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Regulatory sandboxes for Islamic fintech: A maqasid-based comparison of Indonesia, Malaysia, and the United Kingdom

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Abstract
Regulatory sandbox (ruang uji coba terencana) telah menjadi mekanisme penting untuk memfasilitasi inovasi teknologi keuangan (fintech) sekaligus mempertahankan pengawasan regulator, manajemen risiko, dan perlindungan konsumen. Fintech syariah menghadirkan tantangan regulasi tambahan karena produk inovatif harus mematuhi tidak hanya persyaratan keuangan dan teknologi, tetapi juga prinsip-prinsip substansial syariah. Penelitian ini mengkaji bagaimana kepatuhan syariah dapat diintegrasikan ke dalam kerangka kerja regulatory sandbox di Indonesia, Malaysia, dan Inggris, serta mengidentifikasi pelajaran institusional untuk memperkuat kerangka kerja di Indonesia. Penelitian ini menggunakan metode penelitian hukum normatif dengan pendekatan perundang-undangan, komparatif, dan konseptual. Perbandingan berfokus pada dasar hukum pelaksanaan sandbox, otoritas pengatur yang berwenang, mekanisme pengujian, perlindungan konsumen, pengaturan tata kelola syariah, tahapan masuknya pertimbangan syariah dalam proses sandbox, serta implikasi pasca-pengujian. Dimensi-dimensi ini dievaluasi melalui kerangka maqasid al-shariah, khususnya hifz al-din (memelihara agama), hifz al-mal (memelihara harta), dan hifz al-'aql (memelihara akal). Temuan penelitian menunjukkan bahwa isu regulasi yang krusial bukanlah sekadar apakah suatu yurisdiksi memiliki regulatory sandbox dan otoritas syariah, melainkan apakah penilaian syariah terhubung secara prosedural pada tahap penerimaan, pengujian, pemantauan, modifikasi, dan pengeluaran dari eksperimentasi sandbox. Malaysia menyediakan arsitektur kelembagaan pendukung terkuat untuk tata kelola syariah, sementara Inggris menawarkan model eksperimentasi terstruktur dan pembelajaran regulasi yang berpengaruh. Indonesia memiliki kerangka kerja sandbox yang semakin terstruktur serta ekosistem tata kelola syariah yang mapan, namun antarmuka prosedural antara kedua sistem ini belum terformalisasi dengan memadai. Oleh karena itu, penelitian ini mengusulkan pembentukan Joint Fintech Shariah Desk (Desk Bersama Fintech Syariah) yang dikoordinasikan antara OJK dan DSN-MUI, serta penyusunan Shariah Sandbox Guidelines (Panduan Sandbox Syariah) untuk memfasilitasi penilaian syariah secara preventif terkait struktur akad/kontrak, mekanisme penetapan harga, alokasi risiko, pengambilan keputusan berbasis algoritma, keterbukaan informasi kepada konsumen, dan tata kelola data.

Keywords: regulatory sandbox, fintech syariah, tata kelola syariah, maqasid al-shariah, kecerdasan buatan (artificial intelligence), hukum komparatif

Abstract
Regulatory sandboxes have become an important mechanism for facilitating financial technology innovation while maintaining regulatory oversight, risk management, and consumer protection. Islamic fintech introduces an additional regulatory challenge because innovative products must comply not only with financial and technological requirements but also with substantive Shariah principles. This study examines how Shariah compliance can be integrated into regulatory sandbox

frameworks in Indonesia, Malaysia, and the United Kingdom and identifies institutional lessons for strengthening the Indonesian framework. This study employs normative legal research using statutory, comparative, and conceptual approaches. The comparison focuses on the legal basis of sandboxing, competent regulatory authority, testing mechanisms, consumer safeguards, Shariah governance arrangements, the stage at which Shariah considerations may enter the sandbox process, and post-testing implications. These dimensions are evaluated through the maqasid al-shariah framework, particularly hifz al-din, hifz al-mal, and hifz al-'aql. The findings demonstrate that the decisive regulatory issue is not merely whether a jurisdiction possesses both a regulatory sandbox and a Shariah authority, but whether Shariah assessment is procedurally connected to the admission, testing, monitoring, modification, and exit stages of sandbox experimentation. Malaysia provides the strongest surrounding institutional architecture for Shariah governance, while the United Kingdom offers an influential model of structured experimentation and regulatory learning. Indonesia possesses both an increasingly structured sandbox framework and an established Shariah governance ecosystem, but the procedural interface between these systems remains insufficiently formalised. This study therefore proposes a Joint Fintech Shariah Desk coordinated between OJK and DSN-MUI and the development of Shariah Sandbox Guidelines to facilitate preventive Shariah assessment concerning contractual structures, pricing mechanisms, risk allocation, algorithmic decision-making, consumer disclosure, and data governance.

***Keywords**: regulatory sandbox, Islamic fintech, Shariah governance, maqasid al-shariah, artificial intelligence, comparative law*

1. Introduction

The rapid development of financial technology has transformed the provision of financial services while simultaneously challenging conventional regulatory approaches. Digital platforms, automated decision-making, alternative financing models, artificial intelligence, machine learning, and data-driven financial services increasingly develop at a pace that may exceed the capacity of traditional licensing and supervisory mechanisms. These developments have encouraged financial regulators to adopt more adaptive regulatory instruments capable of facilitating innovation without compromising financial stability, market integrity, consumer protection, and regulatory accountability.

One of the most prominent mechanisms developed in response to this challenge is the regulatory sandbox. A regulatory sandbox enables innovative financial products, services, technologies, and business models to be tested within a controlled environment under regulatory supervision before broader market deployment. The United Kingdom's Financial Conduct Authority pioneered this institutional approach through Project Innovate, with its Regulatory Sandbox opening for applications in 2016 (Authority, 2015). Subsequent experience has shown that a sandbox is not merely a mechanism for providing temporary regulatory flexibility. It can also facilitate interaction between regulators and innovators, reduce regulatory uncertainty, support regulatory learning, and potentially improve market access and access to external financing for participating firms (Cornelli et al., 2024; Goo & Heo, 2020; Truby, 2020).

The regulatory challenge becomes more complex when sandbox experimentation concerns Islamic fintech. Unlike conventional fintech, Islamic fintech is expected to satisfy both general financial regulatory requirements and substantive Shariah principles governing financial transactions. Compliance therefore extends beyond technological reliability, licensing, cybersecurity, risk management, and consumer protection to include the prohibition of riba, gharar, and maysir, the validity of contractual structures, the fairness of risk allocation,

and the substantive economic characteristics of transactions. Muryanto et al. (2022) identify Shariah compliance, regulatory coordination, consumer protection, and institutional supervision as important legal challenges in the development of Islamic fintech in Indonesia. Fidhayanti et al. (2024) similarly demonstrate that the Indonesian Islamic fintech ecosystem continues to face regulatory fragmentation and requires stronger coordination among regulators, Shariah institutions, and industry participants.

These characteristics indicate that a conventional regulatory sandbox may be insufficient when its assessment focuses primarily on technological feasibility, business viability, and conventional financial risks. A fintech product may formally employ a recognised Islamic contract while relying on technological mechanisms that influence the substantive allocation of risk, pricing, disclosure, or decision-making. Artificial intelligence and machine learning make this issue particularly significant because automated models may affect customer eligibility, investment recommendations, risk classifications, financing limits, pricing, fees, and other economically significant outcomes. Algorithmic opacity, biased data, and inadequate explanation may therefore introduce forms of uncertainty that require examination alongside the formal contractual architecture of an Islamic financial product.

This challenge acquires further importance when viewed through maqasid al-shariah. A Shariah-compliant regulatory framework should not be confined to formal conformity with contractual requirements but should also assess whether financial innovation protects legitimate interests and prevents harm. In this study, hifz al-din provides a normative basis for preserving the Shariah integrity of financial products and their technological implementation. Hifz al-mal concerns the protection of consumers' and investors' property against exploitation, prohibited transactions, excessive uncertainty, unfair loss, and technology-related financial harm. Hifz al-'aql provides a normative foundation for transparency, intelligibility, disclosure, financial literacy, and informed decision-making. Saputro et al. (2025) demonstrate the broader relevance of maqasid al-shariah as substantive criteria for evaluating whether legal arrangements generate economic justice rather than merely formal compliance (Saputro et al., 2025). In the more specific context of Islamic fintech, Abdullah and Isman (2026) identify emerging concerns involving algorithmic opacity, digital gharar, data governance, and the potential Shariah implications of technology-based risk assessment.

Indonesia, Malaysia, and the United Kingdom provide particularly useful jurisdictions for examining this issue because they represent different regulatory and institutional configurations. Indonesia has strengthened its financial technology framework through Law No. 4 of 2023 on Financial Sector Development and Strengthening, commonly referred to as the UU P2SK, together with its implementing regulations, particularly OJK Regulation No. 3 of 2024 on the Implementation of Financial Sector Technological Innovation and OJK Circular Letter No. 5/SEOJK.07/2024 on the Mechanism for the Regulatory Sandbox and Innovation Development (Keuangan, 2024b). These instruments provide a more structured basis for the testing and development of financial-sector technological innovations and address matters concerning applications, testing, monitoring, reporting, sandbox outcomes, consumer protection, and subsequent regulatory processes.

Indonesia nevertheless operates within a distinctive Shariah governance environment. The Financial Services Authority, or Otoritas Jasa Keuangan (OJK), exercises regulatory and supervisory functions within the financial-services sector, while the National Sharia Council of the Indonesian Ulema Council, or Dewan Syariah Nasional-Majelis Ulama Indonesia (DSN-

MUI), performs an important normative role in developing Shariah principles and fatwas relevant to Islamic financial activities (Keuangan, 2024a). The coexistence of these institutions does not automatically mean that the general ITSK regulatory sandbox includes a formal mechanism through which Shariah assessment is conducted at every stage of experimentation. This institutional relationship therefore provides an important basis for examining how Shariah considerations might be integrated more systematically into the sandbox process.

Malaysia provides a contrasting institutional configuration. Bank Negara Malaysia introduced its Financial Technology Regulatory Sandbox in 2016 and enhanced the framework in February 2024 (Malaysia, 2024). The revised framework incorporates both a Standard Sandbox and a Green Lane intended for eligible financial institutions with established risk-management capabilities. The Malaysian sandbox operates within a broader Islamic financial legal framework supported by the Islamic Financial Services Act 2013 and the institutional authority of the Shariah Advisory Council of Bank Negara Malaysia. Malaysia is therefore relevant not because it necessarily operates a separate sandbox exclusively for Islamic fintech, but because financial innovation occurs within a comparatively institutionalised Shariah governance environment.

The United Kingdom offers a different benchmark. The FCA Regulatory Sandbox does not incorporate a national Shariah supervisory authority comparable to those operating in Indonesia or Malaysia. Its value for this study instead lies in its structured approach to regulatory experimentation. The FCA assesses sandbox applications with reference to regulatory scope, genuine innovation, consumer benefit, readiness for testing, and the need for regulatory support. The United Kingdom therefore serves primarily as a functional benchmark for sandbox architecture, regulatory dialogue, consumer safeguards, testing methodology, and regulatory learning rather than as a model of national Shariah governance. Existing scholarship has addressed important aspects of these issues, but a more specific analytical gap remains. Studies of regulatory sandboxes have predominantly focused on their role in promoting innovation, improving access to finance, reducing regulatory barriers, and encouraging regulatory experimentation (Cornelli et al., 2024; Goo & Heo, 2020; Truby, 2020). Studies of Islamic fintech regulation have examined Shariah compliance, institutional supervision, regulatory fragmentation, and the need for more coherent legal frameworks (Fidhayanti et al., 2024; Muryanto et al., 2022). More specifically, Muryanto (2023) comparatively examines Shariah-compliance regulation and supervision in Indonesia, Malaysia, and the United Kingdom and demonstrates the importance of supportive regulation, Shariah supervisory institutions, and clearer governance standards.

The present study differs from those earlier studies by shifting the unit of analysis from the general regulatory environment of Islamic fintech to the procedural lifecycle of the regulatory sandbox itself. The central question is therefore not simply whether a Shariah governance institution exists in a particular jurisdiction, but where, when, how, and with what regulatory consequence Shariah considerations can enter the sandbox process. The analysis focuses particularly on application and admission, testing-plan design, live experimentation, monitoring, modification of products or technological systems, and final sandbox exit. The use of maqasid al-shariah further enables the study to assess whether these processes support Shariah integrity, financial protection, transparency, and informed decision-making.

This procedural orientation constitutes the principal novelty of the study. Malaysia is used primarily as a benchmark for a regulatory environment characterised by strong institutionalised Shariah governance. The United Kingdom is employed as a benchmark for

structured sandbox experimentation and regulatory learning. Indonesia serves as the principal jurisdiction in which lessons from these different models are evaluated and adapted. The comparison does not therefore presume complete equivalence among the three jurisdictions, but instead seeks to identify institutional components that can inform the development of a more integrated Indonesian regulatory approach.

Accordingly, this study aims to compare the design and operation of regulatory sandboxes relevant to Islamic fintech in Indonesia, Malaysia, and the United Kingdom, to evaluate the extent to which Shariah considerations can be integrated into these regulatory structures through the maqasid al-shariah dimensions of hifz al-din, hifz al-mal, and hifz al-'aql, and to formulate operational recommendations for strengthening the Indonesian sandbox framework through a more explicit interface between financial regulation and Shariah governance.

2. Method

a. Research design and legal materials

This study employs normative legal research using statutory, comparative, and conceptual approaches. The statutory approach is used to examine legislation, regulatory instruments, sandbox frameworks, and official regulatory documents governing financial technology innovation and Shariah governance in Indonesia, Malaysia, and the United Kingdom. The comparative approach is applied to identify similarities, differences, institutional functions, and regulatory practices that may be relevant across jurisdictions. The conceptual approach employs maqasid al-shariah as an evaluative framework for examining the substantive implications of sandbox design for Shariah integrity, financial protection, transparency, and informed decision-making.

The selection of Indonesia, Malaysia, and the United Kingdom is purposive. Indonesia is examined as the primary jurisdiction for regulatory reform because it combines an increasingly structured financial technology regulatory framework with a distinctive institutional relationship between OJK and DSN-MUI. Malaysia represents a comparatively institutionalised Shariah governance environment within Islamic finance. The United Kingdom is included as a functional regulatory benchmark because the FCA pioneered the modern sandbox model and has developed a structured architecture for eligibility assessment, controlled testing, consumer safeguards, and regulatory learning despite the absence of a national Shariah supervisory authority.

The primary legal materials used in the Indonesian analysis consist principally of Law No. 4 of 2023 on Financial Sector Development and Strengthening, OJK Regulation No. 3 of 2024 on the Implementation of Financial Sector Technological Innovation, and OJK Circular Letter No. 5/SEOJK.07/2024 on the Mechanism for the Regulatory Sandbox and Innovation Development. The Malaysian analysis refers primarily to the Financial Technology Regulatory Sandbox Framework of Bank Negara Malaysia, the Islamic Financial Services Act 2013, and the Central Bank of Malaysia Act 2009 (Central Bank of Malaysia Act 2009 (Act 701), 2009). The United Kingdom analysis relies on official FCA regulatory sandbox documents and eligibility criteria. Secondary materials consist of peer-reviewed journal articles and scholarly publications addressing regulatory sandboxes, Islamic fintech, Shariah governance, artificial intelligence-related financial risks, comparative financial regulation, and maqasid al-shariah.

b. Comparative and maqasid-based analytical framework

The comparative analysis is structured around a common set of legal and institutional dimensions in order to avoid merely describing the three jurisdictions separately. The analysis considers the legal basis of the sandbox, the competent regulatory authority, the scope and mechanisms of testing, consumer and risk safeguards, the institutional arrangements for Shariah supervision, the stage at which Shariah considerations can enter the regulatory process, the regulatory significance of Shariah determinations, and the post-testing implications of sandbox participation. These dimensions enable the three jurisdictions to be evaluated through equivalent functional questions even though their broader legal and institutional systems differ.

The comparison is subsequently interpreted through hifz al-din, hifz al-mal, and hifz al-'aql. Hifz al-din is used to assess whether the regulatory architecture provides mechanisms capable of preserving the substantive Shariah integrity of innovative financial products. The assessment therefore extends beyond contractual terminology to consider whether pricing, risk allocation, automated decision-making, and other technological mechanisms may affect the Shariah character of a transaction. Hifz al-mal is employed to assess how sandbox mechanisms protect consumers' and investors' financial interests against prohibited transactions, unfair loss, excessive uncertainty, misleading pricing, inaccurate or discriminatory risk assessment, and other technology-related harms. Hifz al-'aql is used to evaluate transparency, intelligibility, disclosure, explainability, and informed decision-making, particularly where algorithmic systems materially influence financial outcomes.

The study focuses on these three dimensions because they correspond most directly to the regulatory issues under examination. The decision not to use hifz al-nafs and hifz al-nasl as primary analytical dimensions does not suggest that they are irrelevant within the broader theory of maqasid al-shariah. Rather, the study adopts a functional selection based on the close relationship between its research questions and the protection of Shariah integrity, financial interests, and informed understanding.

c. Analytical procedure

The analysis begins by identifying and classifying the primary legal and regulatory materials according to their legal status, institutional authority, substantive scope, and relevance to sandbox experimentation. The legal frameworks are then mapped according to equivalent stages of the regulatory sandbox lifecycle, including application, admission, design of testing parameters, live testing, monitoring, material modification, final evaluation, and exit. This lifecycle-based analysis is important because innovative financial products may change during the testing process, meaning that regulatory and Shariah risks cannot necessarily be identified through a single assessment conducted only at the beginning or end of experimentation.

The comparative findings are subsequently evaluated through the three selected maqasid dimensions to determine whether each regulatory arrangement provides institutional space for Shariah integrity, protection from financial harm, and meaningful transparency. The final analytical stage synthesises the comparative findings to formulate recommendations for Indonesia. These recommendations distinguish clearly between the existing regulatory framework and the institutional model proposed by this study. The proposed Joint Fintech Shariah Desk and Shariah Sandbox Guidelines are therefore normative recommendations and should not be interpreted as descriptions of institutions or procedures that already exist within the current Indonesian framework.

The study employs qualitative legal interpretation and comparative legal synthesis rather than statistical analysis. The specific Islamic fintech use-cases introduced in the discussion are analytical illustrations designed to demonstrate how technology can generate Shariah-relevant risks during sandbox testing. They do not represent empirical case studies of particular fintech companies or sandbox participants..

3. Results and Discussion

a. Comparative design of regulatory sandboxes and Shariah Governance Integration

The comparative analysis demonstrates that Indonesia, Malaysia, and the United Kingdom share a common regulatory rationale in using sandboxes to facilitate controlled experimentation while maintaining oversight and reducing risks to consumers and the financial system. Nevertheless, important differences exist in the legal architecture of the sandbox, the intensity of regulatory interaction, and the institutional relationship between financial innovation and Shariah governance.

In Indonesia, the current regulatory framework for sandbox testing is principally based on Law No. 4 of 2023, OJK Regulation No. 3 of 2024, and OJK Circular Letter No. 5/SEOJK.07/2024. OJK Regulation No. 3 of 2024 replaced the earlier framework under OJK Regulation No. 13/POJK.02/2018 and positioned regulatory sandboxing within the broader governance of Financial Sector Technological Innovation (Law No. 4 of 2023 on Financial Sector Development and Strengthening, 2023). The framework represents a development from an innovation-registration orientation toward a more structured system involving testing, supervision, consumer protection, risk management, monitoring, and follow-up regulatory processes.

SEOJK No. 5/SEOJK.07/2024 provides more detailed procedural mechanisms regarding sandbox participation. It addresses applications to become sandbox participants, document verification and analysis, decisions concerning admission, testing and development, reporting obligations, monitoring, cancellation of participation, final sandbox reports, sandbox outcomes, and procedural workflow. The existence of these identifiable procedural stages is significant because it creates specific points at which Shariah-related assessment could potentially be incorporated without requiring the construction of an entirely separate sandbox system.

Malaysia adopts a similarly controlled-testing approach but differentiates its institutional model through the Standard Sandbox and Green Lane. The Standard Sandbox maintains the conventional application and testing pathway, whereas the Green Lane provides an accelerated mechanism for eligible financial institutions that possess established institutional capacity and risk-management systems. This differentiation suggests a relatively mature regulatory environment in which regulatory intervention can be adjusted according to the characteristics and risk profile of the applicant.

The United Kingdom provides a particularly influential model of structured sandbox experimentation. The FCA assesses applicants by considering whether the proposed innovation falls within its regulatory scope, constitutes genuine innovation, generates identifiable consumer benefit, is sufficiently developed to be ready for testing, and demonstrates a genuine need for regulatory support. These eligibility criteria illustrate how a regulatory sandbox may operate as a structured process rather than as a general regulatory exemption. The UK experience also demonstrates the importance of

clearly defining test objectives, consumer safeguards, regulatory engagement, and exit pathways.

Previous research supports the broader significance of these institutional characteristics. Goo and Heo (2020) explain that regulatory sandboxes can reduce barriers to fintech experimentation, while Cornelli et al. (2024) demonstrate that participation in the UK sandbox is associated with improved access to external financing and stronger firm survival. Truby (2020) similarly emphasises that an advanced regulatory sandbox should generate regulatory learning rather than simply provide temporary regulatory relief.

These regulatory benefits nevertheless do not fully resolve the problem of Islamic fintech. A sandbox may provide effective technological testing and regulatory flexibility while leaving unanswered whether an innovation remains substantively consistent with Shariah principles. Consequently, the adequacy of an Islamic fintech sandbox depends both on the quality of the general testing architecture and on the existence of an institutional mechanism that enables Shariah considerations to influence relevant regulatory decisions throughout experimentation.

Indonesia possesses an established institutional infrastructure for Islamic financial governance involving both OJK and DSN-MUI. The existence of these institutions provides a significant normative and regulatory foundation for Islamic finance. However, the present ITSK sandbox regulations do not expressly institutionalise DSN-MUI or another specialised Shariah assessment mechanism throughout every stage of sandbox admission, testing, monitoring, material modification, and exit.

The central regulatory issue is therefore not the absence of Shariah norms in Indonesia. Rather, the problem lies in the absence of an explicit procedural interface between the general sandbox mechanism and the institutions capable of providing Shariah expertise. This distinction is particularly important because a fintech product may change substantially during experimentation. A product may initially rely on one contractual structure but subsequently modify its pricing model, algorithm, consumer interface, data sources, risk classification method, or other technological processes during live testing.

This finding develops the concerns identified in previous scholarship. Muryanto et al. (2022) emphasise Shariah compliance and regulatory coordination as important challenges in Indonesian Islamic fintech, while Fidhayanti et al. (2024) identify continuing regulatory fragmentation. The present analysis demonstrates that this fragmentation has a specific procedural significance in a regulatory sandbox. If Shariah assessment occurs only after technological architecture and commercial processes have been substantially finalised, Shariah compliance becomes corrective rather than preventive. Such an arrangement increases the possibility that an innovation considered technologically successful may later require substantial redesign because of unresolved Shariah concerns.

Malaysia presents a different institutional configuration. Its regulatory advantage does not necessarily result from the operation of a separate regulatory sandbox exclusively for Islamic fintech. Rather, sandbox experimentation takes place within a broader legal system in which Shariah governance has a comparatively strong statutory foundation. The Islamic Financial Services Act 2013 establishes substantive Shariah-compliance obligations for Islamic financial institutions within its scope, while the Shariah Advisory Council of Bank Negara Malaysia occupies an authoritative position within the

broader institutional structure of Islamic finance (Islamic Financial Services Act 2013 (Act 759), 2013).

The Malaysian position should nevertheless be interpreted carefully. The existence of a central Shariah authority does not necessarily mean that every sandbox participant receives a separate SAC determination at every stage of experimentation. The relevant institutional advantage is instead that the sandbox operates within a regulatory environment in which Shariah compliance possesses formal legal and institutional significance. Laldin and Furqani (2018) similarly demonstrate that Malaysia's statutory framework provides a strong legal basis for ensuring Shariah compliance in Islamic financial activities (Laldin & Furqani, 2018).

This distinction has an important comparative implication. An effective Islamic fintech sandbox does not necessarily require a completely independent sandbox exclusively dedicated to Shariah-compliant innovation. A general financial technology sandbox may remain appropriate when it is institutionally connected to mechanisms capable of identifying, examining, and resolving Shariah questions arising during innovation testing.

The United Kingdom represents a substantially different model. FCA sandbox participation is not differentiated according to the religious or Shariah character of an innovation, and the FCA framework does not incorporate a national Shariah authority. Islamic financial institutions operating within the UK may establish their own Shariah supervisory arrangements, but these operate at the level of individual institutions rather than as a national public mechanism integrated into the sandbox process.

The UK model is therefore highly valuable as a benchmark for regulatory experimentation, structured testing, consumer benefit, regulatory dialogue, readiness assessment, and regulatory learning. However, it cannot be directly adopted as a model of Shariah governance. Muryanto (2023) similarly identifies important differences in Shariah supervision among Indonesia, Malaysia, and the United Kingdom (Muryanto, 2023). The relevant lesson from the UK is consequently institutional methodology rather than Shariah governance architecture.

Berikut adalah tabel komparatif yang disajikan secara terstruktur dan rapi berdasarkan data yang Anda berikan:

Tabel 1. Karakteristik Komparatif Regulasi dan Tata Kelola Syariah

Parameter Komparatif	Indonesia	Malaysia	Inggris (United Kingdom)
Kerangka Utama *Sandbox*	UU No. 4/2023, POJK No. 3/2024, dan SEOJK No. 5/SEOJK.07/2024	BNM Financial Technology Regulatory Sandbox Framework 2024	FCA Regulatory Sandbox
Otoritas Regulator	OJK (Otoritas Jasa Keuangan)	Bank Negara Malaysia (BNM)	Financial Conduct Authority (FCA)
Orientasi Pengujian	Pengujian dan pengembangan inovasi teknologi sektor keuangan secara terkontrol	Pengujian langsung (live testing) dengan fleksibilitas regulasi yang proporsional dan perlindungan	Pengujian berdasarkan cakupan regulasi, inovasi, manfaat konsumen, kesiapan,

			dan kebutuhan regulasi
Lingkungan Kelembagaan Syariah	DSN-MUI di dalam ekosistem keuangan syariah yang lebih luas	Dewan Penasihat Syariah BNM yang didukung oleh tata kelola syariah berdasarkan undang-undang	Tidak ada otoritas syariah nasional di dalam sandbox
Integrasi Syariah dalam Siklus *Sandbox*	Belum diinstitusionalkan secara eksplisit di seluruh tahapan	Sandbox beroperasi di dalam lingkungan tata kelola syariah pendukung yang kuat	Tidak ada integrasi syariah publik
Keunggulan Utama	Ekosistem keuangan syariah yang berkembang dan regulasi ITSK yang semakin terstruktur	Konsistensi kelembagaan antara tata kelola keuangan dan tata kelola syariah	Arsitektur sandbox yang matang dan pembelajaran regulasi
Isu Utama Fintech Syariah	Kurangnya jalur penilaian syariah prosedural yang eksplisit	Memastikan teknologi baru tetap tercakup secara memadai oleh mekanisme syariah yang ada	Tidak adanya mekanisme tata kelola syariah publik di tingkat nasional

The comparison demonstrates that the decisive institutional issue is not simply whether a jurisdiction has a regulatory sandbox and a Shariah authority. The more important question is whether Shariah expertise can influence regulatory decisions at the stages in which the substantive characteristics of an innovative financial product are designed, tested, modified, monitored, and ultimately approved for broader deployment.

b. Maqasid al-Shariah Assessment and Illustrative Analysis

The comparative findings acquire greater normative significance when analysed through maqasid al-shariah. In this study, hifz al-din, hifz al-mal, and hifz al-'aql function as evaluative dimensions through which institutional arrangements can be assessed rather than as abstract theological categories detached from regulatory practice.

From the perspective of hifz al-din, Malaysia provides the strongest surrounding institutional environment among the three jurisdictions because Shariah compliance is embedded within the legal architecture of Islamic financial regulation and supported by a central Shariah authority. This does not mean that every sandbox decision automatically receives a separate Shariah determination. Rather, innovative Islamic financial activities take place against a regulatory background in which Shariah compliance carries formal institutional significance.

Indonesia also possesses considerable institutional potential to support hifz al-din because DSN-MUI provides recognised guidance concerning Shariah principles applicable to Islamic financial transactions. The weakness lies not primarily in the availability of Shariah expertise but in its procedural connection with the general ITSK sandbox. If Shariah considerations are assessed only after the technological and commercial characteristics of a product have been substantially established, the review

may fail to identify risks embedded in algorithms, pricing mechanisms, risk-allocation processes, or consumer interfaces.

The United Kingdom relies primarily on institution-level arrangements to maintain the Shariah integrity of Islamic financial products. Consequently, protection of hifz al-din does not form an explicit component of the FCA sandbox architecture. This distinction reinforces the conclusion that the UK model is more appropriate as a benchmark for regulatory methodology than as a direct model of Islamic financial governance.

The three jurisdictions display greater convergence from the perspective of hifz al-mal. Consumer protection, limited testing, monitoring, risk controls, and regulatory supervision are central elements of conventional sandbox design and can directly support the protection management considerations. Malaysia combines regulatory flexibility with safeguards intended to manage risks arising from experimentation. The FCA likewise places consumer benefit and the mitigation of consumer harm among the central considerations in sandbox assessment.

This convergence demonstrates that conventional financial regulation and maqasid al-shariah should not be understood as inherently separate regulatory objectives. Measures intended to prevent financial harm, fraud, unfair loss, excessive uncertainty, and irresponsible risk allocation can simultaneously serve conventional consumer-protection objectives and the maqasid objective of hifz al-mal.

Islamic fintech nevertheless introduces risks that may not be fully captured through traditional consumer-protection tests. Abdullah and Isman (2026) identify concerns involving digital gharar, algorithmic opacity, technology-based risk assessment, and data governance. A technological system may function accurately from an engineering perspective while still creating uncertainty about how economically significant decisions are produced. Where such uncertainty materially affects pricing, eligibility, investment selection, or allocation of risk, it may acquire substantive significance for Islamic financial regulation (Abdullah & Isman, 2026).

This observation is closely related to hifz al-'aql. In the context of digital finance, protection of intellect can be translated into regulatory requirements concerning transparency, intelligibility, meaningful disclosure, and the capacity of consumers and regulators to understand how financial decisions are generated. Algorithmic opacity can weaken informed consent even when the formal contractual documentation appears complete. A consumer who is provided with a legally valid contract may nevertheless be unable to make an informed financial decision if the algorithm that determines risk, price, eligibility, or expected return remains materially unintelligible.

A maqasid-oriented sandbox should therefore assess not only whether users receive contractual documentation but also whether they receive understandable information concerning contractual obligations, fees, risks, automated decisions, and the use of their data. Regulators and Shariah assessors should likewise possess sufficient information to understand the variables, assumptions, and material effects of automated decision-making systems when these affect the substantive economic operation of an Islamic financial transaction.

The maqasid framework therefore expands the evaluative scope of sandbox regulation. Hifz al-din requires substantive Shariah integrity, hifz al-mal strengthens the focus on protection from financial and technological harm, while hifz al-'aql provides a normative basis for transparency, intelligibility, and informed decision-making. Shariah

compliance consequently becomes an element of regulatory design and technological experimentation rather than merely a final certification question.

The importance of integrating Shariah assessment into the regulatory sandbox becomes clearer when examined through concrete Islamic fintech scenarios. These examples are used as analytical illustrations rather than empirical case studies of particular sandbox participants.

One relevant example is a securities crowdfunding platform structured through a mudharabah arrangement. Under such a model, investors provide capital for a business venture, while returns depend on actual business performance and are distributed according to an agreed profit-sharing arrangement. At the level of contractual form, the platform may appear compatible with Islamic finance because the relationship is structured through profit sharing rather than an interest-bearing lending mechanism. However, the Shariah analysis becomes more complex if the platform uses machine learning to assess issuers, classify investment risk, recommend projects, or present expected outcomes to prospective investors. A machine-learning model used in such a platform may rely on historical financial performance, transaction records, behavioural data, commercial indicators, or various proxy variables. If the operation of the model is highly opaque, investors may be unable to understand why one issuer is classified as high risk while another receives a more favourable assessment. Regulators may face a similar problem if the relevant variables, assumptions, or decision logic cannot be sufficiently explained. The resulting concern is not necessarily that the mudharabah contract itself is invalid, but that the technological mechanism influencing investors' decisions may create material uncertainty about the true basis on which risk is evaluated and communicated.

From a Shariah perspective, such algorithmic opacity may contribute to digital gharar where the uncertainty is sufficiently material to affect informed decision-making, risk perception, or economic outcomes. This is particularly relevant when an automated model determines which investments consumers are encouraged to select or how risk and expected return are presented. A formal Shariah review limited to the contractual label of mudharabah would therefore be insufficient if the actual investment decision-making process depends significantly on an opaque technological system.

Algorithmic bias introduces an additional concern. A machine-learning model trained on historically unequal or incomplete datasets may systematically disadvantage certain issuers or customers even where protected characteristics are not explicitly included in the model. Proxy variables can reproduce pre-existing patterns of exclusion. Such an outcome may implicate hifz al-mal when inaccurate or discriminatory risk assessment affects access to finance, investment opportunities, pricing, or exposure to financial loss. It may simultaneously implicate hifz al-'aql where the affected parties cannot obtain a meaningful explanation of the decision.

A second relevant example is an Islamic digital financing platform that uses automated risk assessment to determine customer eligibility, financing limits, fees, or risk categories. The financing contract itself may employ a recognised Islamic structure and appear formally compliant with Shariah requirements. Nevertheless, the technological process through which costs, eligibility, or risk classifications are determined may affect the substantive operation of the transaction.

If an automated pricing system incorporates assumptions derived from conventional risk-pricing models without sufficient scrutiny of their Shariah implications,

the formal designation of the underlying contract may not be sufficient to establish substantive compliance. The same problem arises when consumers are unable to understand how service charges or financing limits are generated. The issue therefore extends beyond the written contract to the technological logic that determines how the contract is actually offered and implemented in practice.

These use-cases demonstrate why Shariah assessment should begin during the innovation process rather than only after product development has been completed. At the admission stage, regulators should identify whether artificial intelligence, machine learning, or other automated technologies materially influence Shariah-sensitive economic characteristics. At the testing stage, the applicant should be able to explain how automated systems operate, which data are used, what outputs are generated, and how those outputs influence consumers and contractual relationships. During live testing, changes in algorithms, data sources, pricing models, or consumer interfaces should be monitored because they may alter the substantive Shariah characteristics of the product. At the exit stage, unresolved Shariah concerns should form part of the assessment of whether the innovation is suitable for wider market deployment.

The sandbox therefore offers a preventive regulatory environment in which digital gharar, algorithmic opacity, bias, unfair risk allocation, and other emerging risks can be identified before they affect consumers at scale. This role strengthens the argument that Shariah governance should be procedurally connected to technological experimentation rather than confined to formal contractual certification.

The findings both support and extend previous scholarship concerning Islamic fintech regulation. Muryanto (2023) concludes that the development of Islamic fintech requires supportive regulation, Shariah supervisory institutions, and standardised Shariah governance.

The present study supports this argument but identifies a more specific procedural problem. The existence of a Shariah supervisory institution alone is insufficient if its expertise is not connected to the regulatory decision points at which innovative financial products are designed, tested, modified, and evaluated.

This distinction becomes particularly significant in a regulatory sandbox because innovative products are not necessarily static. A participant may enter testing with a particular contractual structure, algorithm, risk model, or consumer interface and subsequently modify those characteristics in response to testing results. A Shariah determination conducted only before sandbox admission may therefore no longer correspond to the product that ultimately emerges from the testing process. Similarly, an assessment undertaken only after testing may identify concerns too late, after significant technological and financial resources have already been invested.

The findings also develop the regulatory-fragmentation argument advanced by Fidhayanti et al. (2024). Instead of treating fragmentation only as a general problem involving multiple institutions and overlapping rules, this study identifies the regulatory sandbox as a concrete institutional location in which financial supervision and Shariah governance can interact before innovations are deployed more broadly. The sandbox therefore creates an opportunity to transform Shariah compliance from an ex post corrective mechanism into a preventive and continuous process of Shariah-risk assessment.

The study also complements conventional regulatory sandbox scholarship. Goo and Heo (2020), Cornelli et al. (2024), and Truby (2020) demonstrate that sandboxes may facilitate innovation, improve access to external financing, and support regulatory learning. The present analysis argues that these benefits should not constitute the sole measure of regulatory success in Islamic fintech. A sandbox may successfully accelerate market entry and encourage investment while remaining normatively incomplete if material Shariah, consumer, or algorithmic risks are left unidentified.

The principal theoretical contribution of this study is therefore the conceptualisation of the regulatory sandbox as a procedural point of integration between technological experimentation, financial supervision, and preventive Shariah governance. Its practical contribution lies in identifying how such integration might be institutionalised in Indonesia without creating an entirely independent regulatory structure for Islamic fintech.

c. Regulatory Implications for Indonesia

The comparative analysis suggests that Indonesia does not necessarily require a completely separate statute establishing a dedicated Islamic fintech regulatory sandbox. The existing legal framework under Law No. 4 of 2023, OJK Regulation No. 3 of 2024, and SEOJK No. 5/SEOJK.07/2024 already provides the legal and procedural foundation for controlled experimentation in Financial Sector Technological Innovation. The more immediate institutional challenge is to create a formal interface between this existing sandbox architecture and Shariah governance for innovations that expressly claim Shariah compliance or whose technological characteristics materially influence Shariah-sensitive financial arrangements.

A practical institutional mechanism could take the form of a Joint Fintech Shariah Desk developed through coordinated engagement between OJK and DSN-MUI. The proposed desk should not be understood as a new independent regulator and should not transfer OJK's statutory regulatory authority to DSN-MUI. OJK would continue to exercise authority over admission, monitoring, sandbox outcomes, registration, licensing, and other regulatory decisions. The proposed desk would instead function as an institutional mechanism through which specialised Shariah expertise could be incorporated into the technological testing process when an innovation raises Shariah-relevant questions.

At the pre-testing stage, the Joint Fintech Shariah Desk could examine whether an innovation marketed as Shariah-compliant relies on established contractual structures or introduces technological features requiring more detailed analysis. This early-stage assessment would be particularly valuable for products involving artificial intelligence, automated pricing, algorithmic risk assessment, smart contracts, or other technological processes that may affect the substantive economic characteristics of a transaction.

The Shariah assessment could subsequently inform the design of testing parameters. Instead of treating Shariah review as a separate certification process, relevant Shariah issues could be translated into matters to be observed during live testing. These could include the operation of contractual structures, the method by which fees or expected returns are calculated, the allocation of financial risks, the transparency of automated decisions, the use of consumer data, and the possibility that technological changes introduce riba, gharar, maysir, or other Shariah concerns.

The Joint Fintech Shariah Desk could also provide an institutional channel for examining material modifications during live testing. This function is particularly important because fintech systems are frequently modified in response to test results. Changes in algorithms, data sources, pricing methodologies, customer classifications, or user interfaces may change the substantive Shariah characteristics of a product even if the original contractual arrangement remains formally unchanged.

At the exit stage, the desk could provide a structured technical assessment regarding whether material Shariah concerns identified during testing have been adequately resolved. Such an assessment would inform rather than replace OJK's regulatory decision. This arrangement would preserve the institutional competence of both bodies: DSN-MUI would contribute specialised Shariah expertise, while OJK would retain statutory responsibility for financial-sector regulation and sandbox outcomes.

The proposed Joint Fintech Shariah Desk should be supported by Shariah Sandbox Guidelines that translate general Shariah principles into practical testing considerations suitable for financial technology innovation. Such guidelines would improve legal and regulatory certainty by informing applicants at an early stage about the Shariah-related characteristics of technological design that may become relevant during sandbox experimentation.

The guidelines should explain how the underlying Shariah contract relates to the technological implementation of the product. A fintech operator should not merely identify the contractual label used but should also explain how the rights, obligations, profit arrangements, loss allocation, and operational processes created by the technology correspond to the substantive requirements of that contract. This approach would reduce the risk that Shariah compliance becomes limited to contractual terminology while technological implementation produces materially different economic effects.

Pricing and fee mechanisms should also form part of the proposed guidelines. Sandbox participants claiming Shariah compliance should be able to explain how fees, expected returns, service charges, financing limits, and other financial variables are generated, particularly when automated systems influence these outcomes. This requirement would assist both regulators and Shariah assessors in determining whether technology-based pricing mechanisms introduce prohibited or excessively uncertain elements.

The guidelines should further address risk allocation. Innovative products frequently distribute financial, technological, operational, and data-related risks across multiple parties. A meaningful Shariah assessment should therefore examine not only the formal allocation of contractual risk but also how technological processes affect the actual distribution of risk during product operation.

Artificial intelligence and algorithmic governance should constitute another important element of the proposed guidelines. Participants should identify automated systems that materially affect eligibility, pricing, scoring, customer classification, investment recommendations, or contractual outcomes. Where such systems produce economically significant decisions, regulators and Shariah assessors should receive sufficient information to understand their purpose, variables, limitations, and material effects.

The proposed guidelines should also establish expectations concerning explainability and consumer disclosure. Consumers should receive meaningful

information about contractual obligations, costs, financial risks, automated decisions, and the use of their data. This requirement is particularly important from the perspective of hifz al-'aql because formal disclosure is insufficient when information remains too complex or opaque to support informed decision-making.

Data governance should likewise be incorporated into Shariah-oriented sandbox testing. Artificial intelligence and machine-learning systems depend heavily on data quality, relevance, and representativeness. Inadequate data can produce inaccurate, discriminatory, or otherwise unfair outcomes that may create financial harm. A Shariah-sensitive sandbox should therefore consider how data are obtained, processed, and used when those practices materially affect financial decisions.

The guidelines should additionally require participants to report material technological changes during testing where those changes may affect previously assessed Shariah considerations. A modification to an algorithm, pricing model, risk classification method, contract implementation, or data source should not automatically be treated as a purely technical matter when it changes the substantive economic operation of the product. The final sandbox evaluation should consequently consider whether material Shariah concerns identified during experimentation have been resolved before the innovation proceeds toward wider market deployment.

The proposed institutional framework can be visualised as an integrated sandbox lifecycle in which Shariah assessment accompanies relevant stages of financial technology experimentation rather than operating solely as a one-time certification mechanism.

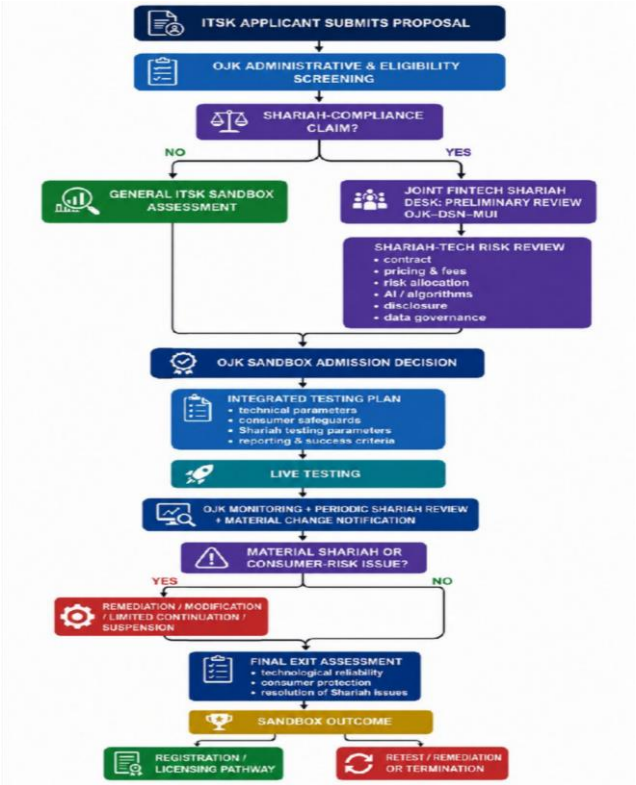


Figure 1. Proposed Integrated Workflow for the Indonesian Islamic Fintech Regulatory Sandbox
Source: Author's Proposal Model

The proposed workflow demonstrates that Shariah review should not be understood as an additional bureaucratic layer imposed after conventional regulatory testing. Instead, Shariah considerations should be introduced where they are relevant to the substantive characteristics of the innovation. Preliminary assessment enables potential Shariah risks to be identified before testing begins, while the integrated testing plan converts those risks into observable regulatory parameters.

During live testing, the combination of OJK monitoring and specialised Shariah assessment would enable regulators to identify whether technological changes alter the substantive characteristics of the product. Where significant concerns arise, the operator could be required to modify or remediate the relevant technological or contractual features before proceeding. At the exit stage, technological reliability, consumer-protection outcomes, and the resolution of material Shariah concerns would collectively inform the determination of whether the product is ready to proceed to subsequent registration or licensing processes.

This model preserves OJK's central regulatory role while providing an institutional mechanism through which DSN-MUI's Shariah expertise can be incorporated into controlled financial experimentation. The model therefore seeks integration rather than institutional duplication.

The proposed Indonesian model should not simply reproduce the institutional architecture of either Malaysia or the United Kingdom. The different legal and institutional contexts of the three jurisdictions make direct transplantation inappropriate. Instead, Indonesia can selectively adopt functional lessons from each model while preserving its own regulatory structure.

Malaysia provides the principal lesson concerning institutional consistency. Its broader Islamic financial regulatory architecture demonstrates the advantage of placing financial innovation within an environment in which Shariah compliance has formal institutional significance. The lesson for Indonesia is not necessarily to reproduce the Malaysian SAC model, but to strengthen the procedural connection between its existing regulatory and Shariah institutions.

The United Kingdom provides a different but complementary lesson. Its principal contribution lies in structured sandbox methodology, including eligibility assessment, testing readiness, consumer benefit, controlled experimentation, regulatory dialogue, and regulatory learning. These features demonstrate the importance of clearly identifying what is being tested, why regulatory support is required, what risks must be monitored, and how successful or unsuccessful testing affects subsequent regulatory decisions.

Indonesia can therefore combine these institutional lessons by retaining OJK's existing ITSK sandbox while introducing a structured Shariah-assessment pathway adapted to the relationship between OJK and DSN-MUI. Such an approach would avoid the unnecessary duplication associated with establishing an entirely separate Islamic fintech regulator while creating a more coherent framework for innovations that claim Shariah compliance.

The broader regulatory implication is a movement from Shariah certification after innovation toward Shariah-informed experimentation during innovation. Such an approach would improve regulatory certainty for fintech operators because relevant Shariah expectations could be identified before substantial resources are committed to product development. It would also strengthen consumer protection, reduce the risk of

costly redesign after sandbox completion, facilitate the early identification of technology-related Shariah risks, and enable regulators and Shariah scholars to develop institutional knowledge about emerging financial technologies.

4. Conclusion

The comparative analysis demonstrates that Indonesia, Malaysia, and the United Kingdom employ regulatory sandboxes with a similar objective of enabling controlled financial innovation, but they differ significantly in the way Shariah considerations are institutionally connected to sandbox governance. Malaysia provides the most integrated surrounding Shariah governance environment because sandbox experimentation operates within a statutory Islamic financial framework supported by an authoritative Shariah institution. The United Kingdom offers the strongest benchmark for structured experimentation, testing readiness, consumer safeguards, and regulatory learning, but does not incorporate public Shariah supervision into the FCA sandbox. Indonesia occupies an intermediate position: it has both a structured ITSK sandbox framework and an established Shariah governance ecosystem, yet the two remain procedurally separate at critical stages of admission, testing, monitoring, modification, and exit. The principal comparative finding is therefore that the effectiveness of an Islamic fintech sandbox depends not merely on the existence of a sandbox or a Shariah institution, but on the procedural connection between the two. Viewed through maqasid al-shariah, this connection must also address substantive rather than merely formal compliance: hifz al-din requires the preservation of Shariah integrity throughout the implementation of financial products, hifz al-mal requires safeguards against financial harm, unfair risk allocation, and technology-related distortions, and hifz al-'aql adds a regulatory requirement for transparency, intelligibility, and meaningful disclosure, particularly where artificial intelligence or automated decision-making materially affects financial outcomes. Shariah compliance in Islamic fintech should accordingly be understood as a continuous regulatory concern arising from contractual structures, pricing mechanisms, algorithmic processes, data use, and product modification during experimentation, shifting the function of Shariah supervision from final certification toward preventive assessment throughout the innovation process.

For Indonesia, the findings indicate that strengthening the existing sandbox framework is more appropriate than creating a completely separate Islamic fintech sandbox regime. The most relevant institutional reform is to establish a formal mechanism through which Shariah expertise can enter the sandbox lifecycle without displacing OJK's statutory regulatory authority. A coordinated Joint Fintech Shariah Desk between OJK and DSN-MUI, supported by Shariah Sandbox Guidelines, would provide a practical mechanism for translating Shariah principles into regulatory testing parameters and for identifying Shariah-related risks before wider market deployment. The broader contribution of this study is therefore to position the regulatory sandbox as an institutional interface between technological experimentation, financial supervision, and preventive Shariah governance, thereby providing a more coherent basis for the development of Islamic fintech regulation in Indonesia.

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