

CHAPTER 1 – INTRODUCTION

1.1. Background

HARA, a startup company in agriculture, creates a solution regarding Indonesia's need for more farmer data. The company captures farmers' personal and land data (Rahmah, 2019) and shared it with the third party based on the farmer's need for loan origination, crop insurance, or compliance need for traceability. As of 2018, around 93% of Indonesian farmers are smallholders, many of whom lack access to financial services due to the absence of reliable data (FAO, 2018; Savelli et al., 2021). This highlights the urgent need for accurate agricultural data solutions, such as HARA's blockchain-based system.

Blockchain can be used to address challenges in the agricultural sector, such as transparency, traceability, and trust (Hussain Awan, 2019). It enables secure sharing of farmer data and establish a reliable database to transfer knowledge in the agricultural industry. HARA adds a blockchain layer as integrity and improves trust between multiple parties in the ecosystem. Blockchain technology helps manage farmer data and enables secure sharing with relevant parties (Abraham and Santosh Kumar, 2020). This approach mitigates data manipulation in the agricultural ecosystem.

The introduction of Indonesia's Personal Data Protection (PDP) Law in 2022, organizations managing personal data must comply with strict regulatory requirements (Presiden Republik Indonesia, 2022). Indonesia experienced over 46 million cyber-attacks between October 2022 to July 2023, emphasizing the need for stronger data protection measures (Diba Tanzilla et al., 2023). Non-compliance with the PDP Law can result in fines of up to 2% of a company's annual revenue or even criminal charges (Presiden Republik Indonesia, 2022).

Since HARA collects personal data that falls under the PDP Law's regulations, it must adapt its data management practices to meet these new legal requirements. This thesis examines how HARA can align its blockchain-based data acquisition system with PDP Law while maintaining data integrity. It aims to identify compliance gaps and develop

a framework for managing agricultural data within blockchain networks in HARA data acquisition application.

1.2. Research Problem

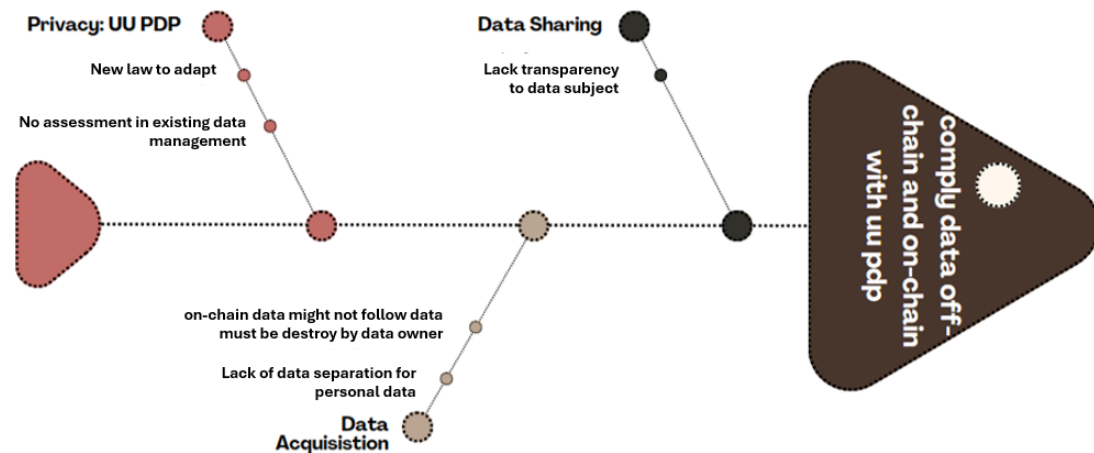


Figure 1.1 Fishbone Diagram to present the research problem.

The current research challenge relates to the necessity of pre-existing data acquisition application's data that stored on the blockchain with the requirements outlined in PDP law concluded by Figure 1.1. When sharing personal data with third parties, transfer data must follow the transfer data defined by PDP law, for example, using consent management or agreement on a contractual basis. Given the immutability of blockchain, it is necessary to do a thorough analysis to evaluate the compatibility of these systems with privacy regulations. The situation is more complicated by the PDP Law's explicit allowance for the destruction of personal data at the request of the data owner, which contradicts the inherent qualities of blockchain.

This study problem aims to explore the details associated with these contradictions and establish a unified and legally compliant framework for managing agriculture data in HARA. It intends to offer an understanding of how to reconcile blockchain technology's immutable characteristics with privacy legislation.

1.3. Research Objective

With its potential to significantly impact the field, this research is motivated by exploring the connections of data management, blockchain technology, and regulatory compliance under PDP law. The following objectives drive this research:

RO1: To comprehensively analyze HARA's current data management practices and blockchain-stored data, identifying and evaluating gaps in compliance with PDP law, particularly in data structure and blockchain alignment.

RO2: To create a framework for HARA data acquisition application that is compliant with PDP law, including data structures that seamlessly integrates HARA's off-chain and on-chain data within its blockchain system.

1.4. Research Question

Exploring the implications of PDP law on HARA's data landscape, this research is driven by the following questions:

RQ1: How does implementing PDP law impact the structure data within HARA's data acquisition product?

RQ2: What are the key strategies for designing data structures that ensure PDP law compliance while effectively managing HARA's off-chain and on-chain data within a blockchain?

1.5. Hypothesis

The hypotheses for this research are as follows:

H1: Implementing the PDP Law will require significant changes to HARA's data acquisition product, especially regarding data collection, data processing, data retention & disposal, data subject rights, and third-party data management.

H2: A hybrid data management framework that combines on-chain and off-chain data storage and processing will be the most effective strategy for achieving compliance with the PDP Law and ensuring efficient data management within HARA's blockchain system.

1.6. Research Scope and Limitation

As we define the scope of this research, it is essential to acknowledge the intentional limitations pointing to the research objective.

1. This research focuses only on the Indonesian PDP law and does not examine international privacy regulations such as the GDPR. As a result, the applicability of our findings to a global context may be limited. The PDP law specifically in article 27, article 43, and article 44.
2. By analyzing only blockchain technology within the Ethereum Virtual Machine (EVM) network with Layer-2 off-chain solution, this study may restrict the broader relevance of our research to other blockchain platforms or configurations found in various technical environments.
3. The study's focus on the data environment of HARA's data acquisition application may limit our ability to capture the full range of data management practices used across various applications within the HARA ecosystem.
4. The output is the design of HARA's data acquisition application, ensuring compliance with the PDP Law, specifically article 27, article 43, and article 44. This design is validated by experts but does not include proof of concept.

1.7. Significance of Study

The findings of this research are highly significant for the organization, as they offer practical insights that go beyond the immediate focus of the HARA ecosystem. These results serve as a foundational framework for developing complementary objectives within the organization, thereby facilitating a smooth integration with Indonesia's PDP law. Additionally, this research establishes a valuable benchmark for any organization utilizing blockchain technology in agricultural solutions within the broader agriculture sector. The information derived from this study can guide the industry in creating effective solutions that leverage the benefits of blockchain technology while complying with Indonesia's PDP law. Ultimately, this research will help establish a more consistent and secure data management environment.

1.7. Thesis Structure

This outlines the structure of the thesis, which will be explained in the following sections:

1. Chapter 1: Introduction. This chapter provides a comprehensive overview of the research topic, containing the background, problem statement, research objectives, research questions, scope and limitations, and significance of the study.
2. Chapter 2: Literature Review. This chapter has a crucial role in the thesis, conducting a thorough literature analysis. This section examines previous studies and critically analyzes current research to identify any gaps in detail. These gaps serve as the justification for research.
3. Chapter 3: Research Methodology. This chapter explains the research methodologies used to achieve the objectives outlined in the thesis.
4. Chapter 4: Result and Evaluation. This section presents the research outcomes, showcasing the findings obtained through analysis and experimentation.
5. Chapter 5: Conclusion. The last chapter is essential as it summarizes findings, answers research questions, and critically evaluates its contribution to relevant literature and practical applications.