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ijtimoiy-iqtisodiy, innovatsion texnik, fan va ta'limga oid ilmiy-amaliy jurnal

2026-YIL

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05.01.00 – Axborot texnologiyalari, boshqaruv va kompyuter grafikasi
05.01.01 – Muhandislik geometriyasi va kompyuter grafikasi. Audio va video texnologiyalari
05.01.02 – Tizimli tahlil, boshqaruv va axborotni qayta ishlash
05.01.03 – Informatikaning nazariy asoslari
05.01.04 – Hisoblash mashinalari, majmualari va kompyuter tarmoqlarining matematik va dasturiy ta'minoti
05.01.05 – Axborotlarni himoyalash usullari va tizimlari. Axborot xavfsizligi
05.01.06 – Hisoblash texnikasi va boshqaruv tizimlarining elementlari va qurilmalari
05.01.07 – Matematik modellashtirish
05.01.11 – Raqamli texnologiyalar va sun'iy intellekt
05.02.00 – Mashinasozlik va mashinashunoslik
05.02.08 – Yer usti majmualari va uchish apparatlari
05.03.02 – Metrologiya va metrologiya ta'minoti
05.04.01 – Telekommunikasiya va kompyuter tizimlari, telekommunikasiya tarmoqlari va qurilmalari. Axborotlarni taqsimlash
05.05.03 – Yorug'lik texnikasi. Maxsus yoritish texnologiyasi
05.05.05 – Issiqlik texnikasining nazariy asoslari
05.05.06 – Qayta tiklanadigan energiya turlari asosidagi energiya qurilmalari
05.06.01 – To'qimachilik va yengil sanoat ishlab chiqarishlari materialshunosligi
05.08.03 – Temir yo'l transportini ishlatish
05.08.06 – "G'ildirakli va gusenisali mashinalar va ularni ishlatish" (texnika fanlari)
05.09.01 – Qurilish konstruksiyalari, bino va inshootlar
05.09.04 – Suv ta'minoti. Kanalizatsiya. Suv havzalarini muhofazalovchi qurilish tizimlari
10.00.06 – Qiyosiy adabiyotshunoslik, chog'ishtirma tilshunoslik va tarjimashunoslik
10.00.04 – Yevropa, Amerika va Avstraliya xalqlari tili va adabiyoti
08.00.01 – Iqtisodiyot nazariyasi
08.00.02 – Makroiqtisodiyot
08.00.03 – Sanoat iqtisodiyoti
08.00.04 – Qishloq xo'jaligi iqtisodiyoti
08.00.05 – Xizmat ko'rsatish tarmoqlari iqtisodiyoti
08.00.06 – Ekonometrika va statistika
08.00.07 – Moliya, pul muomalasi va kredit
08.00.08 – Buxgalteriya hisobi, iqtisodiy tahlil va audit
08.00.09 – Jahon iqtisodiyoti
08.00.10 – Demografiya. Mehnat iqtisodiyoti
08.00.11 – Marketing
08.00.12 – Mintaqaviy iqtisodiyot
08.00.13 – Menejment
08.00.14 – Iqtisodiyotda axborot tizimlari va texnologiyalari
08.00.15 – Tadbirkorlik va kichik biznes iqtisodiyoti
08.00.16 – Raqamli iqtisodiyot va xalqaro raqamli integratsiya
08.00.17 – Turizm va mehmonxona faoliyati

Ma'lumot uchun, OAK Rayosatining 2024-yil 28-avgustdagi 360/5-son qarori bilan "Dissertatsiyalar asosiy ilmiy natijalarini chop etishga tavsiya etilgan milliy ilmiy nashrlar ro'yxati"ga texnika va iqtisodiyot fanlari bo'yicha "Muhandislik va iqtisodiyot" jurnali ro'yxatga kiritilgan.

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MUNDARIJA • СОДЕРЖАНИЕ • CONTENTS

MUNDARIJA

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DEVELOPMENT OF AN INTEGRATED ESG-BASED FRAMEWORK FOR ASSESSING THE INVESTMENT ATTRACTIVENESS OF INDUSTRIAL ENTERPRISES IN THE REPUBLIC OF UZBEKISTAN

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Abstract: The study develops an integrated ESG-based framework for assessing the investment attractiveness of industrial enterprises in the Republic of Uzbekistan. The proposed ESG Investment Attractiveness Index (ESG-IAI) combines environmental, social, governance, financial, innovation and risk-management indicators into a unified assessment model. The methodology includes the selection and normalization of ESG indicators, calculation of partial indices and estimation of an integrated investment attractiveness index. The results show that a higher level of ESG performance increases investment attractiveness, reduces investment risks and supports sustainable industrial development. The proposed framework can be applied by enterprises, investors and public authorities in investment decision-making and ESG evaluation.

Keywords: ESG; ESG-IAI; investment attractiveness; industrial enterprises; sustainable development; corporate governance; sustainable finance; Uzbekistan.

Annotatsiya: Mazkur maqolada O'zbekiston Respublikasi sanoat korxonalarining investitsion jozibadorligini baholash bo'yicha integratsiyalashgan ESGga asoslangan metodologiya ishlab chiqilgan. Tadqiqotda ekologik, ijtimoiy, korporativ boshqaruv, moliyaviy, innovatsion va risklarni boshqarish ko'rsatkichlarini birlashtiruvchi ESG Investment Attractiveness Index (ESG-IAI) taklif etilgan. Metodologiya ESG ko'rsatkichlarini tanlash va normallashtirish, xususiy indekslarni hisoblash hamda integrallashgan investitsion jozibadorlik indeksini aniqlashni o'z ichiga oladi. Tadqiqot natijalari ESG yetukligining yuqori darajasi korxonalarning investitsion jozibadorligini oshirish, investitsiya xavflarini kamaytirish va investitsiya qarorlarini samaraliroq qabul qilishga xizmat qilishini ko'rsatadi. Taklif etilgan yondashuv sanoat korxonalari, investorlar va davlat organlari tomonidan ESG samaradorligini baholash hamda barqaror sanoat rivojlanishini ta'minlashda qo'llanilishi mumkin.

Kalit so'zlar: ESG; ESG-IAI; investitsion jozibadorlik; sanoat korxonalari; barqaror rivojlanish; korporativ boshqaruv; barqaror moliyalashtirish; O'zbekiston Respublikasi.

Аннотация: В статье разработана интегрированная ESG-ориентированная методика оценки инвестиционной привлекательности промышленных предприятий Республики Узбекистан. Предложен ESG Investment Attractiveness Index (ESG-IAI), объединяющий экологические, социальные, управленческие, финансовые, инновационные показатели и показатели управления рисками в единую систему оценки. Методика включает отбор и нормализацию ESG-показателей, расчет частных ESG-индексов и определение интегрального индекса инвестиционной привлекательности. Результаты исследования подтверждают, что высокий уровень ESG-зрелости способствует повышению инвестиционной привлекательности предприятий, снижению инвестиционных рисков и принятию более эффективных инвестиционных решений. Предлагаемый подход может использоваться предприятиями, инвесторами и государственными органами для оценки ESG-эффективности и обеспечения устойчивого промышленного развития Республики Узбекистан.

Ключевые слова: ESG; ESG-IAI; инвестиционная привлекательность; промышленные предприятия; устойчивое развитие; корпоративное управление; устойчивое финансирование; Республика Узбекистан.

INTRODUCTION

Investment attractiveness has traditionally been assessed using financial indicators such as profitability, liquidity and solvency. However, these indicators alone no longer reflect the long-term sustainability of industrial enterprises, as investors increasingly consider environmental, social and governance (ESG) performance alongside financial results. For industrial enterprises, ESG factors are particularly important due to high resource consumption, environmental impacts and stakeholder expectations. In Uzbekistan, the importance of ESG is growing in line with economic modernization, industrial transformation and the attraction of foreign investment. National priorities outlined in the Uzbekistan–2030 Strategy and the World Bank Country Climate and Development Report emphasize sustainable industrial development, corporate governance and environmental responsibility.

Despite the growing importance of ESG, existing assessment methodologies provide valuable foundations that have largely been developed for mature capital markets and multinational corporations with advanced sustainability reporting practices. Their application to industrial enterprises in Uzbekistan can be further strengthened by considering differences in institutional conditions, data availability and ESG disclosure practices. This highlights the opportunity to develop a practical methodology that integrates ESG performance into the assessment of investment attractiveness and can be effectively applied under national conditions.

The purpose of this study is to develop an integrated ESG-based framework for assessing the investment attractiveness of industrial enterprises in the Republic of Uzbekistan. The proposed methodology introduces the ESG Investment Attractiveness Index (ESG-IAI), which combines ESG, financial, innovation and risk-management indicators into a single assessment model. The scientific novelty of the research lies in treating ESG performance as a measurable component of investment attractiveness, providing a practical tool for enterprises, investors and policymakers to support sustainable investment decision-making.

REVIEW OF LITERATURE ON THE SUBJECT

The theoretical foundations of ESG are based on stakeholder theory, sustainable development and corporate social responsibility. Freeman (1984) argued that long-term corporate success depends on balancing the interests of multiple stakeholders, while the Brundtland Report (1987) and Elkington’s (1997) Triple Bottom Line concept established the integration of economic, environmental and social dimensions into corporate performance assessment. Porter and Kramer (2011) further demonstrated that sustainability can create shared value by linking business success with social progress. Empirical evidence confirms that strong ESG performance improves long-term financial performance, firm value and investment attractiveness (Eccles et al., 2014; Friede et al., 2015; Khan et al., 2016; Giese et al., 2019; Pedersen et al., 2021), although inconsistencies in ESG rating methodologies remain an important challenge (Berg et al., 2022).

Other studies have examined ESG disclosure and firm value in different contexts. Li, Gong, Zhang and Koh (2018) found that ESG disclosure may improve firm value, while Fatemi, Glaum and Kaiser (2018) emphasized the moderating role of disclosure quality. Albuquerque, Koskinen and Zhang (2019) linked corporate social responsibility with firm risk, and Atan et al. (2018) provided evidence from an emerging-market setting. These studies support the argument that ESG affects investment attractiveness through both value creation and risk reduction mechanisms.

International ESG standards and frameworks provide the foundation for sustainability assessment and disclosure. The GRI Standards, IFRS S1 and IFRS S2, OECD Principles of Corporate Governance, IFC Performance Standards, and the Principles for Responsible Investment establish key requirements for ESG reporting, governance quality, risk management and responsible investment. Previous studies also confirm the positive relationship between ESG performance and long-term financial outcomes (Whelan et al., 2021). However, a significant research gap remains for emerging economies, including Uzbekistan, where ESG reporting practices are still evolving and practical methodologies for assessing the investment attractiveness of industrial enterprises remain insufficiently developed.

RESEARCH METHODOLOGY

This study develops an integrated methodological framework for assessing the impact of ESG factors on the investment attractiveness of industrial enterprises in Uzbekistan. The proposed ESG Investment Attractiveness Index (ESG-IAI) combines financial and non-financial indicators into a unified composite index. The methodology includes the selection and normalization of ESG indicators, calculation of partial ESG indices, estimation of the integrated ESG-IAI, and classification of enterprises according to investment attractiveness. The framework is based on the composite indicator methodology (OECD, 2008) and incorporates the principles of the Analytic Hierarchy Process (Saaty, 1980) in a simplified form suitable for practical application (Figure 1).

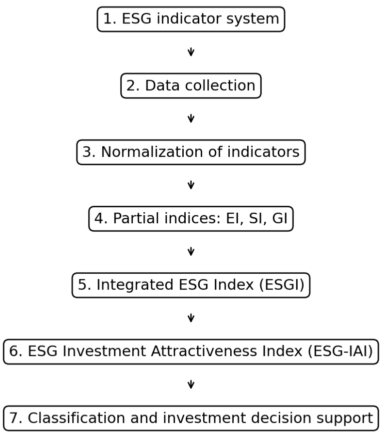

Figure 1. Proposed ESG investment attractiveness assessment framework[1]

ANALYSIS AND RESULTS

The proposed ESG indicator system is adapted to industrial enterprises. The environmental dimension includes indicators related to emissions, energy efficiency, water use, waste management and environmental management systems. The social dimension includes occupational safety, employee development, staff stability, gender diversity and social investment. The governance dimension includes board independence, transparency, ESG disclosure, internal audit, anti-corruption policy and risk management (Table 1).

Table 1. Proposed ESG indicators for industrial enterprises[2]

Dimension	Indicator	Type	Interpretation
Environmental	Greenhouse gas emissions	Negative	Lower emissions indicate stronger environmental performance
Environmental	Energy efficiency	Positive	Higher efficiency reduces cost and environmental risk
Environmental	Water use efficiency	Positive	Reflects rational use of natural resources
Environmental	Waste recycling rate	Positive	Shows circular-economy orientation
Social	Occupational safety	Negative	Lower accident frequency improves social stability
Social	Employee training	Positive	Shows human capital development
Social	Staff turnover	Negative	Lower turnover indicates workforce stability
Social	Social investment	Positive	Reflects contribution to community development
Governance	Transparency of reporting	Positive	Improves investor confidence
Governance	ESG disclosure	Positive	Increases information availability
Governance	Internal audit	Positive	Supports control and accountability
Governance	Risk management system	Positive	Reduces uncertainty for investors

Because the selected indicators have different units of measurement, they are converted into standardized values ranging from 0 to 1. For indicators where a higher value means better performance, the following min-max normalization is used:

$$Xi = (xi - xmin) / (xmax - xmin)$$

For indicators where a lower value means better performance, inverse normalization is applied:

$$Xi = (xmax - xi) / (xmax - xmin)$$

This procedure ensures comparability among enterprises regardless of differences in enterprise size,

1 Source: author's elaboration.
2 Source: author's elaboration.

sector, production capacity and measurement units.

At the first level, three partial ESG indices are calculated: Environmental Index (EI), Social Index (SI) and Governance Index (GI). The integrated ESG Index is calculated as follows:

$$ESGI = wE \times EI + wS \times SI + wG \times GI, \text{ where } wE + wS + wG = 1.$$

At the second level, ESGI is integrated with financial performance, innovation capacity and risk management to calculate ESG-IAI:

$$ESG\text{-}IAI = 0.39 \times ESGI + 0.30 \times FP + 0.18 \times IC + 0.13 \times RM$$

The weights reflect the logic of multi-criteria assessment. ESG performance receives the highest weight because the study focuses on ESG-based investment attractiveness. Financial performance remains the second most important criterion, while innovation capacity and risk management reflect the enterprise ability to maintain competitiveness and reduce uncertainty (Table 2; Figure 2).

Table 2. Weighting coefficients used in ESG-IAI[3]

Criterion	Symbol	Weight
ESG performance	ESGI	0.39
Financial performance	FP	0.30
Innovation capacity	IC	0.18
Risk management	RM	0.13
Total	-	1.00

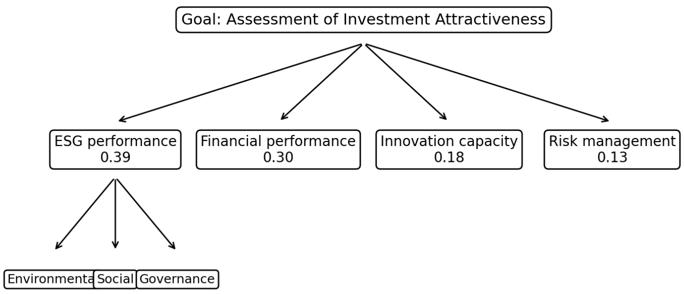

Figure 2. Hierarchical structure of ESG-IAI assessment[4]

To interpret the results, enterprises are classified into four levels according to the ESG-IAI value. This classification supports benchmarking and investment decision-making (Table 3).

Table 3. Classification of enterprises by ESG-IAI[5]

ESG-IAI value	Investment attractiveness level	Interpretation
0.80-1.00	Very high	Strategic investment candidate
0.60-0.79	High	Investment attractive with monitoring
0.40-0.59	Moderate	Selective investment, improvements required
Below 0.40	Low	High investment risk

To demonstrate the practical application of the proposed framework, a pilot assessment was conducted for selected industrial enterprises in Uzbekistan. The enterprises were selected from strategically important sectors, including metallurgy, chemicals, oil and gas, energy and gas-to-liquids production. The purpose of the pilot assessment is not to establish an official ESG ranking, but to show how the proposed methodology can be applied under conditions of limited public ESG disclosure.

The pilot sample includes JSC Uzmetkombinat, JSC Navoiyazot, JSC Uzbekneftegaz, JSC

3 Source: author's elaboration.
4 Source: author's elaboration.
5 Source: author's elaboration.

Uzbekhydroenergo and JSC Uzbekistan GTL. These enterprises represent different levels of environmental intensity, technological modernization and corporate governance development. In cases where quantitative data were incomplete, expert scoring was used to illustrate the logic of the framework (Table 4; Figure 3).

Table 4. Pilot assessment of selected industrial enterprises[6]

Enterprise	ESGI	FP	IC	RM	ESG-IAI	Investment level
Uzbekhydroenergo	0.86	0.83	0.80	0.87	0.84	Very high
Uzbekistan GTL	0.82	0.81	0.78	0.83	0.81	Very high
Uzmetkombinat	0.76	0.74	0.70	0.75	0.74	High
Navoiyazot	0.72	0.70	0.68	0.71	0.70	High
Uzbekneftegaz	0.72	0.69	0.66	0.72	0.70	High

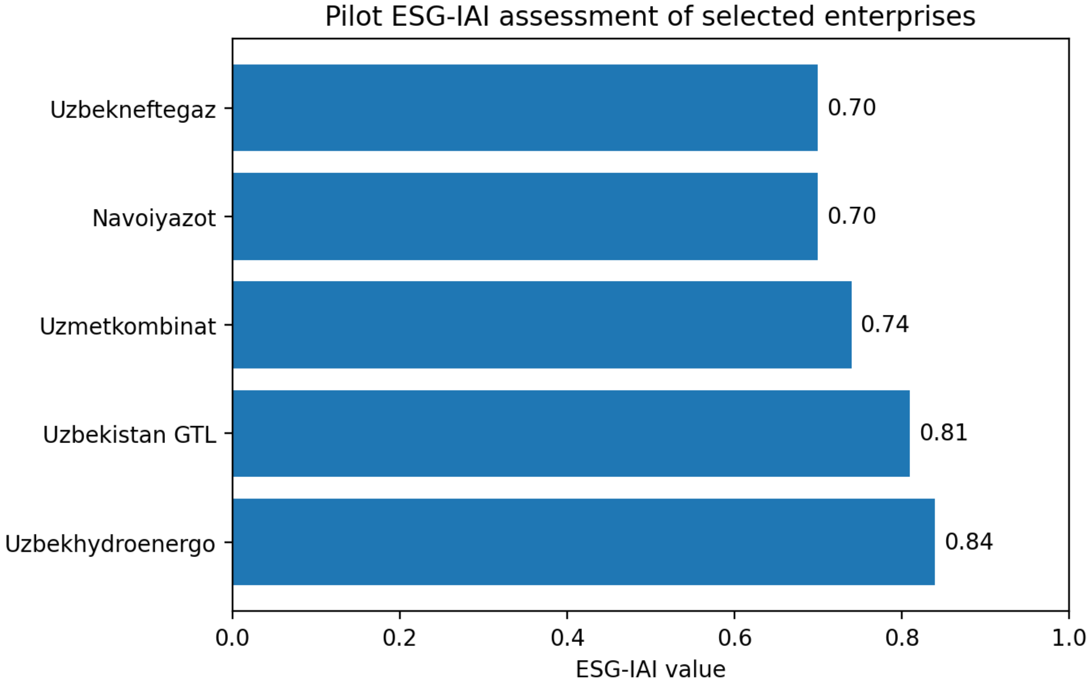

Figure 3. Comparative ESG-IAI results for selected enterprises[7]

As a calculation example, the ESG-IAI of Uzbekistan GTL is obtained as follows: ESG-IAI = 0.39(0.82) + 0.30(0.81) + 0.18(0.78) + 0.13(0.83) = 0.81. According to the classification scale, this value corresponds to a very high level of investment attractiveness.

This study makes three main contributions. First, it develops an integrated ESG Investment Attractiveness Index that links ESG maturity with financial performance, innovation capacity and risk management. Second, it adapts ESG assessment to the conditions of industrial enterprises in Uzbekistan, where standardized sustainability reporting is still developing. Third, it provides a practical classification model that can be used by enterprises, investors and policymakers for benchmarking and decision support.

The proposed methodology is also useful for the broader research agenda on ESG in emerging markets. It demonstrates how composite index methodology can be applied when full ESG datasets are not yet available, while still maintaining a transparent and systematic assessment logic.

CONCLUSIONS AND SUGGESTIONS

This study developed an integrated ESG-based framework for assessing the investment attractiveness of industrial enterprises in the Republic of Uzbekistan. The proposed ESG Investment Attractiveness Index (ESG-IAI) combines ESG performance, financial performance, innovation capacity and risk management into a

6 Source: author’s elaboration.
7 Source: author’s elaboration.

unified assessment model that enables a comprehensive evaluation of investment attractiveness.

The pilot assessment indicates that enterprises with higher ESG maturity achieve stronger investment attractiveness, confirming that ESG factors represent measurable drivers of long-term investment potential rather than solely elements of corporate responsibility. The proposed methodology can support industrial enterprises, investors and policymakers in improving ESG performance, reducing investment risks and promoting sustainable industrial development.

The pilot results are based on publicly available information and expert evaluation and therefore should be regarded as a methodological demonstration. Future research should expand the empirical database and validate the ESG-IAI using larger samples and statistical analysis of investment flows, profitability and the cost of capital.

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Musahhih: Zokir Alibekov

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