

Sharia Analysis of the Property-Asset Tokenisation Business Model: The Goro.id Case

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Abstract

Purpose – This study develops and applies the Tokenisation Sharia-Compliance Matrix (TSCM), a three-layer model for assessing a property-asset tokenisation business model. The model examines the contractual layer of fiqh muamalah, the positive-law layer of the Compilation of Sharia Economic Law (KHES) and Financial Services Authority (OJK) regulation, and the teleological layer of Maqashid al-Syariah, with a focus on Hifzh al-Mal. It is tested on Goro.id, an Indonesian real-asset tokenisation platform admitted to the OJK Regulatory Sandbox.

Method – The study uses a qualitative single-case design that combines normative-juridical reasoning with documentary evidence. The analysis follows four stages: open coding of documents into a graded evidentiary register; thematic mapping against the six-stage tokenisation life cycle; legal reasoning through takhrij, tanqih, and tahqiq al-manath, checked against KHES and the fatwas of the National Sharia Council of the Indonesian Ulema Council (DSN-MUI); and scoring of Hifzh al-Mal on a four-point rubric.

Result – Four findings emerge. First, the token is mal mutaqaawwim of the mal 'ain hukmi type, a constructive corporeal right rather than a debt. Second, the transaction is a three-tier composite contract comprising syirkah milk for ownership, wakalah bi al-ujrah for management, and ijarah for income, with bay' confined to entry and exit. Third, the smart contract functions as sighat and tawthiq, not as the contract itself, so it removes procedural but not substantive gharar. Fourth, the model scores 2 out of 3 on both the protection and the development of wealth, because eight legal and market exposures remain open, most critically enforceability, bankruptcy-remoteness, secondary-market liquidity, and the absence of a specific fatwa. Its Sharia alignment is therefore conditional.

Implication – The matrix offers a replicable tool for appraising digital financial innovation, identifies the fatwa and regulatory gaps that DSN-MUI and OJK need to close, and

Keywords :

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distinguishes compliance-critical safeguards from merely desirable ones.

INTRODUCTION

The property sector is a main pillar of the Indonesian economy and a preferred store of household wealth. Owning a house or a plot of land is widely seen as a sign that a family has achieved economic stability. Yet direct property investment has long faced three barriers: prices that keep rising, especially in large cities; low liquidity; and a long transaction chain involving notaries, brokers, and land administration, which adds both cost and time (Mottaghi & Steininger, 2024).

Financial technology now offers a way around these barriers. Asset tokenisation converts ownership rights over an asset into digital tokens recorded on a blockchain, with each token representing a fraction of the asset. Investors no longer need to buy a whole unit, so the property market becomes more open and affordable. Avci and Erzurumlu (2023) observe that a token offering backed by a special purpose vehicle (SPV) closely resembles the structure of sukuk issuance, while Indonesian evidence shows that fintech adoption strengthens investors' willingness to commit capital to Sharia instruments (Arinia & Syamlan, 2025; Novianti & Syamlan, 2024). Jaouhari et al. (2025) also find tokenisation compatible with Islamic finance, because both require a direct link between a financial instrument and a real asset.

In Indonesia, the idea already operates as a business. Goro.id, run by PT Teknologi Gotong Royong, has been admitted to the Regulatory Sandbox of the Financial Services Authority (Otoritas Jasa Keuangan, OJK) and reports a portfolio dominated by Bali villas and Jakarta apartments, with tokens priced from 10,000 Indonesian rupiah (IDR) (Nasution et al., 2025; Otoritas Jasa Keuangan [OJK], 2024b). As a Muslim-majority country, Indonesia therefore faces a practical question. Is the model consistent with *fiqh muamalah*? How should a property token be classified in Islamic law? And does the model serve the objectives of Sharia, particularly the protection of wealth?

Research Gap and Novelty

The literature leaves four gaps. The theoretical gap is that existing studies treat the transaction as a single contract, usually a sale, although ownership, management, and income rest on different contracts (Tahir et al., 2025; Zulkepli & Mohamad, 2023); the theory of composite contracts (*al-'uqud al-murakkabah*) has not been applied to tokenisation. The methodological gap is that studies are either purely normative (Aswadi et al., 2022; Dewaya, 2025) or empirical without legal reasoning (Nasution et al., 2025), and none moves transparently from platform evidence to a juristic ruling. The contextual gap is

that most work is conceptual or based on Malaysian and Gulf settings (Jaouhari et al., 2025; Mohd Yusof et al., 2025), whereas Indonesia uniquely combines the Compilation of Sharia Economic Law (Kompilasi Hukum Ekonomi Syariah, KHES), the fatwas of the National Sharia Council of the Indonesian Ulema Council (Dewan Syariah Nasional–Majelis Ulama Indonesia, DSN-MUI), and an OJK sandbox regime. The regulatory gap is that the 2021 position of the Indonesian Ulema Council (MUI) on cryptocurrency has been discussed (Sanuri et al., 2025), but its consequences for enforceability, insolvency, and dispute resolution have not.

This article responds with four contributions. First, it builds the Tokenisation Sharia-Compliance Matrix (TSCM), which requires a verdict at the contractual, positive-law, and teleological layers before an overall verdict is given, so that scholarly disagreement can be located precisely. Second, it reads property tokenisation as a three-tier composite contract and states a rule for resolving conflicts between the tiers. Third, it classifies the token as *mal 'ain hukmi* and derives the legal consequences of that classification. Fourth, it treats the oracle problem as a question of liability (*daman*) and resolves it through the maxim *al-kharaju bi al-daman*. Accordingly, the study aims to determine the status of the Goro.id token and its contract form, evaluate compliance with the prohibitions of *gharar*, *maysir*, and *riba* and with KHES and DSN-MUI fatwas, examine unresolved legal exposures, and score the model against the two dimensions of *Hifzh al-Mal*.

Literature Review

Asset Tokenisation and Smart Contracts: Competing Positions

A blockchain is a distributed ledger that records validated transactions transparently; because every node holds the same record, no single party can alter it, and trust shifts partly from intermediaries to an auditable protocol. Beyond this premise, the literature divides. Mottaghi and Steininger (2024) view tokenisation mainly as a liquidity technology and treat the legal shell as settled, so the remaining risk is market risk. Avci and Erzurumlu (2023) argue the opposite: what the token legally is matters more than its economics, and the whole structure depends on the enforceability of the SPV's ownership. This article follows the second view, because a study that assumes the legal shell is settled cannot detect the enforceability risk identified below. Jaouhari et al. (2025) and Mohd Yusof et al. (2025) note its structural resemblance to sukuk but identify no underlying contract, and the latter remains untested on an operating platform.

On smart contracts, Cahyani (2025) and Zulkepli and Mohamad (2023) agree that automation supports Sharia compliance but disagree on why. For

Cahyani, the code is a monitoring tool, so a coding error is merely a breach of the manager's duty. For Zulkepli and Mohamad, the code functions as *sighat* and forms part of the contract, so a coding error could void the contract. Neither study resolves this difference, which this article addresses by treating the smart contract as *sighat* combined with *tawthiq* (documentation).

Mal, Milkiyyah, and Composite Contracts

In *fiqh*, *mal* is anything that has value, can be used, and can be owned. By form, it is divided into *mal 'ain* (a tangible object) and *mal dayn* (a claim against a person); by legal value, it is divided into *mal mutaqawwim*, which may be traded, and *mal ghayr mutaqawwim*, which may not (Ibn Qudamah, 1997). Tahir et al. (2025) conclude that an asset-backed token is *mal mutaqawwim*. This article accepts that conclusion but notes that it leaves the '*ain-versus-dayn* question open, even though this is the question with legal consequences. A holder of *mal dayn* is a creditor who ranks with unsecured creditors on insolvency, whereas a holder of *mal 'ain* is an owner whose claim survives the platform's failure. Ownership (*milkiyyah*) requires a clear transfer (*tamlik*), and Ibn Qudamah (1997) accepts that ownership may be shared (*musytarak*), which provides the legal footing for fractional ownership. Al-Baqarah 2:188, which forbids consuming the wealth of others unjustly, makes consent and fairness conditions of every transfer.

The pillars of a contract are *sighat*, the contracting parties (*'aqidain*), the object (*ma'qud 'alaih*), and a lawful purpose. Two further institutions are relevant. *Syirkah milk* is joint ownership that arises without a separate partnership contract, with profit and risk shared proportionally (Al-Sarakhsi, n.d.; Ibn Qudamah, 1997). *Wakalah* is the delegation of a task to an agent, who must act prudently and honestly (Al-Syarbini, n.d.; Mohamed & Ali, 2022). The literature treats these institutions as alternative labels; this article treats them as concurrent tiers of one composite contract. Contemporary jurisprudence on *al-'uqud al-murakkabah* permits contracts to be combined, provided that the combination is not prohibited by text, is not a legal device (*hilah*) for *riba*, and does not make one contract conditional on another in a way that creates *gharar*.

Legal Maxims, Prohibited Elements, and Legal Dynamics

Several legal maxims guide the assessment of new business models (Al-Suyuthi, n.d.; Ibn Nujaim, 1999). Commercial dealings are permitted unless there is evidence to the contrary, so the burden of proof lies with those who would prohibit them. Matters are judged by their purposes, so intent determines whether a transaction serves Sharia or drifts into speculation (Sanuri et al., 2025). The maxim *al-kharaju bi al-daman* holds that entitlement to profit follows the bearing of risk; studies of Islamic banks confirm that risk-

taking is what legitimises their returns (Asrianti & Syamlan, 2021; Syamlan & Azinuddin, 2019; Syamlan & Jannah, 2019). The prohibition of harm and the recognition of custom (*urf*) require transparency and allow settled digital practices to be accepted (Dewaya, 2025).

Every Islamic financial instrument must also avoid *gharar*, *maysir*, and *riba*. *Gharar* is excessive uncertainty, of which major *gharar* (*kasir*) is prohibited and minor *gharar* (*yasir*) tolerated (Al-Qarafi, 1994; Ibn Qudamah, 1997); *maysir* is gambling, prohibited in Al-Ma'idah 5:90–91; and *riba* is an increase without genuine counter-value or borne risk (Mousavi et al., 2025). Mousavi et al. (2025) argue that blockchain-based sukuk are free of *riba* because returns derive from asset performance, but they assess *gharar* only at the time of contracting. This article therefore distinguishes procedural *gharar*, which arises in forming and executing a contract and can be removed by code, from substantive *gharar*, which arises from the condition of the underlying asset and cannot. Finally, the maxim that fatwas change with time, place, and circumstance (Ibn Qayyim al-Jawziyyah, 1991) allows *ijtihad* to address instruments unknown to classical jurists, provided their substance is tested against the aims of Sharia (Purba & Afandi, 2022).

Fatwas, KHES, Maqashid, and Integrity

DSN-MUI has issued fatwas that are relevant by analogy: Fatwa Number 20/DSN-MUI/IV/2001 on Sharia mutual funds, Fatwa Number 32/DSN-MUI/IX/2002 on Sharia bonds, and Fatwa Number 117/DSN-MUI/II/2018 on technology-based Sharia financing (DSN-MUI, 2001, 2002, 2018). The 2021 MUI prohibition of cryptocurrency concerned crypto as a medium of exchange. Sanuri et al. (2025) argue that it should not extend to asset-backed tokens, following the classical distinction between currency (*tsaman*) and commodity (*sil'ah*), although their argument establishes only what the token is not. KHES, enacted through Supreme Court Regulation (Peraturan Mahkamah Agung, PERMA) Number 2 of 2008, guides religious courts in Sharia economic disputes. It regulates contracts, *syirkah*, *wakalah*, and *ijarah*, and it treats a contract that conflicts with Islamic law as invalid (Mahkamah Agung RI, 2008).

Al-Ghazali (n.d.) set out the five essential objectives of Sharia, and al-Syathibi (1997) ranked human interests as essential (*dlaruriyyat*), complementary (*hajjiyyat*), and embellishing (*tahsiniyyat*). Ibn Asyur (2006) stressed that wealth must be both protected and developed and that the *maqashid* must be read in context. Aswadi et al. (2022) and Dewaya (2025) conclude that a well-designed blockchain supports *hifzh al-mal*, but they assert this potential rather than measure it. This article therefore converts the two dimensions of *Hifzh al-Mal* into a scored rubric, in line with evidence that

transparent digital ledgers can protect assets while serving development goals (Syamlan & Mukhlisin, 2020). Integrity also matters: Sharia resorts operating under Fatwa Number 108/DSN-MUI/X/2016 succeed through managers' moral commitment more than formal compliance (DSN-MUI, 2016; Fauzi & Suryadi, 2021), and compliance builds trust only when anchored in such commitment (Syamlan et al., 2025). Table 1 summarises the prior studies and the position of this article.

Table 1. Critical Comparison of Prior Studies and the Contribution of This Article

Study	Position and limitation	Contribution of this article
Mottaghi & Steininger (2024)	Tokenisation as a liquidity technology; assumes the legal shell is settled	Treats legal risk as the binding constraint
Avci & Erzurumlu (2023)	The token's legal identity is decisive; conventional law only, without a <i>fiqh</i> layer	Adds the <i>fiqh</i> and KHES layers
Jaouhari et al. (2025)	Structural fit with sukuk; no contract specified	Specifies a three-tier composite contract
Mohd Yusof et al. (2025)	Conceptual fractional home-ownership framework; untested	Tests the reasoning on a supervised platform
Cahyani (2025); Zulkepli & Mohamad (2023)	Smart contract as a monitoring tool or as <i>sighat</i> ; the effect of coding errors is unresolved	Smart contract as <i>sighat</i> plus <i>tawthiq</i> ; procedural versus substantive <i>gharar</i>
Tahir et al. (2025)	Asset-backed tokens are <i>mal mutaqawwim</i> ; the 'ain-versus-dayn question is left open	Classifies the token as <i>mal 'ain hukmi</i>

Study	Position and limitation	Contribution of this article
Sanuri et al. (2025)	The crypto fatwa should not cover asset-backed tokens; no affirmative basis	Supplies a contractual and <i>maqashid</i> basis
Mousavi et al. (2025)	Blockchain sukuk are free of <i>riba</i> ; <i>gharar</i> assessed only at contracting	Assesses <i>gharar</i> across the life cycle
Aswadi et al. (2022); Dewaya (2025)	Blockchain supports <i>hifzh al-mal</i> ; no measurement	Scores <i>Hifzh al-Mal</i> on a rubric
Nasution et al. (2025)	GORO is a viable fractional investment; no legal reasoning	Adds an explicit juristic protocol

Source: Processed by the authors (2025)

The Analytical Model: Tokenisation Sharia-Compliance Matrix

The TSCM organises the assessment into three layers. Layer 1 (contractual) determines the mal status of the token, the form of the contract, and the position of the smart contract; a model fails here if the object is not mal mutaqawwim, if the combination of contracts is prohibited or constitutes a hilah, or if a pillar is missing. Layer 2 (positive law) tests validity and enforceability under KHES, DSN-MUI fatwas, and OJK regulation. Layer 3 (teleological) scores the protection and development of wealth. Two ordering rules apply. Failure at Layer 1 ends the analysis, because good outcomes cannot rescue an invalid contract. Passing Layers 1 and 2 yields only a conditional verdict, which Layer 3 either confirms or qualifies. This second rule distinguishes the TSCM from the permitted-or-forbidden approach that dominates the field.

METHOD

Research Design and Case Selection

The study is qualitative and uses a single-case design (Creswell, 2014) that combines normative-juridical reasoning with documentary evidence about one platform. This pairing avoids both the abstraction of purely normative studies and the absence of legal reasoning in purely empirical ones,

and it has proved effective for new Islamic financial products (Purba & Syamlan, 2025). The study is documentary rather than field-based: it involves no interviews, observation, or access to internal contracts, and it makes no claim about unpublished facts.

The case is Goro.id, operated by PT Teknologi Gotong Royong, a member of the GORO Technology group with a parent company in Singapore and offices in Bali and Jakarta. The analysis covers the tokenised properties, mainly Bali villas and Jakarta apartments, and their contract structure, from the platform's entry into the Sandbox to the first quarter of 2025. It was selected because its Sandbox admission allows Layer 2 to be tested against a regulatory decision, its structure is documented in at least three independent sources, and its retail model displays all three contract tiers. The findings apply to the Indonesian retail segment, not to institutional or foreign-buyer models (Mohd Yusof et al., 2025).

Data Sources and Evidentiary Grading

Primary sources comprise the Qur'an and Hadith, classical works of fiqh and maqashid, DSN-MUI fatwas, KHES, and OJK regulations. Secondary sources comprise peer-reviewed articles indexed in Scopus and the Science and Technology Index (SINTA), mostly published between 2021 and 2025, platform material (PT Teknologi Gotong Royong, 2025), and independent coverage. Every factual claim about the platform is graded, as shown in Table 2. Grade A covers regulatory and statutory sources, which are treated as authoritative. Grade B covers independent secondary sources, which are reported with attribution. Grade C covers platform-issued material, which is treated as a claim by an interested party. No juristic conclusion rests on a Grade C source alone. A claim is established only when sources of different grades agree; conflicts are reported, not resolved by preference (Nasution et al., 2025).

Table 2. Evidentiary Grading of the Principal Factual Claims about Goro.id

Factual claim	Grade	Treatment in this article
Entry into the OJK Regulatory Sandbox through Letters S-548/IK.01/2024 and S-549/IK.01/2024, dated 7 November 2024	A	Established; supports the Layer 2 analysis of legal standing

Factual claim	Grade	Treatment in this article
Sandbox governed by OJK Regulation (POJK) Number 3 of 2024	A	Established; provides the regulatory benchmark
About 21 properties tokenised by early 2025, mostly Bali villas and Jakarta apartments	B	Reported as an approximation; the concentration analysis does not depend on the exact figure
Token units priced from IDR 10,000	B	Used only to show the scale of the entry threshold
More than 100,000 users from 43 countries; projected return of 8–10% per year	B/C	Attributed to Nasution et al. (2025) as platform-originated; excluded from all juristic determinations and scoring
ISO 27001 certification; rupiah settlement; risk disclaimer	C	Reported as the platform's own claims; given no weight
SPV constitutive documents, token code, and holder agreements	Not obtained	Recorded as a limitation; dependent findings reported as indeterminate

Source: Processed by the authors (2025)

Analytical Procedure

The analysis followed four stages. **Stage 1 (open coding).** Each statement about the platform was coded with its source, grade, and date, in the platform's own terms, so that *fiqh* categories were not imposed on the data. **Stage 2 (thematic mapping).** The codes were grouped into the six stages of the tokenisation life cycle, namely asset selection, SPV structuring, token issuance, token purchase, management and distribution, and secondary trading, and were checked against Avci and Erzurumlu (2023) and Mottaghi and Steininger (2024). **Stage 3 (legal reasoning).** Each theme passed through three steps of *usul al-fiqh*. *Takhrij al-manath* identified the candidate ratio legis in the nearest classical institutions (*bay'*, *syirkah milk*, *wakalah*, and *ijarah*); *tanqih al-manath* removed incidental features, such as physical handover; and *tahqiq al-manath* verified whether the refined ratio was present in the graded facts. The results were checked against KHES and DSN-MUI fatwas, and where

the evidence was insufficient, the issue was carried forward as an open exposure. **Stage 4 (maqashid scoring)**. The surviving themes were scored on the rubric in Table 3. Only a model that scores 3 on both dimensions may be described as unconditionally aligned.

Table 3. Scoring Rubric for the Two Dimensions of *Hifzh al-Mal*

Score	Protection of wealth	Development of wealth
0	Loss without recourse; no disclosure or supervision	Access is not widened, or is widened only for existing holders of capital
1	Protection is claimed, but no mechanism operates	Wider access is claimed, but the entry threshold is not lowered
2	Mechanisms exist, but an identified failure mode is unmitigated	The entry threshold is lowered, but the benefit is not durable (e.g., exit is impaired)
3	Mechanisms exist, failure modes are mitigated, and the mitigation is independently verifiable	Access is wider and durable, reaching the <i>hajjiyyat</i> level or beyond

Source: Constructed by the authors (2025) from al-Syathibi (1997) and Ibn Asyur (2006)

Reliability rests on the transparency of the four stages, which lets other researchers repeat the procedure, and validity rests on the grading protocol, which keeps a company's own claims from being presented as findings. One author has collaborated with an industry partner on waqf product design (Purba & Syamlan, 2025; Syamlan & Purba, 2025); that work concerns a different institution and has no connection with Goro.id.

RESULT AND DISCUSSION

Business Model and Regulatory Standing

On Grade A evidence, Goro.id entered the OJK Regulatory Sandbox through Letters S-548/IK.01/2024 and S-549/IK.01/2024, dated 7 November 2024, under POJK Number 3 of 2024 (OJK, 2024a, 2024b). This allows Layer 2 to be tested against a real supervisory decision, although the Sandbox concerns responsible innovation, not Sharia compliance.

The platform's description of itself as Indonesia's first fractional property-investment company is a Grade C claim. The token is a security token, since each unit represents fractional ownership of real property; it therefore

calls for stricter disclosure and investor protection than a utility token (Avci & Erzurumlu, 2023).

On Grade B evidence, about 21 properties had been tokenised by early 2025, most of them Bali villas. Each property is divided into thousands of tokens priced from about IDR 10,000; the property is let to tourists, and rental income is distributed monthly to holders in proportion to their tokens. The user numbers and projected returns reported by Nasution et al. (2025) originate from the platform and are excluded from the scoring, because a projection is not a realised return. What the evidence does establish is concentration. Most assets depend on Bali tourism, so their capital value and income are exposed to the same shocks, as the pandemic demonstrated.

Earlier fractional-property platforms struggled when secondary markets were too thin for exit (Sanuri et al., 2025), and liquidity problems in Indonesian Islamic banking suggest that such risk is structural (Khansa & Syamlan, 2022; Syamlan, 2017; Syamlan & Istiana, 2019). Because other initiatives target institutional buyers through a state-owned bank, in a market still reshaped by the Bank Syariah Indonesia (BSI) merger (Syamlan et al., 2023), the findings apply to the retail segment only.

Layer 1: The Token as *Mal 'Ain Hukmi*

Takhrij al-manath places the question within the classical distinction between *mal 'ain*, whose object is a thing, and *mal dayn*, whose object is an obligation owed by a person (*dhimmah*). *Tanqih al-manath* shows that physical possession is incidental, since Ibn Qudamah (1997) already accepts co-owners who do not individually hold the asset. What matters is that the right attaches to an identified thing, so the owner bears its risk and the rule on hidden defects (*'ayb*) applies. *Tahqiq al-manath* confirms this ratio: the token is issued against an identified property, income comes from that property rather than from a platform promise, and any fall in value is borne by the holder. The holder is therefore an owner, not a creditor. However, the property is held by the SPV rather than by the holder directly. The token is thus best classified as *mal 'ain hukmi*, a constructive corporeal right. It is corporeal because it carries the risk of an identified asset, and constructive because a legal entity mediates the holding. It is also *mal mutaqawwim* (Tahir et al., 2025), which separates it from cryptocurrency, whose value rests on sentiment.

Four consequences follow. First, a hidden defect in the property is a defect in the holder's object and supports a claim by the holder. Second, the token forms part of the holder's estate (*tirkah*) and passes by the law of inheritance (*faraid*) as property. Third, zakat is assessed on the property interest and its yield rather than on the token's market price, which may

diverge from it. Fourth, the holder's right should in principle survive the platform's insolvency. Whether Indonesian law will uphold this fourth consequence is a Layer 2 question that the available evidence cannot answer, so it is examined in the critical discussion.

Layer 1: A Three-Tier Composite Contract

No single classical contract explains the transaction, because it creates three legal relationships at once. **The ownership tier is *syirkah milk*.** Holders own the property jointly in proportion to their tokens and share income and risk accordingly, and none manages on behalf of the others (Ibn Qudamah, 1997). **The management tier is *wakalah bi al-ujrah*.** The platform manages the property for the holders in return for a declared fee (Mohamed & Ali, 2022). As agent (*wakil*), it is liable for negligence but not for market loss, and its fee pays for work rather than sharing profit. **The income tier is *ijarah*.** Tenants pay rent for the use of the property, and the rent accrues to the co-owners. This tier makes the return a lawful yield from usufruct rather than an increase on principal. ***Bay'* applies only at entry and exit**, when tokens are bought and later sold (Zulkepli & Mohamad, 2023). Earlier studies mistake this doorway for the whole transaction, although most Sharia risk arises inside.

The combination passes the three tests for composite contracts: no text prohibits it; it is not a *hilah* for *riba*, because the return comes from a genuine lease on an asset whose risk the holders bear; and no contract is conditioned on another in a way that creates *gharar*. The last test requires care: if the agent guaranteed the principal or a return, the arrangement would become a loan that yields a benefit. The evidence shows no such guarantee, and its absence is a condition of validity. The composite reading also yields an ordering rule. Where the tiers conflict, the ownership tier prevails over the management tier, because the agent's authority derives from the owners. A platform term that allows the manager to sell the asset, change the distribution formula, or subordinate holders' claims without their consent is therefore void, not merely unfair. Governance safeguards designed jointly by industry partners and managing institutions from the outset help keep such products accountable (Syamlan & Purba, 2025).

Layer 1: The Smart Contract as *Sighat* and *Tawthiq*

The smart contract performs two functions. It expresses and executes offer and acceptance, which makes it *sighat*, and it records and proves the resulting entitlement, which makes it *tawthiq*, a function the Qur'an endorses in its instruction to record debts (Al-Baqarah 2:282). As established practice, digital ownership records also satisfy *'urf* (Zulkepli & Mohamad, 2023). The smart contract is not, however, the contract itself, which is the underlying legal relationship. Code removes procedural *gharar*, since programmed terms and ledger entries cannot be altered unilaterally, but not substantive *gharar*,

because it knows only the data it receives about the physical asset. If the code miscalculates a distribution, the remedy is correction and restitution, not annulment of ownership. If the code faithfully records false information, the fault lies with the data source (the oracle), and the remedy lies in the rule on hidden defects and the agent's duty of care. This reading avoids treating every coding error as a nullity (Zulkepli & Mohamad, 2023) and avoids reducing false data to a mere supervisory lapse (Cahyani, 2025).

Layers 1 and 2 across the Tokenisation Life Cycle

Table 4 applies the matrix to each stage of the life cycle. At the first stage, a property with disputed title cannot be tokenised, because ownership that the state does not recognise cannot be transferred. Certificates and permits are therefore conditions of the token's existence as *mal* rather than matters of good practice (Avci & Erzurumlu, 2023). At the second stage, the platform's control over the SPV creates a conflict of interest, which calls for a separation between asset management and technology functions and for an internal Sharia supervisory board, in line with Fatwa Number 117/DSN-MUI/II/2018. At the later stages, full disclosure keeps *gharar* at a tolerable level (Cahyani, 2025), automatic proportional distribution with declared fees applies *al-kharaju bi al-daman* (Mousavi et al., 2025), and linking token prices to periodic appraisal limits speculation in secondary trading (Sanuri et al., 2025).

Table 4. Sharia Analysis of the Six Life-Cycle Stages under the TSCM

No	Stage	Governing tier	Main Sharia risk	Determination and mitigation
1	Asset selection and validation	Precondition for all tiers	Doubtful or disputed title	Conditional pass; independent notary and audit, with results published on-chain
2	SPV structuring	<i>Syirkah milk</i> and <i>wakalah</i>	Platform control without oversight	Pass at Layer 1; bankruptcy-remoteness indeterminate; role separation and a Sharia supervisory board
3	Token issuance	<i>Sighat</i> and <i>tawthiq</i>	Doubt over digital ownership records	Pass under the permissibility maxim and ' <i>urf</i> '; code audit

No	Stage	Governing tier	Main Sharia risk	Determination and mitigation
4	Token purchase	<i>Bay'</i> at entry	<i>Gharar</i> from incomplete asset information	Conditional pass; mandatory disclosure of location, size, legal status, appraisal, and projected return
5	Management and distribution	<i>Wakalah bi al-ujrah</i> over <i>ijarah</i> income	Unfair distribution, hidden fees, or a guaranteed return	Conditional pass if no return is guaranteed; automatic distribution and fees declared in advance
6	Secondary trading	<i>Bay'</i> at exit	<i>Maysir</i> from mispricing; inability to exit	Conditional pass; appraisal-linked pricing and a market-making or redemption window

Source : Processed by the authors (2025)

The Digital-Physical Bridge as a Question of Daman

The central weakness of tokenisation is the oracle problem, that is, whether the on-chain record reflects the real condition of the property. Usually seen as an engineering issue, it is treated here as a question of liability (*daman*). There are four weak points. The first is verification of the property's existence and condition. A mismatch, such as undisclosed structural damage, is a hidden defect, and because the token is *mal 'ain hukmi*, the holder has a proprietary claim that requires a compensation mechanism, such as a guarantee fund held in the smart contract (Zulkepli & Mohamad, 2023). The second is outdated information after disasters, rezoning, or disputes, which creates substantive *gharar* and calls for independent six-monthly appraisal recorded on-chain. The third, enforcement under national law, is discussed below. The fourth is liquidation, where delayed or unclear payment would be an injustice; automatic distribution and a third-party price guarantee address this risk, consistent with designs that build risk management into asset-backed Islamic instruments from the start (Syamlan et al., 2020).

Al-kharaju bi al-daman answers the liability question. The platform earns its *wakalah* fee for keeping the record consistent with the asset; that fee is its gain (*kharaj*), so the corresponding liability is also its own. Oracle failure is therefore a failure of the agent's mandate and falls on the platform. A term that disclaims this liability while retaining the fee separates gain from liability and

is void. Holders, in turn, bear the property's market risk, which is what entitles them to its profit. This allocation follows from principle, applies to any tokenisation model, and, to the authors' knowledge, has not been stated in earlier studies.

Layer 2: KHES and the Three Sharia Parameters

Under KHES, a token purchase is an agreement that creates rights and obligations and is executed through the smart contract, provided that the object is clear and free of major *gharar*, *maysir*, and *riba*. Each tier of the composite contract has a counterpart in the KHES provisions on *syirkah*, *wakalah*, and *ijarah*, and the agent's liability for negligence makes the platform legally accountable if it conceals material information (Mahkamah Agung RI, 2008; Mohamed & Ali, 2022). Indonesian Sharia economic law thus already recognises this structure. Because KHES treats a contract that conflicts with Islamic law as invalid, passing a conventional regulatory review does not settle the question of compliance. A religious court may annul a purchase and order restitution if a prohibited element is proven. KHES thus strengthens the investor's position while requiring the platform to comply in substance, not merely in form.

Table 5 summarises the three parameters. The *gharar* verdict concerns operations rather than design. Residual *gharar* is minor (Ibn Qudamah, 1997) only while appraisal and disclosure remain disciplined, and the same model would move towards major *gharar* if they lapsed, without any change in its code or contracts. On *riba*, the lawfulness of the return rests on the presence of the *ijarah* tier, not merely on the absence of interest (Mousavi et al., 2025).

Table 5. Compliance of the Goro.id Model with the Three Sharia Parameters

Parameter	Condition in the model	Assessment	Condition for the assessment
<i>Gharar</i>	Procedural <i>gharar</i> is removed by code; substantive <i>gharar</i> remains at the digital-physical bridge	Conditionally met; residual <i>gharar</i> is minor	Regular appraisal and disclosure; lapses would make it major
<i>Maysir</i>	The token is backed by an asset with intrinsic value and is a commodity (<i>sil'ah</i>), not currency (<i>tsaman</i>)	Conditionally met	Appraisal-linked pricing; exposure remains where the market is thin
<i>Riba</i>	The return is rental income from an asset whose risk the holders bear	Met	Any guaranteed return would turn the <i>wakalah</i> into a benefit-bearing loan

Source: Processed by the authors (2025)

Critical Discussion: Eight Unresolved Exposures

The findings above are not an endorsement. Under the second TSCM rule, they yield only a conditional verdict, and eight exposures could defeat the model in practice.

Legal uncertainty. Indonesian law does not recognise a blockchain token as a right over land. Under the Basic Agrarian Law, land rights exist only in statutory forms evidenced by registration, and a token is not one of them. Its force is derivative: the holder owns an interest in a company that owns the land. Participation in the Sandbox under POJK Number 3 of 2024 reflects supervisory tolerance of an experiment, not judicial recognition of a title.

Ownership mismatch. In *fiqh*, the holder owns the property through an entity. In company law, a shareholder owns shares, not the company's assets. A religious court applying KHES may look to substance, but a general court may not, so what the holder owns depends on the forum.

Enforceability against third parties. If an SPV director wrongly sells the villa to a good-faith purchaser who registers the title, the on-chain record gives that purchaser no notice, leaving the holder a claim only against the director. The blockchain protects the token record, not the underlying title.

Bankruptcy-remoteness. The holder's claim survives the platform's insolvency only if the SPV is legally separated from the platform through activity restrictions, independent directors, non-petition clauses, and the absence of commingled funds. Without the constitutive documents, this

remains indeterminate; if the SPV is not bankruptcy-remote, holders could rank as unsecured creditors, defeating the *mal 'ain* analysis in practice. This is a structuring issue that no Sharia audit can resolve.

Investor protection. The Sandbox is a supervisory arrangement, not a compensation scheme. Disclosure and a risk disclaimer prevent uninformed choices, but not losses. Because the model admits investors with the least capacity to absorb loss, wider access without wider protection shifts risk to the most vulnerable and directly engages the prohibition of harm.

Secondary-market failure. Liquidity depends on a functioning secondary market, and the Indonesian precedent is discouraging (Sanuri et al., 2025). An active market reduces mispricing but invites speculation, whereas a thin market limits speculation but traps investors and lets prices drift from asset values. No mechanism disclosed by the platform resolves this trade-off.

Fatwa vacuum. No DSN-MUI fatwa addresses asset tokenisation. The fatwas used here apply only by analogy, so the conclusions represent the authors' *ijtihad*, not a ruling of the Council. Meanwhile, a platform can claim Sharia alignment on the strength of academic studies, and the 2021 crypto ruling is a pronouncement whose inapplicability must itself be argued (Sanuri et al., 2025).

Dispute resolution. If the relationship is a Sharia economic contract, Law Number 3 of 2006 gives religious courts jurisdiction and KHES applies. If it is a shareholder or consumer dispute, general courts, OJK mechanisms, or arbitration may apply, and KHES may not. Because holder agreements are not public, an unnoticed forum or arbitration clause could remove KHES protection.

In each case, the Sharia conclusion depends on a legal or market fact beyond the reach of both *fiqh* and code, so compliance depends on the operating environment as much as on design.

Layer 3: Scoring the Two Dimensions of Hifzh al-Mal

For protection, mechanisms do exist: an open ledger allows independent verification, the Sandbox adds supervision, and the risk disclaimer reflects the prohibition of harm. However, the oracle gap is only partly addressed, tourism concentration is unaddressed, bankruptcy-remoteness is unproven, and third-party enforceability is unresolved. Protection therefore scores 2, and stronger mitigation with regular Sharia audits is needed (Aswadi et al., 2022).

For development, Grade B evidence shows a genuinely lower entry threshold: tokens from about IDR 10,000 open a market once reserved for

large investors. This benefit reaches the *hajjiyyat* level and could approach *dlaruriyyat* at scale (Al-Syathibi, 1997; Ibn Asyur, 2006). Such access joins commercial and social finance, but its benefit depends on financial literacy (Syamlan & Erwinsyah, 2022; Tamanni et al., 2022). Durability, however, is uncertain because exit is not assured, so development also scores 2. The model is thus aligned in design but not yet in operation (Table 6). The two dimensions also pull against each other: wider access admits investors who can least bear loss, while stronger protection, such as minimum holding periods, raises the entry barrier. Ibn Asyur's requirement that they proceed together is a call for balance, not a promise of harmony.

Table 6. Maqashid Scoring of the Goro.id Model on Hifzh al-Mal

Dimension	Score	Basis for the score	Required to reach 3
Protection of wealth	2	Ledger transparency, Sandbox supervision, and a risk disclaimer exist, but the oracle gap, tourism concentration, bankruptcy-remoteness, and third-party enforceability remain unmitigated	A publicly evidenced bankruptcy-remote SPV; a verified appraisal cycle; a claims and guarantee mechanism; an external Sharia audit
Development of wealth	2	The entry threshold is lowered to about IDR 10,000, but durability is limited by a thin secondary market	Market-making, periodic redemption windows, or a defined liquidation trigger
Aggregate	2/2	Aligned in design; not yet demonstrated in operation	Both dimensions at 3, with the tension between them actively managed

Source: Constructed by the authors (2025)

Integrity and Regulatory Balance

Discretion lies in the *wakalah* tier: the agent chooses tenants, schedules appraisals, and decides what to disclose. Because code cannot constrain what it cannot observe and regulators do not supervise continuously, integrity is the final safeguard (Fauzi & Suryadi, 2021). For Goro.id, this means disclosing each property's true condition, setting fees openly, and distributing income honestly. At the policy level, POJK Number 3 of 2024 casts the regulator as a partner that keeps innovation from compromising consumer safety. This matches the balance required by *Hifzh al-Mal*, since overly strict rules can stifle growth (Dewaya, 2025); it mirrors the rise of Islamic regulatory technology

(RegTech) (Syamlan & Antonio, 2023); and it accords with Ibn Qayyim's view that rulings may adapt to changing needs (Purba & Afandi, 2022). Balance, however, means proportionate regulation, not the absence of the safeguards identified above.

CONCLUSION

This study developed the TSCM and applied it to Goro.id. The token is *mal mutaqawwim* of the *mal 'ain hukmi* type, with consequences for hidden defects, inheritance, zakat, and insolvency. The transaction is a three-tier composite contract of *syirkah milk*, *wakalah bi al-ujrah*, and *ijarah*, with *bay'* confined to entry and exit and with the ownership tier prevailing in any conflict. The smart contract is *sighat* and *tawthiq* rather than the contract itself, so it removes procedural but not substantive *gharar*. The model scores 2 on both the protection and the development of wealth. Goro.id is therefore Sharia-aligned in design but not yet demonstrably aligned in operation, because eight exposures lie beyond the reach of both *fiqh* and code.

Theoretical and Policy Implications

Theoretically, the TSCM traces disagreement to a specific layer, the composite-contract reading replaces the single-contract approach, and the *daman* reading of the oracle problem yields a general liability rule. For policy, DSN-MUI should issue a specific fatwa on real-asset tokenisation that covers the composite structure, the prohibition of guaranteed returns in the *wakalah* tier, and disclosure standards. OJK should make graduation from the Sandbox conditional on a proven bankruptcy-remote SPV and a disclosed exit mechanism. The legislature and the Supreme Court should settle the question of jurisdiction. Platforms should treat bankruptcy-remoteness, verified appraisal, claims mechanisms, and the absence of guaranteed returns as essential rather than relying on certification.

Technological Implications

The findings also offer guidance for technology design. Sharia compliance in tokenisation depends on specific technical features: oracle systems that link on-chain records to independently verified appraisals, smart contracts that automatically distribute rental income and liquidation proceeds in proportion to holdings, coded guarantee funds for defect claims, and tamper-proof logs of fees and disclosures that auditors can inspect. They turn juristic principles into specifications that engineers can build and regulators can test.

Limitations and Future Research

The study relied on public documents without access to the SPV documents, token code, or holder agreements, and its results apply to the

Indonesian retail segment. Future research should interview managers, investors, and regulators, analyse the actual SPV and holder documents, compare platforms across market segments (Mohd Yusof et al., 2025), and measure secondary-market depth quantitatively.

DECLARATION OF CONFLICT OF INTEREST

The authors declare no conflict of interest. The research was conducted independently without external funding, and the authors have no financial or personal relationship with Goro.id or PT Teknologi Gotong Royong.

GENERATIVE AI STATEMENT

The authors used a generative artificial intelligence (AI) tool in a limited capacity, namely for language editing, condensing the text, improving readability, and checking the consistency of formatting and reference style. It was not used to design the research, build the analytical model, perform the legal reasoning, produce the findings, or generate any data or citation. The authors verified all references and take full responsibility for the content of the article.

AUTHOR CONTRIBUTIONS (CRediT AUTHOR STATEMENT)

Asnan Purba: Conceptualization, Methodology, Investigation, Formal Analysis, Writing – Original Draft, and Project Administration.

Oyo Sunaryo Mukhlas: Validation, Supervision, Formal Analysis, and Writing – Review & Editing.

Atang Abd Hakim: Supervision, Resources, Formal Analysis, and Writing – Review & Editing. All authors have read and approved the final manuscript.

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APPENDIX: LIST OF ABBREVIATIONS

Table 7. Abbreviations and Their Full Forms

Abbreviation	Full form	Abbreviation	Full form
AI	Artificial Intelligence	PERMA	Peraturan Mahkamah Agung (Supreme Court Regulation)
BSI	Bank Syariah Indonesia	POJK	Peraturan Otoritas Jasa Keuangan (Financial Services Authority Regulation)
CRedit	Contributor Roles Taxonomy	PT	Perseroan Terbatas (Limited Liability Company)
DSN-MUI	Dewan Syariah Nasional–Majelis Ulama Indonesia (National Sharia Council of the Indonesian Ulema Council)	RegTech	Regulatory Technology
IDR	Indonesian Rupiah	RI	Republik Indonesia (Republic of Indonesia)
ISO	International Organization for Standardization	SINTA	Science and Technology Index (Indonesia)
KHES	Kompilasi Hukum Ekonomi Syariah (Compilation of Sharia Economic Law)	SPV	Special Purpose Vehicle
MUI	Majelis Ulama Indonesia (Indonesian Ulema Council)	TSCM	Tokenisation Sharia-Compliance Matrix
OJK	Otoritas Jasa Keuangan (Financial Services Authority)	UIN	Universitas Islam Negeri (State Islamic University)

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