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STRATEGIES TO INCREASE INVESTMENT ATTRACTIVENESS OF GREEN FINANCE TRANSFORMATION

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Abstract. This article analyzes the role of "green" finance and ESG principles as a modern trend in the global financial market. The main objective of the research is to develop strategies for increasing investment attractiveness by monitoring the ESG performance of enterprises using FinTech instruments. The paper explores the possibilities of implementing blockchain and artificial intelligence technologies as a solution to the "greenwashing" problem. The research results indicate that the introduction of digital monitoring systems increases investor confidence and accelerates the direction of capital flows toward sustainable projects.

Keywords: green finance, ESG, FinTech, digital monitoring, investment attractiveness, blockchain, sustainable development.

Аннотация. В данной статье анализируется роль «зеленых» финансов и принципов ESG в контексте современных тенденций мирового финансового рынка. Основной целью исследования является разработка стратегий повышения инвестиционной привлекательности путем мониторинга показателей ESG предприятий с использованием инструментов FinTech. В работе рассматриваются возможности внедрения технологий блокчейна и искусственного интеллекта как решения проблемы «greenwashing». Результаты исследования показывают, что внедрение систем цифрового мониторинга повышает доверие инвесторов и ускоряет направление потоков капитала в устойчивые проекты.

Ключевые слова: зеленые финансы, ESG, FinTech, цифровой мониторинг, инвестиционная привлекательность, блокчейн, устойчивое развитие.

Introduction

In the current environment of global economic transformation, the profit indicator alone is no longer enough for financial market participants and managers. Modern investors and managers today consider the commitment of enterprises to the principles of sustainable and sustainable development, that is, their compliance with ESG (Environmental, Social, Governance) criteria, as a priority. This trend requires the transformation of the traditional financial system into a "Green Finance" ecosystem.

However, despite the rapid development of the green finance market, the problem of "Greenwashing" (the falsification of the environmental impact of enterprises) in the industry remains elusive and urgent. The lack of transparency of data and subjective approaches to its collection undermine investor confidence. It is at this point that the achievements of FinTech (Financial Technologies) — blockchain, artificial intelligence (AI) and Big Data analysis — provide an opportunity to radically reform and improve ESG monitoring.

We can also see that the President of the Republic of Uzbekistan, Shavkat Mirziyoyev, in his speeches, specifically touched upon the role of "green" growth and digitalization in the modernization of the economy:

"As we implement structural reforms in our economy, we consider the transition to a 'green economy' to be the highest priority. In this regard, the widespread implementation of digital technologies in all sectors, especially in the financial and banking system, is a guarantee of our sustainable development." - he stated such thoughts.[1]

Also, the "Uzbekistan - 2030" strategy sets the tasks of increasing energy efficiency in the economy, rapidly developing the "green" bond market, and gradually introducing international ESG standards. This, in turn, confirms that the issue of establishing ESG monitoring using FinTech instruments, which we are studying, is not only a scientific innovation, but also the initial stage of strategic tasks at the state level.[2]

Literature Review

The impact of green finance and ESG principles on corporate governance and investment attractiveness has been the focus of attention of economists for the past decade. In early studies, in particular, according to the classical theory of Milton Friedman, the only social responsibility of enterprises was to maximize profits.[3] However, modern financial theorists, including R. Freeman in his work "Stakeholder Theory", scientifically substantiated that the company is responsible not only to shareholders, but also to society and the environment.[4]

Busch (2016) and Friede (2015), who studied the impact of ESG indicators on financial performance, proved in their meta-analyses that companies with a high ESG rating have a lower cost of capital and higher long-term profitability. This indicates that "green finance" is not just charity, but also a strategic economic asset.[5]

However, the problem of "Information asymmetry" is also widely discussed in the literature. P. Healy and J. Palepu (2001)[6] noted that shortcomings in corporate reporting increase risks for investors, while modern researcher T. Kim (2022) calls the phenomenon of "Greenwashing" the biggest obstacle in the digital economy. In his opinion, traditional audit methods are insufficient to verify the authenticity of ESG information.[7]

On the role of FinTech solutions in the financial system, scientists such as D. Arner and J. Barberis (2015) have conducted fundamental research. They believe that technological transformation is the main driver of ensuring transparency in financial services [8]. In recent years, N. Kshetri (2021) has studied the potential of blockchain technology in ensuring ESG accountability and argues that the chain data system is the most effective "vaccine" against "Greenwashing".[9]

Uzbek scientists A. Kadyrov [10] and Sh. Mustafakulov[11] have paid attention to the issues of improving the investment climate and introducing digital technologies in the modernization of the national economy. Nevertheless, the impact of FinTech and ESG integration on investment attractiveness has not yet been studied in the domestic literature in a comprehensive manner, which increases the importance of this study in filling the scientific gap.

Research methodology

This study used comparative analysis, logical generalization, and statistical interpretation methods based on the principles of objectivity and systematicity. The dynamics of ESG investments in international and national financial markets was taken as the object of research. The data base was analyzed from the World Bank, Bloomberg Intelligence reports, and official indicators of the Statistical Agency of the Republic of Uzbekistan and the Central Bank. The methodological basis of the study was inductive and deductive approaches to assessing the effectiveness of FinTech instruments (Blockchain, AI) in ESG monitoring.

This can be explained by the following model:

"The impact of ESG principles on investment attractiveness can be expressed mathematically through the capitalization rate and the reduction in the cost of capital. The cost of capital of an enterprise ($WACC$) is determined by the following formula:

$$WACC = w_e \cdot r_e + w_d \cdot r_d \cdot (1 - t)$$

Where:

- r_e — cost of equity (Cost of Equity);
- r_d — cost of debt (Cost of Debt);
- w_e, w_d — shares in the capital structure.

Reducing ESG risks through digital monitoring (FinTech) leads to a decrease in the "risk premium" (rp) required by investors ($r_e = r_f + \beta(r_m - r_f) + rp$). As a result, $WACC$ decreases, which increases the net present value (NPV) of the project and increases investment attractiveness."

ANALYSIS AND DISCUSSION OF RESULTS

Table 1
Comparison of Traditional and FinTech-based ESG Monitoring [7]

Evaluation criterion	An'anaviy monitoring	FinTech-ESG monitoring
Data frequency	Once a year (static)	Real-time (dynamic)
Reliability level	Subjective (depends on the person)	High (Blockchain Verification)
Operating expenses	High (manual operation)	Up to 30-40% lower
Transparency	Limited (based on report)	Absolutely transparent (Public Ledger)
The danger of "greenwashing"	High	Minimal (data not changing)

This table shows how FinTech solutions (blockchain and AI) overcome the shortcomings of traditional audit methods.

Digital monitoring models for FinTech and ESG integration. Currently, the biggest obstacle for investors in global financial markets is information asymmetry. The phenomenon of "Greenwashing" by companies, which artificially shows their performance positively, has a negative impact on the real investment environment. FinTech solutions, in particular Blockchain

and Artificial Intelligence (AI), have a number of advantages over traditional audit systems in eliminating these problems and eliminating them completely. While traditional monitoring is carried out on the basis of static reports once a year, the FinTech-ESG system provides a dynamic data flow in real time. This reduces operating costs by 30-40%, while ensuring the reliability of data through blockchain verification.

1. DATA INPUT	2. FINTECH PROCESS	3.ESG CONFIRMATION (OUTPUT 1)	4.INVESTMENT ATTRACTION (OUTPUT 2)
• Real-time ESG data	•Blockchain (Data Security)	• Transparent ESG certification	• Increased investor confidence
•IoT sensor metrics	•Artificial Intelligence (Analysis and Forecasting)	•Reducing the risk of "greenwashing"	•Decrease in the cost of capital (WACC ↓)

Figure 1. FinTech and ESG Integration Model

The Role of Blockchain and Smart Contracts. Blockchain technology creates a completely new "Trust Ecosystem" by ensuring data immutability and transparency. According to the principles of Islamic finance, each transaction must be linked to a real asset. Through the blockchain, it is possible to link each cash flow to a specific asset (tokenization). Smart Contracts reduce the risk of uncertainty (Gharar) in transactions to zero. For example, in a Murabaha transaction, the transfer of ownership is carried out within seconds through automatic code, which eliminates errors associated with the human factor. This technology also allows for transparent tracking of where Zakat and Waqf funds are spent, taking social responsibility and transparency to a new level.

Table 2
Islamic Finance and Blockchain Compatibility [8]

Islamic finance demand	**Blockchain solution**	**Expected result**
***Gharar* to eliminate (ambiguity)**	Smart Contracts	Automatic execution of transaction terms
Relationship with	Asset tokenization	Each cash flow is attached to a

Islamic finance demand	Blockchain solution	Expected result
real assets		real asset
Social Justice (Zakat/Waqf)	Transparent distribution system	Monitoring the delivery of funds to the intended destination
Transparency	Public distributed ledger	Increasing investor confidence

Reveals the compliance of Blockchain with the principles of "Maqasid al-Sharia" (Goals of Islamic Law).

Sources of Artificial Intelligence in Asset Management. In the field of asset management, Artificial Intelligence (AI) algorithms allow analyzing the ESG ratings of thousands of companies in seconds. This process uses several innovative sources. First, the real pollution level of factories is measured remotely using satellite images (Computer Vision). Second, social networks and media news are scanned using NLP (Natural Language Processing) methods to assess the social reputation of the company. Third, IoT sensors monitor energy and resource consumption in real time, providing the basis for Big Data analysis. These sources serve as a strategic tool for investors in early identification of ESG risks and increasing investment attractiveness.

Table 3
FinTech tools and their roles in ESG monitoring [9]

Technology	Application in ESG	Monitoring source
Blokcheyn	Data chain and tokenization	Transaction history and smart contracts
Artificial intelligence (AI)	Quick analysis of ESG ratings	Satellite images (Computer Vision)
NLP (Natural Language)	Assessing the company's reputation	Media and social media analysis
IoT (Internet of Things)	Resource consumption control	Energy and waste sensors

The table describes the role of technologies such as AI, NLP and IoT in collecting ESG indicators.

Obstacles and prospects for implementing the model in Uzbekistan. The implementation of Islamic FinTech and ESG integration in the Uzbek financial market faces a number of institutional and technical obstacles. One of the main problems is the lack of full legal status of smart contracts in the Civil Code. There is also a noticeable lack of specialists in the industry who understand both Sharia law and IT programming (Sharia-Tech). Nevertheless, the latest legislative changes in 2026 and the "Regulatory Sandbox" regime are opening up new opportunities for digital Islamic banking. The experience of Malaysia and the UAE shows that the creation of digital Sukuk platforms and the introduction of blockchain registries will serve to sharply increase the flow of cross-border investments.

CONCLUSIONS AND SUGGESTIONS

The results of the study showed that the introduction of Islamic FinTech platforms through blockchain and smart contracts in the Uzbek financial market is not only a modern economic trend, but also a strategic necessity for the development of the national financial system. At the end of the study, the following conclusions were formulated:

1. **Technological compatibility:** Blockchain technology, with its decentralization, transparency and immutability of data, fully meets the basic requirements of Islamic law (Maqasid al-Sharia) - eliminating uncertainty (Gharar) and linking each transaction to a real asset.
2. **Operational efficiency:** The use of smart contracts (Smart Contracts) automates complex document flow in Islamic financial products, which allows reducing operating costs by 30-40 percent and reducing errors associated with the human factor to zero.
3. **Investment attractiveness:** The creation of a digital Islamic financial infrastructure will attract idle funds of the population that remain outside the banking system into economic circulation and increase the flow of direct investments from Middle Eastern countries.

Based on the results of the study, the following practical proposals are put forward:

- **Improving the regulatory framework:** It is necessary to amend the legislation to establish the legal status of smart contracts in the Civil Code and their recognition as evidence in court.
- **Expanding the "Regulatory Sandbox" regime:** It is necessary to activate special testing grounds under the Central Bank and the National Agency for Prospective Projects (ILMA) to test digital Islamic finance products in real market conditions.
- **Increasing human resources capacity:** It is of strategic importance to establish a system for training specialists (Sharia-Tech) in higher education institutions who understand both the principles of Sharia and blockchain programming.
- **Optimizing the tax regime:** It is proposed to complete the reforms initiated to eliminate the risk of double taxation of assets (VAT) in Islamic finance transactions and introduce a system of incentives for digital platforms.

Table 4
Obstacles and solutions to implementing the model in Uzbekistan [2]

Existing barrier	Proposed solution	Responsible authority
Lack of legal status	Amendments to the Civil Code	Ministry of Justice, Oliy Majlis
Staff shortage	Opening the "Sharia-Tech" direction	Higher education institutions
Taxation (VAT)	Double taxation elimination	Tax Committee
Lack of technical testing space	Activate the Regulatory Sandbox	Central Bank, ILMA

It summarizes the obstacles in the national economy and practical proposals for their elimination.

To support green FinTech projects in the financial market of Uzbekistan, it is proposed to introduce a special 'Green Regulatory Sandbox' regime under the Central Bank. Within the framework of this regime:

1. Simplify the reporting process for ESG-certified startups;
2. Test the issuance of blockchain-based 'Green Bonds';
3. Create the opportunity to integrate digital monitoring systems into the banking infrastructure.

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