

REGULATING ETHICAL AI: FRAMEWORKS AND BEST PRACTICES FOR FAIRNESS AND TRANSPARENCY

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ABSTRACT

The relevance of the study is due to the fragmented nature of the current ethical and legal regulation of AI alongside the lack of a unified model of regulatory compliance against the backdrop of trans jurisdictional risks. The purpose of this study is to substantiate the SCALEs-15 framework as an integrated model for AI regulation, grounded in the principles of equity and transparency. The research employed an array of methods, including comparative ethic-legal analysis, decomposition of normative model, metric conformity assessment, normative modeling, as well as legal forecasting. The optimized SCALEs-15 demonstrated complete coverage of target metrics, exceeding the AI Act in terms of the level of operationalization of principles and for procedural certification, which makes it expedient to legally endorse it as a unified model for the ethical and legal regulation of AI. The scientific novelty of the research lies in the substantiation of SCALEs-15 as the first normatively structured model that integrates principles of AI governance with metrics of fairness, privacy, and accountability into a procedural compliance system.

Keywords: AI Governance; ethical compliance; fairness metrics; regulatory harmonization; legal accountability; scales-15 framework; AI risk stratification

Regulación ética de IA: Marcos y buenas prácticas para la equidad y la transparencia

RESUMEN

La pertinencia del estudio se debe a la naturaleza fragmentada de la actual regulación ética y jurídica de la IA, junto con la falta de un modelo unificado de cumplimiento normativo en un contexto de riesgos trans jurisdiccionales. El propósito de este estudio es fundamentar el marco SCALEs-15 como modelo integrado de regulación de la IA, basado en los principios de equidad y transparencia. La investigación empleó una serie de métodos, como el análisis ético-jurídico comparativo, la descomposición del modelo normativo, la evaluación de la conformidad métrica, el modelado normativo y la previsión jurídica. El SCALEs-15 optimizado demostró una cobertura completa de las métricas objetivo, superando la Ley de IA en cuanto al nivel de operacionalización de los principios y para la certificación procedimental, lo que hace conveniente respaldarlo legalmente como modelo unificado para la regulación ética y legal de la IA. La novedad científica de la investigación radica en la fundamentación de SCALEs-15 como el primer modelo normativamente estructurado que integra principios de gobernanza de la IA con métricas de equidad, privacidad y responsabilidad en un sistema de cumplimiento de procedimientos. Las futuras vías de investigación se centran en el modelado detallado de SCALEs-15, con el objetivo de transformar los principios en procedimientos normativos aplicables.

Palabras clave: Gobernanza de la IA; cumplimiento ético; métricas de equidad; armonización normativa; responsabilidad jurídica; marco de escalas-15; estratificación del riesgo de IA.

Introducción

The institutionalization of artificial intelligence (AI) is accompanied by a fragmentation of the regulatory landscape, an asymmetry in the legal efficacy of various legislative acts (such as the AI Act, GDPR, ISO/IEC 42001), and a conspicuous absence of a cohesive model for implementing the principles of fairness, transparency, privacy, accountability, and auditability. The lack of formalized mechanisms for metric evaluation and procedural compliance necessitates the development of a comprehensive framework that integrates ethical, technical, and legal requirements into a unified system of certification, monitoring, and accountability for high-risk AI systems (Riabokon, 2025).

The purpose of this study is to formulate and substantiate an optimized ethical and legal framework for the regulation of artificial intelligence applications (SCALEs-15), which ensures the integration of the principles of fairness, privacy, transparency, accountability, and auditability through normatively oriented implementation mechanisms, metric verification, and alignment with international regulatory acts (AI Act, GDPR, ISO/IEC 42001).

To achieve the stated purpose, the following *tasks* were undertaken:

- an ethical and legal comparative analysis of key regulatory acts (AI Act, GDPR, ISO/IEC 42001) in accordance with the criteria of legal force, ethical coverage, as well as judicial practice;
- decomposition of the SCALEs-15 framework was undertaken, encompassing the examination of internal structural consistency, typology of principles, and their alignment with contemporary regulatory acts;

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- metric evaluation of the implementing the principles of fairness, privacy, transparency, accountability, and auditability based on compliance indicators;
- optimization of the SCALES-15 model was executed through normative modeling, integrating legal, technical, and ethical requirements;
- assessment of the potential for regulatory legitimation of SCALES-15 within the European and international legal framework was conducted, taking into account certification and audit procedures.

Literature Review

Within the framework of the current study, we undertook a comprehensive review of the latest legal scholarship pertaining to ethical norms and the regulation of artificial intelligence (AI) utilization.

In particular, Ashraf and Mustafa (2025) substantiated the imperative for regulatory convergence of ethical and legal standards governing AI, particularly concerning the assurance of algorithmic fairness, explainability, privacy by design and legal accountability. The researchers discerned a significant disparity between technical regulation and legal support, which complicates the implementation of ethical AI principles across transnational jurisdictions.

This perspective is shared by More et al. (2025), who examined the normative and ethical challenges associated with AI implementation within the legal framework, concentrating on the risks of algorithmic bias, opacity, accountability deficits, and privacy risks. The authors emphasized the need for an ethical and legal balance between technological innovation and social responsibility, articulating recommendations for the establishment of a sustainable and trustworthy regulatory environment for AI in jurisprudence.

In turn, Lund et al. (2025) conducted a comparative legal analysis of transparency frameworks (IEEE P7001, CLeAR), elucidating the progression of ethical and legal paradigms aimed at ensuring AI interpretability across diverse legal frameworks. Their contribution highlight underscore the necessity for differentiated regulatory approaches to transparency, considering the associated risks, the balance between transparency and the protection of intellectual property, as well as the formalization of the obligation for ongoing documentation as a vehicle for legal accountability.

This issue was thoroughly examined by Nabil et al. (2025), who investigated the ethical and legal risks of using AI in Information Technology project management, with a particular focus on algorithmic bias, data privacy, and deficitary governance. The study emphasizes the necessity of developing transparent and accountable regulatory frameworks that ensure compliance with the General Data Protection Regulation (GDPR), the California Consumer Privacy Act (CCPA), and the Health Insurance Portability and Accountability Act (HIPAA), while simultaneously reducing the risk of algorithm-driven bias and discrimination in managerial decision-making.

A domain-specific analysis by Mishra et al. (2025) examined the ethical and legal risks arising from the use of artificial intelligence and machine learning (AI/ML) systems in credit scoring models for Buy Now, Pay Later (BNPL) services in the United States, with particular attention to violations of the Equal Credit Opportunity Act (ECOA), the Fair Credit Reporting Act (FCRA), and established fair lending principles.

Their contribution highlights for the modernization of regulatory practices to eliminate algorithmic bias, ensure explainability, and safeguard the rights of vulnerable groups within the domain of AI regulation in finance.

An additional industry-specific perspective was considered by Janjua et al. (2025), who probed the deployment of AI-driven cloud services in Human Resource Management in Pakistan, highlighting significant ethical and legal risks: algorithmic bias, opacity, and violations of data protection. The researchers highlighted the pivotal role of ethical leadership in fostering fairness, accountability, and legal compliance while adapting AI to the national cultural and legal context.

Next, Sonani and Govindarajan (2025) introduced an innovative cloud-based model for normative and ethical reinforcement, which amalgamates multi-level compliance, explainable artificial intelligence (XAI), as well as reward algorithms to ensure transparency, fairness, and legal compliance within AI systems under regulatory oversight. This line of research contends that, privacy-by-design, and cross-jurisdictional legal adherence are imperative prerequisites for the ethically sound deployment of AI technologies in law enforcement.

In another significant contribution, Ferhataj et al. (2025) empirically validated the heightened ethical and legal sensitivity among students in terms of utilizing the AI and robotics, particularly in the areas of transparency, accountability, and data privacy. The study introduces the Ethical Awareness–Trust Framework model, which integrates ethical literacy, institutional trust, and regulatory advocacy as essential conditions for the responsible implementation of AI in accordance with the stipulations of the European Union AI Act and European civil law pertaining to robotics.

Further, Stamboliev and Christiaens (2025) scrutinized the concept of Trustworthy AI as a regulatory signifier, arguing that the European Guidelines on Trustworthy AI (EGTAI) represent only a superficial consensus among industry stakeholders, ethicists, and legal experts. This analysis demonstrates that that the discursive dominance of Big Tech replaces ethical imperatives with economic motivations, thereby undermining the autonomy of AI ethics within legal regulation.

Lastly, the research problem was summarized by Poli et al. (2025), who conducted a critical literature review alongside a case analysis of ethical dilemmas in AI, focusing on issues of fairness, transparency, accountability, and algorithmic bias. The scholars pinpointed a lack of research in the practical dimension of AI ethics and underscored the necessity of establishing a comprehensive interdisciplinary research agenda to foster the ethical and legal advancement of technological innovations.

The examination of contemporary scholarship has revealed the fragmentation inherent in AI ethics and legal regulation, highlighting a significant deficiency of effective mechanisms for fairness, interpretability, accountability, and data protection. Moreover, the lack of alignment between sector-based and transnational regulatory regimes reflects broader gaps in coordination and harmonization across AI governance structures. The preeminence of industrial interests over ethical paradigms was underscored, alongside a call for the establishment of a cohesive, and adaptive framework that ensures multilevel compliance, dynamic accountability, and legal legitimacy within high-risk sectors.

Methods and Materials

Research procedure

The study was conducted according to the following scheme (Figure 1).

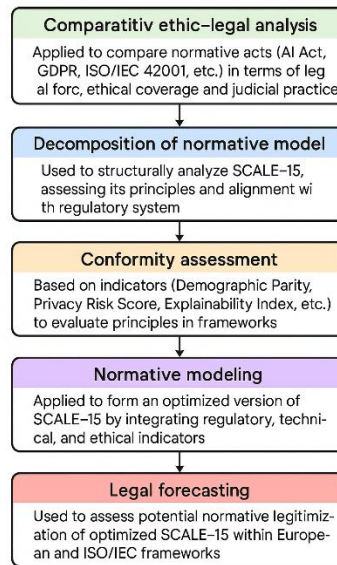


Figure 1. Research procedure

Methods

The study adopted a sequential multi-stage approach, where every methodological approach has been utilized at distinct stages of the research process to guarantee methodological cohesion and scientific transparency. In the first stage of the analytical phase, a comparative ethical–legal analysis was used in evaluating principal normative and regulatory instruments on artificial intelligence such as for example the AI Act, General Data Protection Regulation and ISO/IEC 42001. This approach facilitated a consistent contrast in respect of legal authority; ethical reach; and enforcement and identified regulatory differences, normative lacunae, and conflicting governance approaches. At the next stage, the normative model decomposition was performed for the SCALEs-15 framework. In this phase, the framework’s principles were systematically classified into legal, technical, and procedural categories. They were assessed for internal consistency, component traceability, and compatibility with the existing multi-act regulatory environment. A metric conformity assessment technique was introduced in the third phase to operationalize ethical and legal principles. The degree to which the frameworks discussed were embedded with fairness, privacy, transparency, accountability and auditability was assessed quantitatively and semi-quantitatively on indicators such as Demographic Parity, Privacy Risk Score, Explainability Index. Next, another refined version of the SCALEs-15 was created through normative modeling. This process integrated regulatory requirements, technical standards, and ethical metrics into an operational framework that was unified and operationally consistent. Legal forecasting was then applied in the last phase of the evaluation process, to evaluate the prospects of regulatory legitimization of the optimized SCALEs-15 Framework. Such an assessment was done in the context of European Union law and international ISO/IEC standards, emphasizing certification paths, audit schemes and procedures of compliance. The study was conducted between January 2024 and March 2025.

Sample

The regulatory initiatives currently recognized for the ethical and legal governance of artificial intelligence technologies were used as a representative sample for this study (Table 1).

Table 1.

The recognized regulatory acts (frameworks) for the use of AI technologies

Name of the regulatory act	Country of implementation	Years of implementation	Brief legal description	Judicial practice of application	Current researchers or Authors
AI Act	European Union	Expected from 2026	Comprehensive EU regulation on the classification and control of AI by risk level; introduces mandatory compliance assessment for high-risk AI.	Expected application by the European Court of Justice regarding the classification of high-risk AI systems.	Quintais (2025)

Name of the regulatory act	Country of implementation	Years of implementation	Brief legal description	Judicial practice of application	Current researchers or Authors
Ethics Guidelines for Trustworthy AI (EGTAI)	European Union	2019	The EC's ethical guidelines, which define the requirements for lawful, ethical, robust AI; are not mandatory, but influence compliance policies.	Used as a benchmark in soft law for decision-making on AI policy compliance within European administrative procedures.	Christy et al. (2024)
General Data Protection Regulation (GDPR)	European Union	2018	A legal framework for the protection of personal data; provides principles of lawful basis, purpose limitation, data minimization, accountability.	CJEU, Schrems II (2020): recognized the inadequacy of data protection in transatlantic data transfers; application of the data minimization principle.	Macrin (2025)
Equal Credit Opportunity Act (ECOA)	USA	1974	Prohibits discrimination in the provision of credit; applies to AI decisions in financial scoring.	U.S. Supreme Court, *Texas Dept. of Housing v. Inclusive Communities Project* (2015): Establishment of the disparate impact theory in credit regulation.	Campbell (2025)
Fair Credit Reporting Act (FCRA)	USA	1970	Regulates the handling and accuracy of information in credit reports; applies to algorithmic scoring.	U.S. District Court, *Consumer Financial Protection Bureau v. TransUnion* (2022): AI decisions violated the FCRA by providing inaccurate information.	Wu (2024)
Algorithmic Accountability Act (Draft)	USA	Project 2022–2025	Draft law on the obligation to audit automated systems for bias, fairness, and explainability.	There is no practice, the bill has not yet been adopted; discussion is expected within the framework of FTC rulemaking.	Sousa e Silva (2025)
Civil Law Rules on Robotics	European Union	2017 (proposal)	Rules for regulating autonomous systems within the framework of civil law; focused on protecting liability and transparency.	Decisions do not have precedent force; recommendations are used in scientific conclusions when considering cases of liability of the robot manufacturer.	Hosseini et al. (2024)
Personal Information Protection Law	China	2021	Comprehensive data protection law; includes regulations on	Proceedings against TikTok (2021): application of	Shao et al. (2025)

Name of the regulatory act	Country of implementation	Years of implementation	Brief legal description	Judicial practice of application	Current researchers or Authors
(PIPL)			data processing by AI systems, extraterritorial jurisdiction.	regulations on illegal data collection from minors, taking into account the use of AI.	
IEEE P7001 Transparency of Autonomous Systems	International standard (IEEE)	2020 (draft)	Standard for the transparency of autonomous systems; defines requirements for documentation, explanations, and communication.	Used in internal procedures for evaluating autonomous control systems; judicial practice has not yet been established.	Zhao and Xu (2025)
OECD AI Principles	Intergovernmental organization (OECD)	2019	Principles of responsible AI: inclusiveness, reliability, transparency, accountability; applied to develop soft law instruments.	Taken into account in analytical conclusions when considering policies for state implementation of AI; no court cases have been recorded.	Gramatica (2025)
ISO/IEC 42001:2023	International standard (ISO/IEC)	2023	The first ISO standard for AI management systems; defines requirements for ethical, accountable, and reliable AI in a corporate context.	Judicial practice has yet to be firmly established; it is currently employed in corporate audits for the certification of AI governance.	Benraouane (2024)
ALTAI (Assessment List for Trustworthy AI)	European Union	2020	The EGTAI AI Ethics Self-Assessment Tool; covers privacy, explainability, accountability, and human agency.	It is employed in the ethical compliance evaluation procedures within Horizon 2020 and AI4EU; there exists no pertinent case law.	Fedele et al. (2024)

Tools

To evaluate the regulatory frameworks governing the utilization of artificial intelligence, relevant ethical and legal metrics were employed, which were subsequently categorized in accordance with the principles of AI ethics and governance (Table 2).

Table 2.

Ethical and legal metrics for evaluating the regulatory norms for AI use, grouped according to the principles of AI ethics & governance

Name of the metric	Explanation	Examples of using the metric
Fairness - focus on non-discrimination, equal access, avoidance of bias. The metrics used are directly related to the anti-discrimination check of models.		
Demographic Parity	Evaluation of the non-discriminatory nature of AI decisions based on the uniformity of positive results among different social groups (fairness).	Evaluation of credit scoring results to detect racial bias.
Equalized Odds	Measures the equality of the probability of a correct prediction among all groups, regardless of sensitive attributes (legal fairness, non-discrimination).	Analysis of recidivism prediction systems in criminal justice.
Privacy – confidentiality, targeted processing, minimization of personal information. Metrics directly related to GDPR (lawfulness, minimization, purpose limitation).		
Privacy Risk Score	Quantitative evaluation of the probability of identifying a person from a dataset (protection of personal data, privacy).	Defining the risk of deanonymization in medical datasets.

Name of the metric	Explanation	Examples of using the metric
Data Minimization Index	Assessment of how much the data used is limited to the minimum necessary to achieve the processing objectives (data minimization, GDPR compliance).	Evaluation of AI systems in healthcare in accordance with the principle of data minimization under the GDPR.
Transparency – explainability of decisions, availability of information for users and regulators. Formalizes the requirement to "clearly explain why the AI made a decision."		
Explainability Index	The level of understanding of the algorithmic decision for end users and regulators (explainability, legal accountability).	Assessment of AI recommendations clarity in medical or financial services.
Accountability – the ability to identify the responsible entity and track decisions. Ensures the legal principle of audit trail.		
Accountability Traceability Score	A measure of the ability to trace responsible persons or processes for an AI decision (accountability, legal justification).	Tracking decision-making logs in autonomous transport systems.
Human Agency – human involvement in critical decisions; the right to intervene or refuse. Supports the principles of "meaningful human control", due process, dignity.		
Human-in-the-loop Ratio	The proportion of decisions that involve human participation in the critical decision-making cycle (human control, due process).	Use in military or law enforcement AI systems to comply with the principle of proportionality.
Auditability – the ability to verify the alignment of decisions with norms/standards. The central requirement of ISO/IEC 42001, ALTAI, AI Act regarding compliance assessment.		
Auditability Compliance Rate	The percentage of AI processes that are subject to external audit for compliance with ethical and legal norms (audit, adherence to standards).	Analysis of the compliance of tools with ISO/IEC 42001 or ALTAI standards.

Each metric (Table 2) serves as an instrumentalization of an abstract ethical principle. Accordingly, this distribution facilitates the formalization of AI audits, the construction of comprehensive checklists, as well as the verification of AI alignment with regulatory and ethical standards.

Results

In accordance with the research framework, a comprehensive ethical and legal comparative analysis was conducted on the regulatory acts (frameworks) regarding the implementation of artificial intelligence (

Table 1). This analysis was executed in alignment with the fundamental principles of AI ethics & governance, consisting of relevant metrics (Table 2) –

Table 3.

Table 3.

Ethical and legal comparative analysis of regulatory acts (frameworks) regarding the implementation of AI

Act	Legal force	Ethical coverage	Privacy	Fairness	Exp.	Acc.	Judicial practice	Features
AI Act (EU)	High	Complete	✓	✓	✓	✓	Expected	Risk stratification
EGT AI (EU)	Soft law	High	✓	✓	✓	✓	There is a practice of soft law	The 7 key requirements for Trustworthy AI
GDP R (EU)	High	Partial	✓✓✓	×	×	✓	Yes	The principle of data minimization
ECO A (USA)	High	Medium	×	✓✓	×	✓	Yes	Anti-discrimination in finance
FCR A (USA)	High	Low	×	×	×	✓	Yes	Accuracy of scoring data
Algorithmic Accountability Act (US)	Draft	Potentially high	✓	✓	✓	✓	None	AI audit for bias and explainability
Civil Law Rules on Robotics	Proposal	Medium	×	×	✓	✓	No	Focus on autonomous systems
PIPL (China)	High	High	✓✓	×	×	✓	Yes	Extraterritorial jurisdiction
IEE E P7001	Standard	High	✓	✓	✓	✓	None	Transparency standards
OEC D AI Principles	Soft law	High	✓	✓	✓	✓	Analytical	Basic ethical framework
ISO/IEC 42001:2023	High (standard)	High	✓	✓	✓	✓	None	Corporate compliance
ALTAI (EU)	Soft tool	High	✓	✓	✓	✓	No	Self-compliance check tool

Note. Exp. – Explainability; Acc. – Accountability.

The ethical and legal analysis (

Table 3) has elucidated that the AI Act (EU) emerges as the most balanced regulatory framework, mandating certification for high-risk AI applications. While GDPR, PIPL, and ISO/IEC 42001:2023 offer a substantial level of data governance, they only partially address the critical dimensions of fairness and explainability. Soft law instruments such as ALTAI, EGTAI, and IEEE P7001 advocate for ethical compliance but lack binding authority. The ECOA and FCRA continue to hold relevance in the financial sector; however, they are inadequately equipped to confront the challenges posed by AI. Metrics like Demographic Parity and Explainability Index allow for formalizing the assessment of alignment with ethical and legal principles.

A comparative analysis of existing ethical and legal frameworks concerning AI revealed the fragmentation within the regulatory landscape, the absence of a cohesive compliance model, and an imbalance between legal and technical mechanisms. In this light, the implementation of the SCALEs-15 framework (Standards for Certified AI & Legal Ethics System – 15 Principles) is warranted as a comprehensive system for certification, auditing, and metric evaluation, thereby ensuring the integration of the principles of fairness, privacy, transparency, accountability, and human agency. Decomposition analysis enables the verification of internal structural consistency, the resolution of regulatory conflicts, and the adaptation of SCALEs-15 to transjurisdictional challenges – Table 4.

Table 4.
Decomposition analysis of the SCALEs-15 framework

A group of principles	Principles	Connections and interactions	Alignment with regulatory acts	Possible ethical and legal conflicts
Legal and social principles	1. Legal Compliance	Defines the foundation for the legal application of AI, determining the requirements for principles 2, 3, 4.	AI Act, GDPR, ISO/IEC 42001	Conflict between national and transnational norms (GDPR vs. AI Act)
	2. Data Protection and Privacy	Specifies legal compliance in the field of data governance and privacy.	GDPR, PIPL, ISO/IEC 42001	Exceeding the scope of data collection contrary to the principle of minimization
	3. Non-discrimination	It corresponds to the principle of justice, revealing the aspect of social equality.	AI Act, ECOA, Algorithmic Accountability Act	Algorithmic discrimination, not covered by existing legal acts
	4. Protection of Vulnerable Groups	Ensures enhanced protection of legally vulnerable categories of subjects.	AI Act, EGTAI	Insufficient regulation regarding the protection of children and persons with disabilities
Technical and Ethical Principles	5. Technical Robustness and Safety	It is the basis of functional safety, necessary for the implementation of responsibility.	AI Act, ISO/IEC 42001	Lack of clear criteria for liability in case of technical failure
	6. Transparency	Ensures accountability, closely related to principles 9 and 10.	IEEE P7001, EGTAI	Lack of transparency of black-box model decisions, even with documentation
	7. Reversibility	Guarantees correction of erroneous decisions, associated with control and accountability.	AI Act, ISO/IEC 42001	Lack of a mechanism for appealing decisions in a number of jurisdictions
	8. Fairness	Clarifies the principle of non-discrimination, aimed at algorithmic fairness.	ALTAI, ECOA, AI Act	Conflict between algorithm efficiency and ensuring fairness
	9. Explainability	Ensures explainability of decisions, a prerequisite for transparency and legal legitimacy.	EGTAI, IEEE P7001	Explanations may be insufficient or manipulative
	10. Justifiability	Complements interpretability with evidence-based justification of decisions, important for verification.	ISO/IEC 42001, EGTAI	Formal justification may occur without real ethical validity
	11. Accountability	Unifies previous technical principles into a systemic accountability model.	AI Act, ISO/IEC 42001	Uncertainty of the entity responsible in decentralized systems
Procedural principles	12. Informed Consent	Creates the basis for legitimate user interaction with AI.	GDPR, EGTAI	Formalization of consent without proper information (dark patterns)
	13. Human-in-the-loop	Enhances human agency, critical for interfering with autonomous decisions.	ALTAI, EGTAI	The illusion of human control when automatic decisions prevail
	14. Auditability	Ensures retrospective verification of alignment with all principles.	ISO/IEC 42001, ALTAI	Lack of mandatory independent audit in some countries
	15. Effectiveness	Aimed at assessing the effectiveness of AI functions in an ethical context.	AI Act, OECD Principles	Effectiveness may conflict with human rights or ethical norms

Source: elaborated by the authors

Decomposition analysis (Table 4) elucidated the conceptual integrity of SCALEs-15, yet unveiled regulatory discrepancies that pose a risk of ethical and legal conflicts. The disjunctions between transnational norms, the absence of appeal mechanisms, the partial implementation of the principles of fairness and accountability, and the threat of formalized consent (dark patterns) have been identified. This underscores the imperative to optimize the framework to harmonize alignment criteria and facilitate transjurisdictional integration – Table 5.

Table 5.
Solution on the optimization of the SCALES-15 framework

Principle	Optimization solution	Expected effect	Necessary regulatory acts for implementation
1. Legal Compliance	Institutionalization of internal legal audit of AI systems and implementation of automated compliance monitoring mechanisms, taking into account the transjurisdictional nature of norms.	Increased regulatory compatibility and reduced legal risks in a multijurisdictional environment.	AI Act, GDPR, ISO/IEC 42001
2. Data Protection and Privacy	Development of a multi-level data protection system with built-in privacy-by-design, including formalized validation of the data minimization principle through legal interfaces.	Guaranteed compliance with the principles of legality, purpose limitation, and data minimization.	GDPR, PIPL, ISO/IEC 27701
3. Non-discrimination	Implementation of fairness-aware learning standards and mandatory use of fairness modules (e.g., Equalized Odds, Demographic Parity) at the model output stage.	Reduction of algorithmic bias and increase in the level of social fairness of AI decisions.	AI Act, Algorithmic Accountability Act (US), ECOA
4. Protection of Vulnerable Groups	Introduction of regulatory requirements for UX design for vulnerable groups, involving mandatory testing with the participation of representatives of relevant social categories.	Improving the accessibility and safety of AI systems for socially vulnerable categories.	EGTAI, UN Convention on the Rights of Persons with Disabilities
5. Technical Robustness and Safety	Creation of mechanisms for formalized fault tolerance and risk modeling with the implementation of redundancy and continuous testing under pressure (stress-resilience certification).	Strengthening the reliability of AI in conditions of instability and critical application scenarios.	AI Act, ISO/IEC 24029-1, ISO/IEC 42001
6. Transparency	Introduction of mandatory white-box standards for critical decisions, creation of meta-explanation layers with corresponding documentation.	Enhanced transparency of algorithms, allowing users and auditors to track the logic of decisions.	IEEE P7001, AI Act, EGTAI
7. Reversibility	Formalization of the legal mechanism for reviewing decisions through the creation of human-overridable layers with mandatory logging and the right to appeal.	Increasing user trust and legal security by providing a legal appeal mechanism.	AI Act, Council of Europe Convention 108+
8. Fairness	Development of a standardized bias impact assessment procedure for each category of models and creation of regulations for fairness compliance reporting.	Ensuring algorithmic fairness through the presence of verified compliance criteria.	AI Act, ECOA, OECD AI Principles
9. Explainability	Integration of XAI components (SHAP, LIME) as a mandatory element of production-ready models with explanation of decisions at the user and auditor levels.	Facilitating understanding of decisions for users and regulatory bodies, strengthening legitimacy.	EGTAI, ISO/IEC 23894, IEEE P7001
10. Justifiability	Establishing mandatory sources of evidence-based AI for critical decisions with the requirement for replication of logic through verifiable protocols.	Strengthening the scientific validity and reasonableness of decisions, minimizing false positive decisions.	ISO/IEC 42001, AI Act
11. Accountability	Establishing a legally defined hierarchy of responsibility in the deployment pipeline structure with a contractual definition of the responsible party.	Clear distribution of responsibility in case of damage, reducing legal uncertainty.	AI Act, ISO/IEC 38507, OECD AI Principles
12. Informed Consent	Modular standardization of consent interfaces, using interpretable templates with the integration of legally verified data collection prohibition structures.	Ensuring voluntariness and user awareness when interacting with AI.	GDPR, AI Act, ISO/IEC 29184
13. Human-in-the-loop	Implementation of technically formalized escalation to a human in real-time (reactive intervention) with appropriate safety thresholds and trigger conditions.	Preventing uncontrolled autonomy of AI, ensuring human participation in critical processes.	AI Act, ALTAI, EGTAI
14. Auditability	Mandatory independent annual auditing with multi-level logging, application of formalized decision trajectories (decision provenance chains).	Building institutional trust through regular external audits and full reproducibility of actions.	ISO/IEC 42001, AI Act, OECD Framework for Classification
15. Effectiveness	Implementing performance metrics with verification through KPIs that cover ethical limitations, regulatory compliance, and social relevance.	Optimizing AI usage efficiency, taking into account ethical acceptability and legal compliance.	AI Act, OECD AI Principles, ISO/IEC 25010

Source: created by the authors

Based on the developed optimization solutions (Table 5), it has been ascertained that the refined SCALES-15 framework exhibits a substantial degree of conceptual consistency with the key ethical and legal stipulations governing AI regulation. Nonetheless, the practical implementation of each principle requires the elucidation of assessment tools tailored to regulatory acts (AI Act, GDPR, ISO/IEC 42001, OECD Principles, etc.). The proposed optimization solutions are pertinent to current challenges; however, their efficacy must be further substantiated through a re-evaluation utilizing specialized metrics (Table 2) compared to the previous version of SCALES-15 and the most balanced regulatory act currently in effect, the AI Act (

Table 6).

Table 6.

Comparative calculation of ethical and legal metrics for the most effective frameworks for regulating the use of AI

Act	Legal force	Ethical coverage	Privacy	Fairness	Exp.	Acc.	Judicial practice	Features
AI Act (EU)	High	Complete	✓✓✓	✓	✓	✓	Expected	Risk stratification, mandatory compliance for high-risk AI
SCALEs-15 (basic)	Conceptual model	High (without instrumental detail)	✓	✓	✓	✓	None (ethical model)	15 ethical-legal principles without a technical implementation mechanism
SCALEs-15 (optimized)	An optimized model with the potential for regulatory implementation	Maximum (with instrumental implementation)	✓✓✓	✓✓✓	✓✓✓	✓✓✓	Requires regulatory validation	15 optimized principles with clear implementation mechanisms linked to metrics

Note. Exp. – Explainability; Acc. – Accountability.

The conclusive findings indicate that the AI Act (EU) is the most legally robust framework; however, it necessitates instrumental detailing. The basic SCALEs-15 is primarily declarative, whereas the optimized version ensures maximal adherence to essential principles through the integration of metric indicators and procedural verification. It is expedient to regard this as a promising paradigm for the ethical-legal standardization of artificial intelligence, warranting further regulatory legitimization.

Discussion

Let's verify the obtained results for alignment with analogous studies within a specified chronological period. The study conducted by Radanliev (2025) documented the fragmentation of global ethical and legal regulation of artificial intelligence and proposed technical compensatory measures. The investigation substantiates that the optimized SCALEs-15 facilitates a systematic implementation of the principles of fairness, privacy, and transparency through normatively-oriented mechanisms, thereby establishing a foundation for legal harmonization.

Agbadamasi et al. (2025a) highlighted a regulatory deficiency in the USA: fragmented norms (FTC Act, Algorithmic Accountability Act, HIPAA) inadequately address algorithmic opacity, bias, and data surveillance. In contrast, this study demonstrates that the optimized SCALEs-15 demonstrates the metric integration of fairness, accountability, and privacy-by-design, ensuring normative consistency and the potential for transjurisdictional integration.

Zahra (2025) documented a critical discrepancy between the operational efficacy of AI within jurisprudence and the lack of ethical and legal guarantees. Instead, this study elucidated a normative synergy within SCALEs-15: the integration of explainable AI (XAI), fairness audits, and traceability emerges as indispensable mechanisms for legal legitimation.

Bahangulu and Owusu-Berko (2025) underscored the corporate risks associated with algorithmic bias and the inadequacies of data ethics in business analytics, highlighting the weakness of self-regulation. In contrast, this study's optimized SCALEs-15 provided a robust institutional framework for fairness-aware machine learning, incorporating layers of explainability and normative audits, thereby transforming data ethics into a legally binding component of corporate AI governance.

Kamatala et al. (2025) concentrated on algorithmic bias and proposed a technically oriented debiasing model without normative integration. Notably, the current research advanced SCALEs-15 as a multi-layered regulatory architecture, wherein fairness constraints, XAI, and legal accountability are seamlessly woven as mandatory elements for the legal legitimation of AI decision-making.

Vujnovic et al. (2025) accentuated the role of PR specialists as agents of public explainability, yet neglected the normative imperative of transparency. In contrast, the current study's optimized SCALEs-15 established transparency as a legal requirement through metrics of explainability, auditability, and traceability, thereby transforming communicative transparency into a regulatory obligation.

Agbadamasi et al. (2025b) found that the implementation of corporate AI governance in the USA predominantly transpires within internal business intelligence systems, characterized by a dominance of compliance-oriented control mechanisms. In contrast, the current study has formulated and refined SCALEs-15 as a normatively structured framework that transcends conventional corporate practices, while ensuring the formalized integration of fairness, accountability, and transparency metrics with legal validation and procedural accountability.

Al-Harbi (2025) elucidated that the financial application of AI is marked by regulatory archaism, particularly concerning bias modules, weak explainability, and the lack of sector-specific regulatory stratification. In the present study, the aforementioned issues have been transformed into an operational-legal framework — the optimized SCALEs-15 — which has facilitated standardized verification of fairness, the legal validity of decisions, and transparency through built-in control metrics and procedural alignment with regulatory acts.

Ramesh (2025) accentuated the ethical risks associated with AI/ML in the insurance sector, particularly bias and the lack in transparency. This investigation has normatively delineated the said challenges through the optimized SCALEs-15, which incorporates built-in fairness audits, explainability modules, and legal accountability in the area of insurance scoring.

Ultimately, Alhasan (2025) found that the integration of AI into arbitration engenders conflicts with the principles of procedural fairness, legal accountability, and the legitimacy of decisions, particularly regarding the inadequacy of the New York Convention for AI-generated awards. In the current study, these deficiencies have been rectified by optimizing SCALEs-15, wherein the principles of explainability, reversibility, and accountability have been institutionalized as prerequisites for the legal legitimacy of AI arbitration.

The analysis of scholarly publications corroborated the fragmentation of the AI regulatory field and the scarcity of ethical and legal guarantees. This study has substantiated that the optimized SCALEs-15 engenders a cohesive regulatory architecture with integrated modules for fairness, privacy, explainability, accountability, and auditability, thereby positioning it as a prospective transjurisdictional standard.

Limitation

The principal limitation of this study lies in the absence of opportunities for direct empirical validation of the SCALEs-15 concept due to the inadequately developed relevant infrastructure. Consequently, there exists a lack of established judicial practice, which further complicates the legal validation of the proposed regulatory mechanisms.

Recommendations

It is recommended to undertake more comprehensive modeling of SCALEs-15 with an in-depth procedural elaboration of each principle to facilitate practical implementation. Special emphasis should be placed to tailoring the framework to jurisdictional nuances and conceptualizing legal validation mechanisms through simulated application scenarios.

Conclusions

Drawing upon a comprehensive ethical and legal examination of both existing and proposed AI regulatory frameworks, utilizing analytical metrics for fairness, privacy, explainability, accountability, auditability, and human agency, it has been determined that the regulatory landscape is notably fragmented. Most current legislative instruments, including the AI Act, GDPR, and ISO/IEC 42001, exhibit only partial or sector-specific implementations of the relevant principles. At the same time, the proposed optimized SCALEs-15 model is distinguished by maximum conceptual completeness, procedural organization, and the integration of metric indicators, thereby ensuring a systemic verification of AI decision-making in accordance with ethical and legal norms.

A comparative analysis employing specialized metrics showed that the optimized SCALEs-15 outperforms the AI Act in its elaboration of operational mechanisms and effectively addresses the shortcomings of existing regulatory frameworks. In light of this, it is expedient to advocate for the legal endorsement of the optimized SCALEs-15 as a cohesive framework for the ethical and legal governance of AI, with subsequent harmonization to European and international standards (AI Act, GDPR, ISO/IEC 42001).

The scientific novelty of this research lies in the formalization and decomposition of the optimized SCALEs-15 framework, conceived as a multilevel normative model for the ethical and legal verification of artificial intelligence. This framework, for the first time, integrates metric indicators into the mechanisms of procedural compliance.

The practical significance of the findings resides in the establishment of a unified structure for normative auditing, certification, and risk management of AI decisions. This framework can be utilized by developers, auditors, and regulators in the process of assessing the compliance of artificial intelligence with existing ethical and legal frameworks.

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