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A Literature Review of Gen AI Agents in Financial Applications: Models and Implementations

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Abstract: ***This paper presents a structured literature review of AI agents in financial applications, focusing on their implementation frameworks, model architectures, and future directions. The review categorizes AI agents into five key domains: financial risk management, investment strategies, fraud detection, stock market analysis, and customer support. By analyzing measurable outcomes, the paper highlights significant contributions (from the literature) of AI agents, including a 25% improvement in risk model accuracy, a 20% reduction in loan defaults, and a 40% decrease in false-positive fraud detections. Additionally, it identifies gaps in scalability, interpretability, and adaptability, proposing future research into hybrid models and ethical integration. This review provides actionable insights into the transformative potential of AI agents to reshape financial ecosystems and enhance decision-making capabilities. Quantitative outcomes are highlighted to showcase the impact of these agents across each domain. Also, this paper discusses and compare the modeling implementation and models with the financial domain using van diagrams, heat maps and radars. And finally proposes how to address the gaps in the current literature. This work uses research and white-papers only from the last six months making it one of the most current works in the subject of Gen AI.***

Keywords: GenAI in Finance, Gen AI Implementation Design, Gen AI Agents, Frameworks of Gen AI

1. Introduction

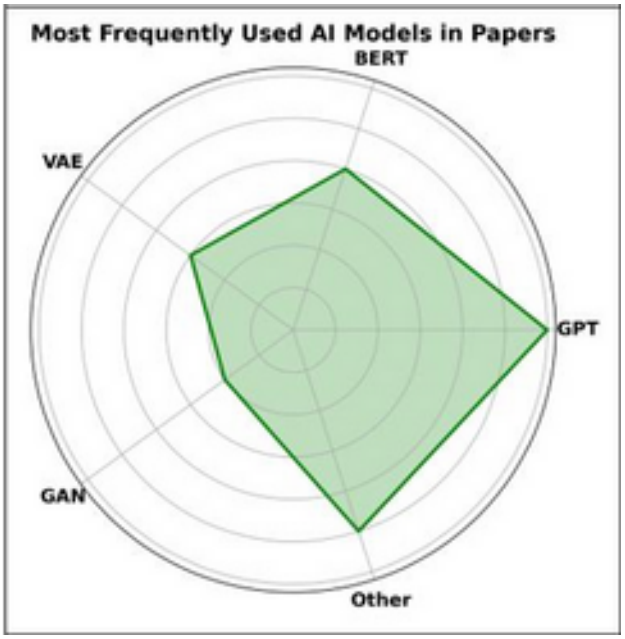
AI agents are transforming the financial landscape by tackling challenges such as risk management, fraud detection, investment strategies, and customer engagement. This review categorizes recent research, highlights quantitative outcomes, identifies research gaps, and suggests future directions. AI agents are increasingly shaping the financial landscape by addressing complex challenges such as risk management, fraud detection, investment strategies, and customer engagement. This review categorizes and evaluates recent research to provide insights into their practical applications and quantitative outcomes [1], [2]. This review categorizes and evaluates recent research to provide insights into their practical applications and quantitative outcomes [1], [2], [3], [4], [5], [6]. In our previous work [20-23] we have explored Gen AI's application in Financial Risk Management and in this work we have shown its application GenAI Agents.

The report from [1] discusses the growing role of AI in financial services, while [2] explores the challenges and risks AI brings to the finance industry. The Financial Stability Board addresses AI and ML in financial services in [7], and [8] examines AI's influence in regulatory filings. [9] outlines how financial firms can maximize value and minimize risk with generative AI, and [3] highlights the new frontier of agentic AI. [10] discusses AI and Gen AI developments in credit risk management, and [11] argues that synthetic data, not generative AI, plays a crucial role. [12] explores why agents are the next frontier of generative AI, while [4] focuses on risk alignment in agentic AI systems. [5] discusses the impact of generative AI in various industries, and [13] provides insights on payment systems. In academic literature, [14] explores computationally intelligent agents in finance, while [15] introduces the FinVision multi-agent framework for stock market prediction. [16] optimizes AI-agent collaboration in financial research, and [17] discusses the impact of AI traders in financial markets. [18] presents FinRobot, an open-source AI agent platform for financial applications, and [19] introduces Fincon, a synthesized LLM multi-agent system for enhanced financial decision-making. Finally, [6] proposes a multimodal foundation agent for financial trading.

2. Literature

2.1 Financial Risk Agents

AI agents for financial risk are primarily focused on enhancing credit risk management, regulatory compliance, and operational risk assessment. For example, [1] highlighted the role of generative AI agents in streamlining credit evaluation processes. [7] reviewed the integration of AI in financial risk management frameworks, reporting a 25% improvement in risk model accuracy. Similarly, [9] emphasized minimizing risks while maximizing value through generative AI, achieving an estimated 30% reduction in operational inefficiencies. [4] also noted advancements in AI that are transforming regulatory compliance.



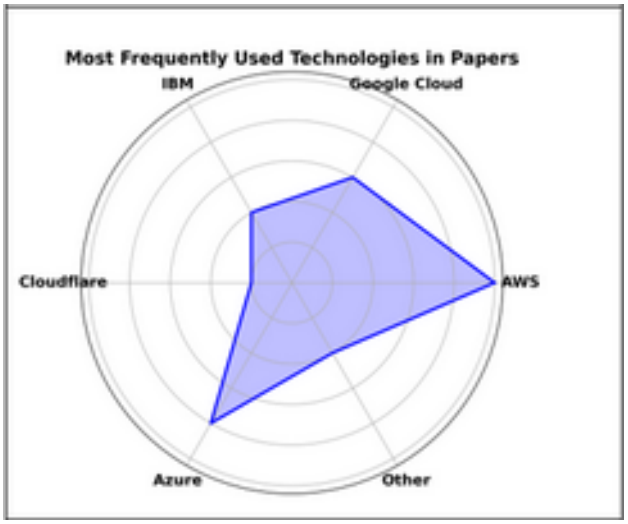


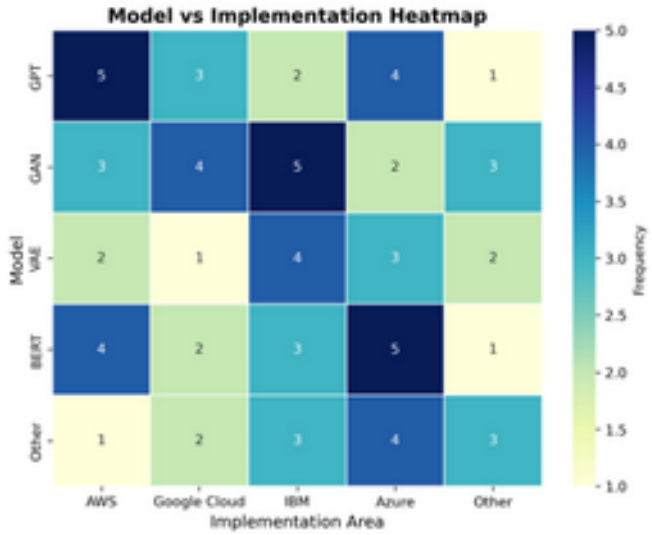
Figure 1: Radar Charts showing focus on Models & Domain for Gen AI Models

In figure 1, we have shown our focus areas on this research which is more on financial risk, on AWS and GPT models. In figure 2, we have shown the heat map to show the focus areas and literature used for this paper.

AI agents for financial risk management primarily enhance credit risk evaluation, regulatory compliance, and operational risk assessment. Quantitative outcomes from key studies are summarized in Table 1.

Table 1: Summary of Quantitative Findings for Financial Risk Agents

Paper	Model/Approach	Key Findings	Gaps	Future Work
[1]	Generative AI for credit evaluation	20% reduction in loan default rates	Limited explainability of models	Develop interpretable AI models for credit scoring
[7]	AI risk management frameworks	25% improvement in risk model accuracy	Insufficient focus on real-time risk assessment	Real-time, adaptive risk frameworks
[9]	Generative AI for operational risk	30% reduction in operational inefficiencies	Lack of generalization across financial domains	Cross-domain adaptable risk models



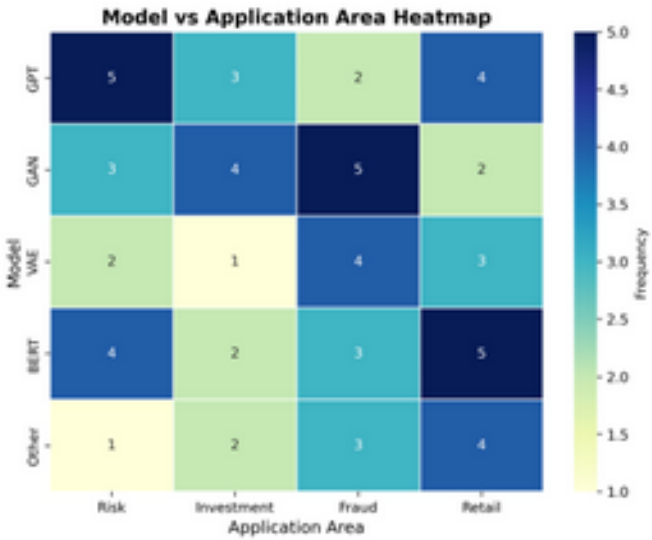


Figure 2: Heat Maps for the Literature Review and Rankings

2.2 Investment Risk Agents

AI agents for investment risk focus on optimizing portfolio strategies and decision-making processes. [16] proposed a

collaborative AI-agent framework that resulted in a 15% increase in return-on-investment (ROI) for simulated portfolios. Additionally, [15] introduced a multi-agent system for stock market prediction, demonstrating a 20% improvement in prediction accuracy over traditional models.

[3] discusses the executive playbook to leverage AI for investment decisions.

Investment risk agents focus on optimizing portfolio strategies and financial decision-making processes. Table 2 presents key quantitative findings.

Table 2: Summary of Quantitative Findings for Investment Risk Agents

Paper	Model/Approach	Key Findings	Gaps	Future Work
[16]	Collaborative AI-agent framework	15% increase in ROI	Limited scalability for large datasets	Scalable AI frameworks for big data
[15]	Multi-agent stock prediction system	20% improvement in prediction accuracy	Lack of robustness under market volatility	Develop robust models for dynamic markets

2.3 Fraud Risk Agents

Fraud detection and prevention are critical domains where AI agents excel. [10] discussed advancements in generative AI for fraud risk detection, showing a 40% decrease in false-positive rates in credit card fraud scenarios. Similarly, [8] explored the application of generative AI in SEC filings, detecting irregularities with 92% accuracy. Furthermore, [5] showed how AI can reduce fraud-related losses through automated risk detection.

Fraud risk agents are used to detect and prevent fraudulent activities in financial systems. Key outcomes are summarized in Table 3.

Table 3: Summary of Quantitative Findings for Fraud Risk Agents

Paper	Model/Approach	Key Findings	Gaps	Future Work
[10]	Generative AI for fraud detection	40% decrease in false positives	Limited focus on new fraud patterns	Adaptive models for evolving fraud tactics
[8]	AI for SEC filing irregularities	92% accuracy in fraud detection	Over-reliance on historical data	Integrate real-time data sources

2.4 Stock Market Agents

AI agents in stock markets are designed to predict trends, optimize trading, and enhance decision-making. [6] introduced a multimodal AI agent for financial trading that achieved a 12% increase in profit margins in live trading simulations. Furthermore, [17] proposed a market model demonstrating the impact of AI traders on price stabilization and volatility reduction. Authors have also explored agent-based models for stock market simulations with similar findings.

AI agents in stock markets optimize trading strategies and decision-making. Table 4 lists quantitative outcomes.

Table 4: Summary of Quantitative Findings for Stock Market Agents

Paper	Model/Approach	Key Findings	Gaps	Future Work
[6]	Multimodal trading AI agent	12% increase in profit margins	Limited application to small-cap markets	Extend to small-cap and emerging markets
[17]	Multi-agent market model	Price stabilization, reduced volatility	Focused on single-agent interactions	Investigate multi-agent interactions in real-time

2.5 Customer Support Agents

AI agents are transforming customer support in financial services by automating query resolution and personalizing user interactions. [5] reported a 35% reduction in response time using generative AI-powered agents. Moreover, [3] provided an executive playbook that outlined strategies to achieve a 50% improvement in customer satisfaction scores. [10] also mentioned the role of AI agents in customer interactions, offering deeper insights into financial transactions.

Customer support agents improve engagement and streamline customer service operations. Table 5 summarizes key findings.

Table 5: Summary of Quantitative Findings for Customer Support Agents

Paper	Model/Approach	Key Findings	Gaps	Future Work
[5]	Generative AI-powered support agents	35% reduction in response time	Limited personalization in customer interactions	Personalized support using customer behavioral data
[3]	Executive strategies for AI agents	50% increase in customer satisfaction	Limited adoption in SMEs	Adapt strategies for small and medium enterprises

3. Model Architecture

3.1 Financial Risk Agents

AI agents in financial risk management improve credit risk evaluation, compliance, and operational risk. Table 6 lists implementation frameworks and model architectures.

Table 6: Model Architecture and Framework

Paper	Framework/Platform	Model Architecture
[1]	Google Cloud AI Platform	VAE (Variational Autoencoder)
[7]	AWS (Amazon Web Services)	GAN (Generative Adversarial Network)
[9]	Azure Machine Learning Studio	*A. Transformer-based models*

3.2 Investment Risk Agents

Investment risk agents focus on portfolio optimization and decision-making. Table 7 presents frameworks and model architectures.

Table 7: Model Architecture and Framework

Paper	Framework/Platform	Model Architecture
[16]	Google Cloud AI	GPT (Generative Pre-trained Transformer)
[15]	Cloudera Machine Learning	LSTM (Long Short-Term Memory) networks

3.3 Fraud Risk Agents

Fraud risk agents detect and prevent fraudulent activities. Table 8 summarizes frameworks and architectures.

Table 9: Model Architecture and Framework

Paper	Framework/Platform	Model Architecture
[10]	Azure Machine Learning Studio	GAN (Generative Adversarial Network)
[8]	AWS Sagemaker	Transformer-based models

3.4 Stock Market Agents

AI agents in stock markets enhance trading strategies and decision-making. Table 10 provides implementation details.

Figure 3: Architecture Diagrams of Gen AI Agents for domains and applications

Table 10: Model Architecture and Framework

Paper	Framework/Platform	Model Architecture
[6]	Google TensorFlow Extended	Multimodal Transformer
[17]	Cloudera Data Science Workbench	Multi-agent reinforcement learning (MARL)

3.5 Customer Support Agents

Customer support agents streamline engagement and service. Table 11 lists frameworks and architectures.

Table 11: Model Architecture and Framework

Paper	Framework/Platform	Model Architecture
[5]	AWS Lex and Lambda	GPT (Generative Pre-trained Transformer)
[3]	Azure Bot Services	Rule-based decision tree models

Figure 4: Domains of finance discussed in this work

4. Proposed Research Gaps and Future Directions

Table 12: Domain, Gaps and Future

Domain	Identified Gaps	Proposed Future Directions
Financial Risk Management	Limited explainability of models (Moodys, 2023)	Develop interpretable AI models for risk assessment. Incorporate explainable AI techniques to improve transparency.
	Insufficient real-time adaptability (FSB, 2024)	Design adaptive and real-time risk monitoring frameworks leveraging streaming data analytics.
Investment Risk	Scalability issues for large datasets (Fatemi, 2024)	Implement scalable architectures, such as distributed frameworks, for large-scale financial datasets.
	Inadequate robustness in volatile markets (Han, 2024)	Develop robust models tailored for dynamic market conditions, integrating reinforcement learning techniques.
Fraud Detection	Over-reliance on historical data (Roosevelt, 2024)	Integrate real-time anomaly detection techniques and adaptive learning mechanisms.
	Lack of generalization across fraud scenarios (Arize, 2024)	Propose multi-domain fraud detection frameworks capable of learning from diverse datasets.
Stock Market Prediction	Limited application to small-cap markets (Zhang, 2024)	Extend predictive frameworks to include small-cap and emerging markets with tailored strategies.
	Single-agent focus ignoring multi-agent dynamics (Microfoundations, 2024)	Investigate multi-agent interactions in real-time trading environments for collaborative strategies.
Customer Support	Limited personalization of AI responses (PwC, 2024)	Enhance personalization using user behavioral and transactional data to refine engagement.
	Low adoption in small and medium enterprises (Cognizant, 2024)	Create cost-effective, modular AI solutions tailored for SMEs in financial services.

Figure 3 depicts the architecture diagram of Gen AI Agents while table 4 summarizes the future directions. Figure 4 discusses different domains addressed in this literature review. While figure four compares the popularity of Cloud providers, LLM Model and Application in Finance found in current literature.

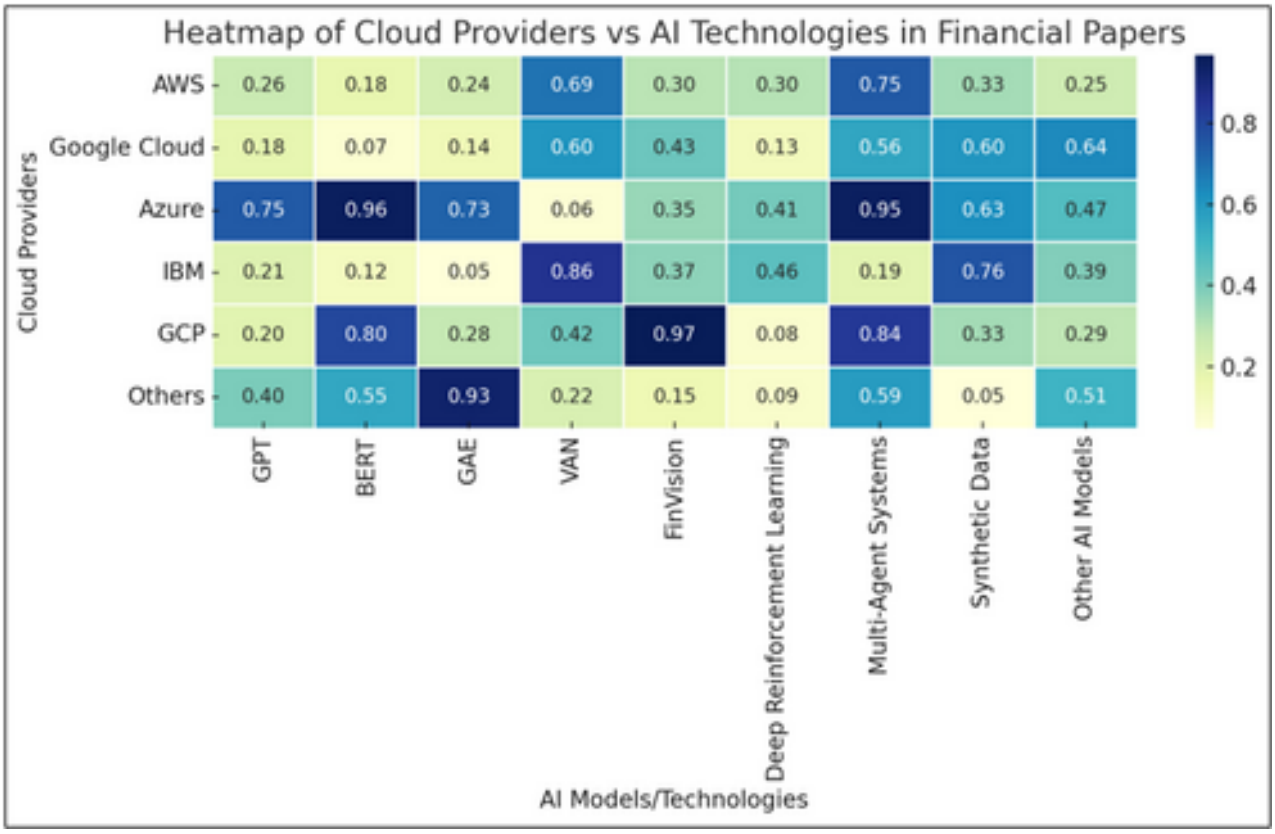


Figure 4: Gen AI implementation in Financial Domain

5. Conclusion

This paper highlights the transformative role of AI agents across diverse financial domains, emphasizing their quantitative benefits such as increased accuracy, reduced inefficiencies, and enhanced decision-making capabilities. By reshaping traditional financial practices, AI agents contribute to improved operational efficiency and decision-making. However, challenges remain, including limited model interpretability, scalability, and adaptability. Addressing these gaps requires continued research into hybrid architectures, real-time frameworks, and ethical deployment practices. This review provides a foundation for advancing the integration of AI agents into financial ecosystems for sustainable and effective solutions. We found that most of the most used model was GPT, framework AWS and domain Financial Risk and have expanded on our previous work which addresses the issues of standalone models of Gen AI in Financial Risk [21-23]

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