Unveiling Justice: Exploring the Effectiveness of CCTV Cameras in Crime Detection and Identification

Glydelle M. Radoc[1], Felipe T. Talento[2], Val A. Aban[3], John Daryl N. Acas[4], Dr. Junvil A. Insong[5]

College of Criminology, Misamis University, Oroquieta City, Philippines

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ABSTRACT

Surveillance cameras have increasingly become an important component of local crime prevention initiatives and urban security systems. This study examined the effectiveness of closed-circuit television (CCTV) cameras in crime detection and suspect identification in one of the cities in Misamis Occidental, Philippines. The research aimed to explore how surveillance technology contributes to crime prevention, investigative processes, and community safety within the local context. A qualitative research design was employed, utilizing in-depth interviews with selected participants who were knowledgeable about the city's surveillance operations and public safety practices. Data gathered from the participants were analyzed using thematic analysis in order to identify recurring patterns and perspectives regarding the implementation and performance of CCTV systems. The analysis generated five major themes that describe the perceived effectiveness and operational realities of surveillance cameras in the city. These themes include: (1) perceived effectiveness of surveillance cameras in crime prevention and detection, (2) role of CCTV in solving specific crimes, (3) challenges and limitations of CCTV use, (4) responses and workarounds to surveillance gaps, and (5) recommendations for system improvement. The findings suggest that surveillance cameras contribute to crime monitoring and investigative efforts, although their effectiveness is influenced by technical limitations, system coverage, and maintenance practices. Strengthening surveillance infrastructure, improving monitoring capabilities, and fostering collaboration between local authorities and community stakeholders may further enhance the impact of CCTV systems on public safety. The study recommends continuous system upgrades, strategic expansion of camera coverage, and stronger coordination among local government units, law enforcement agencies, and private establishments to improve the overall effectiveness of surveillance operations in the city.

Keywords: CCTV surveillance, crime prevention, crime detection, urban security, surveillance technology, public safety

INTRODUCTION

Rationale of the Study

Surveillance cameras have become a fundamental component of contemporary urban security frameworks, contributing significantly to crime prevention and the enhancement of public safety (Liang et al., 2025). Empirical evidence indicates that strategically deployed CCTV systems can deter criminal behavior and improve law enforcement's capacity to resolve offenses by providing clear visual records of incidents (Gómez et al., 2021). As a selected city in Misamis Occidental, Philippines adopts more advanced surveillance technologies, evaluating their practical effectiveness in actual community settings is vital for informing law enforcement strategies and optimizing public safety policies.

The influence of surveillance cameras on crime reduction is shaped by multiple factors, including the number of cameras installed, their strategic placement, and their technological capabilities. Research demonstrates that areas with greater CCTV coverage often report reductions in crime (Feng et al., 2026).

Despite these benefits, the presence of cameras alone does not guarantee improved outcomes. Effective implementation requires proper placement, maintenance, and community engagement. Studies show that public awareness and cooperation enhance the deterrent effect of surveillance (Ardabili et al., 2024).

This study aims to evaluate the effectiveness of surveillance cameras in crime detection and suspect identification within a selected city in Misamis Occidental, Philippines. By examining operational outcomes and community perceptions, the research seeks to produce evidence-based insights to guide law enforcement strategies and improve public safety.

Statement of the Problem

This study aimed to examine the effectiveness of surveillance cameras in one of the cities of Misamis Occidental, exploring their impact on crime prevention, the challenges faced in their implementation, and possible improvements to enhance their role in public safety.

Specifically, the study endeavored to answer the following questions:

1. How effective are surveillance cameras in crime detection, prevention, and suspect identification?
2. What challenges or limitations hinder their use?
3. What measures can improve their effectiveness?

METHODS

This study adopted a qualitative phenomenological approach, guided by Colaizzi's framework, to explore the effectiveness of surveillance cameras in crime detection and identification in one of the cities in Misamis Occidental, Philippines. In-depth, semi-structured interviews were conducted to capture participants lived experiences and perceptions regarding public safety, security, and operational effectiveness of CCTV systems, focusing on incidents such as theft, vandalism, and violent crimes. This approach enabled the collection of rich, contextual insights into how surveillance technology influences crime monitoring and suspect identification.

Data were collected from twelve purposively selected employees of the City Disaster Risk Reduction Management Office, all directly involved in monitoring public spaces. Participants met inclusion criteria ensuring familiarity with CCTV operations, including at least one year of experience and involvement in incidents where surveillance footage was utilized. A researcher-designed interview guide was used, consisting of sections that addressed background information, perceptions of CCTV effectiveness, challenges encountered, and overall reflections. The instrument underwent expert validation, and pilot interviews were conducted to ensure reliability.

Interviews were audio-recorded, transcribed verbatim, and analyzed using Colaizzi's method, emphasizing a systematic extraction of significant statements, formulation of meanings, and thematic clustering. To enhance credibility, findings were cross-checked with participants for accuracy. Dependability was ensured through detailed documentation of procedures, while confirmability was maintained by transparent data management and audit trails, minimizing researcher bias. Ethical considerations, including informed consent, confidentiality, and adherence to the Data Privacy Act of 2012, were strictly observed throughout the study.

This approach allowed for a rigorous exploration of both operational and perceptual dimensions of surveillance camera effectiveness, generating findings that are trustworthy, contextually grounded, and relevant for informing policy and practice in urban security management.

RESULT AND DISCUSSION

Theme 1: Perceived Effectiveness of Surveillance Cameras in Crime Prevention and Detection

Sub-theme: Visible Decline in Crime Rates Due to Surveillance

Participants consistently perceived surveillance cameras as an effective tool for reducing criminal activities in areas where they are installed. Respondents observed that locations equipped with CCTV coverage experienced fewer incidents of robbery and theft compared with areas lacking surveillance infrastructure. One participant estimated that crime incidents declined by approximately ten percent in monitored areas, while theft and robbery cases appeared to decrease even more significantly. Rather than presenting general perceptions alone, these findings indicate a pattern in which CCTV presence is directly associated with reductions in property-related crimes, suggesting a deterrence effect in monitored environments.

Empirical research supports these perceptions. Recent studies indicate that the presence of CCTV systems in public areas can contribute to measurable reductions in certain types of crime, particularly property-related offenses. For example, research examining contemporary surveillance programs found that CCTV deployment in urban areas was associated with reductions in opportunistic crimes such as theft and vandalism due to the increased likelihood of detection (Piza et al., 2020). Similarly, a systematic review of surveillance interventions reported that visible camera systems can deter offenders by increasing perceived risks of identification and apprehension (Welsh et al., 2020).

These findings are consistent with studies conducted in other cities and urban regions, where CCTV systems have shown stronger effectiveness in reducing property crimes than violent offenses. This alignment suggests that the observed outcomes in the study area reflect broader criminological patterns, thereby strengthening the external relevance of the results.

Despite these positive outcomes, the effectiveness of CCTV systems is not uniform across all contexts. Some studies suggest that surveillance technologies may have limited influence on violent crimes and may produce only modest reductions in other offense categories. Research evaluating actively monitored surveillance cameras found that while CCTV systems contributed to reductions in assaults in specific locations, they did not completely eliminate criminal incidents (Gerell, 2020). This indicates that CCTV effectiveness is context-dependent and influenced by factors such as crime type, monitoring intensity, and integration with policing strategies.

Sub-theme: Enhanced Community Safety and Deterrence Effect

Beyond observable changes in crime rates, participants emphasized the psychological impact of surveillance cameras on community safety. Respondents explained that individuals are less inclined to engage in unlawful activities when they are aware that their actions may be recorded. The visible presence of surveillance devices therefore functions as a preventive mechanism that discourages criminal behavior while simultaneously fostering a sense of security among residents.

Existing research supports these observations. Studies examining the social effects of surveillance technologies have shown that CCTV systems can enhance perceived guardianship in public environments and influence offenders' decision-making processes. According to contemporary criminological research, visible monitoring increases the perceived risk of detection, thereby discouraging opportunistic crimes in public spaces (Ratcliffe et al., 2021). In addition, evaluations of urban surveillance programs suggest that residents often report improved perceptions of safety in areas where surveillance systems are actively implemented (Ariel et al., 2022).

Similar patterns have been observed in other regions, where increased visibility of surveillance systems not only deters crime but also enhances public confidence in law enforcement. This suggests that the benefits of CCTV extend beyond crime reduction to include improvements in perceived safety and social order.

However, research also indicates that perceptions of safety may vary across social groups and community contexts. While some individuals view surveillance as a protective measure, others express concerns regarding privacy, surveillance misuse, or government overreach. These contrasting perspectives highlight the need to balance security benefits with ethical considerations, particularly in maintaining public trust and transparency in surveillance practices.

Theme 2: Role of CCTV in Solving Specific Crimes

Sub-theme: Identification and Tracking of Suspects

Participants reported that surveillance cameras play a significant role in identifying individuals involved in criminal incidents. CCTV footage was described as a valuable source of visual evidence that assists law enforcement officers in reconstructing events and tracing suspects' movements. Respondents noted that images capturing license plates or facial features have facilitated suspect identification and subsequent arrests.

Research supports the investigative value of surveillance footage in modern policing. Studies on forensic image analysis indicate that high-quality CCTV recordings can significantly improve suspect identification when environmental conditions allow clear visual capture (Bacci et al., 2020). Additionally, research on digital video evidence in criminal investigations found that surveillance footage can assist investigators in reconstructing events, corroborating witness statements, and identifying offenders (Ashby, 2020).

Rather than merely confirming its usefulness, these findings emphasize the practical role of CCTV as an evidentiary tool that strengthens investigative processes and supports case resolution.

Comparable findings have been reported in other cities, where digital video evidence has enhanced investigative efficiency and improved clearance rates. This suggests that the effectiveness observed in the study site reflects broader applications of CCTV in modern policing systems.

Sub-theme: Real-Time Monitoring for Immediate Response

Another theme emerging from the interviews was the value of real-time monitoring in facilitating rapid responses to incidents. Participants emphasized that CCTV operators can observe suspicious activities as they occur and immediately relay information to law enforcement personnel, enabling quicker intervention and preventing the escalation of criminal situations.

Research on technology-supported policing highlights the importance of real-time surveillance in modern crime prevention strategies. Integrated monitoring systems allow authorities to maintain situational awareness and coordinate rapid responses to emerging threats (Caplan et al., 2021). Studies further indicate that surveillance technologies are most effective when combined with proactive monitoring and rapid-response protocols.

These findings highlight that the effectiveness of CCTV is not solely dependent on recording capabilities but also on the ability to actively monitor and respond to incidents in real time.

However, scholars caution that the effectiveness of real-time monitoring depends heavily on operational capacity. Without adequate staffing, technical infrastructure, and coordination mechanisms, surveillance systems may fail to achieve their intended outcomes. This reinforces the importance of organizational support and resource allocation in maximizing the benefits of surveillance technologies.

Theme 3: Challenges and Limitations of CCTV Use

Subtheme: Technical Limitations: Image Quality and Night Vision

Participants acknowledged that technological limitations sometimes reduce the effectiveness of CCTV

systems, particularly during night time operations. Issues such as poor image clarity, inadequate lighting conditions, and glare from vehicle headlights were reported as factors that hinder the identification of suspects.

Research in surveillance technology confirms that low-light environments significantly affect image quality and recognition accuracy (Ai & Kwon, 2020). Similarly, studies on image enhancement techniques demonstrate improvements in low-resolution footage (Farooq et al., 2021).
These findings indicate that technological constraints remain a significant barrier, emphasizing that system effectiveness depends not only on availability but also on the quality of equipment and environmental conditions.

Sub-theme: Insufficient Coverage and Blind Spots

Participants also identified surveillance gaps in areas where cameras were absent. Respondents observed that criminal incidents were more likely to occur in locations without CCTV coverage.

Research supports this observation, showing that strategic placement significantly improves surveillance effectiveness (Choi & Lee, 2020; Lee et al., 2021).

Similar challenges have been reported in other cities, particularly in developing regions where limited resources restrict full surveillance coverage. This suggests that the issue of blind spots is a common limitation rather than an isolated concern.

Sub-theme: System Maintenance and Equipment Downgrades

Participants emphasized the importance of maintaining surveillance systems. Equipment deterioration and limited technical support were identified as factors reducing effectiveness. Research highlights similar issues, noting that regular maintenance is essential for system reliability (Caplan et al., 2021). This underscores that sustainability of surveillance systems requires continuous investment and not merely initial installation.

Theme 4: Responses and Workarounds to Surveillance Gaps

Sub-theme: Community and Private Sector Cooperation

Participants described how cooperation between local authorities, businesses, and residents can help compensate for gaps in public surveillance infrastructure. In several instances, privately owned cameras from commercial establishments were used to provide additional footage for police investigations.

Research on collaborative crime prevention initiatives emphasizes the importance of partnerships between law enforcement agencies and private stakeholders in expanding surveillance coverage (Welsh et al., 2020). Such collaborations enable authorities to access additional video evidence in areas where government-installed cameras are limited.

However, these practices also raise concerns related to privacy and data protection. Scholars emphasize that the sharing of surveillance footage should comply with established legal frameworks to safeguard individual rights and ensure responsible use of recorded data.

Sub-theme: Flexible Monitoring Strategies and Law Enforcement Coordination

Participants further emphasized the importance of adaptive monitoring strategies and strong coordination between surveillance operators and law enforcement personnel. When surveillance gaps occur, coordinated patrol operations and communication between monitoring centers and police units are used to maintain public safety.

Empirical studies support the effectiveness of complementary policing strategies. Research on hotspot policing indicates that targeted patrols in high-crime areas can significantly reduce violent offenses when implemented strategically (Braga et al., 2021). These findings suggest that surveillance technologies are most effective when integrated with proactive policing strategies.

Nevertheless, scholars emphasize that patrol-based strategies require careful planning and sufficient personnel resources. Without proper deployment and coordination, patrol activities may have limited impact on crime prevention.

Theme 5: Recommendations for System Improvement

Sub-theme: Need for More Cameras in Strategic Areas

Participants recommended expanding CCTV coverage to eliminate unmonitored areas and strengthen surveillance effectiveness. Respondents emphasized that installing additional cameras in high-risk zones could enhance monitoring capacity and improve crime prevention efforts.

Research supports the importance of surveillance coverage in crime prevention initiatives. Studies examining modern CCTV deployment strategies suggest that increased camera density in crime-prone areas can improve monitoring capability and deter criminal activities (Piza et al., 2020). However, scholars caution that simply increasing the number of cameras may not automatically produce improved outcomes.

Spatial analysis research demonstrates that effective surveillance depends largely on the strategic placement of cameras in areas where criminal activities are most likely to occur (Lee et al., 2021). Therefore, careful planning is necessary when expanding surveillance infrastructure.

Sub-theme: Upgrading CCTV Technology for Better Results

Participants also emphasized the need to upgrade surveillance technology in order to improve image quality and system reliability. Higher-resolution cameras and enhanced night-vision capabilities were identified as key improvements that could strengthen crime detection and evidence collection.

Technological advancements in surveillance systems have significantly enhanced the capacity of CCTV cameras to capture clearer images and improve identification accuracy. Research on image-processing techniques demonstrates that modern algorithms can enhance low-quality footage and facilitate more reliable facial recognition in surveillance recordings (Farooq et al., 2021). In addition, advances in infrared and sensor technology have improved surveillance performance in low-light conditions.

These developments support participants' recommendations that upgrading existing surveillance infrastructure is essential for maintaining the effectiveness of CCTV systems in crime prevention and law enforcement operations.

CONCLUSION

The findings of the study indicate that surveillance cameras play a meaningful role in supporting crime prevention and investigation in the city. Participants observed that the presence of CCTV systems contributes to a decline in certain criminal activities, particularly theft and robbery, while also strengthening the capacity of law enforcement agencies to identify suspects and reconstruct incidents. In addition to these operational benefits, the visibility of surveillance cameras appears to enhance the public's sense of safety and reinforce deterrence against potential offenders.

Despite these benefits, several technical and operational concerns limit the overall effectiveness of the surveillance system. Issues related to image clarity, limited camera coverage, and irregular maintenance reduce the reliability of recorded footage and may hinder accurate suspect identification. These findings emphasize

that the effectiveness of CCTV systems is not solely dependent on their presence but on the quality of equipment, strategic placement, and consistency of system management.

Furthermore, when viewed in relation to findings from other regions, the results suggest that the challenges encountered in the study area reflect broader issues in surveillance implementation, particularly in resource-constrained settings. This highlights the need for context-sensitive and evidence-based approaches in maximizing the benefits of surveillance technology.

The study underscores that surveillance technology can serve as a valuable component of local crime prevention strategies when supported by proper infrastructure, maintenance, and coordination among stakeholders. The findings reinforce the importance of integrating technological, organizational, and community-based approaches to achieve sustainable and effective public safety outcomes.

RECOMMENDATIONS

Based on the findings of the study, several practical measures may be considered to strengthen the effectiveness of the city's surveillance system. Continuous improvement of CCTV monitoring operations is essential, particularly through regular training of monitoring personnel and sustained supervision of key surveillance areas. Structured capacity-building programs focusing on real-time monitoring, incident assessment, and coordinated response strategies may further enhance the efficiency and responsiveness of surveillance operations.

Equally important is the allocation of resources for the regular maintenance and upgrading of surveillance equipment. Improving camera resolution, strengthening night-vision capabilities, and ensuring adequate coverage in critical locations will help address technical limitations that currently affect system performance. In addition, implementing routine maintenance schedules, system audits, and performance evaluations can ensure long-term reliability and operational sustainability of CCTV infrastructure.

Collaboration among local government units, law enforcement agencies, and private establishments can further strengthen surveillance capacity within the city. Partnerships that allow the integration of privately owned cameras with public monitoring systems may help address gaps in coverage and improve real-time response to incidents. Establishing clear data-sharing protocols and privacy safeguards is also recommended to ensure ethical and responsible use of surveillance data while maintaining public trust.

Future initiatives may also consider data-driven approaches in determining optimal camera placement, ensuring that surveillance expansion is guided by crime patterns and risk assessments rather than uniform distribution. Additionally, further research incorporating quantitative crime data and comparative studies across multiple locations is recommended to provide a more comprehensive evaluation of CCTV effectiveness.

Through coordinated efforts, sustained investment, and evidence-based planning, the surveillance system in the city can be strengthened as a more effective and reliable tool for crime prevention and community safety.

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