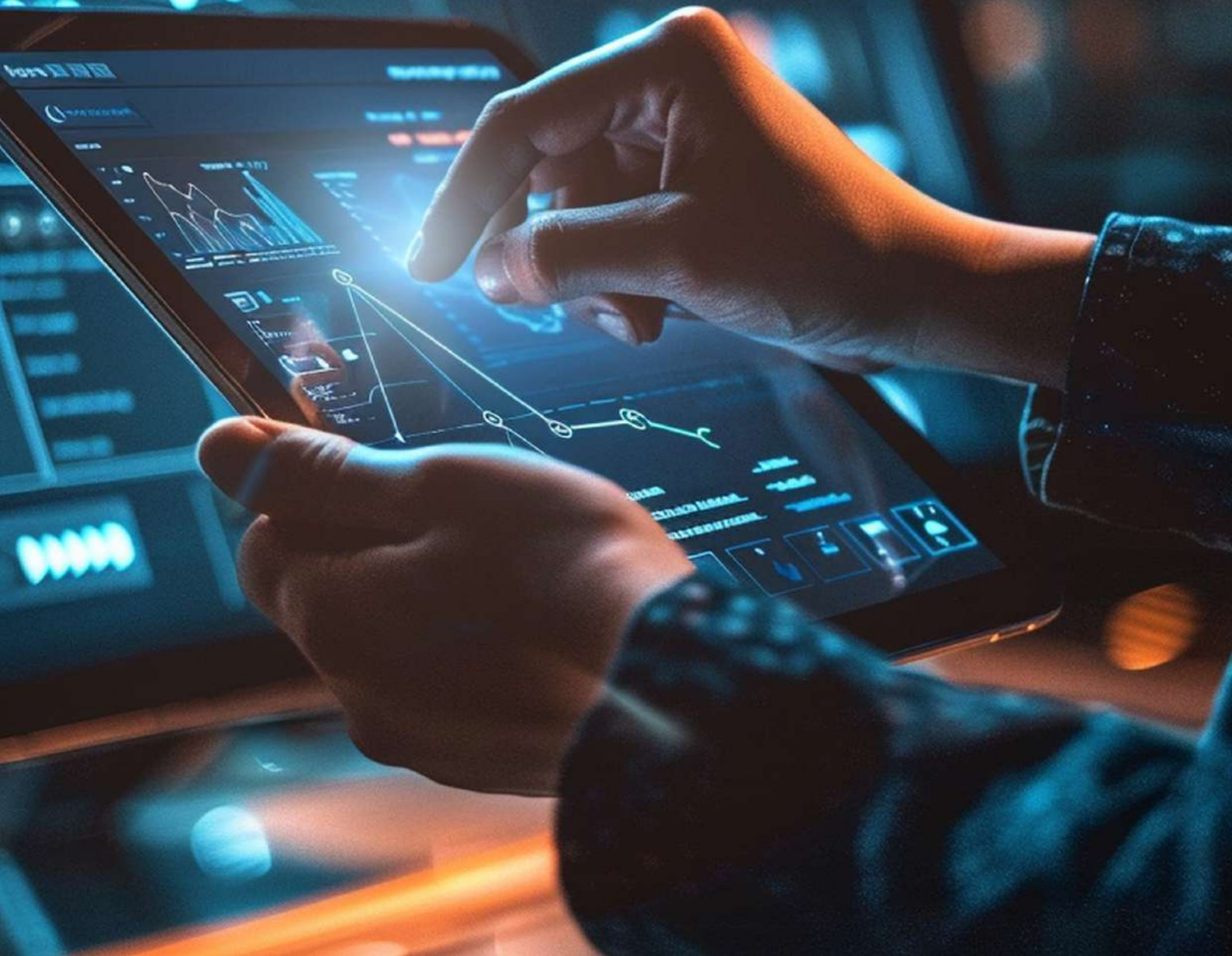


# Banking and Generative AI: A Primer



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# Introduction

The advent of generative artificial intelligence (AI) marks a transformative shift in the banking sector, presenting unprecedented opportunities for enhancing productivity, efficiency, and customer experience. As we stand at the intersection of rapid technological advancement, the integration of generative AI into banking systems is not just a trend but a necessity.

Banking is a pivotal industry that engages individuals from all walks of life, making the benefits of formal banking universally significant. The integration of technology into banking systems has become increasingly crucial, offering unparalleled enhancements in convenience, accessibility, and security. By fostering financial inclusion and equity, technological advancements in banking ensure that everyone, regardless of their socioeconomic status, can participate in, and benefit from modern financial services. Engaging with formal banking institutions is not only advantageous but also essential for the formalization and growth of the economy.<sup>i</sup>

The global banking industry is navigating a complex landscape characterized by technological advancements and evolving regulatory environments.<sup>ii</sup> This backdrop sets the stage for the banking sector to harness the power of generative AI to address these challenges and seize new opportunities. While AI has been used for many years by banking and financial services companies, the rise of generative AI as a

foundational technology over the last year has been novel and notable, with increasing applications and integrations in the banking industry.<sup>iii</sup>

This point of view series delves into aspects of generative AI in banking, including emerging use cases; the convergence of generative AI with other emerging technologies for diverse financial services; associated risks; and the regulatory landscape. Just as important is prioritizing trust in this technology, and this series emphasizes the importance of transparency, ethical guidelines, and robust compliance strategies to build and maintain trust in generative AI technologies.

This paper introduces the foundational concepts of generative AI in banking and financial services, providing an overview of the industry in 2024. It highlights emerging use cases, showcases novel case studies, presents an overview of associated risks, and offers a forward-looking perspective on the industry's trajectory. Finally, this paper lays out a TRUST framework for the responsible and ethical use of generative AI in banking.

The convergence of generative AI and banking presents a transformative opportunity to reshape the financial landscape. The next step is to explore the multifaceted impact and the strategies to harness its potential while ensuring trust and integrity in technology.



# Banking Sector in 2024 and Projections for Growth

In 2024, the global banking sector is navigating a dynamic and evolving landscape. The industry is facing rapid technological advancements, changing consumer expectations, and an increasingly complex regulatory environment. Despite these challenges, the banking sector is poised for significant growth, driven by the integration of innovative technologies, such as AI, Web 3, and digital currencies.<sup>iv</sup>

In early 2024, the International Monetary Fund (IMF) projected global economic growth of around 3.0% for the year ahead.<sup>v</sup> While this indicates a stable economic environment, the growth rates vary significantly across regions and it is important to acknowledge the volatility of financial markets. Advanced economies such as the United States, Europe, Japan, the United Kingdom, and Canada are expected to see minimal growth, averaging around 1.4%. In contrast, emerging markets, particularly in Asia, are anticipated to experience more robust growth.<sup>vi</sup>

The Bank for International Settlements (BIS) highlights that global banking assets have grown by approximately 4% annually over the past five years, with a significant portion of this growth attributed to technological investments.<sup>vii</sup> In 2023 alone, banks allocated more than \$200 billion to technology upgrades, including generative AI and blockchain initiatives.<sup>viii</sup> This investment is expected to increase by 15% in 2024, as financial institutions continue to modernize their operations and infrastructure.

The regulatory landscape is also evolving, with a focus on ensuring the stability and security of the financial system. Banks are navigating a complex web of regulations, including data protection laws, such as the General Data Protection Regulation (GDPR) in Europe and the Fair Credit Reporting Act (FCRA) in the United States.<sup>ix</sup> Additionally, the European Union's Artificial Intelligence Act aims to regulate generative

AI applications, categorizing them by risk levels and establishing compliance requirements.<sup>xi</sup> This regulatory focus is crucial for maintaining consumer trust and ensuring the responsible use of technology in banking. As Federal Reserve System Board of Governors member Michelle Bowman said in a June 2024 speech:

*Our goal should be to develop—and continually invest in—building and supporting a clear and sensible regulatory framework. One that allows the private sector to innovate while also maintaining appropriate safeguards. A clear regulatory framework supports private-sector innovators by providing the clarity and consistency that encourages long-term business investment in pursuing innovation, while continuing to support today's products and services. A clear regulatory framework empowers supervisors to focus on safety and soundness, while also ensuring a safe and efficient payment system.<sup>xii</sup>*

Digital transformation remains a key driver of growth in the banking sector. The rise of digital banking services (e.g., mobile banking, neobanks, and digital wallets) is reshaping how consumers interact with financial institutions. According to BIS, the number of digital banking transactions globally increased 24% in 2023, and the number of digital banking users is projected to exceed 3.6 billion by the end of 2024, up from 2.4 billion in 2020.<sup>xiii</sup> This growth is fuelled by increasing internet penetration, smartphone adoption, and the demand for convenient, accessible financial services.<sup>xiv</sup>

Given these technological innovations, evolving regulatory frameworks, and a focus on digital transformation, the industry is positioned to leverage new technologies drive growth, enhance customer experiences, and maintain their competitive edge in a rapidly changing landscape.



# Potential of Generative AI in the Banking Sector

In 2024, the banking industry is expected to continue its digital transformation by leveraging AI to enhance efficiency, improve customer service, and drive profitability.<sup>xv</sup> A recent survey analyzing key trends in AI and financial services showed that 46% of firms are already using generative AI in their companies.<sup>xvi</sup>

The table below from the BIS Annual Economic Report 2024 highlights the diverse impacts of AI across four

financial areas: payments, lending, insurance, and asset management.<sup>xvii</sup> AI enhances efficiency and reduces costs in back-end processing, regulatory compliance, fraud detection, and customer service. It improves know-your-customer (KYC) processes and fraud detection, ensuring better regulatory compliance and cost efficiency. Additionally, AI chatbots and co-pilots are increasingly used in customer service operations, offering substantial improvements in service delivery and operational efficiency.<sup>xviii</sup>

Opportunities, challenges and financial stability risks of AI in the financial sector					Table 1
	Payments	Lending	Insurance	Asset management	
General opportunities	Back-end processing, virtual assistants, co-pilots, fraud detection, regulatory compliance				
Sector-specific opportunities	Liquidity management, AML/KYC	Credit risk analysis, financial inclusion	Risk assessment, pricing, claims processing	Portfolio allocation, algorithmic trading, robo-advising, asset embeddings	
General challenges	Lack of explainability, data silos, third-party dependencies, algorithmic collusion, hallucinations, cyber security risks				
Sector-specific challenges	Liquidity crises, sophisticated fraud and cyber attacks	Algorithmic discrimination, privacy concerns	Zero-sum arms race for private gains, herding, algorithmic coordination		
Financial stability challenges	Herding, network interconnectedness and procyclicality, single point of failure, incorrect decisions based on short samples of non-representative data, spillovers from real sector				
Source: Adapted from Aldasoro, Gambacorta, Korinek, Shreeti and Stein (2024).					

Alongside more traditional AI applications come increasing adoption of generative AI. Banks are using generative AI to automate processes, analyze large volumes of data, and provide personalized financial services. This technological integration is not only enhancing operational efficiency but also offering new revenue streams and improving customer satisfaction. Generative AI could potentially add between \$200 billion to \$340 billion annually to the banking industry.<sup>xix</sup> This significant value generation stems from enhancements across banking operations,

including automation of routine processes, improved customer interactions, and enhanced fraud detection systems.<sup>xx</sup> By automating tasks related to, for example, customer service inquiries and compliance checks, generative AI enables banks to allocate human resources more effectively, focusing on the most complex, strategic, and value-driving activities.

As the banking sector continues to evolve, integrating generative AI will be an essential tool for maintaining competitiveness and meeting the growing demands of customers.



# Emerging Use Cases for Generative AI in Banking

The expectations for the impact of generative AI in banking are rising given the technology’s capacity to streamline operations, personalize customer services, and optimize marketing strategies. Research estimates these and other applications could boost productivity by up to 30% and increase revenues by up to 6%.<sup>xxi</sup> Consider some of the areas where generative AI application can create value in banking.

## Customer Experience

Generative AI can be used to improve the customer experience by enabling data integration and personalization.<sup>xxii</sup> Service platform interoperability allows for seamless data integration across different systems, enabling banks to offer comprehensive financial services. This interoperability ensures that customer data from various touchpoints is consolidated, providing a holistic view that enhances service delivery.<sup>xxiii</sup>



One of the early use case archetypes for generative AI is improving the conversational capabilities of chatbots, which many banking institutions are already leveraging. In the United States, the top 10 commercial banks use chatbots to engage with customers, taking advantage of features like 24/7 availability and cost savings.<sup>xxiv</sup> The Consumer Financial Protection Bureau (CFPB) notes that chatbots save banks approximately \$8 billion

annually, translating to about \$0.70 per customer interaction.<sup>xxv</sup> Additionally, as of 2022, around 20% of banks and credit unions had deployed chatbots, though the adoption rate is higher among FinTech’s compared to traditional financial institutions.<sup>xxvi</sup> The introduction of generative AI-enabled chatbots holds the potential to improve these business outcomes.

### How data-driven results can be deployed in the financial services industry to enhance customer satisfaction:

- 1 Personalized financial advice
- 2 Tailored product recommendations
- 3 Proactive customer support

# Fraud detection

The Federal Trade Commission (FTC) reported that consumers lost more than \$10 billion to fraud in 2023, highlighting the need for advanced fraud detection systems.<sup>xxvii</sup> Fraud detection is a major application for generative AI in banking. Goldman Sachs, for example, estimates that generative AI could reduce fraud by 20%, a significant improvement in the security of financial transactions.<sup>xxviii</sup> The potential lies in generative AI's capacity to analyze extensive transaction data to identify unusual patterns and fraudulent activities. This enhances the security of banking systems and protects customers from financial crimes. One emerging type of fraud that generative AI may be suited to meet is the rise of so-called deepfake content – synthetic media presented as authentic to intentionally mislead or misrepresent. Generative AI can be used to rapidly create deepfakes, giving fraudsters the capacity to create malicious content, fraudulent websites, and sophisticated phishing schemes. While generative AI fuels the problem, it could also provide a solution, as it analyzes text, images, video, and more for evidence of media manufactured to be misleading.

## Spotlight on SARs

As another window into the kinds of generative AI use cases that support fraud detection, consider

how automating suspicious activity reports (SARs) advances compliance, regulatory compliance, and risk management efficiency.

- » **Automated Report Creation:** Using generative AI to create SARs reduces the manual workload for compliance teams, ensuring reports are generated consistently and quickly.<sup>xxix</sup> Unlike manual report creation, which can be prone to errors and inconsistencies, AI-generated reports are based on predefined criteria and data analysis, leading to more reliable and standardized outputs.
- » **Regulatory Compliance:** Automating SARs creation helps banks meet regulatory compliance by ensuring necessary reports are filed promptly and accurately, reducing the risk of non-compliance penalties and improving overall regulatory adherence.
- » **Risk Management Efficiency:** Automating SARs improves the efficiency of risk management processes by liberating human analysts from mundane report writing to focus on higher level risk assessments and decision-making.<sup>xxx</sup>
- » **Resource Optimization:** With SARs automation, banks can free up compliance officers to engage in more complex tasks, maximizing the use of human expertise and improving operational efficiency across the organization.<sup>xxxi</sup>

## Case Study: J.P. Morgan and Fraud Detection

J.P. Morgan's recent insights highlight the transformative potential of generative AI in payments, emphasizing efficiency and fraud reduction.<sup>xxxii</sup> Generative AI-powered payment validation has been instrumental in reducing classification errors and enhancing queue management, significantly lowering fraud levels and improving customer experience. The implementation of these generative AI systems has cut account validation rejection rates by 15-20% over two years.



## Improved Operational Efficiency

Generative AI contributes to improved operational efficiency, with recent research highlighting it can be used to automate tasks (e.g., summarize unstructured information), reduce operational costs (e.g., chatbots for customer self-service), and drive better resource utilization (e.g., human capital dedicated to the most complex tasks), all of which enable banks to operate more efficiently. In a recent survey of financial services firms and AI deployment and adoption, operational efficiency was the greatest area of application with 48% of firm using AI solutions to improve operational efficiency.<sup>xxxiii</sup> This increased efficiency allows banks to focus on strategic initiatives and innovation, driving overall growth and competitiveness in the industry.

It can also accelerate code development and migration by automating repetitive tasks and ensuring code quality, which can reduce development time and errors. For example, banks can use generative AI to update or translate outdated code, ensuring compliance and improving system performance, in turn allowing banks to innovate more rapidly.<sup>xxxiv</sup> Separately, AI and automation can enhance regulatory compliance through real-time monitoring, automated reporting, and predictive analytics, ensuring consistent application of compliance checks and proactive risk management. And they can streamline back-office operations through automation of routine tasks leading to significant cost savings, improved accuracy, and greater operational efficiency. Major banks, such as J.P. Morgan and HSBC, have successfully implemented these technologies, achieving substantial improvements in efficiency and compliance.<sup>xxxv</sup> Overall, AI and automation offer financial institutions the potential to reduce operating costs by up to 25% while enhancing scalability and resource allocation.

## Marketplace Evaluation

Generative AI enhances market analysis and forecasting through scenario modelling, which improves the accuracy of market predictions. Research notes that AI-driven scenario modelling provides better insights into market trends and customer behavior.<sup>xxxvi</sup> Additionally, generative AI facilitates greater customer segmentation, allowing banks to target specific customer groups with tailored products and services.

Product evaluation and innovation are also significantly impacted by generative AI. J.P. Morgan, for instance, uses generative AI to assist software engineers in optimizing existing products and developing new ones.<sup>xxxvii</sup> This continuous innovation ensures that banks remain competitive and can meet evolving customer demands.

## Risk Management

Generative AI helps banks assess and mitigate risks by providing advanced analytics and predictive modelling, thereby enhancing their ability to manage financial risks. Use cases including automating SARs, ensuring compliance with regulatory requirements, and improving the efficiency of risk management processes.<sup>xxxviii</sup>

In these and other areas, Generative AI is transforming the banking sector and helping organizations navigate the complexities of the modern financial landscape while delivering superior value to their customers. While generative AI applications for improving the customer experience, fraud detection, operational efficiency, and risk management are impactful today, looking ahead, the future of generative AI and banking is lined with novel opportunities, as well as significant risks.





# Evaluating Risks: Reliability and Fraud Risk

While generative AI holds significant potential for banking, its application can create new risks to the organization and its customers. Particularly in a sector as heavily regulated as banking, generative AI risks need to be considered in terms of their impact on business operations, customer perceptions, and compliance with laws and rules. Generative AI risk mitigation needs to be a priority across the AI lifecycle, receiving as much attention and investment as innovation and novel applications. Some of the primary risks resulting from generative AI in banking include:

## Model reliability

Generative AI models are susceptible to inaccurate outputs delivered with total confidence. These “hallucinations” can lead users to make decisions based on flawed information, which can impact customer service and financial opportunities. Over time, this could erode customer trust in financial institutions themselves. As such, generative AI model outputs need to be validated by a human stakeholder to promote accuracy, fairness, and consistency in decision-making and banking operations.

## Model biases

Fairness in banking is not only essential for customer satisfaction but also for legal compliance with laws prohibiting discrimination based on protected characteristics (e.g., ethnicity or gender). Biased AI outputs can inform unfair financial decision-making, and they can also lead to inaccurate forecasts and decreased efficiency due to errors. The root of AI bias is in the data, and enterprise and customer data needs to be curated to remove or augment information that could lead to biased outputs. Banks may also hire third-party providers to develop and audit AI systems for bias. AI bias has long been recognized as a primary risk, and with the growing use of generative AI, developing and managing for model impartiality will only become more business critical.



## Data security

Generative AI is trained on and processes large volumes of data, and in banking, this data includes sensitive customer information. This data is attractive to cybercriminals, but just as important, customer data protection is in many regions mandated by public rules. As such, generative AI applications need to be treated to ensure data security and prevent information from being inadvertently disclosed or accessed. The enabling infrastructure and ecosystem of technologies surrounding a generative AI deployment also need to be secured against unauthorized access. Banks may look to encryption and access controls as components of effective data security with generative AI.

## Model drift

Model drift is the degradation of AI model performance over time due to changes in data patterns (e.g., new data collection methods, changing user behavior).<sup>xxxix</sup> For banks, model drift can lead to decreasing accuracy and reliability in machine outputs, which in turn can misinform decision-making and lead to a range of consequences for the organization and customers alike. Managing model drift requires ongoing monitoring and assessment

of generative AI outputs to identify decreasing performance, as well as thresholds and protocols for when a model should be paused, retrained, or retired.

## Transparency and consent

Trust in generative AI relies in part on the user's understanding of how AI system impacts decisions that concern their interests, as well as their consent to use the system and input sensitive information. The issues of transparency and consent directly impact consumer trust, and banks face generative AI risks when users are unaware or unsure of how AI affects them. At the same time, internal compliance standards and external regulators may require a transparent and explainable record of why an AI system acted as it did and how it informed a decision. Transparent AI operations help all stakeholders understand how AI decisions are made, which supports trust and confidence in generative AI systems.

These are some of the significant risks associated with generative AI deployment in banking. Yet, best practices and third-party solutions are available. By prioritizing fairness, security, model management, and transparency, banks can foster trust and integrity in their operations.



# A TRUST Framework for AI Deployment in Banking Sector

Within the context of AI and the banking sector, a TRUST framework can serve as a stewardship role for industry to address some of the core risks, concerns, and opportunities with generative AI. The framework addresses AI deployment in banking through Transparency, Reliability, Unbiasedness, Security, and Transformation.

## Transparency

- » **Clear Communication:** Maintain transparency in how AI systems inform decisions, providing explanations to customers and regulators.
- » **Documentation:** Maintain detailed records of AI algorithms, data sources, and decision-making processes.
- » **Third-Party Audits:** Engage independent auditors to review and validate AI systems, ensuring impartial evaluations.

## Reliability

- » **Model Validation:** Conduct rigorous testing and validation of AI models to ensure consistent performance and accuracy.
- » **Continuous Monitoring:** Implement continuous monitoring to detect and correct model drift and performance degradation.
- » **Robust Infrastructure:** Develop a resilient AI infrastructure that can efficiently handle high volumes of data and transactions.

## Unbiasedness

- » **Bias Audits:** Regularly perform audits using diverse datasets to identify and mitigate biases.
- » **Inclusive Development:** Involve diverse teams in the development and testing of AI systems to ensure inclusivity.

- » **Ethical Standards:** Establish and enforce ethical guidelines that promote fairness and impartiality in AI operations and governance.

## Security

- » **Data Protection:** Implement robust encryption, access controls, and regular security audits to safeguard sensitive customer data.
- » **Fraud Prevention:** Use generative AI-driven fraud detection systems to identify and mitigate sophisticated fraud techniques.
- » **Compliance:** Ensure generative AI systems comply with relevant data protection regulations and industry standards.

## Transformation

- » **Operational Efficiency:** Use AI to automate routine tasks, optimize processes, and enhance operational efficiency.
- » **Innovation:** Encourage continuous improvement and innovation in AI applications to adapt to evolving financial landscapes.
- » **Scalability:** Design AI systems that can scale effectively to accommodate growing data and transaction volumes.

Managing AI for trust requires collaborative, enterprise-wide governance structures that uphold the trust principles. Leveraging the TRUST Framework alongside best practices in AI governance, banks can foster trust and integrity in generative AI applications.







## Conclusion

Generative AI is already transforming the banking sector. The growing use of generative AI applications not only optimizes internal operations but also paves the way for a more interconnected and efficient financial ecosystem. This paper

outlined the importance of deploying reliable, unbiased, and secure generative AI systems. As the banking industry embraces these advanced technologies, the challenges of ensuring model reliability, addressing data security, and mitigating biases will become even more paramount.

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# References

- i. Nathaniel Young, [“Formal Banking and Economic Growth: Evidence from a Regression Discontinuity Analysis in India,”](#) 2015.
- ii. Bank of International Settlements, [“Artificial Intelligence and the Economy: Implications for Central Banks,”](#) *BIS Annual Economic Report*, 2024.
- iii. Georg Leitner et al., [“The Rise of Artificial Intelligence: Benefits and Risks for Financial Stability,”](#) *Financial Stability Review*, May 2024.
- iv. Rahul Agarwal et al., [“How generative AI can help banks manage risk and compliance,”](#) McKinsey, March 1, 2024.
- v. International Monetary Fund, [“Moderating Inflation and Steady Growth Open Path to Soft Landing,”](#) *World Economic Outlook Update*, Jan. 2024.
- vi. Mike Wade, Neil Tomlinson and Val Srinivas, [“2024 Banking and Capital Markets Outlook,”](#) Deloitte, Oct. 5, 2023.
- vii. Agustín Carstens and Nandan Nilekani, [“Finternet: The Financial System for the Future,”](#) Bank of International Settlements, April 15, 2024.
- viii. Michael Chui, [“The Economic Potential of Generative AI: The Next Productivity Frontier,”](#) McKinsey, June 14, 2023.
- ix. Stephen Bonner, Peter Gooch and Maya Goethals, [“After the dust settles: How Financial Services are taking a sustainable approach to GDPR compliance in a new era for privacy, one year on,”](#) Deloitte, 2018.
- x. Consumer Financial Protection Bureau, [“12 CFR Part 1022 - Fair Credit Reporting \(Regulation V\),”](#) U.S. Government, Jan. 1, 2024.
- xi. [“The EU Artificial Intelligence Act,”](#) European Union, 2024.
- xii. Michelle Bowman, [“Innovation in the Financial System,”](#) at *The Salzburg Global Seminar on Financial Technology Innovation, Social Impact, and Regulation*, June 17, 2024.
- xiii. Kevin Buehler et al., [“Scaling gen AI in banking: Choosing the best operating model,”](#) McKinsey, March 22, 2024.
- xiv. Basel Committee on Banking Supervision, [“Digitalisation of Finance,”](#) Bank of International Settlements, May 16, 2024.
- xv. Michael Abbott, [“Banking on AI: Banking Top 10 Trends for 2024,”](#) Accenture, 2024.
- xvi. NVIDIA report
- xvii. Bank of International Settlements, [“Annual Economic Report,”](#) June 2024.
- xviii. Sebastien Krajka, [“Transforming Banking: The Power of Chatbots in Customer Service,”](#) Boost.ai, Nov. 28, 2023.
- xix. Chui, “The Economic Potential of Generative AI.”
- xx. McKinsey.
- xxi. Abbott, “Banking on AI.”
- xxii. Buehler, “Scaling gen AI in banking.”
- xxiii. Milo Bianchi et al., [“Mobile payments and interoperability: Insights from the academic literature,”](#) *Information Economics and Policy* 65 (2023).
- xxiv. Consumer Financial Protection Bureau, [“Chatbots in consumer finance,”](#) U.S. Government, June 6, 2023.
- xxv. Ibid.
- xxvi. Ibid.
- xxvii. Federal Trade Commission, [“As Nationwide Fraud Losses Top \\$10 Billion in 2023, FTC Steps Up Efforts to Protect the Public,”](#) U.S. Government, Feb. 9, 2024.
- xxviii. Allison Nathan, [“Generative AI: Hype, or Truly Transformative?”](#) Goldman Sachs, July 5, 2023.
- xxix. U.S. Treasury, [“Treasury Announces Enhanced Fraud Detection Process Using AI Recovers \\$375M in Fiscal Year 2023,”](#) U.S. Government, Feb. 28, 2024.
- xxx. Terisa Roberts and Stephen Tonna, *Risk Modeling: Practical Applications of Artificial Intelligence, Machine Learning, and Deep Learning*, John Wiley & Sons: 2022.
- xxxi. IA Goncharenko and Andrea Miglionico, [“Artificial intelligence and automation in financial services: the case of Russian banking sector,”](#) *Law and Economics Yearly Review* 8, no 1(2019), 125-147.
- xxxii. J.P. Morgan, [“How AI will make payments more efficient and reduce fraud,”](#) Nov. 20, 2023.
- xxxiii. NVIDIA report
- xxxiv. Agarwal, “How generative AI can help banks.”
- xxxv. Aaron Ricadela, [“Banks cautiously embrace AI for internal applications,”](#) Oracle, Jan. 5, 2024.
- xxxvi. Adele Wentzel, Walter Creighton and Tanner Shamrock, [“Unlocking generative AI value for banking and financial services,”](#) PWC, Oct. 26, 2023.
- xxxvii. Goldman Sachs, [“A new generation of AI tools and models is emerging,”](#) Dec. 21, 2023.
- xxxviii. Roberts and Tonna, *Risk Modeling*.
- xxxix. Jim Holdsworth, Ivan Belcic and Cole Stryker, [“What is Model Drift?”](#) IBM, July 17, 2024.

