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From Surveillance to Prevention: Leveraging ICT Tools for Enhanced Crime Detection and Security Management

Moses Adeolu Agoi[1], Zohaib Hassan Sain[2*], Oluwanifemi Opeyemi Agoi[3]
[1]Lagos State University of Education, Lagos, Nigeria
[2]Superior University, Lahore, Pakistan
[3]Obafemi Awolowo University, Osun, Nigeria

*Corresponding Author: zohaib3746@gmail.com
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Abstract:

Integrating revolutionary technologies in crime detection and prevention has transformed the landscape of modern security systems. This study aims to analyze the role and effectiveness of advanced Information and Communication Technology (ICT) tools, including facial recognition, thermal sensors, drones, GPS tracking systems, and real-time surveillance cameras, in enhancing crime prevention strategies. This research uses a descriptive survey approach. Data was collected through an online questionnaire distributed to 100 respondents using a non-probability sampling method. Data analysis uses a descriptive approach to describe the use of ICT in crime detection and prevention. The findings reveal that public awareness of ICT tools is increasing, with significant recognition of their potential to support connectivity, intelligence gathering, and proactive security measures. Advanced technologies were identified as essential in improving response times, enabling real-time monitoring, and enhancing the overall efficiency of crime prevention systems. Correlating with previous research, the study confirms that ICT tools provide innovative solutions for combating crime and fostering a sense of security within communities. These insights emphasize the need for continuous innovation and policy support to integrate cutting-edge ICT tools into law enforcement frameworks, ensuring adaptability to evolving security challenges.

Key Words: *Crime Prevention, Surveillance Technologies, Security Challenges*

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INTRODUCTION

Crime and security issues are among societies' most pressing social challenges worldwide (Apenov et al., 2021; Lutsenko et al., 2023). The rapid growth of urbanization and technological advancements have led to increasingly sophisticated methods of committing crimes (Chango et al., 2024; Errol et al., 2021). Modern criminal activities, from cybercrime to organized theft, demand innovative solutions beyond traditional law enforcement techniques. Leveraging revolutionary technologies has become essential to address the complexity and

scale of modern crimes. Facial recognition systems, GPS trackers, and artificial intelligence (AI) analytics have proven instrumental in crime detection and prevention efforts (Omolara et al., 2022; Valavanidis, 2023; Yue & Shyu, 2024). As security threats continue to evolve, societies must adapt by integrating advanced technologies into law enforcement strategies to enhance safety and deter criminal activities effectively.

The importance of technology in crime detection and prevention is well-documented in the literature. Revolutionary technologies, such as biometric authentication systems and data analytics platforms, are often highlighted as transformative tools in modern security frameworks (Awad et al., 2024; Jaime et al., 2023). Integrating AI and machine learning in surveillance systems has significantly increased the efficiency of identifying potential threats in urban environments (Alahi et al., 2023; Heidari et al., 2022). Damaševičius et al. (2023) emphasize the role of IoT-enabled devices, such as smart cameras and sensors, in creating real-time situational awareness for security agencies. Advances in cybersecurity tools have proven effective in combating the growing prevalence of digital crimes (Mallick & Nath, 2024; Aslan et al., 2023). These technologies, supported by advancements in cloud computing and big data, enable the processing and analysis of massive volumes of information, providing law enforcement agencies with actionable insights (Alshabibi et al., 2024). The literature underscores the transformative potential of these technologies in redefining traditional approaches to crime detection and prevention.

Several studies have provided empirical evidence supporting the effectiveness of revolutionary technologies in crime prevention. He and Zheng (2021) demonstrated the role of predictive analytics in reducing crime rates in urban neighborhoods by identifying high-risk areas. The deployment of drones for surveillance in rural and urban settings highlights their cost-effectiveness and ability to monitor large areas (Kamarulzaman et al., 2023). Research by Zhang et al. (2022) focused on applying heat sensors and motion detectors in securing critical infrastructures, reporting a significant reduction in trespassing incidents. The role of social media analytics in tracking criminal networks, finding it particularly effective in uncovering organized cybercrime operations (Ramírez Sánchez et al., 2021; Sarkar & Shukla, 2023). Atlam et al. (2024) emphasized the importance of integrating blockchain technologies in securing forensic data, reducing the risk of evidence tampering. These studies collectively illustrate the versatility and impact of revolutionary technologies across various aspects of crime detection and prevention.

The main objective of this study is to explore how revolutionary technologies aid security tools in crime detection and prevention. The study evaluates the effectiveness of advanced tools such as AI-based analytics, IoT-enabled devices, and biometric systems in addressing various security challenges. The study attempts to identify the limitations and ethical issues

associated with implementing these technologies, particularly regarding data privacy and security, based on questionnaire responses.

Revolutionary technologies, as the study argues, are complementary and essential tools for modern crime detection and prevention strategies. The technology's ability to process large amounts of data, predict crime patterns, and provide real-time monitoring makes it indispensable in combating complex security threats. However, the widespread adoption of these devices requires careful consideration of ethical and regulatory aspects to prevent misuse. While challenges such as data privacy issues and potential bias in AI algorithms remain, the benefits of leveraging these technologies far outweigh the risks. By advancing the understanding of their applications and limitations, this study explores the integration of revolutionary technologies as an original research contribution as well as a cornerstone of modern crime prevention strategies, ensuring effectiveness and accountability in addressing contemporary security challenges.

RESEARCH METHOD

This study uses a descriptive survey approach to identify and describe the use of Information and Communication Technology (ICT) tools in detecting and preventing crime. This survey method was chosen to obtain an overview of how ICT is applied to prevent and detect crime effectively. Data were collected through interviews using an online questionnaire distributed via Google Forms. Using Google Forms simplifies the data collection because respondents can provide information directly and efficiently (Matović & Ovesni, 2023).

The sample in this study consisted of 100 respondents selected using a non-probability sampling method (free sampling). This method was chosen because it does not require each member of the population to have an equal opportunity to be selected as a sample, making it more flexible in certain situations. To ensure the reliability of the data obtained, the questionnaire instrument was tested using Cronbach's Alpha analysis, which produced a value of 0.79. This value indicates that the research instrument is reliable and can be used in further analysis without concerns about inconsistency of results.

The entire research process, from preparation to data collection and analysis, was completed within 43 days. Reliability analysis was conducted to measure the consistency of the measurement scale, with results that meet good reliability standards (≥ 0.7). This approach provides clarity in data collection methods, instrument validation, and the duration of research implementation. This supports the validity and transparency of the overall research process, making the results more reliable and representative. Data analysis in this study involved several steps (Batt & Kahn, 2021). First, descriptive analysis was used to identify patterns and describe the use of ICT in crime prevention and detection, such as frequency distribution, percentage, and average. Furthermore, to ensure the reliability of the questionnaire instrument, Cronbach's Alpha analysis was used, which produced a value of 0.79, indicating that the instrument

used had good reliability. In addition, qualitative analysis can also be used to dig deeper into open-ended responses from respondents. Data processing uses statistical software such as SPSS or Excel to calculate frequency distributions and further analysis.

RESULT AND DISCUSSION

Result

Understanding ICT Tools and Their Components

Information and Communication Technology (ICT) in the modern era has become integral to everyday life, playing a vital role in supporting connectivity and communication. Public understanding of ICT tools and their components is essential to understanding their benefits and applications. This shows that the public is increasingly aware that ICT tools include modern digital infrastructure, such as the Internet and wireless networks, and older technologies, such as telephones, radios, and televisions. Respondents also highlighted that these technologies play a significant role in providing access to connectivity that supports various aspects of life, from communication to security. Thus, this data reflects a positive view and high awareness of the importance of ICT tools in supporting digital transformation.

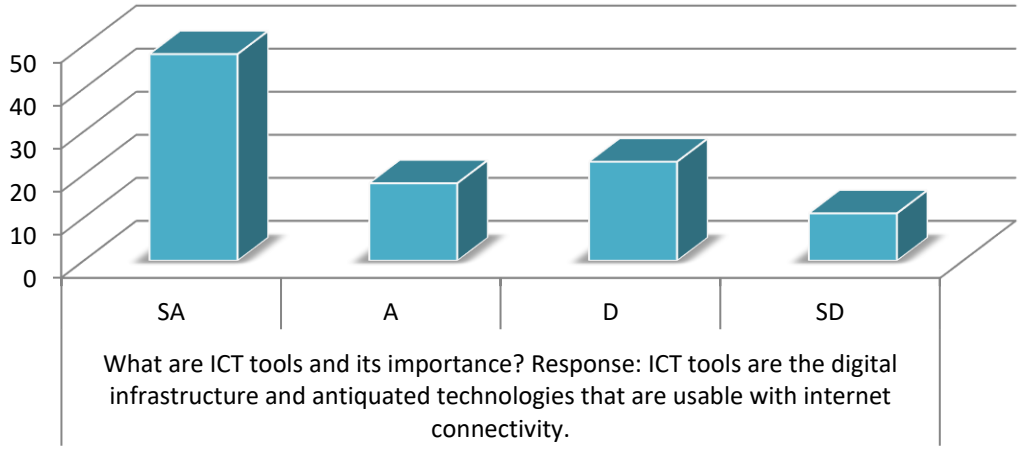

Figure 1. Chat Analysis

Figure 1 clearly shows that the majority of the respondents, 64%, align with the given conception of ICT tools and their importance. The respondents explain that ICT tools are the digital infrastructure and antiquated technologies usable with internet connectivity. According to the respondents, ICT tools include mobile devices' internet and wireless networks. In addition, the respondents also mentioned other antiquated technologies such as telephones, landlines, radio, and television as parts of ICT tools.

The graph shows the distribution of respondents' responses to questions regarding Information and Communication Technology (ICT) tools and their importance. The majority of respondents, 48 people, are in the Strongly Agree

(SA) category, indicating that they strongly agree with the concept that ICT tools are digital infrastructure and technology that can be used with internet connectivity.

The Agree (A) category recorded 18 respondents (18%) who agreed with the statement, although they did not behave in the SA category. This shows that most respondents support the importance of ICT tools, including wireless networks and devices that support internet connectivity. In contrast, the Disagree (D) category was only submitted by 23 respondents (23%), who were less supportive of the statement. The last category, Strongly Disagree (SD), had 11 respondents (11%) who completely disagreed with the concept.

The data shows that 70% or more than two-thirds of respondents have a positive view of the role of ICT tools in supporting connectivity and digital technology. In contrast, only a small portion of the population has a different view. These results underline the high awareness of the relevance of ICT tools, including older technologies such as telephones and radios, which are still considered relevant in supporting communication in the digital era.

The Role of ICT in Crime Detection

Information and Communication Technology (ICT) To detect crime effectively, it has become an important tool for law enforcement and security agencies. ICT tools such as live streaming cameras, drones, and gunshot detection systems provide real-time surveillance capabilities that enable early detection and rapid response to criminal activity. Live streaming cameras allow for continuous monitoring in strategic locations, while drones provide the ability to access areas difficult for humans to reach. In addition, gunshot detection systems can precisely identify the location of gunshots, helping security forces respond to incidents immediately.

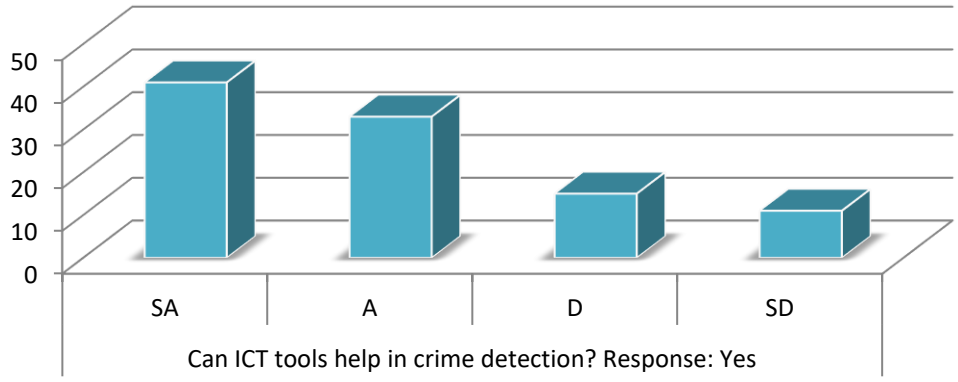

Figure 2. Chat Analysis

Figure 2 indicates that most of the respondents, about 74%, openly support the idea that ICT tools are significantly useful in crime detection. According to the respondents, integrating gadgets such as live-streaming

cameras, license plate-reading cameras, drones, gunshot detection equipment, and other related technologies allows security agents to combat crime at their fullest capacity. The respondents conclusively inferred that real-time crime centers are now increasingly becoming important.

ICT Tools for Security Enhancement

Information and Communication Technology (ICT) has significantly improved public safety through various tools to detect and prevent potential threats. Tools such as Closed-Circuit Television (CCTV), metal detectors, and emergency call systems create a safer environment. CCTV allows continuous surveillance in public and private areas, helping security forces monitor suspicious activity in real-time. Metal detectors are widely used in strategic places such as airports, schools, and government buildings to prevent the entry of dangerous objects. Meanwhile, emergency call systems provide quick access for the public to report incidents or seek emergency assistance. Based on the data, more than two-thirds of respondents considered that these tools improve security and provide a greater sense of security for the public. This confirms that implementing ICT technology is a strategic step in supporting more proactive public safety efforts.

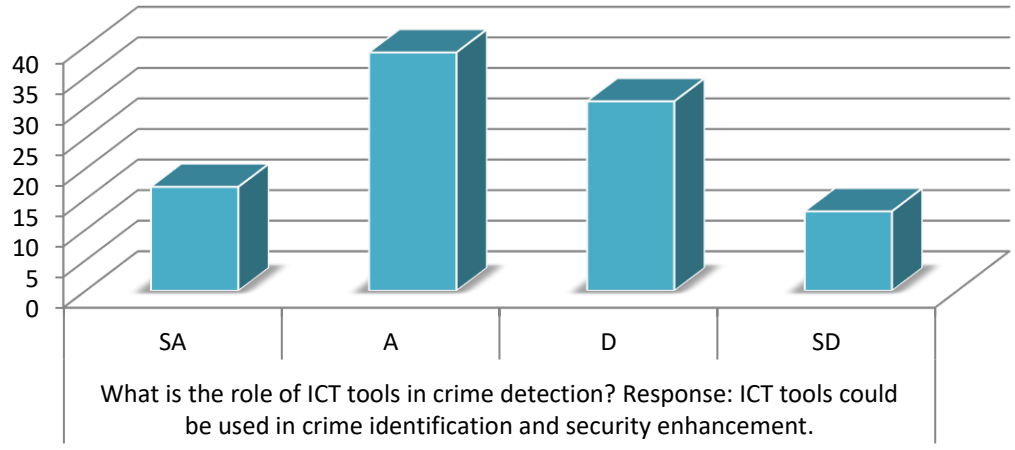

Figure 3. Chat Analysis

Figure 3 depicts that a greater number of the respondents, representing more than two-thirds, assert that the use of ICT tools cannot be undermined. According to the respondents, ICT tools could be useful in crime identification and security enhancement. The respondents explain further that ICT could play a key role in crime detection and societal security. In addition, ICT tools such as Closed-Circuit Television (CCTV), metal detectors, GPS trackers, emergency call systems, biometrics, scanners, and bomb detectors are useful technologies that could help improve security.

ICT as a Platform for Crime Prevention

Information and Communication Technology (ICT) has developed into a very effective platform for supporting crime prevention efforts. Various ICT tools and technologies, such as social media, mobile phones, and other telecommunications networks, are now widely used by security forces to gather intelligence and monitor suspicious activities. Social media, for example, is a rich data source for detecting potential threats or suspicious behavior through analyzing communication patterns. Mobile phones and telecommunications networks allow for location tracking, call monitoring, and collecting digital evidence that can be used in investigations.

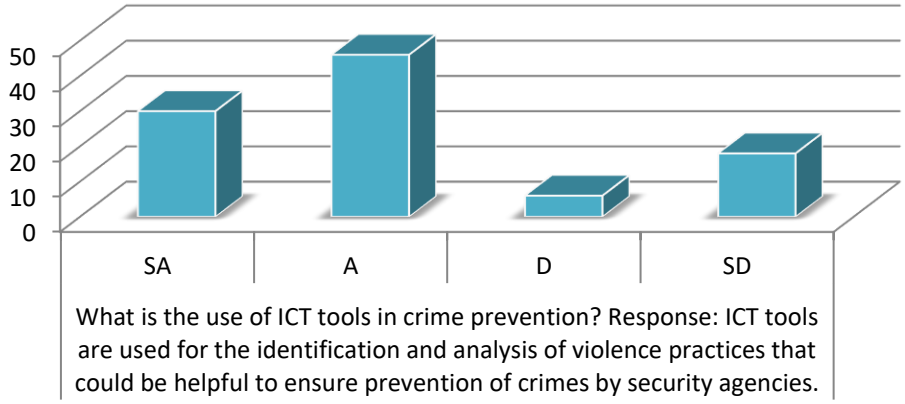

Figure 4. Chat Analysis

Figure 4 indicates that a huge number of respondents derived as 75% indicate that a huge number of the respondents agree that technology tools can essentially be used to help fight against crime. The respondents explain that ICT tools can be used to detect, identify, and analyze the occurrence of violence, which could help ensure the prevention of crimes by security agencies. The respondents further mentioned that ICT tools such as mobile telephones, the internet, social media networks, and other telecommunication media are increasingly becoming veritable platforms for intelligence gathering by security agencies.

Revolutionizing Crime Prevention with Advanced ICT Tools

Information and communication technology (ICT) advances have revolutionized the way crime is prevented and handled through sophisticated tools. Technologies such as facial recognition, thermal sensors, and GPS tracking systems are now the main weapons in dealing with serious crimes and tracking criminals. Facial recognition allows for quick and accurate identification of individuals, even in crowds, thus helping security forces track criminals. Thermal sensors detect the presence of humans or suspicious activity in hard-to-reach areas, such as closed buildings or forested areas. GPS tracking systems allow real-time tracking of vehicles, goods, or individuals associated with criminal activity.

Based on the data, most respondents support using this technology because of its ability to increase efficiency and effectiveness in detecting, analyzing, and preventing crime. By utilizing these sophisticated tools, security forces can provide a faster and more precise response, creating a more resilient and adaptive security system.

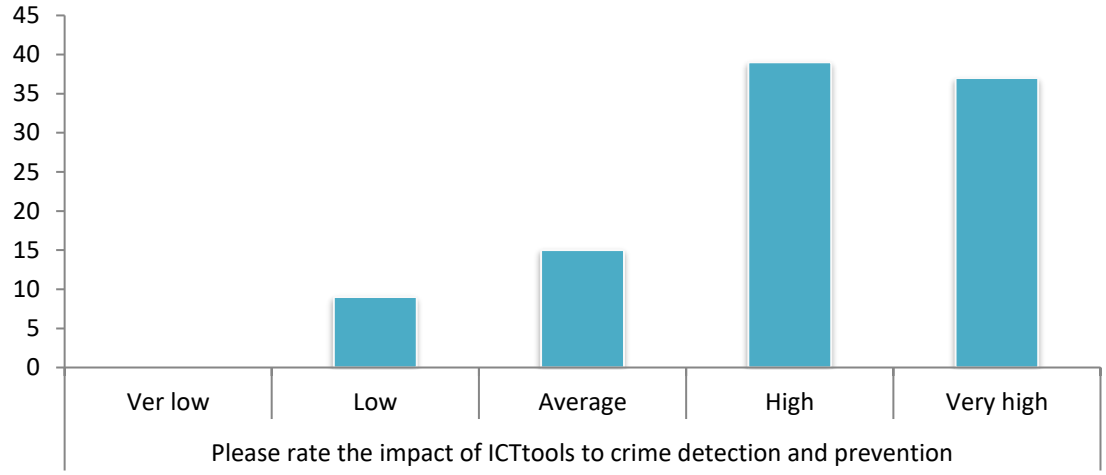

Figure 5. Chat Analysis

Figure 5 shows the significance of using ICT tools in crime detection and prevention. Therefore, revolutionary tools such as surveillance cameras, facial recognition systems, GPS tracking systems, data gathering systems, heat sensors, and Internet and telecommunications systems could effectively address serious offenses and criminal haunting or tracking tasks.

Discussion

The findings on the public's understanding of ICT tools and their components highlight the increasing awareness of digital technologies and their significance in modern life. Public awareness of ICT directly correlates with the successful adoption of digital tools to enhance communication and security. Celik (2023) emphasized that a clear understanding of ICT components allows more effective utilization of these tools in diverse fields. The respondents' recognition of modern and traditional technologies reflects a comprehensive perspective, aligning with Mondejar et al. (2021) assertion that integrating older communication systems with modern ICT infrastructure enhances overall connectivity and functionality.

The role of ICT in crime detection, as supported by the study findings, aligns with prior research demonstrating the efficacy of advanced technologies in law enforcement. Yue and Shyu (2024) showed that live-streaming cameras improve situational awareness, enabling quicker responses to criminal activities. The utility of gunshot detection systems corroborates findings by Omolara et al. (2022), who noted their significant impact on reducing response times in urban

crime hotspots. These technologies collectively demonstrate the transformative potential of ICT in enhancing law enforcement capabilities.

ICT tools for security enhancement, such as CCTV, metal detectors, and emergency call systems, have proven indispensable in creating safer environments. Panpet and Rugwongwan (2023) emphasized the role of CCTV in deterring crime through continuous surveillance, while Surawan et al. (2022) highlighted the effectiveness of metal detectors in preventing the entry of dangerous objects in high-risk areas. As discussed by Heidari et al. (2022), emergency call systems ensure prompt communication during crises, facilitating immediate assistance. The widespread adoption of these tools reflects their critical role in modern security frameworks, reinforcing the need for continuous innovation to address emerging threats.

The use of ICT as a platform for crime prevention is further validated by prior studies emphasizing its role in intelligence gathering and monitoring. Research by Quach et al. (2022) highlighted the effectiveness of social media analytics in identifying potential threats and criminal networks. The utility of mobile phone data in tracking criminal activities and providing critical evidence (Abiodun et al., 2022; Mallick & Nath, 2024). Jaime et al. (2023) explored telecommunications networks' role in enabling real-time location tracking, emphasizing their importance in proactive crime prevention strategies. These findings underscore the versatility of ICT as a tool for both reactive and preventive measures in combating crime.

Revolutionary technologies, such as facial recognition, thermal sensors, and GPS tracking systems, represent a significant leap forward in crime prevention strategies. Juneja and Rana (2021) found that facial recognition technology improves the accuracy and speed of suspect identification, even in high-density environments. Errol et al. (2021) are particularly effective in detecting human presence in concealed areas, enhancing search-and-rescue operations. As Lutsenko et al. (2023) noted, GPS tracking systems provide real-time data critical for monitoring and apprehending suspects. These tools' integration into security systems ensures a comprehensive approach to tackling modern security challenges, reaffirming the findings of this study and their relevance in addressing complex criminal activities. Hopefully, these findings can be used to reference revolutionary technology in everyday life.

CONCLUSION

This study emphasizes the importance of using ICT technology in crime detection and prevention in response to the increasing criminal activities that threaten society globally. This technology has great potential to help combat disturbing criminal behavior, but the role of government remains crucial in ensuring maximum protection of life and property. Based on the study's findings, it is recommended that the government and security stakeholders actively adopt this cutting-edge technology, provide modern ICT facilities for all security

operators, and implement policies that require regular training to enhance their ability to utilize the technology. In addition, a special department under the Ministry of Justice is needed to oversee the operation and maintenance of ICT technology to ensure its long-term effectiveness in providing maximum security to the community.

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