TASHKENT STATE UNIVERSITY OF ECONOMICS

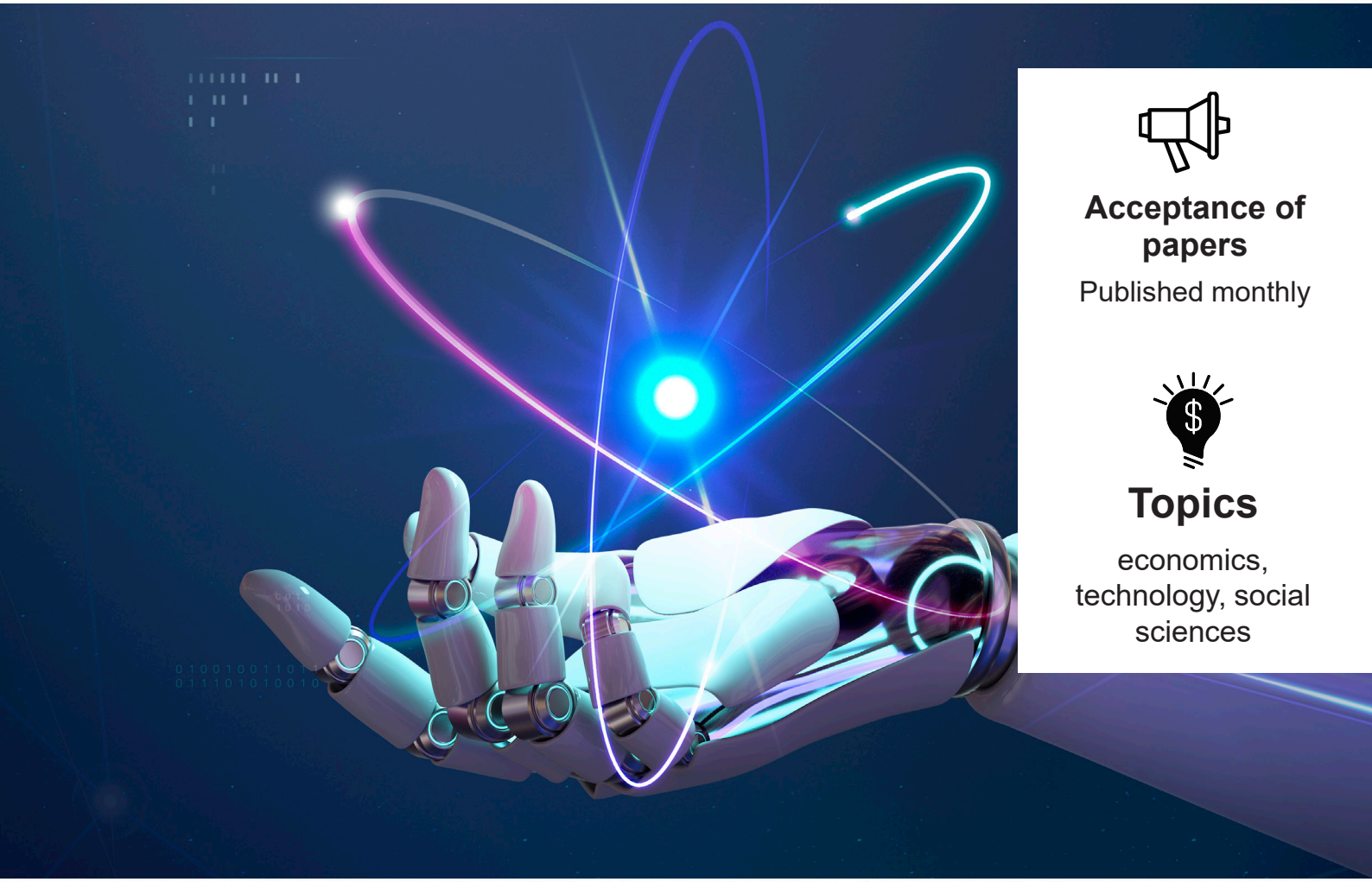
International journal of topics

INNOVATION SCIENCE AND TECHNOLOGY

Scopus || Electronic journal specializing in Scopus

ISSUE 3

Acceptance of papers **March, 2026**



Acceptance of papers

Published monthly

Topics

economics, technology, social sciences

ISSN 3060-5229

Electronic publication, Issue 3. 254 pages.
Approved for publication on March, 2026.

THE SCIENTIFIC-POPULAR ELECTRONIC JOURNAL **"INNOVATION SCIENCE AND TECHNOLOGY"** HAS BEEN REGISTERED UNDER THE NUMBER **C-5669633** BY THE AGENCY FOR INFORMATION AND MASS COMMUNICATIONS (AOKA) OF THE REPUBLIC OF UZBEKISTAN, EFFECTIVE FROM OCTOBER 9, 2024.

CONTACTS

Phone: **+998 50 737 87 88**

Website: https://ist-journal.uz

Email: innovationist2025@gmail.com

The scientific electronic journal “Innovation Science and Technology” has been included in the list of scientific publications recommended for the publication of main scientific results of dissertations for the award of PhD and DSc degrees in economics and technical sciences, in accordance with the Resolution No. 370 of the Presidium of the Higher Attestation Commission of the Republic of Uzbekistan, dated May 8, 2025.

Editorial board:

CONTENTS

CONTENTS

CONTENTS

COMPLIANCE OF BANKING AI SYSTEMS WITH EU AI ACT REQUIREMENTS AND THEIR ROLE IN RISK MANAGEMENT

Usmonov Faridun F.
3rd-year student, Group BI-223
Samarkand Institute of Economics and Service

Scientific Supervisor:
Zainalov Zh.R.
Professor (DSc), Head of the Finance Department
Samarkand Institute of Economics and Service
E-mail: dz50@mail.ru

Abstract: This article examines how banking AI systems—particularly those used in credit scoring—are positioned within the regulatory framework established by the EU Artificial Intelligence Act (EU AI Act). The analysis centres on the Act's high-risk classification requirements and their technical implications for credit institutions. Rather than treating compliance as a checklist exercise, this paper argues that structured AI governance, when properly implemented, can become a source of institutional resilience and competitive differentiation. Practical recommendations are developed with particular attention to the applicability of EU experience in the context of Uzbekistan's emerging AI regulatory environment.

Key words: EU AI Act, artificial intelligence, banks, credit scoring, risk management, regulation, Basel Committee, machine learning, governance, high-risk systems, compliance.

INTRODUCTION

The adoption of the EU AI Act on 1-August-2024 fundamentally transforms the regulatory approach to artificial intelligence in banking—shifting the focus from general compliance to structured risk governance. This shift is not merely procedural. For institutions whose credit decisions increasingly rely on machine learning models, the Act introduces accountability requirements that extend deeply into system architecture, data pipelines, and organisational processes.

The regulation of AI systems is becoming a structural element of financial stability, particularly in jurisdictions where AI-based decision-making directly affects consumer rights. This logic is well established in EU supervisory practice—from DORA to ECB model governance guidelines—but the AI Act goes further by introducing an explicit risk-based classification with binding obligations for high-risk system operators.

As of 2025, approximately 40% of EU banks actively use generative AI, predominantly in customer service and internal process optimisation [10]. The pace of adoption creates an asymmetry: deployment is accelerating faster than governance frameworks can be developed around it. The AI Act is, in part, a regulatory response to this gap. The compliance deadline for high-risk AI systems—2-August-2026—leaves banks with a limited window for transformation.

This study identifies the key requirements of the EU AI Act for banking AI systems and develops a practical compliance model applicable to credit institutions. Special attention is given to the gap between EU regulatory expectations and the institutional environment of Uzbekistan, where formal AI classification frameworks do not yet exist.

LITERATURE REVIEW

The scholarly discourse on AI in banking regulation has developed along two parallel tracks: technical governance and legal compliance. The Basel Committee on Banking Supervision has consistently emphasised

three foundational concerns—model explainability, AI/ML governance structures, and systemic implications for financial stability [6]. These concerns predate the AI Act but are directly reflected in its regulatory architecture.

The European Banking Authority, in its mapping exercise published in November-2025, identified no significant contradictions between the AI Act and existing EU banking legislation [2]. This convergence of regulatory expectations—across the AI Act, DORA, and ECB internal model guidelines—indicates the emergence of a unified supervisory logic centred on explainability and governance transparency. Banks can no longer treat these instruments as separate compliance silos; rather, they constitute an integrated regulatory framework.

In Uzbekistan, scholarly attention to this intersection remains limited. Domestic researchers—including Iminov M., Bobojonova M., and Ergashev O.—have analysed the influence of demographic and social factors on commercial bank performance; however, the formal treatment of AI governance as a regulatory category remains absent from the literature. This gap reflects a broader institutional reality: unlike EU jurisdictions, the regulatory framework in Uzbekistan does not yet provide a formal risk-based classification of AI systems, which complicates early-stage governance alignment for banks seeking to operate across both markets.

RESEARCH METHODOLOGY

This study is based on regulatory analysis, comparative institutional review, and the structured synthesis of primary sources. The primary corpus includes the EU AI Act, EBA mapping reports, ECB internal model guidelines, Basel Committee publications, and materials from the Financial Stability Institute. Secondary sources—such as McKinsey and Deloitte—are used to contextualise adoption rates and organisational readiness data.

Where possible, regulatory provisions are analysed in relation to their practical implications for banking operations rather than being presented in abstract form. The objective is to move beyond a purely descriptive account of the Act's requirements toward the development of an analytical framework for implementation—one that recognises both the compliance burden and the potential strategic advantages of well-structured AI governance.

ANALYSIS AND RESULTS

The EU AI Act classifies AI systems into a four-tier risk hierarchy based on their potential impact on fundamental rights, safety, and health [1]: unacceptable risk (prohibited systems, including social scoring and manipulative techniques); high risk (systems subject to strict regulatory requirements, including AI used for creditworthiness and credit rating assessments of individuals); limited risk (systems subject only to transparency obligations, such as chatbots); and minimal risk (systems with no specific regulatory obligations). This classification framework is not arbitrary; rather, it reflects a deliberate policy choice to impose the most stringent requirements on systems whose automated decisions most directly affect individuals' economic access.

Credit scoring systems fall explicitly within the high-risk category under Annex III. This classification has implications that extend beyond formal labelling. Banks operating such systems are subject to regulatory obligations that cover the entire lifecycle of model development, deployment, and post-deployment monitoring. Table 1 presents the key provisions of the EU AI Act and their operational implications for credit institutions (Table 1).

Table 1. Key EU AI Act Requirements for High-Risk Banking AI Systems[1]

Article	Core Obligation	Operational Meaning for Credit Scoring
Art. 9	Continuous risk management	Systematic identification and documentation of discrimination risks, data quality issues, model drift, and gaps in human oversight on an ongoing basis
Art. 10	Data governance	Training datasets must be representative and subject to bias assessment. The use of social media or alternative data sources requires explicit bias mitigation strategies
Art. 11–12	Technical documentation and logging	Comprehensive audit trail, including system architecture, development processes, validation outcomes, and secure, immutable logs with access controls
Art. 13–14	Transparency and human oversight	Automated credit decisions must be subject to human review. System outputs should be interpretable rather than opaque
Art. 72	Post-market monitoring	Continuous performance monitoring after deployment, with a regulatory obligation to intervene if system behaviour deviates from the validated baseline

1 Source: Compiled by the author based on EU AI Act [1], EBA [2], ECB [4].

Several key observations emerge from this mapping. First, the obligations are not static—Article 9 explicitly requires a continuous risk management process rather than a point-in-time assessment. Second, the data governance requirements under Article 10 create a genuine tension for banks using alternative credit scoring data, such as rental history, utility payments, and transactional patterns. While such data can improve scoring accuracy for underbanked populations by approximately 20–25% [8], it simultaneously introduces bias risks that must be actively managed rather than assumed away.

Third—and this is where implementation becomes particularly challenging—the interpretability requirement under Article 13 runs counter to the design of high-performance models, such as gradient boosting and deep learning algorithms, which typically trade transparency for predictive power.

This tension between model accuracy and explainability is not resolved by the Act; instead, it is delegated to financial institutions. While the Act establishes the regulatory standard, it leaves the technical implementation pathway open. This creates both flexibility and uncertainty, particularly for institutions that lack in-house expertise in model governance.

At the same time, the convergence between the AI Act and other regulatory frameworks provides a practical advantage. The European Central Bank's updated Guide to Internal Models (July-2025) establishes machine learning governance standards that closely align with Articles 9–14 of the AI Act [7]. Consequently, banks that have already invested in ECB-compliant model documentation are significantly better positioned to achieve AI Act compliance than those starting from scratch. Similarly, the Digital Operational Resilience Act (DORA) overlaps substantially with the AI Act in areas such as logging requirements and incident management obligations.

The Gap Between Regulatory Expectation and Organisational Readiness

The compliance landscape appears less favourable when assessed against current organisational readiness. More than half of financial institutions lack systematic inventories of their AI systems [9], meaning they are unable to identify which tools fall into the high-risk category, let alone demonstrate compliance with Article 9. This challenge is not purely technical; rather, it is fundamentally a governance issue. Without a centralised AI registry, effective compliance planning becomes structurally unfeasible.

Table 2 presents a comparison between current readiness indicators and the requirements established by the AI Act.

Table 2. AI Compliance Readiness in the EU Banking Sector vs. Act Requirements[2]

Indicator	Current State	Act Requirement
Share of EU banks using generative AI	~40% (**2025**)	Full inventory and risk classification required
Organisations with systematic AI inventories	<50% [9]	Mandatory pre-deployment registry
Banks with documented model governance policies	Minority [10]	Comprehensive lifecycle documentation
Compliance deadline (high-risk systems)	**2-August-2026**	Full operational compliance

The available evidence suggests that a significant share of the banking sector is starting from a substantial governance deficit. Although the compliance deadline of August-2026 may appear distant, the infrastructure transformations required—such as versioning systems, automated logging, data lineage tracking, and bias testing tools—typically require 18 to 24 months for proper implementation. Institutions that have not yet initiated these processes face a credible risk of non-compliance, which may result in reputational damage and supervisory consequences extending beyond immediate compliance costs.

While the EU AI Act establishes a comprehensive compliance framework, its practical implementation may impose disproportionate operational burdens on medium-sized banks that lack advanced data governance infrastructure. Notably, the Act does not differentiate between large institutions with dedicated AI governance teams and smaller regional banks whose credit scoring models rely on third-party platforms. This represents a legitimate concern that forthcoming technical standards from the European Banking Authority (EBA) will need to address.

Based on the preceding analysis, a practical compliance pathway can be structured into three sequential stages. This model is not directly derived from the Act's text; rather, it is an analytical construct designed to translate regulatory obligations into an operational sequence.

Stage 1 — Inventory and Classification.

Before any compliance effort can be effective, institutions must establish a centralised AI registry. This includes a comprehensive inventory of both deployed and in-development AI systems, each assessed against

2 Source: Compiled by the author based on McKinsey [10], Deloitte [9], EU AI Act [1].

the Act's risk categories. Importantly, third-party and vendor-supplied models must also be included, as legal responsibility remains with the deploying institution. Vendor contracts should therefore be updated to incorporate documentation requirements and compliance assurances.

Stage 2 — Governance Infrastructure.

Following system classification, institutions must develop the technical and policy infrastructure necessary for operating high-risk AI systems. This includes model versioning, immutable audit logs, data lineage tools, bias testing protocols, and post-market monitoring procedures. Crucially, human override mechanisms must be implemented at the decision-making level—not merely as a theoretical safeguard, but as an operational control actively used by credit officers.

Stage 3 — Continuous Validation.

One of the most frequently underestimated requirements of the Act is its emphasis on continuity. Risk management under Article 9 is not a one-time project completed at deployment; it is an ongoing process. Model performance must be continuously monitored against validated baselines, and any drift must trigger a documented review. Changes to training data or model architecture require a renewed documentation cycle. Consequently, banks that rely on periodic validation must transition toward real-time or near-real-time monitoring frameworks.

This three-stage model reflects a deliberate logic: governance structures must precede technical implementation, and continuous monitoring must follow it. Reversing this sequence—such as implementing infrastructure without prior classification or deploying monitoring without established baselines—results in superficial compliance rather than substantive regulatory alignment.

The EU AI Act does not apply directly to banks in Uzbekistan; however, its relevance extends beyond territorial jurisdiction. Uzbek banks engaged in cross-border transactions, partnerships with European financial institutions, or international certification processes will increasingly encounter EU-aligned regulatory expectations.

Unlike EU jurisdictions, Uzbekistan's regulatory framework does not yet include a formal risk-based classification of AI systems. The Central Bank of the Republic of Uzbekistan has prioritised digitalisation—consumer lending expanded at rates exceeding 30% annually in 2023–2024 [CBU, 2024]—yet formal AI governance requirements remain underdeveloped. This creates a structural asymmetry: while the adoption of AI-driven credit tools is accelerating, the supervisory capacity to evaluate associated risks is still evolving.

This maturity gap is significant because the risks identified within the EU regulatory framework—such as algorithmic bias in credit scoring, model drift in volatile economic environments, and insufficient human oversight of automated decisions—are not region-specific. They are inherent characteristics of the technology itself. A bank deploying a gradient boosting credit scoring model in Tashkent faces the same interpretability trade-offs as a bank in Frankfurt; only the regulatory consequences differ.

The EU experience should therefore be viewed not merely as a compliance obligation but as a strategic roadmap. Establishing AI system inventories, formalising model governance processes, and implementing effective human oversight mechanisms strengthen institutional risk management regardless of regulatory mandates. Banks in Uzbekistan that proactively develop AI governance frameworks—prior to the introduction of formal regulatory requirements—will be better positioned both for future domestic regulation and for integration into international financial ecosystems. Notably, the cost of retroactively implementing governance frameworks, as currently observed in EU institutions, significantly exceeds the cost of proactive implementation.

CONCLUSIONS AND RECOMMENDATIONS

The EU AI Act shifts the burden of proof in AI-based credit decision-making: institutions must demonstrate that their systems are properly governed, explainable, and subject to meaningful human oversight, rather than merely assuming compliance. This represents a more demanding standard than that required by most existing model validation frameworks, and it is accompanied by a fixed compliance deadline.

Three key conclusions emerge from the analysis. First, the compliance challenge is primarily organisational rather than technical. The absence of AI system inventories in more than half of financial institutions [9] reflects deficiencies in governance structures rather than technological constraints. Second, the requirements of the Act—when implemented as an integrated governance framework rather than a checklist—are fully compatible with sound risk management practices. The three-stage implementation model proposed in this study is specifically designed to operationalise this compatibility. Third, the convergence between the AI Act, ECB internal model guidelines, and Basel Committee principles establishes a unified governance logic that banks can adopt in a systematic and coherent manner.

For institutions in Uzbekistan and other emerging market contexts, the practical implications are clear. Governance investments undertaken at an early stage—prior to the formalisation of domestic regulatory

requirements—can significantly reduce future compliance costs while enhancing institutional credibility. Banks that delay the development of AI governance infrastructure until regulatory enforcement becomes mandatory are likely to incur substantially higher costs, both in terms of financial resources and reputational risk, compared to institutions that proactively treat AI governance as a strategic priority.

REFERENCES

1. Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13-June-2024 laying down harmonised rules on artificial intelligence. Official Journal of the European Union, 2024.
2. European Banking Authority. AI Act implications for the EU banking sector: Mapping exercise. November-2025.
3. Goodwin. EU AI Act: Key Points for Financial Services Businesses. Legal Analysis, January-2025, pp. 1–15.
4. European Central Bank. Guide to Internal Models. Frankfurt am Main: ECB Publishing, 2025, 287 p.
5. Bird & Bird. Recent developments on the interplay between AI and financial institutions. Banking & Finance Newsletter, No. 1, 2026, pp. 23–31.
6. Basel Committee on Banking Supervision. Newsletter on artificial intelligence and machine learning. BIS Quarterly Review, March-2022, pp. 45–58.
7. Bank for International Settlements. Managing AI in banking: Are we ready to cooperate? Speech by Pablo Hernández de Cos. BIS Speeches, 15-April-2024.
8. Financial Stability Institute. Managing explanations: How regulators can address AI explainability. FSI Insights on Policy Implementation, No. 24, 2025, pp. 1–32.
9. Deloitte. EU AI Act: What you need to know. Technology & Regulatory Insights, 2024, pp. 1–45.
10. McKinsey & Company. AI regulation in banking: Getting ready for the EU AI Act. Financial Services Practice, 2025, pp. 12–28.

Proofreader: Zokir ALIBEKOV

Layout and Designer: Oloviddin Sobir ugli

2026. № 3

To publish articles in this journal, you may submit articles, advertisements, stories, and other creative materials through the following links. Materials and advertisements are published on a paid basis.

You may subscribe to the journal at any time using the following details. Once subscribed, please send a screenshot or photo of your payment confirmation to our Telegram page @iqtisodiyot_77. Based on this, we will send the latest issue of the journal to your address each month.

“The journal “INNOVATION SCIENCE AND TECHNOLOGY” has been registered by the Agency for Information and Mass Communications under the Administration of the President of the Republic of Uzbekistan from 09.10.2024 under the registration number №390637. License number: C-5669633. PNFL: 30407832680027

Our address: Tashkent city, Yunusobod district, 19th block, House 17.

TASHKENT STATE UNIVERSITY OF ECONOMICS

Google Scholar | OPEN ACCESS | ULRICHSWEB GLOBAL SERIALS DIRECTORY

Academic Resource Index ResearchBib | ISSN INTERNATIONAL STANDARD SERIAL NUMBER INTERNATIONAL CENTRE | CYBERLENINKA

OpenAIRE | ROAD | НАУЧНАЯ ЭЛЕКТРОННАЯ БИБЛИОТЕКА LIBRARY.RU

BASE | INDEX COPERNICUS INTERNATIONAL | Crossref

doi Digital Object Identifier | CiteFactor Academic Scientific Journals | zenodo

Acceptance of articles

Published every monthly

Directions

Social, economic, political, technological, scientific

Scopus || Scientific electronic journal specializing in Scopus

CERTIFICATE NUMBER: №390637

ORDER NUMBER ACCORDING TO THE LICENSE REGISTER: C-5669633

CONTACT:

Contact us
+998 50 737 87 88

Telegram channel
t.me/scopus_IST2100

Journal official website
https://ist-journal.uz/index.php/IST