

Uncovering the ground truth

AI in Indian financial services

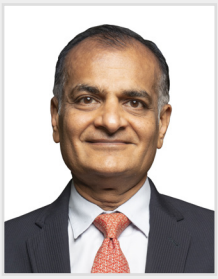
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pwc

FICCI

Message from FICCI



Rashesh Shah
Past President, FICCI,
and Chair, FICCI Financial
Sector Council

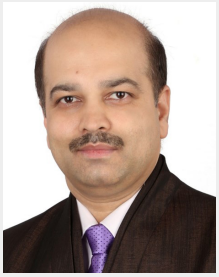
The financial services industry in India has been a leader in embracing newer technologies and has been undergoing a transformation over time. Financial institutions in India are using AI-powered solutions to unlock revenue growth opportunities, minimise operating expenses, and automate manually intensive processes. Many of the routine activities have already been entrusted to machines. Financial firms are also using artificial intelligence (AI) to improve security and transparency in systems for payments fraud detection and prevention, as well as for identity verification to meet regulatory requirements associated with Anti-Money Laundering (AML) and Know Your Customer (KYC). We are also seeing innovative lending products with data-driven insights enabling the prediction and minimisation of credit risk as well as analytics-based collection models. Such developments have deep implications for financial inclusion and access.

Against the above backdrop, FICCI and PwC have prepared this detailed report to highlight adoption of AI by the financial services industry in India and provide the industry's point of view on opportunities, implementation challenges and threats, and propose possible solutions. Several rounds of consultation were held with different ecosystem players while preparing this report. The report lists out some of the major regulatory concerns, such as data privacy and data protection, approval for use of AI engines, accountability for AI decisions, and cloud migration/ adoption including public cloud. Key stakeholders such as the government, regulators, major technology companies, FinTechs as well as financial institutions need to work collectively to address these issues and to meaningfully harness the transformational potential of AI.

As we move ahead on this journey, we will see that greater adoption of AI in the financial services industry will offer many possibilities. Members of the Indian financial services sector must explore these possibilities, embrace AI as a game changer, invest the needed resources in AI and develop a well thought out roadmap for AI implementation.

I would like to thank the team at FICCI secretariat and our colleagues from PwC for undertaking detailed research and bringing out this timely report. I would also like to thank all the industry members who contributed to this report with their highly relevant and important inputs. I am sure that readers will find this report useful and that it would contribute to the ongoing discussions on this important subject.

Message from PwC



Mukesh Deshpande
Partner, PwC India



Rajnil Mallik
Partner, PwC India

Artificial intelligence (AI) has become an important topic of consideration in business. The financial services industry in India is no exception, and players are using AI to drive innovation and make better decisions. This trend is accelerating in the wake of the COVID-19 pandemic as more and more businesses re-imagine themselves in the 'AI era' and leaders think through how to make AI mainstream. Leaders also have many questions on their minds: What is the current level of AI adoption in the industry? Are competitors viewing AI as a game changer or a passing fad? What are the challenges around AI? Will business processes need to change? How disruptive will that change be? What is the RoI profile of AI?

PwC India, in partnership with FICCI, undertook a comprehensive survey of leaders of Indian financial institutions, in order to understand the current adoption, sentiments, use cases, challenges and future aspirations surrounding AI. This report presents our findings.

Our survey reveals that while two out of three survey respondents strongly agree that AI will provide a competitive edge and improve operational efficiency, they are also worried about data privacy and protection. To help leaders navigate these uncharted waters, we have presented an AI maturity curve that offers useful insights into how financial institutions can think about developing an AI roadmap which aligns with their long-term business goals. We have also benchmarked the current regulatory landscape in India against that of global counterparts and presented the industry's point of view on the present regulatory guidelines to understand these concerns better.

We hope that this report gives regulators, industry players, and other stakeholders a clearer picture of the current state of AI adoption and maturity and helps them prepare for the road ahead. We foresee a future where different stakeholders work together to ensure broad-based industry growth and where AI helps address challenges that were considered to be unsolvable.

In the post-COVID world, **disruption through artificial intelligence (AI) in the Indian financial services (FS) industry** has occurred at a faster pace than is generally believed. Are you an AI-mature organisation, ready to gain from the rising AI wave?

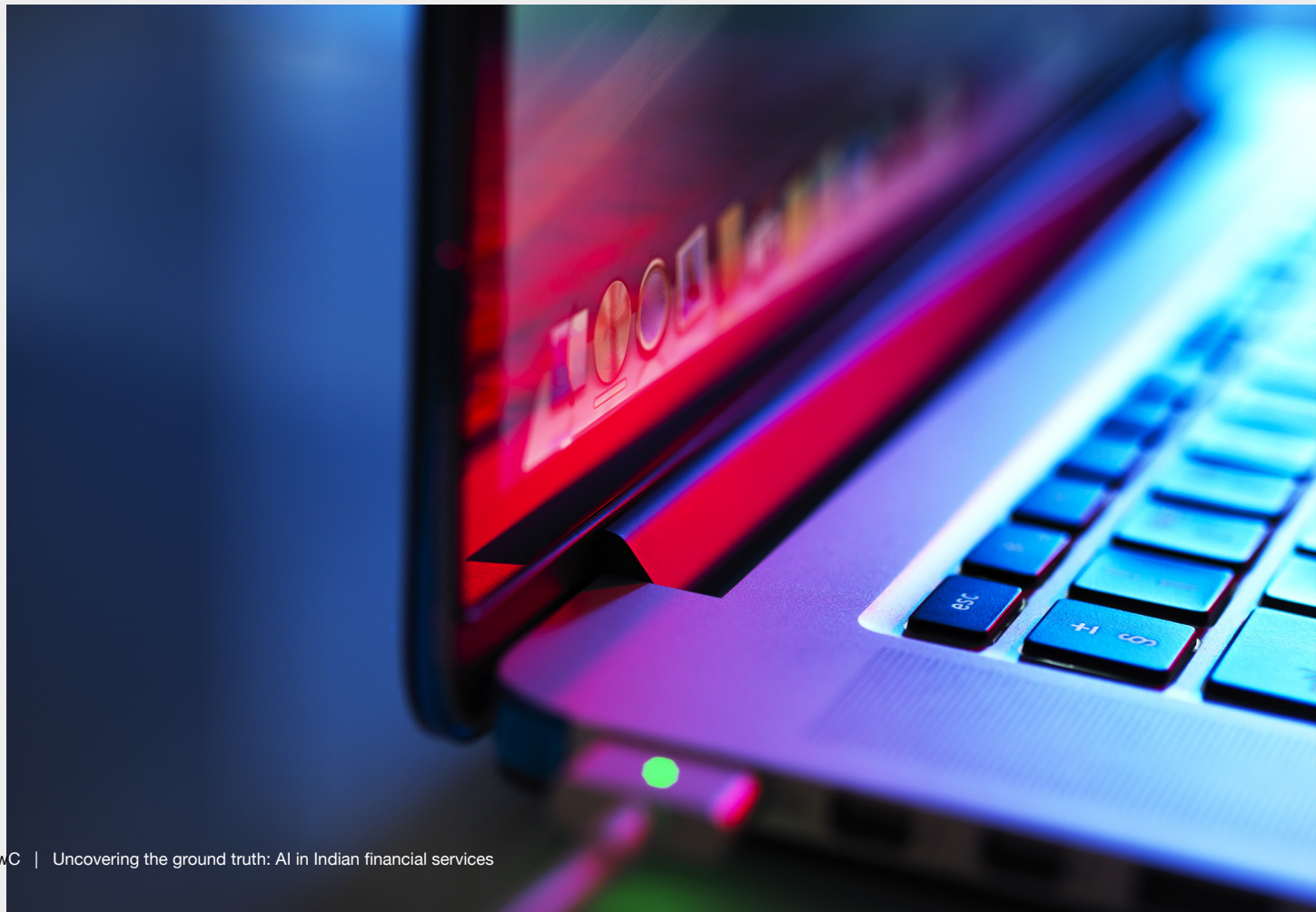
Drawing on a detailed analysis of the maturity of AI in the Indian landscape, we identify the most viable roadmap for organisations at different stages of maturity.

83%

of Indian FS organisations have identified **enhancing customer experience** as the top driver for AI-enabled use cases

57%

of them strongly agree that AI will give them a **competitive edge over their peers**



Contents

Executive summary	06
Methodology	07
AI in the Indian FS industry: A bird's-eye view	08
Deep dive into enterprise-wide AI sentiments	10
AI maturity framework	15
Sector view – use cases	18
Support for the implementation of AI: US, UK and India	22
Industry's voice on the Indian AI regulatory outlook	24
Key challenges and associated solutions for AI technologies	26
Roadmap to build AI capabilities in next the near future	32
Conclusion	33

Executive summary

Not too long ago, artificial intelligence (AI) was an academic curiosity. Today, however, it is reshaping our everyday lives. The financial services (FS) industry – often the bellwether industry across the globe – has embarked on an AI-led transformation journey using AI-based predictive modeling, automated manual tasks, robotic assistance/ chatbots, advanced technologies like collaborative filtering, support vector machines, and deep learning.

Some of the key highlights and findings of this survey report are as follows:

1. Indian financial institutions are currently thinking through the many implications of AI and how to lead with AI in the future. Through our conversations with leaders across Indian FS institutions, we have developed an AI maturity framework to help organisations identify how AI ready they are today. The framework helps in positioning an organisation on the maturity curve which is based on the complexity/sophistication of AI algorithms being deployed and the degree to which AI use cases have been operationalised.

   It classifies organisations as leaders, followers and starters based on their performance against maturity drivers.

2. This report presents a roadmap that allows companies to develop future-ready AI applications.

3. We identified various successful AI-based use cases in the Indian context across banking, insurance, non-banking financial companies (NBFCs), asset management companies (AMCs), and payments.

4. Our survey of senior leaders at large financial institutions in India revealed the following:

   Chat automation, fraud detection and AI virtual assistants are the top three use cases deployed widely across the FS industry.

   The top business drivers for FS organisations include enhancing customer experience, improving productivity and increasing revenue.

   The top concerns relate to availability of data, privacy of consumers and security of data, integration, operationalisation and maintenance of AI infrastructure, and the very distinctive and progressive skills required for success in AI.

5. Our benchmarking of the current regulatory landscape in India against that of global counterparts suggests the need for a well laid out and evolving regulatory plan across the entire FS industry and covering different risk categories.

   In addition, a responsible AI framework is required to ensure ethical, fair, transparent and accountable practices.

This paper is a step towards documenting the industry's hopes and concerns for AI while working hand in hand with regulatory authorities to shape AI-related policies. We hope that this report will help in alleviating the challenges currently being encountered by players in the industry and lead to a better AI future for the country.

Methodology

This report adopted an outside-in as well as an inside-out approach.

The outside-in approach involved extensive primary and secondary research that was conducted by PwC in collaboration with FICCI. The primary research comprised an AI adoption survey and executive interviews with senior leaders in some of the top Indian financial institutions. The survey and interviews helped us gauge the pulse of the Indian FS industry (including banking, insurance, NBFCs, payments, and asset and wealth management) with respect to

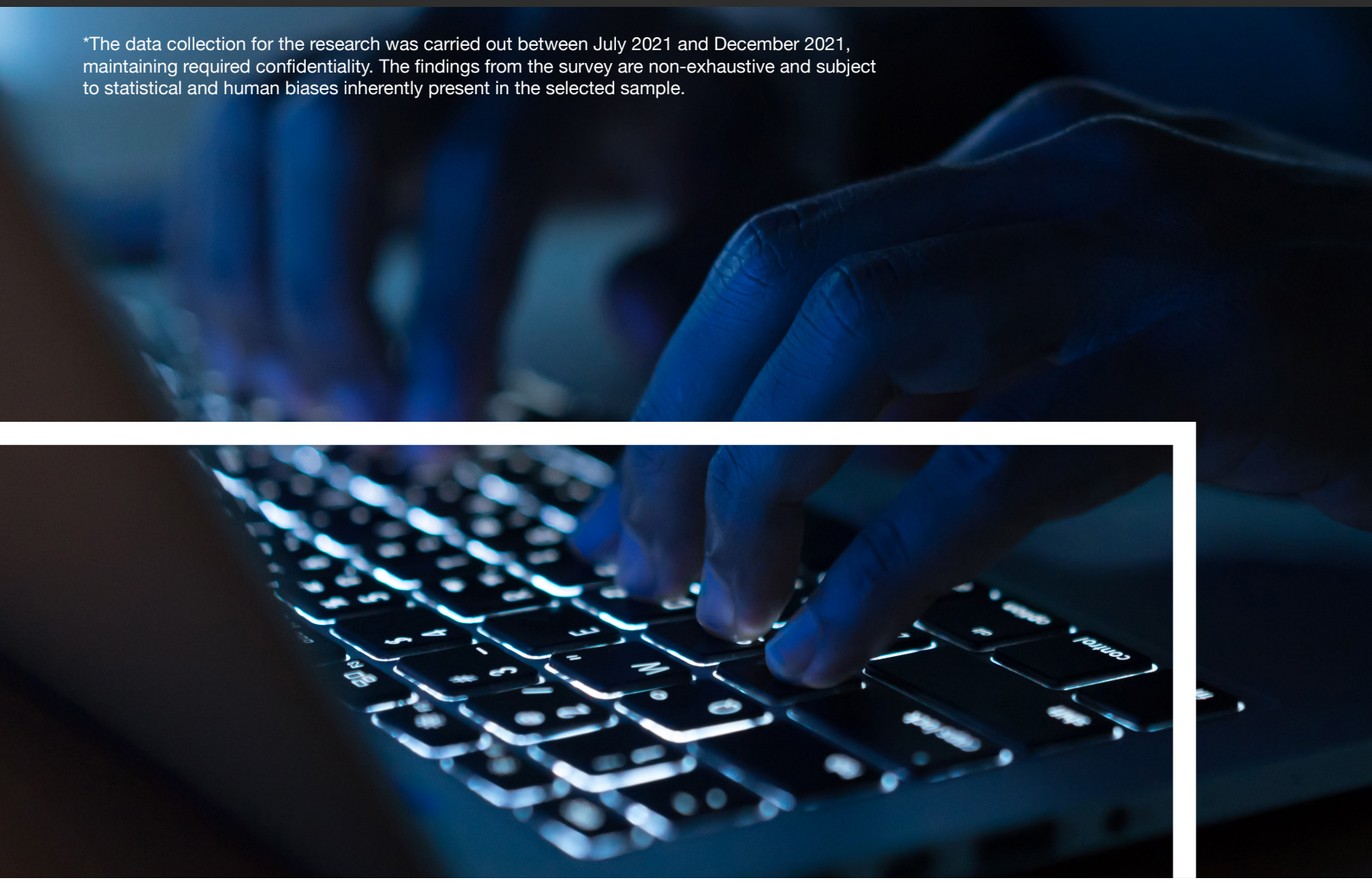
- adoption and implementation of AI
- hopes, challenges and apprehensions concerning AI
- the evolving global regulatory environment and its possible impact on the Indian market.

Our secondary research involved a thorough analysis of academic journals, industry reports and leading business publications. This resulted in the creation of a repository of 100+ AI use cases which were subsequently utilised to create benchmarks for the AI maturity framework.

The inside-out approach was rooted in our understanding of and experience with AI within our extensive client network of about 25+ financial institutions in India, AI functional experts within the PwC network across the world, and sectoral experts and industry veterans from FICCI.

Further, having tested our hypotheses using the data collected and the common areas between the two approaches, we created a roadmap for AI strategy, adoption, implementation, scale up and subsequent innovation.

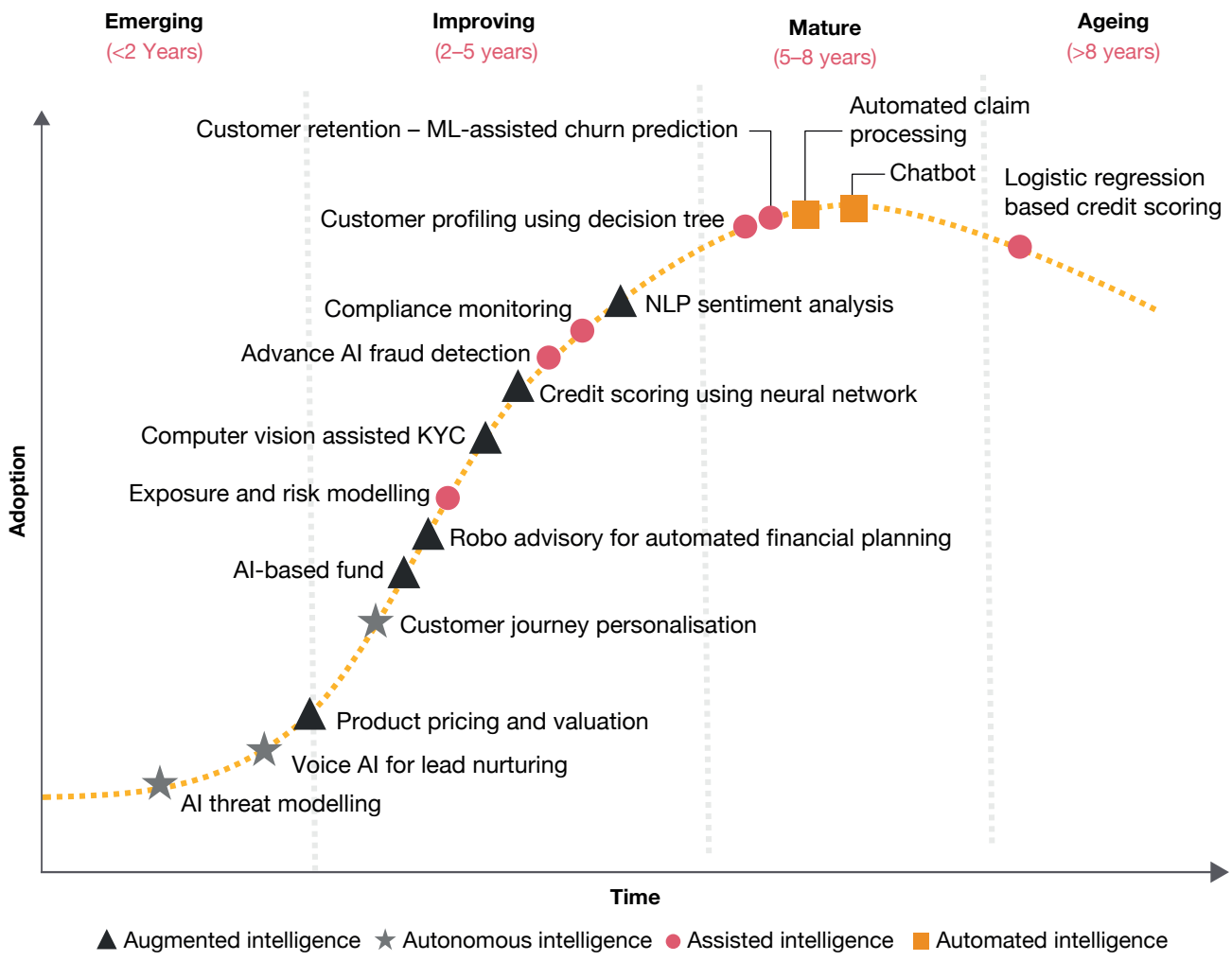
*The data collection for the research was carried out between July 2021 and December 2021, maintaining required confidentiality. The findings from the survey are non-exhaustive and subject to statistical and human biases inherently present in the selected sample.



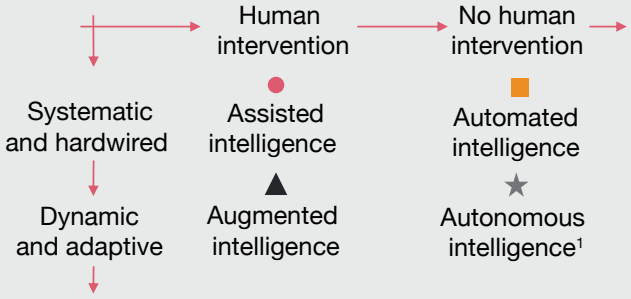


AI in the Indian FS industry:

A bird's-eye view



- The curve above categorises the AI landscape based on the level of AI adoption and the time required to achieve that adoption level in the Indian context.
- A noticeable feature of the above use cases is the positive correlation between level of adoption and timeframe. This is due to the adoption of highly effective and proven use cases globally by Indian FS organisations.



1 *https://www.pwc.com/gx/en/issues/analytics/assets/pwc-ai-analysis-sizing-the-prize-report.pdf*

The pandemic has accelerated the adoption of a few technologies like chatbots, computer vision and assisted video KYC to enable efficient servicing and onboarding of customers where corresponding offline functionalities were no longer accessible.

Using this multidimensional view tailored to the Indian FS industry, organisations can plan their timelines, estimate effort and prioritise the implementation of AI technologies. For example, the graph shows that customer journey personalisation is an emerging technology whose adoption is relatively low and driven by autonomous intelligence, while chatbots are being widely used by most FS players.

That said, the opportunity for AI to contribute substantial gains in productivity and consumption across the value chain is high, even in the case of seemingly mature technologies. For instance, though chatbots are widely used, few financial institutions are using the data collected by them to redefine up- and down-stream processes. Further, with the rise of AI, there are concerns about trust and accountability. Organisations globally are considering how they can fully realise AI's potential while addressing the potential risks. Governments are following suit, with emerging regulation on data privacy, accountability and explainability.

> At the industry level, market maturity for technology is being democratised, and open source AI stacks are made available for use.
>
> **Digital transformation head at a general insurance firm**





Deep dive into enterprise-wide AI sentiments

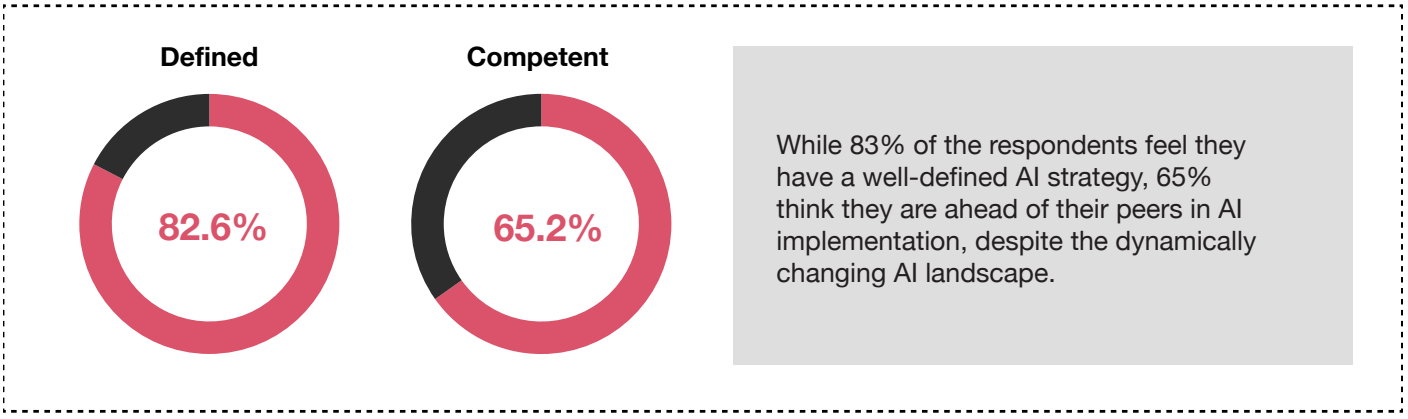
Insights from the Indian FS AI Adoption Survey 2021

We have consolidated the insights gathered through our research and inputs from experts across the Indian FS industry.

The report will address the following aspects:

- readiness of organisations to ride the current AI wave and benefit from it
- AI data architecture, sustainability of data infrastructure and data governance framework
- top business drivers for AI use cases
- perceived AI potential and the top five AI use cases in each FS industry sector.

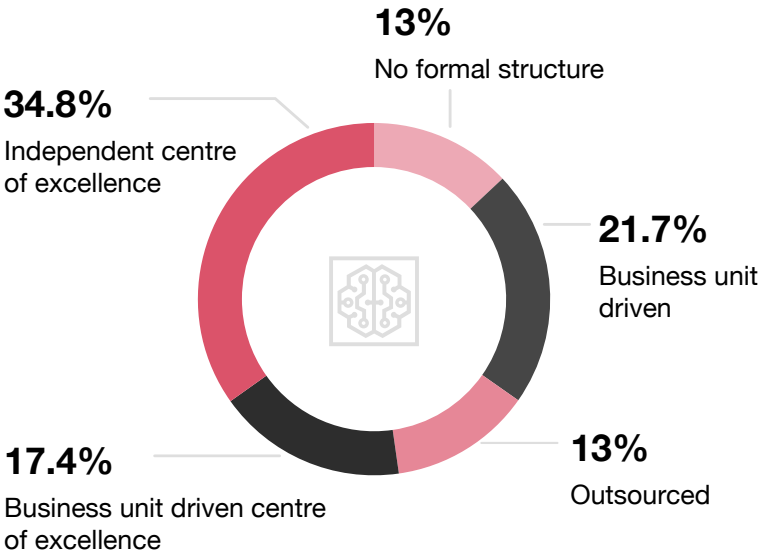
AI readiness check in the industry



While 83% of the respondents feel they have a well-defined AI strategy, 65% think they are ahead of their peers in AI implementation, despite the dynamically changing AI landscape.

Q: How well-defined is the AI strategy/roadmap of your organisation? Do you think you're ahead of your peer organisations in AI implementation?
Source: Indian FS AI Adoption Survey 2021

Where does AI fit within your organisational structure?



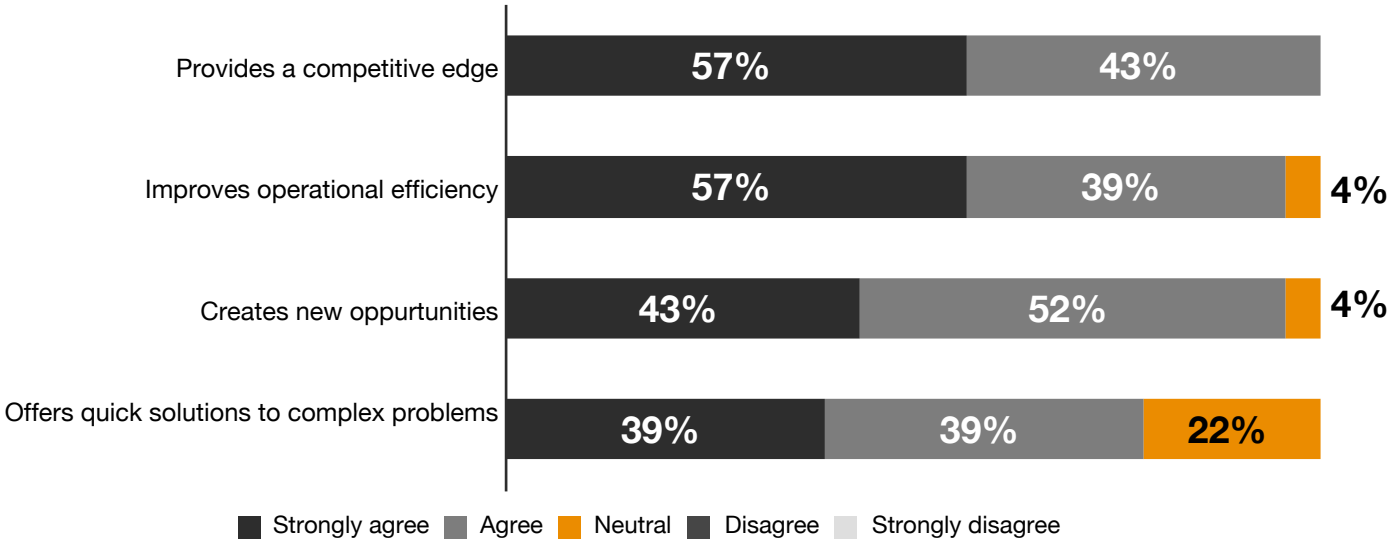
A small proportion of respondents (13%) is completely relying on vendor partners for AI-led innovations, while many large organisations have independent and BU-driven CoEs in collaboration with vendor partners.

BU-driven CoEs, generally in a small or mid-sized organisation, have small teams working under business functions such as marketing, sales and operations. They use AI to solve complex business problems.

Q: How is your analytics function organised throughout the organisation?
Source: Indian FS AI Adoption Survey 2021

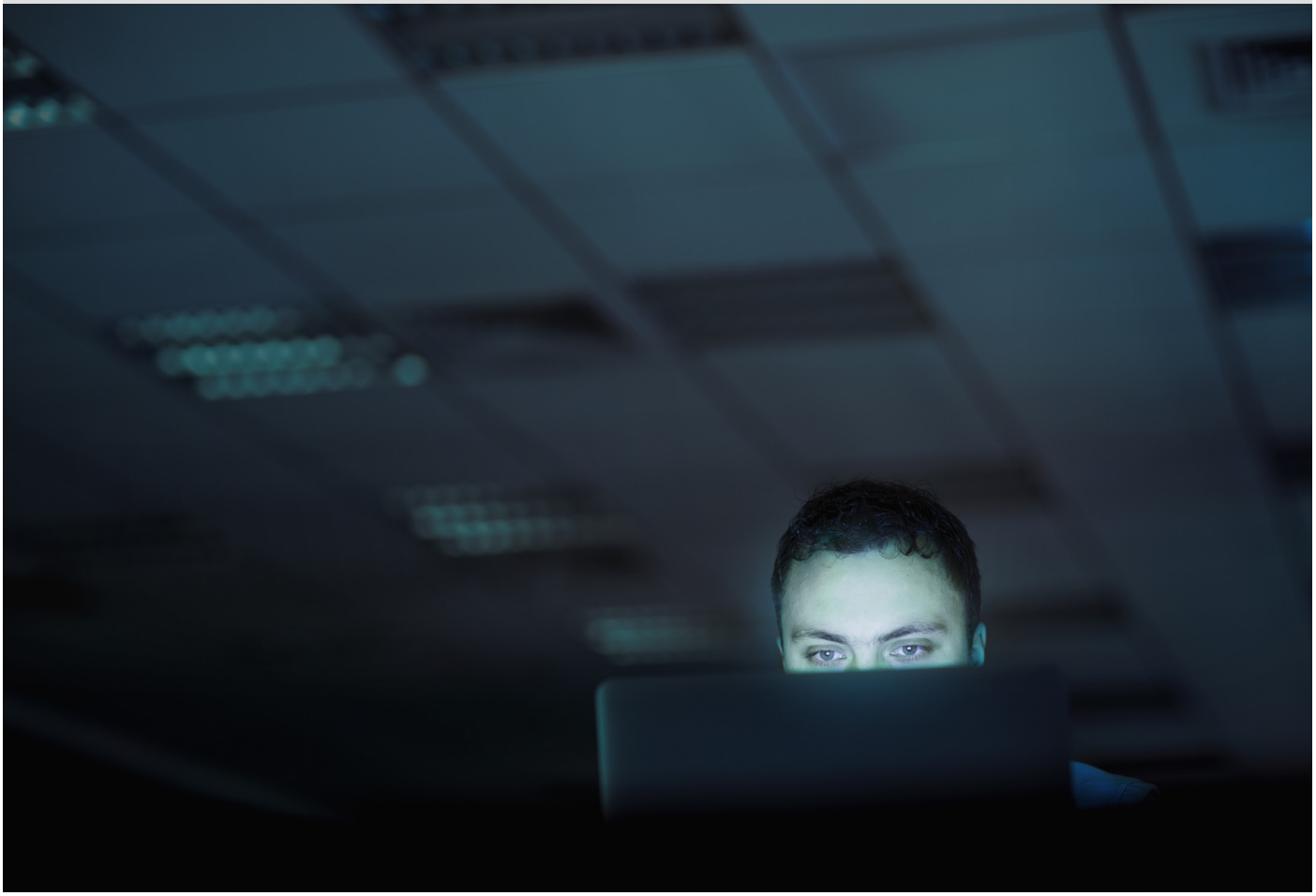


Potential of AI as perceived by organisations

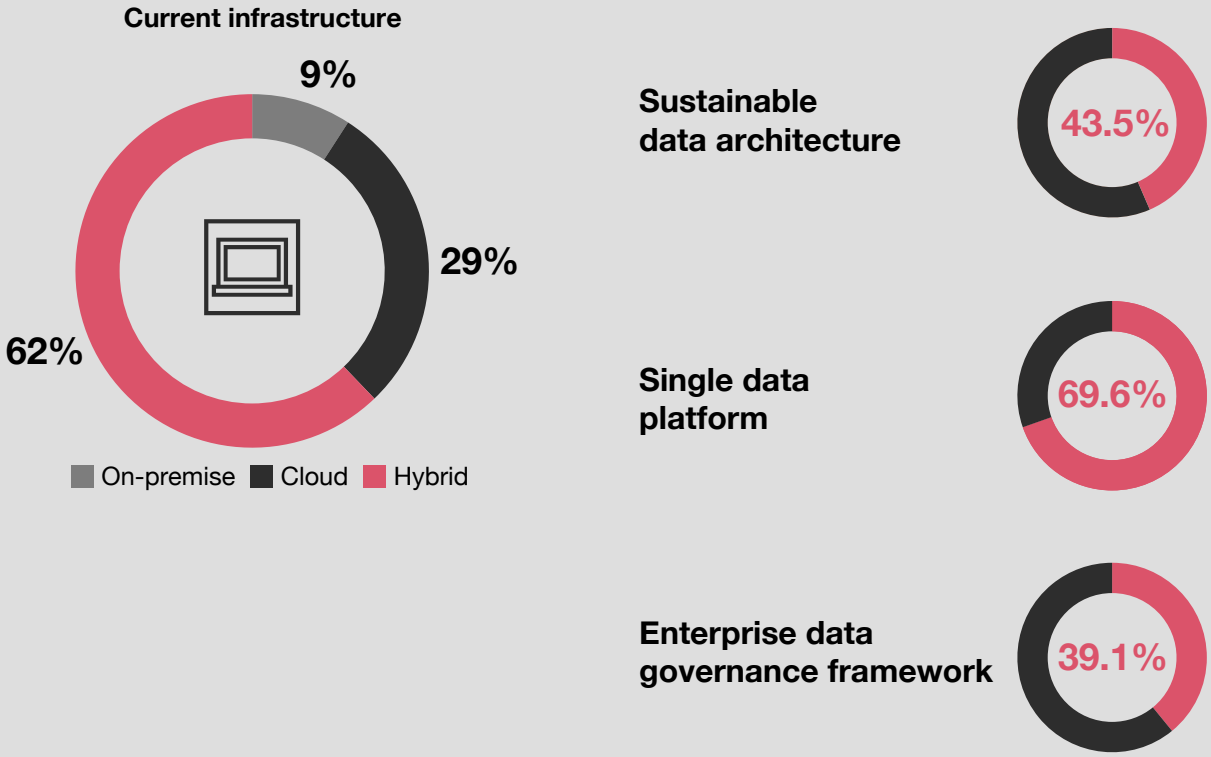


Q: Do you agree with the listed benefits of AI?
Source: Indian FS AI Adoption Survey 2021

Most survey respondents strongly feel that AI implementation in their organisation will give them a competitive edge and improve operational efficiency. None of the organisations denied the huge potential offered by AI in the FS industry.



How is the data architecture within FS organisations currently organised?

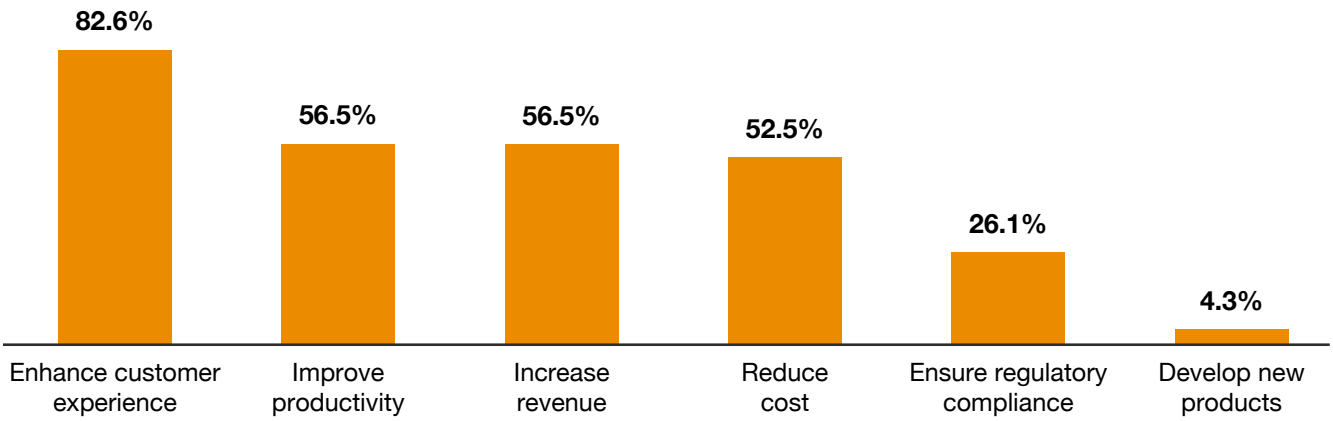


Q: What is the current stage of your data architecture? Is it supported through the cloud or on premise?
Source: Indian FS AI Adoption Survey 2021

Less than half the respondents think they are ready to scale up to meet business needs for the next five years. More than half the respondents say that they have a single unified data repository and almost 40% have an enterprise-wide data governance framework. Most organisations prefer a hybrid architecture for data storage as there is some hesitation towards advanced non-hybrid cloud architectures because of the current regulatory outlook.



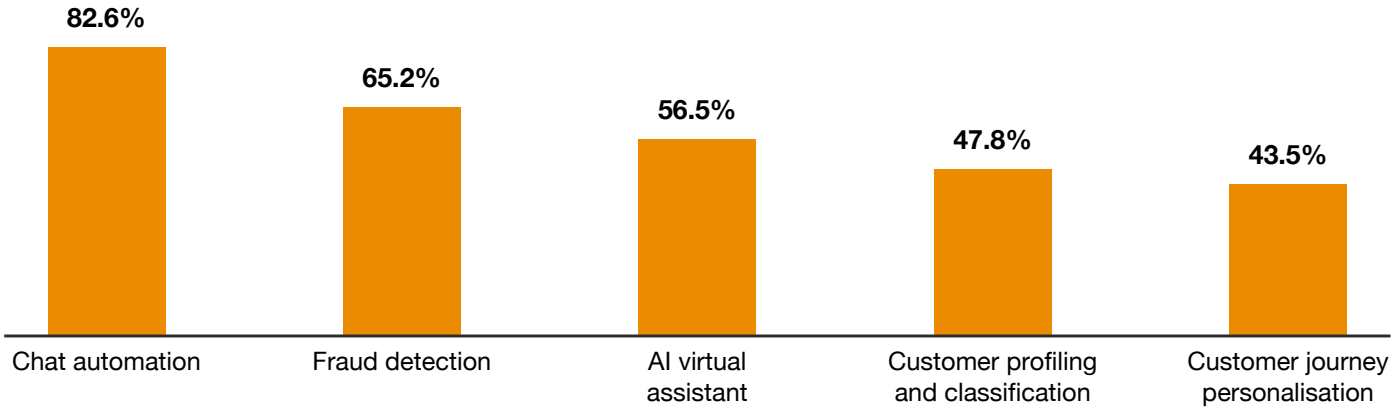
Top business drivers for AI-enabled use cases



Q: What are the business drivers you have tried to address through AI enabled use cases?
Source: Indian FS AI Adoption Survey 2021

According to our survey, **enhancing customer experience** is the top business driver for implementing AI. PwC's AI Predictions 2021 report[2] corroborates our finding at the global level. **Improving productivity** is the next important business driver for AI as proliferation of data has increased manual efforts dramatically.

Top five most implemented AI use cases across organisations



Q: List down all the AI use cases that have been implemented in your organization.
Source: Indian FS AI Adoption Survey 2021

AI's power to make sense of vast amounts of structured and unstructured data is empowering FS organisations. For retail firms, the capability to offer better experiences, products and services to consumers is important.

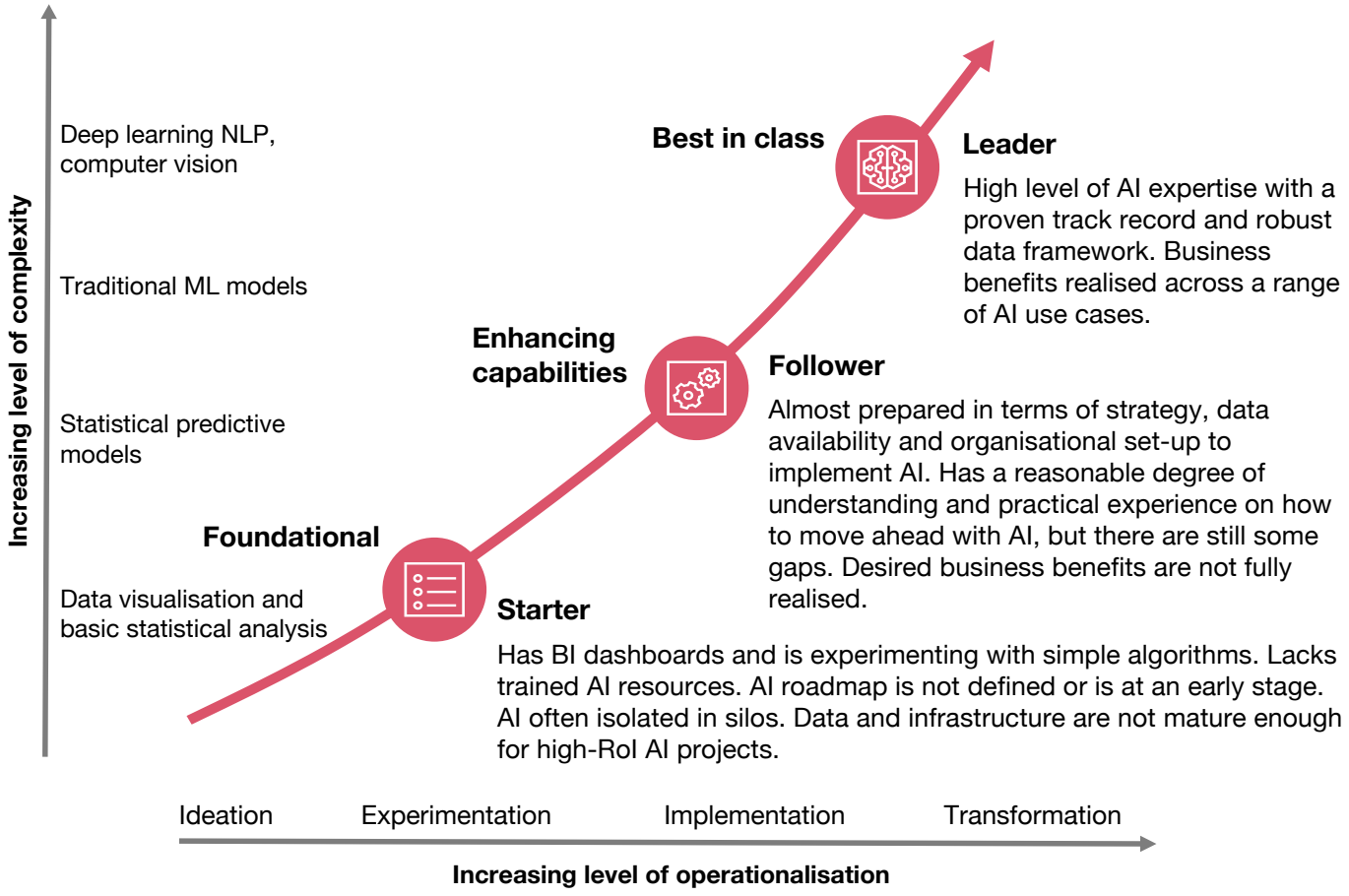
More than 80% of the survey respondents say that they have deployed chatbots to make customer servicing easy. Also, 65% of them have deployed fraud detection AI engines, making it the second most common use case in the FS industry.

2 https://www.pwc.com/us/en/tech-effect/ai-analytics/ai-predictions.html



AI maturity framework

Our AI maturity framework gauges the maturity of an organisation in terms of AI adoption along two dimensions – complexity/sophistication of AI algorithms being deployed and the degree to which AI use cases have been operationalised. Using this framework, organisations can be grouped under three categories: starters, followers and leaders.



The AI maturity drivers

- Enterprise-level AI plan and strategy
- Robust and sustainable data architecture
- Data governance framework
- Unified data console
- Ready list of AI use cases in the pipeline
- Evidence of success stories meeting RoI expectations
- AI CoE
- Reskilling and upskilling employees in AI/ML
- Planned AI investments for future
- Adopting new technologies through proofs of concept (PoCs)/first-mover advantage
- Internal and external data integration
- Centralised AI model deployment and integration
- Right AI talent identification and hiring
- Fairness, transparency and adaptability in AI
- Explainable and ethical AI practices



AI maturity framework

Ingredients for success

This table below highlights the state of success ingredients – i.e. vision and strategy, data, modelling, infrastructure, people, policies and processes – at the different levels of the AI maturity spectrum. It will help indicate the current state of AI in any organisation and its potential to grow.

Ingredients for success	Starter	Follower	Leader
Vision and strategy	Establishing the organisational vision and aligning both business and technical leadership teams on the need for a dedicated AI strategy Definition of desired business outcomes Planning AI investments with the help of PoCs to gain trust of CxOs	Adoption of champion/ challenger framework. Identifying larger objectives to integrate AI across the organisation Incremental increase in AI investments by gaining sponsorship from CxOs by demonstrating previous wins and RoI	Utilising the gained momentum to discover new avenues to achieve AI-based top-line and bottom-line improvements Integrating AI across the organisation for synergistic outcomes Triple the RoI by demonstrating leadership through first-mover advantage in new AI technologies
Data	Identifying the uniqueness, volume, accuracy or quality of data that is being sourced or generated by the organisation Understanding different data requirements to achieve desired business outcomes	Standardising data cleansing and consolidation across the organisation Consolidation of data with a focus on quality and efficiency Identifying technologies, processes or partnerships needed to acquire new data	Sustainable data platform – highly automated central data repository[3] Exploring new sources, both internally and externally, to find sources for actionable data Documenting proper data lineage through data catalogue and ensuring data privacy for effective data governance
Modelling	Determining use cases using simple AI experiments to achieve quick wins. Assessing the optimum mix of algorithm and technology to reliably achieve small objectives	Centralising deployment of AI models Introducing governance practices with supporting technology for monitoring AI model performance and adoption	Addressing innovation by introducing new tools and technological capabilities First-mover advantage with new and upcoming use cases
Infrastructure	Set up the initial infrastructure to carry out the required AI experiments and then scale up, as per need and new use case identification	Continue to streamline the current infrastructure by adding recent AI technologies and capabilities	Making existing infrastructure sustainable and scalable for the next 5–10 years with capabilities of adding upcoming AI tools and techniques
People, policies and processes	To develop long-term competency – developing and retaining talent is the key. Establishing a culture for AI learning among business teams, including leadership. Defining key performance indicators to actively monitor even the smallest of wins. Identifying risks associated with the currently adopted AI roadmap	Establishing a centre of excellence (CoE) Updating HR policies for new skills and roles required for AI. Incorporating both technical and non-technical AI skills into the learning curriculum and making these mandatory	Strong governance to define and state new paradigms for regulatory compliance Establishing a fully mature machine learning (ML) ops pipeline that can be rapidly deployed in production with continuous integration and continuous deployment capabilities

3 https://hbr.org/2017/05/whats-your-data-strategy



Sector view – use cases

Banking

Banking

Summary:

Banking is the pioneer in implementing and adopting all emerging AI use cases across the globe as well as in the Indian context.

AI applications are estimated to help banks make potential cost savings worth USD 447 billion by 2023.[4]

Emerging focus areas:

- Combating fraudulent practices
- Increasing compliance
- Providing 24/7 frictionless customer experience

Success stories

AI Maturity Index: 3.7/5

A leading private Indian bank has implemented predictive analytics through regression and decision tree models that use patterns observed in historical data to **identify borrowers with a high tendency to default** across segments.

An Indian bank has built more than five predictive collection models **to indicate high-risk cases**. This is to support the collection department in **prioritising its efforts**.

An international conglomerate helped a large Indian bank leverage AI **to detect lifecycle and macroeconomic events** for small and medium businesses. This was used to curate unique personalised experiences through customer profiling and micro segmentation.

4 https://www.businessinsider.in/finance/news/the-impact-of-artificial-intelligence-in-the-banking-sector-how-ai-is-being-used-in-2020/articleshow/72860899.cms

Sector view – use cases

Insurance, NBFCs

Insurance

Summary:

In PwC's AI Predictions 2021 survey,[5] among insurers who have already invested in AI, nearly half have improved their decision making. About two-thirds reported success in using AI to create a better customer experience (CX).

Emerging focus areas:

- Customising product offerings
- Increasing customer engagement and upselling
- Automating claims processing
- Enhancing fraud detection and categorisation
- Sophisticated property and actuarial analysis

Success stories — AI Maturity Index: 3.35/5

An Indian firm, in partnership with a tech giant, has launched AI-based services for auto insurance activities like **new policy generation, renewal and claims inspection**. They use AI and ML to analyse user-uploaded vehicle images for damage.

An Indian InsurTech company provides AI-powered solutions for insurance companies. After integration with an insurer's systems, its solution can undertake **claim analysis and fraud detection** using a highly accurate AI decision engine.

An Indian insurance firm has introduced an **AI-powered video streaming application** for simplifying claims processing for damaged vehicles in real time. The firm has launched an **AI-based pre-approval feature** which is currently processing 30% of its pre-authorisation approvals for health insurance.

NBFCs

Summary:

NBFCs have been steadily gaining prominence and visibility in the Indian financial ecosystem. AI is helping NBFCs to deploy new credit and grow exponentially.

Emerging focus areas:

- Collection analytics
- Credit scoring
- Customer churn reduction
- Fraud detection and risk mitigation

Success stories — AI Maturity Index: 3.27/5

A non-deposit taking NBFC in India uses non-traditional data points such as GST data, mobile data, product interaction data and social data in combination with ML techniques **to evaluate the creditworthiness** of applicants.

An Indian automobile finance company used collection analytics **to streamline its collection process**. Using data points such as gross amount owed and contact attempts, an ML model was trained to identify a debtor's propensity to pay.

An India-based NBFC developed ML-based gating models **to identify residual profitability** of customers who are at risk of leaving and targeted them with AI-driven cross-sell and upsell offers, leading to increased retention.

5 https://www.pwc.com/us/en/tech-effect/ai-analytics/ai-predictions.html

Sector view – use cases

Asset and wealth management

Asset and wealth management

Success stories

AI Maturity Index: 2.7/5

Summary:

Asset and wealth management relies heavily on data to offer the best customised solutions to its customers. In the Indian context, even though chatbots find wide application in offering personalised advice to wealth management customers, sometimes the human touch becomes important for high net worth individuals with vast portfolios. AI supports wealth managers by helping them save time on operations, understand customers and mitigate risks.

Emerging focus areas:

- Real-time optimisation of sales and marketing functions
- Bots for fund managers and research analysts

AI-enabled digital advertising was launched by an Indian mutual fund which displayed the contact details of the relationship manager geographically closest to the person watching the advertisement by using device location information.

Several quant hedge funds and mutual funds are using AI to enhance the way they analyse securities and make investment choices.

An Indian firm has developed a **natural language processing (NLP) based sentiment analysis tool** which extracts the news and social sentiment from text. This can be used as an input while taking investment or trading-related decisions.



Sector view – use cases

Payments

Payments

Success stories

AI Maturity Index: 2.5/5

Summary:

By 2025, digital payments in India are expected to account for 71.7% of all payment transactions.[6] This growth has been expedited by the continuous emergence of new AI technologies, payments products/processes, launch of disruptive market competitors and regulatory interventions, among other factors.

Emerging focus areas:

With the size and volume of digital transactions growing and a continuous rise in fraudulent activities, the use of AI technology becomes increasingly important. A few of the areas in payments where AI can help involve

- ensuring frictionless and theft-free successful transactions
- improving customer experience
- onboarding people to digital platforms
- increasing digital literacy
- curbing fraud and other transactional risks.

How we determined the AI Maturity Index:

We used a 15-point list for AI maturity (AI maturity drivers) and rated all the participating organisations based on their responses to the survey (conducted anonymously). Finally, we created an industry-wide view by consolidating the ratings we arrived at in the first step. The score out of five is based on global benchmarking standards.

This method is used solely to fit the purposes of this report. We are aware that human and other biases may be involved as the methods used to collect responses were surveys, in-depth interviews and other secondary research findings.

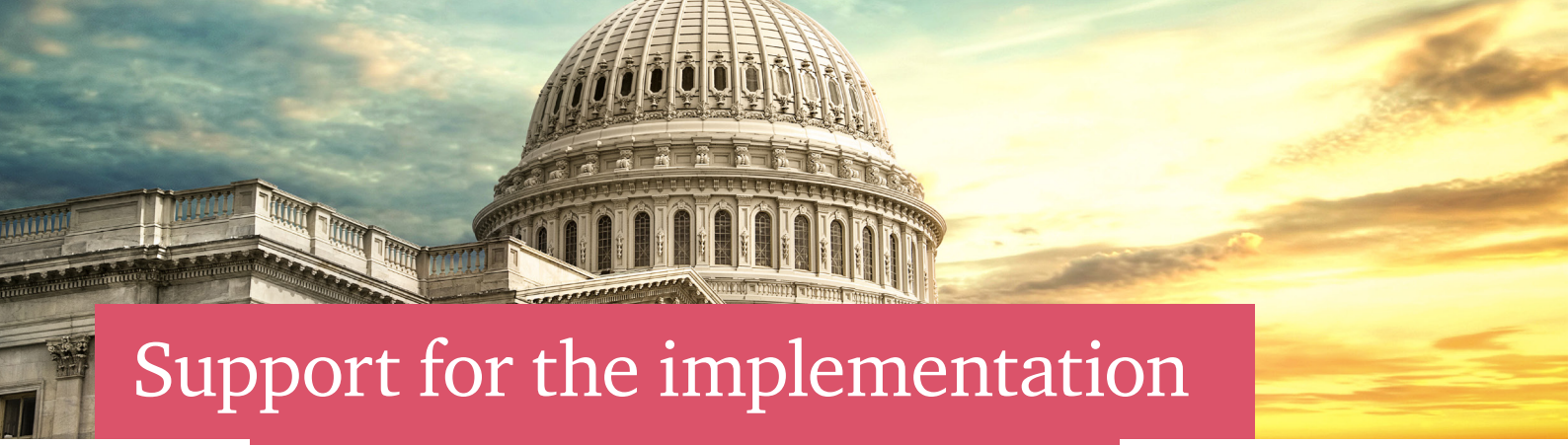
A payment app uses AI and fraud prevention technology **to identify suspicious transactions in real time**. To protect customers from fraudsters, it uses security measures based on AI

An AI-driven solution from a payment gateway solution **flags risky and fraudulent orders** in milliseconds by analysing 300+ parameters and provides detailed reasons, thus reducing potential order cancellations and return-to-origin (RTO) orders.

To address the issue of payment failure, a payments company that also runs its own payment gateway vertical has launched an AI-**powered routing engine** to dynamically route transactions.

> Our AI CoE is always on the lookout for use cases, using many open source and in-source platforms. Issuing of FASTags and settlements requiring the use of AI (vehicle scanning) have been implemented by us. Inward check clearing involving signature verification (single, dual) is being done through AI. Other use cases like credit decisioning, KYC and chatbot have already been done.
>
> **Executive VP and IT head of a major private bank**

6 *https://www.livemint.com/news/india/digital-payments-in-india-to-account-for-71-of-all-payments-by-2025-report-11617193269439.html*



Support for the implementation of AI: US, UK and India

Governments across the world have realised how AI is shaping the future and the significant role it will play in the economic development of various countries. To this end, regulatory bodies and policymakers are assessing a variety of regulations, laws, principles, frameworks and risks before laying down the foundations for the development of an AI framework. The areas of interest include risk appetite, leadership engagement and oversight, management and reporting structures, compliances and assurance capabilities, policies and procedures, documentation and audit trails, and training and awareness. Furthermore, AI-specific risks such as fairness and transparency in profiling, cybersecurity, accuracy, fully automated decision-making models and impact on public rights are some of the critical domains that need to be studied thoroughly by policymakers prior to passing any enactment.

Country	US	UK	India
Vision for AI	The US Federal Government's AI R&D Strategic Plan defines a long-term coordinated effort for increasing industrial productivity, improving quality of life and strengthening national security.	The UK national government aims to propel the country to global leadership in AI, big data, clean energy and self-driving vehicles. The Sector Deal and Industrial Strategy Challenge Fund have outlined a support package of GBP 2.65 billion to harness big data and AI.	The Indian government aims to become the global leader in AI ensuring responsible and transformational #AIforAll with a special emphasis on the promotion of research, skilling and reskilling, responsible AI and increased AI adoption.
Government initiatives and investments	The National AI Initiative Act of 2020[7] identifies five key areas of effort: AI R&D investment, Federal support, defining AI standards, training AI workforce and international engagement. The act also includes the following: • USD 6.5 billion funding over five years for AI R&D, education and standard generation • AI application framework by coordinated efforts of NASA, National Science Foundation (NSF) and Departments of Commerce, Defense and Energy • establishment of an AI Research Institute at NSF for AI innovation projects.	The UK's Industrial Strategy (2019)[8] outlines the roadmap for an economy that improves productivity with policies framed on business environment, infrastructure, people, ideas and locations: • Increase total R&D investment to 2.4% of GDP by 2027. • Invest GBP 113 million to boost AI application in service sector, nuclear energy and deep mining. • Develop a global Turing AI Fellowship Program to attract the best research talent in AI. • Establish AI Council and Office of Artificial Intelligence to create an AI strategy and oversee the implementation.	The Union Budget 2018 doubled its past allocation to the Digital India initiative (USD 480 million or INR 3,703 crore) for the growth of digital technologies.[9] • The Ministry of Commerce and Industry set up the AI Task Force to create a roadmap for AI use; the task force outlined 10 key domains of AI application for India's socio-economic development. • NITI Aayog chalked out an 'AI for All' strategy – focused on leveraging AI for inclusive growth aligned with the Government's aim of development for everyone. • Other proposed initiatives included AI application in the education, defence and agriculture sectors.

7 *https://www.congress.gov/116/crpt/hrpt617/CRPT-116hrpt617.pdf?__cf_chl_jschl_tk__=RVrNlDkMibyNf_UKuMlkkZCeUMh7MS6UQ1ESn4GV6Co-1639393705-0-gaNycGzNC2U#page=1210*

8 *https://www.gov.uk/government/publications/artificial-intelligence-sector-deal/ai-sector-deal#key-commitments*

9 *https://www.idrbt.ac.in/assets/publications/Best%20Practices/2020/AI_2020.pdf35 https://institute.global/sites/default/files/2020-01/Israel%20Case%20Study%20Web%20reduced.pdf*

US	UK	India
US Federal Reserve 'Existing regulatory and supervisory guardrails' is the AI approach to begin with.[10] 'Maker-checker' type control must be implemented to ensure unbiased outcomes from the models. 'Principle of proportionality' should be applied with caution so that the models are well-trained without bias. Data should be made available in a consumable format; data access control over all sources is critical. **Commodity Futures Trading Commission (CFTC)** The CFTC has adopted the narrow set of Electronic Trading Risk Principles, which focus on: • exchange rules and control to prevent, detect and mitigate market disruptions and system anomalies 10 associated with electronic trading • implementation of pre-trade risk controls to prevent, detect and mitigate such disruptions and anomalies • notice to the CFTC of significant disruptions to electronic trading. **Financial Industry Regulatory Authority (FINRA)** • FINRA has implemented AI and ML in its market surveillance operations, noting its ability to enhance the detection of market manipulation and collusion.[10] • In April 2019, FINRA created the Office of Financial Innovations (OFI), designed to co-originate issues related to significant financial innovations – particularly the use of FinTech. • FINRA advises firms to ensure that its written supervisory procedures regarding AI-based tools and services are regularly updated and tested.	**General Data Protection Regulation (GDPR)** Lawfulness, transparency, fairness, purpose limitation, accountability and accuracy are key principles for the processing of personal data.[11] Has established an extensive legal framework for any organisation processing personal data, including provisions for automated processing. Safeguards against many of the standard issues. **Centre for Data Ethics and Innovation (CDEI)** The CDEI was established to advise the Government regarding AI regulations, the focus areas of which are as follows: establish a trustworthy way to access data since it is a considerable barrier to responsible innovation[11] leverage the huge opportunity for the public sector to use data to better serve citizens[12] develop an ecosystem for AI assurance product and services, as well as lead globally on the governance on AI. **Information Commission Officer (ICO)** The ICO has issued guidance relevant to public standards and AI through its auditing framework. The ICO, as the UK's data protection regulator, is currently looking at how GDPR applies to AI. Their conclusions will form a substantive part of the UK's regulatory landscape of AI.	In India, the **Reserve Bank of India (RBI), Securities Exchange Board of India (SEBI) and Insurance Regulatory and Development Authority of India (IRDAI) –** which oversee the Indian banking system, securities markets and insurance and reinsurance sectors, respectively – have considered a 'regulatory sandboxes' approach towards the use of emerging technologies like AI and blockchain. **US–India AI initiatives:** The Indo-US Science and Technology Forum has launched an AI initiative for sharing ideas, learning, experience and identifying new opportunities in research and development. National Research Foundation: An autonomous body has been established under the National Education Policy to boost AI research in various segments. Funds amounting to INR 50,000 crore have been allocated to encourage AI-related research. Data Protection Bill: India is yet to implement a data privacy law. The Data Protection Bill (formerly the Personal Data Protection Bill) is under consideration by a Joint Parliamentary Committee (JPC). Account Aggregator (AA) ecosystem 'Sahamati': The Indian Government has launched the AA network, a financial data-sharing architecture that may transform credit and investment. It would give millions of customers better access and control over their financial information and expand the potential pool of customers for FinTech and lending companies.[13] The AAs themselves are data blind and can neither read nor resell customer data. However, they can ensure the transfer of a customer's financial data such as bank statements, tax data, pensions data and securities data from one institution to another after obtaining consent from the customer.

10 https://www.globallegalinsights.com/practice-areas/ai-machine-learning-and-big-data-laws-and-regulations/usa#chaptercontent6

11 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/868284/Web_Version_AI_and_Public_Standards.PDF

12. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/999259/Centre_for_Data_Ethics_and_Innovation_-_Two_year_review.pd

13 https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1753713



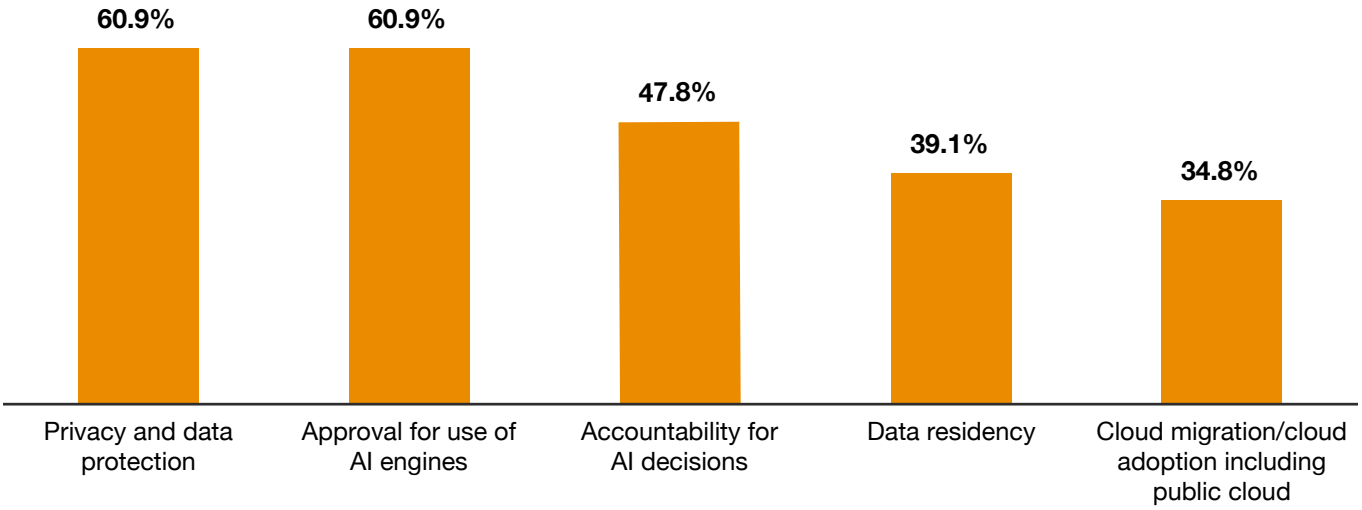
Industry's voice on the Indian AI regulatory outlook

Although there is an ever-growing demand for AI technologies such as chatbots, voicebots and videobots in the Indian banking, financial services and insurance (BFSI) landscape, there is still a need for greater clarity around 'explainability', 'fairness', 'transparency', 'accountability', 'provability' and 'accessibility' in relation to AI. These aspects need to be addressed from both the technology regulation and legal standpoint. In 2018, the Government of India appointed NITI Aayog to lead the laws governing AI in India, covering ethical and system considerations. However, the current law infrastructure is at a nascent stage and does not address the implications of:

- biased data outcomes
- sharing of sensitive or personal data/information
- not taking responsibility in the case of an accident involving human/property losses
- AI model and outcome transparency
- AI robots and their eventual rights (citizenship, licences, etc.)
- intellectual property rights (IPRs), copyrights, competition laws and patent credits, etc.

The adoption of technologies across the world is unprecedented. However, the pace at which policymakers should set rules and regulations is lagging because the contours of the application of AI are still undefined. Implementers must have a self-governed, self-regulated and self-audited framework in place to avoid any violation of laws. The framework can be developed by making use of the following elements: defining the problem scope, unbiased data collection, proper data labelling, data processing, training, deployment and dynamic evaluation.

Major regulatory concerns



Q: Which of the above areas needs most clarity in terms of regulation?
Source: Indian FS AI Adoption Survey 2021

Responsible AI (RAI) is one of the ways to mitigate risks. To this end, most companies are ensuring ethical, fair, transparent, human-centred and accountable practices with the help of RAI frameworks. According to PwC's AI Predictions 2021 survey, 75% of the companies have some formal or ethical guidance in place for AI, and 1 in every 5 companies have a proper ethical framework.[14] RAI must cover various dimensions including data and AI ethics, policy and regulations, bias and fairness, explainability, privacy, security, robustness, safety, governance, compliance and risk management.

In a recent AI act passed by the EU, a set of critical guidelines was set up for all industries to ensure technically robust, ethically sound and legally binding AI products.[15] A sophisticated 'AI product framework' has been put in place that identifies four risk categories whereby stricter requirements are imposed on high-risk AI systems through a mandatory CE marking process. A committee called the European Artificial Intelligence Board oversees the implementation of high AI standards in pre-market checks, in order to protect customers' rights and integrity.

Similar frameworks and oversight that encompass all the industries in India and identify various risk categories, subsequent standardisations and protective measures might help guide through the grey areas of current AI implementations.



14 https://www.pwc.com/gx/en/issues/data-and-analytics/artificial-intelligence/what-is-responsible-ai.html

15 https://law.stanford.edu/publications/eu-artificial-intelligence-act-the-european-approach-to-ai/



Key challenges and associated solutions for AI technologies

1. Privacy and security

Data is the new oil that feeds the AI algorithms, and with this new oil come the concerns of data privacy and data security. Although these challenges have been present since the inception of information technology, the amount of data that is needed by AI algorithms makes them even more challenging when implementing AI solutions.

AI systems pose a unique set of challenges with regard to data security. In addition to attacks aimed at extracting the data used by AI algorithms, hackers can carry out adversarial attacks to confuse/manipulate the AI systems to their advantage. For example, researchers have demonstrated that even if an AI system is trained on a few thousand images, a carefully placed pixel in an image can fundamentally alter its perception by the AI system, leading to a false prediction.[16] Hence, AI algorithms need to be tested for these types of attacks to ensure their robustness before being deployed into production.

Customers must make a voluntary trade-off between greater privacy and customised service. Those that highly value their privacy will be giving less data points to the AI models, resulting in less customised (and more general) service. Comparatively, customers that consent to the sharing of private data will enjoy a more personalised service experience.

2. Lack of integration

Legacy systems are still used extensively in financial institutions. Due to the limitations on the volume, variety and velocity of data these systems can handle, they are not well suited to be used directly in AI applications.

For AI models to provide value to such businesses, these models must be incorporated into new or existing applications by application development teams. These teams, however, in most cases, are already overloaded. The challenges are even greater if the applications are managed by different vendors. Moreover, most of the web development done for organisations is also not AI friendly.

16 *https://arxiv.org/pdf/1710.08864.pdf*

AI and cybersecurity

Even though it may seem that AI is the perfect solution to every problem, it is a double-edged sword, which if not handled carefully could lead to improper judgment and security incidents.

The implementation of AI provides newer attack surfaces and exposes systems to new ways of exploitation and abuse by malicious attackers. These attacks are targeted at the confidentiality, integrity and availability of the AI system.

- **Attacks on confidentiality:** These are in form of inference attacks that target the confidentiality of an AI system in order to uncover crucial details. This information then can be used to plan a more targeted attack. Inference attacks can take the following forms:
  - inferring training attributes
  - inferring data used in training
  - inferring the algorithm itself.
- **Attacks on integrity:** These attacks aim to alter the trustworthiness of an AI system. These could take one of the following two forms:
  - adversarial or mutated inputs at the time of testing or production
  - data poisoning attack.
- **Attack on availability:** These attacks involve
  - taking control of the model with adversarial reprogramming and making it function in a completely different manner than intended
  - attacks by malicious actors, who themselves are using AI, regardless of whether or not an organisation does
  - attacks with minimal manual effort and with more speed, precision and accuracy.



3. Operationalisation and maintenance

ML models, which are developed by the data scientists, constitute a small portion of the production deployment workflow of an enterprise. In order to operationalise an AI model, data scientists need to collaborate closely with other teams such as engineering, operations and business. This leads to organisational challenges in terms of ensuring proper collaboration, coordination and communication amongst all the stakeholders.

Steps such as data procurement and data cleansing are highly manual in nature, and take up a significant amount of time of data scientists who should instead be working on developing and testing new algorithms. Therefore, the automation of such tasks will enable them to work on high value-added activities.

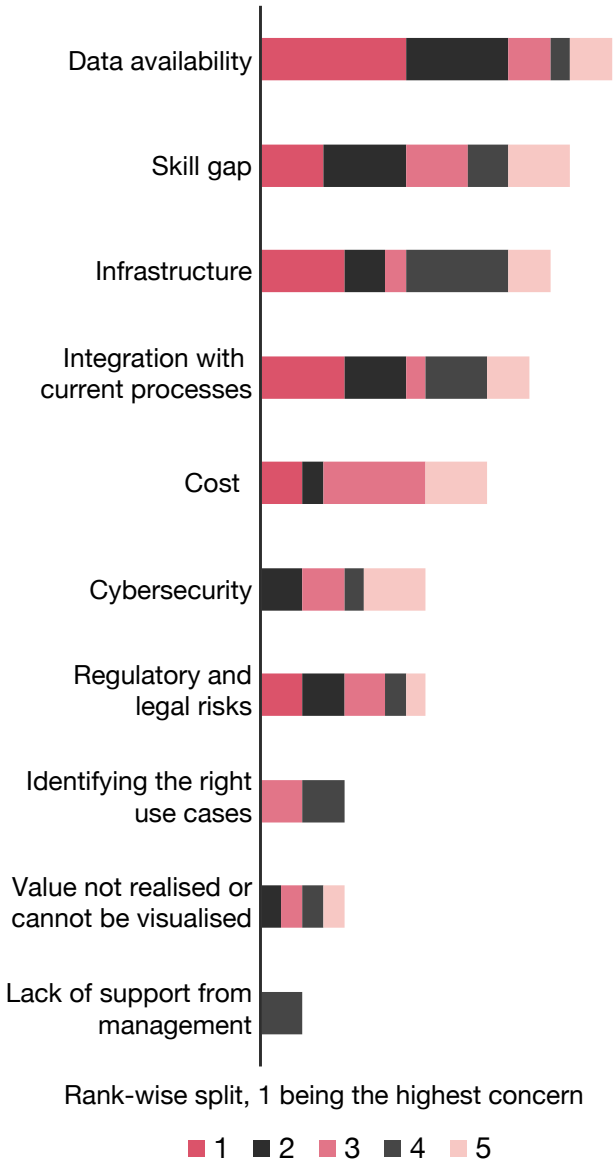
Under data readiness, choosing the 'right data' takes precedence over the 'volume' of data, whereby accurate results can be gathered through the right kind of limited data as well.

AI models need to undergo an extensive process of testing and validation, model packaging, production deployment and ongoing management. However, most organisations are not yet prepared to facilitate this.

Inherently, ML algorithms are designed to solve specific problems, and the model cannot deviate from the objective it is built to achieve. For example, an algorithm developed to identify suspicious payment activity will not be able to detect suspicious behaviour related to trading transactions.

Hence, given the ever-evolving and dynamic nature of financial institutions and the regulations governing them, it is imperative that the algorithms are regularly fine-tuned to adapt to the changing requirements. This also brings forth the need for a more general AI that is capable of resolving the different use cases through a single adaptable algorithm.

Critical hurdles to AI adoption



> Shortage of good quality data scientists, end-to-end deployment of solutions, adoption and RoI are some of our major challenges. Also, we cannot invest in AI InsurTech start-ups due to regulatory policies. Enabling such partnerships will be useful.
>
> **Business intelligence VP at an insurance firm**

4. Skill sets and talent

Organisations often find themselves lacking the necessary skill sets required to implement AI initiatives. Skill gaps are one of the major challenges faced by organisations, irrespective of their maturity level in AI adoption.

In June 2020, a report[17] from LinkedIn noted that the COVID-19 crisis had cooled off the demand for AI skills. However, months later, companies are struggling to find relevant AI personnel because of increased AI adoption[18] in 2020. Gartner predicted[19] that through 2022, 85% of the AI projects will deliver erroneous outcomes – skill gaps were one of the major reasons for this.

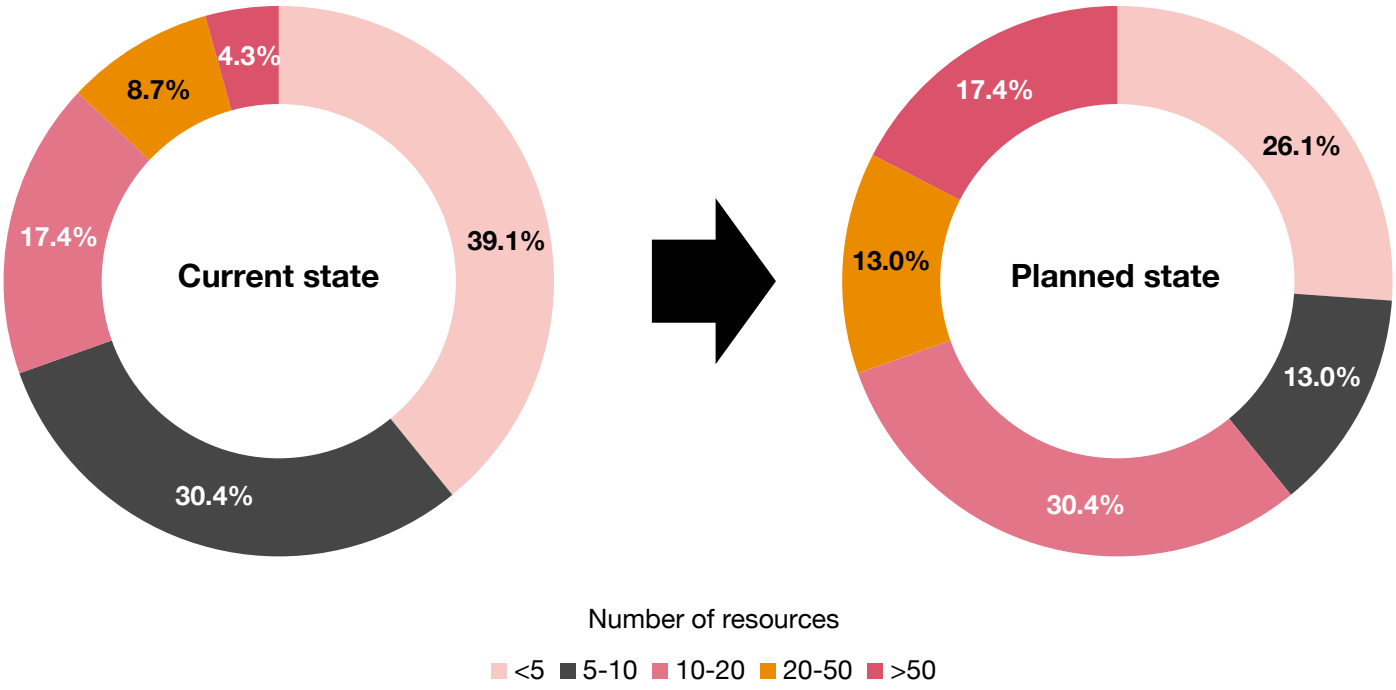
To overcome this challenge, organisations first need to identify the specific skill sets that are required for AI implementation. The major skills required for AI implementation are project management, business analysis, data science, data engineering, domain expertise, user interface (UI) designing, software development and change management. While this list may not be exhaustive, these functions are crucial for any AI implementation project. However, additional skills may be required, depending on the project.

The next step would be to decide whether the skills can be developed in existing employees through training, or if there is a need to recruit outside talent. Companies should encourage their employees to upskill and take on more relevant roles, such as those of data scientists and AI specialists. An increasing number of organisations are turning to developing in-house AI professionals through training,[20] encouraging their employees to use AI in their jobs.

Moreover, an organisation should strive to fill skill gaps using diverse sources such as experienced hires, university hires and by relying on partners and vendors. The business talent in the organisation should also be trained in the concepts of AI. This ensures that the organisation undertakes only the AI initiatives that have a high business impact.

Dedicated resources for AI-driven initiatives and research

Resources planned for the next two years



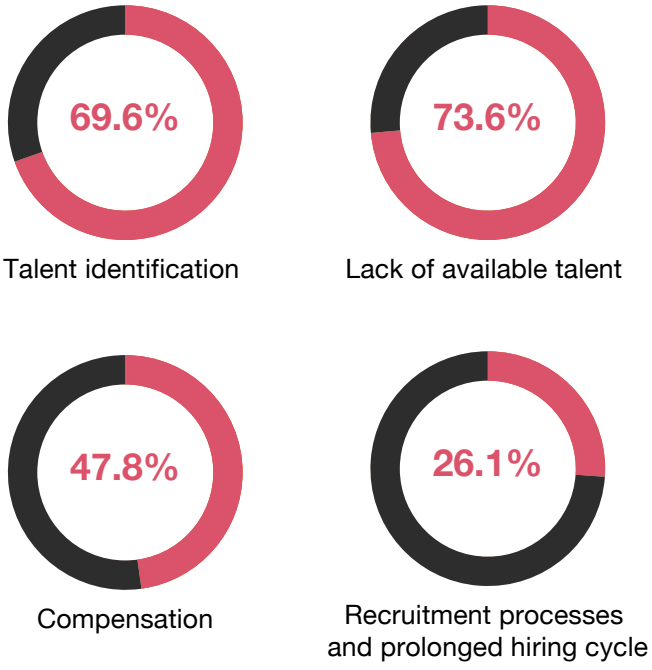
17 *https://www.linkedin.com/pulse/after-us-covid-19-outbreak-ai-job-growth-slows-zhichun-jenny-ying/*

18 *https://www.zdnet.com/article/artificial-intelligence-skills-shortages-re-emerge/*

19 *https://www.gartner.com/en/newsroom/press-releases/2018-02-13-gartner-says-nearly-half-of-cios-are-planning-to-deploy-artificial-intelligence*

20 *https://www.zdnet.com/article/artificial-intelligence-skills-shortages-re-emerge/*

Challenges related to the AI talent pool

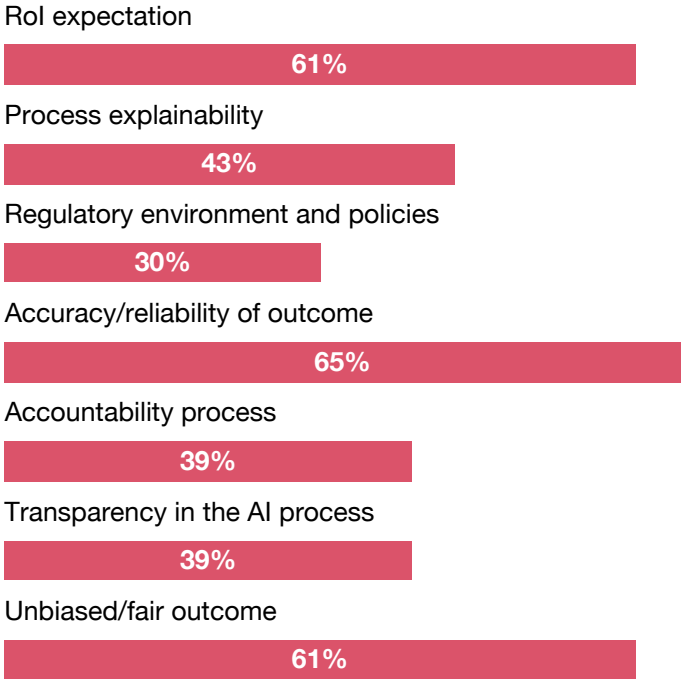


Q: What are the challenges in hiring/expannding AI talent pool?
Source: Indian FS AI Adoption Survey 2021

Indian FS organisations are facing challenges with the **identification and availability of talent** and determining the precise or desired **compensation** for the hiring of AI professionals.

Responsible and explainable AI

High level of comfort with respect to the following AI decisions



Q: With respect to AI decisions how comfortable are you with the following?
Source: Indian FS AI Adoption Survey 2021

5. Explainability of AI models

A major problem with AI is that it is quite complex. AI is based on algorithms, and people who are not familiar with these algorithms might find it difficult to grasp the functioning of AI-driven decision making. This lack of understanding may lead to apprehension regarding AI among employees. For example, banks use simple algorithms that are based on linear mathematics, such as linear/logistic regression, which are easy to interpret and make it possible to explain how the algorithm works – from input to output. This explainability creates a sense of trust. However, in general, AI has failed to gain widespread acceptance. A solution to this problem would be to make people understand how this technology really works. Organisations working on AI-based products should be able to clearly demonstrate what business outcomes are achievable using AI techniques. There also exists a trade-off between accuracy and explainability of the model – models with higher accuracy are generally highly complex, while better explainable models are expected to be simple by design. Thus, prioritising and striking a balance between the two also becomes necessary.

6. Financial roadblocks

Budget constraints are one of the primary factors slowing down the adoption of AI in FS. As a result, leading financial institutions are planning to increase their investments in AI-led projects to achieve better outcomes. A study conducted by the Economist Intelligence Unit[21] revealed that 86% of FS executives plan to increase their investment in AI over the next five years, with those from the Asia-Pacific region (90%) and North America (89%) most inclined towards doing so. Higher investment in AI algorithms, together with system upgrades, would help solve issues related to legacy systems and increase their efficiency.

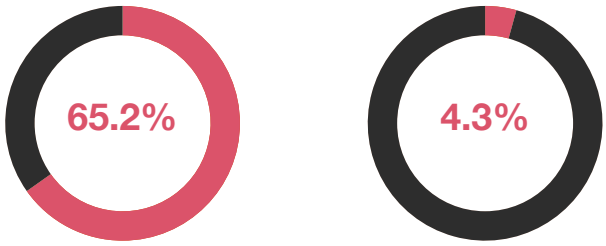
21 https://www.forbes.com/sites/louiscolumbus/2020/10/31/the-state-of-ai-adoption-in-financial-services/?sh=22b753f62aac

It is important to understand that it can be disastrous to adopt AI applications without thinking through the rationale and evaluating the implications. Hence, starting small should ideally be the rule of thumb for developing AI applications in order to solve challenging problems.

Firms must first test the PoC before launching a full-scale AI project. Executive personnel should consider the business problem they want to solve, start small and then roll out the solution enterprise wide, and reuse existing talent and technical resources in their decision to adopt AI.

FS organisation's investment in AI

(Current fiscal year, as % of IT costs)



How much does the organisation invest in AI infrastructure/ technologies/use cases?
Source: Indian FS AI Adoption Survey 2021

> The factor of time is an important consideration in AI adoption and PoCs often get pushed aside in order to focus on other priority projects.
>
> **Executive vice president and digital transformation head at a financial services firm**

7. Biases

Financial organisations using AI are vulnerable to biases. AI technology feeds on data which could have biases – either due to poor representation of minority populations in a data set or encoding of human judgement and bias into the training data itself. Optimal functioning of AI would thus require data scientists to employ proper modelling techniques and receive data ethics training. This should be backed by ethical and managerial considerations.

8. Prevention of misuse

With the rise of AI products and algorithms and their increasing contribution to decision making, ethics and morality have emerged as a major challenge for AI solution providers. An AI model is designed to train itself based on the data fed into the system and continuously modify its algorithms through self-learning. Hence, in certain instances, the model overlooks the data authenticity and can deliver unpopular results. Moreover, the output may even contain biases due to data set tampering.

There is a lack of accountability when it comes to decision making by AI models. In many instances, institutions blame the complex and sophisticated algorithms that make the decisions, rather than taking responsibility themselves. Therefore, this remains a grey area for regulators to monitor.

People tend to prefer human interaction for financial discussions. This has led to hesitation in adopting AI-based financial services. Thus, the low likelihood of instant returns has hindered the utilisation and growth of AI services in FS.

> For big-ticket businesses, video calls/face-to-face discussions or relationship manager visits are still part of the process, as customers expect the human touch rather than well-trained bots.
>
> **Senior VP at a wealth management firm**

Roadmap to build AI capabilities in the near future

	Starter	Follower	Leader
1	Set forth AI vision and strategy.	Refine your AI vision and strategy based on past outcomes.	Pivot your AI vision and strategy based on RoI and long-term goals.
2	Map business objectives with identified AI use cases.	Assess the business objectives against AI use cases.	Perform iterative revision of evolving and expanding business objectives and new use cases.
3	Perform cost-benefit analysis for prioritised AI use cases.	Re-prioritise and scale up AI use cases based on current goals, costs and timelines.	Drive the existing innovation machinery with new tools and techniques.
4	Perform RoI expectation/ success criteria mapping against priority use cases in the short term.	Assess the maximum RoI potential and set short-term targets.	Set the long-term target RoI to be achieved and define timelines.
5	Identify risk and regulatory challenges.	Measure risks and regulatory concerns around use cases.	Continuously monitor risks, regulations concerning old and new use cases.
6	Be ready to ideate and experiment.	Keep up the implementation and value realisation.	Bring in a transformation.

Conclusion

This report identified the many AI-driven accomplishments of the Indian FS sector in the last few years. At the same time, it also highlighted the challenges on leaders' minds as AI becomes more mainstream, as well as possible solutions for each.

Through our work with some of the top financial institutions in the country and our conversations with many senior executives at these organisations, we have developed an AI maturity framework. This framework will help companies assess how ready they are to adopt AI in their workflow.

Finally, we constructed a potential roadmap that could help organisations decide on their onward journey with AI.

The future of AI in FS requires all stakeholders – organisations, leaders, employees, regulators and customers – to collaborate in order to resolve the challenges that hinder overall industry growth. This future has already begun!



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