

GREEN ISLAMIC FINTECH ECOSYSTEM (GIFE) MODEL BASED ON ESG-MAQASID FOR SEMI-RURAL MSME EMPOWERMENT IN KUNINGAN REGENCY, INDONESIA IN THE PERSPECTIVE OF SUSTAINABLE DEVELOPMENT GOALS (SDGs)

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Abstract: This study designs and validates the Green Islamic Fintech Ecosystem (GIFE) model, integrating Environmental, Social, and Governance (ESG) frameworks with Maqasid Syariah as a halal investment instrument and vehicle for Micro, Small, and Medium Enterprise (MSME) empowerment in Kuningan Regency, West Java, Indonesia. The GIFE model is explicitly designed as a contribution toward achieving the Sustainable Development Goals (SDGs), particularly SDG 1 (No Poverty), SDG 8 (Decent Work and Economic Growth), SDG 10 (Reduced Inequalities), SDG 13 (Climate Action), and SDG 17 (Partnerships for the Goals). Employing a mixed methods design combining quantitative secondary data analysis across twenty-five cross-sectoral indicators and qualitative inquiry framed by the Unified Theory of Acceptance and Use of Technology (UTAUT), this study uncovers five structural dimensions of adoption barriers that collectively constitute a triple exclusion pattern among semi-rural MSMEs. Quantitative findings reveal a 62.14-percentage-point Islamic financial inclusion gap between conventional inclusion (75.02%) and Islamic inclusion (12.88%), alongside a national MSME green economy potential of IDR 1,596 trillion by 2030 and 4 million projected green jobs (Bappenas, 2025). The GIFE model is structured around three mutually reinforcing pillars: the value pillar (ESG-Maqasid Syariah Integration Framework, ESMIF), the technology pillar (integrated low-bandwidth digital platform), and the ecosystem pillar (multi-stakeholder institutional network). The study recommends harmonization of POJK No. 51/2017 with TKBI Version 2, establishment of a green lane within the OJK regulatory sandbox, integrated mentoring through the pesantren network, and locally contextualized emission-based fiscal incentive schemes—all oriented toward accelerating SDGs achievement in Kuningan Regency

Keywords: Islamic green fintech, ESMIF, Micro Small Medium Enterprise, GIFE, Kuningan Regency

1. Introduction

In the second decade of the twenty-first century, the convergence of Islamic finance, financial technology (fintech), and environmental sustainability has given rise to a new paradigm known as green Islamic fintech an ecosystem that integrates sharia principles with Environmental, Social, and Governance (ESG) standards within the framework of digital financial services. This paradigm is not merely a market-driven response but represents a normative imperative rooted in the Islamic teaching of *khalifah fil ardh* (stewardship of the earth), which affirms humanity's responsibility as guardians of the natural ecosystem. Simultaneously, the global community, through the United Nations' 2030 Agenda, has established 17 Sustainable Development Goals (SDGs) as a roadmap for inclusive, equitable, and sustainable development an agenda that resonates profoundly with the values of *Maqasid Syariah*.

The relationship between green Islamic fintech and the SDGs extends beyond mere conceptual parallelism. SDG 1 (No Poverty) and SDG 10 (Reduced Inequalities) directly challenge the Islamic finance ecosystem to reach the most marginalized segments. SDG 8 (Decent Work and Economic Growth) promotes the creation of inclusive green jobs. SDG 13 (Climate Action) mainstreams green financial instruments as mechanisms for transition financing. SDG 17 (Partnerships for the Goals) acknowledges that no single actor can bear this transformative burden alone a coherent multi-stakeholder partnership architecture is required. The GIFE model developed in this study is designed as an operational contribution to this cluster of SDGs within the semi-rural Indonesian context.

Indonesia occupies a paradoxical position in the global Islamic fintech landscape. On one hand, the country has achieved third-place ranking in the Global Islamic Fintech Index (GIFR 2023/2024), reflecting a conducive regulatory and infrastructure ecosystem. On the other hand, the national Islamic financial inclusion index stands at only 12.88% a 62.14-percentage-point gap from the 75.02% conventional financial inclusion rate (SNLIK OJK-BPS, 2024). This gap reflects a systemic ecosystem deficit that has yet to synergistically integrate Islamic values, technological capacity, sustainability incentives, and user competency, simultaneously representing a tangible barrier to achieving SDG 10 on reducing inequality in financial access.

Kuningan Regency, West Java, presents itself as a unique and strategically significant study context. With a population of 1.24 million and over 65,000 MSME units spread across 32 sub-districts, the regency recorded an economic growth rate of 10.41% in Q2 2025, making it the fastest-growing region in West Java. However, behind this momentum, the District Minimum Wage (UMK) stands at only IDR 2,209,519 per month (ranked 26th out of 27 districts/cities in West Java), and the poverty rate remains at 10.74% (BPS Kab. Kuningan, 2025) realities that directly challenge the achievement of SDG 1 and SDG 8 at the local level.

The environmental dimension adds further urgency. GHG emissions from the national MSME sector reach approximately 216 MtCO₂e per year (IESR, 2024), while Indonesia's climate finance gap until 2030 is estimated at USD 240 billion, with realization at only 16.4% (Kemenkeu CBT Report, 2025). Locally, the tofu industry in Kuningan Regency generates emissions of 0.35–0.5 kg CO₂eq per kilogram of product (LCA ResearchGate, 2018), while the palm sugar sector has the potential to reduce 19–30 tonnes of CO₂ per business unit per year if managed sustainably (BSI Maslahat, April 2026). This reduction potential remains unmonetized—a market failure that directly impedes the achievement of SDG 13 (Climate Action) and Indonesia's NDC 2030 targets.

Against this multidimensional backdrop, this study establishes three primary objectives: first, to identify and analyze barriers to green Islamic fintech adoption through the

UTAUT framework; second, to design the GIFE model that operationally integrates ESG-Maqasid Syariah; and third, to formulate policy recommendations that support model implementation while contributing to SDGs achievement. This study contributes to the still-limited literature on green Islamic fintech, particularly in the environmental sustainability dimension and its explicit linkage to the global SDGs framework.

2. Literature review

2.1 Maqasid Syariah and the Environmental Protection Dimension

Maqasid Syariah as the philosophy of Islamic law was historically formulated by al-Ghazali in *Shifa' al-Ghalil* and subsequently systematized by al-Shatibi in *al-Muwafaqat* into five core objectives of protection: religion (*hifdz ad-din*), life (*hifdz an-nafs*), intellect (*hifdz al-'aql*), lineage (*hifdz an-nasl*), and wealth (*hifdz al-mal*). Contemporary Muslim scholars Ibn Ashur, Yusuf al-Qaradawi, and Jasser Auda have converged in extending the Maqasid framework to respond to contemporary ecological challenges through the addition of *hifdz al-bi'ah* (environmental protection) as a sixth Maqasid.

From an SDGs perspective, *hifdz al-bi'ah* directly corresponds to SDG 13 (Climate Action), SDG 14 (Life Below Water), and SDG 15 (Life on Land). More broadly, the entire Maqasid framework—which at its core aims to protect the conditions that enable dignified human existence—represents a theological equivalent of the universal spirit of the UN's 2030 Agenda. This integration is not merely conceptual compatibility: it opens normative space for the development of financial instruments that are not only formally sharia-compliant but also substantively responsive to the ecological crisis (Nugroho et al., 2025; Maarif et al., 2025).

2.2 The ESG Framework in the Context of Islamic Finance

Environmental, Social, and Governance (ESG) criteria as a set of corporate impact evaluation tools exhibit significant conceptual compatibility with Islamic finance, alongside epistemological tensions that require careful management. Compatibility lies in substantive parallelism: the prohibition of *riba* corresponds to financial accountability (Governance/G); the obligation of *zakat* and Islamic social responsibility principles are closely linked to the Social (S) dimension; and the principle of *ihsan* toward nature and the prohibition of *israf* align with the Environmental (E) dimension. The epistemological tension lies in differences of authority sources: ESG originates from secular market consensus, while Maqasid Syariah is rooted in revelation and the *fiqh* tradition.

The relevance of ESG to the SDGs is direct and well-documented. The Environmental (E) dimension corresponds to SDGs 7, 13, 14, and 15; the Social (S) dimension to SDGs 1, 3, 4, 5, 8, and 10; and the Governance (G) dimension to SDGs 16 and 17. Global assets managed under ESG criteria exceeded USD 40 trillion in 2022 (Bloomberg Intelligence, 2023), proving that sustainability and profitability are not binary choices. The ESG-Maqasid Syariah Integration Framework (ESMIF) proposed in this study positions Maqasid as the normative foundation (the why), while ESG serves as the measurable and verifiable technical operationalization (the how).

2.3 Technology Acceptance Theory: UTAUT and Religious Moderation

The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), identifies four primary determinant constructs: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC). In the context

of semi-rural MSMEs with a strong religious cultural base, these constructs interact complexly with religious variables. Alalwan et al. (2018) demonstrated that religious trust functions as a positive moderator of Social Influence, while Raza et al. (2019) confirmed that perceived sharia compliance is a significant determinant of Performance Expectancy.

From an SDGs perspective, low acceptance of financial technology among semi-rural MSMEs represents a barrier to SDG 9 (Industry, Innovation and Infrastructure), SDG 10 (Reduced Inequalities in digital access), and SDG 8 (Decent Work). These cross-contextual findings form the empirical basis for the design of the ulama endorsement feature and MUI fatwa integration in the GIFE model architecture simultaneously functioning as mechanisms to accelerate digital inclusion within the Islamic value corridor.

2.4 Green Fintech, Sustainable Islamic Financing, and the SDGs Agenda

Green fintech is defined as the use of digital financial technology to facilitate, measure, report, and enhance the positive environmental impact of economic activities (Ding et al., 2022). Globally, the green sukuk market has expanded rapidly, with issuances reaching USD 9.4 billion in 2022 and an average annual growth rate of 25% (Climate Bonds Initiative, 2023). Indonesia has been a pioneer in sovereign Green Sukuk issuance since 2018, with cumulative total of USD 4.8 billion through 2024.

The Triple Exclusion Framework (IFC, 2021; ADB, 2021) diagnoses that MSMEs in developing countries face simultaneous exclusion from formal financial markets, global green value chains, and climate policy mechanisms. These three forms of exclusion mutually reinforce each other in a cycle that cannot be broken piecemeal—and each corresponds to barriers against SDG 1, SDG 10, and SDG 13 simultaneously. The subsequent challenge is to scale down Islamic green instruments until they become accessible to MSMEs at the sub-district level—a decentralization of values that forms the heart of the GIFE model, translating the global ambitions of the SDGs into the local reality of Kuningan Regency.

2.5 SDGs as a Normative Development Framework: Relevance to GIFE

The UN's 2030 Agenda, containing 17 SDGs with 169 targets and 231 unique indicators, was adopted in September 2015 as the successor to the Millennium Development Goals (MDGs). Unlike the MDGs, which focused on developing countries, the SDGs are universal, applicable to all nations regardless of income level. In the context of this study, six SDGs bear direct and substantive linkage to the GIFE model, as detailed in Table 1 below.

Table 1. Mapping of GIFE Model against the Sustainable Development Goals (SDGs)

SDG	Specific Target	Linkage to GIFE	Measurable Indicator	Kuningan Baseline 2025
SDG 1 No Poverty	1.4: MSME access to financial services & productive resources	ESMIF-based micro-MSME financing addresses financial exclusion	% MSMEs receiving financing; poverty rate reduction	Poverty: 10.74%; Min. Wage IDR 2.2M/month (rank 26/27 West Java)
SDG 8 Decent Work & Economic Growth	8.3: MSME formalization; 8.5: decent work; 8.10: financial access	GIFE platform facilitates green Islamic KUR access & green job creation	Green jobs created; MSME financing volume; revenue growth	Target 4M green jobs nationally by 2030; GRDP per capita IDR 29.27M/year
SDG 10 Reduced Inequalities	10.2: Social & financial inclusion;	Low-bandwidth & freemium architecture reduces	Islamic vs. conventional inclusion gap; %	62.14 pp inclusion gap (Islamic 12.88%

	10.3: equal opportunity	digital-financial access gap	border MSMEs served	vs. conventional 75.02%)
SDG 13 Climate Action	13.1: Climate resilience; 13.3: Mitigation capacity	GHG-based ESG scoring; fiscal incentives for verified emission reduction	CO ₂ reduction per MSME unit; % MSMEs adopting green practices	Tofu emissions: 0.35–0.5 kg CO ₂ eq/kg; palm sugar potential: 19–30 t CO ₂ /unit/year
SDG 17 Partnerships for the Goals	17.3: Diverse financial resource mobilization; 17.17: Public-private partnership	Multi-stakeholder governance: BSI, OJK, Pemda, pesantren, MSME community	Active stakeholders; collaborative financing volume; ecosystem sustainability	EKI Village Desa Jagara (OJK Cirebon, May 2026); BSI green financing +108% YoY
SDG 9 Industry, Innovation & Infrastructure	9.3: MSME financial services access; 9.c: Universal affordable ICT	Low-bandwidth offline-first platform addresses digital infrastructure gap in 10 border sub-districts	% sub-districts served; platform uptime in low-signal areas	10 border sub-districts with limited connectivity; low digital literacy

Source: Processed from UN SDGs Framework (2015), BPS Kab. Kuningan (2025), OJK-BPS SNLIK (2024), Bappenas (2025), BSI Maslahat (2026).

3. Research methodology

3.1 Research Design: Sequential Explanatory Mixed Methods

This study adopts a mixed methods design with a sequential explanatory strategy (Creswell & Plano Clark, 2018), wherein the quantitative phase is conducted first to map the magnitude and patterns of problems at the macro level, followed by the qualitative phase that provides in-depth explanation and generates model construction. The integration of both approaches enables epistemological triangulation: quantitative data provides robust structural context and empirical validation, while qualitative analysis produces a holistic, contextual, and value-nuanced design model. This strategy was selected because the complexity of the research problem encompassing economic, environmental, socio-religious, and technological dimensions simultaneously cannot be reduced to either statistical computation or descriptive narrative alone.

3.2 Data Sources and Collection

Quantitative data were obtained from twenty-five indicators sourced from seven official institutions: BPS Kabupaten Kuningan (Kuningan in Figures 2025), SNLIK OJK-BPS 2024, BSI financial reports 2024–2025, the Ministry of Finance Climate Budget Tagging Report 2025, GIFR 2023/2024, Bappenas green economy projections 2025, and operational data from Diskopdagperin Kabupaten Kuningan for November 2025. Indicators span five thematic clusters: macroeconomic profile, Islamic financial inclusion and literacy, Islamic financing ecosystem performance, MSME environmental impact and emissions, and the regulatory ecosystem.

Qualitative data were collected through four modalities: review of regulatory documents (POJK No. 51/2017, POJK No. 13/2018, and TKBI Version 2/2025); case study of the BSI Maslahat palm sugar program 2026; review of Life Cycle Assessment (LCA) literature on the local tofu industry; and documentary analysis of the Inclusive Financial Ecosystem Village (Desa EKI) program in Desa Jagara, OJK Cirebon, May 2026.

3.3 Data Analysis

Quantitative data were analyzed using descriptive statistics, gap analysis, and cross-variable comparison with a benchmarking approach against SDGs targets. The Islamic financial inclusion gap was measured against SDG 10 targets; MSME GHG emissions were positioned against Indonesia's NDC and SDG 13 targets; and green job projections were calibrated against SDG 8 targets. Qualitative data were analyzed using thematic analysis with UTAUT as the template for adoption barrier analysis, and Design Thinking as the framework for GIFE model construction. Model validation was conducted through source triangulation and comparative member checking against the BSI Maslahat empirical case study.

3.4 Conceptual Framework

The conceptual framework positions the ESG-Maqasid Syariah Integration Framework (ESMIF) as the normative foundation bridging two convergent epistemological traditions. Upon the ESMIF foundation, the GIFE model is constructed as a response to five UTAUT barrier dimensions and three layers of triple exclusion, with outputs in the form of a three-pillar ecosystem generating dual measurable impacts: improvement of Islamic financial inclusion and reduction of MSME GHG emissions. All model outputs are explicitly oriented toward the achievement of six relevant SDGs, making the SDGs both a normative evaluation framework and a KPI guide for the model.

4. Results and discussion

4.1 Economic and MSME Profile of Kuningan Regency: The Paradox of Growth and Vulnerability

Secondary data analysis from BPS Kabupaten Kuningan and Diskopdagperin reveals an economic profile characterized by a challenging paradox: impressive macro-level achievements confronting a vulnerable micro-level reality. Kuningan Regency, with a population of 1.24 million and a current-price GRDP of IDR 35.54 trillion in 2024, recorded an economic growth rate of 10.41% in Q2 2025—the highest in West Java. However, this aggregate figure conceals significant structural inequality. This paradox represents a tangible challenge to SDG 8 (inclusive growth) and SDG 10 (reduced inequalities), wherein high macro growth has not been translated into proportional welfare improvements.

Table 2. Macroeconomic and MSME Profile of Kuningan Regency (2024–2025)

Indicator	Value	Source	Year
Number of MSMEs	>65,000 units (32 sub-districts)	Diskopdagperin	Nov 2025
GRDP per capita	IDR 29.27 million/year	BPS Kab. Kuningan	2024
Total GRDP (current prices)	IDR 35.54 trillion	BPS / Databoks	2024
Economic growth rate	10.41% Q2 2025 (highest in West Java)	BPS via Pemkab	Q2 2025
District Minimum Wage 2025	IDR 2,209,519/month (rank 26/27)	West Java Governor Decree	2025
Poverty rate	10.74% of total population	BPS Kab. Kuningan	2025
Total population	1.24 million	BPS Kab. Kuningan	2024

Source: BPS Kabupaten Kuningan (2025); Diskopdagperin Kabupaten Kuningan (2025); West Java Governor Decree (2025).

The minimum wage ranking of 26th out of 27 districts/cities in West Java indicates that economic growth has not been proportionally transformed into worker welfare improvements—a concrete indication that the achievement of SDG 8.5 (decent work and equal pay) still requires systemic intervention. With a poverty rate of 10.74%, the most vulnerable segments of society are precisely the primary target of the inclusive financing model being designed—and simultaneously the group least reachable by conventional financial instruments (relevance of SDG 1.4).

4.2 Islamic Financial Inclusion Conditions: Gap Analysis and Market Potential

Data from SNLIK OJK-BPS 2024 reveals a concerning yet opportunity-opening state of Islamic financial inclusion. The 62.14-percentage-point gap between conventional inclusion (75.02%) and Islamic inclusion (12.88%) is not merely a statistical figure—it represents a systemic ecosystem failure: failure of products to meet user needs, failure of distribution to reach target communities, and failure of communication to build value-based trust. In the context of SDG 10 (Reduced Inequalities), this gap constitutes a manifestation of financial access inequality that must be addressed structurally.

Table 3. Indicators of Islamic Financial Inclusion, Literacy, and Ecosystem Performance (2024–2025)

Indicator	Value	Source	Year
National Islamic financial inclusion	12.88%	SNLIK OJK-BPS	2024
Conventional financial inclusion	75.02%	SNLIK OJK-BPS	2024
Islamic vs. conventional inclusion gap	62.14 pp	SNLIK OJK-BPS	2024
Islamic financial literacy	39.11%	SNLIK OJK-BPS	2024
Global Islamic Fintech Index rank	3rd globally	OJK-AFSI / GIFR	2023/2024
BSI total sustainable financing	IDR 72.5 trillion	IDNFinancials	Q1 2025
BSI green financing growth (YoY)	108%	Euromoney Islamic Finance	Q4 2024
BSI MSME financing	IDR 52.01 trillion	bankbsi.co.id	Jun 2025
BSI MSME customers	>347,000 (+6.28% YoY)	IDNFinancials	Q1 2025
BSI Sustainability Sukuk Tranche 2	IDR 5 trillion (oversubscribed 4.4x)	BSI, 2025	2025

Source: SNLIK OJK-BPS (2024); BSI Financial Reports (2025); Euromoney Islamic Finance (2024).

4.3 Environmental Dimension: MSME Emissions and Reduction Potential in the Context of SDG 13

The environmental dimension is the least studied aspect in the existing green Islamic fintech literature, yet it represents the core of SDG 13 (Climate Action). Data in Table 3 confirms that the emission reduction potential in the MSME sector of Kuningan Regency is not merely hypothetical. The tofu industry, with a baseline emission of 0.35–0.5 kg CO₂eq per kilogram of product, and the palm sugar sector, with a reduction potential of 19–30 tonnes of CO₂ per

business unit per year, are priority pilot candidates possessing solid data readiness and communal networks. These figures serve as the basis for establishing environmental KPIs in the ESG scoring of the GIFE platform—something absent in conventional MSME financing models and representing a concrete contribution toward Indonesia's NDC 2030 target of 31.89% emission reduction.

Table 4. Environmental Impact Indicators and MSME Emission Reduction Potential

Environmental Indicator	Value / Data	Source	SDGs Relevance	GIFE Model
National MSME GHG emissions	~216 MtCO ₂ e/year	IESR, 2024	SDG 13	Emission reduction urgency
Tofu industry emissions (Kuningan)	0.35–0.5 kg CO ₂ eq/kg product	LCA ResearchGate, 2018	SDG 13, 12	Sectoral KPI baseline
CO ₂ reduction – palm sugar	19–30 tonnes CO ₂ /unit/year	BSI Maslahat, Apr 2026	SDG 13, 15	Desa Jagara pilot KPI
CO ₂ reduction – rice straw bioenergy	~14% CO ₂ reduction	ScienceDirect, 2024	SDG 7, 13	Organic agriculture sector
Indonesia climate finance gap	~USD 240 bn to 2030 (realized 16.4%)	Kemenkeu CBT, 2025	SDG 13, 17	Green fintech capital opportunity
Indonesia NDC target 2030	31.89% emission reduction	KLHK/Kemenkeu CBT, 2025	SDG 13	Macro regulatory framework
Bank Indonesia KLM incentive	IDR 50 trillion for green financing	Bank Indonesia, Oct 2023	SDG 13, 17	Regulatory support for model
Projected green jobs from MSMEs by 2030	4 million green jobs	Bappenas, 2025	SDG 8, 1	Socioeconomic impact
Green MSME transformation value	IDR 1,596 trillion (if 20% transition)	Bappenas, 2025	SDG 8, 10, 13	Macroeconomic scale

Source: IESR (2024); ResearchGate LCA (2018); BSI Maslahat (2026); Kemenkeu CBT (2025); Bappenas (2025).

4.4 UTAUT-Based Adoption Barrier Analysis: Five Critical Dimensions

The qualitative analysis using the UTAUT framework identifies five critical barrier dimensions that collectively constitute a triple exclusion pattern among semi-rural MSMEs in Kuningan Regency. From an SDGs perspective, each barrier dimension represents a manifestation of specific SDG achievement deficits requiring systemic resolution.

Table 5. Adoption Barrier Map for Green Islamic Fintech among Kuningan MSMEs (UTAUT-SDGs Framework)

Barrier Dimension	UTAUT Construct	Level	GIFE Platform Design Solution	SDGs Affected	SDGs Indicators
Limited digital-financial literacy	Performance Expectancy	High	Integrated education module + simplified icon-and-voice interface	SDG 4, 8, 10	4.6 (adult literacy); 8.6 (productive capacity)

Digital infrastructure gap	Facilitating Conditions	High	Low-bandwidth architecture + offline-first mode + periodic sync	SDG 9, 10	9.c (universal ICT access); 10.2 (digital inclusion)
Heterogeneous maqasid comprehension	Social Influence	Medium	Ulama endorsement feature + MUI pro-environment fatwa integration	SDG 16, 17	16.7 (inclusive participation); 17.17 (effective partnerships)
Limited MSME purchasing power	Effort Expectancy	High	Freemium scheme + adoption subsidy + green Islamic KUR integration	SDG 1, 8, 10	1.4 (MSME access); 8.10 (financial services access)
Regulatory and reporting complexity	Facilitating Conditions	Medium	Automated ESG reporting + compliance checker + OJK green lane	SDG 16, 17	16.6 (transparent institutions); 17.14 (coherent policies)

Source: Processed from Venkatesh et al. (2003); Alalwan et al. (2018); Raza et al. (2019); UN SDGs Framework (2015).

4.5 GIFE Model Design: A Three-Pillar Architecture Based on SDGs

Based on the synthesis of quantitative findings from twenty-five cross-sectoral indicators and qualitative findings from the five UTAUT barrier dimensions, the Green Islamic Fintech Ecosystem (GIFE) model is designed around three mutually reinforcing pillars. Each pillar contributes to the achievement of different yet complementary SDGs, creating a solution architecture that is coherent, contextual, and oriented toward sustainable development goals.

Table 6. GIFE Model Architecture and SDGs Linkages

Pillar	Description & Foundation	Platform Implementation	SDGs Supported	Measurable SDG KPIs
VALUE (ESMIF)	Integration of Maqasid Syariah (especially hifdz al-bi'ah) with ESG as normative foundation providing dual legitimacy: sharia and sustainability	Islamic-values-based ESG scoring rubric; sector whitelist/blacklist; sharia-green certification; MUI fatwa integration; ulama endorsement	SDG 13 (climate), SDG 16 (governance), SDG 17 (partnerships)	% MSME emission reduction; avg. ESG score; no. sharia-green certifications
TECHNOLOGY (Digital Platform)	Integrated digital platform: alternative data credit scoring + simple ESG assessment + mobile sustainability reporting	Low-bandwidth architecture; credit scoring engine; ESG module (photo + voice input); TKBI-compliant reporting dashboard; BSI & OJK sandbox API; offline-first mode	SDG 9 (innovation), SDG 10 (digital inclusion), SDG 8 (financial access)	% border MSMEs served; platform adoption rate; digital financing volume
ECOSYSTEM (Institutional Network)	Multi-stakeholder institutional network: BSI–OJK–Pemda–	Multi-stakeholder governance model; Desa EKI Desa Jagara pilot program; pesantren-based	SDG 1 (poverty), SDG 8 (growth), SDG 17 (partnerships)	No. active MSMEs in ecosystem; poverty rate

	pesantren–majelis taklim–MSME community in participatory trust-based governance	trust-building mechanism; ESG achievement gamification; performance-based profit-sharing incentive scheme		reduction; no. active stakeholders
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Source: Processed from research findings and UN SDGs Framework (2015).

The value pillar positions ESMIF as the normative foundation providing dual legitimacy—sharia and sustainability—to all platform components. ESMIF operationalizes hifdz al-bi'ah through measurable ESG indicators: GHG emissions per unit of MSME output (baseline for the tofu industry at 0.35–0.5 kg CO₂eq per kilogram of product), renewable versus fossil energy consumption, and production waste management. The resulting ESG scoring functions not merely as a passive reporting instrument but as an active determinant in financing access decisions, profit-sharing ratio, and fiscal incentive eligibility—creating a market mechanism that internalizes environmental values into the economic calculations of MSMEs, consistent with SDG 13.3 on enhancing climate change mitigation capacity.

The technology pillar integrates three main modules in a mobile interface designed for low-literacy users. The alternative data-based credit scoring engine—drawing on digital transaction history, community track records, and informal payment patterns—enables MSMEs without formal credit histories to access financing, translating SDG 1.4 and SDG 8.10 targets into concrete technical features. The ESG assessment module with photo and voice input overcomes text literacy barriers, supporting SDG 4 (Quality Education) through a technology-based andragogical approach. The reporting dashboard that automates sustainability reporting in compliance with TKBI standards supports SDG 16.6 on transparent and accountable institutions.

The ecosystem pillar designs multi-stakeholder governance that positions the pesantren network as the community anchor. The governance model involving BSI (institutional financier), OJK Cirebon (sandbox regulator), Kuningan Regency Government (policy champion), pesantren and majelis taklim (distribution channels), and MSME communities (active prosumers) represents a concrete realization of SDG 17.17 on effective public-private partnerships. Desa Jagara as an EKI Village (OJK Cirebon, May 2026) was selected as the pilot locus because it possesses a cohesive community-based MSME ecosystem and a verified palm sugar emission reduction potential.

4.6 Policy Implications: Four Operational Recommendations Based on SDGs

The GIFE model generates four complementary operational policy recommendations that collectively form a conducive regulatory ecosystem for model implementation, while contributing to SDGs achievement.

The first recommendation addresses regulatory harmonization (SDG 16.3 and SDG 17.14). POJK No. 51/2017 needs to be harmonized with TKBI Version 2 (2025), supplemented by an operational definition of 'green MSME' that is currently absent from any regulation. This definitional gap creates legal uncertainty that impedes product development and incentive access. The automated compliance checker feature in the GIFE platform can serve as a technical reference for OJK.

The second recommendation calls for the establishment of a green Islamic fintech innovation sandbox (SDG 9.3 and SDG 17.17). POJK No. 13/2018 needs to be supplemented with a dedicated green lane for Islamic fintech platforms serving MSMEs in emissions-intensive sectors. This green lane needs to offer simplified registration procedures, proportional

capital requirements, and longer trial periods to enable medium-term environmental impact measurement.

The third recommendation advocates for an integrated mentoring program (SDG 4.6 and SDG 8.6). A tripartite collaboration between Kuningan Regency Government, BSI, and OJK Cirebon is needed for a program that simultaneously integrates Islamic financial literacy, digital literacy, and sustainability knowledge. This program should be implemented through the pesantren network, with a pilot in Desa Jagara in 2026 serving as a proof of concept.

The fourth recommendation proposes an emission-based local fiscal incentive scheme (SDG 13 and SDG 17.3). The Kuningan Regency Government needs to explore mechanisms for local tax reductions and business levies for MSMEs that can demonstrate verified emission reductions through the GIFE platform. Integration of the GIFE emission verification feature with the local taxation system (Bapenda) could create evidence-based incentives that reinforce the region's fiscal commitment to Indonesia's NDC 2030 targets.

5. Conclusion

This study has designed and conceptually validated the Green Islamic Fintech Ecosystem (GIFE) model as a response to two simultaneous and interrelated crises: the Islamic financial inclusion deficit (a 62.14-percentage-point gap between conventional inclusion at 75.02% and Islamic inclusion at 12.88%) and the environmental crisis (national MSME sector GHG emissions of 216 MtCO_{2e} per year amid a USD 240 billion climate finance gap). Within a broader frame, both crises represent tangible barriers to SDGs achievement, particularly SDG 1, 8, 10, 13, and 17.

The GIFE model, built upon three mutually reinforcing pillars—values through ESMIF, technology through an integrated digital platform, and ecosystem through a multi-stakeholder institutional network—offers a solution architecture that is coherent, contextual, and SDGs-oriented. Five adoption barrier dimensions (literacy, infrastructure, Maqasid comprehension, purchasing power, and regulation) identified through the UTAUT framework have been translated directly into concrete and measurable design features, with explicit mapping to specific SDGs targets.

Key research findings include: (1) identification of the triple exclusion pattern as a systemic barrier for semi-rural MSMEs; (2) empirical validation of the viability of Islamic green instruments through BSI's performance (green financing +108% YoY and 4.4x sukuk oversubscription); (3) the ESMIF design as a normative integration framework that operationalizes *hifdz al-bi'ah* into measurable ESG indicators; (4) four operational policy recommendations spanning regulatory, programmatic, and fiscal dimensions; and (5) comprehensive mapping of the GIFE model's linkages with SDG 1, 4, 8, 9, 10, 13, 16, and 17.

The theoretical contribution of this research lies in the development of ESMIF as a new integration framework bridging Islamic finance epistemology and sustainability science in an operationalizable construct—with the SDGs as both the normative evaluation framework and the KPI guide for the model. The potential impact of the model encompasses 4 million green jobs by 2030, a green MSME transformation economic value of IDR 1,596 trillion if 20% of national MSMEs transition, and a measurable contribution toward Indonesia's NDC 2030 target of 31.89% emission reduction.

This study carries methodological limitations in its reliance on secondary data and the absence of empirical field testing. Further research is recommended for: development and testing of a prototype within the OJK sandbox; primary survey-based quantitative studies to directly measure UTAUT constructs; impact evaluation of the Desa Jagara pilot program in

2026–2027; and comparative analysis of the GIFE model against green Islamic fintech ecosystems in Malaysia, the United Arab Emirates, and Bangladesh to enrich cross-contextual validation.

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References

- Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2018). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management*, 37(3), 99–110. <https://doi.org/10.1016/j.ijinfomgt.2017.01.002>
- Asian Development Bank (ADB). (2021). *Greening micro, small, and medium-sized enterprises: A guide to green finance for development financial institutions*. ADB.
- Auda, J. (2008). *Maqasid Al-Shariah as philosophy of Islamic law: A systems approach*. International Institute of Islamic Thought.
- Badan Pusat Statistik Kabupaten Kuningan. (2025). *Kabupaten Kuningan dalam angka 2025 [Kuningan in Figures 2025]*. BPS Kabupaten Kuningan.
- Bappenas. (2025). *Green economy projection for Indonesian MSMEs 2030*. Badan Perencanaan Pembangunan Nasional.
- Bank Indonesia. (2023, October). *Macroprudential liquidity incentive policy (KLM) for green financing*. Bank Indonesia.
- Bank Syariah Indonesia. (2025). *Quarterly financial report Q1 2025*. PT Bank Syariah Indonesia Tbk.
- Bloomberg Intelligence. (2023). *ESG assets may hit \$53 trillion by 2025, a third of global AUM*. Bloomberg.
- BSI Maslahat. (2026, April). *Sustainable palm sugar program: Environmental impact report*. Yayasan BSI Maslahat.
- Chapra, M. U. (2008). *The Islamic vision of development in the light of Maqasid al-Shariah*. Islamic Research and Training Institute, IDB.
- Climate Bonds Initiative. (2023). *Green sukuk global market report 2022*. Climate Bonds Initiative.
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.
- Dinas Koperasi, Perdagangan, dan Perindustrian Kabupaten Kuningan. (2025, November). *MSME data of Kuningan Regency 2025*. Diskopdagperin Kab. Kuningan.
- Ding, N., Zheng, S., & Sun, X. (2022). The role of fintech in promoting green finance. *Frontiers in Environmental Science*, 10, 916988. <https://doi.org/10.3389/fenvs.2022.916988>
- Euromoney Islamic Finance. (2024). *BSI green financing report 2024*. Euromoney.
- Institute for Essential Services Reform (IESR). (2024). *GHG emissions of Indonesia's MSME sector 2024*. IESR.

- International Finance Corporation (IFC). (2021). MSME finance gap 2020: Assessment of the shortfalls and opportunities in financing MSMEs in emerging markets. IFC World Bank Group.
- Kementerian Keuangan RI. (2025). Climate budget tagging report 2025: Indonesia's climate finance progress. Ministry of Finance of the Republic of Indonesia.
- Kementerian Lingkungan Hidup dan Kehutanan (KLHK). (2025). Nationally determined contribution (NDC) Indonesia: Updated 2030 target. Ministry of Environment and Forestry.
- Maarif, M. S., Nugroho, A., & Hafiz, A. (2025). ESG-Maqasid Syariah integration in Islamic financial institutions: A conceptual framework. *Journal of Islamic Finance*, 14(1), 45–62.
- Nugroho, A., Maarif, M. S., & Pratama, D. (2025). Hifdz al-bi'ah as the sixth maqasid: Contemporary fiqh study and its implications for Islamic green finance. *Journal of Islamic Economics*, 16(2), 112–134.
- OJK-AFSI. (2024). Global Islamic fintech report 2023/2024. Otoritas Jasa Keuangan & Asosiasi Fintech Syariah Indonesia.
- Otoritas Jasa Keuangan. (2017). POJK No. 51/POJK.03/2017 on the implementation of sustainable finance for financial service institutions, issuers, and public companies. OJK.
- Otoritas Jasa Keuangan. (2018). POJK No. 13/POJK.02/2018 on digital financial innovation in the financial services sector. OJK.
- Otoritas Jasa Keuangan & BPS. (2024). National survey on financial literacy and inclusion (SNLIK) 2024. OJK.
- Otoritas Jasa Keuangan. (2025). Indonesian sustainable finance taxonomy (TKBI) version 2. OJK.
- Ozili, P. K. (2022). Financial inclusion and sustainable development: A review and research agenda. *Sustainable Development*, 30(5), 1003–1013. <https://doi.org/10.1002/sd.2245>
- Raza, S. A., Umer, A., Qureshi, M. A., & Dahri, A. S. (2019). Internet banking and mobile banking consumers' perception in Pakistan: A study of branchless banking. *International Journal of Bank Marketing*, 37(2), 467–488.
- ResearchGate. (2018). Life cycle assessment of tofu production in Kuningan, West Java: Environmental impact analysis. *Environmental Science and Technology Research*, 12(3), 78–91.
- ScienceDirect. (2024). Rice straw bioenergy and CO₂ emission reduction potential in Indonesia's agricultural sector. *Renewable and Sustainable Energy Reviews*, 189, 113892.
- United Nations. (2015). Transforming our world: The 2030 agenda for sustainable development. United Nations General Assembly Resolution A/RES/70/1.
- United Nations Development Programme (UNDP). (2023). SDG integration in Islamic finance: Opportunities and pathways for OIC member states. UNDP.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>