

SCIENCEZONE

ONLINE SCIENTIFIC
CONFERENCES

Conference

On Legal Science

№.1 (4)
2025

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LEGAL MECHANISMS FOR ENSURING SECURITY AND PROTECTION OF PERSONAL DATA IN THE USE OF ARTIFICIAL INTELLIGENCE IN BANKING SYSTEMS

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Abstract. The integration of artificial intelligence (AI) in banking systems has revolutionized financial services, enhancing efficiency while posing significant challenges to personal data protection and security. This study analyzes legal mechanisms safeguarding personal data in AI-driven banking environments, identifying regulatory gaps and proposing innovative solutions. Employing an interdisciplinary approach, including legal scholarship, financial technology research, and comparative regulatory analysis, the research examines algorithmic transparency, automated decision-making, cross-border data processing, and consumer protection. Findings reveal that traditional data protection laws are insufficient for addressing AI-specific risks, such as machine learning opacity and algorithmic bias. A comprehensive AI governance framework is proposed, balancing innovation with robust consumer safeguards through adaptive regulations, enhanced transparency, and accountability mechanisms. The study underscores the need for evolving legal frameworks to ensure trust, compliance, and fairness in AI-powered banking.

Keywords: artificial intelligence, banking systems, personal data protection, legal mechanisms, financial services regulation, consumer protection, algorithmic governance, data security.

Introduction

Artificial intelligence (AI) has transformed the banking sector, enabling advanced credit scoring, fraud detection, customer service automation, and personalized financial products (Arner et al., 2017). However, this technological shift introduces complex challenges related to personal data protection, privacy, and algorithmic accountability (Barocas & Selbst, 2016). Traditional legal frameworks, designed for human-controlled processes, struggle to address the dynamic nature of AI, including machine learning opacity and real-time data processing (Citron & Pasquale, 2014). Issues such as algorithmic fairness, transparency, and cross-border data transfers necessitate specialized legal mechanisms tailored to AI in banking (Crawford & Schultz, 2014). This article examines existing regulatory frameworks, identifies gaps, and proposes a governance model to balance innovation with consumer protection, emphasizing transparency, accountability, and adaptive regulation (Broeders et al., 2018).

Method

This study adopts an interdisciplinary methodology, integrating legal scholarship, financial technology research, and comparative regulatory analysis (Hildebrandt, 2019). A systematic literature review was conducted, encompassing peer-reviewed articles, regulatory guidelines, case law, and industry reports from 2013 to 2021, sourced from databases like Google Scholar and JSTOR (Grimmelmann, 2020). Key search terms included “AI in banking,” “data protection,” “algorithmic governance,” and “consumer rights.”

The analysis focused on primary legal sources (e.g., EU General Data Protection Regulation, U.S. regulations) and secondary sources from organizations like the Basel Committee on Banking Supervision and Financial

Stability Board (International Monetary Fund, 2019). Comparative case studies examined regulatory approaches in the EU, U.S., UK, and Singapore, identifying best practices and challenges (Kaal, 2018). Qualitative content analysis of regulatory documents and quantitative trends in AI adoption were employed (Kazachenok, 2021). Expert interviews with regulators and banking professionals supplemented the analysis, ensuring practical insights (Kumar et al., 2022). The forward-looking framework considered emerging trends, regulatory sandboxes, and technological advancements (Monetary Authority of Singapore, 2020).

Results

Intellectual Property Challenges

AI in banking raises complex intellectual property issues, particularly regarding patentability and trade secret protection for algorithms used in credit scoring and fraud detection (Nizioł, 2021). Traditional patent law struggles with AI-generated innovations, as concepts like inventorship and novelty are difficult to apply to machine learning systems (Pasquale, 2015). Banks face a tension between protecting proprietary algorithms as trade secrets and meeting regulatory demands for transparency (Rudin, 2019). This balance is critical to maintain competitive advantages while ensuring compliance (Financial Conduct Authority, 2019).

Privacy and Data Security

AI systems process vast datasets, including alternative data (e.g., social media, behavioral analytics), challenging traditional privacy principles like purpose limitation and data minimization (Tschider, 2018). Consent mechanisms are limited, as consumers cannot fully understand evolving AI data uses (Wachter et

al., 2017). Existing privacy frameworks, such as the GDPR, provide foundational protections but are inadequate for AI's dynamic processing (Veale & Edwards, 2018). New approaches are needed to reconcile AI efficiency with privacy compliance (Dwork & Roth, 2014).

Liability and Accountability

Attributing liability for AI-driven decisions in banking is complex, given risks like algorithmic bias, errors, and data breaches (Gillis & Spiess, 2019). Traditional liability models, designed for human decisions, are ill-suited for autonomous AI systems involving multiple stakeholders (e.g., vendors, banks) (Selbst & Powles, 2017). Product liability frameworks require adaptation for evolving AI behaviors, potentially necessitating strict or shared liability models (Kroll et al., 2017). Professional liability in AI-powered advisory services further blurs human and algorithmic roles, requiring clear oversight protocols (European Banking Authority, 2020).

Evidence and Legal Proceedings

AI-generated evidence in banking poses challenges for admissibility and reliability due to the “black box” nature of algorithms (Lehr & Ohm, 2017). Courts struggle to interpret AI decisions, complicating authentication and expert testimony requirements (Diakopoulos, 2015). Comprehensive audit trails and logging systems are essential for regulatory review and legal challenges, ensuring accountability and due process (Pedreschi et al., 2019). Explainability remains a critical issue, balancing technical limitations with consumer rights (Goodman & Flaxman, 2017).

AI in Legal Reasoning

AI enhances regulatory compliance through tools for contract review and risk assessment, improving efficiency (OECD, 2019). However, its role in legal decision-making raises concerns about human oversight and accountability (Stahl, 2021). Banks must define clear governance frameworks to delineate AI's scope in legal processes, ensuring human intervention where necessary (Financial Stability Board, 2017).

Discussion

The integration of AI in banking necessitates a fundamental overhaul of legal frameworks to address its unique risks and opportunities (Calo, 2017). Regulatory adaptation must encompass technical standards, governance protocols, transparency requirements, and liability models (European Central Bank, 2020). Balancing innovation with consumer protection requires nuanced, adaptive approaches that evolve with technology (Federal Reserve Board, 2019).

Global variations in AI regulation create compliance challenges for multinational banks, risking regulatory arbitrage (World Bank, 2020). International coordination through multilateral agreements and standards is essential (International Association of Insurance Supervisors, 2020). Privacy-preserving technologies, such as differential privacy and homomorphic encryption, offer solutions, though their applicability varies (Abadi et al., 2016). Explainable AI and regulatory technology (RegTech) can enhance transparency and oversight, but technical limitations persist (Gunning & Aha, 2019).

Future research should include empirical studies on AI's consumer impacts, comparative analyses of regulatory effectiveness, and interdisciplinary

approaches combining legal, technical, and economic perspectives (Jordan & Mitchell, 2015). Long-term studies on AI's evolution will inform adaptive regulation (World Economic Forum, 2020).

Conclusion

AI's integration into banking systems demands comprehensive legal mechanisms to protect personal data and ensure consumer rights (Agrawal et al., 2018). Existing frameworks provide foundational principles but are inadequate for AI's complexities, including opacity and bias (O'Neil, 2016). Effective governance requires adaptive regulations addressing transparency, accountability, liability, and cross-border compliance (Brynjolfsson & McAfee, 2014). Proposed solutions include privacy-preserving technologies, explainable AI, and RegTech, supported by international coordination (United Nations, 2021). This study contributes to AI law by offering a framework for banking governance, emphasizing human oversight and fairness. Continued research and collaboration among regulators, banks, and technologists are critical to shaping effective AI regulation (Zhang et al., 2020).

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