

## Scientific Crime Investigation: A Comparison of The Indonesia Criminal Justice System and Malaysia Legal Practice

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ARTICLE INFO	ABSTRACT
<p><b>Keywords:</b> Scientific Criminal Investigation; Criminal Justice; Evidence; Forensics; Justice</p> <p><b>How to cite:</b> Harefa, Beniharmoni, Et., Al. (2025). Scientific Crime Investigation: A Comparison of The Indonesia Criminal Justice System and Malaysia Legal Practice Veteran Law Review. 8(2). 278-294.</p> <p>Received:2025-10-24 Revised:2025-12-11 Accepted:2025-12-12</p>	<p><i>Advances in forensic technology provide an opportunity to enhance the accuracy of evidence in Indonesia's criminal justice system, yet scholarly examination of the extent to which Scientific Crime Investigation (SCI) influences judicial decision-making remains limited. This research gap is significant, as scientific evidence has not been fully integrated into procedural law, potentially weakening the objectivity of judicial rulings. This study aims to analyze the evidentiary impact of SCI on judges' considerations and to identify normative and practical obstacles to its implementation in Indonesia. Employing a normative legal research method with statutory and conceptual approaches, the analysis is further strengthened by a comparative assessment of SCI regulation in Malaysia to evaluate relevant regional best practices. The findings demonstrate that SCI has the potential to reinforce judicial conviction by providing more objective and verifiable forms of evidence. However, its implementation is constrained by inadequate forensic infrastructure, insufficient expert competence, and a regulatory framework that remains incomplete. This study contributes to the literature by mapping the necessary legal and institutional reforms required for SCI to operate as primary, reliable evidence, surpassing the limitations of conventional evidentiary methods.</i></p>

### 1. Introduction

The Indonesian criminal justice system faces the challenge of delivering fair and objective decisions, as mandated by the constitution and the nation's fundamental values. One fundamental aspect in achieving this goal is strong, valid, and legally binding evidence. This is because evidence in the criminal justice system plays a central role in determining the fate of both the accused and the victim (WARMAN et al., 2022). In line with the mandate contained in Article 28D paragraph (1) of the 1945 Constitution, which expressly states that every person has the right to recognition, guarantees, protection and certainty

of fair law. This article emphasizes that the legal process, including the presentation of evidence in criminal cases, must be carried out by upholding justice and truth in order to protect the rights of every individual involved (Kambu, 2021).

Pancasila, as the nation's philosophical foundation, also contains important principles that must be embodied in the criminal justice system. The second principle, which embodies the principle of just and civilized humanity, requires the justice system to treat all parties fairly and ensure that legal proceedings are carried out in a civilized manner and in accordance with humanitarian values (Afifah, 2017). In the context of evidence, this means that every piece of evidence presented in court must be tested in a fair and objective manner, so that the decision taken by the judge is not only based on strong and valid evidence, but also reflects a sense of justice and respect for human dignity.

As one of the legal instruments that serves as the basis for law enforcement officials in carrying out their duties of enforcing criminal law, the Criminal Procedure Code is inseparable from social aspects concerning societal developments. One development related to the law enforcement process is the interaction between science and the criminal justice system, which has undergone significant changes over the years, particularly in the evolution of scientific evidence used in legal contexts (Bakhtiar, 2024). Therefore, the important reality currently occurring is that the rapid development and sophistication of technology have fundamentally changed people's lives. Based on this phenomenon, investigators must abandon conventional methods that rely solely on witness/suspect testimony and transform themselves by using methods that can ensure accuracy and fairness in every court decision (Rombot et al., 2024).

One of technology's major contributions to the legal world is the emergence of Scientific Criminal Investigation (SCI). SCI is an investigative approach that prioritizes various scientific disciplines to uncover a case (Sativa, 2020). SCI includes the use of forensic technology, DNA analysis, and other scientific methods to uncover criminal facts (Kharismawati et al., 2024). So in this case, SCI provides new hope for law enforcers to obtain more accurate, objective and scientific evidence in the investigation and trial of criminal cases.

As the application of Scientific Criminal Investigation (SCI) has grown, the method has begun to play a significant role in the investigation and resolution of criminal cases in various countries, including Indonesia. This is in accordance with Article 14 of Law Number 2 of 2002 concerning the Indonesian National Police, which states that one of the police's duties is to conduct investigations. In addition to its role in the investigative process,

evidence generated through SCI methods has significant potential to influence court decisions, particularly in cases requiring scientific evidence that cannot be obtained through conventional methods. Although the use of forensic technology has begun to be implemented, its implementation is still far from ideal when compared to developed countries. This raises concerns about the effectiveness of evidence in the judicial process (Disantara, 2024).

Given the central role of evidence in the criminal justice system, this research is highly relevant to the application of SCI in Indonesia. It examines how evidence produced through SCI methods influences judicial decision-making, particularly in enhancing the accuracy and objectivity of court judgments. Considering the significant potential of scientific evidence to strengthen evidentiary processes, this analysis aims to offer new insights into the effectiveness of technological tools within the criminal justice system. Furthermore, this study seeks to identify the practical challenges faced by law-enforcement authorities in implementing SCI in Indonesia. By outlining these obstacles, the research proposes relevant and actionable solutions to improve evidentiary mechanisms and law enforcement practices, enabling SCI to be applied more effectively and efficiently in judicial proceedings.

In addition, this research employs a comparative legal approach with Malaysia, which possesses a more comprehensive regulatory framework concerning scientific evidence through the Evidence Act 1950, the Criminal Procedure Code, the Dangerous Drugs Act 1952, the Drug Dependents (Treatment and Rehabilitation) Act 1983, and the Deoxyribonucleic Acid (DNA) Identification Act 2009. This comparison provides a novel contribution by analyzing how standards of scientific proof are applied within a common-law system and by identifying lessons that may be adapted to strengthen the effectiveness of SCI in Indonesia's criminal justice process.

## 2. Method

This study employs a normative legal research method using three principal approaches: the statutory approach, the conceptual approach, and the functional-doctrinal comparative approach. The legal materials consist of primary legal materials, including the Indonesian Criminal Procedure Code (KUHP), evidentiary regulations, the Malaysian *Evidence Act 1950* and relevant judicial decisions from both jurisdictions; secondary legal materials, such as legal textbooks, scholarly journal articles, forensic science reports, and institutional guidelines; and tertiary materials, including legal dictionaries and encyclopedias used to clarify key concepts.

Data collection was conducted through a structured literature review, involving the examination of statutory documents, case law repositories, academic databases, and scientific publications relevant to evidentiary law

and *Scientific Crime Investigation* (SCI). All materials were subsequently subjected to inventory, classification, systematization, and verification to assess their relevance and normative coherence. The analysis applied deductive reasoning, deriving specific conclusions on the legal position and effectiveness of SCI from broader theoretical and normative premises.

Furthermore, the study adopts a functional and doctrinal comparative analysis to evaluate how Indonesia and Malaysia regulate and utilize scientific evidence. This comparative approach examines the functional operation of evidentiary rules, judicial practices, and institutional forensic capacities in both legal systems, thereby offering a comprehensive assessment of the factors influencing the admissibility, reliability, and evidentiary weight of SCI in criminal proceedings.

### 3. Analysis

#### 3.1. The Influence of Evidence Generated from Scientific Criminal Investigation on Court Decisions in Indonesia

In forensic or criminalistic evidence systems, there is a concept known as the crime scene triangle, which connects the victim, the evidence, and the perpetrator. This principle aligns with Locard's theory, introduced by Dr. Edmund Locard of France, which states that every physical interaction between two objects will leave a trace on each of them (Bode, 2019). The Locard Exchange Principles essentially provide guidance for investigators on how to search for, collect, store, and analyze evidence found at a crime scene, with the aim of supporting the legal process in court (Mistek et al., 2018). This scientific approach is crucial in building criminal cases, as the physical evidence obtained is often a key element guiding the evidentiary process in court. This evidence is not only objective and verifiable, but also has strong legal binding force when combined with forensic analysis supported by scientific expertise. Therefore, scientific evidence plays a critical role as the backbone of criminal cases, especially in cases that are difficult to prove solely through testimony or confessions.

The application of forensic principles such as the Locard Exchange in scientific evidence not only provides a clear framework for investigators in uncovering the facts at the crime scene, but has also received formal legitimacy through various regulations governing technical assistance in criminal investigations. As technical assistance for investigators in conducting criminal investigations, scientific evidence has been legitimized through Article 34 of the Regulation of the Chief of the Republic of Indonesia National Police Number 6 of 2019 concerning Criminal Investigations (Regulation of the Chief of the Republic of Indonesia National Police Number 6 of 2019 Concerning Criminal Investigations, n.d.). Furthermore, Article 35 mentions the types of

technical assistance for investigations as referred to in Article 34, including forensic laboratories, identification, forensic medicine, forensic psychology, and digital forensics. Each of these fields has its own role and collaborates to complete the evidence to solve a case. Therefore, based on scientific evidence, it will produce evidence as regulated in Article 184 of the Criminal Procedure Code, which specifically regulates the types of valid evidence in the criminal justice process. This article states that valid evidence includes witness testimony, expert testimony, letters, clues, and the defendant's statement (Law Number 8 of 1981 concerning Criminal Procedure Law, n.d.).

In criminal justice practice, the use of Scientific Crime Investigation (SCI) is not only expressed in the form of evidence classified under Article 184 of the Criminal Procedure Code, but also manifested in the application of forensic techniques that significantly influence the construction of evidence. DNA analysis, for example, has been used by courts in murder and rape cases to determine the probabilistic involvement of the perpetrator with a high degree of accuracy, as seen in a number of decisions where genetic profile matches were decisive evidence in the direction of the verdict. Similarly, fingerprint examination and digital reconstruction are often used as the basis for forming clues in cases of theft, violence, and murder, because they are able to show the physical relationship between the perpetrator, the victim, and the crime scene objectively. On the other hand, the *visum et repertum* as written evidence according to Article 187 letter c of the Criminal Procedure Code remains the main instrument for proving the elements of violence, injuries, and the victim's medical condition in crimes of assault or crimes that result in loss of life. These various forensic techniques demonstrate that SCI is not only a theoretical framework, but a scientific method that has been used consistently to strengthen, verify, or even refute other evidence, thus having a direct influence on the judge's conviction and can be decisive evidence in the criminal proof process (Warman, 2022).

The use of SCI in proving criminal cases must be placed consistently within the framework of criminal procedural law, particularly in the construction of evidence as stipulated in Article 184 of the Criminal Procedure Code. The technical legitimacy of the use of scientific methods is also strengthened through Articles 34 and 35 of Regulation of the Chief of Police No. 6 of 2019 which regulates forensic technical assistance such as laboratory examinations, DNA analysis, fingerprints, ballistics, digital forensics, and other forms of scientific examination that can be included in written evidence or expert testimony. Therefore, SCI not only functions as a technical instrument for investigators, but has obtained a clear normative position in the process of proving criminal cases in Indonesia,

so that its existence plays an important role in upholding objectivity and legal certainty (Marpaung, 2009).

Nevertheless, the existence of SCI must still be considered within the framework of the principle of *in dubio pro reo*, namely the principle that requires judges to render the most favorable decision for the defendant if there is still doubt regarding his guilt. Supreme Court Decision No. 33 K/MIL/2009 and Decision No. 2175 K/Pid/2007 affirm that when such doubts are not resolved through the assessment of evidence, including scientific evidence, the defendant must be acquitted. This principle is in line with the adage, "it is better to acquit a thousand guilty people than to convict one innocent person," which emphasizes the importance of judges' caution in assessing the validity, accuracy, and relevance of each form of scientific evidence. Thus, although SCI plays a significant role in reducing the room for subjectivity and increasing the accuracy of evidence, judges must still achieve a level of certainty beyond reasonable doubt before issuing a sentencing decision. This makes SCI not merely a technical aid, but an integral part of legal rationality that ensures that punishment is only imposed when there is no longer justifiable doubt (Rusianto, 2016).

To avoid any doubts felt by judges regarding the cases they handle, more accurate facts are needed so that case handling can be effective and reflect justice. These facts arise from the use of science in an evidentiary system that is closely related to more accountable facts. This demonstrates the difference between scientific evidence and direct evidence against suspects or witnesses. This is because witnesses are human beings who are prone to providing false testimony, while SCI examinations are based on scientifically based methods (Werdaya, 2023). One example of the application of SCI which stems from the inability to uncover issues related to injuries, health and life of a person caused by a crime using conventional methods, requires assistance from the medical discipline (Ahmad & Djanggih, 2018). One way to help the process of proving criminal cases is to ask for the help of a doctor as a witness who can make a written statement in the form of a *visum et repertum* and provide information in court as an expert witness (Yusuf et al., 2020). Based on this, it can be seen that (SCI) has a very important role.

The view on the importance of scientific evidence is also reflected in previous research findings. Kharismawati et al. noted that Burhanuddin, S.H., M.H. (Makassar District Court Judge), in an interview with the research, emphasized that science is very supportive in uncovering a crime, so that the defendant's guilt can be proven or not in court. It should be emphasized that proving guilt through science is important, because without using science, there is a possibility that investigators will make mistakes in identifying suspects/perpetrators of criminal acts. Similarly,

Ruslan Renggong, as quoted in the literature, stated that scientific evidence reduces the use of intervention methods and increases the accuracy of investigations. This shows the advantages of applying scientific evidence, including the abandonment of old methods of solving cases that use intervention, violence, and so on. In addition, examinations are faster, more precise, and more accurate because they use special tools that support the examination of evidence or processing of crime scenes and minimize errors in the examination process because they use digital tools (Asrudi et al., 2023).

The application of SCI in criminal evidence provides quality assurance and quality control. In criminal evidence, this application plays a crucial role in the process of establishing the judge's conviction for the determination of a court decision and is a valid and irrefutable evidence because it is based on scientific principles. The importance of using (SCI) in evidence shows that the purpose of scientific evidence in criminal cases is to increase confidence and provide guidance for law enforcement to assess the authenticity of evidence. This is closely related to the mandate of Article 183 of the Criminal Procedure Code which states that a judge may not impose a sentence on a person unless with at least two valid pieces of evidence and a conviction is obtained that a crime actually occurred and that the defendant is guilty of committing it. Therefore, by applying scientific evidence, it can certainly create the judge's confidence in determining the court's decision and also become a valid and irrefutable evidence because it contains scientific principles in the process. In addition, evidence from SCI often strengthens or changes the interpretation of other existing evidence, thereby influencing the final outcome of the court's decision.

SCI, which includes forensic DNA analysis, digital forensics, and various other scientific fields, has become essential to modern criminal justice systems. In Malaysia, the incorporation of scientific methods in criminal investigations is not only a response to technological advancements but also a necessity for ensuring the reliability of evidence and fairness in trials. The legal framework governing SCI in Malaysia is established by several statutes.

The Evidence Act 1950 serves as the cornerstone of legislation concerning the admissibility of expert scientific evidence in Malaysia. Section 45(1) of the Act provides that:

“When the court has to form an opinion upon a point of foreign law or of science or art, or as to identity or genuineness of handwriting or finger impressions, the opinions upon that point of persons specially

skilled in that foreign law, science or art, or in questions as to identity or genuineness of handwriting or finger impressions, are relevant facts."

The aforesaid provision is significant because the terms "*science or art*" are interpreted in a broad manner, encompassing any discipline that necessitates specialized knowledge or considerable experience for a thorough and informed opinion. A good illustration of this point can be found in the judgment of the case *Chandrasekaran & Ors v PP* [1971] 1 MLJ 153, where the court determined that the phrase "science or art" is broad enough to allow for a liberal interpretation. The absence of specific fields of knowledge mentioned in the section does not imply that those fields are excluded.

Consequently, section 45 of the Evidence Act 1950 establishes a framework for including a range of experts, such as forensic scientists who analyze physical evidence, medical examiners who determine the cause of death through autopsies, and digital experts who examine electronic data and cyber evidence. These professionals are essential in interpreting complex data and translating it into understandable terms for the court. Their expertise enables judges and juries to make informed decisions, informed by the complexities of the evidence presented.

In response to the rapid advancements in technology, sections 90A, 90B, and 90C of the Evidence Act 1950 have been introduced to facilitate the admissibility of electronic and computer-generated documents in legal proceedings. These sections recognize that such documents can serve as valid evidence if they are produced by a computer "in the course of its ordinary use," meaning that they were created and stored through standard operating procedures without any tampering. This legal framework is particularly vital for modern criminal investigations, as it addresses the unique challenges posed by cybercrimes, online fraud, and digital forensics. The ability to incorporate electronic evidence, such as emails, CCTV footage, and digital footprints, is essential for establishing the facts of a case in an increasingly digital world. Moreover, these provisions ensure that electronic evidence can be legally utilized in prosecutions, provided that its authenticity is clearly demonstrated. In short, the law aims to protect the integrity of the judicial process while adapting to the evolving landscape of crime and technology.

Further, the Criminal Procedure Code (CPC) also plays a crucial role in facilitating scientific investigations within the judicial framework. Section 399(1) of the CPC authorizes the admission of reports from certain experts, such as chemists, medical officers, and document examiners, as evidence

without requiring their testimony in court. This provision has the effect of streamlining legal proceedings by minimizing both the temporal and financial burdens associated with expert witness appearances. It represents a significant deviation from the conventional evidentiary requirements, thereby enhancing procedural efficacy in the context of the admissibility of expert reports in legal settings.

Nonetheless, this efficiency measure is balanced by a robust defense safeguard, as section 399 imposes a duty on the prosecution to call the chemist as a witness if the defense contests the report or requires the analyst's presence for cross-examination. Case law confirms that if a chemist's report is admitted in contravention of this provision, it constitutes an irregularity of a serious nature, rendering the report inadmissible. Furthermore, this right cannot be waived by the accused. This mechanism streamlines simple cases while guaranteeing the accused's right to challenge complex scientific methodologies through adversarial cross-examination.

Apart from the Evidence Act 1950 and the CPC, the Dangerous Drugs Act 1952 (DDA) and the Drug Dependents (Treatment and Rehabilitation) Act 1983 (DDTRA) are also vital for scientific criminal investigations in Malaysia. The DDA is particularly important as it legally defines what substances are considered "dangerous drugs". Forensic scientists are required to identify and quantify these substances based on this definition. The DDA's First Schedule specifies the substances that require forensic analysis, and various sections, particularly those concerning trafficking and possession, establish the evidentiary requirements that scientific results must meet. For instance, specific weights of a substance can trigger legal presumptions, as outlined in section 37. Without the DDA's definitions and thresholds, the chemical identification and accurate weighing of seized items by the Department of Chemistry Malaysia would lack legal significance in prosecuting drug-related offenses.

In addition, the DDTRA is essential in scientific criminal investigations as it establishes the legal framework for forensic toxicology analysis of individuals suspected of drug abuse. The DDTRA grants officers the authority to detain suspects for urine testing, which is used to scientifically assess drug dependency and recent consumption. A positive result from this test, certified by a medical officer, serves as conclusive scientific evidence to classify a person as "drug dependent". This classification allows for the initiation of non-punitive rehabilitative measures under the DDTRA, diverting cases of minor drug abuse from the more severe penalties outlined in the DDA.

Furthermore, the Deoxyribonucleic Acid (DNA) Identification Act 2009 (the DNA Act) was enacted as a significant legislation that formally introduced advanced forensic DNA technology into Malaysia's criminal justice system. This advancement has significantly enhanced the investigation of serious crimes. Its main significance lies in the legal establishment of the Forensic DNA Databank Malaysia (FDDM) and in defining the protocols for sample collection, forensic DNA analysis, and the use of DNA profiles. The DNA Act grants the necessary legal authority for forensic laboratories, primarily the Department of Chemistry Malaysia, to analyze biological evidence such as blood, semen, and hair, and to create DNA profiles from crime scenes and individuals. This ensures that the scientific evidence is both admissible and reliable in court proceedings. By standardizing the forensic process from the crime scene to the courtroom, the DNA Act significantly enhances law enforcement's ability to solve crimes, especially "cold cases", by enabling systematic profile matching across various criminal investigations.

A comparison between Indonesia and Malaysia reveals that both jurisdictions recognize the importance of Scientific Criminal Investigation (SCI), yet they adopt markedly different normative structures for regulating it. Indonesia places SCI within the evidentiary taxonomy of Article 184 of the Criminal Procedure Code (KUHP), where scientific outputs are absorbed into "expert testimony," "documentary evidence," or "clues," depending on their form. This model integrates SCI indirectly through procedural categories rather than through a dedicated statute, supplemented only by Police Regulation No. 6 of 2019, which legitimizes forensic assistance through laboratory examinations, DNA analysis, ballistics, identification, and digital forensics. By contrast, Malaysia adopts a more elaborate and explicit legislative framework. Not only does the Evidence Act 1950 provide broad admissibility for expert scientific opinions under section 45, but electronic, digital, and computer-generated evidence receive direct statutory recognition through sections 90A–90C. Moreover, Malaysia's enactment of the Deoxyribonucleic Acid (DNA) Identification Act 2009 provides a stand-alone regulatory regime governing DNA databanking, sample collection, forensic processing, and admissibility. This indicates that while both systems accept SCI as authoritative evidence, Malaysia's structure is considerably more codified, consolidated, and technologically responsive.

### **3.2. Problems in Implementing Scientific Criminal Investigation in Indonesia**

In the legal system theory proposed by Lawrence M. Friedman, it is stated that the success of a legal system is influenced by three main components: legal structure, legal substance, and legal culture. Legal structure includes

the institutions and apparatus that enforce the law, and how the law is implemented depends heavily on the efficiency and capacity of this structure. For example, the means of supporting law enforcement influence how well the law can be implemented. Legal substance includes the legal regulations and norms themselves, as well as legal culture related to public attitudes and perceptions towards the law. In the context of the application of the Scientific Criminal Investigation method in Indonesia, the main obstacles encountered can be analyzed through these three components (Khozim, 2019).

## Legal Factors

The role of scientific forensic science is crucial in detecting crime. Considering that the regulations that underpin the implementation of SCI are currently limited to the National Police Chief level, it is clear that the basis for its implementation is still limited to the level of instructions for carrying out tasks to executive investigators. Therefore, going forward, lawmakers need to consider the application of scientific criminal investigation methods so that SCI can hopefully provide additional evidence beyond the five types of evidence stipulated in the Criminal Procedure Code. In the future, with the development of information technology, SCI law will occupy a central place in current criminal evidence.

Efforts to gain the attention of lawmakers to make SCI not merely as supporting evidence as regulated in the Criminal Procedure Code are certainly relevant to one component of Lawrence M. Friedman's legal system theory, namely legal substance. Legal substance refers to the rules and norms that govern community behavior and the law enforcement process. As mentioned, the regulation of SCI is still limited to internal regulations of the Republic of Indonesia Police, which only function as technical implementation guidelines for investigators and do not yet have a stronger legal basis in formal legislation. According to Lawrence Friedman, to support the effectiveness of the legal system, legal substance needs to evolve in line with social and technological changes. Therefore, it is necessary to strengthen regulations that explicitly regulate SCI as a central part of criminal evidence, not just as supporting evidence. Thus, legal regulations regarding SCI must be integrated into formal legislation to align with developments in science and technology, and be able to provide a strong legal foundation for law enforcement officials in facing the challenges of modern crime in the digital era.

In line with the above, it can be strengthened by the statement made by I Gede Suarhawan, delivered in an interview in the study entitled "The Effectiveness of Scientific Crime Investigation in Proving Murder Cases"

by Kharismawati, et al. As part of the Forensic Laboratory of the South Sulawesi Regional Police, I Gede Suarhawan strongly supports the implementation of scientific crime investigation as the spearhead. This is because the presence of the suspect, the suspect's confession, or witness testimony is not always necessary. Sometimes there are cases where there are no witnesses, no one saw, so faced with a deadlock. Therefore, in the process of evidence, law enforcement should be able to prioritize scientific crime investigation because it will go hand in hand with technological advances. Furthermore, efforts are needed to make SCI not only as technical assistance, but also as a primary supporting function of the investigation.

### **Facilities and Infrastructure Factors**

Supporting facilities can be simply defined as a means to an end. Supporting facilities include trained and skilled personnel, proper organization, appropriate equipment, and adequate funding. In addition to the availability of facilities, maintenance is also crucial to ensure their sustainability. Regulations are often enforced even though complete facilities are not yet available. This situation can be counterproductive and create obstacles to the implementation of SCI. Without certain resources and equipment, a smooth law enforcement process is impossible (Orlando, 2022). In relation to the availability of supporting resources that help smooth the law enforcement process, there are a number of issues concerning facilities and infrastructure, both in terms of quality and quantity, namely:

- a. The necessary facilities and infrastructure are available;
- b. Existing equipment is sufficient and can continue to be used;
- c. Are existing facilities being used effectively?
- d. What facilities must be provided to support the law enforcement process?

Facilities and infrastructure are crucial elements in the successful implementation of the Scientific Criminal Investigation method in Indonesia's criminal justice system. A major obstacle often encountered is the lack of adequate forensic infrastructure in various regions, particularly in remote areas with limited access. The lack of forensic laboratories equipped with modern technology such as DNA analysis, digital imaging, and other sophisticated investigative tools severely limits investigators' ability to collect and analyze scientific evidence accurately and quickly. Furthermore, even if facilities are available, many are outdated and poorly maintained, rendering them ineffective. In this context, the problem lies not only in the availability of equipment but also in the capabilities and expertise of human resources. The number of forensic experts remains very limited, and education and training for investigators at the regional

level regarding the use of forensic technology is also uneven. This results in SCI-based law enforcement being suboptimal, ultimately reducing the quality of evidence in court and influencing judges' decisions. Therefore, it is urgent to invest in the procurement of more sophisticated facilities and infrastructure and improve the quality of human resources through continuous and equitable training to support the scientific-based law enforcement process in Indonesia.

## Community Factors

Law enforcement strives to create order, security, and peace in society, primarily by intervening after a violation of the law occurs. Public awareness of the law also helps ensure the effectiveness of law enforcement. Public knowledge and awareness have a significant impact on the actions taken. Therefore, understanding the importance of law enforcement is also a supporting factor in the law enforcement process (Cikdin, 2022). This factor certainly impacts the effectiveness of SCI implementation. Low public awareness, including among law enforcement officials, regarding the importance of scientific evidence often leads to a preference for conventional methods. Law enforcement tends to rely more on conventional methods, which involve intervention and violence. This inevitably results in slow and inaccurate examinations due to the lack of specialized tools to support evidence examination or crime scene processing, leading to errors in the examination process.

From the community's perspective, as conveyed by Rahmat Sarbin as Head of the Crime Scene Unit for Scientific Crime Investigation in Handling Criminal Acts, the obstacles that occur in the community are usually damaged crime scenes due to security from the community itself. This has an impact on making it easier for investigators to find sufficient evidence and can be used as valid evidence. In addition, the lack of awareness by the community so that their understanding of evidence still believes in methods outside of science, such as superstition. One example of a case is a case that occurred in 2016 and has become a hot topic recently, namely the MRD and VDA case. Initially, this case was identified by the Talun Police as a single traffic accident, but it turned into a murder case. In this case, there is an interesting phenomenon, namely the phenomenon of possession experienced by Linda, Vina's friend who claimed to be possessed by Vina's figure. The lack of awareness and understanding of the law by the community, so many use this phenomenon as an indication that is recognized as true. Even though this phenomenon is not included in Scientific Criminal Investigation.

## 4. Conclusion

The application of Scientific Criminal Investigation (SCI) is essential for improving the accuracy and effectiveness of the criminal justice process. By relying on Locard's principle and the crime scene triangle, SCI strengthens evidence collection and analysis, reduces uncertainty in trials, and supports judges in making fair, evidence-based decisions. In Indonesia, however, SCI implementation faces structural, substantive, and cultural obstacles. Forensic infrastructure and human resources remain limited, legal rules are still centered on internal police regulations, and legal culture often favors conventional over scientific methods. Strengthening infrastructure, enhancing professional capacity, and integrating SCI into formal legal regulations are therefore crucial to ensuring its optimal use as valid evidence.

In Malaysia, challenges stem primarily from a complex and dualistic legal system that produces overlapping jurisdictions and inconsistent standards of evidence between civil and Syariah courts. Although federal laws such as the Evidence Act and the DNA Act provide a legal basis for scientific evidence, ambiguities and procedural gaps persist—particularly in Syariah courts, which lack comprehensive rules on forensic and digital evidence. Limited technical expertise among judges and legal practitioners further hinders consistent evaluation of scientific evidence. Despite the adoption of modern forensic technologies, regulatory development has not kept pace. To ensure equitable and effective use of SCI, Malaysia requires clearer statutory frameworks and continuous capacity building through training and modernization of forensic procedures.

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