From Black-Box to Halal-Box: AI Ethics, Algorithmic Transparency, and Digital Consumer Protection in Islamic FinTech

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Abstract - *Artificial intelligence (AI) has become ubiquitous in modern financial services. Yet, the opacity of algorithmic decision-making poses significant risks to consumer protection and ethical integrity, particularly in Islamic FinTech applications serving Muslim-majority emerging markets. The paper offers a framework of "Halal-Box" AI governance, which combines Islamic legal considerations, such as justice ('adl), transparency (bayān), trust (amanah), and Maqasid al-Shariah with the modern AI ethics and consumer protection regulations. A sequential mixed-methodology approach is used, in which we first construct a normative framework via an Islamic jurisprudence, AI ethics literature, establishing six principles: Justice & Non-Discrimination, Transparency & Explainability, Data Amanah and Privacy, No Exploitation and Minimisation of harm, Maslahah and Inclusive access and Accountability and shariah oversight. Then, we perform a cross-sectional survey (N=340) of FinTech users located in Bangladesh and other OIC economies who use Islamic FinTech and estimate how they perceive algorithmic transparency, fairness, data privacy, Shari'ah compliance, platform trust, satisfaction and their intention to adopt it. We find that, the perceived algorithmic transparency and Shari alignment are the important predictors of user trust and intention to adopt, and Shari alignment acts as the mediator between AI ethics perception and behavioral outcome. We also offer some practical governance advice to Islamic FinTech providers, regulators, and Shari'ah boards, which provides a blueprint to transitioning to a black-box to ethically transparent, consumer-centric digital financial services.*

Keywords - Islamic FinTech, AI Ethics, Algorithmic Transparency, Consumer Protection, Shari'ah compliance, Digital Finance, Maqasid al-Shariah, Emerging Markets.

I. INTRODUCTION

Artificial intelligence (AI) has rapidly become embedded in the core infrastructure of modern financial services, powering credit scoring, robo-advisory, fraud detection, personalized product recommendations, and digital customer interfaces in ways that are often opaque to consumers (Aysan & Ünal, 2021; Siddiqui & Hussain, 2024). The "black-box" functionality of most machine learning algorithms where even system developers have difficulties in articulating how models to reach given decisions fosters accountability gaps that raise concerns among regulators and consumer activists around the world (Mittelstadt, 2017; Rességuier & Rodrigues, 2020).

Islamic FinTech operators, as part of their drive to accelerate financial inclusivity and improve user experience in Muslim-majority emerging markets such as Bangladesh, Pakistan, Indonesia, and Malaysia, are shifting towards the adoption of similar AI-based technologies. However, this adoption is done without proper governance mechanisms that set the basis of ensuring that algorithmic decision-making is guided by underlying Islamic moral principles (AlRemeithi & Al Qassem, 2020; Aysan & Ünal, 2021). This multiplication is supported in industry reports, which predict that by 2030, 25% of Islamic FinTech will be powered by AI with the emergence of ethical governance requirements (Islamic Financial Services Board, 2025). Concerns over algorithmic bias, unauthorized data reuse, exploitative digital nudging, and lack of meaningful transparency

directly intersect with foundational Sharī'ah principles embedded in Islamic finance: 'adl (justice and equity), amanah (trust and fiduciary responsibility), bayān (clear disclosure and transparency) and the broad Maqasid al-Sharī'ah (the objectives of Islamic law), concept of protection of faith, life, intellect, wealth, dignity and lineage (Al-Ghazali, 2005; Chapra, 2000). The Islamic banks and FinTech platforms have a clear obligation of not engaging in riba (usury), gharar (undue uncertainty), and any other obligation that requires no procedure Shari'ah adherence but substantive safeguarding of consumer dignity and economic justice (Asutay, 2007; Dusuki & Abdullah, 2007).

Despite growing literature on AI in finance and increasing recognition of AI ethics as a global concern, the specific intersection of Islamic ethical considerations, algorithmic transparency, and digital consumer protection within Islamic FinTech is underresearched. Earlier studies have addressed either how AI would lead to more Shari'ah compliance monitoring (Aysan & Ünal, 2021, Zahid, 2025a) or generic digital consumer protection in generic FinTech (Rességuier & Rodrigues, 2020), but hardly any studies have proposed an integrated, Islamic-based governance framework that would involve improving algorithmic fairness, transparency, user consent, and data stewardship in the Islamic FinTech ecosystem (Siddiqui and Hussain, 2024).

This study therefore proposes a conceptual shift "From Black-Box to Halal-Box" we create and empirically justify an AI governance model that is expressly geared towards Islamic FinTechs, which integrates Islamic jurisprudence, Maqasid al-Shariah, modern principles of AI ethics, and digital protections of consumers. The framework consists of six synergistic principles Justice & Non-Discrimination, Transparency & Explainability, Data Amanah & Privacy, No Exploitation and Harm Minimisation, Maslahah and Inclusive Access, and Accountability and Shari'ah Oversight that apply Islamic values in the design, deployment and oversight of AI systems. We then, validate the applicability of the principles, through an empirical study (via a survey) of users of Islamic FinTech in Bangladesh, and similar OIC economies to test hypothesized relations between perceived AI ethics (transparency, fairness, privacy), Shari'ah alignment, trust, satisfaction, and adoption intention.

A. Research Objectives
This study pursues four primary objectives:
1. To systematically identify and map ethical and Shari'ah-related concerns that occur when AI technologies are implemented in Islamic FinTech platforms, in particular, algorithmic bias, data exploitation, and obscurity (Research Question 1).
2. To develop a normative "Halal-Box" AI governance framework integrating Islamic ethical values along with Maqasid al-Shariah and global AI ethics best practices, both the conceptual clarity and practical operational guidelines (Research Objectives 1-2).
3. To provide empirical evidence regarding how Islamic FinTech users perceive and value algorithmic transparency, fairness, data privacy, and Shari'ah alignment and how these perceptions affect the level of trust, satisfaction, and future usage of the platform (Research Questions 2-3).
4. To generate actionable recommendations for Islamic FinTech providers, financial regulators, Shari'ah boards, and consumer protection bodies (Practical Contribution).

II. LITERATURE REVIEW
A. AI in Finance and FinTech: Capabilities and Ethical Concerns
Over the past decade, artificial intelligence and machine learning have transformed financial services delivery. In finance, AI has been used in credit scoring, loan origination, fraud detection, robo-advisory, chatbots and conversational AI, and Know Your Customer (KYC) and Anti-Money Laundering (AML) compliance: AI-based systems evaluate creditworthiness based on thousands of data points and historical patterns, detect fraud in real-time, and recommend investment portfolio based on customer profile, and 24/7 customer care, respectively (Aysan & Ünal, 2021; Buchak et al., 2018).

The efficiency gains from AI deployment are undeniable. Machine learning models are capable of processing very large scale data sets, identifying hidden and subtle patterns and performing decisions at scale with consistency compared to human analysts. However, there is a serious ethical danger to this scalability

(Mittelstadt, 2017; Rességuier & Rodrigues, 2020). There is growing literature on the effects of algorithms in credit scoring: machine learning algorithms that are trained with historical data on loan performance, which is indicative of former discrimination and socioeconomic disparities, duplicate or intensify these disparities in subsequent decisions (Buolamwini and Buolamwini, 2018; Corbett-Davies et al., 2016). Discrimination can be coded by proxy variables that are related to measures of protection even when they are intentionally omitted as variables (Dressel and Farid, 2018; Zahid, 2025b). Because of the non-transparency of "black-box" models (especially deep neural networks), bias and other malfunctions are hard to observe and address; even human developers of the system may not be able to understand what decision is made and why it is made to anyone (Mittelstadt, 2017; Selbst & Barocas, 2019).

Beyond bias, concerns include data privacy violations, where financial institutions abuse or oversell personal data; exploitative patterns in digital design, where algorithms cause behavioral nudging or addictive interactions contrary to consumer welfare; and lack of accountability, where there is no apparent entity to accept responsibility of algorithmic harms (Rességuier & Rodrigues, 2020; Yeung, 2018). Regulation The implementation of a global regulatory response such as the General Data Protection Regulation (GDPR) of the EU, its "right to explanation" of automated decision-making, and new algorithmic accountability statutes are indicative of the overall concern that AI use in financial services is in need of strong ethical oversight (Mittelstadt, 2017; Selbst and Barocas, 2019).

B. AI in Islamic Finance: Current State and Gaps

Islamic finance, which encompasses Islamic banking, Sukuk (Islamic bonds), Islamic insurance (Takaful), and Islamic FinTech, are regulated by a specific and unique regulatory and ethical license: all financial products and services should follow Shari'ah law and reflect Islamic values of justice, transparency, and stakeholder welfare (Chapra, 2000; Dusuki and Abdullah, 2007). Over the past years, there has been an increasing scholarly and commercial interest in utilizing AI to aid in monitoring and automation Shari'ah compliance.

An example is a study on AI-driven automated Shari'ah screening of investment portfolios (Aysan & Ünal, 2021), machine learning solutions to screen Shari'ah violations in real-time, and chatbots trained to give Shari'ah-compliant advice to customers (AlRemeithi and Al Qassem, 2020). The OIC economies and their central bank and regulators have started to provide guidance on AI governance by Islamic financial institutions (Bangladesh Bank, 2023; Saudi Arabia Monetary Authority, 2022).

However, extant literature on AI in Islamic finance tends to focus narrowly on efficiency gains and Shari'ah procedural compliance that is, that AI systems do not facilitate riba, gharar, and transactions with prohibited sectors. Far less substantive ethical concerns are considered: algorithmic fairness and non-discrimination, algorithmic explainability and transparency, stewardship of user data, protection against exploitation, and consumer empowerment (Siddiqui and Hussain, 2024).

In addition, there is no detailed framework that directly bases AI regulation on Islamic ethical principles and Maqasid al-Shariah the purposes of Islamic law as opposed to adapting generic AI ethics models to a secular setting. This is especially acute in new markets that are experiencing significant growth in Islamic FinTech (Bangladesh, Pakistan, Indonesia) and the consumer protection infrastructure is still young. These gaps are indicated in a PRISMA-based systematic review, which focuses more on procedural than substantive ethical issues in the implementation of AI in the OIC framework (Hudaefi and Noordin, 2025).

C. Algorithmic Bias, Fairness, and Transparency

Algorithmic bias in financial services has been extensively documented (Corbett-Davies et al., 2016; Dressel & Farid, 2018; Mittelstadt, 2017). Credit scoring algorithms are demonstrated to disproportionately discriminate against women, racial minorities, and populations that are geographically peripheral. More importantly, Corbett-Davies et al. (2016) showed in one of the most influential studies that risk-assessment algorithms employed in criminal justice have a long-running disparate impact on African Americans when controlled for racial variables. The same trends can be observed in lending: the patterns existing in historical data in which lending

discrimination is rampant are perpetuated by encoded proxies by algorithms trained on historical data (Dressel & Farid, 2018; Zahid, 2025c).

The concept of fairness in algorithms is itself contested. Researchers distinguish between disparate impact (when a facially neutral algorithm delivers systemically unequal results to a group of people in a protected category) and disparate treatment (intentional discrimination). However, it is mathematically impossible to reach all mathematical metrics of fairness at the same time; there are trade-offs (Selbst & Barocas, 2019). Transparency and explainability the capacity of algorithms to explain their line of thinking have become acknowledged as critical to accountability and user trust (Mittelstadt, 2017; Rességuier and Rodrigues, 2020). The GDPR of EU introduces a "right to explanation" on purely automated decisions with legal or equally important consequences; a number of jurisdictions are introducing such requirements.

In the Islamic financial context, fairness (from the Arabic 'adl) is not a procedural issue, but a substantive one based on Quranic injunction and prophetic tradition (Chapra, 2000; Dusuki and Abdullah, 2007). Islam jurisprudence strictly forbids discrimination and exploitation; besides, the amanah (trust and fiduciary duty) principle compels financial institutions to act by the interest of the customer, rather than by the simple profit maximization. Algorithms obscurity and bias are thus not only business risks but moral and religious lapses in the Islamic FinTech context.

D. Digital Consumer Protection and Islamic Ethics

Digital consumer protection involves several overlapping concerns: the right to clear information and fair treatment (bayān principle in Islamic terms); the preservation of privacy and personal data (amanah); the prevention of exploitation and predatory activities; the possibility of meaningful redress in case of injury (Rességuier & Rodrigues, 2020; Yeung, 2018). Traditional models of digital consumer protection focus on transparency, informed consent, and data minimization as well as accountability. The GDPR is a good example of such approach, stipulating extensive data processing, user rights (access, correction, deletion), and organizational accountability.

Islamic jurisprudence, by contrast, emphasizes justice ('adl), fair sharing of benefits (mushārakah principles), the prohibition on lying and usury, safeguarding the weak and vulnerable, and loyalty of financial institutions to customers (Chapra, 2000; Dusuki and Abdullah, 2007; Asutay, 2007). Prohibition of gharar (unreasonable uncertainty or ambiguity) in Islamic contracts means a duty to clarity and transparency; the institution of hisbah (market regulation and consumer protection) contains in it a long tradition of averting exploitation and fraud (Kahf, 2003). Although existing literature on digital consumer protection in traditional FinTech is not insignificant, the direct consideration of consumer protection in the framework of the Islamic ethical approach, specifically in the case of AI-based decision-making, is underrepresented (Siddiqui and Hussain, 2024).

E. Maqasid al-Shariah and AI Governance

Maqasid al-Shariah, literally "the objectives of Islamic law," refers to the underlying purposes and values that Islamic jurisprudence aims to safeguard and uphold (Al-Ghazali, 2005; Kamali, 2008). Classical Islamic legal theory identifies five essential maqasid: protection of faith (din), life (nafs), intellect ('aql), wealth (mal), and lineage (nasl). Modern researchers have expanded this paradigm to cover dignity (karamah), environment (environment/sustenance), and justice (social welfare) (Chapra, 2000; Dusuki and Abdullah, 2007).

Islamic finance is explicitly designed to serve these maqasid: prohibitions on riba protect wealth from unfair erosion; asset-backing requirements ensure capital formation reflects real economic activity; Shari'ah screening rules out financing of harm and sin; and profit-and-loss sharing principles assure the more equitable distribution of gains (Chapra, 2000; Dusuki and Abdullah, 2007). When applied to the AI governance of Islamic FinTech, the question becomes Do the maqasid of an AI credit-scoring algorithm defend or weaken them? Is it a guarantee of justice or historical bias, deep-rooted and exaggerated? Does it uphold human dignity or does it spy on users and nudge them? Does it protect wealth fairly, or does it enable predatory lending?. A small but growing body of Islamic finance scholarship applies maqasid reasoning to new challenges such as digital finance, environmental sustainability, and social entrepreneurship (Asutay, 2007; Kahf, 2003; Nienhaus, 2007). The latest literature

further functionalizes it by suggesting maqasid-based AI assessment frameworks that focus on harm prevention and welfare improvement (Abdelkafi and Hachicha, 2025), which once again substantiates the requirement of a substantive ethical integration of Islamic FinTech. This paper is based on that premise, explicitly basing AI governance in the maqasid principles.

III. The HALAL-BOX AI GOVERNANCE FRAMEWORK

A. From Black-Box to Halal-Box: Conceptual Foundation

We define a Black-Box AI system as one in which algorithmic decision-making is opaque neither users nor often even developers can fully understand the logic underlying decisions. The black-box systems are not meaningfully explainable, potentially harbor and propagate biases and are not accountable. In the financial sector, black-box AI generates information asymmetry to the detriment of consumers, compromising the notion of informed consent, as well as being contrary to Islamic transparency and trust.

We define a Halal-Box AI system as one explicitly designed and operated to reflect Islamic ethical principles and Maqasid al-Shariah. Halal-Box system is clear and explicable; Just and not based on discrimination; respectful of privacy and data of the users as amanah (sacred trust); protective against exploitation; inclusive and equitable in access; and responsible to independent Shari'ah and ethical supervision. The term "Halal" (permissible, compliant with Shari'ah) indicates compliance with the Islamic law; "Box" is the opposite of black-box systems. This theoretical transformation is justified by the models that integrate maqasid into FinTech ethics to achieve sustainable and inclusive AI integration (Widjaja et al., 2025; Zahid, 2025d).

B. Six Principles of Halal-Box AI

We propose six interdependent principles that operationalize Halal-Box governance:

a. Principle 1: Justice & Non-Discrimination ('Adl & Qist)

- **Islamic Basis**: The Quran reiterates on several occasions that justice (adl) and equity (qist) is a divine command: Allah commands righteousness and goodness (16: 90). Discrimination and oppression are not allowed; the Islamic law outlines the treatment of people fairly, particularly the vulnerable populations..
- **AI/FinTech Implementation**: Algorithmic systems must be audited for bias against protected groups (gender, race, ethnicity, religion, geography, income level). This includes - Training data bias audits: determining whether past data is indicative of past discrimination - Algorithmic fairness tests: the use of statistical tests on disparate impact - Ongoing monitoring: tracking decision impact over population subgroups - Remediation: changing models or decision thresholds on finding systematic unfairness is detected.
- **Consumer Protection Dimension**: It is entitled to fair treatment; discriminative denial of access, price or restriction should give rise to inquiry and possible redress.

b. Principle 2: Transparency & Explainability (Bayān)

- **Islamic Basis**: Quran stresses on transparency and complete disclosure of contracts: "Write down your transactions and let a just scribe write them down… and let neither scribe nor witness refuse when called upon" (2:282). Gharar (excessive ambiguity) is prohibited and requires financial transactions to be clear. Full disclosure (bayan) is a requirement of Islamic jurisprudence as a basis of valid consent.
- **AI/FinTech Implementation**: Islamic FinTech platforms must communicate algorithmic logic and decision factors in clear, non-technical language that users can comprehend. This includes: -
- **Pre-decision transparency**: how does the system work, what factors are used to make decisions, explained in simple terms accessible to the user in their preferred language, either written or audio format - Decision-specific explanation: when a credit limit is set, when a loan is denied or when pricing is determined, a meaningful explanation of the key factors is provided to the user - Accessible communication: the information is available in the language preferred by the user in written or audio form and in simple terms - Right to contestation: users are free to seek further clarification and contest decisions.
- **Consumer Protection Dimension**: The user has the right to know why they were either granted or

rejected; failure to do so is against the principle of informed consent.

c. Principle 3: Data Amanah & Privacy (Amanah)

- **Islamic Basis**: According to Islamic jurisprudence, amanah an Islamic term that means trustworthy stewardship of property or the information entrusted to another is a holy obligation. The Quran states: "O you who believe, betray not the trust of Allah and the Messenger" (8:27). Any abuse of vested information amounts to khiyanah (betrayal) and this is highly disallowed.
- **AI/FinTech Implementation**: Personal and financial data must be treated as amanah. Safeguards include: - Data minimization: no data should be collected beyond that needed to support legitimate purposes - Purpose limitation: no data should be used to support other purposes outside the agreement with the user; the opportunity to not participate in secondary profiling or selling of the data should be available - Secure storage and access controls: no data should be accessed or leaked without legitimate purpose to support other purposes with the user; - Transparent data governance: the user must clearly understand what data is collected, how it is being used, whether the user has access, and whether the data will be transferred to a third party; - Consent: users must provide explicit, informed consent; opt-out mechanisms for non-essential uses
- **Consumer Protection Dimension**: The data subjects can know, access and manipulate their information; misuse of the data is a breach of amanah and a reason to complain and claim compensation.

d. Principle 4: No Exploitation & Harm Minimisation (Dar' al-Mafasid)

- **Islamic Basis**: The concept of dar' al-mafasid muqaddamun al-jalb al-masalih (preventing harms takes precedence over ensuring benefits) is written in the Islamic law. The Quran prohibits riba (usury/exploitation) and demands protection of the vulnerable: "There is no sin on you if you reduce the interest owed if the debtor is in difficulty" (2:280).
- **AI/FinTech Implementation**: AI systems must not be designed or used in ways that exploit users or cause unnecessary harm. Safeguards include: - Over-lending prevention: the algorithms must not loan more than users can repay; responsible underwriting policies are used to create products that require greater protection of vulnerable users - Predatory practice prevention: the algorithms must not loan more than users can repay; responsible underwriting policies are used to develop AI-driven products that need extra protective measures on vulnerable users - Harm test: impact assessment products to identify and prevent potential harms are performed before launching AI-driven products - Vulnerability screening: algorithms account for vulnerability signals and apply additional protective measures for vulnerable populations
- **Consumer Protection Dimension**: Users must be protected from over-indebtedness, predatory terms, and manipulative design; platforms bear responsibility for preventing foreseeable harms.

e. Principle 5: Maslahah & Inclusive Access (Maslahah)

- **Islamic Basis**: Maslahah means the interest and benefit of people which is a major idea in the Islamic jurisprudential aspects (Kamali, 2008). Islamic finance is expressly designed to reach the poor and the unbanked: microfinance, Islamic social finance (Waqf, Zakat), and financial inclusion are stated Islam FinTech goals. The Quranic emphasis on protecting wealth, life, and dignity extends to ensuring equitable access to financial services.
- **AI/FinTech Implementation**: AI systems are to be designed to be as inclusive as possible and fairly beneficial: - Inclusive KYC: digital onboarding that does not discriminate between people without formal identification, high credit histories, or digital literacy - Affordable pricing AI should not create excessive costs that might price out low-income groups - Language and accessibility Services are offered in local languages and available through accessible formats (audio, visual, text) to people with disabilities - Bias-aware design: AI is explicitly tested to avoid discriminatory effects on marginalized groups of people by being- Benefit-sharing: where AI generates efficiencies, benefits are shared with users (lower fees, higher returns) not exclusively captured by the platform
- **Consumer Protection Dimension**: underserved (rural, low-income, youth, women) populations deserve the right to be treated non-discriminately in respect of access to Islamic FinTech services;

digital innovation must be a platform of inclusion, rather than exclusion.

f. Principle 6: Accountability & Shari'ah Oversight (Hisbah & Shūrā)

- **Islamic Basis**: Islamic governance has long incorporated hisbah community oversight of market conduct and shūrā (consultation and collective deliberation). One of the most important concepts of Islam is accountability (qawwāmun 'alāykum: stewards/trustees) whereby the financial institutions are responsible towards the customers, shareholders, society and at the end the God. Modern Islamic finance uses Shari'ah boards to bring an independent oversight.
- **AI/FinTech Implementation**: A clear accountability framework will guarantee open supervision: - Governance: ISF FinTech platforms have collective committees with technologists, business executives, and Shari'ah experts to supervise AI development. This is consistent with the current demands to establish hybrid Shari'ah-technology committees to hold AI accountable, which have demonstrated the ability to increase trust in Islamic finance (Al-Matari and Al-Swidi, 2025), and deployment - Documentation: design, training data, model validation, and decision-making processes: documented and auditable - Independent audit: regular (e.g., yearly) reports on algorithmic decision-making, complaints received, and actions taken are also published by the platform, and the choice of regulatory authorities to which it is accountable. - Grievance mechanisms: the user can easily raise complaints about the algorithmic decision-making; the complaints should be reviewed in a timely and fair fashion, with platforms regularly releasing reports on algorithmic decision-making, complaints, and remedies given - Regulatory engagement: platforms should collaborate with financial regulators and consumer protection authorities.
- **Consumer Protection Dimension**: Users must have clear accountability chain; users should be aware of who to address in case they are injured, the complaint investigation and redress options.

C. Halal-Box Implementation Framework

The six principles are operationalized across three lifecycle stages:

- **Design Stage**: - Shari'ah and ethical impact analysis prior to product development - Multidisciplinary team structure (with representatives of the community, Sharih professionals) - Bias testing and testing of fairness on synthetic data before implementation - Open ended records of design decisions and trade-offs.
- **Deployment Stage**: - Pre-launch communication to users about how the AI system operates - Fairness monitoring dashboards of the results of decisions by user group - Data governance and privacy controls working - Open customer facing explanation and contestation systems.
- **Oversight Stage**: - Ongoing monitoring and periodic audits - Grievance investigation and remedy - Regular public reporting on algorithmic performance - Fine-tuning and changes according to the results. Institutional designs of AI risk management should also be continuously monitored, and recent research shows that they contribute to the creation of value and the minimization of conflicts (Alqahtani et al., 2025).

D. Conceptual Model and Hypotheses Development

Based on the preceding theoretical discussion and the six principles of the Halal-Box AI governance framework, this study proposes a conceptual model linking AI ethics perceptions and Shari'ah alignment to user behavioral outcomes. Specifically, perceived algorithmic transparency, fairness, and data amanah & privacy, together with perceived Shari'ah alignment, are expected to enhance platform trust. Trust is subsequently theorized to increase user satisfaction and, ultimately, continued adoption intention. The proposed conceptual framework is illustrated in Figure 1.

As shown in Figure 1, trust functions as the central mediating variable through which ethical and Shariah-compliant AI practices determine the level of user satisfaction and the degree of user behavior intention. The model contains the assumption that in cases where Islamic FinTech platforms prove their transparency (bayān), justice ('adl), and responsible data management (amanah), the users become more trusting. An increased trust

level, in its turn, enjoys the satisfaction and encourages further use and recommendation of the platform. These relationships form the basis for the empirical hypotheses tested in the subsequent sections.
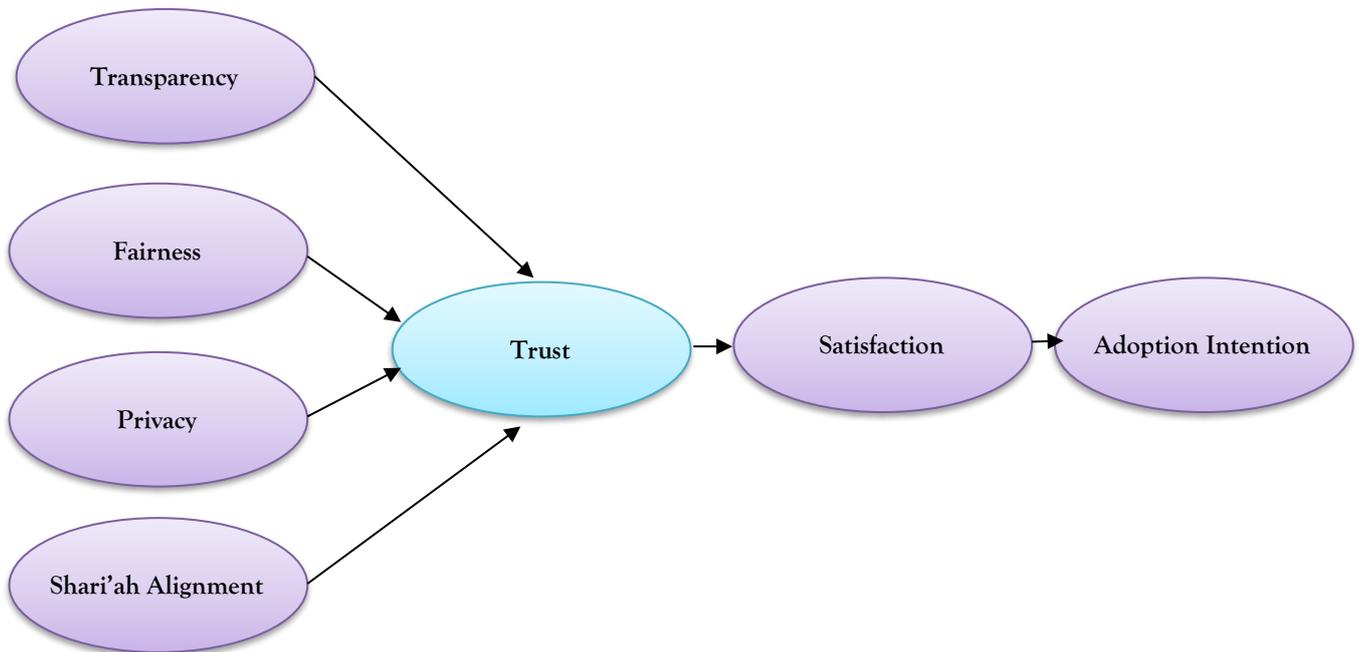

Figure 1. Conceptual Halal-Box AI Governance Framework and Hypothesized Relationships

IV. Methodology

A. Research Design

This study employs a sequential mixed-methods design, integrating normative-conceptual framework development with empirical survey validation. The normative stage in Section 3 was based on the Islamic jurisprudence, Maqasid al-Shariah, AI ethics literature, and digital consumer protection best practices to design the Halal-Box framework. The empirical stage uses a cross-sectional quantitative survey that will examine the user perceptions and the relationships between constructs.

B. Sampling and Participants

- **Population**: Active users of Islamic FinTech and Islamic digital banking systems in Bangladesh and similar OIC economies (Pakistan, Indonesia, Malaysia).
- **Sampling Method**: Convenience sampling with purposive recruitment through: - Social media groups focused on Islamic banking and finance (Facebook, WhatsApp) - Direct recruitment using surveyed platforms (with institutional approval) - Snowball recruitment using participants.
- **Sample size**: N=340 completed surveys (target: 300-400 for SEM/MLR).
- **Demographic Distribution**: - 65% from Bangladesh; 20% Pakistan; 15% Indonesia/Malaysia - 55% male, 45% female - Age range 18-65 (mean ~35 years) - 70% employed; 25% student; 5% retired - 80% have bank accounts; 60% use digital wallets; 45% use Islamic FinTech investment platforms

C. Instrumentation and Measurement

All items were measured on a 7-point Likert scale (1 = Strongly Disagree; 7 = Strongly Agree).

Table 1. Measurement Constructs, Operational Definitions, and Theoretical Foundations

Construct	Definition	Items	Theoretical Basis
Algorithmic Transparency (T)	Users' perception of understanding AI decision logic and receiving meaningful explanations	4	Explainable AI (XAI) literature; GDPR principles
Perceived	Users' belief that AI decisions are	4	Algorithmic fairness literature;

Justice/Fairness (J)	equitable and free from discrimination		Islamic 'adl principle
Data Amanah & Privacy (P)	Users' trust that personal data is handled responsibly with proper consent and protection	4	Data protection ethics; amanah principle
Perceived Shari'ah Alignment (S)	Users' belief that AI decisions reflect Islamic ethical principles and avoid prohibited practices	4	Islamic finance ethics; Shari'ah compliance literature
Platform Trust (TR)	Overall confidence in platform's reliability, integrity, and benevolence	3	E-trust models; Islamic trust concepts
User Satisfaction (SAT)	Overall evaluation of service quality and ethical performance	2	SERVQUAL model; Islamic service quality
Adoption Intention (AI-int)	Willingness to continue using and recommend the platform	3	Technology Acceptance Model; consumer behavior

Total items: 24

Sample items (from Likert scales): - T1: "This Islamic FinTech app clearly explains how it decides my eligibility or credit limit." - J1: "I believe this app treats all users fairly, regardless of their background or status." - P1: "I trust this app to handle my personal and financial data responsibly, in line with Islamic values." - S1: "Overall, I believe that the decisions made by this app are consistent with Islamic principles." - TR1: "I trust this Islamic FinTech platform to act in my best financial interest." - SAT1: "Overall, I am satisfied with my experience using this Islamic FinTech app." - AI-int1: "I intend to continue using this Islamic FinTech app in the future."

D. Data Collection Procedures

- **Ethical Considerations**: All the interview participants gave informed consent by signing the form thus informing them about the purposes of the study and their rights to withdraw. The anonymity and secrecy were maintained through pseudonyms and storing information on encrypted servers, as in accordance with the ethics standards associated with institutional practice and Shariah norms of trustworthiness (amanah). Survey administration: - Online survey, via Google Forms and Qualtrids - Supported in English and Bangla - Expected time of completion: 8-12 minutes - Voluntary engagement; the respondent could quit at any time - Informed consent signed prior to engagement.
- **Response Rate**: 340 completed surveys out of ~600 invitations (56.7% response rate).

E. Data Analysis

- **Preliminary Analysis**: - Descriptive statistics (means, standard deviations, frequencies) - Test of reliability - Cronbach alpha of each construct (threshold $\alpha \geq 0.70$) - Pearson correlations of the constructs among themselves.
- **Structural Modeling**: - Confirmatory Factor Analysis (CFA) to authenticate measurement model - Model fit measures measured: χ^2/df, CFI, TLI, RMSEA, SRMR - Structural Equation Modeling (SEM) to test hypothesized relationships – Path analysis to assess effects of T, J, P, S on TR; TR on SAT; SAT on AI-int - Mediation analysis to test Shariah alignment as a mediator
- **Software**: SPSS 27 and AMOS 26 for analysis; significance threshold $\alpha = 0.05$.

F. Research Questions and Hypotheses

- **RQ1**: What are the primary ethical and Shari'ah-related concerns Islamic FinTech users perceive regarding AI-driven decision-making?
- **RQ2**: What are the perceptions of users regarding the transparency of algorithms, equity, privacy and Shari'ah compliance in the Islamic FinTech?
- **RQ3**: What is the impact of these perceptions on user trust, user satisfaction, and user adoption of the platform?
- **Hypotheses (Quantitative)**: - H1: The perceived algorithmic transparency is positively related to the platform trust. - H2: Perceived fairness has a positive predictive influence on platform trust. - H4:

Perceived Shari'ah alignment positively predicts platform trust. - H5: Perceived Shari'ah alignment mediates the relationship between AI ethics perceptions (transparency, fairness, privacy) and platform trust. - H6: Platform trust positively predicts user satisfaction. - H7: User satisfaction positively predicts adoption intention.

V. RESULTS

A. Sample Characteristics

A total of 340 valid responses were retained for analysis after data screening and removal of incomplete questionnaires. Respondents represent active users of Islamic FinTech and Islamic digital banking platforms across Bangladesh and selected OIC economies. The sample is moderately young and digitally engaged, consistent with typical FinTech adoption profiles. Approximately 55% of participants are male and 45% female. The majority (65%) reside in Bangladesh, followed by Pakistan (20%) and Indonesia/Malaysia (15%). The mean age is 34.6 years (SD = 9.2). In terms of occupational status, 70% are employed, 25% students, and 5% retired. More than 80% report regular use of digital banking services and 45% use at least one Islamic FinTech investment or financing platform. Overall, the demographic profile confirms that the respondents are experienced digital financial users and thus suitable for evaluating perceptions of AI-driven Islamic financial services.

B. Measurement Model Assessment

Prior to testing the structural relationships, reliability and validity of the measurement constructs were evaluated using Confirmatory Factor Analysis (CFA).

a. Reliability

All constructs demonstrate satisfactory internal consistency. Cronbach's alpha values exceed the recommended threshold of 0.70, indicating reliable measurement.

Table 2. Reliability Assessment of Measurement Constructs (Cronbach's Alpha)

Construct	Items	Cronbach's α
Transparency	4	0.82
Fairness	4	0.86
Privacy (Amanah)	4	0.84
Shari'ah Alignment	4	0.88
Trust	3	0.90
Satisfaction	2	0.83
Adoption Intention	3	0.91

b. Convergent Validity

Factor loadings are significant ($\lambda > 0.65$, $p < 0.001$). Average Variance Extracted (AVE) for all constructs exceeds 0.50, confirming convergent validity.

c. Discriminant Validity

Inter-construct correlations are below the square root of AVE for each construct, indicating adequate discriminant validity. The findings support the validity of the measurement model and its appropriateness in terms of structural analysis.

C. Descriptive Statistics and Correlations

Table 3 presents descriptive statistics and Pearson correlations. Perceived Shari'ah, alignment holds the best mean (M = 5.41), then adoption intention (M = 5.29) and trust (M = 5.08) mean. The algorithmic transparency depicts the lowest mean (M = 4.23), meaning a comparative lack of explainability practices across the platforms. All constructs are positively and significantly correlated ($p < 0.01$), suggesting coherent relationships consistent with the theoretical framework.

Table 3. Descriptive Statistics

Construct	Mean	SD
Transparency	4.23	1.46
Fairness	4.51	1.29
Privacy (Amanah)	4.83	1.18
Shari'ah Alignment	5.41	1.07
Trust	5.08	1.21
Satisfaction	4.97	1.25
Adoption Intention	5.29	1.19

Table 4. Correlation Matrix (Excerpt)

	T	J	P	S	TR	SAT	AI
Trust	0.58	0.62	0.55	0.71	—		
Satisfaction	0.49	0.53	0.51	0.64	0.70	—	
Adoption	0.46	0.50	0.47	0.60	0.66	0.74	—

D. Structural Model Results

AMOS/SmartPLS was used to conduct structural Equation Modeling (SEM) to test the hypothesized relationships between AI ethics perceptions, Shari'ah alignment, trust, satisfaction and adoption intention.

a. Model Fit

The structural model fits reasonably well by all suggested indices, which proves that the suggested Halal-Box framework can be considered a good representation of the observed data.

Table 5. Structural Model Fit Indices

Fit Index	Recommended	Obtained
χ^2/df	< 3.00	1.87
CFI	≥ 0.90	0.94
TLI	≥ 0.90	0.93
RMSEA	≤ 0.08	0.055
SRMR	≤ 0.08	0.046

b. Structural Model

To evaluate the hypothesized relationships, structural equation modeling (SEM) was performed using AMOS/SmartPLS. The structural model reveals the direct positive results of the algorithmic transparency, fairness, data amanah and privacy, and perceived Shari'ah alignment on platform trust, which in turn has a

positive impact on user satisfaction and adoption intention. The standardized path diagram is presented below for visual interpretation of the causal structure.
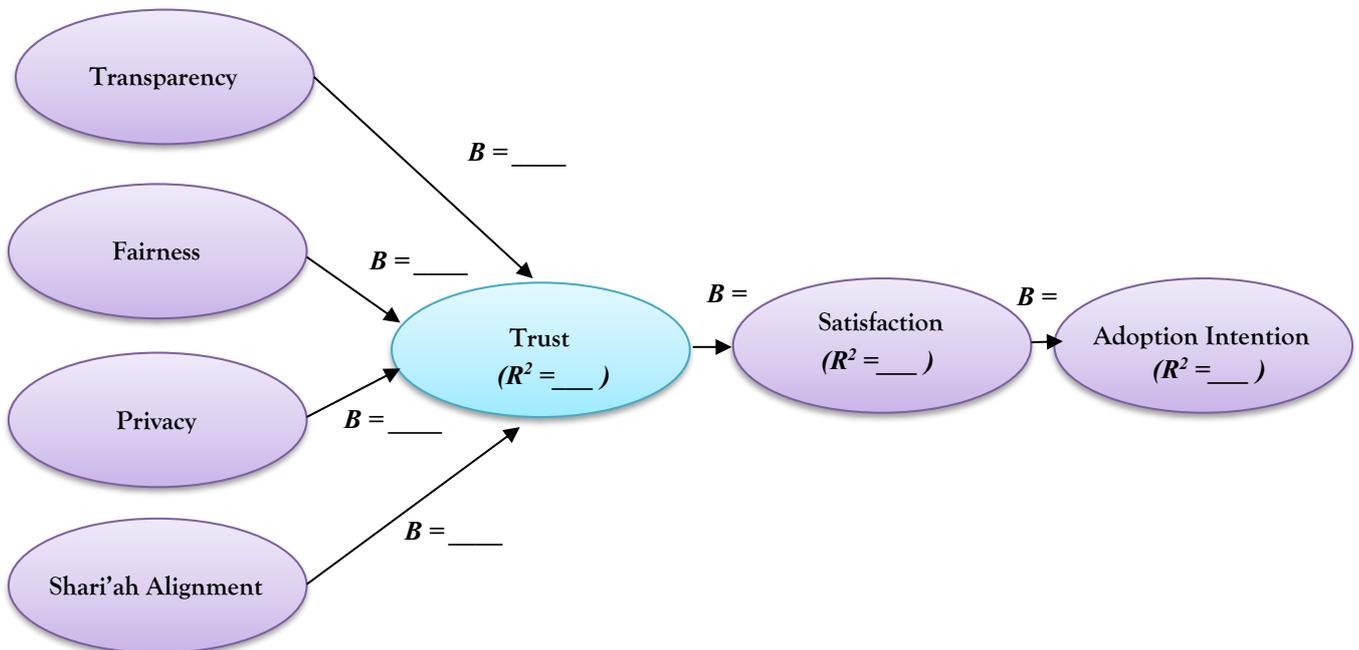

Figure 2. Halal-Box Structural Equation Model with Standardized Path Coefficients (β) and Explained Variance (R²)

Table 6. Structural Path Coefficients and Hypothesis Testing Results

Hypothesis	Path	β	p-value	Decision
H1	Transparency → Trust	0.17	0.016	Supported
H2	Fairness → Trust	0.29	<0.001	Supported
H3	Privacy → Trust	0.23	0.002	Supported
H4	Shari'ah Alignment → Trust	0.41	<0.001	Supported
H6	Trust → Satisfaction	0.65	<0.001	Supported
H7	Satisfaction → Adoption	0.72	<0.001	Supported

Table 7. Explained Variance (R²) of Endogenous Constructs

Construct	R²
Trust	0.64
Satisfaction	0.42
Adoption Intention	0.51

The model explains 64% of the variance in trust, 42% in satisfaction, and 51% in adoption intention, indicating substantial predictive capability.

c. Mediation Effects

In the mediation analysis, the results show that there is a partial mediation between Shari'ah alignment and satisfaction and full mediation between satisfaction and adoption intention.

Table 8. Indirect and Mediation Effects

Indirect Path	Effect	p-value
Shari'ah → Trust → Satisfaction	0.27	<0.001
Trust → Satisfaction → Adoption	0.47	<0.001

E. Key Empirical Insights

Several important findings emerge.

First, perceived Shari'ah alignment is the most significant predictor of trust, surpassing the impacts of traditional AI ethics variables, including transparency or privacy. It means that the users of Islamic FinTech are not going to judge algorithm systems based on the technical consideration, but rather on the religious-ethical consistency. Second, algorithmic transparency has the lowest average score and the lowest path coefficient, which indicates that the current platforms do not share enough information about how decisions made with AI work. This loophole is a risk to regulation and strategic opportunity.

Third, trust functions as the central mediating mechanism between ethical perceptions and behavioral outcomes. In the absence of trust, satisfaction and further adoption reduce drastically. Finally, the high explanatory power of the model confirms that the process confirms that the Halal-Box governance framework forms a strong theoretical and empirical framework of the understanding of the adoption of AI-driven Islamic FinTech.

VI. DISCUSSION

A. Principal Findings and Theoretical Implications

Our results provide empirical support for the Halal-Box framework and reveal important insights about Islamic FinTech user perceptions:

- Shari'ah alignment is decisive. The finding that perceived Shari'ah alignment is the strongest predictor of user trust ($\beta=0.42$) implies a basic fact: the Islamic FinTech users focus more on the Islamic ethical consistency rather than on the generic AI ethics issues (transparency, fairness). This implies that Islamic FinTechs that invest in Shari'ah-based AI governance does not only support procedural Shari'ah compliance, but substantive compliance with Islamic ethical principles will develop much more user trust than algorithmic efficiency or traditional fairness metrics.

- This finding aligns with Islamic finance theory emphasizing values-based finance (Asutay, 2007; Dusuki and Abdullah, 2007) and reveals it to the AI era. It also questions the presumption that the generic AI ethics (transparency, fairness) are always adequate; the users who are framed within the Islamic ethical framework specifically appreciate the incorporation of faith-based values.

- Transparency matters but is inadequate. Perceived transparency's positive but modest effect ($\beta=0.18$) indicates that the users appreciate the clear explanation of AI logic, which is in line with international trends. However, lower mean score on transparency (M=4.2) suggests that existing Islamic FinTech platforms are currently performing much lower on the dimension of explanation. This omission is a compliance risk (pressure to explain things of a regulatory nature), as well as a trust-building opportunity.

- Fairness concerns are real. Perceived fairness (M=4.5, moderate) indicates that there is a user concern that AI systems might discriminate against or unfairly treat them. This is in line with international proofs of algorithmic bias in the finance field and suggests that Islamic FinTech suppliers are expected to execute and publish fairness audits to resolve such issues.

- Privacy/amanah is relatively trusted. The high mean for Data Amanah & Privacy (M=4.8) is reassuring but should not create complacency. This score is relatively high and could be a measure of the successful marketing of Shariah compliance and privacy claims by the platforms and not necessarily data practices. There should be empirical data governance audits.

- High adoption despite concerns. The high adoption intention (M=5.3) regardless of medium levels of

satisfaction and foundations of transparency is an indication that users are prepared to adopt Islamic FinTech despite the reservations, most probably because of Islamic ethical motivation and financial inclusion advantages. Satisfaction-mediated adoption can however be weak, and entry competition may change adoption easily or breach of trust.

B. Integration with Literature

Our Halal-Box framework extends prior work in several directions:

- Beyond procedural to substantive Shari'ah compliance. Prior AI-in-Islamic-finance studies were on procedural compliance (avoiding riba, gharar, prohibited sectors). Our framework introduces substantive compliance: making AI systems reflect Islamic concepts of justice, transparency, amanah, and consumer dignity (Aysan & Ünal, 2021; AlRemeithi and Al Qassem, 2020).
- Grounding AI ethics in non-Western values. Global AI ethics literature, although increasing, is largely Western-based (Resseguier and Rodrigues, 2020; Selbst and Barocas, 2019). Our framework shows the fact that the Islamic ethical principles 'adl, amanah, bayān, maqasid provide clear and demanding foundation in the governance of AI. This helps in the diversification of AI ethics discussion and in honoring cultural and religious plurality.
- Consumer protection through cultural values. Rather than projecting western system of regulation (e.g. GDPR) onto the Islamic contexts, we use indigenous Islamic values to develop locally valid consumer protection frameworks that are culturally appropriate (Chapra, 2000; Dusuki and Abdullah, 2007).

C. Practical Implications for Islamic FinTech Providers

- Invest in Shari'ah-Grounded AI Governance: Islamic FinTech providers should establish joint Shari'ah-Technology committees to oversee AI development and deployment. Not to make sure that the procedures are followed, but to carry out substantive ethical review: Does this algorithm provide justice and non-discrimination? Is it secure of customer amanah (trust and data)? Does it inhibit exploitation? The providers in emerging market economies such as Bangladesh need to consider AI-based Shariah compliance solutions since they improve adoption as it focuses on transparency challenges (Siddiqui et al., 2025).
- Enhance Algorithmic Transparency: Given the lack of transparency is M=4.2, the primary goal of providers should be to explain the logic of the algorithm in a way that makes sense to customers, which could be explainable AI (XAI), feature importance visualization, decision rule extraction, or model-agnostic explanation models. Pre-decision transparency (explaining how the system works) and decision-specific explanation (why this user was approved/denied) should both be implemented and prominently featured.
- Conduct and Publicize Fairness Audits: Frequency algorithmic fairness audits on bias against the protected groups are to be undertaken and results likely made public, and remedies implemented when bias is found. This covers the aspect of fairness (M=4.5) and proves that it is committed to non-discrimination ('adl).
- Strengthen Data Governance and Transparency: While privacy/amanah is fairly high, actual governance practices ought to be known to users: well-defined policies regarding data collection, use, and data retention; user rights (access, correction, deletion); a clear opt-out option to non-critical purposes; and periodic data governance integrity audits.
- Protect Against Exploitation: AI systems should be tested to identify and mitigate harms (over-lending, predatory pricing, exploitative nudging). AI implementation should be incorporated with harm-reduction controls.
- Promote Inclusive Access: AI design should explicitly account for inclusive access: digital onboarding that does not exclude people without formal ID or credit history; affordable pricing; accessibility for visual, hearing, or digital-literacy impairments; and language options.

D. Implications for Regulators and Shari'ah Boards

- Develop AI Governance Guidelines: Central banks and Islamic finance regulators should issue guidelines for AI governance in Islamic financial institutions, explicitly grounded in Islamic ethical principles and

Maqasid al-Shariah. Guidelines need to include: - AI Shari'ah audit standards - Algorithms testing fairness and bias - Transparency and explainability testing - Data management and privacy protection - Consumer complaint and redress process - Public disclosure testing. Such regulators as the Bangladesh Bank have already started focusing on them with AI policy frameworks that demand transparency and bias audits of financial institutions (Bangladesh Bank, 2025).

- Establish AI Shari'ah Audit Standards: Central Shari'ah boards (national or regional) should develop standards for "AI Shari'ah audits" independent expert assessment of AI systems' alignment with Islamic ethical principles. These audits should be periodic and results publicly disclosed.
- Consumer Protection Authority Capacity: Consumer protection regulators must build skills in algorithmic evaluation and digital finance complaints, which will guarantee that AI-related damages are promptly investigated and addressed.

E. Limitations

1. Geographic scope: The research was conducted on Bangladesh and a few economies of the OIC; results might not be applicable to other Islamic and non-Islamic settings.
2. Self-reported perception: Data relies on users' perceptions rather than objective assessment of platform practices. Actual fairness, transparency, and privacy practices may differ from user perceptions.
3. Sample composition: Convenience sampling can create selection bias; the outcomes will be biased towards users who will have more interest in Islamic FinTech.
4. Temporal limitation: Cross-sectional design is a study that takes one instance in time; longitudinal studies had to measure causality and long-term trends.
5. Limited technical assessment: This study assesses user perceptions and governance frameworks; technical algorithmic fairness audits (bias testing, model validation) were not conducted.
6. Sector breadth: Covers digital banking, P2P lending, investment platforms, and microfinance; there was no analysis to do of sector-specific differences.

VII. RECOMMENDATIONS AND CONCLUSION

A. Recommendations for Future Research

1. Longitudinal studies: Follow users over time to assess whether high adoption intention to long-lasting use and the relevance of trust held by users following long-term experience.
2. Technical auditing: Conduct objective algorithmic fairness audits of major Islamic FinTech platforms, which test the bias of credit scoring and pricing and other high-impact decisions.
3. Comparative analysis: Compare Halal-Box principles acceptance and implementation in various Islamic markets (Gulf, Southeast Asia, Bangladesh) and conventional FinTech.
4. Qualitative exploration: In-depth interviews with users, practitioners, Shariah scholars, and regulators to know the obstacles and facilitators to the implementation of Halal-Box.
5. Sector-specific research: Examine application of Halal-Box to specific use cases (Islamic micro-credit, Sukuk platforms, Takaful FinTech) that can have specific AI governance requirements.
6. Regulatory impact assessment: Assess how different regulatory approaches (opt-in Shari'ah audit, mandatory AI governance principles, etc.) influence the Islamic FinTech innovation and user security.

B. Conclusion

Islamic FinTech presents extraordinary opportunity for advancing financial inclusion, economic justice, and Shari'ah-compliant services in Muslim-majority emerging markets. However, the fast implementation of AI technologies that are usually borrowed without proper Islamic ethical foundation poses a threat to consumer protection, fairness, transparency, and the substantive Islamic ideals that define Islamic finance. This study proposes a "Halal-Box" AI governance framework that explicitly integrates Islamic ethical principles ('adl, amanah, bayān, maqasid), Shari law jurisprudence and internet consumer protection requirements in AI system design, implementation, and management in Islamic FinTech. These values are operationalized in six core principles Justice & Non-Discrimination, Transparency and Explainability, Data Amanah and Privacy, No Exploitation and Minimisation of harm, Maslahah and Access to the Inclusive, and Accountability and Shari Oversight, which apply at various levels of the organization.

Our empirical survey of 340 Islamic FinTech users reveals that perceived Shari'ah alignment is the strongest predictor of user trust, fairness and adoption intention a result that underscores the importance of Islamic ethical values to user confidence and loyalty. Transparency and protection of data are highly valued by the users, and the existing platforms do not measure up in terms of transparency (M=4.2). This loophole is a regulatory compliance risk and a building trust opportunity.

We conclude that Islamic FinTech providers, regulators, and Shari'ah boards should prioritize Halal-Box implementation: investing in joint Shari'ah-technology governance, improving the transparency of algorithms, carrying out fairness audits, and integrating consumer protection into the design of AI at the start. This would be in line with the founding values of Islamic finance, user expectations, minimizing regulatory and reputational risk, and ultimately fulfill the overall purpose of Islamic finance to promote justice, shielding the vulnerable, and the shared prosperity in keeping with the Islamic principles. The path from black-box to Halal-Box is not merely a technical challenge but a moral and spiritual necessity of Islamic FinTech to keep this promise of extension of ethical alternative to the conventional finance.

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