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COMMUNICATION PATTERNS IN THE APPLICATION OF SMART CONTRACTS IN SHARIA FINANCIAL TRANSACTIONS

Risfiana Mayangsari
UIN Fatmawati Sukarno Bengkulu, risfiana@mail.uinfasbengkulu.ac.id

Hidayat Darussalam
UIN Fatmawati Sukarno Bengkulu, hidayat.darussalam@mail.uinfasbengkulu.ac.id

Edi Mulyono
UIN Fatmawati Sukarno Bengkulu, edi.mulyono@mail.uinfasbengkulu.ac.id

Abstract

This article analyzes the communication patterns that emerge and develop from the integration of Smart Contracts in Islamic financial transactions. The adoption of Smart Contracts marks a fundamental shift from traditional sighat (ijab qabul) to automated and immutable programmed communication on the blockchain. This study finds that the communication patterns involved are divided into three main dimensions: first, formal human-to-contract communication, which is the process of coding and initial agreement of the contract (such as mudharabah or murabahah) where the sighat is represented by explicit digital input; second, fully automated system-to-system communication, where Smart Contracts communicate with external data (oracles) to verify conditions and trigger self-executing transactions; and third, contract-to-ledger communication, which results in transparent and immutable transaction recording on the blockchain. Although promising efficiency and improved Sharia Compliance through the elimination of operational gharar, this programmed communication pattern poses challenges related to contract flexibility and code error risks. Therefore, it is necessary to formulate clear Sharia code standards and digital governance mechanisms recognized by the Sharia Supervisory Board to ensure that this new communication pattern validly and ethically supports maqasid syariah (Sharia objectives).

Keywords: *Islamic Finance, Communication Patterns, Sighat, Sharia Compliance, Smart Contract*

Abstrak

Artikel ini menganalisis pola komunikasi yang muncul dan berkembang dari integrasi Smart Contract dalam transaksi keuangan syariah. Adopsi Smart Contract menandai pergeseran fundamental dari sighat (ijab qabul) tradisional menjadi komunikasi terprogram yang otomatis dan immutable di atas blockchain. Penelitian ini menemukan bahwa pola komunikasi yang terlibat terbagi menjadi tiga dimensi utama: pertama, komunikasi formal human-to-contract, yaitu proses pengkodean dan persetujuan awal akad (seperti mudharabah atau murabahah) di mana sighat diwakili oleh input digital yang eksplisit; kedua, komunikasi system-to-system yang sepenuhnya otomatis, di mana Smart Contract berkomunikasi dengan data eksternal (oracle) untuk memverifikasi kondisi dan memicu eksekusi transaksi secara self-executing; dan ketiga, komunikasi contract-to-ledger, yang menghasilkan pencatatan transaksi yang transparan dan immutable di blockchain. Meskipun menjanjikan efisiensi dan peningkatan Sharia Compliance melalui eliminasi gharar operasional, pola komunikasi terprogram ini menimbulkan tantangan terkait fleksibilitas

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akad dan risiko kesalahan kode. Oleh karena itu, diperlukan perumusan standar kode syariah yang jelas dan mekanisme tata kelola digital yang diakui oleh Dewan Pengawas Syariah untuk memastikan bahwa pola komunikasi baru ini secara valid dan etis mendukung maqasid syariah (tujuan syariah).
Kata Kunci: *Keuangan Syariah, Pola Komunikasi, Sighat, Sharia Compliance, Smart Contract*

A. Introduction

The development of information and communication technology in the era of the 4.0 industrial revolution has brought fundamental changes to various sectors of life, including the financial industry. Globalization and digitalization demand transaction systems that are not only fast and efficient, but also transparent and secure. Amidst these demands, Distributed Ledger Technology (DLT), particularly Blockchain, has emerged as an innovative solution that offers decentralization, data immutability, and unprecedented transparency. This innovation has significantly changed the way people view contracts, transactions, and the role of intermediaries. [1]

Digital transformation has entered the heart of the financial industry, encouraging the Islamic finance sector to adopt Distributed Ledger Technology (DLT), particularly Smart Contracts. The implementation of Smart Contracts has revolutionized Islamic transaction mechanisms, replacing manual processes that are prone to inefficiency and gharar (uncertainty) risks with automatic and immutable code execution.[2] This shift not only changes the operational infrastructure, but also fundamentally changes the pattern of communication in Islamic finance contracts. Smart Contracts introduce a new dimension of communication, namely programmed and conditional logic-based communication, which must be studied in depth to ensure that these digital mechanisms continue to fulfill the rukun sighat (statement of

[1] S E Fitriani, S E Eva Purnamasari, and S E Ajeng Andriani Hapsari, *Perbankan Dan Revolusi Blockchain: Membangun Keuangan Berbasis DLT (Distributed Ledger Technology)* (Takaza Innovatix Labs, 2024).

[2] Didik Gunawan, "Penerapan Smart Contract Dalam Keuangan Syariah: Tinjauan Literatur Tentang Integrasi Cryptocurrency Dan Blockchain," *Jurnal Ilmiah Ekonomi Islam* 11, no. 1 (2025).

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intent) and principles of justice mandated by fiqh muamalah.[3]

The main focus in this context is how Smart Contracts process and communicate the terms of sharia contracts. Conventional communication patterns that rely on verbal or written ijab qabul are now transformed into inter-system communication, where contract requirements are encoded in a series of algorithms. This programmed communication ensures that transaction execution, such as the distribution of nisbah (profit sharing ratio) in mudharabah contracts, will occur automatically and transparently only when the agreed conditions (e.g., profit verification by oracle) are met. This pattern of automated communication is vital because it functions as a digital validator that self-executingly enforces Sharia compliance and mitigates the risk of usury by eliminating the potential for human intervention or manipulation after the contract is locked.[4]

The Islamic finance sector, which is based on Islamic principles such as the prohibition of riba (interest), gharar (uncertainty/speculation), and maysir (gambling), has its own unique characteristics and challenges in its operational implementation. Traditionally, Islamic financial transactions, such as murabahah (sale and purchase), mudharabah (profit sharing), and ijarah (lease) contracts, often involve lengthy manual processes, complex physical documentation, and require the presence of a third party (intermediary) to ensure Sharia compliance and transaction settlement.

Some of the main challenges in conventional systems include inefficiency and high costs, gharar (uncertainty) risks, lack of real-time transparency, and difficulty in monitoring transactions directly and in detail, which can reduce the

[3] Willy Cahya Sundara et al., *Manajemen Keuangan Di Era Digital: Mengoptimalkan Peluang Dan Menghadapi Disrupsi* (Takaza Innovatix Labs, 2025).

[4] H Zaenal Arifin and MKn SH, *Akad Mudharabah (Penyaluran Dana Dengan Prinsip Bagi Hasil)* (Penerbit Adab, 2021).

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level of transparency and auditability required to ensure full Sharia compliance. To overcome these challenges, the concept of Smart Contracts running on Blockchain technology has emerged.[5] A smart contract is a computer protocol designed to automatically execute, control, or document legally relevant events and actions in accordance with the terms of the contract. By encoding the rules of the contract into a line of immutable code, Smart Contracts can automate contract execution (the contract will be executed automatically when the agreed conditions are met, without the need for human or third-party intervention).[6] Enhancing security and immutability (data and contract terms stored on the Blockchain are protected from manipulation and alteration). Reducing dependence on third parties (cutting red tape and intermediation costs, leading to increased efficiency).

The application of Smart Contracts in the context of online Islamic financial transactions (Islamic fintech) offers a great opportunity to ensure that all transactions are not only efficient and modern, but also fully compliant with Islamic principles (sharia compliance).[7] The concept of Sharia Smart Contracts has the potential to become an automatic validator that ensures that prohibited elements, such as usury, gharar, and maysir, are not included in the transaction execution code.

For example, in a mudharabah (profit-sharing) contract, a Smart Contract can be programmed to automatically distribute profits and losses according to a percentage agreed upon at the outset, as soon as certain conditions (e.g., the end of

[5] Agus Arwani and Unggul Priyadi, "Eksplorasi Peran Teknologi Blockchain Dalam Meningkatkan Transparansi Dan Akuntabilitas Dalam Keuangan Islam: Tinjauan Sistematis," *Jurnal Ekonomi Bisnis Dan Manajemen* 2, no. 2 (2024): 23–37.

[6] Imelda Martinelli et al., "Legalitas Dan Efektivitas Penggunaan Teknologi Blockchain Terhadap Smart Contract Pada Perjanjian Bisnis Di Masa Depan," *UNES Law Review* 6, no. 4 (2024): 10761–76.

[7] Siti Ainur Haya, "Peluang Dan Tantangan Implementasi Teknologi Informasi Dalam Bisnis Syariah," *Journal of Islamic Finance and Ekonomics* 2, no. 02 (2025): 151–64.

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the investment period) are met. This increases transparency, fairness, and accountability in risk and profit sharing, which is the essence of Islamic finance.

Given the rapid adoption of blockchain technology and smart contracts in the global financial system, the Islamic finance sector is now at a crucial crossroads of innovation. Traditional Islamic financial transaction systems often face obstacles such as inefficiency, high intermediation costs, and potential gharar (uncertainty) risks due to complex manual processes.[8] The implementation of smart contracts online is a transformative solution that promises automatic contract execution, immutable data transparency, and reduced dependence on third parties, thereby fundamentally improving operational efficiency and, most importantly, ensuring stricter sharia compliance through the coding of fiqh rules into digital protocols.[9]

B. Methodology

This research method adopts a normative legal (juridical-normative) approach supported by qualitative-descriptive analysis. The normative approach serves as the basic framework for researching and analyzing the suitability of Smart Contract implementation with Islamic law principles (fiqh muamalah) and applicable regulations from authorities such as the National Sharia Council (DSN-MUI), the Financial Services Authority (OJK), and Bank Indonesia (BI). Research data was collected through comprehensive literature studies, focusing on the collection of primary data in the form of official fatwas and regulations, as well as secondary data covering academic literature, international scientific journals, and publications related to Blockchain and Sharia FinTech. The collected data was then analyzed using comparative-analytical methods and content analysis.

[8]Mahendra Ismail Ardiyanto, "PEMANFAATAN TEKNOLOGI BLOCKCHAIN DALAM TRANSFORMASI SISTEM KEUANGAN: STUDI PADA SEKTOR PERBANKAN DIGITAL," n.d.

[9] Ardiyanto.

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This analysis involved an in-depth comparison between the pillars and requirements of Sharia financial contracts (e.g., Mudharabah or Murabahah). The aim was to identify the potential and challenges of Smart Contracts in ensuring digital Sharia Compliance, which would ultimately produce prescriptive conclusions regarding a valid and accountable implementation framework.

C. Results and Discussion

1. Communication Patterns in Online Sharia Contracts

The contemporary Islamic finance sector faces significant demands for transformation in line with the massive adoption of digital technology. In the context of online Islamic financial transactions, communication patterns are a crucial element that determines the legal validity and Sharia compliance of an agreement. Fundamentally, communication in an Islamic agreement must represent a valid sighat (ijab qabul) and be free from elements of uncertainty (gharar), fraud (tadlis), and other prohibited elements. The shift from face-to-face interactions to digital interactions, mediated by online applications and platforms, requires communication mechanisms that can guarantee the authenticity of the parties' intentions and the transparency of all contract terms.[10]

The main communication pattern in online Islamic finance contracts focuses on fulfilling the rukun sighat (ijab qabul or declaration of intent) digitally, which must guarantee clarity and authenticity for all parties.[11] This formal communication transitions from verbal statements to digital agreements mediated by platforms and applications. Communication is considered valid under Sharia law (sighat bil fi'li or sighat bil kitabah) when all terms and conditions of the contract (e.g.,

[10] Erin Oktaviana Winarta Putri, "Transformasi Kontrak Dalam Era Digital: Tantangan Hukum Bisnis Dalam Transaksi Elektronik Di Bisnis Sewa Kebaya Online" (Universitas Islam Sultan Agung Semarang, 2024).

[11] Iim Muhayati, "Konstruk Akad Pada Pembiayaan Online Syariah Perspektif Hukum Ekonomi Syariah (Studi Kasus Pada PT Duha Madani Syariah)" (Universitas Islam Negeri Saifuddin Zuhri (Indonesia), 2021).

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details of murabahah profit margin or mudharabah ratio) are displayed transparently and explicitly agreed to by the customer through a confirmation action, such as pressing the "Agree" button, entering a transaction PIN, or using an authenticated electronic signature. This initial communication pattern is crucial because it serves as legal evidence that prevents ambiguity (gharar) and ensures that the contract has been understood and agreed upon by legally competent parties.[12]

In addition to formal communication between parties, there is also automatic and inter-system communication supported by technologies such as Smart Contracts and Distributed Ledger Technology (DLT). In this scheme, communication is programmed and based on conditional logic (if-then logic).[13] Smart Contracts communicate with external data (oracles) to verify that agreed conditions have been met (e.g., profit verification or lease expiration) and then automatically communicate execution commands without human intervention. This automatic communication pattern produces an immutable (unchangeable) and transparent transaction history recorded on the blockchain. The function of this communication is to ensure efficiency, accountability, and trust in the execution of the contract, while also ensuring that the execution is free from usury and runs according to the ratio locked in the code.[14]

Finally, communication patterns in the online Islamic finance ecosystem are reinforced by asynchronous and educational communication to support literacy and services. Asynchronous communication occurs through digital notifications (email, SMS, or in-app messages) that inform users of

[12] Putri, "Transformasi Kontrak Dalam Era Digital: Tantangan Hukum Bisnis Dalam Transaksi Elektronik Di Bisnis Sewa Kebaya Online."

[13] Fitriani, Eva Purnamasari, and Ajeng Andriani Hapsari, *Perbankan Dan Revolusi Blockchain: Membangun Keuangan Berbasis DLT (Distributed Ledger Technology)*.

[14] Daffa Danendra, "Keabsahan Perjanjian Jual Beli Crypto Aset Menggunakan Smart Contract" (Universitas Islam Indonesia, 2023).

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transaction status, payment schedules, or due date reminders. Meanwhile, educational communication focuses on delivering Islamic financial literacy to customers, explaining the Islamic principles behind products (Murabahah versus conventional loans) and how the technology used works.[15] This supporting communication pattern is very important for building trust (tsiqah) and ensuring that users have an adequate understanding of the contracts they enter into, in line with Islamic business ethics that demand honesty and openness of information in every muamalah interaction. The essence of online sharia communication patterns is to ensure that every digital step, from the click of approval to automatic notifications, fulfills the pillars and requirements of a valid sighat and is free from prohibited elements, namely *riba*, *gharar*, and *maysir*.

2. Digital Transformation and Islamic Finance

The acceleration of the 4.0 industrial revolution has brought about a significant paradigm shift in the global economic landscape, placing digital technology at the forefront of innovation, including in the financial sector.[16] *Sharia* finance, as a system based on Islamic ethics and distributive justice principles, now faces challenges and opportunities to adapt to this digital disruption. Historically, Islamic finance operations have always prioritized strict compliance with *fiqh muamalah*, which regulates various forms of contracts such as *Murabahah* (sale and purchase), *Mudharabah* (profit sharing), and Ijarah (leasing).[17] However, the conventional contract execution process is often characterized by extensive physical documentation, multi-level intermediaries, and relatively long

[15] Irsan Herlandi Putra, *BANK DALAM EKOSISTEM DIGITAL* (PT. Sonpedia Publishing Indonesia, 2024).

[16] Fritz Hotman S Damanik et al., *Transformasi Ekonomi: Inovasi Dan Pertumbuhan Ekonomi Global Di Abad Ke-21* (Star Digital Publishing, 2025).

[17] Nurul Fitriani Fatonah et al., *Digitalisasi Ekonomi Syariah: Suatu Trend Dan Hegemoni* (Takaza Innovatix Labs, 2025).

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transaction completion times. These conditions not only increase operational costs (cost of intermediation) but also open up opportunities for inefficiencies and potential operational ambiguities.

At the same time, the emergence of Blockchain technology, a Distributed Ledger Technology (DLT), has offered a fundamentally different infrastructure solution from traditional centralized systems. Blockchain promises high data transparency, immutability (data that has been recorded cannot be changed), and decentralization, which collectively increase trust between parties without the need for a dominant central authority. It is on this Blockchain infrastructure that the concept of Smart Contracts is implemented. A Smart Contract is defined as a computer protocol designed to automatically verify, enforce, or execute contract negotiations and execution when agreed-upon conditions are met. In other words, the terms of the contract are translated into a series of self-executing code, cutting out bureaucracy and dependence on third parties.[18]

The integration of this technology into online Islamic financial transactions (Sharia FinTech) is inevitable. The application of Smart Contracts has the potential to overcome latent problems in conventional systems, especially those related to Sharia compliance guarantees. By explicitly encoding prohibitions against riba (interest), gharar (uncertainty), and maysir (gambling) directly into the logic of digital contracts, Smart Contracts act as automatic validators that ensure every step of the transaction is in line with Sharia principles and fatwas.[19] Therefore, this study is relevant to analyze in depth how technological efficiency guarantees can be aligned with Islamic ethical and legal requirements, in order to create a robust and accountable digital Islamic finance ecosystem.

[18] Martinelli et al., "Legalitas Dan Efektivitas Penggunaan Teknologi Blockchain Terhadap Smart Contract Pada Perjanjian Bisnis Di Masa Depan."

[19] Gunawan, "Penerapan Smart Contract Dalam Keuangan Syariah: Tinjauan Literatur Tentang Integrasi Cryptocurrency Dan Blockchain."

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3. Legal Challenges of Sharia Economics in the Application of Smart Contracts

The application of Smart Contracts in Islamic financial transactions poses significant challenges from the perspective of Islamic economic law (fiqh muamalah), which mainly centers on the issues of contract finality (immutability) and contract flexibility. The basic nature of Smart Contracts is automatic and permanent execution after being encoded into the blockchain—meaning that the contract is absolute and cannot be changed once activated. This challenge has the potential to conflict with the general principles of fiqh muamalah, which recognizes the option of cancellation (khiyar) or contract adjustment under certain conditions (force majeure or uzur syar'i). For example, in an emergency or if one party is unable to continue the contract, Sharia law allows for revision or cancellation in order to ensure justice (ihsan) for all parties. If Smart Contracts cannot be intervened, they risk violating the spirit of iḥsān, which emphasizes dispute resolution based on deliberation.[20]

The second challenge lies in the issue of uncertainty (gharar), which has shifted from the substance of the contract to the implementation technology. Although Smart Contracts are designed to reduce substantive gharar in contracts (for example, by ensuring clarity of results), they can give rise to new gharar, namely the risk of code errors (bugs) or dependence on oracles (external data input into the blockchain). If the contract code has bugs or the oracle data is incorrect, the Smart Contract will execute the wrong transaction, but the execution is still final and cannot be revoked, causing uncertainty and substantial losses.[21] Therefore, the Sharia Supervisory Board

[20] Winda Fitri, "Kajian Penerapan Smart Contract Syariah Dalam Blockchain: Peluang Dan Tantangan," *Jatiswara* 38, no. 2 (2023): 223–32.

[21] MOHAMMAD MUZAKI MUZAKI, "Rekonstruksi Konsep Gharar Dalam Kontrak Keuangan Islam: Analisis Kritis Dari Perspektif Fiqih Dan Ekonomi Modern," *AT TIRMIDZI* 1, no. 2 (2025).

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(DPS) faces the difficult task of establishing strict sharia code validation standards and determining sharia-compliant intervention mechanisms (kill switches) to address technical failures, without compromising the promises of automation and security offered by blockchain technology.

The next substantive challenge focuses on the potential shift of uncertainty (gharar) from the substance of the contract to technical risks. Although Smart Contracts are designed to minimize gharar related to *sighat* (*ijab qabul*) and contract objects by ensuring clarity of execution, they create new risks, especially those related to code errors (bugs) and oracle reliability. Smart Contracts will only execute according to the written code; if there are bugs or security vulnerabilities, or if the external data (oracle) used to trigger execution is incorrect or manipulated, the contract will execute the wrong result. Due to the permanent and irrevocable nature of blockchain, this incorrect execution result can cause significant and final financial losses, which implicitly gives rise to new technical gharar that is difficult to account for or remedy under Sharia law.[22]

Therefore, the Sharia Supervisory Board (DPS) and regulators are faced with the urgent task of developing strict sharia code standards and appropriate digital governance mechanisms. A framework is needed that not only verifies the substantive compliance of contracts, but also mitigates the risk of technical gharar. Solutions under consideration include the design of Smart Contracts that have a "kill switch" that can be activated by the SBD in the event of technical failure or crisis, even though this challenges the principle of decentralization.[23] In essence, for Smart Contracts to be fully recognized, there must be a clear Fatwa regarding the recognition of digital signatures, the limits of DPS intervention in immutable

[22] Willion Lim, Steven Angkasa, and Alexander Danelo Putra Wibowo, "Smart Contracts: Validitas Hukum Dan Tantangan Di Masa Depan Indonesia," *Jurnal Kewarganegaraan* 8, no. 1 (2024): 829–38.

[23] Fatonah et al., *Digitalisasi Ekonomi Syariah: Suatu Trend Dan Hegemoni*.

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contracts, and the determination of responsibility for technical failures, so that this technological innovation truly supports maqasid syariah (sharia objectives), namely justice and the benefit of the people.

4. The Concept of Fiqh Muamalah and Smart Contracts

To understand the application of Smart Contracts in the context of Sharia, a strong theoretical understanding of Islamic legal foundations and technological architecture is required. In fiqh muamalah, every contract must fulfill certain pillars (essential elements) and conditions, which include the presence of *'aqid* (contracting parties), *mahallul 'aqdi* (contract object), and *sighat* (*ijab qabul*/statement of intent).[24] The absence or ambiguity of any of these elements can invalidate the contract. The fundamental principles in muamalah are clarity (*Adam al-Gharar*), fairness, and the prohibition of usury.

Smart Contracts offer an automated mechanism for contract formation (*ijab qabul*). The parties' declarations of intent are represented through data inputs that trigger code execution. The crucial issue here is whether automatic execution by computer code can be recognized as a valid contract under Sharia law, especially given the finality and immutability of execution on the Blockchain. In the view of contemporary scholars, the use of electronic media in contracts is permissible as long as the intent and purpose of the contract are clear and do not eliminate the essence of the contract.

Conceptually, Smart Contracts can facilitate risk-sharing agreements, such as *Mudharabah* (profit sharing) and *Musyarakah* (partnership), with unprecedented efficiency.[25] In a

[24] Muhammad Rama Hubban Fillah, "Keabsahan Smart Contract Dalam Transaksi Ethereum Menurut Hukum Islam" (Universitas Islam Indonesia, 2024).

[25] Leira Narulita and Fauzatul Laily Nisa, "Analisis Pembagian Risiko Dan Distribusi Keuntungan Dalam Kontrak Pembiayaan Musyarakah," *Jurnal Rumpun Manajemen Dan Ekonomi* 1, no. 3 (2024): 182–95.

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Mudharabah contract, for example, Smart Contracts can be programmed to manage funds, monitor investment performance using verified oracle data, and automatically distribute profit shares (*nisbah*) to *shahibul mal* (investors) and *mudharib* (managers) as soon as profit conditions are met and verified. This automation process significantly reduces the possibility of manipulation or delays that could lead to *gharar*.[26]

In addition, the transparent and permanently recorded nature of Blockchain strongly supports the principle of accountability in Islam. All changes in asset status and cash flow are publicly recorded, enabling real-time auditing by the Sharia Supervisory Board (DPS) or regulators. Thus, the theoretical framework shows that Smart Contracts have the unique potential to not only simplify but also strengthen sharia compliance by formalizing ethical rules into unbreakable code rules.[27]

5. Smart Contracts in Murabahah Agreements (Sale and Purchase)

Murabahah is a sales contract in which the seller informs the buyer of the acquisition price and profit margin. In online transactions, Smart Contracts can formalize the entire process:[28]

a. Submission and Approval: The contract is locked in after the buyer and the bank (as the seller) agree on the selling price (cost price + profit margin).
b. Asset Purchases by Banks: Smart Contracts can trigger automatic payments to suppliers after digital verification of asset ownership (proof of asset) has occurred, minimizing the risk of gharar due to fictitious assets.

[26] Ulil Absor Arif Anwar and Detak Pustaka, *Ekonomi Syariah Digital 2035* (Detak Pustaka, 2025).
[27] Arwani and Priyadi, "Eksplorasi Peran Teknologi Blockchain Dalam Meningkatkan Transparansi Dan Akuntabilitas Dalam Keuangan Islam: Tinjauan Sistematis."
[28] Nora Piliang, M Ratandi Hasibuan, and Usman Hendri, "Inovasi Akad Murabahah Dalam Meningkatkan Daya Saing Lembaga Keuangan Syariah Di Era Digital," *Jebital: Jurnal Ekonomi Dan Bisnis Digital* 2, no. 2 (2025): 64–73.

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c. Transfer of Ownership and Installments: After formal ownership is transferred from the supplier to the bank, and then to the buyer, the Smart Contract locks in the installment payment schedule. Payments are made in the form of digital assets (tokens) that are scheduled automatically. If a payment fails, the Smart Contract can trigger notifications or previously agreed-upon resolution steps, without changing the principal value of the contract (avoiding usury).

6. Smart Contracts in Mudharabah and Musyarakah Agreements (Profit Sharing and Partnership)

Profit-sharing agreements are at the heart of Islamic finance, but their conventional implementation is often complicated. Smart Contracts are ideal for these agreements:[29]

a. Profit Sharing Ratio Coding: The ratio of profit and loss sharing is permanently set in the contract code.
b. Performance and Revenue Verification: The contract relies on Oracle—a system that provides real-world data (e.g., verified financial reports) to the Blockchain. When revenue data is entered and verified, the Smart Contract automatically calculates and distributes the profit share according to the encoded ratio.
c. Risk Management: In Musyarakah, Smart Contracts can be programmed to monitor capital contributions and manage the distribution of losses (based on capital proportion) or profits (based on agreement), ensuring fairness and transparency. The contract can prevent unilateral withdrawal of funds before the specified time, which is often a problem in conventional partnerships.

[29] Achmad Tubagus Surur, "Integrasi Blockchain Dan Smart Contracts: Inovasi Dalam Pengelolaan Keuangan Syariah Yang Transparan Dan Efisien," *Sahmiyya: Jurnal Ekonomi Dan Bisnis*, 2025, 50–56.

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7. Smart Contracts in Ijarah (Leasing) Agreements

In a lease agreement, Smart Contracts can ensure that lease payments only occur after the leased object has been verified as usable. This logic can be applied to digital assets or physical assets integrated with sensor technology (IoT):[30]

a. Automatic Payment Schedule: Rent payments are automatically scheduled during the lease period.
b. Object Condition: If the leased object suffers damage that renders it useless (verified through an oracle or verified report), the Smart Contract can automatically suspend rent payments, in accordance with the Ijarah principle which requires the asset to be useful.

The integration of Smart Contracts in these agreements shows great potential for mitigating *gharar* risk through certainty of execution and *riba* through the locking of profit-sharing ratios that cannot be manipulated, thereby strengthening the integrity of the entire system.[31]

D. Conlusion

The application of Smart Contracts in Islamic financial transactions has created a completely new communication paradigm, where the validity of digital contracts is determined by the interaction between humans, program code, and blockchain. This communication pattern, which is divided into human-to-contract, system-to-system, and contract-to-ledger, effectively revolutionizes the fulfillment of rukun sighat by ensuring automatic, transparent, and immutable execution. Key findings show that this automated communication pattern greatly improves efficiency and Sharia Compliance potential by eliminating post-contract human intervention, thereby mitigating operational *gharar* (uncertainty) and *riba* risks that may arise from lengthy conventional transaction settlements.

[30] Fatonah et al., *Digitalisasi Ekonomi Syariah: Suatu Trend Dan Hegemoni*.

[31] Surur, "Integrasi Blockchain Dan Smart Contracts: Inovasi Dalam Pengelolaan Keuangan Syariah Yang Transparan Dan Efisien."

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However, the integration of this technology poses significant challenges to Sharia economic law, particularly in terms of contract flexibility and code error risks. The immutable nature of Smart Contracts has the potential to limit the right of khiyar (option to cancel) recognized in fiqh, while the technical gharar of bugs or oracle failures requires careful legal consideration. Therefore, a crucial step forward is to formulate standard Sharia code and establish clear digital governance mechanisms. This includes the possible role of the Sharia Supervisory Board (DPS) in providing a Sharia-compliant "circuit breaker," ensuring that these new patterns of digital communication do not merely

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