



## Trends in Banking, Accounting and Business

Vol: 4(2), 2025

REST Publisher; ISBN: 978-81-956353-0-6

Website: <https://restpublisher.com/book-series/tbab/>

DOI: <https://doi.org/10.46632/tbab/4/2/2>



# An Emperical Study on AI-Powered Financial Risk Analytics and Cost Optimization: A Corporate Social Responsibility Framework with reference to Private banks in Indian banking sector

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**Abstract:** The study Analyzes the synergistic interaction between AI-based financial risk, cost optimization, and CSR (corporate social responsibility) in private sector banks, as well as the integration of these aspects to promote responsible and sustainable financial corporate management. The study investigates the potential advantages and challenges of applying AI-driven financial strategies within the CSR framework, taking into account a variety of issues such as stakeholder involvement, ethical implications, and long-term wealth generation in a sustainable way. The articulate is based on conceptual models that explore the intersection of new financial technology and CSR. The study highlights the good influence of such frameworks on corporate decision making, sustainable decisions, and overall organizational resilience.

**Key words:** AI driven financial strategies, cost optimization, CSR framework, Sustainable decision, ethical implications, stakeholder involvement.

## 1. INTRODUCTION

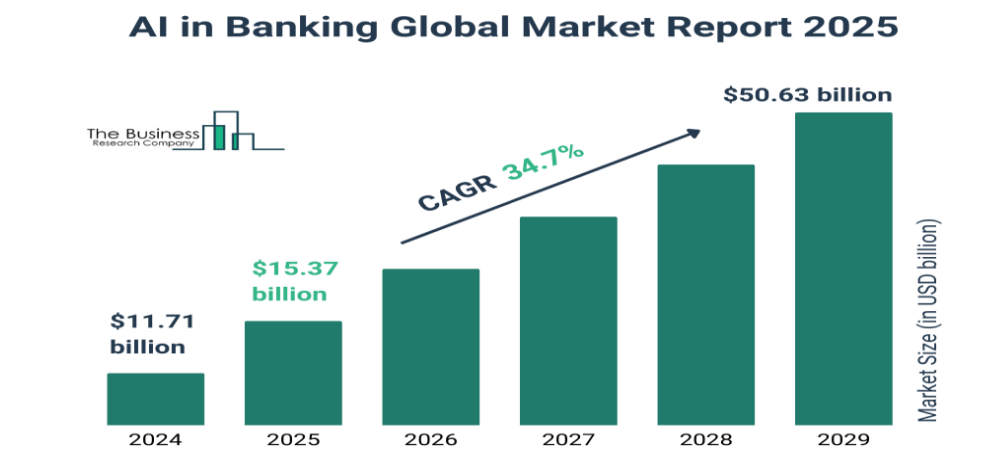
The banking industry in India, especially its private banks, functions in a fiercely competitive and dynamic setting. The revolutionary movement of financial sectors from fundamental concepts to innovative approaches has established the groundwork for AI generation in these sectors. This linchpin in the transformation has changed the overall spectrum of the banks towards greater strategic and operational efficiency. These organisations are progressively using cutting-edge technology like artificial intelligence (AI) in order to preserve their market dominance and financial success. AI is transforming fundamental banking operations by providing previously unheard-of capabilities in cost optimisation and financial risk assessments (Neharika 2025). This is accomplished through the use of machine learning models to evaluate large datasets in order to automate back-office tasks, identify fraud in real time, and assess credit risk more accurately. Banks may improve decision-making, decrease manual mistakes, and expedite procedures by utilising AI, all of which directly lead to a more successful and efficient business model (JIER, IJRASET).

However, the banks' Corporate Social Responsibility (CSR) must be balanced with the pursuit of financial rewards. In India, the Companies Act of 2013 mandates that businesses allocate a percentage of their revenues to social and environmental projects, making corporate social responsibility (CSR) more than merely an ethical factor. There are serious concerns concerning the societal effects of AI's application in banking. Even while AI can increase productivity and save expenses, its use has consequences for employment, data privacy, and the possibility of algorithmic bias in credit decisions, all of which might disproportionately impact particular groups of people (WIKIPEDIA).

A fresh set of moral conundrums is raised by the incorporation of AI into financial operations. The objective of financial inclusion may be compromised, for instance, if algorithmic bias in credit scoring algorithms unintentionally discriminates against particular demographic groups. Despite its efficiency, job automation may

result in employment displacement, which would affect lives and the stability of communities. Additionally, there are serious privacy and security risks when AI systems use large amounts of client data.

Therefore, the goal of this empirical study is to develop a thorough CSR framework that combines the ethical and social responsibilities of private banks in India with the use of AI for financial risk assessments and cost optimisation. It looks at how these institutions may use AI to improve commercial success while also making sure their operations are ethical, open, and in line with the interests of society. This study will offer a framework for a sustainable and socially conscious approach to AI adoption in the Indian banking sector by analysing the present methods and results, guaranteeing that technology growth serves both business interests and the greater welfare of society.



**FIGURE 1.** Business Research company, 2025

The chart titled “AI in Banking Global Market Report 2025” illustrates the projected growth of the AI market in the banking sector from 2024 to 2029. In 2024, the market size stands at \$11.71 billion, which is expected to rise to \$15.37 billion in 2025 and continue growing steadily in subsequent years, reaching \$50.63 billion by 2029. This expansion represents a strong compound annual growth rate (CAGR) of 34.7%, indicating rapid adoption of AI technologies in banking.

## 2. REVIEW OF LITERATURE

- **Emmanuel Baffour Gyau (2024)**, The study examines the complex interaction between the innovative AI technology and how it affects banking performance in 20 different nations worldwide. According to the report, AI innovation in the financial technology sector has improved banking performance, particularly return on assets (ROA). However, it also noted that non-performing assets (NPA) have a detrimental effect on banking performance. To examine the data, the researcher used FGLS (Feasible Generalized Least Squares) and GMM (Generalized method of moments) approaches. Additionally, the researcher has proposed that advancing AI innovation and modernizing financial frameworks leads to an improved banking ecosystem.
- **Mounaf Asaad Khalil (2025)**, The paper investigates a system that integrates artificial intelligence and optimization for evaluating letters of credit. To reduce hazards and boost efficiency, the researcher developed an integer linear programming model. Additionally, the study evaluated improvements, goal trade-offs, and supply-demand sensitivity using real-world data. It concluded that, as compared to the baseline, a 68.3% risk reduction could be achieved while preserving high utilization and no delays. Additionally, it provided research possibilities in compliance, sustainability, and the integration of artificial intelligence.

- **Yulia Sullivan (2024)** This study looks at how organisations may benefit from AI-powered capabilities that improve their Adaptive Response to Market Changes (ARMC). It describes ARMC as an organization's capacity to quickly recognise and adapt to changes in the market, using insights from organisational agility and the dynamic capability framework. The core skills of ARMC are operational adjustment and customer responsiveness. The findings show that the linkages between AI-powered capabilities and ARMC are significantly impacted by the interplay effects of environmental dynamism and hostility. Additionally, we discover that ARMC has a favourable impact on innovation and company performance.

### 3. OBJECTIVES

1. The examine the status quo of AI implications in financial risk analytics and cost optimization in selected Private Sector Banks in India.
2. To develop CSR conceptual model and integrate with AI powered Financial Management.
3. To investigate the outcomes of AI implications for cost optimization in financial services.
4. To recommend a road-map to private banks for adopting an AI-powered financial management system inside a comprehensive CSR framework.

#### Theoretical Framework

The model demonstrates how these three components are not isolated but rather interrelated and supported by proven business and economic ideas.

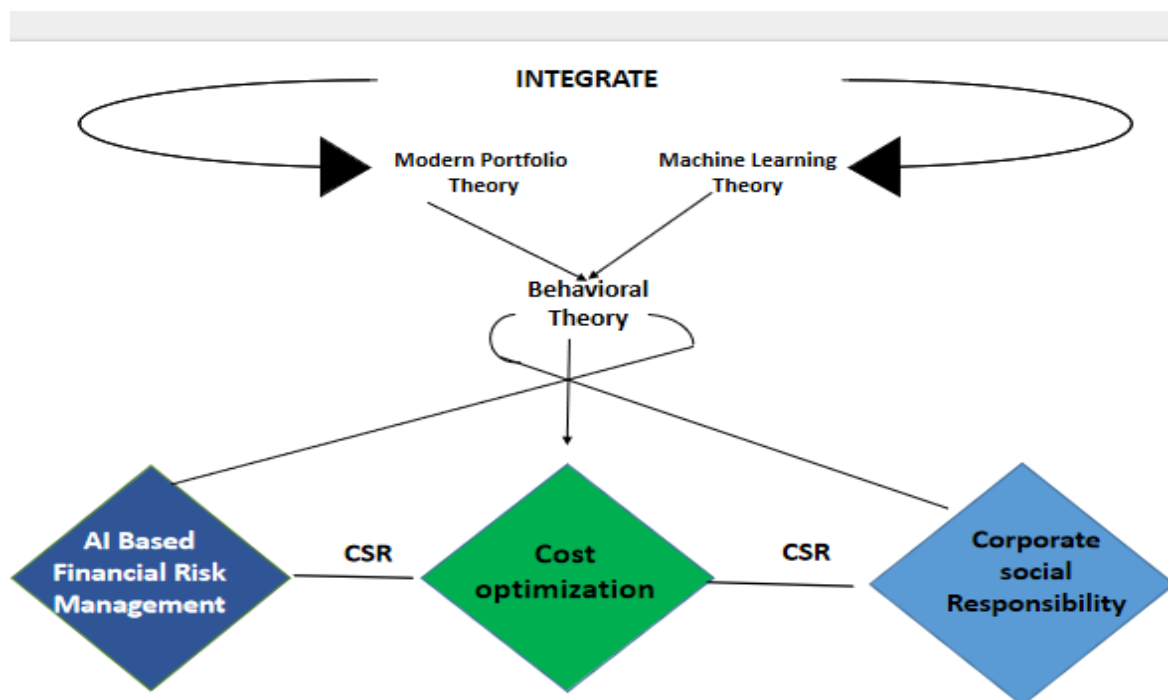


FIGURE 2. The above diagram is based on many theories

**AI based Risk Management** states about the usage of Artificial Intelligence to enhance risk assement it is based on the

- **Modern Portfolio Theory:** AI improves on this by analyzing vast datasets with advanced algorithms to find complicated risk patterns and correlations that older approaches may overlook.
- **Behavioral Finance Theory** states that artificial intelligence may discover psychological biases in decision-making by evaluating market data and trading patterns.

**Cost Optimization:** The green component reflects ideas for increasing efficiency and reducing costs. The theoretical basis includes:

- **Agency Theory:** AI can cut costs by giving real-time data and transparency, allowing principals (shareholders) to monitor agent (management) performance and assure cost-effective judgments.
- **Transaction Cost Economics Theory:** states that artificial intelligence (AI) can streamline internal operations and minimize market transaction costs.

**Corporate Social Responsibility (CSR):** The final diamond shape in the theoretical framework symbolizes the organization's dedication to environmental and social objectives based on several ideas, including

- **Stakeholders Theory:** A bank must provide value for all of its stakeholders, not just shareholders, according to this philosophy. By monitoring and controlling a bank's environmental, social, and governance (ESG) effect, artificial intelligence (AI) aids in internationalizing this.
- **Resource Dependence Theory:** According to this idea, organizations need to get and preserve resources from their surroundings. AI-enhanced CSR initiatives can assist a bank in gaining societal support and establishing a good reputation.

### The Role of Integrative Theories

The three fundamental elements are not independent, as the model demonstrates. This integration is made possible by the following links and general theoretical ideas:

- **Dynamic Capabilities Theory:** The main, overarching idea in this theory implies that a company's success depends on its capacity to adjust and reorganize its resources, such as via utilizing AI. The interconnection of the model illustrates how AI acts as this dynamic capacity, enabling the bank to manage risk, optimize expenses, and fulfill its social obligations all at once.
- **Machine learning theory,** All three of the pillars are supported by machine learning theory which offers the algorithms and computational resources required for artificial intelligence to operate.
- **Behavioral Economics/Behavioral Finance:** From anticipating market risks to controlling stakeholder expectations, comprehending human behaviour is essential for all three fields, according to the model's main connecting points.

### AI implications in private sector Banks

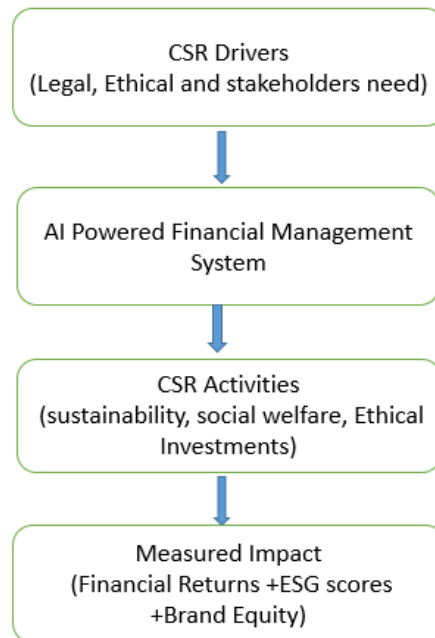
Banks are experimenting. Technology is now the foundation of its contemporary operations. AI banking solutions have made it possible for banks to create personalized chat bots that can respond to basic queries and use machine learning algorithms to evaluate loan risk in a matter of seconds. Although there isn't a single SDG that is exclusively focused on AI, its appropriate deployment may greatly progress a number of goals. These include Sustainable Development Goals (SDGs) 3 (health and well-being), 4 (quality education), 7 (clean and affordable energy), 9 (industry, innovation, and infrastructure), 11 (sustainable cities and communities), and 13 (climate action). To overcome obstacles in data analysis, predictive modelling, and personalised learning, artificial intelligence (AI) can be used.

Even while AI has a lot of promise to help achieve the SDGs, it's important to address possible concerns including prejudice, disinformation, and job displacement. Maximising AI's beneficial effects on sustainable development requires its responsible development and use, with an emphasis on moral issues and international cooperation.

**In order to achieve a balance between profit and purpose, banks must integrate CSR with AI-driven financial strategy.** Environmental responsibility (reducing carbon footprint, climate change, sustainable development, social initiatives, and ESG governance), legal responsibility (following rules and regulations), ethical responsibility (fair practices, transparency, data privacy, and AI ethics), and economic responsibility (profitable and sustainable growth) are the four main pillars that make up corporate social responsibility (CSR). By incorporating AI into CSR financial planning, banks will be able to create AI algorithms that will allocate funds for CSR projects according to stakeholders' priorities and ESG. Additionally, predictive analytics should be attempted to forecast return on investments for CSR projects in terms of sustainability score, customer loyalty, and brand image.

Block chain and artificial intelligence should be developed by banks to provide transparency in the use of CSR funds, assist stakeholders in understanding real-time fund distribution, and enable automated reporting to regulatory bodies. Bias-free data is used to train AI algorithms for ethical decision-making. Ensuring financial inclusion through equitable lending and investing practices.

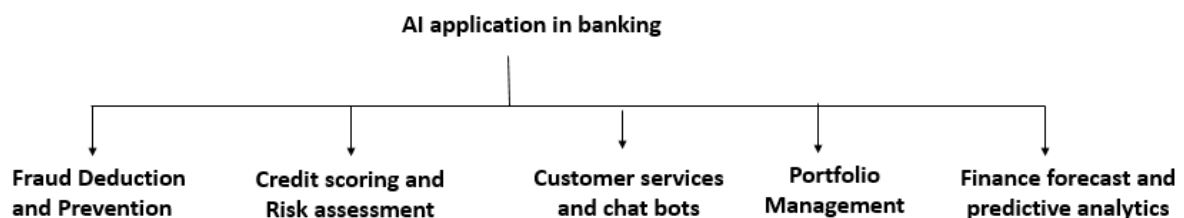
#### 4. CSR CONCEPTUAL MODEL INTEGRATED WITH AI FINANCIAL MANAGEMENT



**FIGURE 3.** Outcomes of AI implications for cost optimization in financial services

By automating procedures, increasing productivity, and lowering risks, artificial intelligence (AI) in financial services is essential to cost optimisation. Banks and other financial organisations may save a lot of money on operations by streamlining loan processing, KYC, and compliance checks, as well as drastically cutting back-office costs, by using AI-driven technologies and robotic process automation. While AI chatbots and virtual assistants reduce customer service costs by effectively and 24/7 answering questions, AI-powered risk management systems reduce loss-related costs by detecting fraud, improving credit scoring, and providing predictive analytics. Robo-advisors lower the cost of wealth management in the financial services industry, while AI-enabled compliance solutions cut down on the need for human labour and error-related fines. AI also improves transaction efficiency by reducing processing errors and expenses. Together, these benefits lead to immediate cost reductions, revenue protection from decreased fraud, scalability without proportionate cost increases, enhanced client loyalty, and long-term strategic advantages, all of which boost financial institutions' profitability and competitiveness.

#### Role of AI to reduce operational cost and Increase operation efficiency (AI Intelligence)



- Fraud Deduction and Prevention** : Banks have expert coded algorithms and software which will try to identify suspicious transactions and 70% of financial organization use machine learning for fraud deduction (viitor cloud). Banks use AI powered chat bots as first line security authentication along with

multiple security authentication like Biometric, 2FA ( multifactor authentication) which will increase customer service quality .

- **Credit scoring and risk assessment:** Fintech companies have used machine learning to analyse the risk factor and have tapped into underutilised data from traditional lending to determine the risk associated in lending (Wells Fargo). AI effectively manages risk by taking into account a variety of social and economic aspects. Additionally, it offers proactive risk mitigation techniques rather to reactive ones that are implemented after losses.
- **Customer services and chat bots :** Custom AI-powered chat bots that study consumer behaviour patterns and forecast future behaviour based on historical trends and customer input should be developed by banks. In the banking and finance sector, large companies like Wells Fargo employ this technology to anticipate potential problems that might impact their clients' accounts or transactions. This allows them to take fast action and builds confidence with their consumers.
- **Portfolio management :** Fintech businesses are essential to creating a successful and efficient portfolio since they employ several strategies rather than just one. Instead of adhering to a predefined plan, this novel approach enables a fluid asset allocation that adjusts assets based on market conditions. In this manner, it successfully lowers risks while increasing rewards.
- **Finance Forecast and Predictive Analytics :** It is one of the powerful tool which helps to predict future financial performance of the banks by analysing the big data and also tries to manage risk proactively and helps in smarter decisions making.

## 5. CONCLUSION

According to the empirical study, Indian private banks have the ability to incorporate AI into financial risk analytics, cost optimisation, and corporate social responsibility (CSR). This will match their business dimensions with CSR principles, increasing their operational efficiency and profitability while also taking ethical ideals into consideration. According to the report, AI-powered financial risk management simultaneously strengthens social trust and sustainability while protecting stakeholders' interests and boosting competitiveness. In a larger sense, incorporating CSR into AI not only safeguards stakeholders' interests but also encourages financial inclusion, which will increase the private banking industry's long-term resilience. It also serves as a catalyst for responsible innovation, positioning financial institutions to contribute to society while upholding moral and social values.

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