

Legal Review of the Implementation of Scientific Crime Investigation by the Police as an Effort to Prove Crimes

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Abstract. *With the advancement of forensic technology, digital analysis, and various other scientific methods, law enforcement officials can now collect and analyze evidence more accurately and systematically. Scientific Criminal Investigation is an investigative process that utilizes science and technology applied to forensic functions within its evidentiary system. All valid evidence under the applicable Criminal Procedure Code has equal legal force. The issue lies in the extent to which such valid evidence is useful and can assist the general judicial process during the investigation. The aim of this research is to determine and analyze (1) the legal legitimacy of the function of the scientific crime investigation method in the process of handling crimes, (2) the nature of the functional urgency of the scientific crime investigation method in efforts to prove crimes, and (3) the problems in applying the scientific crime investigation method in efforts to prove crimes. The approach method used in this research is normative juridical. The specifications of this research are analytical descriptive. The data source used is secondary data. Secondary data is data obtained from library research consisting of primary legal materials, secondary legal materials and tertiary legal materials. The research results and discussion can be concluded: (1) In terms of legal legitimacy regarding efforts to obtain evidence using the scientific crime investigation method, there are several legal provisions that accommodate the legality of the SCI action, including the provisions of Article 120 of the Criminal Procedure Code, in which if the investigator deems it necessary, he can ask for the opinion of an expert or someone who has special expertise. (2) In terms of urgency, this method is very helpful in implementing Scientific Crime Investigation, which has revolutionized the way of proving criminal cases. If implemented correctly, this strategy is said to be very useful for law enforcement in solving cases that lack evidence. When all conventional investigative efforts cannot be revealed and reach a dead end, the law turns to other scientific fields to help and in terms of legality, this is valid and represents a support system in the smooth enforcement of the law. (3) Although the*

Scientific Crime Investigation method in proving a crime that lacks evidence is very effective and accurate, there are several problems as part of the weaknesses of using this method in revealing various crimes. In principle, SCI uses science that develops along with the times. Examination data becomes more complex and detailed over time. Errors, such as missing or incorrect data, are common when processing evidence, and are related to its limitation or reduction.

Keywords: Crime; Evidence; Investigation; Scientific.

1. Introduction

The Unitary State of the Republic of Indonesia is a major nation that places a high premium on the rule of law. The positive legal regulations in Indonesia are clearly a crucial component in building a safe, secure, and peaceful life.¹ As in the Constitution of the Republic of Indonesia, namely the 1945 Constitution of the Republic of Indonesia, it has been emphasized that Indonesia is a state of law, this phrase is stated in Article 1 paragraph 3 of the 1945 Constitution of the Republic of Indonesia. This emphasizes that the implementation of the Indonesian state government must always be based on and in accordance with the will of the law. The 4th paragraph of the Preamble to the 1945 Constitution, which is the constitutional basis of this country, contains that one of the goals of the state is to create general welfare and to educate the life of the nation.² This has implications that general welfare becomes a constitutional ideal, accompanied by the growth of an intelligent Indonesian society that is capable of leading the Indonesian nation to become a sovereign and prosperous nation.

Indonesia is a country that has a heterogeneous society, both horizontally and vertically. Inequality in society can basically be a factor in the occurrence of criminal acts, if there is a lack of justice in law enforcement and conflicts in society. Criminal law exists as a form of social control for society as a mediator to resolve conflicts in society.³ Thus, criminal law has an important role in controlling crime in society.

Objectively (Ius Punale), criminal law is divided into two types of law, namely material criminal law and formal criminal law. Material criminal law is the regulation that confirms what actions can be punished, who can be punished, and

¹ Sumaryono and Sri Kusriyah, The Criminal Enforcement of the Fraud Mode of Multiple Money (Casestudy Decision No. 61 / Pid.B / 2019 / PN.Blora). Jurnal Daulat Hukum: 3 (1), March 2020, p. 237

² Sulistiawan Doni Ardiyanto, Eko Soponyono, and Achmad Sulchan, Judgment Considerations Policy in Decree of the Court Criminal Statement Based on Criminal Destination, Jurnal Daulat Hukum: 3 (1), March 2020, p. 179

³ Zainuddin Ali, Sociology of Law. Jakarta: Sinar Grafika, 2007. pp. 22-23.

with what punishment to punish someone, for example, is a legal product of the Criminal Code. Meanwhile, formal criminal law is the law that regulates how to punish someone who violates criminal regulations (is the implementation of material criminal law), for example, is in the Criminal Procedure Code.⁴

When discussing formal criminal law, we inevitably come across law enforcement officials, such as the police, public prosecutors, judges, and advocates. The police, as a subsystem of the criminal justice system in Indonesia, are often referred to as "gatekeepers," meaning that every criminal case will inevitably be brought before the police as the initial step in resolving the case.⁵ The central role in the criminal justice system, the police must strive to ensure that preventive and repressive efforts in dealing with crime run as well as possible, especially considering that the police are the party that should be trusted by the community, the police are the ones who are in the midst of the community and are able to provide a sense of security and appropriate protection for the community and ensure the achievement of legal certainty in the community.

The main task of the Republic of Indonesia National Police is to maintain public security and order, enforce the law, and provide protection, patronage and services to the community.⁶ In carrying out its main duties in Article 13 of Law Number 2 of 2002 concerning the Republic of Indonesia National Police, one of its duties is to conduct investigations and inquiries into all criminal acts that occur in accordance with criminal procedural law as the formal law of the implementation of criminal law and other laws and regulations.

Investigation is a series of investigators' actions to search for and find an event suspected of being a crime in order to determine whether or not an investigation can be carried out according to the methods regulated in the Criminal Procedure Code. Investigation is the initial stage in the criminal case process in the police so that it can influence the continuation of the criminal process whether it can be continued to the investigation stage or not because in the investigation stage it will determine whether the act is a crime or not by collecting sufficient initial evidence to be able to raise its status to the investigation stage.

The subject who conducts an investigation is called an investigator. Based on Article 4 of the Criminal Code (KUHAP), it is stated that the person who can become an investigator is only a police officer, so there is a limitation that those who can become investigators are only from among the police members, in contrast to investigators who can be taken from non-police members, such as civil

⁴Kansil, Criminal Law Exam Practice for Universities, Jakarta, Sinar Grafika 1994, page 13

⁵Fikry Latukau, Study of the Progress of the Role of the Police in the Criminal Justice System, Tahkim, XV (1) June 2019, page 3

⁶Article 2 of Law Number 2 of 2002 concerning the Republic of Indonesia National Police

servant investigators who are taken from civil servants who are supervised by police investigators and are under the Ministry of Law and Human Rights.⁷

The next procedure after an investigation is an inquest. An investigation is a series of actions by investigators in the manner and according to the methods stipulated in the Criminal Procedure Code to seek and collect evidence that will shed light on the crime that occurred and to identify the suspect. The investigation stage is also known for its coercive measures (dwang middelen)⁸ which can be in the form of detention, confiscation, body searches, house searches, examination of documents.

The police certainly face challenges and a vital role in ensuring a sense of security and order in society, ensuring that citizens live a safe and secure life in accordance with applicable laws and regulations and are able to carry out their duties in law enforcement. Legal certainty is vital to realizing legal aspirations.

During the investigation phase, investigators are required to search for and collect evidence related to the crime to identify the suspect. This requirement provides investigators with the option of using scientific crime investigation methods when there is a lack of relevant evidence. One method commonly used in the investigation process is scientific crime investigation.

Police investigators are certainly not exempt from this, thus requiring various legal measures to maintain order in society. This is done by examining crime scenes (TKP) to uncover criminal cases. One strategy is the Scientific Crime Investigation method, a technique used by investigators to solve criminal cases by applying science and technology combined with criminalistic analysis.

The rapid technological advancements of the Industrial Revolution 4.0 have significantly impacted nearly every aspect of life, including investigations and law enforcement. In this context, investigators are challenged to abandon conventional methods that have traditionally relied on witness or suspect testimony as primary evidence. As a solution, investigators are now required to transform by adopting scientific crime investigation methods.⁹

On the other hand, a confession without supporting evidence can lead to injustice, by judging someone solely on a confession that may not be true. This is why modern legal principles emphasize the importance of valid and objective evidence,

⁷Indra Hanada Jonadie, Investigator's Authority to Stop Investigations Based on Law Number 8 of 1981 concerning the Criminal Procedure Code, Lex Crimen, VIII (2) February 2018, page 83

⁸Bagus Teguh Santoso, Coercive Efforts (Dwang Middelen) in Alleged Criminal Acts for Investigators, Mimbar Yustitia, 6 (1) June 2022, page 79.

⁹Riza Sativa, Scientific Investigation in the Investigation of Murder Crimes, Journal of Police Science, 15 (1) 2021

which can take the form of physical evidence, documents, credible evidence, or scientific evidence, such as in scientific crime investigation methods.

Scientific Crime Investigation is an investigative process that utilizes science and technology applied in forensic science (forensic laboratories, forensic doctors, identification, forensic psychology, and other experts) in its evidence-gathering system. With the development of forensic technology, digital analysis, and various other scientific methods, law enforcement officials can now collect and analyze evidence more accurately and systematically. This technology not only increases the efficiency of investigations but also allows for a more objective examination of existing evidence, reducing reliance on confessions alone. Overall, although confessions of suspects or defendants have been the main evidence in certain cases in the past, today law enforcement is expected to prioritize valid, objective, and scientifically based evidence to ensure the achievement of justice. Technology has provided new tools that can reduce reliance on confessions and strengthen the law enforcement process that is more transparent and accurate.

The Scientific Crime Investigation (SCI) method, embodied in concrete form through forensic laboratory examinations and explanations from police forensic experts, serves as a central point in connecting the perpetrator, victim, and evidence to the crime scene. This strengthens the construction of criminal evidence and allows judges to confidently decide cases fairly and in accordance with the actual facts. Scientific evidence in criminal investigations is a highly reliable source of evidence and, in fact, the backbone of the criminal justice process, particularly in resolving cases during the investigation. This is known from several forensic experts, who note that if witnesses are not present in court, the results of the examination of evidence become the primary source of evidence.

The existence of regulations regarding investigations in the Criminal Procedure Code provides a derivative to Law Number 2 of 2002 concerning the Republic of Indonesia Police, specifically in Article 14 paragraph (1) letter h which explains the main duties of the police, one of which is to carry out the police identification process, also coordinating with police medicine, forensic laboratories as executors of technical criminalistic examinations of crime scenes and/or examination of evidence, and also coordinating with police psychology for the benefit of police duties. The scientific crime investigation method is also regulated in the Chief of Police Regulation Number 6 of 2019 concerning Criminal Investigations which discusses investigators in carrying out their duties supported by technical assistance for scientific evidence (Scientific Crime Investigation), such as Forensic Laboratories, Identification, Forensic Medicine, Forensic Psychology, and Digital Forensics.

This study was conducted to analyze the role of science at the investigative level, involving experts with their respective expertise in solving criminal cases that are difficult to prove with simple methods. This is important to examine in order to

measure whether every crime requires experts who explain their expertise or knowledge in proving a crime, or only some crimes, or perhaps there are crimes that do not necessarily require experts.

Therefore, the researchers conducted this study with the aim of describing and analyzing the contribution of Scientific Crime Investigation (SCR) to the criminal justice process. Furthermore, this study also aims to describe and analyze the reasons why Scientific Crime Investigation can be used to strengthen evidence in a crime.

According to Karim Nasution, judges are given the greatest possible latitude in assessing the evidentiary strength of the evidence used. The rule regarding the evidentiary strength of statements given under oath is also eliminated. However, restrictions on the evidentiary strength remain, meaning that judges remain bound by the evidentiary strengths stipulated in the law.¹⁰

2. Research Methods

The normative juridical research method uses an approach by studying legislation, theories, and concepts related to the problem being studied. Sampling is a process of selecting a representative portion of the entire population. This study does not use samples as research material but rather utilizes literature studies as data sources. Secondary data is used as raw data and expert opinions are added as additional data to be processed as research results. This study uses descriptive analytical research specifications or those that are in the nature of explaining the research object. The purpose of descriptive research specifications is to obtain a complete picture of the legal situation in a particular place and at a particular time. Legal events in force at a particular time are highly dependent on the situation and dynamics of the developing society.

3. Results and Discussion

3.1. Legal Legitimacy of the Functional Function of the Scientific Crime Investigation Method in the Crime Handling Process

The term legitimacy comes from the Latin word *lex*, meaning "law." The Big Indonesian Dictionary (KBBI) defines it as a statement or statement that is legally valid. Furthermore, several political experts have defined legitimacy from their own perspectives. First, according to Zimmerman and Zeitz, legitimacy is the acceptance of something by society. This acceptance can be characterized by social assessment.¹¹ According to Silalahi as quoted by Ali Imron, legitimacy comes

¹⁰A Karim Nasution. Problems of Evidence in Criminal Proceedings Volume I. Jakarta: Head of the Directorate of the Attorney General's Office's Training Center. 1976, p. 34.

¹¹B. Irawan, Factors that are the Basis for Legitimacy in Public Services. Transparency Journal, 6 (1) 2014

from the English word legitimacy which means giving authority to a political system.¹²

In a legal context, legal legitimacy is the public's recognition and acceptance of a law or legal system as legitimate and deserving of obedience, as well as the belief that those who make and implement the law have legitimate authority. This concept is also often referred to as societal approval of applicable law.

In the study of legal philosophy, power is a fundamental concept underlying legal legitimacy. Power plays a crucial role in determining public compliance with applicable legal regulations and in establishing the legitimacy of law enforcement itself.¹³ An effective legal system depends not only on formally formulated norms, but also on societal acceptance and recognition of the competent authority. Therefore, the relationship between power and law is a subject of in-depth study in legal philosophy, particularly regarding how power is used to legitimize law in various political systems.

In practice, legal legitimacy is often tested by how power is used to enforce law and justice. A legal system that is not supported by strong legitimacy will struggle to gain compliance from its citizens.¹⁴ Power is the basis of legal legitimacy in legal philosophy, through the concept that law requires legitimate authority to be recognized and obeyed by society. Philosophers such as Thomas Hobbes and Max Weber argued that without power, law would be ineffective because it lacks the authority to regulate society.¹⁵ Hobbes emphasized the need for absolute power to avoid conflict and chaos, while Weber explained that legitimate authority arises from a rational system recognized by society. This legitimate power provides legitimacy for the law to be implemented and enforced.

Ahmad Ali is of the opinion that not all laws are made by the government.¹⁶ However, law cannot be separated from the existence of government because a rule can only be considered a rule of law if its enactment is legitimized by the government. In order to uphold the law and achieve justice, existing laws in society must be supported by government approval to achieve

¹²Aprilia Putri Hapsari, et al. Analysis of the Urgency of the Legitimation Process and Communication of Education Policy in Indonesia, Sultra Educational Journal (Seduj), 2 (2) August 2022, p. 69

¹³Muhammad Arif, Duties and Functions of the Police in Their Role as Law Enforcers According to Law Number 2 of 2002 Concerning the Police, Al-Adl: Jurnal Hukum, 13 (1) 2021, p. 92

¹⁴Hawreyvian Rianda Seputra and Suyatno, Power as the Basis of Legal Legitimacy in Legal Philosophy Thought, Al Mikraj: Journal of Islamic Studies and Humanities, 5 (1) July-December 2024, p. 1207

¹⁵Fajrul Ilmy Darussalam, Andi Batara Indra, and Saifur Rahman, The Nature of Humanity and Its Relevance to Humanitarian Issues: A Comparative Analysis of the Political Philosophy of Thomas Hobbes and John Locke, Media: Journal of Philosophy and Theology, 5 (2) 2024, p. 219

¹⁶Achmad Ali, Uncovering Legal Theory and Judicial Prudence, Including the Interpretation of Laws, Jakarta, Kencana Prenada Media Group, 2009, pp. 223-224

legitimacy (validity). This is because law enforcement institutions are state institutions that operate based on normative legal guidelines in accordance with certain procedures and rules. This legal legitimacy is important to consider when legal practice in Indonesia refers to the procedures and regulations contained in the Law/Criminal Code/Criminal Procedure Code. Although legal legitimacy is important, justice is the ultimate goal of law.

In conclusion, legal legitimacy is interrelated with legal political activities. Legal politics plays a strategic role in shaping the direction and foundation of a country's legal system. In Indonesia, legal politics serves as the foundation for determining legislative priorities, formulating legal norms, and designing law enforcement strategies relevant to societal needs.¹⁷ As part of state policy, legal policy serves not only as a legislative guide but also as a tool for achieving national development goals. In this regard, legal policy ideally reflects the values of justice, democracy, and the rule of law, which guarantee the rights and obligations of every citizen.¹⁸

The position of legal policy is important for the state because it is related to the creation and updating of legal materials so that they are in accordance with needs.¹⁹ In essence, law, represented in part by statutory regulations, is not merely an attempt to legalize existing patterns and customs within society. Rather, law serves to guide the achievement of desired goals, eliminate customs deemed no longer relevant, and create new patterns. At this point, law serves as an instrument.²⁰

Law serves as the rules of the game for achieving shared ideals, which are the basis for political agreements. Furthermore, law must be complemented by legitimate political instruments to address violations of the law. In terms of das sein, when law is defined as a statute, it is a political product. Law is created by legislative institutions, thus, it can be interpreted as the crystallization, formalization, or legalization of political will. It is important to note that law is not an autonomous institution, but rather interconnected with other sectors of society, one of which is politics.

According to Krzysztof Szczucki, there are two types of legal legitimacy: primary and secondary. Primary legitimacy derives the validity of criminal law from its coherence with ethical principles of responsibility. Therefore, criminal law, together with ethics, forms a convincing message about what is right and wrong. The fact that law can deviate from or even be separated from ethical principles does not mean that it ceases to be formally binding. However, it undoubtedly loses

¹⁷Rahmat Ferdian Andi Rosidi, "The Digital Legal Politics of the Jokowi Administration." Scripta: Journal of Public Policy and Law, 2 (II), July 2022, p. 241

¹⁸Ismaidar, et al. The Influence of Legal Politics in the Formation and Enforcement of Law in Indonesia, Indonesian Legal Media (MHI), 2 (4) November 2024, p. 347

¹⁹Moh. Mahfud M. D, Legal Politics in Indonesia, Jakarta: Rajawali Pers, 2009, p. 17

²⁰Satjipto Rahardjo, Legal Studies, VII, PT Citra Aditya Bakti, 2012, page 216

one of the fundamental justifications for its bindingness, and its enforcement becomes much more difficult. Secondary legitimacy, currently often considered the sole form of legitimacy, places the validity of criminal law in the decisions of authorized legislators, thus determining the bindingness of normative determinations.²¹

Legal policy, as the process of establishing and implementing a legal system or order that regulates the lives of people in a country, is closely related to various courses, one of which is the Criminal Justice System. This is because the formation of criminal law policy influences the Criminal Justice System in Indonesia. The term criminal justice system refers to a working mechanism in combating crime that uses a systems approach. This systems approach uses all elements involved as a unified, interconnected, and mutually influencing one another. Through this approach, the Police, Prosecutors, Courts, and Correctional Institutions are important and interconnected elements.

According to Mardjono Reksodiputro, the criminal justice system is a crime control system consisting of the police, prosecutors, courts, and correctional institutions for convicts. He also stated that the criminal justice system is a system within a society for dealing with crime. Dealing with crime is defined as controlling crime so that it remains within the limits of societal tolerance. Controlling crime so that it remains within the limits of societal tolerance does not mean tolerating a particular crime or allowing it to occur. This tolerance is an awareness that crime will continue to exist as long as there are humans in society. Therefore, wherever there is a society, there will always be crime. The components of the criminal justice system that are commonly recognized, both in knowledge of criminal policy and in law enforcement practice, consist of the police, prosecutors, courts, and correctional institutions.

Law enforcement efforts are an integral part of social welfare efforts and an integral part of social policy. Social policy can be defined as a rational effort to achieve social welfare while simultaneously encompassing community protection. Therefore, the term "social policy" also encompasses "social welfare policy" and "social defense policy."²² Broadly speaking, criminal law policy can cover the scope of policy in the field of material criminal law, in the field of formal criminal law and in the field of criminal law for the implementation of criminal law.

Substantial law is used as a basis for resolving societal problems through law enforcement. Law enforcement is defined as the process of realizing legal desires or legal ideas into reality. The application or enforcement of substantive law requires formal law or procedural law. Formal law or procedural law is a legal

²¹Krzysztof Szczucki, Ethical Legitimacy of Criminal Law, Elsevier: International Journal of Law, Crime and Justice, 53, June 2018, p 69

²²Barda Nawawi Arief, Anthology of Criminal Law Policy: The Development of the New Criminal Code Concept, Jakarta: Kencana Prenadamedia Group, 2008, p. 26.

regulation that governs the procedures for implementing or enforcing substantive law.²³

The criminal justice system is the mechanism that implements formal criminal law, namely procedural law that regulates the procedures for implementing substantive criminal law. Formal law (or criminal procedure) is the set of procedural rules that determine how investigations, prosecutions, and the implementation of court decisions are carried out to uphold substantive criminal law.

One of the stages in the criminal justice system is investigation. Investigation is the stage of collecting evidence from a criminal case, the evidence that has been collected will be a bright spot to find the perpetrator or suspect in a criminal case. Based on the formal source of criminal law, namely the Criminal Procedure Code Article 1 number (2), it is stated that Investigation is a series of investigator actions in the case and according to the method regulated in this Law to search for and collect evidence that occurred and to find the suspect.²⁴

Based on the definition of investigation contained in Article 1 number 2 of the Criminal Procedure Code, the elements contained in the definition of investigation are:

- a. Investigation is a series of actions that contain actions that are interconnected with each other;
- b. Investigations are carried out by public officials called investigators;
- c. Investigations are conducted based on statutory regulations;
- d. The aim of an investigation is to seek and collect evidence, which will shed light on the crime that occurred and find the suspect.

Based on the four elements, it is concluded that before the investigation was conducted, it was known that a crime had occurred but the crime was not yet clear and it was not yet known who committed it, the existence of the crime that was not yet clear was known from the investigation. Therefore, the investigation is the spearhead of revealing a crime in order to achieve the objectives of criminal procedural law, namely to seek and find material truth, so the burden of searching to find evidence that will be used by the public prosecutor in court is on the shoulders of the investigator.²⁵

²³Yashinta Nurul Imani, et al. Analysis of Formal and Material Legal Sources in the Formation of Jinayat Customary Law in Aceh, *Intelektiva*, 4 (10) June 2023, p. 53

²⁴Article 1 number (2) of Law Number 8 of 1981 concerning Criminal Procedure Law (KUHAP)

²⁵Hibnu Nugroho. *Integration of Corruption Crime Investigations in Indonesia*. Media Prima Aksara. Jakarta. 2012. p. 31

Investigations play a crucial role in determining the next steps in the criminal legal process. If sufficient evidence is not found during the investigation to support the alleged crime, prosecution and trial cannot begin. The purpose of criminal investigations is to understand the circumstances and protect uninvolved individuals from unfair legal action. Therefore, the investigative process is often time-consuming, tedious, and can cause psychological distress.

Scientific Crime Investigation is an investigative method that uses science and technology in the evidence system, by utilizing various forensic disciplines²⁶ such as forensic identification, forensic laboratories, forensic psychology, forensic medicine, and digital forensics.²⁷ Each stage in this method aims to collect, compare, and interpret physical evidence found at the crime scene or obtained from suspects and victims.

Scientific Crime Investigation allows for the analysis of various types of evidence, which can link suspects to crimes, link certain objects to their original sources, and uncover new facts that may not have been revealed through suspect confessions or witness testimony.²⁸ This evidence can be obtained from both digital sources and forensic laboratories, providing a more comprehensive approach to investigating and proving crimes. Rapid technological developments are undoubtedly a positive impact on human life. Technology exists to simplify all human affairs. The application of SCI technology in the evidentiary process can increase the likelihood of uncovering a crime.

In order to fully understand the concept of Scientific Crime Investigation, it is necessary to first distinguish between the two main elements of the term, namely "Crime Investigation" and "Scientific Investigation". According to Osterburg and Ward, the investigation of a crime is a process that includes a series of activities in the form of information seeking and gathering evidence, which aims to identify the perpetrator, arrest him, and bring him to justice to be held accountable for his actions.²⁹ The term "Scientific Investigation" is derived from two words: "scientific," meaning related to knowledge, and "investigation," referring to the activity of inquiry. In this context, "scientific" implies a systematic approach to an object through observation, experimentation, and methodological studies to gain a deep understanding of the object being studied. Meanwhile, "investigation" is a

²⁶Indonesian National Police Forensic Laboratory Center, Company Profile; Indonesian National Police Forensic Laboratory Center, Jakarta: Indonesian National Police Forensic Laboratory Center, 2012, p. 4.

²⁷Riza Sativa, Scientific....Op.Cit, 15 (1) April 2021, p 59

²⁸Andra Fanizha Mendorfa, et al. Strengthening Evidence through Scientific Crime Investigation in the Crime of Murder by Poisoning (Analysis of Lhoksukon District Court Decisions Number 216/Pid.B/2019/PN LSK and 217/Pid.B/2019/PN LSK), Suloh Journal of the Master of Law Study Program, 10 (1) April 2022, p. 83

²⁹James W Osterburg & Richard H. Ward. Criminal Investigation: A Method for Reconstructing the Past. Anderson Publishing.Co, Ohio: United States, 1997, p. 32

fact-finding activity through in-depth data collection and information analysis to draw a justifiable conclusion, both in the context of proving truth and testing a hypothesis.³⁰

SCI aims to gather findings to determine or prove the truth or falsity of a fact. With this approach, investigators can summarize a series of findings and establish a sequence of events based on the evidence obtained.³¹

In other words, Scientific Crime Investigation (SCI) can be defined as the process of investigating and investigating criminal acts using a science-based approach. In the context of criminal procedure law, this method can also be understood as a system of evidence that relies on scientific principles.³² SCI is vital in handling complex criminal cases, where conventional methods are often inadequate. Cases such as poisoning, assault, or crimes committed in a hidden and systematic manner require more precise methods due to the limited availability of conventional evidence in the field.

SCI enables law enforcement officials, particularly investigators, to obtain and process evidence directly from the crime scene through a scientific approach. This technique combines various disciplines and technologies, such as toxicology testing to identify poisons in the victim's body, wound analysis to determine the type of violence, and digital data tracking to uncover the perpetrator's involvement in the crime. Evidence obtained through this method is objective, measurable, and has a high level of reliability in court, especially when traditional evidence such as witness testimony or physical evidence is difficult to obtain. SCI provides a systematic and verifiable evidentiary structure, making it a credible tool in supporting the upholding of criminal justice.³³

With a specific description of the types of Scientific Crime Investigation (SCI) media, including:

- a. Forensic laboratories focus on the examination and testing of physical evidence. For example, analyzing fingerprints, chemical residue, narcotics, or DNA to provide scientific results.
- b. Identification, Used to confirm the identity of a suspect, witness, or victim. For example, identification through fingerprints, facial photographs, or DNA analysis for bookkeeping purposes;

³⁰Riza Sativa, Scientific....Op.Cit, 15 (1) April 2021

³¹R. Wahyuni, The Role of Forensic Laboratories in Crime Scene Processing within the Framework of Scientific Crime Investigation (Sci). Jurisprudence, 4 (2) 2014, pp. 92–97

³²Wahyu and Trisna Agus Brata, The Use of Scientific Evidence in Proving Environmental Criminal Cases. Wasaka Hukum: A Window on Legal Information & Ideas, 10 (2) August 2022, p. 44

³³Suyanto. Introduction to Criminal Procedure. Jakarta: Permata Kencana, 2018

- c. Forensic medicine, is used when investigators require examination of suspects/witnesses/victims who must receive special physical treatment/handling, for example, examination of wounds, autopsy, or post-mortem examination to determine the cause of death;
- d. Forensic psychology focuses on the psychological aspects of the individuals involved, including suspects, witnesses, and victims. For example, to assess the mental state of the suspect or the psychological impact on the victim; and
- e. Digital forensics deals with the examination of digital evidence, such as electronic devices, emails, communication records, or other digitally stored data. The goal is to uncover relevant information.³⁴

The scientific crime investigation (SCI) method is indeed a mainstay in addressing the complexity of criminal cases, especially those that are difficult to solve with conventional evidence or a limited number of witnesses. In cases such as murder by poisoning or assault, physical evidence is often minimal or even vague, making a scientific approach the primary solution. Through the SCI method, various pieces of evidence from the crime scene are analyzed in detail, from toxic substances in the victim's body, DNA traces, fingerprints, to digital recordings that may reveal the perpetrator's involvement. With the help of SCI, investigators can build a stronger and more objective evidentiary argument in court. This is crucial because scientific evidence from forensic laboratories has higher validity and is widely accepted in the legal realm.³⁵

In terms of legal legitimacy regarding efforts to obtain evidence using the scientific crime investigation method, there are several legal provisions that accommodate the legality of SCI actions, including:

1) Criminal Procedure Code (KUHAP)

In the provisions of Article 184 of the Criminal Procedure Code, it is regulated that valid evidence in criminal cases is witness testimony, expert testimony, letters, instructions, and the defendant's statement. Furthermore, Article 1 point 28 of the Criminal Procedure Code states: "Expert testimony is information provided by a person who has special expertise regarding matters required to clarify a criminal case for the purposes of examination." Furthermore, Article 170 of the Criminal Procedure Code further details the meaning of "special expertise", namely:

³⁴Niki Marjuki and Budi Sastra Panjaitan, Application of Scientific Crime Investigation (SCI) in Disclosing Criminal Cases in Indonesia (Study of Medan High Court Decision No. 1250/Pid/2020/PT Mdn), JIHHP: Journal of Law, Humanities and Politics, 5 (1) November 2024, p. 541

³⁵Soeparmono, Expert Statement and Visum et Rapertum in the Aspects of Criminal Procedure Law, Mandar Maju, Bandung. 2011

"Anyone who is asked for their opinion as a forensic medicine expert or doctor or other expert is obliged to provide expert testimony for the sake of justice."

Article 120 of the Criminal Procedure Code, namely: (1) In this case, the investigator considers it necessary, he can ask for the opinion of an expert or someone who has special expertise; (2) The expert takes an oath or makes a promise before the investigator that he will provide information to the best of his knowledge, unless this violates the obligation to maintain professional or official confidentiality, he can refuse to provide the information requested.

Article 133 paragraph (1) of the Criminal Procedure Code states that "in the case of an investigation in the interests of justice dealing with a victim who is injured, abused or dies allegedly due to a criminal act, the police have the authority to request information from a forensic medical expert or doctor or other expert.

2) Law Number 2 of 2002 concerning the Indonesian Police

The next legal basis can be found in the provisions of Article 14 paragraph (1) letter h, Law of the Republic of Indonesia Number 2 of 2002 concerning the Republic of Indonesia National Police, namely In carrying out the main duties as referred to in Article 13, the Republic of Indonesia National Police is tasked with and organizes police identification, police medicine, forensic laboratories and police psychology for the benefit of police duties. In substance, Article 14 paragraph (1) letter h has identified that the implementation of police identification, police medicine, forensic laboratories and police psychology is part of the instrument in the Scientific Crime Investigation method.

3) Regulation of the Republic of Indonesia National Police Number 6 of 2019 concerning the Revocation of Regulation of the Head of the Republic of Indonesia National Police Number 14 of 2012 concerning the Management of Criminal Investigations

The legal basis for the use of the SCI method in criminal investigations is further regulated in the Regulation of the Chief of Police No. 6 of 2019 concerning Criminal Investigations in Article 34 which states "Investigators in carrying out criminal investigations are supported by technical assistance for scientific evidence (Scientific Crime Investigation)". Meanwhile, based on Article 35, technical assistance for investigations as referred to in Article 34, includes:

- a. forensic laboratory, used when investigators require examination and testing of evidence that requires special handling and/or treatment;
- b. identification, used when investigators require certainty about the identity of suspects/witnesses/victims of criminal acts and as evidence;

- c. forensic medicine, used when investigators require examination of suspects/witnesses/victims who must receive special physical treatment/handling;
- d. forensic psychology, used when investigators require examination of suspects/witnesses/victims who must receive special psychological treatment/handling; and
- e. digital forensics, used when investigators require examination and testing of digital evidence that requires special handling and/or treatment.³⁶

4) Regulation of the Chief of the Republic of Indonesia Police Number 10 of 2009 is regarding the Procedures and Requirements for Requests for Criminalistic Technical Examination of Crime Scenes and Criminalistic Laboratory Examination of Evidence to the Indonesian National Police Forensic Laboratory.

In the Regulation of the Chief of the Indonesian National Police Number 10 of 2009, specifically in Article 1 number 2, it is explained that the National Police Forensic Laboratory is part of the Police organizational structure which includes the Forensic Laboratory Center and its branch units. This institution has the main task of implementing and developing the function of the forensic laboratory as part of the technical support in criminal investigations, which are carried out by regional units according to the division of work areas stipulated in the Decree of the Chief of Police. The existence of this laboratory is very important in supporting the investigation process, as also emphasized in Law Number 8 of 1981 concerning Criminal Procedure Code (KUHAP) which has mutual implications, because it plays a role in analyzing evidence to uncover criminal acts.³⁷

5) Law Number 1 of 2024 concerning the Second Amendment to Law Number 11 of 2008 concerning Electronic Information and Transactions (ITE Law)

Digital forensics in crime cases helps prove cases

digital crime. Electronic information and/or electronic and/or printed documents are valid evidence according to Article 5 paragraph (1) of Law Number 1 of 2024 concerning the Second Amendment to Law Number 11 of 2008 concerning Electronic Information and Transactions (ITE Law). Based on Article 43 (5) letter H of the ITE Law, a digital forensic expert means a person with certain expertise in

³⁶Article 35 of the Regulation of the Republic of Indonesia National Police Number 6 of 2019 concerning the Revocation of the Regulation of the Head of the Republic of Indonesia National Police Number 14 of 2012 concerning the Management of Criminal Investigations

³⁷Article 1 number 2 of the Regulation of the Chief of the Republic of Indonesia Police Number 10 of 2009 is regarding the Procedures and Requirements for Requesting Criminalistic Technical Examination of the Crime Scene and Criminalistic Laboratory Examination of Evidence to the Indonesian National Police Forensic Laboratory.

the field of information technology who is academically and practically responsible for that knowledge.³⁸

Based on these provisions, the ITE Law also influences the legal legitimacy of Scientific Crime Investigation in the field of digital crime evidence by accommodating electronic evidence as valid evidence produced through Scientific Crime Investigation and also the terminology of digital forensic experts as expert subjects in the field of digital crime, where both variables are part of one of the inseparable instruments of the Scientific Crime Investigation method.

3.2. The Urgent Functional Nature of the Scientific Crime Investigation Method in Efforts to Prove Crimes

In facing criminal cases that are not supported by at least two valid pieces of evidence, law enforcement officers find it difficult to prove the guilt or innocence of the suspect/defendant. In ancient times, if law enforcement officers found a criminal case that was not supported by valid evidence but the public suspected or accused someone of being the perpetrator of the crime, then law enforcement officers would prioritize the suspect/defendant's confession. In reality, in obtaining such evidence, there were law enforcement officers who took shortcuts by intimidating the suspect/defendant by forcing them to confess to having committed a crime, which became a polemic in investigative practices in ancient dimensions.³⁹

The criminal investigation process today has undergone significant progress thanks to the development of modern science and technology. One impact of this development on investigations is the use of scientific crime investigation, or science-based investigations, which are applied as breakthroughs in the evidentiary process. According to Jan Remmelink, criminal law is intended to uphold the rule of law and protect the legal community.⁴⁰

Basically, the criminal justice process at the investigation stage in terms of analyzing efforts to find evidence which is known to have difficulty in revealing a crime, then the Scientific Crime Investigation method as a form of technical assistance to achieve evidence that reveals the truth in a crime case comprehensively is the scope of the Police's work.

Referring to Article 2 of the Republic of Indonesia National Police Law Number 2 of 2002, the police function includes 3 things: First, maintaining public order and security (public order maintenance); Second, law enforcement; and Third, public

³⁸Article 5 paragraph (1) and Article 43 (5) letter H of Law Number 1 of 2024 concerning the Second Amendment to Law Number 11 of 2008 concerning Electronic Information and Transactions

³⁹Abdussalam, Smart Forensic Book (Scientific Evidence), Jakarta: Restu Agung, 2006, page 1

⁴⁰H. Hendarta, et al. Handling of Narcotics Evidence at the Barru District Court, Hermeneutika: Journal of Legal Studies, 5 (2) 2021.

service (public service provider).⁴¹ From the perspective of its implementation, if each activity is laid out in a continuous line, what the police do can be said to be at the upstream, initial or basic level of the criminal justice system as well as in the context of maintaining security and order.

The implementation of the Scientific Crime Investigation method in investigations has become a necessity to ensure the effectiveness of case disclosure and evidence. Therefore, investigators authorized to handle criminal cases can seek the advice of forensic experts during the investigation phase. The application of Scientific Crime Investigation has revolutionized the way criminal cases are proven. When implemented correctly, this strategy is said to be very useful for the police in solving cases where evidence is lacking or difficult to produce.⁴² The evidence presented during the trial is also what ultimately convinces the judge to impose a criminal sentence. For example, in cases involving bodily injury, there must be legally supported evidence of when the injury occurred and whether it was caused by a crime.⁴³

In this case, scientific crime investigation involves many fields of science involved with the term forensics. Historically, the development of forensic needs in law enforcement with the aim of uncovering crimes during the investigation stage, was first recorded in the 19th century in France. Josep Bonaventura Orfila in a trial with animal poisoning experiments and with his toxicology book was able to convince the judge, thus dispelling the assumption that death due to poisoning was caused by mysticism. In the mid-19th century, chemistry, microscopy, and photography were first used in criminal investigations.⁴⁴ This revolution is a reflection of the responsibility of investigative officers in law enforcement.⁴⁵

Alphonse Bertillon was the first scientist to systematically study human body size as a parameter in personal identification. Until the early 1900s, Bertillon's method was highly effective in personal identification. Bertillon is known as the father of criminal identification.⁴⁶

Francis Galton first studied human fingerprints and developed a classification method from fingerprint samples. The results of his research are now used as a basic method in personal identification. Leone Lattes is a professor at the Institute of Forensic Medicine at the University of Turin, Italy. In the investigation and

⁴¹Adrianus Meliala, The Need for Renewal and Strengthening of Criminal Procedure Law within the Scope of the Police, Indonesian Judicial Journal, 3, July-December 2015, p. 45

⁴²Riza Sativa, Scientific....Op.Cit, 15 (1) April 2021, p 64

⁴³Pande Putu Thalia Alma, I Nyoman Gede Sugiarta, Ketut Adi Wirawan. Analysis of Evidence Examination Using the Scientific Crime Investigation Method in Disclosing a Murder Case at the Denpasar Police Headquarters. Journal of Legal Analogy, 5 (3) 2023, p. 367

⁴⁴WG Eckert, Introduction to Forensic Sciences, Missouri: The CV Mosby Company, 1980, p 234

⁴⁵Muhammad Efenfy, Introduction to Indonesian Health Law, Jakarta: Rineka Cipta, 2019, p. 25

⁴⁶PD Anderson, An Overview of Forensic Pharmacists Practice. Journal of Pharmacy Practice, 13, 2000, p. 179

identification of dried bloodstains, Lattes classified blood into four classifications: A, B, AB, and O.⁴⁷

This basic classification is still widely recognized and utilized today. This science is often known as Forensic Science. Saferstein, in his book "Criminalistics: An Introduction to Forensic Science," argues that forensic science, in general, is the application of science to law.⁴⁸ Forensic Science is categorized as a natural science and is built on the methods of natural science. In the view of natural science, something is considered scientific only and only if it is based on facts or experience (empiricism), scientific truth must be able to be proven by everyone through their senses (positivism), analysis and results can be expressed in a reasonable manner, both deductively and inductively in a certain language structure that has meaning (logic) and the results can be communicated to the wider community easily or without being shaken (criticism of science).⁴⁹

The existence of scientific evidence is expected to prevent the police from relying on confessions from suspects or living witnesses in investigations and solving cases. Because living witnesses can lie or be instructed to lie, relying solely on the testimony of the witness in question cannot guarantee the achievement of the goal of upholding the truth in the criminal process. In scientific evidence and examination, we are familiar with the terms forensic science and criminology. In general, forensic science can be defined as the application or utilization of certain scientific knowledge for the purposes of law enforcement and justice. This auxiliary science will be used to detect the cause of death or to determine the cause of the victim's death in a crime, in which case the entire interpretation of forensic science is applied to the scientific crime investigation (SCI) method.

The branches of forensic science described above provide an easy way to determine the cause of a crime. If one branch of forensic science cannot identify a crime, other branches of forensic science can be used. All of these branches are applied in law enforcement investigations, a method called scientific crime investigation.

In terms of urgency, this method is extremely helpful. The implementation of Scientific Crime Investigation has revolutionized the way criminal cases are proven. When implemented correctly, this strategy is said to be very useful for law enforcement in solving cases lacking evidence. When all conventional investigative efforts fail and reach a dead end, the law turns to other scientific fields for

⁴⁷ML Avinash Tejasvi, Evaluation of the Secretor Status of ABO Blood Group Antigens in Saliva using Absorption Inhibition Method. Global Medical Genetics, 8, (1) 2021, pp. 19–23.

⁴⁸R. Saferstein, Criminalistics, an Introduction to Forensic Science, 5th Ed., New Jersey: A Simon & Schuster Co., Englewood Cliffs, 1995, p 15.

⁴⁹A. Purwandianto, Utilization of Forensic Laboratories for Non-Litigation Purposes, Jakarta: Institute for Community Service, University of Indonesia, 2000, p. 16.

assistance. This is legally valid and represents a support system for smooth law enforcement.

In terms of urgency, researchers are trying to unravel various cases in Indonesia that involve experts with an investigation using the scientific crime investigation method as an illustration of the urgency of involving other scientific fields in order to achieve valid evidence, including:

1) The murder case of Jamaluddin Hakim, Medan District Court

The victim was a judge who served at the Medan District Court, he was found dead in the Palm Oil Plantation, Hamlet II Namo Bintang, Namo Bintang Village, Kutanlimbaru District, Deli Serdang Regency at 13.00 on November 29 2019, when found, the victim died wearing sportswear in his private car, so this incident really requires accurate evidence because of the

At that time, the victim was suspected of being the victim of a robbery or a single accident.⁵⁰

Therefore, the police immediately took the victim's body to Bhayangkara Hospital in Medan for forensic examination and initiated a Scientific Crime Investigation investigation. They appointed Dr. Mistar Ritonga, Sp.FM, as the Head of the Forensic Team. This process, in the Scientific Crime Investigation method, is referred to as the forensic medical stage, or the examination of the victim's body through a surgical examination of the victim's internal conditions to obtain information on the facts of the cause of death.⁵¹

The forensic examination of this case revealed numerous injuries on the victim's body, indicating physical violence. Abrasions, bruises, and marks found on several parts of the body, including the forehead, face, nose, lips, neck, chest, and abdomen, strongly evidence violence against the victim prior to her death. Brownish fluid coming from the nose and blood from the mouth also suggest serious trauma. Several key findings, such as bruising on the neck and lips, may indicate that the victim may have been subjected to pressure or strangulation, potentially leading to asphyxia (difficulty breathing) and death. A block-shaped mark on the abdomen suggests contact with a hard object or intense pressure. These findings support the suspicion that the victim's death was not a natural result, but rather a deliberate act of physical violence.⁵²

Through the results of the investigation using the Scientific Crime Investigation method, police investigators through the North Sumatra Regional Police raised the status of the case to an investigation in order to find out more about the

⁵⁰Niki Marjuki and Budi Sastra Panjaitan, Op.Cit, 5 (1) November 2024, page 542

⁵¹Ibid

⁵²Ibid

perpetrator who killed the victim. However, police investigators also still had difficulty in determining who the perpetrator who killed the Medan judge was, because the body found and the location where the body was found did not provide any signs of the perpetrator's traces, therefore in this case investigators used digital forensic methods with the aim of tracing more deeply the digital traces of the victim and the victim's surroundings through cell phone tracking and CCTV examination. Furthermore, through cell phone tracking, information was obtained that the victim was still at home at 22.00 WIB, this indicated that the victim died right at home because the results of the examination of the victim's body based on forensic medicine stated that the heart and digestive organs had been inactive since 13 hours ago, and if correlated with the digital traces, it was concluded that the victim was actually murdered at home. Furthermore, to complete the information, investigators conducted a CCTV examination around the victim's home complex, and the results obtained that at 03.15 WIB the car driven by the victim was found passing. This is what gave investigators confidence in the involvement of his wife and the people in his house.⁵³

2) The Ryan Jombang Case

We still remember the incident of "Ryan's victims", where the perpetrator killed 11 people, one of whose body was mutilated and put in two large bags and dumped in Jakarta, and 10 other victims whose bodies were buried behind his parents' house in Jombang between 2007-2008. The excavation and investigation involved a biological anthropologist, Dr. Toetik Koesbardiati from the Department of Anthropology, Airlangga University. The first excavation on July 21, 2008 and the second on July 28, 2008 each found individual victims, most of whom had lost their soft tissue.⁵⁴ In this case, the application of the scientific crime investigation method involves the field of forensic anthropology in the process of uncovering victims who have been buried for quite a long time.

3) The Ferdy Sambo Case

One concrete example of the application of scientific-based crime-solving methods is in the case of the premeditated murder of Nofriansyah Yoshua Hutabarat, also known as Brigadier Yoshua, which implicated the former Head of the Propam Division of the Indonesian National Police, Inspector General Ferdy Sambo, as the main suspect or intellectual actor behind the incident. The handling of this case received special attention from the Chief of Police, General Listyo Sigit Prabowo, who directly instructed the special team formed to investigate the case to work transparently and prioritize a scientific investigation approach or scientific

⁵³Ibid, p. 543

⁵⁴Rusyad Adi Suryianto, Forensic Archaeologist...Op.Cit, 36 (1) May 2016, page 53

crime investigation.⁵⁵ On July 18, 2022, Brigadier Yoshua's family lawyers, Kamaruddin Simanjuntak and Johnson Panjaitan, went to the National Police Criminal Investigation Agency (Bareskrim Polri) to report the alleged premeditated murder of Brigadier Yoshua. Kamaruddin Simanjuntak revealed several wounds resulting from alleged torture on the body of the deceased Brigadier Yoshua. They firmly stated that Yoshua was not only shot, but also tortured. On July 27, 2022, a second autopsy of Brigadier Yoshua's body was conducted in Jambi. The autopsies were carried out at Sungai Bahar Regional Hospital, Muaro Jambi Regency. The autopsies were conducted by a team of forensic doctors brought in by the National Police, involving various elements, including a doctor recommended by the family to witness the autopsy process and an examination of 20 CCTV recordings they obtained, ranging from Yoshua's journey from Magelang to CCTV footage around Inspector General Ferdy Sambo's official residence in Duren Tiga.

The autopsy results of the death of Brigadier Nofriansyah Yoshua Hutabarat as conveyed by Kamaruddin Simanjuntak as the lawyer for the family of Brigadier J or Nofriansyah Yosua Hutabarat, among others (a) found a kind of adhesive glue on the head. They then conducted further examination and found a hole poked (punctured). The hole penetrated the eyes and nose. It is suspected that he was shot from behind and penetrated the nose; (b) Found a crack in the skull of six. The crack is suspected to be due to a gunshot; (c) Part of Brigadier J's brain was moved to the chest near the stomach; (d) Found cracks from the neck leading to the lips; (e) There was an open wound on the shoulder with flesh almost peeled off; (f) The lower arm was broken, the cause of which has not been determined by the forensic doctor; (g) Found finger fractures around the nails of the little finger and ring finger; (h) Found bruises on the back; (i) Found bruises on the left leg; (j) Found a hole in the lower left ankle; (k) Four holes were found in the chest, suspected to be gunshot wounds.⁵⁶

Another interesting thing is regarding the alleged abuse before Brigadier Yoshua's death. This is based on the following facts: (a) Nails pulled out; (b) Neck strangulation. There are marks of strangulation on Brigadier Yoshua's neck. It is suspected to be a rope strangulation; (c) Incisions. There are incisions on the nose, lips and under the eyes; (d) Broken Fingers. Brigadier Yoshua's fingers are broken. This is also evidence that Brigadier Yoshua experienced violence; (e) Damage to the shoulders and stomach; (f) Dislocated jaw.⁵⁷

The SCI method was also mentioned again by the Inspector General of the Indonesian National Police, Commissioner General Agung Budi Maryoto, when he

⁵⁵Irwan Muin and Fakhur, The Role and Position of Scientific Crime Investigation in Criminal Procedure Evidence Law (Case Study of Decision Number 777/Pid.B/2016/PN.Jkt.Pst. and Decision Number 796/Pid.B/2022/PN Jkt.Sel.), FOCUS: Journal of Social Studies, 6 (2) August 2025, p. 70

⁵⁶Lusia Sulastri, Autopsy Ethics: The Responsibility of Forensic Doctors in Murder Cases, National Security Journal, IX (2) 2023, pp. 434-436

⁵⁷Ibid

named Putri Chandrawati as the fifth suspect in the murder of Brigadier Josua.⁵⁸ In handling the case of Brigadier Josua, the Indonesian National Police gathered various experts such as biologists, forensic chemists, forensic ballistics, digital forensics, and forensic pathology.

4. Jessica Kumala Wongso's Cyanide Coffee Case

The premeditated murder case of Wayan Mirna Salihin, known as the "Cyanide Coffee Case," is a significant example of the successful application of scientific crime investigation methods in the law enforcement process. The Panel of Judges' legal considerations in sentencing Jessica Kumala Wongso indicate that they used circumstantial evidence. This is because there were no witnesses who directly saw Jessica put cyanide into the drink consumed by the victim, Wayan Mirna Salihin. Nevertheless, the Panel of Judges built their conviction through the consistency between various pieces of evidence, such as expert testimony, witness testimony, electronic evidence, documentary evidence (including a post-mortem examination), and indicative evidence. Some of the expert testimony that served as the basis for the judge's assessment included:

- a. Forensic psychiatry expert, Dr. Natalia Widiasih, and the RSCM team stated the defendant's psychological condition in the psychological post-mortem;
- b. Forensic chemist, Senior Commissioner of Police Dr. Nursamran Subandi, found cyanide ion content of 7,900 mg/l, which is equivalent to 14.88 grams/liter of sodium cyanide in the drink;
- c. Forensic pathologist, Dr. Slamet Purnomo, stated that there was irritation in the victim's stomach and mouth, which proved that the poison was administered while the victim was still alive;
- d. Toxicologist, Dr. I Made Agus Gelgel Wirasuta, said that a neutralization reaction occurs between stomach acid and cyanide, which causes the stomach pH to increase to 5.5;
- e. Another forensic pathologist, Dr. Djaya Surya Atmadja, emphasized that it was impossible for the cyanide to have been administered after the victim died due to the significant corrosive wounds in the victim's stomach;
- f. *Visum et repertum* stated that there was a residual cyanide of 0.2 mg/l in the victim's stomach, sufficient to support the conclusion that death was caused by the toxic and corrosive effects of cyanide.⁵⁹

⁵⁸Jonaedi Efendi, The Urgency of Synergy between the Police and Universities in Law Enforcement Based on Scientific Crime Investigation, Delivered at the Open Senate Session in the Context of the Anniversary of Bhayangkara University Surabaya, July 31, 2024, page 11

⁵⁹Irwan Muin and Fakhlur, Role and Position ...Op.Cit, 6 (2) August 2025, pp. 74-75

In addition, the Panel of Judges also considered electronic evidence within the scope of digital forensics, including WhatsApp conversations between Jessica and Mirna before the incident, SMS from Jessica to Sandy (Mirna's twin sister) which showed the defendant's interest in the results of the victim's forensic examination, CCTV footage showing the victim's reaction after drinking the drink and Jessica's behavior before and after the incident as well as indicative evidence, such as the defendant sending a news link about poisoned coffee to witness Sandy which indicated deliberate intent and an attempt to direct public perception. The Panel of Judges' conviction was strengthened by the conclusion that the defendant closely observed all movements around the victim's coffee, including when adjusting the position of the glass, and showed anxiety if his plan was threatened with failure. This was emphasized by the defendant's personal motives related to various problems in Australia, which were the background to his return and the alleged planning of this crime.

In terms of the institutional role of the Indonesian National Police (Polri), the implementation of SCI within the National Police involves the synergy of various technical units with forensic expertise according to their respective disciplines. INAFIS, for example, plays a role in fingerprint identification and digital crime scene documentation. The Forensic Laboratory Center (Puslabfor) analyzes chemical, biological, ballistic, and toxicological evidence. The Indonesian National Police's Medical Unit (Dokkes Polri) conducts autopsies and post-mortem examinations on corpses and live victims to scientifically determine the cause of injury and death. Equally important, the Cyber and Digital Forensics Unit traces electronic communications and data, which often provide crucial clues in uncovering the motive or chronology of an incident. When all these units work together methodologically, investigations no longer rely on assumptions, but on undeniable facts.

The benefits of the SCI approach are felt not only in the context of law enforcement, but also for the wider community. First, SCI ensures that the truth revealed is material and not easily manipulated. This provides a more tangible sense of justice for victims and their families. Second, the public, as legal subjects, is better protected from potential criminalization or baseless accusations. In a science-based system, a person cannot be punished simply by pressure from public opinion or subjective suspicions, but must be proven through rational and objective evidence. Third, SCI creates a stronger deterrent effect for perpetrators of crimes, as perpetrators realize that every criminal act leaves a scientific trail that can be accurately traced. Finally, in the long term, this approach strengthens Indonesia's legal civilization by placing science as the primary foundation in the process of upholding justice, rather than simply the power or intuition of law enforcement officers.

Scientific evidence used in a system of proof can never produce conclusions that are consistent with reality. This is the difference between scientific evidence and direct evidence against suspects or witnesses. Witnesses are fallible and prone to making false statements. In contrast, Scientific Crime Investigation examinations are based on science. If someone disputes the results, they can be verified by another comparable laboratory. The methods used by Scientific Crime Investigation are clear, methodical, and provable.⁶⁰

In conclusion, the urgency of Scientific Crime Investigation as a proof that there is no perfect crime and will definitely be revealed with various gaps even though the gap is as small as a needle hole which has implications for a saying that "there is no perfect crime, every crime would definitely leave a mark" which means "there is no perfect crime, every crime must leave a trace". Locard's principle "Every Contact Leaves a Trace", every physical contact between two objects will definitely cause a trace to be left on each of the objects.

The benefits of implementing the Scientific Crime Investigation method, Ruslan Renggong said, are three, namely: (1) Investigators are no longer standardized on the suspect's confession which often gives rise to violence because there is a target to obtain the confession of the person being examined; (2) The examination is fast, precise and accurate because it is supported by special tools that are internationally standardized; (3) Minimizing errors in the examination process because it uses digital tools.⁶¹

Although the Scientific Crime Investigation method is very effective and accurate in proving crimes without sufficient evidence, it does pose several problems as weaknesses in its use in solving various crimes. In principle, SCI utilizes scientific knowledge that evolves over time. Examination data becomes more complex and detailed over time. Errors, such as missing or incorrect data, are common when processing evidence, and this is related to its limitation or reduction.⁶²

In the process of proof, there are reasons for using the Scientific Crime Investigation method which is not optimal even though it has significant advantages, technical problems make it difficult for investigators to apply Scientific Crime Investigation.

Some of the factors that become problematic in the application of the Scientific Crime Investigation method include:

⁶⁰Muhammad Fadil Imran, *Mutilation in Indonesia*, Jakarta: Yayasan Pustaka Obor. 2015

⁶¹Asrudi, Ruslan Ranggong, Abd. Haris Hamid. The Effectiveness Of Evidentiary Method Through Scientific Crime Investigation In The West Sulawesi Regional Police, *Indonesian Journal of Legality of Law*, 6 (1) December 2023, p. 126

⁶²Jasman and Pathahillah, The Urgency of Crime Scene Processing in the Evidence Process, *Amsir Litigation Journal*, 4 (1), 2023, p. 105,

1. Regulatory Factors

More resources should be directed toward implementing the Scientific Crime Investigation approach. Legislation can serve as a framework for this model, making it easier to implement and more transparent. Furthermore, incorporating scientific crime investigation into legislation would likely strengthen its case for higher priority. This means specific substantive legal support from each forensic science field within the scope of Scientific Crime Investigation to ensure its full legal validity.

2. Law Enforcement Factors

Investigators are expected to improve their skills in examining cases using the Scientific Crime Investigation method. This means that experienced forensic professionals and investigators are expected to work together and support each other during the investigation process to ensure that cases are revealed accurately. In this case, although the use of the Scientific Crime Investigation method relies on an expert in the field of science related to a crime disclosure, in this case the Police apparatus also needs to upgrade the quality in various scientific fields other than police science and law to gain an intuition about what happened and what should be concluded in reading the situation of the crime pattern in addition to being assisted technically by an expert investigation so that the relationship between experts and Polri investigators can be integrated to produce accurate, objective, scientific and rational evidence.

3. Facilities and Infrastructure Factors

As crime patterns and motives evolve, newer and more sophisticated maintenance support is required for all parties involved in scientific crime investigation, including the police and expert institutions in various forensic sciences. This means that the distribution of facilities and infrastructure for scientific crime investigation functions throughout Indonesia must be optimized, for example, the availability of forensic laboratories in various forensic science fields. This is a challenge for the government to improve the accuracy and smoothness of law enforcement against crimes in order to achieve justice by paying attention to the completeness of facilities and infrastructure for conducting scientific crime investigations in each region throughout the Republic of Indonesia.

4. Conclusion

In terms of legal legitimacy for the efforts to obtain evidence using the scientific crime investigation method, there are several legal provisions that accommodate the legality of the SCI action, including the provisions of Article 120 of the Criminal Procedure Code in which if the investigator considers it necessary, he can ask for the opinion of an expert or someone who has special expertise; The expert takes an oath or expresses a promise before the investigator that he will provide

information according to his best knowledge unless it violates the obligation to maintain professional or positional confidentiality, he can refuse to provide the requested information. Article 14 paragraph 1 letter h, Law of the Republic of Indonesia Number 2 of 2002 concerning the Indonesian National Police, namely In carrying out the main tasks as referred to in Article 13, the Indonesian National Police is tasked with and organizes police identification, police medicine, forensic laboratories and police psychology for the benefit of police duties. In substance, Article 14 paragraph 1 letter h has identified that the implementation of police identification, police medicine, forensic laboratories and police psychology is part of the instrument in the Scientific Crime Investigation method.

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