

CONTRIBUTION OF AI APPLICATIONS IN THE STATE BANK OF INDIA IN ECONOMIC DEVELOPMENT OF INDIA

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ABSTRACT

AI applications are significant in India's economic development. AI Applications not only boost economic development but also enhance productivity, product quality, and employee efficiency in the Indian economy, resulting in higher output at lower cost. It helps to make better decisions for manufacturing and supply chains. The research paper focuses on productivity and economic growth. It is estimated that AI will add hundreds of billions to trillions of dollars to India's GDP by 2030-2035. It also reduces costs in the agricultural sector by increasing yields and helps farmers get inputs at fair prices. It also improves customers' experience and awareness, helping them avoid a range of risks and fraud. It also helps with risk assessment and risk avoidance.

The research paper also focuses on SBI's contribution to providing digital banking services to customers. State Bank of India (SBI) has made its branches highly hi-tech to offer banking and mobile services through digital channels, enabling consumers to enjoy digital banking facilities smoothly and conveniently, saving time. The branches of SBI also have the capacity to compete with the global financial institutions and fintech platforms. It has also enhanced the security protocols to minimise fraud and ensure transparency, fairness and accountability, thereby increasing customer trust. Finally, the research paper also covers the issues arising from AI Applications and seeks appropriate solutions to address them and reduce associated risks. It provides appropriate suggestions to address the various problems arising from AI Applications in the banking sector.

Keywords: Financial inclusion, AI applications, SBI's services, Risk management.

INTRODUCTION

Artificial Intelligence (AI) describes the ability of machines to carry out activities that are traditionally handled by human cognitive functioning. It facilitates systems in acquiring knowledge through experience, adapting to novel circumstances, and independently addressing complicated challenges. AI employs datasets, algorithms, and large language models to analyse data, identify patterns, and generate responses. Gradually, these systems improve their efficiency, allowing them to reason, make informed decisions, and communicate in a manner that closely mimics human interaction.

John McCarthy and Marvin Minsky, regarded as pioneers of AI, defined AI as “the science and engineering of making intelligent machines” in collaboration with a consortium of researchers at Dartmouth College in the United States in 1956. This collective of scholars was endeavouring to enable machines to utilise language, conceptualise ideas, and resolve problems autonomously, without human oversight.

SBI started its AI journey with SBI (SBI Intelligent Assistant) in September 2017 for customer services, but significantly expanded its use with the YONO AI Bot embedded in its banking application and with the

internal chatbots Spark and Holistic Internal Documentation, launched in early 2025. SBI also uses AI-driven features within its YONO platform for loan offers and predictive services (Klover.ai).

State Bank of India (SBI) has transformed into a global digital powerhouse, leveraging Artificial Intelligence (AI) to drive India's transition toward an "upper middle-income" Economy by 2030. Currently ranked the 43rd-largest bank globally and the 4th most trustworthy by Newsweek, SBI manages a massive customer base of 530 million, with approximately 97% of transactions now occurring through digital channels. Central to this transformation is the YONO Ecosystem, which recently launched its 2.0 version in December 2025. This "financial super App" utilises Agentic AI and Machine Learning to provide hyper-personalised services to more than 100 million registered users, with an ambitious goal to double this to 200 million.

SBI's adoption of an AI-driven strategy has had a strong strategic and economic impact. The bank has automated more than 220 back-end processes, which has improved operational efficiency and reduced the cost-to-income ratio to 51.6 per cent. AI-based real-time fraud detection and predictive credit scoring have strengthened risk management, helping SBI maintain a record-low Gross NPA of 1.82 per cent. Financial inclusion has also expanded through the integration of 15 regional languages and the deployment of 10,000 digital floor managers across branches, supporting MSMEs, agriculture, and rural customers. With a record net profit of ₹70,901 crore in FY25, SBI's AI-first approach has developed into a key driver of its performance and a significant contributor to India's goal of becoming the world's third-largest economy by 2028.

The technological advancements associated with artificial intelligence (AI) are profoundly significant for contemporary enterprises across sectors such as manufacturing, healthcare, automotive, education, infrastructure, and financial services. The Indian banking sector, together with the broader financial services industry, is currently undergoing a transformative shift from traditional methodologies to a more automated, digitally driven framework that is fundamentally reliant on artificial intelligence. The implementation of AI in banking encompasses the utilisation of sophisticated chatbots to enhance customer service, the provision of tailored services for individual clients, the optimisation of decision-making processes in credit evaluations, the reduction of risks and operational expenses, the identification of fraudulent activities, and the facilitation of intelligent advisory services about investment diversification.

Within the domain of financial services, artificial intelligence proves advantageous in areas such as data retrieval, market analytics, insurance processes, customer interaction, retail lending, and credit assessment, thereby contributing to the establishment of a comprehensive customer experience through digitalised offerings (Mehrotra, A.2019).

LITERATURE REVIEW

Maity, S., & Majumder. A, (2026). Titled "Role of Public Sector Banks Toward Financial Inclusion in the Era of AI: An Efficiency Review Study", the report explains that AI is transforming India's banking sector by enabling fraud detection, automated customer services, credit assessment, and personalised financial services. This study uses Data Envelopment Analysis (DEA) to evaluate the effectiveness of public sector banks (PCBs) in advancing financial inclusion before and after AI adoption. The results show improved overall technical efficiency (OTE), indicating that AI has enhanced resource utilisation and operational performance, thereby strengthening financial inclusion.

Sharma & Kohli (2025) investigated "the impact of AI-enabled operational transformation within Indian public sector banks", with particular emphasis on the State Bank of India (SBI). The study found that AI has reduced manual errors, sped up routine processes, and improved customer service through chatbots. SBI's use of robotic process automation and loan risk assessment. However, the study identified challenges such as inadequate employee training, low customer awareness, especially in rural areas and uneven infrastructure. Cybersecurity concerns and slow adoption further limited the effective use of AI. The authors concluded that continuous staff training, stronger governance, and greater customer awareness are crucial to fully realising the advantages of AI in public-sector banks.

Kumar, P., & Manchikatla, A. (2025). Title “Does Adoption of AI Swell the Financial Performance of Banks in India: A Comparative Study of SBI and ICICI Using Balanced Panel Data.” This study explores how the adoption of Artificial Intelligence (AI) has influenced the financial performance of Indian banks. It compares performance before and after AI integration in core banking operations, focusing on State Bank of India (SBI) and ICICI Bank. Using balanced panel data over 14 years (2010-2024), divided into pre-AI and post-AI periods, the study evaluated performance through the CAMEL framework and key financial indicators. A paired t-test in SPSS shows a significant improvement in performance for both banks after AI adoption. The findings suggest that AI implementation has a positive and meaningful impact on the financial performance of banks in India.

Verma & Siddiqui (2025) investigated the “progressive role of artificial intelligence in augmenting customer engagement across prominent Indian banks, with a principal focus on SBI’s digital service platforms.” The study found that AI tools such as SIA, YONO, voice assistants, and recommendation systems have enabled SBI to offer personalised services, reduce dependence on physical branches, and speed up processes such as balance inquiries, fund transfers, and complaint resolution. AI has also strengthened fraud detection by identifying unusual transaction patterns. Nevertheless, issues related to data privacy, customer trust, and difficulties with digital interfaces were noted. The authors concluded that SBI should focus on improving digital literacy, multilingual support, and customer awareness to fully benefit from AI-driven services.

Bhoite, D. B. (2024). “Beyond Brick-and-Mortar”, this paper is a case study detailing the digital transformation of SBI, focusing on the strategic implementation of digital technologies and their subsequent effects on customer engagement, service delivery, operational efficiency, and competitive advantage, with specific attention to tools like AI chatbots, mobile banking, and data analytics. The study is explicitly identified as a “case study” focusing on the process of digital transformation at SBI. This approach allows for an in-depth examination of a specific organization and its strategic initiatives. The paper concludes that SBI’s digital transformation has significantly improved customer engagement, service delivery, operational efficiency, and its competitive standing in the banking industry, leveraging tools such as AI-powered chatbots, mobile banking apps, and data analytics.

Chavan, S. S. (2023). This paper is titled “Artificial Intelligence used in Indian Economy Development and Management.” Examines the function of artificial intelligence (AI) in transforming key sectors of the Indian economy. It analyses how AI applications drive economic growth, efficiency, and sustainability, while also considering associated challenges and ethical issues. The study adopts a descriptive and analytical approach to evaluate the applications, benefits, and limitations of AI across various sectors, providing a comprehensive view of its impact on economic development and management. The results suggest that AI is a significant driver of innovation and productivity in India. Despite existing challenges, strong government support and increasing adoption suggest a positive shift toward a technology-driven economy powered by AI.

Gujrati, P., & Biradar, J. (2023). Titled “Application of Artificial Intelligence in Banking and Finance: Bibliometric Review and Emerging Research Agenda”, this paper presents a bibliometric review of Artificial Intelligence (AI) applications in the banking and finance sector, aiming to gain a clear understanding of the major contributions, key players, and emerging research trends in this field. The primary goal is to understand the major contributions of researchers, subject experts, and sources, as well as the countries actively involved in AI research within the banking and finance sectors. A systematic review of 756 documents published between 1972 and 2021 was conducted using the Scopus database, which is recognised as the largest available database. In conclusion, the application of AI in banking and finance is rapidly expanding, driven by increasing efficiency and productivity. While the US, China, and the UK lead in research output, there is considerable scope for future research in less-examined areas, along with the necessity to strike a balance between technological progress and human considerations.

Anbukarasi, M. (2022). Titled “Artificial intelligence influence on mobile banking services among selected college students”. This study examines how Artificial Intelligence (AI) enhances mobile banking services, particularly in improving customer experience among college students. Existing literature highlights the growing role of AI in making banking faster, smarter, and more user-friendly, forming the foundation of this research. A numerical, descriptive method was employed, using data gathered from college students in

Coimbatore through questionnaires and analysed using statistical tools. The findings reveal that AI-enabled mobile banking apps significantly reduce wait times and enable users to perform most banking activities on their smartphones. The study concludes that selected factors strongly influence the adoption of AI-based mobile banking and that its usage will continue to grow. However, the scope is limited to college students and a restricted set of variables.

Triveni, K., Bharathi, G. R., & Nawaz, M. (2020). Titled “Application of Artificial Intelligence in Indian Banking: Opportunities and Challenges.” The manuscript reviews existing studies on the use, opportunities, and challenges associated with Artificial Intelligence (AI) in the Indian banking sector. It provides an overview of AI’s impact and future potential, drawing on secondary data from prior research and reports. The findings highlight that AI has significantly transformed banking operations by improving efficiency and service delivery. Simultaneously, the study identifies key challenges related to data management, workforce adaptation, and ethical concerns. Overall, the manuscript concludes that AI is a robust instrument for improving efficiency and customer service in Indian banks, although careful management of its associated challenges is essential.

Ambika, D. M. R., & Pasha, M. A. (2020). This scholarly article investigates “A study on impact of artificial intelligence in financial services of private banks in Bangalore.” Focusing on AI-based financial services, adoption methods, and customer responses. The study took 10 major private banks in India and used both secondary and primary data, with the latter collected through a structured questionnaire. The findings reveal that private banks are widely using AI applications to improve service quality and customer satisfaction, and to help address service-related complaints. The study also sees strong public support for technology adoption under the Digital India initiative. Additionally, customers showed greater loyalty to banks that provided better training to enhance AI-based operations, and the study emphasised the importance of sending electronic alerts for every online banking transaction.

Meena, M. M. R., & Parimalarani, G. (2020). Titled “Impact of Digital Transformation on Employment in the Banking Sector”. Highlights that digital transformation has profoundly altered employment patterns in both the public and private sector banks. Advancements in technology have changed organisational structures, management practices, and hiring processes, making banking operations more efficient and technology-driven. Automation has reduced the need for human involvement in routine tasks, leading to a decline in clerical and mid-level roles. At the same time, digital banking allows customers to access services anytime and anywhere. The study highlights that nearly 70% of front-office functions are now managed by AI tools, including chatbots, voice assistants, and biometric systems. However, digitalisation has also generated new job opportunities, including roles such as cybersecurity experts, programmers, blockchain specialists, and credit analysts. Overall, while traditional roles are evolving, effective collaboration between human employees and digital technologies can enhance bank performance and reduce operational errors.

Lakshminarayana, N., Deepthi, B. R., & Sjrww. (2019). This study examines the digital transformation journey of State Bank of India, highlighting its strategic adoption of technologies such as AI-driven chatbots, mobile banking platforms, and data analytics. By using a case study method, the paper provides a detailed insight into the implementation of these innovations within the organisation. The results indicate that SBI’s digital initiatives have markedly improved customer interaction, enhanced service quality, boosted operational efficiency, and reinforced its competitive standing in the banking industry. Overall, the integration of digital technologies has been instrumental in modernising the bank’s operations.

Rajesh.R., Palpandi. (2015). Titled “A study on impact of information technology in banking sector with reference to Southern Tamil Nadu”. This study explores how the adoption of information technology has improved banking operations by enabling faster, more reliable services, introducing innovative financial products, and providing real-time information to customers. Using a descriptive design, data were collected through open-ended questionnaires. The study analysed customer accessibility using six key factors: banking services, ancillary services, front-office operations, technology-enabled services, and service safety and reliability through principal component factor analysis. The findings reveal that core banking services have the strongest influence on customer accessibility. Additionally, a one-sample t-test highlights areas for improvement, such as weekly account statements, email alerts, and SMS notifications for transactions. The

paper concludes that banks should follow a customer-centric approach and deliver affordable, customer-driven services to enhance accessibility and satisfaction.

Kapoor, A. (2014). Titled “Financial inclusion and the future of the Indian economy”, the study examines the evolution of financial inclusion in India by analysing its past progress, current status, and future prospects up to 2050. It highlights financial inclusion as a key catalyst for economic growth and inclusive development, especially in light of India’s changing demographic and economic landscape. Using a qualitative, foresight-based approach, the study draws on existing data and expert insights to assess future trends. The results indicate that India has addressed many earlier challenges and is likely to achieve sustainable and inclusive financial growth by 2050. However, this progress will be gradual and will depend on well-planned strategic decisions.

Ray, S. (2013). Titled “Does FDPEG in India”, this study looks at how FDEG are connected in India from 1990-91 to 2010-11. Domestic savings and capital formation are measures of financial development expressed as shares of GDP. Standard tests are used to check the dependability of the data, followed by a Granger causality analysis. The findings demonstrate a one-way relationship where financial development leads to economic growth. In simple terms, a stronger and more developed financial system helps drive economic growth in India. These findings support the supply-leading view, especially in the period after economic liberalisation.

RESEARCH GAP

After conducting numerous studies on my topic, we found that most of the researches focused on operational efficiency, customer experience, financial performance, and these studies use descriptive approaches. There is limited research on AI Applications in SBI on economic development. Simultaneously, AI Applications serve a significant role in economic growth and development. Therefore, we selected our topic: "Contribution of AI Applications in the State Bank of India in Economic Development" to enhance the research in Economic development of India.

Moreover, few studies combine bank-level AI indicators with macroeconomic variables to establish causal relationships between them. This highlights a clear research gap and a need for a focused study on SBI’s AI-driven contribution to India’s economic growth.

RESEARCH OBJECTIVES

The main objectives of the research paper are as follows:

- To evaluate the impact of AI Applications on SBI’s profitability.
- To analyse the role of AI in fostering Financial Inclusion.
- To find the impact of AI Applications on employee efficiency.

RESEARCH METHODOLOGY

The research paper is descriptive and based on secondary data collected from various sources on AI applications in banks, namely government reports published by ministries and organisations, peer-reviewed articles, reputable websites, and newspapers.

SOURCE OF DATA COLLECTION

Secondary Data: Sourced from academic journals, reports, SBI annual reports, RBI publications and previous empirical studies.

DATA ANALYSIS & INTERPRETATION

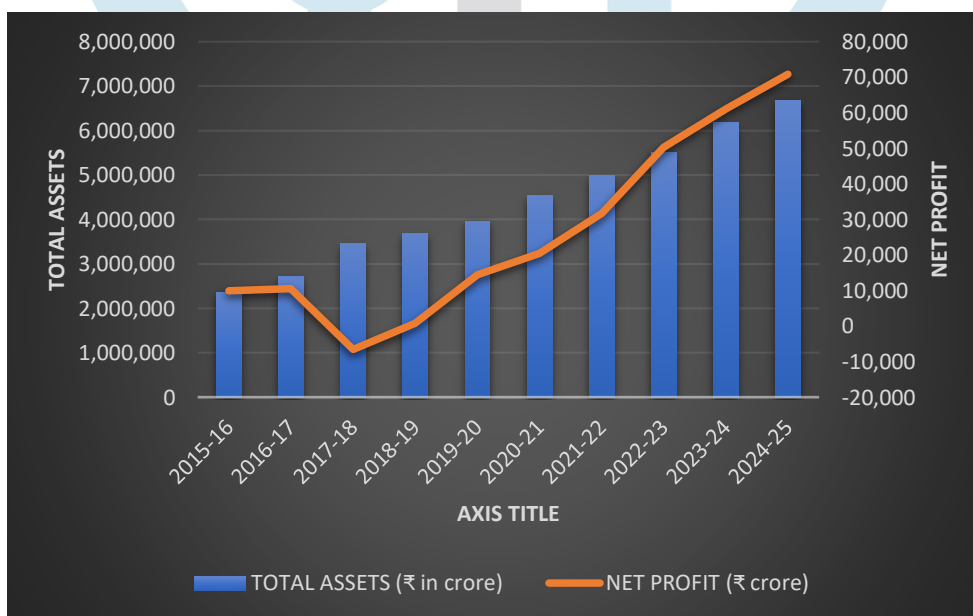
Table: 1

Total Assets and Net Profit

YEAR	TOTAL ASSETS (₹ in crore)	NET PROFIT (₹ crore)
2015-16	23,57,617	9,951
2016-17	27,05,966	10,484
2017-18	34,54,752	-6,547
2018-19	36,80,914	862
2019-20	39,51,394	14,488
2020-21	45,34,430	20,410
2021-22	49,87,597	31,676
2022-23	55,16,979	50,232
2023-24	61,79,694	61,077
2024-25	66,76,053	70,901

Source: SBI Annual report 2024-25.

Figure: 1



Source: SBI Annual report 2024-25.

Table no. 1 is also presented graphically in figure no. 1, which depicts the trends in total assets and net profit of the State Bank of India (SBI) from 2015-16 to 2024-25. SBI's total assets show a consistent and substantial increase throughout the study period, rising from ₹23,57,617 crore in 2015-16 to ₹66,76,053 crore in 2024-25. This sustained growth reflects the bank's expanding operational scale, improved deposit mobilisation, and increased credit outreach.

Net profit performance, however, exhibits notable fluctuations in the initial years. After recording profits in 2015-16 and 2016-17, SBI incurred a significant loss in 2017-18, largely due to asset quality stress and higher provisioning for non-performing assets. From 2018-19 onwards, profitability recovered and strengthened steadily. A sharp improvement is observed after 2019-20, with net profit rising from ₹14,488 crore to ₹70,901 crore by 2024-25.

The simultaneous growth in assets and profits in recent years indicates improved operational efficiency, better risk management, and enhanced productivity. Overall, the table highlights SBI's successful transition from

financial stress to sustained profitability and stability in the latter years of the study period, as well as its significant contribution to India's economic development.

Table: 2**AI Maturity Level and YONO Users**

YEAR	PHASE	AI Maturity Level (Est. Index) *	Key AI/Digital Milestone	Digital/YONO Users (Approx.)
2015	Early Digital	1.2	Introduction of SBI INTOUCH (Digital Stores)	Negligible
2016	Infrastructure	1.5	Migration to Private Cloud; Big Data setup	-
2017	Launch	2.0	Launch of YONO & SIA (AI Chatbot)	2Million
2018	Integration	2.2	AI used for Pre-approved Personal Loans (PAPL)	10Million
2019	Expansion	2.4	Launch of “YONO Cash” (Cardless ATM via AI)	20Million
2020	Acceleration	2.8	AI for COVID-relief loan processing & KYC	32Million
2021	Analytics	3.1	Real-time Fraud Detection & Sentiment Analysis	45Million
2022	Maturity	3.4	AI-driven “NextGen Data Warehouse” operational	58Million
2023	Optimization	3.7	AI/ML used in 200+ automated back-end processes	70Million
2024	Advanced	4.1	ICT Spend reaches \$1.3B; GenAI pilots begin	82Million
2025	Intelligent	4.5	Launch of YONO 2.0 (Omnichannel AI)	93Million

Source: *Index estimated on a scale of 1–5 based on NASSCOM's Banking AI Maturity framework 2025.

Table 2 highlights a strong link between rising AI maturity and improvements in productivity, profitability, and financial inclusion at the State Bank of India (SBI) during 2015-2025. The steady increase in AI maturity from 1.2 to 4.5 reflects SBI's transition from basic automation to advanced AI-driven applications such as predictive analytics and automation, which have enhanced operational productivity by reducing processing time, minimising human error, and lowering operational costs.

Simultaneously, the rapid growth in digital/YONO users, driven by financial inclusion and time savings, from negligible levels in 2015-16 to about 93 million in 2025, demonstrates the scalability of AI-enabled banking services. By enabling SBI to serve a significantly larger customer base without a corresponding increase in physical infrastructure or staffing, AI-driven digitalisation has improved cost efficiency and revenue generation, thereby supporting profitability.

Furthermore, the expansion of digital users underscores SBI's role in promoting financial inclusion. AI-powered platforms have facilitated easier account access, faster service delivery, and personalized financial products, particularly benefiting rural and underserved populations. Overall, the table indicates that increasing AI maturity has positively influenced SBI's productivity, strengthened its profitability, and expanded inclusive access to formal banking, reinforcing AI's role in sustainable economic development.

Table: 3

Profit per Employee

YEAR	PROFIT PER EMPLOYEE (₹ IN 000)
2015-16	470
2016-17	511
2017-18	-243
2018-19	33
2019-20	578.98
2020-21	828.35
2021-22	1292.72
2022-23	2122.69
2023-24	2620.46
2024-25	2991

Source: SBI Annual report 2024-25.

Table 3 indicates the trend in profit per employee during the year. It is revealing significant fluctuations, followed by a sustained improvement in recent years. During the initial years, profit per employee increased moderately from ₹470 thousand in 2015-16 to ₹511 thousand in 2016-17, indicating stable employee-level productivity. However, a sharp deterioration is observed in 2017-18, when profit per employee turned negative (-₹243 thousand), reflecting a phase of financial stress and reduced operational efficiency.

A gradual recovery began in 2018-19, with profit per employee returning to a marginally positive level (₹33 thousand). From 2019-20 onwards, performance improved markedly, rising to ₹578.98 thousand and accelerating further in subsequent years. The period 2020-21 to 2024-25 shows a consistent, steep upward trajectory, with profit per employee increasing from ₹828.35 thousand in 2020-21 to ₹2,991 thousand in 2024-25.

The sustained growth indicates substantial improvements in employee productivity and profitability, likely driven by operational restructuring, technology adoption, and efficiency-enhancing initiatives. Overall, the table suggests that after overcoming a phase of financial strain, the organisation achieved robust gains in profit per employee, attributable to the use of AI applications in banks, reflecting stronger financial performance and more effective utilisation of human resources during the study period.

RESULTS AND FINDINGS

The major findings from the study are as under:

1. AI Applications lead to the economic development of India, and SBI become the 43rd largest bank globally, which indicates the economic development of the country also (as per RBI report 2024-25).
2. Using AI Applications in banks increases employees' efficiency.
3. AI Applications also increase financial inclusion in the country, in the way that SBI Yono is available in 15 regional languages, which is very convenient to use for users in India.

CONCLUSION

This study concludes that the adoption of Artificial Intelligence (AI) in the Indian banking sector plays a significant role in promoting economic development, with the State Bank of India (SBI) serving as a strong example. The findings clearly show that AI has helped SBI improve its operational efficiency, profitability, employee productivity, and outreach to a wider population. Over the study period, SBI recorded steady growth in total assets and a strong recovery in net profits, indicating improved financial performance supported by technology-driven decision-making and better risk management. The rise in AI maturity at SBI is closely linked with the rapid expansion of digital banking through the YONO platform. The sharp increase in digital users highlights how AI-enabled services have improved customer convenience, reduced service costs, and allowed the bank to serve more customers without increasing physical infrastructure. This has directly supported financial inclusion, especially among rural and underserved populations, through multilingual and user-friendly digital services. The study also finds that AI adoption has improved employee efficiency, as

reflected in substantial growth in profit per employee in recent years. Overall, the research confirms that AI is not only strengthening SBI's performance but also contributing meaningfully to India's broader economic development. Despite certain challenges, the effective use of AI in banking offers strong potential for sustainable growth, improved inclusion, and long-term financial stability. We hope that AI Applications will be a boon for future generations and be used optimally without adversely affecting any stakeholders or India's economic growth & development.

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