

Ethical AI in Banking: A Sectoral Literature Review with Case-Based Interventions

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Abstract

As artificial intelligence (AI) becomes more integrated into banking, concerns around bias, privacy, and governance are becoming increasingly urgent. This article explores the ethical risks of AI in financial services and reviews practical interventions that can help banks use AI responsibly. Drawing from literature and real-world examples from institutions like JP Morgan Chase, Wells Fargo, HSBC, Bank of America, Triodos Bank and Credit Union Australia, the study highlights five key strategies: implementing Explainable AI (XAI), using bias detection tools, forming ethics committees, educating customers, and aligning with global standards such as the EU AI Act, OECD AI Principles, and NIST AI RMF. The article evaluates tools like IBM's AI Fairness 360, Google's What-If Tool, and Fairkit-learn for detecting and mitigating bias in automated decisions. While challenges such as cost, technical complexity, and organizational resistance exist, especially for smaller banks, the findings show that ethical, transparent AI is achievable and scalable. The paper concludes that strong leadership, stakeholder engagement, and policy alignment are critical for building AI systems that are fair, trustworthy, and fit for the future of banking.

Keywords

Artificial Intelligence, Banking, Governance Frameworks, Explainable AI, Algorithmic Bias, Customer Trust, Transparency, Ethical AI Practices

1. Introduction

As AI integrates into banking, concerns about privacy, biased outcomes, and operational risks are increasing. Poor governance could lead to unfair results, loss of public trust, and legal issues. Banks' main issue is the absence of established and fast-enough evolving governance for AI technologies, deployed rapidly without ethical standards or regulations. Key factors include biased algorithms that worsen

social inequality, the opaque nature of AI systems hindering oversight, outdated regulations that cannot keep up with innovation, and institutional resistance to ethical constraints due to competitive concerns. Responsible usage is crucial rather than optional as AI transforms the banking industry. Financial institutions must implement ethical guidelines emphasizing transparency, fairness, and accountability in every AI-assisted decision to leverage AI's advantages while maintaining public trust.

2. Background

Alan Turing introduced the concept of AI in the 1950s, but its practical applications grew significantly with the rise of the internet (Fares et al., 2022). Over the last two decades, banks have implemented AI for loan processing, customer service, and voice/image recognition. A pivotal moment came in 2011 when major tech companies integrated AI into banking platforms, although adoption varies by institution based on perceived benefits and reliability (Qahtani & Alsmairat, 2023).

Even with productivity improvements, ethical issues have become more pronounced. Credit scoring and fraud detection are especially susceptible because algorithmic biases can disproportionately affect specific communities. Kidron and Kreis (2020) argue that transparency is crucial for customer trust and highlight the importance of Explainable AI (XAI), though its implementation differs across organizations.

AI systems trained on biased historical data can perpetuate discrimination (Daneshjou et al., 2021). The lack of algorithm transparency reduces accountability in AI decisions regarding race, socioeconomic status, and gender (Pérez, 2022). Machine learning can reinforce social inequalities (Hassani, 2021) and raise data privacy concerns that undermine consumer trust. At the same time, regulatory bodies attempt to create ethical guidelines to safeguard users (Gasser, 2023; Walter, 2024). Similarly, financial institutions strive to develop internal AI systems prioritizing fairness, transparency, and accountability (Ridzuan et al., 2024).

3. Methodology and Literature Integration

The selected institutions—JP Morgan Chase, Wells Fargo, HSBC, and Bank of America—were chosen for their documented AI governance initiatives and leadership in the banking sector. They reflect diverse geographic areas and stages of digital transformation and showcase ethical AI practices. Selection criteria included ethics committees, explainable AI frameworks, and customer education strategies supported by company reports, press releases, and academic references for credibility.

A thematic analysis was conducted to synthesize literature on ethical AI in banking. Sources were sourced from several literature databases using keywords such as XAI, bias mitigation, AI governance, and regulatory compliance. The literature was organized into key themes: governance gaps, ethical challenges, pro-

posed interventions, real-world practices, and limitations. Peer-reviewed articles and gray literature, including policy briefs, were included to create a structured review linking theory to industry application.

4. Proposed Solutions

As AI becomes a core of banking operations, a thoughtful governance strategy is crucial to managing its ethical, operational, and reputational risks. Banks risk reinforcing bias, damaging customer trust, and facing serious regulatory consequences without explicit action. The following solutions are proposed to tackle these challenges, build a foundation for ethical AI, promote transparency, and support sustainable innovation (**Table 1**).

Table 1. Potential solutions to address the ethical and operational challenges of AI in banking.

Solution	Description
Adoption of Explainable AI (XAI)	Adopting Explainable AI (XAI) is vital for trust in AI-driven banking, particularly in credit scoring. XAI clarifies reasons for declined loan applications, empowering customers and ensuring accountability. This transparency enhances fairness, strengthens customer relationships, reduces regulatory risks, and positions banks as ethical institutions. An example is JP Morgan Chase's XAI Center of Excellence, which advances research in explainability and fairness (Morgan Chase, n.d.).
Adoption of Bias Detection and Mitigation Tools	Addressing bias in AI is crucial for banks to use technology responsibly. Historical data in AI can reinforce inequalities, particularly in credit scoring. By integrating bias detection tools early in the design process and using fairness-aware algorithms, banks can promote equitable treatment and build trust while ensuring regulatory compliance. According to Wick (2024) , Wells Fargo improved its AI credit scoring models and reduced racial bias in loan approvals by 25%, resulting in a fairer evaluation process.
Introducing Ethics Committees	Establishing AI ethics committees is essential for banks using intelligent automation. Composed of data science, law, and ethics experts, these committees ensure AI systems are fair, transparent, and compliant with regulations like the EU AI Act. They identify risks, guide responsible innovation, and enhance public trust. For example, HSBC's markets and securities division has created an AI Ethics Committee to align AI usage with its ethical principles (HSBC, n.d.).
Customer Education on AI	Educating customers about AI in finance is crucial. Financial organizations can use infographics, articles, and videos to explain AI's role in loan approvals and fraud detection, building trust, and enhancing client relationships. For instance, Bank of America's AI-driven virtual assistant, Erica, offers personalized insights and real-time support, helping customers understand AI in managing finances (Bank of America, n.d.). Customer education builds trust in algorithmic credit scoring. Kleiser et al. (2019) found that understanding AI decision-making improves perceptions of fairness and brand credibility. Interactive tools like videos and chatbots clarify automated decisions, boosting satisfaction and loyalty through transparency.
Alignment with International Standards	For banks deploying AI, aligning with global ethical standards is no longer optional—it is essential for maintaining trust and meeting regulatory expectations. While the EU AI Act provides a strong legal framework by classifying AI systems based on risk and enforcing strict rules for high-risk applications like credit scoring, it is just one piece of the puzzle (Gasser, 2023 ; Botunac et al., 2024). Banks should consider the OECD AI Principles and the U.S. NIST AI Risk Management Framework (AI RMF) to build a more balanced and globally relevant AI governance strategy. The OECD Principles, adopted by over 40 countries, promote fairness, transparency, and human-centered design. Though not legally binding, they offer a widely accepted ethical baseline, especially useful for multinational banks seeking consistent standards across jurisdictions (Butcher & Beridze, 2019).

Continued

The NIST AI Risk Management Framework (AI RMF) is a flexible, practical guide designed to help organizations manage the risks of using AI (NIST, 2023). Instead of laying down strict rules, the framework provides a straightforward, flexible approach to spotting, evaluating, and managing risks, especially in sensitive areas like surveillance. It breaks risk management into practical, easy-to-follow steps, helping organizations build trustworthy AI systems that adapt as needs evolve. It is not just theory—NIST developed the AI RMF with input from various stakeholders, including the ACM’s U.S. Technology Policy Committee, to ensure it is relevant and grounded in real-world needs. Covering the full AI lifecycle, the framework helps balance the push for innovation with the need for trust and accountability in AI (NIST, 2023). Unlike the EU Act’s regulatory model, NIST focuses on helping organizations of all sizes—from large commercial banks to smaller credit unions—embed trust and safety into AI systems throughout their lifecycle (Hu & Wu, 2023). It is beneficial for institutions needing operational flexibility while maintaining accountability.

These frameworks—the EU AI Act, the OECD Principles, and the NIST AI RMF—share core goals like transparency and fairness but differ in their approaches. Combining them allows banks to build ethical, legally sound, adaptable, and internationally credible AI systems. This is particularly valuable as financial institutions expand digitally and face diverse regulatory environments.

By regularly reviewing AI systems through the lens of these frameworks, banks can more effectively identify bias, protect customer data, and ensure that automated decisions remain accountable. This proactive, global alignment helps institutions avoid compliance demands while signaling a genuine commitment to responsible innovation (Ridzuan et al., 2024; Cath, 2018).

Table 2. AI fairness tools in banking.

Tools	Developer	Key Features	Banking Applications	Strengths	Limitations
AI Fairness 360	IBM	70+ fairness metrics, 9 bias mitigation algorithms, pre-/post-processing options, Python/R support	Credit scoring, loan approval, fraud detection, regulatory compliance	Comprehensive metrics, open-source,	Requires programming skills, integration
What-if Tool	Google	Visual interface, counterfactual analysis, subgroup performance evaluation, no coding required	Lending model explainability, customer segmentation, risk assessment	User-friendly, visual model insights, no	Limited to TensorFlow, analysis-focused (not mitigation)
Fairkit-learn	Independent	Model evaluation and comparison using fairness metrics, integrates with scikit-learn, supports exploratory bias testing	Comparing fairness of various models in use cases like credit scoring and customer risk profiling	Flexible integration with Python ML stack, simplifies fairness audits across multiple models	Still evolving, less mature than larger frameworks, limited mitigation tools

IBM’s AI Fairness 360 is a robust open-source toolkit that helps banks identify and reduce bias in AI models using various fairness metrics and mitigation techniques. It is already being used to tackle concerns around fairness in algorithmic decision-making, particularly in high-stakes areas like credit scoring and loan approvals (Majumder et al., 2023). Google’s What-If Tool provides a user-friendly, no-code interface that lets users explore how machine learning models make decisions. This makes it especially useful for explaining outcomes in customer-facing systems and promoting transparency in lending decisions (González-Fernández & González-Velasco, 2020). A newer addition to the space, Fairkit-learn, is designed to simplify model comparisons by integrating fairness checks into the

familiar scikit-learn workflow. It supports over 70 fairness definitions and enables engineers to visualize trade-offs between fairness and performance. It is a valuable tool for banks evaluating bias across different models, even as it matures (Johnson et al., 2022) (Table 2).

5. Justification of Proposed Solutions

These initiatives stem from studies emphasizing the importance of fairness, transparency, and regulatory compliance. The foundation of trust largely relies on explainable AI (Al-Harbi, 2025). Methods for identifying bias, such as adversarial learning and reweighting (Sarwal & Islam, 2024), have enhanced fairness in AI. Tools like AI Fairness 360 provide metrics to assess fairness, aiding ethical AI development in finance. Financial institutions should adopt data systems emphasizing accountability and inclusivity (Pagano et al., 2023).

Establishing an AI ethics committee ensures banks have dedicated oversight to identify risks, enforce accountability, and guide ethical decision-making as AI systems evolve. Owolabi et al. (2024) find that examples of banks that implemented an AI Ethics Council are the Dutch Bank ING and the Canadian Imperial Bank of Commerce. Pairing this with customer education builds transparency and empowers users to understand how AI affects their financial lives.

Ethical AI transformation in banking needs leaders who promote fairness and innovation. According to Northouse (2021), such leaders exhibit idealized influence and inspirational motivation to tackle AI's ethical challenges. They encourage transparency, challenge outdated practices, and advocate for inclusive decision-making. By emphasizing ethics, they establish governance frameworks that build accountability and trust, positioning banks as responsible entities in the digital landscape.

Complying with international AI standards enables banks to operate ethically and transparently in a fast-evolving digital landscape (Botunac et al., 2024). Frameworks like the EU AI Act help minimize bias, enhance data privacy, and build public trust. Compliance also reduces legal risks and supports smoother cross-border operations, showcasing the bank's commitment to responsible innovation and providing a strategic advantage.

6. Implementation Complexities and Potential Challenges

Implementing ethical AI in banking comes with technical and organizational challenges. The cost and complexity of integrating Explainable AI (XAI) can be especially daunting for smaller institutions that lack the infrastructure or budget to support advanced AI systems (Papenmeier et al., 2022; Oldemeyer et al., 2024). Bias detection tools are only as good as the data on which they are built and need continuous updates to stay accurate and fair (Haider et al., 2022). Ethics committees, while essential, often face internal pushback, unclear mandates, or conflicting priorities, making it difficult to drive change across departments (Hine, 2021). Customer education, another critical pillar, demands sustained investment in out-

reach, digital literacy, and communication tools that remain up-to-date and easy to understand. Organizationally, aligning ethical AI practices with business strategy can also meet resistance from teams focused solely on performance (Ali et al., 2023), creating friction between innovation and accountability. These barriers show why ethical AI adoption must be approached strategically. However, the solutions remain achievable, especially when banks use what they already have. Existing compliance structures, legal teams, and customer support platforms offer a strong base that can be adapted to embed ethics into AI systems. Banks can move forward responsibly and cost-effectively with phased rollouts, interdepartmental collaboration, and executive support.

7. Scalability and Relevance for Smaller Banks

Indeed, solutions like Explainable AI and dedicated ethics committees are often easier for large banks with more resources to implement. Still, ethical AI is not just for big institutions—smaller banks can adopt these practices in scalable, cost-effective ways. To address this, I have expanded the scope to highlight practical strategies that smaller institutions such as *Triodos Bank* and *Credit Union Australia* use. These banks leverage cost-effective alternatives like integrating ethical oversight into existing compliance roles, deploying open-source bias detection tools such as IBM's AI Fairness 360 toolkit (Bellamy et al., 2019), and participating in industry partnerships to share risk frameworks (Eitel-Porter, 2021). Smaller banks do not need massive budgets to prioritize ethical AI. By bringing part-time ethics advisors or rotating existing staff into ethics review roles, they can build accountability into their systems without overextending resources (Ali et al., 2023). These flexible approaches show that fairness and transparency are within reach, even for leaner institutions. Incorporating these examples enhances the generalizability of our findings and offers inclusive, actionable pathways for banks of all sizes to engage in ethical AI transformation.

8. Feasibility of Proposed Solutions

These suggestions are practical. Financial institutions are increasingly developing AI governance structures to mitigate legal, ethical, and operational challenges (Cath, 2018). Explainable AI is becoming more popular, particularly in credit evaluations and risk management (de Lange et al., 2022). It improves adherence to regulations and fosters public confidence (Hu & Wu, 2023).

Committees focused on AI ethics are becoming more prevalent and provide an economical means for establishing oversight frameworks. They assist in implementing ethical standards and guarantee that organizations comply with changing regulations (Eitel-Porter, 2021). Educating consumers is crucial to uphold credibility in light of growing regulatory requirements. Effective governance aligned with international standards requires continuous performance monitoring, stakeholder collaboration, and feedback mechanisms. Banks with existing legal and compliance teams can adopt AI governance through policy adjustments rather

than a complete structural overhaul.

9. Methodology and Structure for Implementation of Proposed Solutions

The first stage evaluates governance weaknesses and recognizes risks such as biased algorithms and potential privacy violations. Financial institutions must establish AI governance structures that tackle ethical issues and adhere to regulatory requirements (Ridzuan et al., 2024). As the execution phase starts, it is crucial to involve ethics boards, tackle possible biases, and create AI systems that produce transparent and comprehensible results (Eitel-Porter, 2021).

In the monitoring phase, external evaluations evaluate safety and build public trust. Audits should recognize risks and confirm compliance with standards (Falco et al., 2021). Engaging stakeholders increases transparency and accountability (Bell et al., 2023). Contemporary auditing practices now include legal, ethical, and technical dimensions (Mökander, 2023), and technologies like blockchain could enable decentralized oversight (Kulothungan, 2024).

Adopting ethical AI in banking requires a strategic organizational shift, not just technical changes. Successful implementation requires aligning structural systems, cultural values, and power dynamics. Banks should integrate ethical AI into operations, foster fairness and transparency, and engage stakeholders to build trust and innovation (Palmer et al., 2022).

10. Implementation of Proposed Solutions

Effective execution requires that technical advancements are in harmony with regulatory policies. From a technical standpoint, banks need to integrate XAI and bias identification into their current systems. AI explanation tools help customers understand automated decisions and enhance transparency.

Implementing AI ethics committees in banks requires careful consideration of their role, whether advisory, oversight, or decision-making, along with securing leadership support (Eitel-Porter, 2021). A diverse group of experts in data science, legal compliance, and ethics is essential for creating equitable AI solutions and avoiding biases (de Hond et al., 2022). These committees are increasingly vital for establishing AI governance policies that emphasize fairness, transparency, and accountability, and they play a crucial role in evaluating AI systems and conducting ongoing audits to address risks like bias and privacy (Eghaghe et al., 2024).

Furthermore, informing customers about AI can be achieved through clear and engaging explanations (Cornacchia et al., 2021). Educational strategies include hosting webinars, creating chatbots that are well-versed in AI, offering channels for feedback, and improving customer understanding. By making AI visible and approachable, banks empower customers to engage with technology confidently and responsibly.

To comply with global standards, internal review boards should assess governance practices, track AI performance, and communicate findings with key stake-

holders (Butcher & Beridze, 2019).

11. Limitations of Proposed Solutions

The proposed solutions promote openness, fairness, and ethics in AI banking, but their limitations must also be acknowledged (Table 3).

Table 3. Limitations of proposed solutions.

Challenges	Description
Complexity and Cost of XAI Implementation	Explainable AI (XAI) is important, but its implementation can be challenging. While deep learning models provide high accuracy, they often lack interpretability, which can reduce trust (Papenmeier et al., 2022; Kinger & Kulkarni, 2023). Smaller banks face financial and technical hurdles in adopting AI (Oldemeyer et al., 2024).
Limitations of Bias Detection Tools	Bias often stems from the fundamental issues found within the training data. Consistently refreshing models is crucial for keeping up with evolving societal norms and reducing inequalities in access to financial services (Haider et al., 2022).
Challenges in Ethics Committees	Hine (2021) notes that ethics committees encounter internal disagreements due to diverse stakeholder viewpoints and values while managing complex regulations and fostering organizational culture changes that may meet resistance.

While this study offers actionable insights, it has a few limitations. The focus on four major banks—JP Morgan Chase, Wells Fargo, HSBC, and Bank of America—limits the scope, potentially overlooking challenges unique to smaller or regional institutions. The analysis relies on secondary data such as reports and press releases rather than firsthand empirical evidence, which may constrain the depth of insight into internal practices. Additionally, while proposed solutions like XAI and ethics committees are promising, their implementation may be costly, complex, and less feasible for smaller banks. These factors suggest caution in generalizing findings and highlight the need for future empirical research across more diverse financial institutions.

12. Conclusion

As AI becomes central to banking operations, ethical governance is no longer a future concern but a present necessity. This review shows that banks can adopt AI transparently, reasonably, and accountably by implementing tools like Explainable AI, bias mitigation frameworks, and customer education initiatives. Real-world examples and global standards such as the EU AI Act, OECD AI Principles, and NIST AI RMF provide direction and credibility. While challenges like cost, complexity, and internal resistance remain, especially for smaller institutions, scalable solutions and shared best practices offer a path forward. Building ethical AI in banking ultimately depends on strong leadership, cross-functional collaboration, and a willingness to align innovation with responsible governance. Doing so is not only suitable for compliance and trust—it is essential for the future of digital finance.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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