Journal of International Commercial Law and Technology
Print ISSN: 1901-8401

Website: https://www.jiclt.com/

Article

GenAI: A Technological Catalyst for Reshaping India's Banking Sector

Article History:

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How to cite this article:
Rana Mukherji, GenAI: A Technological Catalyst for Reshaping India's Banking Sector. *J Int Commer Law Technol*. 2026;7(1):215–224.

Received: *02-10-2025*
Revised: *04-11-2025*
Accepted: *13-12-2025*
Published: *17-01-2026*

Abstract: A massive digital disruption is happening in the Indian banking industry, and an enormous transformation is happening due to the integration of advanced digital technologies. Generative Artificial Intelligence (GenAI) is playing a transformative role. This review article is critically poised at GenAI as a "technological disruptor" to reconfigure the morphologies 3 of the operational, strategic, and customer dimensions of Indian banking. In contrast to standard AI, GenAI can generate synthetic data, offer an intelligent user experience, and provide highly personalized solutions, thereby opening new doors for innovation in fraud detection, credit scoring, regulatory compliance, risk rating, and customer management. Synthesizing existing literature and recent industry developments, this study investigates how Indian banks are adopting GenAI to enhance efficacy, & promote financial inclusion. The study further analyses the opportunities and challenges for deploying GenAI – including questions of data governance, ethical frameworks, algorithmic transparency, or the reskilling of the bank labour force. The review also summaries highlight visible use cases across comparators, identifying potential knowledge gaps that may inform future studies. The results suggest that the adoption of GenAI in India is early. Still, with its dynamic growth, GenAI can enable faster digital transformation, enhance competitiveness, and reinvent customer engagement paradigms. Finally, this paper delves into how GenAI will not merely gave revolutionary edge existing banking processes but fundamentally reshape the structure and resilience of India's banking ecosystem in the coming decade.

Keywords - Generative Artificial Intelligence, Banking Sector, Digital Transformation, Financial Innovation.

INTRODUCTION

GenAI broke into the mainstream a few months into 2023, rising to become one of the most disruptive technologies in the world of international banking. The technology's rise has been particularly steep in banking, as banks globally test and scale applications in use cases as varied as customer service, operational processes, compliance, risk management, and innovation pipelines. Overall, GenAI is projected to generate $2.6 trillion to $4.4 trillion per year across all sectors, with 63 industries and banking accounting for $200 billion to $340 billion per year, according to data from the McKinsey Global Institute (Figure 1). This is equivalent to between 9 and 15 per cent of the sector's total operating profit — highlighting the extent of the potential upside for banks compared with the strategic risk they take by backing the tech. Corporate banking (USD $56 billion a year) and retail banking (USD $54 billion a year) represent the most significant opportunities for productivity and efficiency improvement at the worldwide level. The decrease of the MSME credit gap by 10–12% and recovery of PMJDY account usage from 27–40% to 45% by 2030 is also displayed in Table 7.3. These are moves that could boost the banking sector's annual contribution to GDP by 0.5-1 percentage points. In unison, GenAI not only delivers measurable efficiencies but also takes it a step further to catapult Indian banking into the engine of mass digitalization.

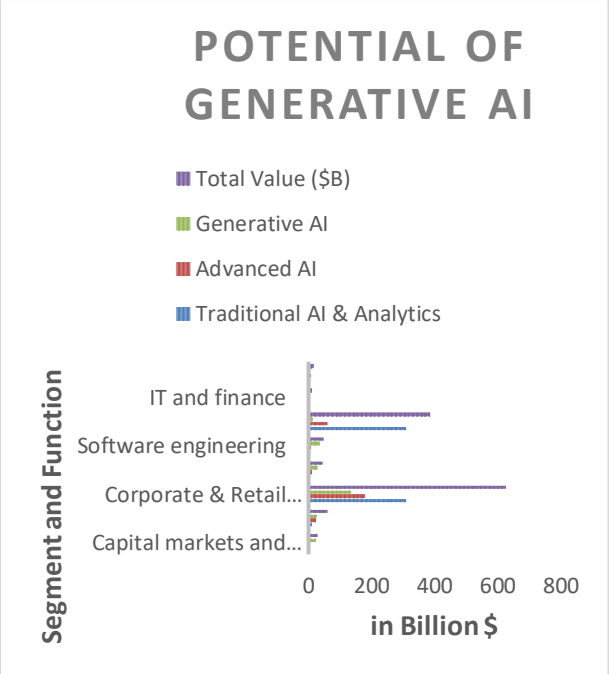

Figure 1 AI-Driven Value at Stake by Segment and Business Function (McKinsey & Company. (2023)).

Internationally, GenAI is utilized by banks in four primary areas of the business: customer interface management, content creation, engineering and software support, and operational automation. Retail: Chatbots and virtual assistants are being developed for customer engagement that extends beyond transactional support to provide conversationally personalized assistance (Stanoevska, 2025; Puchakayala, 2024). For example, Morgan Stanley has launched a GPT-4-based assistant that summarizes client meetings and automatically writes post-meeting emails to help wealth managers better address their clients. Moreover, another global bank reported that its investment memorandum preparation time was reduced from nine hours to half an hour by using GenAI applications. These are just a few instances of financial services institutions evolving from traditional, static digital interactions to adaptive, intelligent systems that help improve operational effectiveness and customer trust. Meanwhile, banks like Citigroup and Goldman Sachs are experimenting with GenAI for end-to-end processes, such as regulatory translation and automated testing, indicating that some developers are moving beyond testing to incorporate it more deeply into their workflows (EY, 2023;Deloitte 2023; Shabsigh & Boukherouaa, 2023;Goldman Sachs,2023;CDO Magazine ,2024); Dzhaparov,2024). However, the international banking behemoths also face structural constraints to scaling GenAI efficiently. It is not only technology that needs to change to adopt AI; it is the approach to talent pipelines, data architecture, compliance mechanisms, and governance structures. More than half of the world's top banks already have centralized GenAI governance in place, according to surveys, even though their broader analytics models continue to follow decentralized approaches. Key challenges include the need to collect and curate high-quality unstructured data, the necessity for rapidly re-training teams on agile model development and management, as well as the hazards associated with GenAI failures such as "hallucination", privacy infringements, and lack of transparency around black box models. This combination of opportunity and added risk – banks that can simultaneously adapt to a new environment will have a vastly better chance of success. As such, GenAI is, in fact, reinventing the structure of service and competition in the financial services industry during a time of digital transformation (Kulkarni, 2023;Varvara, 2024; Şahin & Karayel, 2024; Kulkarni, 2024).

Given the world scenario, GenAI adoption is the strongest candidate among banks in India. India is undergoing a tangible digital revolution, driven by fast technology dissemination and far-reaching financial inclusion strategies. Over the past 20 years, the industry has transitioned from a branch-first to a digital-first model. The shift is palpable with facts to prove — over 300 million UPI users, monthly UPI transactions (in 2024) at 10+ billion, and urban customer internet and mobile banking penetration at 80%+. Electronic wallets contribute 20–25% of retail payments, reflecting the degree of acceptance of technology-enabled financial services by the population. GenAI is, in some sense, one layer above this continuum, which enables synthetic data generation, adaptive personalization, and large-scale simulation that classical AI cannot. That might save a few percentage points, but not every business will benefit from datacentres, alive or dead, as there are diminishing returns to scale when it comes to data: GenAI will teach you the AI pipeline, not what the results can do, like increasing fraud detection accuracy by 10-15% due to the synthetic data you have already generated for training, charactersing customers via a their behaviour on a combination of channels to offer them a more tailored customer journey leading to an uplift of 15-20% in cross-sell, getting compliance processing automated so that processing times are reduced by 30-40% per transaction with a projected annual cost reduction of 10-12% (NPCI, 2025; RBI, 2024).

In India, the synergistic imperatives to innovate in these areas are particularly compelling and doable. With more than 800 million internet users and hundreds of millions of rural users expected to sign up for digital finance by 2030, the opportunity is vast. Moreover, while rural communities often lack access to banks, urban, tech-savvy consumers demand tailored services, which are further disrupted by

language and literacy barriers. Current digital underpinning—whether that be the Unified Payments Interface ($200+ billion transactions per month), payment systems built on Aadhaar covering 1.3 billion people, or > 90% mobile penetration throughout the country—puts India in a league of its own when it comes to readying for the pace of GenAI. Nevertheless, there are still obstacles to overcome: 78% of Indian banks identify data governance as a top concern, and 65% indicate that workforce reskilling is a significant challenge (NASSCOM, 2023). The constraints may hinder or bias its adoption if they are not managed.

From the customer's side, GenAI can deliver a significant increase in the quality of interaction and engagement. Today's chatbot systems can solve around 65% of customer queries without involving humans. However, with GenAI, the number can go up to around 85–90%, thus significantly reducing dependence on call-center staff. A personalised recommendation engine has the potential to increase customer retention by 10-15%, and empathetic adaptive interactions could boost NPS by 20-30 points. In practical terms, Synthetic Datasets can increase the inputs available to fraud detection solutions by 300–500%, resulting in a 20–25% reduction in false positives, and automation of compliance can lead to a decrease in manual compliance costs of upwards of 40% per year. GenAI-improved models can stress-test for five to ten times the number of simulated scenarios as traditional models, providing significantly better systemic resilience and risk outlooks. Taken together, these results are estimated to increase productivity in the banking sector by 0.5 to 1 percentage point, annually contributing billions to India's GDP (Kalia, 2023; SuperAGI, 2025; An, 2025).

Simultaneously, risks are also capable of being quantified and dismissed. Approximately 20-25% of banking personnel in India will need to be reskilled in GenAI competencies over the next five years. Untrained, this would result in displacement in the roles of compliance, risk, and customer service. Related topics for thought 298 Algorithmic opacity—biased or inexplicable decision-making potentially affecting 5-10% of loan applications and perhaps fairness and trust directly. Regulators, particularly the RBI, would need to take on extended loads and increase their supervised capacity by 25-30 percent to oversee AI-driven processes (Economic Times, 2025; Akter, 2022; EY, 2024).

Furthermore, adoption is highly uneven: urban penetration of smartphones is already 70–80%, whereas rural penetration lags at 35–40%, with a risk of a widening digital divide. Voice- and local-language GenAI models have the potential to increase rural engagement by 20–30%. However, they will only achieve this if they are deployed in a manner that addresses the literacy and accessibility challenges (Goyal et al., 2025)

Both international and Indian experiences demonstrate that GenAI is not incremental; it is a game-changing technology. Worldwide, it has already rebooted customer service, content creation, and risk management, all with real productivity dividends. India, with its massive digital base, established payment infrastructure, and urgent requirements for inclusion, makes it even more imperative to integrate GenAI. However, the rewards—cost savings, efficiency improvements, customer satisfaction, and inclusiveness—will be reaped only if the governance, workforce, and regulatory hurdles are overcome. The current paper thus has three primary purposes: to review and synthesize the global and Indian literature with respect to GenAI adoption in banking, to quantitatively examine its impacts on operational, customer, and strategic dimensions, and to identify challenges and knowledge gaps that require regulatory focus. Doing so sets up GenAI both as an opportunity and a responsibility: a technology that can shape the form and structure of Indian banking, provided its rollout is calibrated, ethically anchored, and inclusive (Saha et al., 2025; Raju, R. 2025; Lia et al,2024; Botunac et al, 2024).

EVOLUTION OF AI IN INDIAN BANKING

Technology adoption in Indian banking has witnessed at least three overlapping yet distinct mandates: digitization (1990s–2010s), AI-driven automation (2010s–2020s), and Generative AI (2020s–present). Each of these phases marks successive gains in efficiency, scale of engagement, and financial inclusion. This was not the first wave; that would be the creation of CBS and Internet payment agencies, laying the foundation for the digital economy. By 2010, over 70 percent of bank branches in India had adopted the CBS-based system (Singh, 2012), resulting in accelerated service delivery and providing a single source of data. This push got an added fillip with the introduction of the Unified Payments Interface (UPI) in 2016, and just like that, India jumped overnight to becoming the world's number one digital payments ecosystem. UPI transaction volumes grew from 2 million transactions in 2016 to more than 11 billion transactions by October 2023, reflecting a CAGR of almost 200%. At the same time, internet and mobile banking penetration was in excess of 80 percent for urban users by 2022, while digital wallets comprised 20-25 percent of retail payment volumes. This powerhouse digital engine laid the foundation for AI-enabled solutions to flourish. Artificial intelligence also opened up access to new-to-credit consumers in credit scoring, raising approval rates by 10-12%

without creating a corresponding rise in NPAs (Boston Consulting Group, 2023; Mintoak,2023).

Meanwhile, Robotic Process Automation (RPA) and AI have reduced operating costs by 15–20% across several large private sector banks, particularly in reconciliation, regulatory compliance, and back-office processes. These results represent a significant leap forward; however, the majority of these systems are still predictive or reactive, which has led to the demand for generative, adaptive technologies. The third and current phase is defined by the development of Generative AI (GenAI), rather than marginal improvement, which represents a paradigm shift. In contrast to previous configurations, GenAI applications surpass automation, providing new opportunities in personalization, simulation, and multilingual interaction. Early implementations at Indian banks are showing results: One private Bank witnessed a 30 percent reduction in its call-center costs after expanding the availability of a GenAI-based multilingual chatbot; another noticed a 15–20 percent increase in cross-selling conversions after starting to provide personalized product recommendations. In fraud prevention, synthetic data generation, which led to up to 300–400 percent additional training volumes, resulted in an approximately 18% reduction in the number of false positives. In addition, GenAI-powered stress testing enables banks to simulate 5-10 times more economic scenarios compared to traditional AI, providing greater resiliency perspectives for regulators and policymakers (EY India,2024).

The State Bank of India (SBI) utilizes AI for predicting ATM failures, monitoring compliance, detecting revenue leaks, and generating leads (Acharya, 2021). Its chatbot SIA (Smart Intelligent Assistant) was responsible for 20 million customer interactions last year (in 2017) alone, demonstrating that AI-enabled customer engagement can go from 0 to 100 mph very rapidly. Table 2.1 provides a snapshot of the scope and applicability of AI applications in Indian banks, which have democratized artificial intelligence-powered services, making them accessible on the web, mobile apps, and voice assistants like Alexa and Google Assistant.

Private sector banks, on the other hand, have been quick to adopt and implement AI. Eva of HDFC Bank manages millions of service requests across digital and virtual platforms, while ICICI's iPal has over 250 transactional features, from bill payments to fund transfers. Then there are more recent examples, such as Aha by Axis Bank and AI tools by Yes Bank, which also use predictive analytics to provide customised financial services. AI is also transforming the way fraud can be prevented and predictions made in lending. For example, ICICI Bank has slashed its fraud incidence by 25 per cent this year after analysing 15 million transactions a day by running them through an artificial intelligence algorithm, and Axis Bank has brought down fraud by 20 per cent. In loans, ICICI and HDFC have cut down loan approval turnaround time by 60 per cent and increased recovery rates by 30 per cent, and Yes Bank has increased MSME loan approval by 35 per cent through AI-based underwriting (Dwibedi & Sahoo, 2025; Wahab, 2024; Bhattacharya et al, 2024).

Taken in combination, the three phases of IT—the digitization, AI-powered automation, and GenAI revolution—reinforce how Indian banking has continuously leveraged technology for more robust operations, more intimate customer engagement, and more inclusive finance. Utilizing AI to enable real-time analytics, fraud detection and prevention, personalization, and improved credit risk assessment, banks are now using these technologies not only to serve their existing customers better, but also to bank the unbanked. This trend also suggests that GenAI, due to its generational and adaptive dimensions, has the potential to enhance operational efficiency, strategic competitiveness, and serve as a lever for growth expansion in the Indian banking sector economy (Dubey, 2025; Rane, 2023; Dibouliya & Shelar,2024; Kaur et al, 2025).

Table 2.1. The journey of AI enabled Financial Inclusion (Dwibedi & Sahoo, 2025)

Era	Key Developments	Technological Icon	Summary Description
Pre-2010 Early Foundations	• Basic automation through ATMs and EFTs• Traditional credit scoring methods	ATM	Early-stage banking technology focusing on automating basic services and initial risk assessments.
2010–2015 Alternative Data & Machine Learning	• Use of mobile usage and non-traditional data• Adoption of machine learning models for credit scoring	Data Analytics Graph	Financial institutions began leveraging alternative data sources and ML algorithms for more nuanced credit and risk evaluations.
2015–2020 Digital Financial	• Emergence of fintech platforms• Introduction of digital wallets &	Mobile Banking App	Enhanced customer experience through user-friendly AI tools

Services	P2P lending• Chatbots and fraud detection systems		and expanded digital finance offerings.
2020–2023 Integration & Advanced Capabilities	• AI-driven personalization• Deep integration with traditional financial systems	Integrated Financial Ecosystem	AI technologies became core to financial services, offering customized solutions and seamless digital experiences.
2023–Present Inclusion & Empowerment	• Development of inclusive financial products• Generative & Ethical AI and regulatory focus	Diverse Group of People	Emphasis on underserved communities, fair practices, and alignment with regulatory and ethical standards.

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Taken in combination, the three phases of IT—the digitization, AI-powered automation, and GenAI revolution—reinforce how Indian banking has continuously leveraged technology for more robust operations, more intimate customer engagement, and more inclusive finance. With AI that can deliver real-time analytics, fraud-detection, personalization, and enhanced credit risk assessment, banks are utilizing these technologies to not only serve their existing customer base more effectively but also to bank the unbanked. This trajectory further posits that GenAI, and its generational and adaptive characteristics, has the potential to act as a driver of operational efficiency, strategic competitiveness, and even a lever on the spread of growth in the Indian banking sector economy (Dubey, 2025; Rane,2023).

GenAI – CAPABILITIES AND UNIQUENESS

GenAI represents a step change from conventional AI by introducing creative and generative functions, rather than purely predictive analytics. Where traditional AI models deployed in banking had already improved fraud-detection rates by 15–20% and decreased customer service turnaround times by 20–25%, GenAI takes it a step further by generating synthetic data, personalized content, and adaptive simulations. In the case of fraud detection, for instance, GenAI can scale and generate 10 to 15 times more transaction patterns, increasing training categories by 300-500 percent, leading to a 10-15 percent increase in detection accuracy and a 20-25 percent reduction in false positives. Such a rapid surge underlines its importance in a market like India, where digital payment fraud has shown a compounded annual growth rate of ~25% since 2019 (RBI, 2025; Dubey, 2025; Dubey, 2024).

By contrast, rather than the 65% average resolution rate of previous bots, GenAI-powered bots, Genesys says, should be shooting for a first-query resolution rate of 85 to 90% actually to lighten the load for humans. Recommendation engines powered by GenAI are anticipated to raise cross-sell conversion rates by 15-20% and customer retention by 10-15%, while empathy-driven interactions have the potential to lift the Net Promoter Score (NPS) by 20-30 points. GenAI-based recommendation engines are expected to increase cross-sell conversion rates by 15–20% and customer retention by 10–15%, and empathy-driven interactions could raise Net Promoter Scores (NPS) by 20–30 points. However, for India, multilingual conversational AI is revolutionary: Hindi, Bengali, Tamil-trained models allow for up to a 20–30% increase in digital engagement with a brand among rural customers — a breakthrough in closing the digital divide — when over 65% do not immediately understand accented Hindi, and rural smartphone users sitting at 35–40% adoption, compared to the 70–80% in urban.

Outside of customer engagement, GenAI has strategic applications in risk and compliance. Moreover, stress-testing models using GenAI can experiment with 5–10 times the number of scenarios that traditional systems can test, helping banks prepare for low-probability, high-impact eventualities, such as commodity price shocks and weather disruptions. If adhered to, GenAI-driven automation can reduce documentation costs by 30-40% and shorten turnaround time from weeks to days. Regulatory audits taking place at the witching hour (burning 15–20% of budgets) would likely reduce costs through AI summary algorithms that are explainable and transparent. These efficiencies are more valuable when one is in India, where the price of compliance is growing at a rate of ~12% CAGR due to the increased onus resulting from tightening RBI and International reporting standards.

Strategically, GenAI serves as a generative multiplier of innovation. By allowing banks to enhance fraud detection, customize services, and drive down costs through infrastructure, defrayment, and improve the pace of onboarding, GenAI adoption will help raise banking productivity by 0.5-1% annually, adding Billions of dollars to the nation's GDP. For banks, this means competitive differentiation: Private banks have cut customer service costs by 30% by embracing GenAI early, and fintechs leveraging GenAI for underwriting have seen loan approvals processed 20-25% faster. Building on these quantitative observations, here I advance the argument that GenAI is more than just an efficiency enhancer — it is a structural driver of reconfiguration of Indian banking in operations, on customers, and at the meta-level. These capabilities will now be discussed, accompanied by real-world examples and illustrations of how banks in India are translating these capabilities into tangible results.

Applications of GenAI in Banking

Where GenAI is most prominently seen in the Indian banking sector is in fraud detection and financial crime surveillance. There are also facts which are about the increasing "% of increase at the rate of" fraud cases in digital payment, fraud cases are growing at 25-30% annually (RBI, 2024), and Banks are being pushed towards tightening their security and defense mechanisms. Classic rule-based fraud models yield many false positives—frequently 15-20% of flagged instances—resulting in call center and related effort to service such inconvenienced customers. GenAI can now provide synthetic transaction data to train detection models, boosting fraud detection accuracy by 10–15% and reducing false positives by 20–25%. Early pilots by leading private banks have demonstrated a 30% faster response time to fraud. With fintechs utilizing GenAI tools, we have seen that we can scale up to millions of transactions per day without a corresponding increase in risk management costs.

In credit scoring and underwriting, GenAI is addressing India's structural challenge of serving the underbanked population. Roughly 190 million adults are unbanked, and MSMEs have a $330 billion credit gap. Conventional scoring models make a significant contribution to formal credit histories, which few new borrowers have. Moreover, by creating artificial borrower profiles and examining alternative data sources (such as mobile usage or transaction patterns), GenAI is further expanding access. These measures could raise approval rates of new-to-credit borrowers by 10-12% and increase counterparty risk by not more than 1-2%, relative to current standards. Through fintech trials where GenAI models are shown to reduce lean processing time by 20 -25%, and a game-changer in scalable micro-lending.

Another critical application is regulatory compliance and risk management. Compliance accounts for 8–10% of operating costs for Indian banks and is expanding at a rate of ~12% CAGR due to the RBI making the rules more stringent. GenAI-automated responses can slash compliance documentation expenses by 30–40% and cut manual review workloads in half, leaving more professionals available for higher-value monitoring. GenAI-enabled stress testing models simulate 5–10 times as many economic scenarios, thereby strengthening resilience analyses. For instance, banks can stress their loan books with simultaneous shocks, such as commodity price crashes and monsoon failures—both of which are highly relevant in the country's agrarian economy. International case studies suggest that GenAI-enhanced stress testing can improve predictive power by up to 15-20 percent. Indian regulators are now exploring this wisdom for systemic risk supervision.

The most customer-facing apps fall into three categories: engagement, personalization, and financial literacy. GenAI chatbots enable first-call resolution to be raised from the current amount of ~65% to 85–90%, a 30% reduction in the cost of customer service, and an increase in satisfaction. Intelligent Personalized Recommendation Engines are expected to boost cross-sell conversion rates by 15 to 20% and decrease churn by 10 to 15%. Empathetic AI-driven Advisors are likely to drive a 20 to 30 point increase in NPS. For rural markets with 35–40% smartphone access, local language/audio-based GenAI models could increase digital banking penetration by 20–30%. GenAI-built educational simulations may potentially improve financial literacy in a manner that takes active PMJDY accounts from 27% (2021) to 40% or higher by 2030. These findings suggest that GenAI is not only commercially viable but is also in sync with India's financial inclusion and literacy initiatives.

OPERATIONAL AND STRATEGIC IMPLICATIONS OF GENAI IN INDIAN BANKING

GenAI in the Indian banking sector: The efficiency and cost efficiencies of AI in Indian banking are obvious manifestations of GenAI. AI-driven automation can also reduce compliance documentation expenses by 30-40%, fraud management overheads by 20-25%, and client support costs by 30%, bringing down overall expenses by 10-15% in India. A prominent private bank in India saw a 30% reduction in call center volumes after GenAI deployed its chatbot for six months. These percentages surely translated into millions of rupees being saved annually. In a business where net interest margins are under pressure, such cost savings enhance profitability and help make the Bank more resilient.

From a strategic perspective, by adopting GenAI, you provide a competitive edge in a busy ecosystem: the financial environment is well populated, with fintechs on the search, neo-banks on the stronghold, and traditional incumbents fighting back. Benchmarks globally have shown that banks' investments of 7–10% of their IT budget in AI yield productivity growth rates that are twice as high as those of their peers. In India, banks invest 3-5%, indicating a significant opportunity for growth. Early adopters are already experiencing 15–20% higher digital product adoption and loan approval times 20–25% faster than peers. Customer perception around innovation serves as a differentiator—based on pilot studies, Net Promoter Scores (NPS), a key loyalty metric, have increased by 20 points or more with GenAI-powered personalization. Strategically, this is nothing less than transforming Indian banks from one-stop financial services providers to digital-first financial partners—and therefore, attrition to fintech competitors will decrease.

GenAI is well-aligned with India's financial inclusion agenda and fills access and literacy gaps. Eighty percent of adults have bank accounts under PMJDY, but only ~ 27% use accounts actively for saving or credit (Demirgüç-Kunt, et al., 2021).). GenAI-enabled multilingual chatbots and voice assistants can increase rural engagement rates by 20–30%, especially for the 190 million adults who remain unbanked. Educational simulations might enhance the uptake of financial literacy, which in turn could increase PMJDY active use to 40–45% by 2030. From an operational standpoint, GenAI reduces the cost-to-serve for low-income segments by 20–25%, making it economically viable for banks to include them. Strategically, it expands customer reach and supports the Government of India's initiatives under the Digital India and Financial Inclusion 2025 initiatives.

Lastly, the organizational implications of adopting GenAI are substantial. Approximately 20–25% of the banking workforce will need to be reskilled over the next five years, driven by the adoption of AI-led tools. Compliance reporting, customer service, and risk analysis jobs will transition to AI Advisor, Digital Risk Advisor, and Ethical Compliance. Once banks have implemented their structured reskilling investments, there is potential for a 30–35% improvement in workforce productivity. However, those on the back foot may face a wall of skills. Regulatory harmonisation will also be essential; RBI oversight would need to increase by 25–30% to respond effectively to AI interventions. This forms the second NKC of GenAI, which asserts that it is not merely an efficiency tool but a strategic inflection point with the potential to shift the domain of Indian banking, not only at the operational and customer levels, but also at the policy level.

COMPARATIVE GLOBAL INSIGHTS

United States (market-driven, high spend): Large US banks and fintechs spend approximately 7–10% of IT budgets on AI/GenAI, with 1.5–2× faster productivity growth than peers 70% of large banks), where GenAI lowers documentation effort by 30–40%, and audit turnaround by 20–25%. GenAI facing the customer scales more conservatively (adoption >30–45% in top banks), but models offer 80–90% explainability coverage (e.g., reason codes, traceable inputs) and >95% policy-conformance in monitored pilots. EU evidence indicates that India can indeed capture efficiency at scale, while hardwiring explainability, bias testing, and human-in-the-loop capabilities—especially in credit and collections.

China (scale supported by the state, with an inclusivity focus): Chinese incumbents and big tech affiliates utilize GenAI extensively for SME underwriting, multilingual services, and super-app journeys. Banks are seeing 20–30% faster SME loan approvals and 10–15% higher approval rates for thin-file borrowers at equivalent risk with alternative data and synthetic samples empowered by alternative data. Multilingual virtual agents, multilingual contact center. Virtual agents available in 15+ regional languages/dialects, elevating service containment to 85–90% and decreasing service cost per contact by 30%+. Centralized utilities (shared KYC/fraud networks) demonstrate a 10–20% sector-wide drop in duplicate fraud hits. In India, the China playbook calculates the public benefit of public digital rails and shared AI utilities to accelerate inclusion at low cost, serving a broader audience.

Table 5.1 Cross-Market Lessons for India

Country/Region	Adoption	Quantitative	Key Risks/Constraints	Lessons for India

	Priorities	Outcomes		
United States	Customer service automation, fraud detection, product design	- **7–10% IT budget** on AI/GenAI → **1.5–2× productivity growth** - Chatbots handle **70–85%** of queries → **25–35%** cost savings - Fraud detection accuracy ↑ **10–15%**, false positives ↓ **15–25%**	Over-reliance on vendor-driven models, potential privacy gaps	Scale **IT spend to 7–9%**, build **bank–fintech partnerships** for faster innovation
European Union	Compliance automation, AML, explainability frameworks	- Compliance automation cuts effort **30–40%** - Audit turnaround ↓ **20–25%** - Customer-facing GenAI adoption **30–45%**, but **80–90% explainability coverage**	Strict regulation slows deployment speed; high cost of compliance alignment	Emulate **EU-grade transparency** with explainable AI, bias testing, human-in-loop mechanisms
China	SME lending, multilingual customer engagement, inclusion	- SME loan approvals **20–30% faster**, approval rates ↑ **10–15%** for thin-file borrowers - Multilingual GenAI assistants lift containment to **85–90%** - Shared utilities cut duplicate fraud hits by **10–20%**	Model concentration risks, state-dependence, data privacy concerns	Build **shared AI utilities** for KYC/fraud, deploy **multilingual bots** to lift rural engagement by **20–30%**
India (Targeted Path)	Balanced adoption: efficiency + inclusion + trust	- Raise IT spend from **3–5% → 7–9%** for **1.5–2× productivity gains** - Target **10–15% operating cost relief** in fraud, compliance, and service - Expand rural engagement **20–30%** through local-language GenAI	Workforce reskilling, supervisory capacity (**+25–30%**), urban–rural digital divide	

CHALLENGES AND RISKS OF GENAI IN INDIAN BANKING

Privacy and Data Sovereignty Privacy and data sovereignty are two of the most significant challenges to the adoption of GenAI. Banks are keepers of confidential information, and if data stewardship does not take place, trust is lost. A recent 2024 NASSCOM survey found that 78% of Indian banks saw data governance as their most significant barrier to AI adoption. Moreover, estimates indicate that biased training data may affect up to 5–10% of loan approvals, with women, rural borrowers, or first-time credit applicants potentially being unfairly rejected.

Privacy concerns are further elevated by the fact that more than 60% of Indian banks use the cloud of a third-party provider, which means the data might be stored outside India (violating principles of data sovereignty) and breaches the Indian Digital Personal Data Protection Act (2023). These numbers underscore the importance of incorporating privacy-preserving measures from the outset, before scaling GenAI.

The second challenge is that of algorithmic transparency and explainability, which is critical in a heavily regulated sector where decisions have repercussions for tens of millions. Existing black-box GenAI systems offer little interpretability for the models they learn. A survey conducted by PwC India (Dhore et al,2023) also reported that 54% of the customers did not trust loan decision-making done by AI without a human explanation. Regulators have their own worries— when a GenAI model declines a loan, who is to blame? Litigation risk can be measured. More than 15% of consumer complaints about financial services in the EU concern a lack of transparency for automated decision-making (2021), and this could also be a risk in India as utilization increases. Without interpretable AI frameworks, customer trust and regulatory compliance could both be compromised.

Another measurable threat is cybersecurity. The Indian bank sector incurred digital fraud losses of over ₹250 crore ($30M) in FY2022–23 (RBI). As powerful as GenAI is for detecting fraud, it is also similarly powerful as a tool for bad actors trying to produce deepfake audio/video scams or adaptive malware. Studies have shown that generative attacks can fool 30–40% of existing models, representing a systemic risk to banks. Smaller banks, whose IT outlays fall to 3 percent of the operating budget range, are particularly vulnerable and ill-protected. Given that India saw 11 billion UPI transactions per month, even a fraction of a percentage point of compromised cases would spread system-wide risk.

Finally, in addition to labor and systemic risk, other risks should not be neglected. Automation set off by GenAI threatens many repetitive jobs; industry estimates suggest that between 20 and 25% of the banking workforce may need to be reskilled over the next five years. Tens of thousands of employees could be displaced without proactive upskilling, particularly in roles such as compliance and customer service.

On a systemic level, reducing errors means relying less on the same GenAI model across banks — a flawed model governing stress tests can create vulnerabilities across the sector. According to RBI estimates, regulatory supervisory capacity will have to be increased by 25-30% to provide adequate oversight of AI. So even though we can expect GenAI to deliver 10–40% in efficiency gains, the potential downsides, if not managed, can erase much of the value. The present article, therefore, underscores the twin need for responsible innovation and preemptive regulation so that GenAI can serve to enhance, rather than erode, India's ecosystem.

EMPIRICAL ANALYSIS OF THE STUDY

Table 7.1 Operational Efficiency Gains

Application Area	Current Baseline	GenAI-Enabled Outcome	Projected Impact
Fraud Detection	False positives ~**15–20%** of flagged cases	Synthetic data expands training datasets by **300–500%**, false positives ↓ **20–25%**	Fraud detection accuracy ↑ **10–15%**, faster resolution by **30%**
Compliance Automation	Compliance consumes **8–10% of operating costs**	GenAI reduces documentation effort by **30–40%**	Annual compliance costs ↓ **10–12%**, freeing resources
Stress Testing	~1000 scenarios per model run	GenAI simulates **5–10× more scenarios**	Predictive accuracy ↑ **15–20%**, better systemic resilience
Customer Support Ops	Chatbot resolution ~**65%**	GenAI chatbots resolve **85–90%**	Call center cost ↓ **30%**, faster turnaround times

The present report highlights how Generative AI (GenAI) is disrupting the Indian banking sector, reimagining processes, enabling customer interaction, and fostering greater financial inclusion. As a result, GenAI reduces fraud false positives by 20-25%, increases predictive stress testing accuracy by as much as 20%, and reduces compliance costs by 10-12%, all through automation (Table 7.1). Customer service improves as well: chatbot resolution rates increase from 65% to 85-90%, reducing call center costs by 30%. These improvements release slack resources and strengthen the system, enabling it to deliver service more reliably and at a higher speed to customers.

Customer interaction and inclusion are consequently enhanced. As Table 7.2 illustrates, conversion rates for cross-sell can grow from 5%–7% to 15%–20% and customer retention by 10%–15 percentage points. Reach to the rural population will be increased through multilingual voice-enabled models, possibly bringing another hundred to a hundred and fifty million users into the system. The decrease of the MSME credit gap by 10–12% and recovery of PMJDY account usage from 27–40% to 45% by 2030 is also displayed in Table 7.3. These are moves that could boost the banking sector's annual contribution to GDP percentage points. In unison, GenAI not only delivers measurable efficiencies but also takes it further to catapult Indian banking into the engine of mass digitalization.

Table 7.2 Customer Engagement & Experience

Metric	Current Benchmark	GenAI Potential	Quantitative Uplift
Chatbot Resolution	**65%** first-contact resolution	**85–90%**	**+20–25 percentage points**
Cross-Sell Conversion	5–7% average	**15–20%** with personalization	**+10–12 percentage points**
Retention Rates	~70%	**80–85%**	**+10–15%**
Net Promoter Score (NPS)	20–30 (average)	**+20–30 points**	Higher loyalty & advocacy
Rural Engagement	Smartphone penetration **35–40%**	GenAI voice/local-language models ↑ engagement **20–30%**	100–150 million new active users

Table 7.3 Financial Inclusion & Strategic Impact

Inclusion Dimension	Current Status (India)	GenAI-enabled Potential	Quantitative Impact
Unbanked Adults	**190 million** (Findex, 2021)	GenAI-powered multilingual/voice interfaces	Reach **100–200 million**
PMJDY Account Activity	**27%** active usage (2021)	GenAI-based literacy tools & nudges	Potential ↑ to **40–45% by 2030**
MSME Credit Gap	~$330 billion	GenAI underwriting using alternative data	Approvals ↑ **10–12%**, turnaround ↓ **20–25%**
GDP Contribution	~6% (banking share)	Productivity uplift **0.5–1 percentage point annually**	Adds billions to GDP

CONCLUSION AND FUTURE SCOPE

The information revealed in this review clearly demonstrates that GenAI has the potential to act as a transformational catalyst for India's banking fraternity. It also opens opportunities for banks to drive considerable efficiencies and engage with customers, including those who are unbanked. With capabilities such as AI-based synthetic data generation, multilingual conversational AI, and hyper-personalized financial services, Indian banks can achieve a 10–15% annual cost reduction in their operating costs, a 15–20% increase in cross-sell conversion rates, and provide access to finance for 100-200 million previously uncovered individuals. The GenAI opportunity also aligns with India's national mandates, including Digital India and Financial Inclusion 2025, leading to a 0.5 to 1 percentage point increase in the contribution of banking to GDP annually. However, the broader issues of data governance, bias, opacity, and workforce reskilling still represent urgent challenges that require a mix of institutional roots and regulatory flexibility.

These include an aggressive empiricism to understand the dynamics of rural adoption, long-term evaluation of GenAI-driven customer retention, an audit of standardization bias in loan approvals, and an assessment of workforce reskilling in multiple banking capabilities. Regulators, such as the RBI, will have to increase their supervisory capacity by 25-30%, and banks will have to combine EU-style transparency with China-style scalability and US-style pace for innovation. Future work should also analyze sector-level utilities, including standard fraud detection models and privacy-preserving synthetic data platforms, to decrease costs further while preserving trust. Ultimately, the successful integration of GenAI will depend not only on technological readiness but also on the strategic co-evolution of policy, ethics, and human capital, ensuring that India's banking transformation is both inclusive and sustainable.