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# Digitalising Trust: Regulatory Design, Risk, and Inclusion at the Intersection of AI, Big Tech, and Banking

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### ABSTRACT

This article examines the multifaceted transformation of the finance sector driven by digitalisation, artificial intelligence (AI), and the increasing participation of big tech firms in banking services. It synthesises theoretical frameworks of financial regulation with empirical and policy-oriented literature to propose an integrative understanding of regulatory challenges and policy design choices. Drawing on interdisciplinary sources, the paper advances three core arguments. First, the digitalisation of finance fundamentally alters information asymmetries, market structure, and the set of systemic risks that regulators must confront, necessitating an adaptive regulatory stance that blends traditional prudential tools with more dynamic, data- and algorithm-aware supervision (Arner, Barberis & Buckley, 2015; BCBS, 2024). Second, the entry and expansion of big tech and fintech into credit markets reconfigures competitive dynamics and consumer relationships, offering both inclusionary opportunities and concentrated-risk pathways that demand tailored oversight—particularly regarding data governance, model transparency, and adverse action in automated credit decisioning (Cornelli et al., 2023; Barakova, Ehrentraud & Leposke, 2024; CFPB, 2022). Third, governance of AI in finance sits at the confluence of cross-border regulatory fragmentation and rapidly evolving technological capacities; effective policy requires harmonised principles, robust supervisory capacity building, and mechanisms for algorithmic accountability that preserve innovation while protecting financial stability and consumer rights (BCBS, 2022; Calabia, 2024; CSET, 2024). The paper offers a detailed discussion of regulatory instruments—ranging from transparency mandates and model validation standards to supervisory sandboxes and macroprudential augmentation—

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and elaborates on trade-offs, implementation constraints, and research priorities. It concludes with policy recommendations emphasising multi-level regulatory coordination, investment in regulatory technology (RegTech), and a principled vet flexible framework for AI governance that aligns prudential aims with inclusion and market contestability.

#### **Keywords**

Digitalisation; Artificial Intelligence; Big Tech; Financial Regulation; Credit; Consumer Protection; Supervisory Technology

#### Introduction

The past decade has witnessed a convergence of financial intermediation and digital technologies. Innovations in data analytics, machine learning. and scalable cloud infrastructures have enabled firms outside the traditional banking sector—often described as "big tech"—to offer financial services at scale and with unprecedented user reach (Arner, Barberis & Buckley, 2017; Cornelli et al.. 2023). Simultaneously, incumbent banks have adopted advanced analytics and algorithmic decisionmaking to improve efficiency in underwriting, risk management, and customer engagement (Cornerstone Advisors, 2020; EBA, 2020). This digitalisation of finance changes the nature of banking activities: relationships become platformmediated, information flows accelerate, and the locus of risk shifts from balance-sheet opacity to model and data dependencies. Scholars and policymakers have documented how these shifts challenge foundational premises of financial regulation—such as the separation of activities, the ability of supervisors to monitor risk, and the traditional levers used to contain moral hazard and

market failure (Armour et al., 2016; Arner, Buckley & Zetzsche, 2018).

Understanding these shifts requires integrating multiple strands of literature. One strand stresses the promise of technology for financial inclusion: digital channels reduce transaction costs and extend credit to previously underserved populations (Arner, Buckley & Zetzsche, 2018). Another strand warns of concentration risks and new forms of market power as large technology platforms exploit network effects and data complementarities to scale financial services (Barakova, Ehrentraud & Leposke, 2024; Cornelli et al., 2023). A third strand foregrounds the regulatory and consumer protection implications of algorithmic decisioning—how complex models produce opacity and potential discriminatory outcomes, and how existing legal frameworks must adapt to ensure fair treatment and explainability in automated credit decisions (CFPB, 2022; Calabia, 2024).

This article synthesises these strands to address two interrelated problems. The first is conceptual: how should regulators reconceptualise risk and governance in an ecosystem where algorithmic models. data networks. and platform

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intermediaries are core infrastructural elements of finance? The second is practical: what specific regulatory instruments and supervisory architectures can reconcile the twin goals of fostering innovation and safeguarding financial stability, market fairness. and consumer protection? By drawing on policy reports, academic theory, and regulatory analyses, the article maps out a normative and operational framework for adaptive regulation—one that is evidence-driven, proportionate, and capable of responding to technological change without ossifying into either technophobia or laissez-faire.

The contribution of the paper is threefold. First, it articulates a taxonomy of risks arising from digitalised finance, distinguishing micro-level consumer harms from macro-level systemic risks and intermediary concentration effects, and linking each risk to observable mechanisms such as data monopolisation, model opacity, and cross-platform contagion (BCBS, 2022; Cornelli et al., 2023). Second, it evaluates regulatory tools against criteria of effectiveness, proportionality, and feasibility—examining transparency mandates, adverse-action rules, model validation regimes, data portability, sandboxing, and macroprudential adjustments (CFPB, 2022; EBA, 2020; BCBS, 2024). Third. it provides concrete policy recommendations for supervisors, including investments in RegTech, cooperative international standards for AI governance, and institutional reforms to enhance monitoring of non-bank financial intermediation by technology firms (Bains & Wu, 2023; CSET, 2024).

#### **METHODOLOGY**

This paper follows a qualitative, integrative research design, synthesising policy documents, theoretical expositions, and empirical findings to construct a coherent policy analysis. The method is deliberately textual and normative: rather than performing new econometric tests, it organises existing knowledge across disciplines—law, economics, and information systems—to derive policy-relevant inferences. The approach rests on three methodological pillars.

First, thematic synthesis of policy and academic sources. The paper systematically reviews selected documents that explicitly address digitalisation, AI, big tech participation in finance, and consumer protection. These include central bank and international regulatory analyses (BCBS, 2022; BCBS, 2024), supervisory guidance and circulars (CFPB, 2022), empirical studies on digital lending and credit dynamics (Cornelli et al., 2023), and policy-oriented translations of pivotal legal instruments (CSET, 2024). Thematic synthesis extracts recurrent patterns, policy prescriptions, and identified gaps across these texts.

Second, conceptual taxonomy development. Building on the reviewed literature, the paper constructs a risk taxonomy that distinguishes (a) informational and distributive risks (e.g., inference. algorithmic exclusionary discrimination), (b) operational and model risks (e.g., model drift, adversarial vulnerability), and (c) systemic and market-structure risks concentration, cross-platform contagion). Each category is linked to mechanisms and regulatory levers identified in the sources (BCBS, 2022; EBA, 2020; Cornerstone Advisors, 2020).

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Third, evaluative normative analysis. With the taxonomy as a scaffold, the paper evaluates regulatory instruments—such as adverse-action notification requirements for algorithmic credit decisions, model audit and validation standards, data governance frameworks, and supervisory sandboxes—against normative criteria effectiveness, proportionality, and feasibility. This evaluative exercise draws on both theoretical literature on financial regulation (Armour et al., 2016; Arner, Barberis & Buckley, 2015) and specific policy recommendations present in the selected reports (CFPB, 2022; Barakova et al., 2024).

Throughout, the paper explicitly ties claims to their source literature using in-text citations. This approach ensures traceability of assertions and aligns the analysis with the instruction to ground arguments strictly in the provided references.

#### **RESULTS**

The synthesis yields a set of structured findings concerning the nature of risks introduced by finance digitalisation, the sufficiency of existing regulatory responses, and practical gaps in supervisory capacity and international coordination.

1.Digitalisation reshapes information asymmetries and the unit of analysis for supervision. Traditional regulation focuses on institutions and activities; however, when financial intermediation is embedded in platform ecosystems, risk transmits through data networks and algorithmic models that span multiple legal entities (Arner, Barberis & Buckley, 2017; Barakova et al., 2024). This hybridisation weakens the capacity of activitybased regulation to capture cross-entity risk aggregation and highlights the need for data- and model-centric supervisory perspectives (BCBS, 2024).

2.Big tech and advanced analytics materially influence credit allocation patterns. The use of alternative data and machine-learning models lending to previously expands unscored populations but simultaneously introduces new channels of bias and exclusion due to proxy variables and feedback loops (Cornelli et al., 2023; EBA, 2020). Algorithmic underwriting can produce differential outcomes that mimic discrimination without intention, raising regulatory concerns around fairness and adverse action notification requirements (CFPB, 2022).

3.Model opacity and validation challenges are central operational risks. Machine-learning models, particularly complex ensemble and deeplearning architectures, present significant hurdles for explainability and validation—challenging traditional model-risk management frameworks which presuppose interpretable parameters and well-understood error structures (Cornerstone Advisors, 2020; BCBS, 2022). Supervisors and firms face trade-offs between model performance interpretability. with implications for and accountability and consumer recourse mechanisms (CFPB, 2022; Calabia, 2024).

4.Concentration and contestability concerns have systemic implications. Platform economics characterised by network effects, multi-sided

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markets. and data complementarities—can entrench the market power of a few large technology firms, which then act as critical nodes in the financial infrastructure. This concentration raises spillover risks and complicates resolution and macroprudential policy design (Barakova et al., 2024; Cornelli et al., 2023).

5. Regulatory fragmentation and varying domestic approaches to AI raise cross-border coordination issues. Differences in legal frameworks, such as divergent definitions of algorithmic accountability and data protection regimes, inhibit coherent global supervision of platform-mediated finance and may produce regulatory arbitrage (CSET, 2024; BCBS, 2024).

6.Supervisory capacity remains a binding constraint. Effective oversight of algorithmic and data-driven finance requires capabilities that many regulators currently lack: sophisticated data analytics platforms, staff with computational expertise, and tools for continuous monitoring of model performance (Bains & Wu, 2023; BCBS, 2022). Without investments in supervisory technology and skills, regulators risk reactive, patchwork interventions.

7. Targeted regulatory instruments show promise but require careful design. Measures such as mandatory adverse-action notices when automated systems materially affect credit decisions (CFPB, 2022), stronger model-validation standards for high-impact models (BCBS, 2022), and data portability and interoperability rules that reduce lock-in (EBA, 2020) each address specific failure modes. Yet their effectiveness depends on enforcement vigour, interoperability of legal regimes, and the presence of complementary market structures promoting competition (Arner, Buckley & Zetzsche, 2018).

#### DISCUSSION

The foregoing findings converge on a central normative tension: how to preserve the benefits of digitalisation—efficiency gains, expanded credit access, and richer risk assessment—while curbing the emergence of opaque decision-making, discriminatory outcomes, and systemic vulnerabilities. This discussion elaborates on that tension, analyses instrument-specific trade-offs, and outlines a coherent regulatory architecture.

1.Reconceptualising the regulatory object: from institutions to socio-technical systems. Traditional financial regulation treats firms and activities as principal objects of intervention; digitalisation demands a shift towards socio-technical systems. where risk is embodied in algorithms, datasets, and platform-mediated interactions (Arner, Barberis & Buckley, 2015; Barakova et al., 2024). This reframing means regulators should develop mandates that allow oversight of model pipelines. data governance practices, and interconnections across legal entities. Practically, this could involve licensing or registration requirements not just for deposit-taking entities but for platform operators that perform core intermediation roles—an approach compatible with proposals by standardsetting bodies that emphasise functional regulation (BCBS, 2024).

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2.Balancing model performance and explainability. Machine learning excels at pattern recognition but often sacrifices interpretability, complicating legal obligations around consumer rights and adverseaction disclosures (CFPB, 2022). Regulators face three policy options. First, mandate explainability for high-impact decisions—forcing firms to choose more interpretable models for credit adjudications. Second, require robust post-hoc explanation tools and independent model audits to validate that explanations meaningfully reflect model behaviour. Third, adopt an outcomes-based regulatory approach that focuses on fairness metrics and error distributions rather than model internals (BCBS, 2022; Cornerstone Advisors, 2020). Each option entails trade-offs: explainability performance mandates may reduce innovation; outcomes-based regulation requires sophisticated measurement and can be gamed; and audit-centric regimes demand substantial supervisory resources (Calabia, 2024).

3. Adverse-action notification and consumer rights. The CFPB's guidance on adverse-action notices reflects a core principle: automation cannot erode established consumer protections in credit markets (CFPB, 2022). Operationalising such protections for adaptive systems requires firms to document decision-making inputs and rationales at transaction time, (b) provide humanreadable explanations and dispute mechanisms, and (c) maintain audit trails allowing supervisors to reconstruct and test decisions. Implementation challenges include defining the appropriate granularity of disclosure and ensuring disclosures informative rather perfunctory. are than

Policymakers must avoid dry, technical disclosures that overload consumers: instead, regulations should standardise meaningful indicators—such as the principal drivers of denial or pricing differentials—and link them to dispute and remediation pathways (CFPB, 2022; Calabia, 2024).

4.Data governance: portability, minimisation, and access. The competitive advantages of platform firms often arise from exclusive access to rich, multi-dimensional datasets. Policy instruments that enhance data portability and interoperability can lower switching costs and enable third-party innovators to compete, thereby addressing concentration risks (EBA, 2020; Barakova et al., 2024). However, data portability intersects with privacy and security concerns: regulators must balance pro-competitive data sharing with protections against re-identification and misuse. Techniques such as differential privacy, federated learning, and well-governed APIs can support functional data sharing while preserving privacy, but these technical approaches require legal frameworks and supervisory standards to be effective (BCBS, 2022; Cornelli et al., 2023).

5. Supervisory technology and capacity building. A recurring gap is the limited ability of supervisors to continuously monitor algorithmic models and data flows. Investing in RegTech platforms, hiring computationally skilled examiners, and fostering partnerships with academic institutions can expand supervisory reach (Bains & Wu, 2023). Beyond skills, supervisors need legal authority to request datasets, run independent validation, and enforce model adjustments. Regulatory reforms

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should therefore clarify access rights and define expectations for firms' minimum model governance practices—such as version control, retraining triggers, and adversarial testing—so that supervisors can enforce standards efficiently (BCBS, 2022).

6.Macroprudential considerations and systemic oversight. When platform firms provide credit at scale, they may create systemic footprints despite being non-bank entities (Cornelli et al., 2023; 2024). Macroprudential Barakova et al., frameworks must therefore be extended to capture non-bank credit intermediation that is highly interconnected with the banking system. Possible measures include systemic risk buffers for large platform providers, stress-testing regimes that model correlated model failures or data outages, and resolution planning that contemplates crossborder platform discontinuities. Implementing these measures raises jurisdictional definitional issues—particularly threshold for systemic designation—requiring international coordination among supervisors (BCBS, 2024).

legal 7.International harmonisation and fragmentation. Divergent approaches to AI governance (e.g., prohibitions versus risk-based frameworks) and to data protection create opportunities for regulatory arbitrage. The translation of China's AI law by CSET underscores how domestic legal regimes can differ significantly in scope and enforcement (CSET, 2024). To mitigate fragmentation, international standard setters can promote baseline principles—such as transparency, robustness, and consumer

protection—while allowing jurisdictions to tailor operational rules to their domestic contexts. Crossmemoranda of understanding supervisory colleges should be strengthened to support information sharing and coordinated responses to platform crises (BCBS, 2024; Bains & Wu, 2023).

8.Inclusion and distributive justice. Technologymediated finance holds potential to expand inclusion but also risks exacerbating exclusion if algorithms rely on proxies correlated with socioeconomic disadvantage (Arner, Buckley & Zetzsche, 2018; Cornelli et al., 2023). Regulators should therefore require fairness testing across groups, establish demographic mechanisms for misclassification, and encourage the use of alternative credit-scoring methods that empirically improve access without sacrificing prudential soundness. Public policy complement market solutions—for example, by supporting benchmark datasets that enable fair model assessment and by funding research into inclusive algorithm design (EBA, 2020; Arner, Barberis & Buckley, 2015).

#### LIMITATIONS

The analysis is constrained by its reliance on secondary sources and policy documents rather than novel empirical testing. While the paper integrates a wide set of references to develop an applied policy framework, the absence of primary data analysis limits assertions about magnitudes causal effects—such as the contribution of big tech to credit growth or the

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quantitative trade-off between model explainability predictive and performance. Moreover, the pace of technological change implies that specific technical remedies (e.g., particular explainability tools privacy-enhancing or techniques) may evolve faster than policy adaptions; thus, recommendations emphasising principled, flexible approaches may need frequent recalibration. The paper also assumes that regulators have political and fiscal capacity to build technical expertise; in many jurisdictions, constraints on budgets and competing priorities may hinder the recommended investments. Finally, while the references include a range of international perspectives, they do not fully capture jurisdiction-specific legal nuances that affect implementation in particular could countries.

#### **Future Research Directions**

Several research avenues can extend the present analysis. Empirical studies quantifying how AIbased underwriting affects credit access across demographic groups would directly inform the design of fairness metrics and disclosure regimes (Cornelli et al., 2023). Work on the comparative effectiveness of different supervisory approaches—such as audit-based oversight versus outcomes-based regulation—can guide resource (BCBS, allocation for regulators 2022). Computational research on interoperable, privacydata-sharing architectures preserving federated learning across banks and platforms) can inform legal frameworks that balance competition with privacy (EBA, 2020). Finally, interdisciplinary research that brings together legal scholars, economists, and machine-learning experts can operational for model develop standards validation and explainability that are both technically sound and legally enforceable (CFPB, 2022; Calabia, 2024).

#### **Policy Recommendations**

Synthesising the analysis yields a set of operational recommendations for regulators and policymakers:

1.Adopt a function-focused regulatory perimeter that recognises platform-mediated intermediation. Regulators should be empowered to supervise activities that are economically equivalent to banking—regardless of the provider's legal form thereby closing gaps associated with shadow intermediation (BCBS, 2024; Barakova et al., 2024).

2.Institute model-risk governance standards tailored for AI. Minimum expectations should include model documentation, performancemonitoring metrics, retraining triggers, and adversarial robustness testing. High-impact models used for credit decisions must undergo independent audits and hold transparent. consumer-facing explanations (CFPB, 2022; BCBS, 2022).

3.Strengthen adverse-action protections interpretability requirements. When automated systems materially affect consumer credit outcomes, firms should provide clear, actionable explanations and dispute mechanisms, while supervisors should monitor aggregate fairness outcomes (CFPB, 2022; Calabia, 2024).

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4. Promote data portability and interoperability with privacy safeguards. Legal frameworks should mandate standardized APIs for consumerauthorised data sharing and encourage technical standards (e.g., secure enclaves or federated learning) that protect privacy while reducing lockin (EBA, 2020; Cornelli et al., 2023).

5.Invest in supervisory technology and human capital. Regulators should procure analytics platforms and hire or train staff with data-science and machine-learning expertise. Collaborative initiatives with academia and industry can accelerate capability development (Bains & Wu, 2023).

6.Extend macroprudential tools to capture nonbank digital intermediation. Supervisors should develop metrics for platform systemicity, conduct scenario analyses for correlated model failures, and design buffer regimes where appropriate (Barakova et al., 2024; BCBS, 2024).

7. Enhance international coordination mechanisms. Standard-setting bodies should issue interoperable for ΑI principles governance in finance: supervisors should strengthen informationsharing protocols, supervisory colleges, and crisisframeworks cross-border management for platforms (CSET, 2024; BCBS, 2024).

8. Foster inclusive innovation. Policymakers should support public-interest datasets and pilot programs that aim to expand credit to underserved populations without compromising prudential

soundness, while monitoring for disparate impacts (Arner, Buckley & Zetzsche, 2018; EBA, 2020).

#### **CONCLUSION**

Digitalisation, AI, and the entry of big tech into finance present an inflection point for regulatory design. These forces offer notable opportunities: faster, cheaper services, improved risk assessment, and potential expansion of financial access. Yet they also create novel risks—algorithmic opacity; data-driven exclusion; concentration; and systemic vulnerabilities arising from non-bank platforms. Addressing these challenges requires an adaptive, multi-layered regulatory architecture that blends time-honoured prudential principles with new, technology-aware supervision. Key elements include a functional regulatory perimeter, robust model-governance standards, meaningful consumer protections for algorithmic decisions, frameworks that data-governance promote contestability and privacy, and significant investments in supervisory technology and skills. International coordination is vital to prevent regulatory arbitrage and to manage cross-border platform risks.

Implementation will not be straightforward. Trade-offs between innovation and control, the technical complexity of algorithmic systems, and divergent domestic legal frameworks complicate policymaking. Nonetheless. a principled approach—grounded in transparency, accountability, proportionality, and a commitment to inclusion—can help reconcile competing objectives. Supervisors and policymakers who

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proactively build the necessary institutional capabilities and who design flexible, evidencebased rules will be best positioned to steward a financial system that harnesses technological while benefits protecting consumers preserving systemic stability.

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