

# AI-Finance Odyssey: Challenges, Opportunities, and Cases from Global Practitioners

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## ABSTRACT

The rapid integration of Artificial Intelligence (AI) in the financial and banking sectors presents both transformative opportunities and complex challenges. This study examines practitioner perspectives on AI adoption, analysing 60 YouTube videos featuring industry experts through a grounded-theory approach. Findings reveal key challenges, including regulatory compliance complexities, data quality limitations, ethical risks, and talent shortages, which hinder AI implementation. Conversely, AI offers significant benefits, such as hyper-personalised banking, enhanced fraud detection, automated credit underwriting, and operational cost savings. The study highlights the critical role of human oversight in ensuring transparency and mitigating biases in AI-driven decisions. By bridging practitioner insights with technological advancements, this research provides a framework for responsible AI adoption, emphasising the need for balanced human-AI collaboration to optimise efficiency, inclusivity, and ethical governance in the evolving financial landscape.

**Keywords:** Artificial Intelligence, Banking Innovation, Regulatory Compliance, Human-AI Collaboration

## 1. INTRODUCTION

The rapid integration of AI is profoundly reshaping the financial and banking industries, impacting a wide array of operations from enhancing customer service and bolstering fraud detection to refining investment strategies and ensuring regulatory compliance (Cao, 2022). This technological transformation is no longer a theoretical concept but a tangible reality within these sectors (Rodrigues et al., 2022). To navigate this dynamic environment effectively, it is essential to gain a deep understanding of the perspectives held by practitioners at the forefront of this evolution, such as bankers and fund managers (Rahman et al., 2023). Their direct experiences with the implementation, benefits, and limitations of AI provide invaluable insights that are critical for its successful and responsible deployment (Rahman et al., 2023).

Understanding the views of these professionals is crucial for several reasons. Firstly, they are the individuals who are actively involved in applying AI in the financial and banking industry within their daily workflows, giving them firsthand knowledge of the practical challenges and opportunities that arise (Rahman et al., 2023; Zhang et al., 2023). For instance, bankers are leveraging AI for fraud detection and risk prevention (Rahman et al., 2023), while fund managers may be exploring AI-driven analytics for investment decisions (Musleh Al-Sartawi et al., 2022). Their perspectives on the effectiveness of these AI applications, the infrastructure required for their adoption, and the skills necessary to utilise them are vital for guiding future developments and investments in AI within the industry (Rahman et al., 2023).

Furthermore, the ethical and regulatory implications of AI in finance and banking are significant (Chen et al., 2023; Zhang et al., 2023). Practitioners' views on issues such as data privacy and security (Rahman et al., 2023; Zhang et al., 2023), algorithmic bias and fairness (Nair et al., 2024), and the need for transparency and explainability in AI-driven decisions (Zhang et al., 2022) are paramount. Their insights can inform the development of robust ethical frameworks and regulatory guidelines that can foster trust and ensure the responsible use of AI (Chen et al., 2023; Nair et al., 2024). By analysing the perceptions and experiences of bankers, fund managers, and other financial professionals, we can bridge the gap between the technological possibilities of AI and its practical, ethical, and sustainable implementation within the financial and banking industry (Brusseau, 2023; Giudici & Raffinetti, 2023; Nair et al., 2024).

This study explores how financial practitioners navigate AI implementation challenges, leverage strategic opportunities, and structure human-AI collaboration. The views of practitioners in the financial and banking industries on AI are not merely an academic exercise but a fundamental necessity for the continued and responsible advancement

of AI in these critical sectors. Their practical insights associated with AI adoption are indispensable for shaping its trajectory and ensuring that its implementation aligns with the needs and values of the industry and society as a whole (Rahman et al., 2023; Zhang et al., 2023). This analysis will help to foster a more nuanced understanding of AI's real-world impact and guide the development of strategies that maximise its benefits while mitigating potential risks (Nguyen et al., 2023; Rahman et al., 2023).

## **2. RESEARCH METHOD**

### **2.1. Data Sources**

This research utilised YouTube videos as primary data sources, analysing 60 videos featuring finance and banking professionals worldwide discussing AI applications in their sector. The complete dataset totalled 19 hours, 36 minutes, and 12 seconds of content, predominantly in English. This methodology aligns with established qualitative research approaches using YouTube videos (Izharuddin, 2025; Mohammed et al., 2023).

### **2.2. Data Analysis**

This study employed a grounded-theory methodology (Glaser & Strauss, 2017) following Gioia's framework (Gioia et al., 2013). NVivo 14 software facilitated the initial coding process, identifying key concepts through "In Vivo" first-order codes during open coding. Axial coding techniques revealed relationships between categories through source triangulation, continuing until theoretical saturation was achieved. From an initial pool of 53 themes, the analysis distilled 18 core themes that captured the most significant patterns in the data.

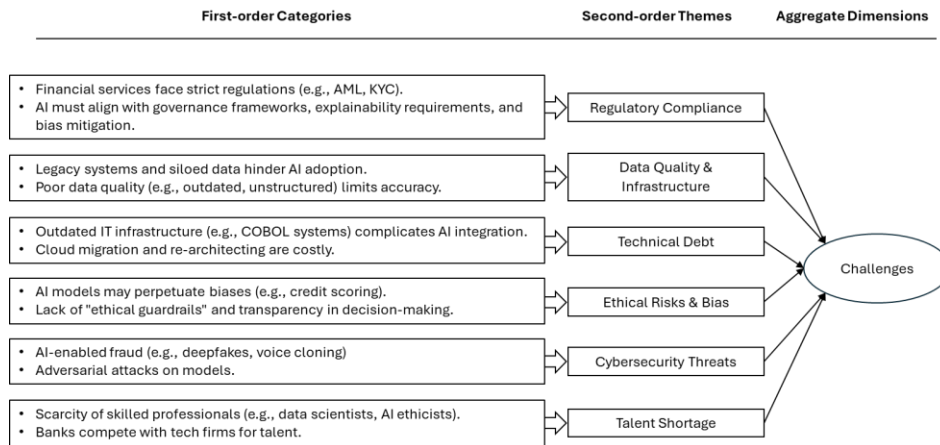
The concluding phase established connections between third-order dimensions and second-order codes through iterative pattern refinement (Eisenhardt & Graebner, 2007). Comprehensive NVivo coding of all interviews supported conceptual model development, with constant comparison and theoretical sampling ensuring theoretical reflexivity (Charmaz, 2006) within the Straussian Grounded Theory tradition (Glaser & Strauss, 2017).

## **3. RESULTS AND DISCUSSIONS**

### **3.1. Challenges**

The financial and banking industry faces significant challenges in adopting AI, primarily due to regulatory compliance and data quality issues. Strict regulations like Anti-Money Laundering (AML) and Know Your Customer (KYC) require AI systems to adhere to governance frameworks, ensure explainability, and mitigate biases, adding complexity to deployment. Additionally, many institutions struggle with legacy systems and siloed data, which hinder AI integration, while poor-quality or unstructured data limits model accuracy. Outdated IT infrastructure, such as Common Business-Oriented Language (COBOL) systems, further complicates modernisation efforts, leading to technical debt and costly cloud migrations. Ethical concerns, including biased credit scoring and a lack of transparency, amplify risks, while cybersecurity threats like deepfake fraud and adversarial attacks demand robust safeguards. Compounding these issues is a talent shortage, as banks compete with tech firms for skilled AI professionals and ethicists, slowing innovation and implementation.

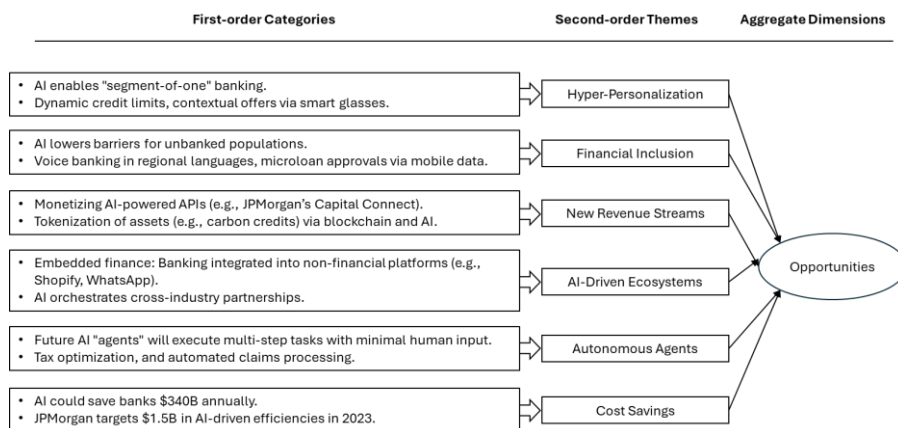
The financial sector faces significant challenges in implementing AI, beginning with regulatory compliance, where AI systems must align with governance frameworks while remaining explainable and reproducible (Aziz & Dowling, 2019; Königstorfer & Thalmann, 2020), though current regulations limit data usage and often indirectly govern AI through requirements like credit decision transparency (Polak et al., 2020). Data quality and infrastructure issues, including legacy systems, siloed data, and non-standardised structures, hinder AI adoption by reducing data reliability and usefulness (Rahman et al., 2023; Zhang et al., 2023), while the absence of explicit mentions of technical debt still implies infrastructure scalability pressures and integration failures that limit AI's potential (Königstorfer & Thalmann, 2020; Polak et al., 2020; Rodrigues et al., 2022). Ethical risks and bias persist as AI models may replicate historical biases if trained on flawed data, compounded by the "black box" problem that obscures decision-making and raises fairness concerns (Königstorfer & Thalmann, 2020; Nair et al., 2024; Zhang et al., 2023). Cybersecurity threats escalate as banks leverage AI for fraud detection but grapple with rising cybercrimes and privacy risks when handling sensitive customer data (Chen et al., 2023; Polak et al., 2020). Lastly, a talent shortage exacerbates these challenges, with a growing need for professionals skilled in both domain expertise and machine learning to fully realise AI's advantages (Cao et al., 2024; Königstorfer & Thalmann, 2020).



**Figure 1.** Codification of the challenges of AI in the finance sector.

### 3.2. Opportunities

The financial and banking industry is increasingly leveraging AI to enhance efficiency and customer experience, with AI-powered chatbots like JPMorgan's Contract Intelligence (COIN) and HDFC's Electronic Virtual Assistant (EVA) handling around 65% of customer queries, improving response times through generative AI. In fraud detection and AML, AI reduces false positives and enables real-time transaction monitoring, as seen in tools like Feedzai and JPMorgan's fraud models. Credit underwriting has also evolved, with AI analysing alternative data, such as cash flow patterns and social media, while generative AI synthesises unstructured documents like bank statements for faster approvals. Wealth management benefits from robo-advisors, such as Morgan Stanley's AI-driven tools, which create personalised portfolios and summarise market trends. Additionally, AI aids in risk management by predicting market volatility and assisting employees in real-time, like JPMorgan's COIN for call centres. However, human oversight remains critical—high-stakes decisions, including AML alerts and investment strategies, still require human validation to prevent AI errors or biases, even as automation streamlines back-office tasks like KYC checks and document processing.



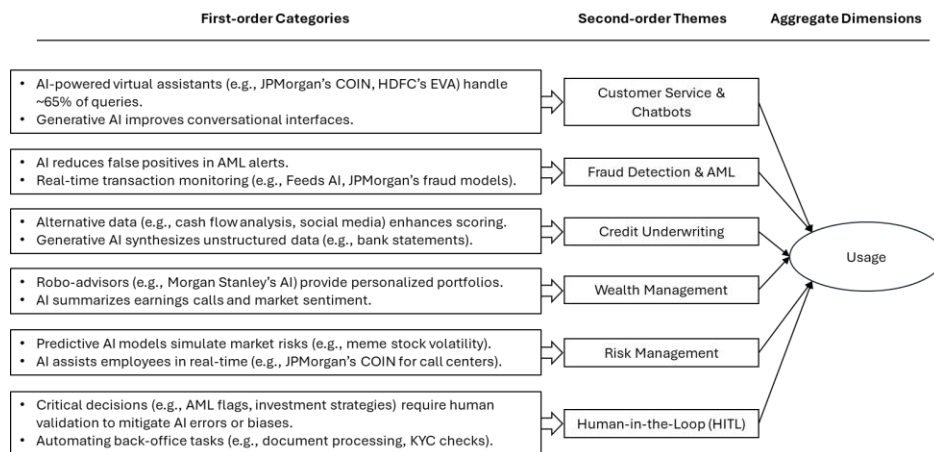
**Figure 2.** Codification of opportunities for AI in the finance sector.

AI enables hyper-personalisation in banking by analysing customer data to identify optimal engagement opportunities and design targeted campaigns (Han & Yang, 2018; Königstorfer & Thalmann, 2020; Rahman et al., 2023), while also enhancing financial inclusion through AI-driven chatbots and streamlined lending processes for underserved populations (Nair et al., 2024; Shao et al., 2022). AI is recognised for creating non-traditional revenue streams in FinTech (Nguyen et al., 2023). AI's role in task automation is evident through applications like automated financial reporting and fraud detection (Cao, 2022; Chen et al., 2023), with significant cost-saving potential through improved risk assessment, network optimization, and compliance automation (Königstorfer & Thalmann, 2020; Nguyen et al., 2023).

### 3.3. Usage

The financial and banking industry stands to gain transformative opportunities through AI, particularly in hyper-personalisation, where AI enables "segment-of-one" banking, delivering dynamic credit limits and contextual offers, even through emerging tech like smart glasses. AI also drives financial inclusion by lowering barriers for the unbanked, offering voice banking in regional languages and microloan approvals via alternative mobile data. Beyond customer-facing benefits, AI unlocks new revenue streams, such as monetising APIS (e.g., JPMorgan's Capital Connect) and facilitating asset tokenisation (e.g., carbon credits) through blockchain integration. The rise of AI-driven ecosystems allows banks to embed services into non-financial platforms like Shopify and WhatsApp, while AI orchestrates cross-industry partnerships for seamless financial solutions. Looking ahead, autonomous AI agents could revolutionise operations by handling multi-step tasks—from tax optimisation to automated claims processing—with minimal human intervention. These advancements promise massive cost savings, with AI projected to save banks \$340B annually, exemplified by JPMorgan's 1.5 billion AI efficiency target in 2023.

AI is transforming financial services across multiple domains, with customer service chatbots providing 24/7 personalised support (Nair et al., 2024), analysing behavioural patterns (Rahman et al., 2023), and enabling multilingual interactions like Bank of Tokyo's Nao robot (Marinova et al., 2017). In fraud detection and AML, AI algorithms (random forests, SVMs, neural networks) effectively monitor transactions, reduce investigation times (Rahman et al., 2023) and detect money laundering across cash/electronic channels (Königstorfer & Thalmann, 2020). For credit underwriting, machine learning improves risk assessment by incorporating alternative data (e.g., social media) and outperforms traditional models (Shao et al., 2022). While in wealth management, robo-advisors democratize investment strategies through algorithmic portfolio management (Shanmuganathan, 2020). AI enhances risk management by simulating market risks, optimizing models (Polak et al., 2020) and improving creditworthiness evaluations (Nair et al., 2024). However, human oversight remains critical to address AI's "black box" problem (Usama et al., 2019), ensure explainability (Königstorfer & Thalmann, 2020) and mitigate biases (Nair et al., 2024), even as demand grows for professionals skilled in both finance and machine learning (Aziz & Dowling, 2019).



**Figure 3.** Codification for usage case dimensions of AI in the finance sector.

## 4. CONCLUSION

In conclusion, this study highlights the transformative yet complex role of AI in the financial and banking sectors, revealing both significant challenges and substantial opportunities. While AI adoption faces hurdles such as regulatory compliance, data quality issues, ethical risks, and talent shortages, its successful implementation offers immense potential—from hyper-personalised banking and financial inclusion to fraud detection, automated underwriting, and cost savings. The analysis underscores the necessity of human oversight to mitigate biases and ensure transparency, while also emphasizing the importance of practitioner insights in shaping AI's ethical and sustainable integration. As the industry navigates this AI-driven evolution, strategic collaboration between technology and human expertise will be critical to maximising benefits, addressing risks, and fostering inclusive, responsible innovation in finance.

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