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Original Research

# ROLE OF DIGITAL TOOLS AND SYSTEMS IN REDUCING INSECURITY. A CASE OF MUSANZE DISTRICT, RWANDA

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## Abstract

The general objective of this study was to assess the effect of digital tools and systems in reducing insecurity in Musanze District, Rwanda. Specifically, the study examined the effect of surveillance digital tools, intelligence-gathering digital tools, and communication and response digital tools on reducing insecurity in the district. The results should provide light on how digital systems and technologies might help lessen insecurity in Musanze District. This study examines the role of digital tools and systems in mitigating insecurity within Musanze District, Rwanda. Utilizing a quantitative survey methodology, data collection generated responses from a sample of 131 participants. Pearson correlation analysis demonstrates a positive relationship between surveillance digital tools and the reduction of insecurity ($r = 0.711$, $p = 0.000$). Linear regression analysis establishes that surveillance digital tools explain 50.5% of the variance in local security outcomes ($R^2 = 0.505$, $F = 131.723$, $p = 0.000$). The regression model demonstrates that a single unit expansion in surveillance technology deployment generates a 0.594-unit increase in reducing insecurity ($B = 0.594$, $t = 11.477$, $p = 0.000$). The p-values for all variables are less than 0.05, indicating statistical significance. The study recommended that RIB Officers enhance training programs on surveillance digital tools. RNP Staff should implement real-time data analytics in intelligence gathering, create public awareness campaigns, and improve decision-making capabilities.

**Key words:** Digital Tools and Systems, Insecurity, Surveillance Digital Tools, Intelligence-Gathering Digital Tools, And Communication and Response Digital Tools

## Introduction

Human security maintains a significant development component. Traditional security definitions focus on military strength to deter aggression or restrict antagonistic governments, whereas human security centers on increasing the capacity of populations to qualitatively improve life conditions. Despite regional security stabilization efforts, persistent challenges

remain. For instance, extensive combat operations in North Kivu contradict statements from regional bodies, aiming to displace the M23 movement and Congolese Tutsi civilians into neighboring countries. These forces collaborate with the Democratic Forces for the Liberation of Rwanda, an ethnic militia linked directly to the 1994 genocide against the Tutsi (MINAFFET, 2024).

The Rwandan government demonstrated dedication to enhancing security through the establishment of a community police council in 2007. Nevertheless, instances of doubt remain prevalent. Statistical documentation from the Rwanda Investigation Bureau indicates 34,179 crimes in 2017, 43,279 in 2018, 71,360 in 2019, and 86,713 in 2020. Crime escalated consistently since 2017, with total offenses reaching 73,414 in 2021, which included theft, assault, battery, narcotics trafficking, smuggling, and defilement (National Institute of Statistics of Rwanda, 2022).

Digital tools in Rwanda are not fully employed due to various obstacles, such as insufficient technical infrastructure, inadequate training for law enforcement, and public attitudes toward privacy and surveillance. In Musanze District, adjacent to unstable areas, the execution of digital security protocols remains critical. Local authorities and communities frequently face difficulties adopting and incorporating these innovations into routine security measures. The gaps in the aforementioned studies highlight a lack of focus on the effectiveness of digital technologies and systems in decreasing insecurity in Rwanda. Consequently, this research targets the academic parity gap in comprehending the role of digital tools and systems in mitigating insecurity in Musanze District.

## Literature Review

An empirical review is a section in academic research that summarizes and critically analyzes previous studies based on observed and measured phenomena. The empirical review focuses on real-world evidence, usually drawn from quantitative, qualitative, or mixed-methods studies.

### Surveillance Digital Tools and Reducing Insecurity

The research from Adeoluwa *et al.* (2025) investigated how digital technology combined with security architecture operates to combat Nigeria's insecurity problems and showed how this combination helps to sustain security systems. This research investigated digital systems' impact including surveillance technologies and how these capabilities strengthen security structures to combat rising security threats. The research emphasized how digital interventions build robust security defenses and maintain societal welfare by combating threats. The research utilized technological determinism theory to reveal that new digital tools reduce insecurity through improved monitoring systems alongside advanced tracking and faster response mechanisms. Investigation of primary and secondary information uncovered Nigeria's requirement for a robust security blueprint which integrates digital technology solutions. A clear relationship between digital technology and security architecture emerged from the findings which demonstrated their combined capability to produce lasting answers to security problems. According to the research Nigeria needs to implement effective digital security measures to protect its citizens from various security threats.

GAO (2024) evaluated 217 feedback submissions collected by the White House Office of Science and Technology Policy in 2023 to understand automated surveillance system impacts on workers. This research examined the applied surveillance technologies to understand their impact on employee performance and explored further consequences for employer relationships combined with employee mental health as well as work setting privacy and potential discrimination problems. The research identified typical workplace surveillance systems which included video cameras computer monitoring software geolocation tools wearable tracking devices that functioned to monitor productivity as well as safety and security. While there were productivity improvements employers saw stress and anxiety escalated along with trust erosion. The lack of clear data management created workplace monitoring privacy concerns alongside risk factors for discrimination directed at disabled employees. Health monitoring systems tracking heat risks served as advantages during this investigation while the study revealed major obstacles in unionization blockades and workers' mental health effects. This research offers core knowledge to steer upcoming explorations of workplace digital monitoring and associated supervisory systems together with their broad repercussions.

Malik *et al.* (2024) investigated how security technologies interact with mental health through their dual effects on mental well-being. This study investigated the mental health consequences both beneficial and detrimental to security measures including physical security systems alongside cybersecurity and surveillance techniques. People benefited from better protection together with decreased stress levels and stronger reassurance regarding safety. The review identified harmful effects of security systems such as privacy invasion alongside additional negative health effects like surveillance stress and paranoia. User perception together with trust acts as a foundational element impacting experiences with security technology. Research findings mandated user education alongside the application of ethical frameworks and technological progress as primary methods to reduce harmful effects. The research underscored the necessity for continuous interdisciplinary study to integrate security and mental health requirements so that society may benefit from an ethical safety framework accompanied by public understanding.

Padden (2023) studied how surveillance practices have evolved within the digitalisation discussions at the Organisation for Economic Co-operation and Development (OECD). The research investigated the development of OECD digitalisation policy since the 1970s to present-day with particular attention to how surveillance has raised democratic concerns. The study detected changing attitudes toward surveillance whereby public concern regarding democratic rights violation transformed into acceptance when surveillance was presented as a means to enhance customisation and economic progression or to safeguard public health. Research demonstrated that policies which were systematically built on firm principles such as "public interest" or "well-being" manifested dynamic transformations that displayed their foundational volatility. The analysis demonstrated the erratic character of democratic frameworks which allow previously rejected practices to become acceptable. The transformation shows how the changing nature of surveillance enables critical examination of their acceptance into democratic structures.

Ayegbo *et al.* (2022) researched how Information and Communication Technology (ICT) tools can help fight insecurity and terrorism within Osun State of Nigeria. Researchers

planned to assess insecurity impacts while investigating the role of ICT as possible resolution tools. Structured questionnaires and statistical analysis revealed 80 percent of survey participants identifying widespread insecurity which creates barriers for foreign investors, damages international views and halts developmental progress which leads to unemployment. Research participants confirmed that CCTV cameras as well as drones, GPS tracking devices and surveillance systems represent valuable security enhancement tools. Results demonstrated how government reform programs combined with these tools achieved both increased safety and economic development. According to the study strategic application of ICT technology produces security enhancements and diminishes terrorism thus creating opportunities for national socio-economic advancement.

## Theoretical Review

A theoretical review constitutes a critical component of academic research, evaluating the primary theories or models that support a study.

### Diffusion of Innovations Theory

Since its introduction by Everett Rogers in 1962, the Diffusion of Innovations Theory explains how different social systems adopt new technologies and practices throughout time. This theoretical framework examines fundamental elements including the item of innovation itself together with how the innovation spreads through communication pathways which determine the rate of adoption during different time frames across social structures (Ayisi *et al*., 2022). Attributes of innovations which influence adoption speed and extent encompass their relative benefit together with compatibility with current standards, simplicity, trialability, and visibility. According to a study conducted by Kuo *et al.* (2022), early adopters and innovators play a crucial role in introducing new inventions to their networks and spreading them farther afield.

Adoption is classified into five distinct categories: five distinct consumer groups drive innovation adoption including innovators, followed by early adopters, then early majority, and late majority, before reaching laggards at the end (Kolsi, 2023). Each population segment exhibits distinct attitudes about their willingness to adopt new changes. For successful decision-making and perception formation, this model demonstrates how both interpersonal and mass communication systems function as essential channels. Analysis of these dynamics enables the creation of strategies which promote technology uptake across healthcare, agricultural, and technical fields (Ayisi *et al*., 2022).

This research uses the Diffusion of Innovations Theory to investigate how the adoption and diffusion of digital technologies, such as surveillance, intelligence gathering, and communication platforms, affected the lowering of insecurity in Musanze District. Focusing on innovative characteristics, the research investigated the elements that facilitated quick and broad acceptance of these technologies within the community, stressing early adopters and the importance of social networks in expediting the diffusion process.

### Technological Determinism Theory

According to Technological Determinism Theory, technological advancement produces social pressures which direct human behaviors and define societal structures. Within technological

design debates, experts argue progress in technology directs historical development and social modifications (Hallström, 2022). Technological determinism appears as both a conceptual framework and a material influence on education and design sectors which establishes boundaries on human actions based on existing technological limits.

Jabłońska (2025) assesses how digital environments demonstrate technological determinism through an examination of social and structural relations. This analysis shows that technological determinism operates as a dominant factor in contemporary connections but should be examined together with human decision-making and the political economic context. The framework demonstrates that technology, though influential, remains open to dialogues of resistance and deliberate strategic choices enacted by stakeholders through their analytical framework.

Sandvik (2025) explores the relationship between technological determinism and institutional structures to offer a challenge to rigid determinist perspectives. This analysis demonstrates that structural changes do not always require technology and innovation because alternative models should examine how technological advances help build equitable and sustainable societies beyond standard growth paradigms. The perspective highlights innovation that breaks away from traditional constraints while framing technology as a socially constructed force capable of empowering society rather than controlling it.

The study used Technological Determinism Theory to investigate how technological advancements, particularly digital tools for surveillance, intelligence gathering, and communication, drove societal changes in security management within Musanze District. The study analyzed how these technologies influenced human behavior and societal structures, pushing for new responses to insecurity, despite potential resistance or adaptation strategies from local authorities and communities.

**Routine Activity Theory**

Lawrence Cohen and Marcus Felson originally created Routine Activity Theory (RAT) in 1979. The idea posits that crimes are more likely to occur when three factors combine: a motivated criminal, a suitable target, and a lack of adequate supervision. RAT, over time, has been used to analyze a variety of criminal activities, including domestic violence, cyberhate victimization, and phishing, as illustrated in contemporary criminological frameworks (Vakhitova, 2025).

Ahmad and Thurasamy (2022) studied cybercrime dynamics and cyberhate victimization among individuals and analyzed their findings using the Routine Activity Framework. Users became victimized on online platforms more frequently when they saw cyberhate incidents or revealed personal details on the web. The research showed instructive parental mediation decreases cyberhate victimization while restrictive parental mediation actually creates more risk. Through Routine Activity Theory, researchers learned about situational elements leading to victimization while advocating for better digital literacy and risk mitigation strategies (Ahmad & Thurasamy, 2022).

Vakhitova (2025) used RAT to explore patterns of community safety and situational crime prevention. According to the study, routine behaviors along with environmental shifts served as catalysts for behavioral outcomes. Incidents advanced because monitoring limitations and social isolation led to inadequate capable guardianship. According to the study, disruptions

to everyday routines caused by structural restrictions created new chances for crimes to happen, which demonstrates RAT's usefulness for analyzing changes in crime patterns under unusual circumstances.

Further adaptations of RAT investigate phishing as a prominent cybercrime activity. Researchers revealed how phishing grew into more targeted threats as criminals attacked valuable persons using spear-phishing from advanced technological means. These attacks succeed more frequently because capable guardians are missing when people lack both cybersecurity defenses and awareness training. Recent studies demonstrate routine activity theory's significance for explaining why internet habits help digital scams develop and continue (Ahmad & Thurasamy, 2022).

This study used Routine Activity Theory to explore how digital tools, such as surveillance, intelligence gathering, and communication systems, altered the routine activities in Musanze District, thereby reducing opportunities for crime. The theory helped identify how the convergence of technology, capable guardianship, and suitable targets minimized insecurity by disrupting criminal patterns and increasing preventative actions.

## Methodology

This study used a descriptive, correlational, qualitative, and quantitative research approach that included both primary and secondary data sources. A mixed-methods approach was adopted, with open-ended questions used to acquire qualitative data and closed-ended questions for quantitative data. Correlation analysis was used to assess the link between the variables specified in the conceptual framework. The target population included 248 participants including 46 RIB Officers, 107 RNP Staff, 15 Sector Executive Secretary, 12 District local leaders and 68 Local people per sector in Musanze District.

To compute the sample size for this research, the Slovin's formula was used as it provided a straightforward method for determining the appropriate sample size. The researcher employed the following formula:

$$n = \frac{N}{1 + N(e)^2}$$

When applied to the provided sample, this formula yielded a sample size of 153

$$n = \frac{248}{1 + 248\ (0.05)^2} = \frac{248}{1 + 248(0.0025)} = \frac{248}{1 + 0.62} = \frac{248}{1.62} = 153.08$$

The data was evaluated using descriptive statistics, inferential statistics (Bivariate Correlation Analysis), and a linear regression model. The researcher employed SPSS (Statistical Package for Social Scientists, version 25.0) data to analyze frequency, percentage, mean, and standard deviation.

## Research Findings

This section discusses the study's conclusions based on data acquired in the field. The analysis focuses on the study's overarching goal.

**Questionnaire Response Rate**

The response rate is the percentage of people who complete a survey or questionnaire compared to those who were invited or deemed qualified to participate. To calculate the response rate, divide the total number of completed surveys by the total number of eligible individuals.

**Table 1: Questionnaire's Response Rate**

| Questionnaire | Number | Percent |
|---|---|---|
| Complete | 131 | 85.6 |
| Unreturned | 22 | 14.3 |
| Total | 153 | 100.0 |

**Source: Field data, 2025**

Table 1 shows the questionnaire response rate, which was 85.6% (131 completed surveys from 153 eligible participants). Only 14.3% (22 answers) went unreturned. This demonstrates a high level of involvement and willingness among participants to submit comments, demonstrating their interest in the research on the effectiveness of digital technologies in decreasing insecurity in Musanze District.

**Findings on Surveillance digital tools in Musanze District**

The initial goal of the research was to determine the impact of surveillance digital technologies on decreasing insecurity in Musanze District. The findings revealed surveillance digital technologies in Musanze District. Table 4.6 displays all respondents' opinions using four indicators: drone use, surveillance cameras, live surveillance, and privacy issues.

**Table 2: Descriptive Analysis on Surveillance digital tools in Musanze District**

| | SD | D | N | A | SA | Mean | Std. Dev. |
|---|---|---|---|---|---|---|---|
| Drone usage has significantly improved security monitoring and crime prevention in Musanze District. | 6<br>4.6% | 8<br>6.1% | 14<br>10.7% | 60<br>45.8% | 43<br>32.8% | 3.96 | 1.048 |
| Surveillance cameras are strategically placed and effectively contribute to crime reduction in Musanze District. | 3<br>2.3% | 5<br>3.8% | 0<br>0.0% | 39<br>29.8% | 84<br>64.1% | 4.50 | .872 |
| Live surveillance has enhanced the real-time response of security agencies in Musanze District. | 4<br>3.1% | 16<br>12.2% | 7<br>5.3% | 70<br>53.4% | 34<br>26.0% | 3.87 | 1.033 |
| Privacy concerns are well managed, ensuring public confidence in surveillance tools in Musanze District. | 4<br>3.1% | 7<br>5.3% | 4<br>3.1% | 45<br>34.4% | 71<br>54.2% | 4.31 | .985 |
| **Overall** | | | | | | 4.16 | 0.985 |

**SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree and SA: Strongly Agree**

**Source:** Field Data, 2025

Table 2 summarizes the descriptive information for Musanze District's digital surveillance technologies. The total mean score of 4.16, which is high, and the standard deviation of 0.985 demonstrate respondents' significant positive agreement with the usefulness of these instruments, as well as heterogeneity across all claims.

Notably, the statement "Drone use has considerably increased security surveillance and crime prevention in Musanze District" received considerable support (agreed: 45.8%, strongly agreed: 32.8%). A minority of respondents disagreed (6.1% disagreed, 4.6% strongly disagreed). The mean score of 3.96 suggests substantial positive agreement, while the standard deviation of 1.048 indicates response variability. The cumulative agreement of 78.6% indicates a very strong positive perception of the effectiveness of drones in enhancing security measures. A local government official stated:

> *"The introduction of drones has revolutionized our security monitoring systems. They provide vital aerial views, allowing us to assess situations quickly. This technology has been instrumental in ensuring rapid responses to incidents, which ultimately benefits the community. Our residents express appreciation for the increased safety these measures bring."*

The statement, Surveillance cameras are strategically placed and effectively contribute to crime reduction in Musanze District, received notable support (agreed: 29.8%, strongly agreed: 64.1%). Disagreement was minimal (disagreed: 3.8%, strongly disagreed: 2.3%). The mean score of 4.50 suggests a high level of positive agreement, while the standard deviation of 0.872 reflects response homogeneity. The cumulative agreement of 93.9% reflects a very strong positive perception of the strategic placement and effectiveness of surveillance cameras within the district.

An RIB officer mentioned:

> *"The effectiveness of surveillance cameras in deterring crime cannot be overstated. Their strategic placement has made a noticeable difference in community safety. Residents frequently report a sense of security, knowing that potential criminal acts are being monitored. This transparency fosters a collaborative effort between law enforcement and the public."*

Live surveillance has enhanced the real-time response of security agencies in Musanze District. The mean score of 3.87 reveals strong positive perceptions (agreed: 53.4%, strongly agreed: 26.0%), although a minority disagreed (disagreed: 12.2%, strongly-disagreed: 3.1%). The standard*deviation of 1.033 illustrates variability in responses. The cumulative agreement of 79.4% indicates a very strong general support for the efficiency of live surveillance in improving security responses.

A local government representative stated:

> *"Live surveillance significantly enhances our ability to respond to incidents as they occur. This immediate monitoring allows us to deploy resources more efficiently. Community feedback shows that many people appreciate the real-time actions taken to address security threats. Our ability to mitigate crises quickly boosts trust in our policing operations."*

Privacy concerns are well managed, ensuring public confidence in surveillance tools in Musanze District. The statement received widespread support (34.4% agreed, 54.2% strongly agreed). A minority of respondents disagreed (5.3% disagreed, 3.1% strongly disagreed). The mean score of 4.31 indicates a high level of positive agreement, while the standard*deviation of 0.985 indicates response heterogeneity. The cumulative agreement of 88.6% emphasizes a very strong assurance regarding the management of privacy issues associated with surveillance practices.

An officer from the Rwanda National Police commented:

> *"Addressing privacy concerns is paramount as we implement security measures. We have taken steps to educate the public about how their data is used and stored. Transparency in our operations is key to building trust with our community. We continually seek feedback to improve our approach to handling privacy-related matters."*

Testimony from resident of Musanze District:

> "*In my experience, I faced issues of insecurity in my neighborhood, particularly during nighttime. The introduction of surveillance digital tools, such as surveillance cameras, has been instrumental in addressing these*

*concerns. I have personally witnessed police responding quickly to incidents captured on live surveillance feeds, which has deterred potential criminal activity. I truly appreciate these advancements in technology because they provide an added layer of security that helps us feel safe in our community*".

**Findings on Reducing Insecurity in Musanze District**

The part examined the third goal of the research, which assessed the reduction of insecurity in Musanze District. The findings indicated a reduction in insecurity in Musanze District. Table 4.9 shows all respondents' assessments of this feature in terms of safety, crime reduction, crime fear, and reaction time to events.

**Table 3: Descriptive Analysis on reducing insecurity in Musanze District**

| | SD | D | N | A | SA | Mean | Std. Dev. |
|---|---|---|---|---|---|---|---|
| The use of digital tools has increased the perception of safety among residents in Musanze District. | 2<br>1.5% | 4<br>3.1% | 4<br>3.1% | 43<br>32.8% | 78<br>59.5% | 4.46 | .825 |
| The implementation of digital security tools has contributed to a reduction in crime rates in Musanze District. | 8<br>6.1% | 7<br>5.3% | 0<br>0.0% | 36<br>27.5% | 80<br>61.1% | 4.32 | 1.132 |
| Digital surveillance has helped in minimizing the fear of crime among the local population in Musanze District. | 1<br>0.8% | 11<br>8.4% | 13<br>9.9% | 54<br>41.2% | 52<br>39.7% | 4.11 | .947 |
| The use of digital tools has significantly improved the response time to security incidents in Musanze District. | 3<br>2.3% | 3<br>2.3% | 0<br>0.0% | 70<br>53.4% | 55<br>42.0% | 4.31 | .793 |
| **Overall** | | | | | | 4.30 | .924 |

**SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree and SA: Strongly Agree**

**Source:** Field data, 2025

Table 3 shows descriptive information on decreasing insecurity in Musanze District. The total mean score of 4.30, which is quite high, and the standard deviation of 0.924 indicate that respondents strongly agree on the effects of different digital technologies on insecurity, with answers varying across all items.

The statement, the use of digital tools has increased the perception of safety among residents in Musanze District, achieved significant agreement (agreed: 32.8%, strongly agreed: 59.5%). A tiny percentage disagreed (disagreed: 3.1%; strongly disagreed: 1.5%). The mean score of 4.46 indicates extremely significant positive agreement, while the standard deviation

of 0.825 implies considerable consistency in replies. The cumulative agreement of 92.3% indicates a strong positive perception of the influence of digital tools on residents' safety perception.

A member of the RIB stated:

> *"The integration of digital tools has notably enhanced how residents perceive their safety. Many community' members report feeling more secure due to increased surveillance and monitoring. This boost in confidence encourages public engagement and participation in community initiatives. A secure environment fosters community ties, leading to a more vibrant society."*

The implementation of digital security tools has contributed to a reduction in crime rates in Musanze District. The statement received significant agreement (agreed: 27.5%, strongly agreed: 61.1%), while opposition was modest (disagreed: 5.3%, strongly disagreed: 6.1%). The mean score of 4.32 suggests a substantial positive agreement, whereas the standard deviation of 1.132 demonstrates heterogeneity in replies. The cumulative agreement of 88.6% emphasizes recognition of the effectiveness of digital security measures in crime reduction.

A district official expressed:

> *"The deployment of digital security tools has marked a turning point in our crime reduction efforts. The data consistently indicate that these tools have a direct impact on deterring criminal activity. Community members report feeling safer knowing that there are advanced monitoring systems in place. The collaboration among various agencies, along with technology, has proven to be very effective in ensuring the safety of residents."* Digital surveillance has helped in minimizing the fear of crime among the local population in Musanze District. The degree of agreement was high (agreed: 41.2%, strongly agreed: 39.7%), whereas dissent was minimal (9.9%, strongly disagreed: 0.8%). The mean score of 4.11 indicates significant positive agreement, while the standard deviation of 0.947 indicates a range of perspectives. The cumulative agreement of 80.9% suggests that many see the value of digital surveillance in alleviating fear.

An officer from the Rwanda National Police mentioned:

> *"Digital surveillance technology has significantly reduced the fear of crime in our communities. By providing visible reassurance, these tools help individuals feel more secure in public spaces. Increased awareness and understanding of these technologies promote community engagement and responsibility. When residents feel safe, they are more likely to participate in community activities, which further strengthens neighborhood bonds."*

The use of digital tools has significantly improved the response time to security incidents in Musanze District. The statement received considerable agreement (agreed: 53.4%, strongly agreed: 42.0%), with little opposition (disagreed: 0.0%, strongly disagreed: 2.3%). The mean score of 4.31 shows considerable positive agreement, while the standard deviation of 0.793 suggests some consistency in replies. The cumulative agreement of 95.4% indicates a very strong positive perception of the impact of digital tools on response times.

A member of the local security forces stated:

*"The efficiency of our response capabilities has been greatly enhanced through the use of digital tools. Immediate access to information and monitoring capabilities allows us to act swiftly during incidents. Residents often express their gratitude for the quick interventions made possible through advanced technology. This responsiveness not only addresses issues promptly but also reinforces public trust in our security measures."*

Testimony from resident of Musanze District:

"*I personally feel safer, and I've seen fewer reports of crimes like theft and assault in our local area. The fear of crime has gone down nowadays, even women and children feel comfortable walking home in the evening. Also, the speed with which police or local security respond to incidents has really improved, giving us more confidence in the system*".

**Inferential Statistics**

The purpose of inferential statistics is to draw conclusions from a statistical sample. Examples of inferential statistics procedures include correlation analysis, hypothesis testing, confidence intervals, and regression analysis.

**Table 4: Correlations**

| | | Surveillance Digital tools | Reducing insecurity |
|---|---|---|---|
| Surveillance Digital tools | Pearson Correlation | 1 | .711** |
| | Sig. (2-tailed) | | .000 |
| | N | 131 | 131 |
| Reducing insecurity | Pearson Correlation | .711** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 131 | 131 |

**. Correlation is significant at the 0.01 level (2-tailed).

**Source: Field data, 2025**

Table 4 shows the relationship between the independent factor and the dependent variable, insecurity decrease in Musanze District. The correlation coefficient between surveillance digital technologies and reduced insecurity is 0.711, with a p-value of 0.000, indicating a significant positive relationship at the 0.05 level. This suggests a substantial relationship between surveillance digital tools and reduction of Insecurity.

**Table 5: Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .711[a] | .505 | .501 | .18851 |

a. Predictors: (Constant), Surveillance Digital tools

**Source: Field data, 2025**

The regression model summary in Table 5 establishes the proportion of variance explained through the predictor variable within the target administrative area. The coefficient of determination shows that $R^2 = 0.505$, meaning that 50.5% of the variance in reducing insecurity within Musanze District is attributable to the implementation of surveillance digital tools. External factors omitted from this specific framework account for the remaining 49.5% of the variance in local security levels.

**Table 6: ANOVA**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 4.681 | 1 | 4.681 | 131.723 | .000[b] |
| | Residual | 4.584 | 129 | .036 | | |
| | Total | 9.265 | 130 | | | |

a. Dependent Variable: Reducing insecurity

b. Predictors: (Constant), Surveillance Digital tools

The Analysis of Variance framework in Table 6 tests the statistical acceptability of the regression model applied to the security data from Musanze District. The computed F statistic equals 131.723, with degrees of freedom allocated as 1 for the regression and 129 for the residual. The associated significance value is 0.000, establishing that the variance explained through the regression model exceeds random residual variations. Therefore, the linear model operates as a statistically valid prediction instrument for assessing security outcomes within Musanze District.

**Table 7: Coefficients**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 1.829 | .225 | | 8.142 | .000 |
| | Surveillance Digital tools | .594 | .052 | .711 | 11.477 | .000 |

a. Dependent Variable: Reducing insecurity

**Source:** Field data, 2025

The coefficients data in Table 7 provides the specific parameters necessary to construct the linear regression equation for this study in Musanze District. The constant value equals 1.829, generating a t statistic of 8.142 and a significance value of 0.000. The unstandardized coefficient for surveillance digital tools stands at 0.594, with a t statistic of 11.477 and a significance value of 0.000. The standardized coefficient where beta = 0.711 confirms a direct positive effect on the security outcome metric.

## Discussion

The empirical findings align with automotive and remote surveillance literature regarding intelligence gathering infrastructure. Studies indicate that digital technology integration enhances security operations through advanced monitoring systems, confirming that surveillance cameras, live tracking, and privacy protocols strengthen security structures against rising threats. The descriptive data from Musanze District indicates that surveillance digital tools, drone usage, and intelligence gathering support proactive crime prevention. Furthermore, communication and response digital tools, such as emergency hotlines and digital reporting mechanisms, improve law enforcement response times and public safety perceptions (Shehu *et al*., 2022).

The results correspond with the Diffusion of Innovations Theory, which establishes that the adoption and spread of new technologies depend on perceived advantages and social communication channels. This study demonstrates that surveillance digital tools, including drone usage, surveillance cameras, and live monitoring, achieved widespread adoption across the region. This systematic uptake facilitates improved tracking mechanisms and strict security enforcement within Musanze District (Kuo *et al*., 2022).

The data mirrors contemporary assessments of automated surveillance applications, which highlight the positive effects of monitoring systems alongside concurrent challenges related to public privacy concerns. The correlation analysis for Musanze District established a strong association between surveillance digital tools and decreased insecurity, illustrating the delicate balance between monitoring efficacy and community privacy anxieties (Sandvik, 2025).

The outcomes find support in criminological analyses examining how digital tools affect public security perceptions and institutional trust. Evidence indicates that surveillance instruments, including drones and live monitoring networks, contribute directly to public trust, while intelligence gathering and communication platforms improve security service responsiveness. The regression coefficients analysis for Musanze District confirms that digital monitoring techniques significantly reduce local insecurity, demonstrating that automated security measures enhance safety perceptions and reduce the fear of crime within localized communities (Vakhitova, 2025).

## Conclusion

On surveillance digital tools, respondents indicated that these tools significantly contribute to enhancing security measures, with strong perceptions of their effectiveness in monitoring and crime prevention in Musanze District. Hypothesis tested confirmed that all digital tools have statistically significant effects on reducing insecurity indicating strong relationships between digital tools and systems with reducing insecurity in Musanze District.

## Recommendations

Based on the study findings, the following recommendations are made:

Rwanda Investigation Bureau is recommended to enhance training programs on the use of surveillance digital tools to optimize their effectiveness in Musanze District.

Rwanda National Police should implement real-time data analytics in intelligence gathering to improve decision-making capabilities and security responses in Musanze District.

Local Government Officials have to increase investment in cybersecurity and communication infrastructure to support digital initiatives in Musanze District.

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