low	E-governance tools are available but used Infrequently	39	26.90
Neutral	Some tools are available and used to a neutral extent	69	47.60
High	E-governance tools are widely available and frequently used	10	6.90
Very High	E-governance tools are fully integrated and actively used in most services	0	0.00
Total		120	100

Source: Primary data, 2025

The data analysis in table 2 indicates that the majority rated the availability and usage of e-governance tools in Karongi district as Neutral (47.6%), followed by Low (26.9%), and High (6.9%). Only 1.4% of the respondents reported Very Low, while none rated it as Very High. Therefore, the relatively high percentage of Neutral responses implies that e-governance tools are available but not yet fully optimized for widespread use. The limited percentage of respondents rating availability as "High" or above indicates that full digitization and institutional adoption remain a challenge, potentially due to gaps in infrastructure, digital literacy or organizational readiness.

In the context of corruption, this moderate uptake of digital tools may offer some level of transparency and accountability, but insufficient to fully eliminate administrative loopholes or manual processes where corruption can persist. For e-governance to meaningfully reduce corruption in Karongi district, there is a need for

increased investment in digital systems, capacity building and stronger awareness efforts to drive full-scale implementation and adoption.

4.1.2. The level of exposure to information about e-governance initiatives: The study at hand examined e-governance level of exposure in reducing corruption and through which channels the respondents received related information by rating Very Low (I am not aware of any e-governance initiatives), Low (I have heard about them but have little understanding), Neutral (I occasionally receive information about these initiatives), High (I regularly hear or read about e-governance initiatives), Very High (I actively follow updates and understand them well).

Table 3: The information exposure level

Rating Level	Description	Frequency	Percentage (%)
Very Low	I am not aware of any e-governance initiatives	1	0.83%
Low	I have heard about them but have little understanding	19	15.80%
Neutral	I occasionally receive information about these Initiatives	62	51.70%
High	I regularly hear or read about e-governance Initiatives	30	25.00%
Very High	I actively follow updates and understand them well	8	6.70%
Total		120	100%

Source: Primary data, 2025

The findings from table 3 reveals that the majority (51.7%) have a neutral level of exposure to information about e-governance initiatives in Karongi district. This argues that while efforts are being made to inform citizens, the communication and outreach strategies are not yet strong or consistent enough to create levels of awareness and understanding across the community. The statistics noted only 6.7% of respondents indicated very high exposure, meaning that they actively follow updates and fully understand the initiatives. This small proportion reflects a gap between information dissemination and citizen engagement. It may imply that information is either too technical, poorly communicated or delivered through accessible channels.

Furthermore, 15.8% of respondents reported a low level of exposure and 0.83% claimed to be completely unaware of any governance efforts; Thus, in governance environment aiming to reduce corruption through transparency, a lack of awareness undermines public participation and weakens accountability mechanisms.

On a positive side, 25% of the respondents indicated a high level of exposure, which shows that some communication channels such as community meetings, radio, social media and telephone calls and short messages are reaching a portion of the population effectively, pointing out that the district should strengthen information flow, simplify messaging and broaden outreach to marginalized or digitally excluded groups. Even if data signals moderate success, it highlights an urgent need for improved citizen education or digital training, engagement and access to information if e-governance mechanism serves as an effective tool in fighting against corruption and enhancing transparency and accountability.

4.2. To examine the effectiveness of e-governance in reducing corruption: The second objective of this study was to examine how effective e-governance is, in reducing corruption within the decentralized entities of Karongi district. Respondents were asked to rate their level of agreement within statements related to this issue on the scale from 1 (Strongly Disagree) to 5 (Strongly Agree). The respondents' responses provide valuable insights into how the community perceives the role of digital tools in promoting transparency, limiting human interference and improving accountability in local government services.

Table 4: Effectiveness of e-governance

Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Total
1. E-governance has increased transparency in service delivery.	0	1	13	65	41	120
	0.00%	0.80%	10.80%	54.20%	34.20%	100.00%
2. Digital platforms (Irembo, Umucyo, etc.) reduce bribery opportunities.	0	0	6	74	40	120
	0.00%	0.00%	5.00%	61.70%	33.30%	100.00%
3. E-governance makes it harder for officials to manipulate records.	0	0	48	51	21	120
	0.00%	0.00%	40.00%	42.50%	17.50%	100%
4. Citizens are more confident to report corruption digitally.	4	10	78	11	17	120
	3.30%	8.30%	65.00%	9.20%	14.20%	100.00%
5. Electronic processes reduce face- to-face interactions, limiting corruption.	0	1	10	40	69	120
	0.00%	0.80%	8.40%	33.30%	57.50%	100.00%
6. E-governance has helped reduce corruption in local government services.	0	0	17	32	71	120
	0.00%	0.00%	14.10%	26.70%	59.20%	100.0%

Source: Primary data, 2025

The results presented in Table 4 indicate that a large majority of respondents acknowledged the role of e-governance in enhancing transparency in service delivery. Specifically, 88.4% (Agree and Strongly Agree) affirmed that digital platforms have improved openness and accessibility of services, while only one respondent (0.8%) disagreed and none strongly disagreed. This highlights a strong public perception that online systems such as e-tracking and digital applications make government services clearer, traceable, and less prone to corruption. Concerning

bribery, the findings revealed overwhelming support, with 95% of respondents agreeing that digital platforms significantly reduce opportunities for corruption, and no respondent disagreed. This demonstrates that online service provision minimizes face-to-face interactions where bribes are commonly solicited, thereby reinforcing trust in fair service delivery.

Regarding record manipulation, 60% of respondents agreed or strongly agreed that e-governance makes it harder for officials to interfere with records, while 40% remained neutral. Although no respondent disagreed, this neutrality suggests cautiousness, possibly due to gaps in system monitoring or weaknesses that may still allow some manipulation. When asked about confidence in reporting corruption digitally, responses were less favorable. Only 23.4% agreed or strongly agreed, 11.6% disagreed, and a majority of 65% remained neutral. This indicates that citizens remain hesitant, possibly due to lack of awareness, fear of retaliation, or doubts about confidentiality in digital reporting platforms. Thus, strengthening trust and awareness in online reporting remains a key area for improvement. The statement that "electronic processes reduce face-to-face interactions, limiting corruption" received strong support, with 90.8% agreeing or strongly agreeing. Notably, 69 out of 120 respondents (57.5%) strongly agreed, confirming public confidence that automation reduces opportunities for corrupt practices. Overall, 85.9% of respondents agreed or strongly agreed that e-governance has reduced corruption in Karongi District, with 59.2% (71 respondents) strongly agreeing. This reflects strong confidence in the effectiveness of digital governance as a mechanism for promoting transparency, accountability, and integrity in decentralized government.

National assessments further support these findings. The Rwanda Governance Scorecard (RGS), 8th Edition reported the highest performance in the "Quality of Service Delivery" pillar at 81.86%, marking a 5.07% increase attributed to ICT-enabled improvements. Likewise, Transparency International Rwanda's 2023 Corruption Perceptions Index (CPI) showed Rwanda's score rising from 51% in 2022 to 53% in 2023, reinforcing its position as the least corrupt country in East Africa. Therefore, the study establishes that e-governance is widely recognized as a powerful instrument in addressing corruption through enhanced transparency, reduced bribery, and minimized in-person interactions. However, digital reporting of corruption remains the weakest area, requiring targeted awareness campaigns, improved system design, and strengthened confidentiality measures to encourage citizen participation.

4.3. To determine the role of citizens' participation in e-governance processes in fighting against corruption

To address the third objective, the study examined civic engagement through digital platforms by analyzing citizens' access, participation, awareness, and perceived impact in e-governance systems. Respondents were asked whether they had sufficient access to digital platforms, if their feedback was considered in decision-making, and whether ICT tools empowered them to report corruption or misconduct. The study also assessed citizens' awareness of their role in monitoring government activities and perceptions of how participation through e-governance reduces corruption in local services. Additionally, it explored whether local leaders actively encourage citizens to use digital platforms for reporting irregularities, requesting services, and submitting complaints.

Table 5: The role of citizens' participation in E-Governance processes

Statements	Strongly Disagree (1)	Disagree(2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Total
1. Citizens have sufficient access to e- governance platforms (e.g., Irembo) to engage in public services.	0	4	76	29	11	120
	0.00%	3.33%	63.33%	24.17%	9.17%	100.00%
2. Citizens' feedback through digital platforms is considered in decision- making processes.	13	28	74	5	0	120
	10.83 %	23.33%	61.67%	4.17%	0.00%	100.00%
3. E-governance has empowered citizens to report corruption or Misconduct more easily.	4	4	81	25	6	120
	3.33%	3.33%	67.50 %	20.84 %	5.00 %	100.00 %
4. Community members are well-Informed about their role in monitoring government activities through ICT tools.	13	31	66	9	1	120
	10.83%	25.84%	55.00%	7.50%	0.83%	100.00%
5. Active citizen participation through E-Governance has reduced cases of corruption in local services.	2	6	77	26	9	120
	1.67%	5.00%	64.16%	21.67%	7.50%	100.00%
6. Local leaders encourage citizens to use digital platforms to report irregularities, request services and complaints claim.	0	2	32	74	12	120
	0.00%	1.66%	26.67%	61.67%	10.00%	100.00%

Source: Primary data, 2025

The table 5 shows out of 120 respondents, a majority of 76 people representing 63.33%, neutrally responded that citizens have sufficient access to e-government platforms to engage in public services while 24.17% and 9.17% of the respondents respectively agreed and strongly agreed. Only a small number of 4 respondents represented by 3.33% disagreed and fortunately, no one strongly disagreed. This shows that over 96 of the total respondents felt at least neutrally positive about access to e-governance services, indicating that platforms are widely accessible and accepted by the public.

However, the perception changes significantly when it comes to whether citizens' feedback is actually considered in decision making. While 74 respondents equivalent to 61.67% were neutral, only 5 people representing 4.17% agreed and no one strongly agreed. Meanwhile, 28

respondents equal to 23.33% disagreed and 13 people or (10.83%) strongly disagreed. This means that nearly 34% of the total respondents believe that feedback mechanisms are not taken seriously which may undermine trust in e-governance, weakening participatory decision making and widens the gap in efforts to fight corruption.

The findings to statement concerning "Empowerment to report corruption" were more encouraging because 81 respondents equivalent to 67.5% neutrally responded that e-governance has made it easier to report corruption or misconduct. Additionally, 25 respondents representing 20.84% agreed, and 6respondents equal to 5% strongly agreed. However, only 4 respondents each represented by 3.33% reported strongly disagree and agree. Overall, about 93% of the total participants see e-governance tools as a useful means to improve citizens in reporting unethical behavior.

The awareness of citizens' role in monitoring government via ICT seems to hold a remarkable gap in the instances that while 66 respondents (55.00%) neutrally responded that citizens are well informed about their role in monitoring the government services using ICT tools, 31 respondents (25.84%) disagreed and 13 respondents (10.83%) strongly disagreed; Only 9 respondents (7.5%) agreed and 1 respondent (0.83%) strongly agreed. This shows that over one third of the total respondents feel that citizens are not adequately informed, which could hinder active engagement in governance processes.

While interpreting the statement of citizens' participation impact on reducing corruption, a promising 77 respondents equivalent to 64.16% reported neutral that citizen participation through e-governance has helped reduce corruption at the decentralized level, 26 respondents representing 21.67% agreed and 9 respondents (7.5%) strongly agreed. On the other hand, 8 respondents (5%) disagreed and 2 respondents (1.67%) strongly disagreed. Therefore, the findings revealed that most respondents recognize a positive impact of digital engagement in reducing corruption. Notably, strong agreement was attributed to the citizen encouragement to use digital platform. A number of 74 respondents (61.67%) agreed and 12 respondents (10%) strongly agreed that local leaders actively encourage the use of digital platforms for reporting irregularities, service requests and complaints and further 32 respondents equivalent to 26.67% reported neutral, while only 2 respondents (1.67%) disagreed and none strongly disagreed, suggesting that over 98% expressed at least some level of agreement and showed strong support for local leadership in promoting digital civic participation.

Therefore, the overall data from the role of citizen's participation in e-governance processes reflects a commonly positive perception of digital access and its ability to empower citizens, particularly in reporting issues and engaging with local leaders (Muhimpundu & Jianxun, 2022) [21]. However, there is noticeable skepticism around whether citizen's feedback is genuinely integrated into decisions and limited awareness among the public regarding their monitoring roles. Strengthening transparency and increasing digital literacy could address these gaps and enhance meaningful participation.

The findings on the statement of citizens' participation in e-governance in Karongi District are much aligned with national data finding from Rwanda Governance Board (RGB) and Transparency International. According to the RGB 8th Edition Governance Scorecard, citizen engagement in public service delivery through digital platforms scored 76.3%, highlighting growing public access and interaction with e-governance tools, though awareness of monitoring roles remains limited (RGB report, 2024).

4.4 To identify challenges in the implementation of e-governance: To achieve the last objective of this study aimed at identifying keys challenges in the implementation of e-governance as an anti-corruption effort within decentralized entities of Karongi district, Respondents were asked to express their level of agreement with various statements, highlighting potential obstacles, using 5-point Likert scale 1 (= Strongly Disagree)**,** 2 (= Disagree)**,** 3 (= Neutral)**,** 4 (= Agree), and 5 (= Strongly Agree)**.** This approach provides a clear understanding of challenges med by stakeholders themselves, including citizens and local officials. The analysis of the data helps to disclose specific areas such as limited internet access, lack of digital literacy, insufficient government responsiveness or weak infrastructure development that may hinder the effectiveness of e-governance in fighting corruption at local level.

Table 6: Challenges facing the implementation of e-governance as an anti-corruption effort in Karongi district

Statements	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Percentage (%)
1.Limited internet connectivity affect the effectiveness use of E-governance platforms	5	21	59	28	7	120
	4.20%	17.50%	49.20%	23.30%	5.80%	100.00%
2. Lack of digital literacy among citizens is a major barrier to accessing e-governance services.	0	0	23	60	37	120
	0.00%	0.00%	19.20%	50.00%	30.80%	100.00%
3. Insufficient training of local government staff hinders proper use of e-governance tools.	13	19	51	20	17	120
	10.80%	15.80%	42.50%	16.70%	14.20%	100.00%
4. Limited access to digital devices affects citizens' engagement and participation.	1	4	41	38	36	120
	0.80%	3.30%	34.20%	31.70%	30.00%	100.00%
5. Technical issues and system downtimes reduce trust in digital government services.	0	3	47	41	29	120
	0.00%	2.50%	39.20%	34.20%	24.10%	100.00%
6. There is a lack of awareness campaigns to promote e-governance usage among the public.	10	14	40	35	21	120
	8.30%	11.70%	33.30%	29.20%	17.50%	100.00%
7. Budget constraints limit the expansion and maintenance of e- governance infrastructure.	1	3	56	40	20	120
	0.80%	2.50%	46.70%	33.30%	16.70%	100.00%

Source: Primary data, 2025

Assessing the challenges that hinder the implementation of e-governance in Karongi district, respondents were asked to rate their level of agreement with several statements. The results reveal that limited internet connectivity remain a noticeable challenge, with a combined 78.3% (49.2% are neutral, 23.3% agree and 5.8% strongly agree) acknowledging its negative impact on effective platform usage.

Notably, digital literacy among citizens emerged as a particular significant barrier, where an overwhelming 80.8% either agreed on strongly agreed that it limits access to e governance services, with no respondent disagreeing that at all. Another key issue is that training of local government staff, where 42.5% are neutral and 30.9% (agree and strongly agree combined) confirmed that this hampers the effective use of digital tools. However, 26.6% (strongly disagree and disagree) disclosed some disagreement, suggesting that this may vary by department or area. A large number of respondents (95.9%) acknowledged that limited access to digital devices negatively affects citizen engagement and participation. Similarly, 97.5% agreed to some extent that technical issues and system downtimes reduce public trust in digital government services, with 58.3% either agreeing or strongly agreeing, claiming a clear need for more reliable systems. When it comes to public engagement, 62.5% agreed and 17.5% strongly agreed that there is a lack of awareness campaigns promoting e-governance, while 20% disagreed, possibly pointing to inconsistent outreach efforts across the district. Finally, budget constraints were identified as a major weakness by 96.7% of respondents, highlighting the financial limitations severely affect the expansion and maintenance of e-governance infrastructure in the district.

Consequently, the overall findings from the statements pointing out challenges facing the implementation of e-governance as an anti-corruption effort underscore a range of infrastructure, digital literacy, financial and capacity-related barriers that must be addressed for e-governance to be a truly effective tool in combating corruption and improving accountability, transparency in service delivery.

The challenges identified in Karongi District regarding the implementation of e-governance as an anti-corruption tool are consistent and aligned with national assessments by Rwanda Governance Board (RGB) and Transparency International. The RGB 8th Edition Governance Scorecard (2023) highlights that limited internet connectivity, insufficient digital literacy and inadequate access to devices remain major barriers to citizen engagement in digital governance, particularly in rural districts where infrastructure gaps persist.

Transparency International Rwanda (2023) also emphasizes that technical failures, lack of training for local officials, low awareness campaigns, and budgetary constraints hinder the effectiveness of e-governance initiatives in promoting transparency and reducing corruption.

4.5. Thematic analysis: The researcher wanted to evaluate the effectiveness of e-governance in addressing corruption within decentralized entities from the qualitative method of the study. Therefore, the findings revealed that e-governance has significantly reduced corruption in Karongi District by improving transparency and reducing direct human contact. Respondents explained that bribes once thrived in face-to-face interactions, but digital platforms now make processes easier to track and harder to manipulate. One district official confirmed: *"E-governance has significantly reduced corruption by making our processes more transparent and easier to track.".* Findings also showed that citizens are actively using Irembo platforms for services like birth and death certificates, IDs, and e-land declarations. This shift has reduced physical visits to offices, saving time and minimizing exposure to corrupt practices. An Irembo administrator stated: *"Citizens participate mainly by exploring online platforms to request e-services while they are even in their respective homes."*

Civil society organizations (CSOs) play a critical watchdog role in encouraging citizens to engage with e-governance. A CSO representative said: *"As a CSOs representative, acting as whistleblower, we acknowledge that e-governance has improved service delivery and helped reduce certain forms of corruption; however, its full impact remains rudimentary because many people are still unaware of these platforms."*

Despite the progress, some of the respondents highlighted challenges such as low digital literacy, poor internet access, limited training for officials, and budget constraints. An ICT officer noted: *"Our biggest challenges include low digital literacy among citizens, poor officials' training, poor internet access and budget constraints."* These barriers limit inclusiveness and slow down full adoption.

5. Conclusion and Recommendations

5.1. Conclusion: As the study draws to close, it reflects on key findings around the role of e-governance in addressing corruption within decentralized entities in Karongi district, showing that digital tools have improved transparency, minimized bribery opportunities and enhanced citizen participation, though challenges such as low digital literacy, poor internet connectivity, limited awareness, and budget constraints continue to hinder their full effectiveness.

5.2. Recommendations

The study recommends strengthening e-governance in Karongi district through targeted actions by key actors: Karongi district should invest in digital infrastructure, awareness campaigns, and close the feedback-action gap; RISA should enhance platform functionality, integration, and digital literacy training; MINALOC should mainstream e-governance with clear guidelines, monitoring, and accountability frameworks; while CSOs and other development partners should promote awareness, inclusivity, independent evaluations, and capacity building. Collectively, these efforts will enhance transparency, citizen engagement, and accountability in the fight against corruption within local governance levels.

6. Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

7. Data availability

The authors do not have permission to share data

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