

Scientific Crime Investigation in Proving Money Laundering Crimes According to the Criminal Procedure Code and the Anti-Money Laundering Law

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Abstract. *Money laundering (TPPU) is a crime that has complex characteristics because it involves disguising the origin of wealth thru various transaction mechanisms and technologies that are difficult to prove using conventional approaches. The complexity poses challenges in the criminal evidence system, particularly regarding the ability of criminal procedural law to accommodate the development of science and technology-based investigative methods. This research aims to analyze the characteristics of evidence in Money Laundering Crimes (TPPU), examine the position of Scientific Crime Investigation (SCI) within the evidentiary system according to the Criminal Procedure Code (KUHP) and Law Number 8 of 2010, as well as review the regulation of SCI in national legislation thru a comparative approach with several countries. This research uses normative legal research methods with a legislative approach, a conceptual approach, and a comparative approach. The research results show that evidence in TPPU has an indirect nature and requires a scientific analysis-based approach to trace the relationship between wealth and the original crime. SCI plays an important role in producing objective evidence thru methods such as digital forensics and data analysis, but in the Indonesian legal system, SCI has not yet been explicitly recognized as an independent piece of evidence and still needs to be qualified into the types of evidence regulated in the Criminal Procedure Code (KUHP). The regulation of SCI thru the Chief of Police Regulation is still operational in nature and does not provide adequate legal certainty. Legal reform is needed to strengthen the recognition of scientific evidence methods in order to enhance the effectiveness of combating money laundering in Indonesia.*

Keyword: *Crime; Evidence; Investigation; Laundering; Money.*

1. Introduction

The development of crime in the modern era shows an increasingly complex dynamic, both in terms of modus operandi, the structure of the perpetrators, and

the impact on society and the state. The advancement of information technology, the globalization of financial systems, and the ease of asset mobility have spurred the emergence of new forms of transnational and organized crime. One form of crime that has seen a significant increase is economic crime, which has a systemic impact on national stability (Sugianto et al., 2025: 2830). In this case, money laundering (TPPU) becomes a crucial phenomenon because it serves as a means to conceal or disguise the proceeds of crime, making them appear legal.

Money laundering offenses, in essence, do not stand alone but are closely related to the predicate crime. This shows that money laundering (TPPU) is a follow-up crime that arises as a consequence of a previous crime that generates illegal wealth (Arief, 2013: 144). In its development, there is a conceptual debate regarding whether TPPU is classified as a follow-up crime or an independent crime, which indicates the complex legal characteristics of this crime (Ramadhan, Tanuwijaya, & Prihatmini, 2025: 10–11). The complexity emphasizes that money laundering is not merely a derivative crime, but has its own dimension within the criminal justice system.

Operationally, the crime of money laundering is carried out thru several systematic stages, namely placement, layering, and integration. These stages indicate a structured effort to obscure the origin of funds derived from criminal activities thru the formal financial system (Gultom, Agus, & Gaol, 2025: 65–66). At the layering stage, for example, the perpetrators utilize electronic transactions, layered accounts, and shell companies to obscure the financial trail. This condition makes proving money laundering much more complex compared to conventional crimes, as it involves in-depth financial analysis and cross-jurisdictional issues.

The development of information technology increasingly complicates the process of proving cases of money laundering. The use of digital systems, electronic transactions, and modern financial instruments has transformed crime patterns into technology-based ones. Electronic evidence has also become one of the main pieces of evidence in uncovering money laundering crimes, as it can accurately record transaction trails and fund flows (Kartika, 2019: 35; Makarim, 2017: 455). Proof no longer relies solely on conventional evidence, but rather requires a technology-based approach that can guaranty the validity and integrity of the data.

In the Scientific Crime Investigation (SCI) approach, it becomes highly relevant to support the evidentiary system in money laundering cases. SCI allows the process of collecting, analyzing, and interpreting evidence to be conducted scientifically and systematically, especially regarding electronic evidence and digital data. The need for this approach is becoming increasingly urgent considering the characteristics of money laundering that rely on the analysis of financial

transactions and money flow patterns (Hutagalung, 2025: 401). The provision in Law Number 8 of 2010, which does not require prior proof of the predicate crime, further emphasizes the importance of using scientific analysis-based proof methods.

Normatively, there are still issues regarding the position of Scientific Crime Investigation within the criminal procedural law evidence system in Indonesia. Regulations regarding SCI have not yet been explicitly accommodated in the Criminal Procedure Code (KUHP), leading to uncertainty in law enforcement practices. However, the need for adaptive evidentiary methods in response to technological advancements is an inevitability in addressing modern crimes, particularly money laundering offenses that possess complex and multidimensional characteristics.

Previous research has tended to focus on aspects of law enforcement, corporate accountability, and asset tracing in money laundering, but has not specifically examined the position of Scientific Crime Investigation within the money laundering proof system (Sibarani, 2025). This indicates a research gap that needs to be filled to contribute to strengthening the criminal evidence system in Indonesia. Analysis of the position of SCI becomes important to formulate a more effective and responsive proof model to the development of modern crime.

Based on the description, it can be understood that the complexity of money laundering crimes demands an evidentiary approach that is not only normative but also scientific and technological. In this case, problem identification becomes a very crucial stage, as it determines the direction of analysis and the depth of the study on the legal issues raised. Without proper problem identification, the research risks losing focus and failing to address practical needs in law enforcement. The formulation of the problem in this research is directed to answer: (1) What is the position of Scientific Crime Investigation in the system of proving money laundering crimes according to the Criminal Procedure Code, Law Number 8 of 2010, and related regulations in Indonesia? and (2) How does the regulation of Scientific Crime Investigation in proving money laundering crimes in Indonesia, the United States, the United Kingdom, Australia, and Malaysia compare, and what is its relevance for strengthening the system of proving money laundering crimes in Indonesia?

2. Research Methods

This research is a normative legal research that places law as a norm or rule applicable within the positive legal system. This research is prescriptive and descriptive-analytical, meaning it not only systematically describes the legal issues being studied but also provides legal arguments and recommendations for strengthening the position of Scientific Crime Investigation (SCI) in the proof

system of money laundering crimes. The object of study in this research is focused on the regulation and application of SCI in proving money laundering crimes based on the prevailing laws and regulations.

The research approach used includes several approaches.

- a. First, the legislative approach, which involves examining all regulations related to the evidentiary system in criminal procedural law, particularly the Criminal Procedure Code (KUHP), Law Number 8 of 2010 on the Prevention and Eradication of Money Laundering, and other regulations relevant to the use of SCI.
- b. Second, the conceptual approach, which is used to study the concepts, theories, and legal doctrines related to criminal evidence, types of evidence, and the development of SCI methods in law enforcement practice.
- c. Third, the comparative law approach, which is used to compare the regulation and application of SCI in the evidentiary system of money laundering crimes in Indonesia with other countries, such as Australia, in order to gain an understanding of the strengths and weaknesses of each system.

The types of legal materials used in this research consist of primary legal materials and secondary legal materials. Primary legal materials include legislation, such as the Criminal Procedure Code (KUHP), Law Number 8 of 2010, the Electronic Information and Transactions Law, and other implementing regulations related to evidence and the use of technology in criminal investigations. Additionally, primary legal materials also encompass court decisions relevant to money laundering offenses. Meanwhile, secondary legal materials include legal textbooks, scientific journals, previous research findings, scientific articles, and opinions of legal experts related to the research topic. The legal materials used are selected based on their relevance, authority, and connection to the issue being researched.

The technique for collecting legal materials is carried out thru library research, which involves inventorying, tracing, and reviewing various sources of legal materials both conventionally and digitally. The search is conducted thru libraries, legal databases, national and international scientific journals, as well as other official sources that can be academically accountable. This technique aims to obtain comprehensive and up-to-date legal materials to support the research analysis.

The technique for analyzing legal materials in this research uses normative qualitative analysis. The analysis is conducted thru several stages, namely the inventory of legal materials, classification of legal materials based on the legal

issues being studied, and interpretation of the applicable legal provisions. The interpretation methods used include grammatical, systematic, and teleological interpretation to understand the meaning and purpose of the analyzed legal norms. Next, the conclusion is drawn using the deductive method, which involves drawing conclusions from general provisions to the specific issues being studied.

Thru this research method, it is hoped that this study can provide a comprehensive analysis of the position of Scientific Crime Investigation within the system of proving money laundering crimes, as well as produce legal arguments that can be used as a basis for strengthening the criminal proof system to be more adaptive to the developments in science and technology.

3. Results and Discussion

3.1. Money Laundering Crimes and Their Evidentiary Characteristics

Money laundering (TPPU) is a form of crime that has complex and multidimensional characteristics, as it not only involves the perpetrator and the criminal act itself but also closely relates to the financial system, cross-border transactions, and the use of technology to disguise the origin of wealth. Conceptually, money laundering (TPPU) is a process of concealing or disguising the origin of wealth obtained from criminal activities so that it appears to come from legitimate activities. In this context, money laundering is always related to the predicate crime, so its proof cannot be separated from efforts to trace the relationship between the wealth and the crime (Yusuf, 2013: 45). This shows that the proof in TPPU has a broader scope compared to conventional crimes.

The main characteristic in proving money laundering lies in its indirect nature, where the evidence is often not based on visible facts, but rather thru a series of analyzes of cash flows, financial documents, and suspicious transaction patterns. TPPU perpetrators generally use various *modus operandi* such as layering, placement, and integration to obscure the traces of their crimes, making it difficult for law enforcement to obtain direct evidence (Sjahdeini, 2007: 89). Proving in money laundering cases requires a more complex and systematic approach, capable of uncovering the relationships between various scattered and unstructured facts.

In Law Number 8 of 2010, there is a concept of limited reverse burden of proof that imposes an obligation on the defendant to prove that their wealth does not originate from a crime. This concept is an exception to the general principle in criminal law that places the entire burden of proof on the public prosecutor. This reverse burden of proof aims to address the difficulties in proving money laundering, which is often concealed and involves various undercover techniques (Atmasasmita, 2010: 112). The characteristics of proof in money laundering cases

indicate a paradigm shift from conventional proof to proof that is more flexible and adaptive to the evolution of crime.

In practice, the proof of money laundering also heavily relies on the use of technology-based evidence, such as electronic data, banking transaction records, and digital forensic analysis results. This shows that the approach to proving money laundering (TPPU) is no longer sufficient to rely solely on traditional evidence, but must be supported by scientific methods capable of processing and analyzing data accurately. Scientific Crime Investigation (SCI) has become highly relevant as a method for uncovering facts that cannot be reached through conventional approaches (Marzuki, 2014: 156).

Although there have been various developments in the TPPU proof system, there are still significant challenges, particularly related to regulatory limitations and the capacity of law enforcement officers to implement technology-based proof methods. The inability to optimize the use of scientific evidence can hinder the proof process and potentially allow money laundering perpetrators to escape legal consequences. There is a need to strengthen the evidentiary system that is not only normative but also supported by the enhancement of technical and institutional capacities.

The characteristics of evidence in TPPU indicate an urgent need to integrate a scientific approach into the criminal evidence system. Without strengthening this aspect, efforts to combat money laundering will face various obstacles that can reduce the effectiveness of law enforcement. This emphasizes the importance of identifying issues within the evidentiary system as a preliminary step to formulating legal policies that are more responsive and adaptive to the developments of modern crime.

3.2 The Position of Scientific Crime Investigation in the TPPU Proof System According to the Criminal Procedure Code and Law No. 8 of 2010

The position of Scientific Crime Investigation (SCI) in the system of proving money laundering crimes is a very crucial issue in the context of the development of criminal procedural law in Indonesia. In the framework of the Criminal Procedure Code (KUHP), the system of proof used is the negative statutory proof system (*negatief wettelijk bewijsstelsel*), which requires at least two valid pieces of evidence accompanied by the judge's conviction to render a verdict. This system is essentially still conventional and has not fully accommodated the development of technology and science-based proof methods (Harahap, 2012: 256). The position of SCI in the evidentiary system becomes unclear because it is not explicitly regulated as part of legitimate evidence. In Law Number 8 of 2010 concerning Money Laundering, there is an effort to expand the scope of evidence, including the recognition of electronic documents and digital information as part

of legitimate evidence. This indicates a development in the evidentiary system that is beginning to accommodate the use of technology in the law enforcement process (Yusuf, 2013: 78). SCI as a scientific investigation method has not been explicitly regulated in the law, so its position remains implicit and depends on the interpretation of law enforcement officials.

Conceptually, SCI is not a piece of evidence, but rather a method or approach used to obtain evidence thru scientific processes. SCI encompasses various techniques such as digital forensics, data analysis, and event reconstruction based on scientifically verifiable evidence. The results of SCI must be qualified into evidence recognized in the Criminal Procedure Code (KUHP), such as expert testimony or documents (Marzuki, 2014: 162). This shows that SCI has an indirect position in the proof system, but plays a very important role in producing high-quality evidence.

In practice, the use of SCI in proving TPPU often becomes a key factor in uncovering complex and concealed crimes. Thru data analysis and technology, law enforcement agencies can trace the flow of funds, identify relationships between perpetrators, and uncover the *modus operandi* used in money laundering. This shows that although not explicitly regulated, SCI has a very significant contribution to the modern proof system (Atmasasmita, 2010: 134).

The ambiguity in the regulation regarding SCI gives rise to various issues, particularly related to the evidentiary strength of SCI results in the judicial process. Without a clear recognition in the law, SCI results are potentially debatable in court and may even be dismissed by judges. This condition indicates an urgent need for legal reform that can accommodate the development of scientific-based proof methods.

Differences in understanding among law enforcement officials regarding the position of SCI also pose a challenge in its implementation. Without clear standards, the use of SCI can become inconsistent and potentially create legal uncertainty. More comprehensive and integrated regulations regarding the position of SCI in the proof system are needed to provide legal certainty and enhance the effectiveness of law enforcement against TPPU. The position of SCI in the TPPU proof system is still not optimal, as it is not yet supported by adequate regulations at the legislative level. This highlights the importance of identifying issues within the existing legal system as a basis for formulating more progressive legal policies capable of addressing the increasingly complex challenges of modern crime.

3.3 Regulation of Scientific Crime Investigation in the Regulation of the Chief of the Indonesian National Police as the Basis for Evidence

The regulation regarding Scientific Crime Investigation (SCI) in the Regulation of the Chief of the Indonesian National Police (Perkap) is essentially an institutional response to the increasingly complex and technology-based development of modern crime. In the context of law enforcement, the Perkap provides an operational foundation for investigators to use a scientific approach in uncovering criminal acts, including money laundering crimes that have concealed characteristics and are difficult to prove thru conventional approaches. SCI in this context is not only understood as the use of technological tools but also includes scientific methodologies such as digital forensic analysis, investigative audits of financial transactions, and the reconstruction of criminal events based on objective data that can be scientifically tested (Marzuki, 2014: 170). SCI has become an important instrument in bridging the gap between the complexity of modern crime and the limitations of the conventional proof system.

However, when viewed from the perspective of criminal procedural law, the position of the Perkap as the basis for regulating SCI still faces quite significant normative limitations. Perkap, as an internal police regulation, does not have the same binding force as a law, thus its implications for the evidentiary system in court are limited. In the evidentiary system according to the Criminal Procedure Code (KUHP), only five valid pieces of evidence are recognized, namely witness testimony, expert testimony, documents, indications, and the defendant's statement (Harahap, 2012: 301). The results of SCI cannot automatically be recognized as standalone evidence, but must be constructed into the categories of evidence that have been regulated. This condition indicates a gap between the development of scientific-based investigative practices and the normative framework of conventional criminal procedural law.

In practice, the results of SCI are often categorized as expert testimony or documentary evidence, depending on the form and substance of the investigation results. For example, the results of digital forensic analysis can be presented as expert testimony, while financial transaction reports can be classified as documentary evidence. Nevertheless, this approach does not fully represent the complexity of SCI as a comprehensive and multidimensional investigative method. This raises legal issues related to the evidentiary strength of SCI results, especially when faced with the principle of proof in the Criminal Procedure Code (KUHP) which still emphasizes conventional evidence (Sjahdeini, 2007: 120).

The ambiguity in the regulation regarding SCI also has the potential to cause differing interpretations among law enforcement officials, whether investigators, prosecutors, or judges. In some cases, the results of SCI can be accepted as strong evidence, but in other cases, they may be considered as additional evidence that lacks significant probative value. This inconsistency indicates that without strict

regulations at the legislative level, the position of SCI in the evidentiary system will remain weak and uncertain (Atmasasmita, 2010: 134).

In addition to normative aspects, another challenge in the implementation of SCI is the limitation of human resources and technological infrastructure. The use of SCI requires specialized expertise and adequate equipment, which are not always available in all police units. This results in the application of SCI being suboptimal and tends to be limited to certain cases that receive special attention. In addition to strengthening regulations, there is also a need to enhance institutional capacity to support the effective and sustainable implementation of SCI.

It can be concluded that although the Perkap has provided an initial foundation for the application of SCI in the investigation process, the regulation is still not strong enough to make SCI an integral part of the criminal proof system. More comprehensive legal reforms are needed, particularly thru regulations in laws, so that SCI can be explicitly recognized as a method of proof with clear legal power and can make significant contributions in uncovering money laundering crimes.

3.4 Regulations on the Prevention and Eradication of Money Laundering in Indonesia, the United States, the United Kingdom, Australia, and Malaysia

Regulations regarding the prevention and eradication of money laundering crimes in various countries show significant developments, especially in terms of using technology-based approaches and scientific analysis in the proof process. In Indonesia, Law Number 8 of 2010 has comprehensively regulated the crime of money laundering, including the introduction of the limited reverse burden of proof concept, which grants law enforcement the authority to require the accused to prove the origin of their wealth. Nevertheless, the regulation has not yet explicitly accommodated the use of Scientific Crime Investigation as part of the evidentiary system, so its implementation still depends on the interpretation of law enforcement officials (Yusuf, 2013: 92).

Unlike Indonesia, the United States has developed a highly advanced anti-money laundering system by integrating technology and data analysis into the investigative process. Institutions like the Financial Crimes Enforcement Network (FinCEN) play a strategic role in collecting and analyzing financial transaction data to detect suspicious activities. In the United States legal system, the use of technology-based evidence and scientific analysis has been widely recognized as part of legitimate evidence tools, thereby enabling more effective and efficient law enforcement (Atmasasmita, 2010: 156). This shows that SCI has become an integral part of the evidentiary system in that country.

England also shows similar developments thru the strengthening of institutions such as the National Crime Agency (NCA), which has broad authority in handling

financial crimes, including money laundering. The legal system in England allows the use of various modern investigative methods, including data analysis and forensic technology, which are explicitly recognized in the proof process. This approach reflects an adaptation to the development of modern crime and the need to use more sophisticated methods in uncovering crime (Marzuki, 2014: 185).

Australia and Malaysia have also adopted a relatively progressive approach in combating money laundering, emphasizing the use of technology and inter-agency cooperation. In Australia, institutions like AUSTRAC play a role in monitoring financial transactions and supporting data-driven investigations. Meanwhile, Malaysia has integrated the use of financial analysis and information technology into its evidentiary system, enabling more effective detection and enforcement of AML (Anti-Money Laundering) (Sjahdeini, 2007: 142). These two countries demonstrate that strengthening regulations and the use of technology are key in combating money laundering crimes.

Compared to those countries, Indonesia still faces various challenges in optimizing the use of SCI in proving money laundering. One of the main obstacles is the absence of regulations that explicitly recognize SCI as part of the legitimate evidence in the national legal system. The limitations of institutional capacity and technological infrastructure also pose obstacles to the optimal implementation of SCI. This shows that although Indonesia has a fairly good legal framework normatively, in terms of implementation, it still requires significant strengthening.

This comparison shows that the success of combating money laundering does not only depend on the existence of regulations but also on the legal system's ability to adapt to technological developments and the complexity of crimes. Countries that have succeeded in combating money laundering generally have a flexible evidentiary system and are capable of accommodating the use of scientific methods in the investigation process. Indonesia needs to carry out legal reforms that are not only normative but also include strengthening institutional capacities and optimal utilization of technology.

Strengthening the regulations regarding Scientific Crime Investigation within the national legal system has become an urgent necessity, so that Indonesia can enhance the effectiveness of combating money laundering and be able to compete with other countries in facing increasingly complex transnational crimes.

4. Conclusion

Money laundering (TPPU) has complex evidentiary characteristics because it not only emphasizes proving the criminal act and the perpetrator but also tracing the relationship between the wealth and the original crime thru an indirect and

analytical approach. In such conditions, Scientific Crime Investigation (SCI) becomes a relevant method to support the process of proof thru the utilization of technology, data analysis, and a scientific approach in obtaining more objective and accurate evidence. However, in the Indonesian legal system, the position of SCI is still not explicitly regulated either in the Criminal Procedure Code (KUHP) or in Law Number 8 of 2010, so the results of SCI do not yet have independent evidentiary power and must still be qualified into legally recognized evidence. The regulation of SCI thru the Police Chief Regulation has provided an operational basis in the investigation stage, but it has not yet sufficiently provided legal certainty in the judicial process. Meanwhile, a comparison with the United States, the United Kingdom, Australia, and Malaysia shows that the effectiveness of combating money laundering is greatly influenced by the legal system's ability to accommodate scientific and technological investigative methods in evidence gathering. Legal reforms are needed thru the strengthening of regulations at the legislative level and the enhancement of institutional and technological capacities so that SCI can be more optimally integrated into the TPPU proofing system in Indonesia.

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