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The Transformation Potential of AI in Indian BFSI Organizations – An Empirical Investigation

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Abstract: About 46% of the world's banking digital transactions happen in India. India is the third largest fintech market globally after the US and China, with the highest fintech adoption rate at 87% against a global average of 64%. The current study on Artificial Intelligence (AI) -led Banking Financial Services and Insurance (BFSI) sector transformation is set in India with a research objective to explore the transformation potential of AI in the BFSI industry in India. The empirical study identifies top AI use cases in the Indian BFSI industry and examines the impact of AI on BFSI customer experience including the privacy and ethical concerns introduced by the use of AI. The study reinforces that emerging areas of applied AI are credit risk assessment, cost management, claims investigation, fraud detection and prevention, and stringent customer verification. A key finding of the study is that users have privacy and ethical concerns on the use of AI-powered applications. This has potential to impact the overall growth of the AI industry as users might not embrace the newly developed AI-powered processes. The research contributes to studies on disruptive technologies and AI-led digital transformation in the Indian BFSI industry.

Keywords: *AI, BFSI, Fintech, Privacy, Ethical concerns.*

1. Introduction

'Artificial Intelligence would be the single biggest technology revolution of our times. It is poised to disrupt industry, work and most of the aspects related to human existence. AI is a natural progression for banking and financial services, and it is inevitable that it will dramatically alter the sector over the next few years impacting customer service, fraud mitigation, investment advisories, loans, and credit scores. These will all use AI and machine learning to deliver a better and safer customer experience and more efficient operations for banks and Fintech companies'

- Amitabh Kant. CEO, National Institution for Transforming India.

Banking, Financial Services, Insurance (BFSI) industry of India has witnessed an enormous growth over the past decade playing a crucial role in driving the economy and financial inclusion (Srivastava and Dhamija, 2022; Srinivasan et al., 2024). The Indian banking, financial services, and insurance (BFSI) sector is seeing a significant expansion, with a year-on-year (YoY) growth rate of 31%. The banking sector in India reached a significant achievement by surpassing a net profit of Rs 3 lakh crore, an increase of 39% YOY, for the first time in FY24. Insurance is an integral sector of the financial services industry and plays a significant role in the economic development of India, as inter alia, it provides long-term funds for infrastructure development. India's insurance sector is expected to be the fastest growing among G20 countries, with a 7.1% growth over the period of 2024-2028 (Swiss Re, 2024).

Massive expansion in the BFSI industry entailed the need for rapid responsiveness to customer needs that necessitated massive digitization of processes, operations, and services especially with the outbreak and aftermath of COVID-19. Newcomers with disruptive business models are challenging well-established organizations, fintech companies being examples of such companies leaving the traditional big banks with no option but to transform their operations to keep up with the latest players. Amidst the changing market dynamics, firms are embracing disruptive technologies such as Artificial Intelligence (AI), Machine Learning (ML), Robotic Process Automation (RPA) and Blockchain to address these difficulties. In addition, advanced technologies such as biometric-based identification and authentication (biometrics), cloud computing (CC) and distributed ledger technology (DLT) are currently driving innovations in the global financial sector. The current study investigates the potential of AI in enhancing customer experience and solving critical problems of businesses that could lead to transformation in BFSI organizations. The study also examines the possible privacy and ethical issues caused by AI adoption in the BFSI industry.

AI in BFSI industry

Globally, AI is the most adopted technology by enterprises for digitizing core processes. In the most digitized firms, the AI embedded component of business processes forms about 67% compared to 43% in the rest, according to a recent

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NASSCOM survey. While AI is uncovering its application across sectors, the businesses that generate huge amount of data are where major AI investments are commonly made, BFSI being one of such critical sectors of the economy (Choithani et al, 2024). AI has transformed the financial services industry, with applications in investment banking, insurance, wealth management, and more (Bhattacharyya et al., 2023). AI in the BFSI sector involves the application of sophisticated algorithms and computational models to replicate human intellect in financial activities. In the aftermath of COVID-19 that has impacted most facets of the global economy, big data analytics and AI have emerged as front runners of digital technologies in all sectors and industries. Big data and AI have a synergistic relationship, where big data analytics leverages AI for better data analysis. In turn, AI requires a massive scale of data to learn and improve decision-making processes. The BFSI industry has been among the early adopters of AI and the pandemic-triggered- crisis has put massive digitalization on a rapid upward trajectory. Banks have often been the first in adopting new technology to get the first mover advantage. With the rise of AI, banks can now leverage generative language tools like ChatGPT to improve productivity, streamline operations, and enhance their services.

Access to large amount of digitized data in the Indian BFSI industry is leading to massive AI-led transformation opportunities. Big data analytics along with AI constitute the key pillars of data utilization strategy that play a strong enabling role across sectors for driving recovery and economic stimulation. AI technologies commonly implemented by the BFSI industry are in the areas of predictive analytics, predictive customer service, automated sales assistance, lead scoring, marketing automation, dynamic emails, content generation and curation, among others. The current study emphasizes the need for BFSI players to revisit their current business models to make AI an integral part of enterprise strategy while being cognizant of the possible privacy and ethical issues.

Most industries have reached a stage in AI adoption that investments in various processes have to show ROI to have continued interest in AI. So, what are the current areas of application of AI and potentially promising areas in BFSI? The following sections attempt to answer this in detail.

1.1. The current and potentially promising AI application areas in BFSI industry

AI concepts were used in different ways and has led to the development of a variety of technologies. Each of these technologies have been applied to develop new frameworks and tools such as chatbots for specific purposes such as image and speech recognition, pattern recognition etc. The current and potential AI applications in BFSI include but are not limited to real-time insight generation, loan default prediction, potential fraud detection, personalized financial recommendation, digitized customer interaction. The following are a few examples of the top Indian banks that are using AI and how are they benefiting from it – SBI Intelligent Assistant (SIA), an AI-powered smart chat assistant; Eva by HDFC; next-generation multilingual voice bot, AXAA by Axis bank; RPA by the ICICI Bank; Bank of Baroda's robot named Baroda Brainy and a chatbot named ADI (Assisted Digital Interaction); AI interactive assistant named "ABHi" by Andhra Bank; Kotak Mahindra Bank's 'Keya', a bilingual voicebot that comes integrated with the bank's phone-banking helpline.

The percentage of businesses that have adopted AI has remained stable between 50 and 60 percent over the previous few years, despite the fact that adoption has more than doubled when compared to 2017 (McKinsey, 2023). When surveyed about the poor AI implementation rate by businesses, most executives conceded that adoption of AI is more of a challenge than opportunity leading to unmet digital transformation goals. Top challenges stated were the culture of adoption, scale, and nature of data, privacy and ethical concerns among others. Further, financial institutions encounter setbacks such as changing industry laws, high profile incorrect decisioning due to bias and rising operational costs. With this background, this study explores the potential of AI in improving customer experience and addressing crucial challenges faced by businesses, which could result in significant changes within BFSI companies. The study also investigates the potential privacy and ethical concerns arising from the implementation of AI in BFSI organizations.

1.2. Scope of the study

The current paper attempts to explore the role of AI in BFSI organizational transformation. It contributes to the ongoing debate on the potential of AI in unlocking the hidden business value of the BFSI industry. The study draws on the best practices from across the globe of applied AI, a wide range of AI use cases across the BFSI industries and prior academic and industry research in the area. The AI evolution, current and potential areas of AI application to enhance business and its predictable effects are also studied. While similar studies are being carried out specially to understand the changing organizational priorities in the post COVID scenario, the current study is unique in that it focuses on the strategic focus of BFSI companies in India in contemporary times while highlighting the privacy and ethical concerns in the use of AI in the BFSI industry.

2. Literature review

Technology strengthens change (Goswami, 2022). Technology for achieving the twin goals of economic growth and improvement in the general wellbeing of people, is being harnessed today like never before. A review of literature on knowledge economy highlights that original

scientific knowledge, innovation and technological transformation are major drivers of economic development in developed economies (Zhou et al, 2020). Digital technologies play an enabler role in bringing about disruption in business models, more often resulting in tectonic shifts and reorientation at industry level, and digital transformation and innovation at firm level. Emerging technologies enhance organizational efficiencies by aiding standardization and integration of data and processes (Osei et al., 2023). Digital technologies help in enhancing customer-organization relationships, improving revenue models, and facilitating intra and inter organizational interaction such as the ones among partners, vendors, and competitors (Li, 2015). AI, one of such digital technologies, is commonly referred to the cognitive ability of a computer to perform tasks usually associated with human intellect and capabilities such as logic, problem solving, learning, character recognition and more. The application of AI can be classified into three types– 'aided intelligence' to enhance performance of ongoing processes such as automated repetitive tasks; 'increased intelligence' to add value considerably to ongoing processes by 'thinking as per set algorithms or logic' which are otherwise not done; 'autonomous intelligence' in highly evolved non-structured, unspecified contexts where 'learning' by systems is required to deliver autonomously).

Tracing the origin of AI as a discipline, the concept of 'Artificial Intelligence' was used for the first time by Alan Turing, when in 1950 he suggested that in the near future there would be machines that would think and reason like human beings. Right from 1950 there has been a continuous stream of projects right from the first artificial intelligence program 'Logic Theorist' developed by Allen Newell, Herbert Simon, and Cliff Shaw. In the founding event, the Dartmouth Artificial Intelligence Conference, U.S.A., the term AI was first defined by Marvin Lee Minsky, an American mathematician, as 'the science of making machines do things that would require intelligence if done by men'. John McCarthy is credited with the coining of the term 'Artificial Intelligence' at the same conference where Logic Theorist was presented to refer to machines which would think independently. Until the 1970s the research in AI was primarily funded by government agencies buoyed by academic research in interpretation of spoken language.

The subsequent decade saw a lull in private AI research and diminished funding from various government institutions across the world due to lack of workable concepts and insufficient computational power to conduct research at a sustainable cost. The year 1997 can be considered as the year when AI went mainstream from just being a concept to one which would actually work. The year witnessed the first public display of the power of computing with IBM's Deep blue, the chess playing program defeating the then grandmaster and world chess champion Gary Kasparov. The same year came the implementation of the first speech recognition program in Windows Software. These two events showcased the two primary functions of AI, problem solving based on sensing patterns on one hand and recognizing spoken language on the other. The primary factor that enabled these two events is the multi-fold increase in the available computing power driven by new technologies in chip design leading to increased memory that was available for computation. This showed that the success and failure of AI as a tool is only limited by the availability of computational power and, as the same increases over the period of time, real world applications would slowly come to fruition.

The Association for Advancement of Artificial Intelligence (AAAI) defines AI as "the scientific understanding of the mechanisms underlying thought and intelligent behavior and their embodiment in machines." In Russell and Norvig's (2009) textbook 'Artificial Intelligence: A Modern Approach', AI has been the defined across four broad dimensions – thinking humanly, acting humanly, thinking rationally, and acting rationally

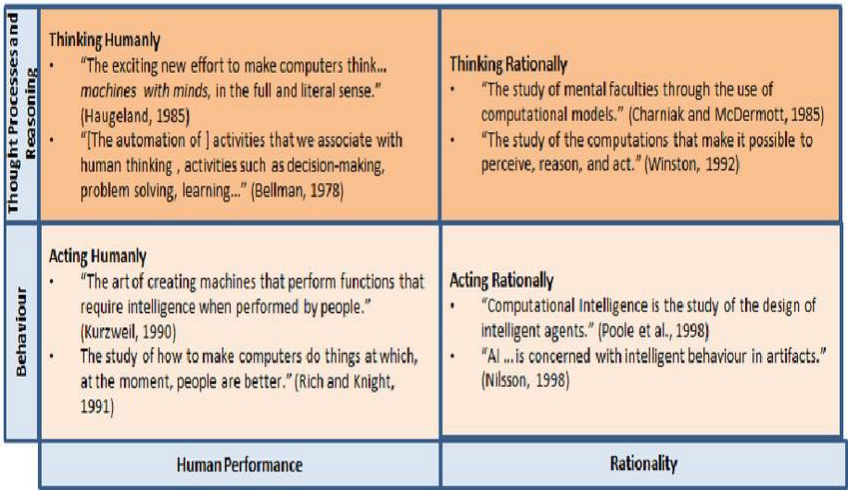

Fig 1. A Framework for Understanding Artificial Intelligence Source: Russell and Norvig (2009)

Over a period of time, the concept of Artificial Intelligence has come to be considered to be a group of software systems that make decisions which require expertise of humans and are used in identifying issues or problems and respond or react to issues identified or problems encountered (Guthrie and Rich, 2022).

BFSI as a sector has been a frontrunner in the adoption of AI and is poised to do so with an accelerated pace in the future. For instance, ICICI Bank India was able to slash process turnaround time by 80% for disputed transactions by means of AI. The literature suggests significant application of AI for predictive analytics in varied areas such as pattern recognition in financial transactions to identify loan defaults and fraud, sentimental analysis in real time which enable proactive intervention during customer contact over IVR, image recognition using computer vision, HR selection, quality control and consumer behaviour, just to name a few.

AI was touted as the next big disruption in the banking sector in the 2018 World Economic forum-Deloitte report. Key outcomes predicted by the study were - replacement of traditional delivery channels and increasing dependence of financial services on hi-tech institutions. The same year, NASSCOM in association with KPMG came out with a report on trends in fintech advancement where transition from low-impact rule-based model to high impact cognitive and predictive processes was projected. (NASSCOM, 2018)

2.1. **Research gap**

Rising digital adoption in India, growing customer expectations, and increasing financial awareness among rural population that constitute the majority of the country's population and BFSI customer base, coupled with advantageous regulatory frameworks, are presenting strong AI-led transformation momentum to the Indian BFSI industry. It is more time-critical than ever before for BFSI companies to embark on their respective AI-led business transformation journeys.

The research gap is that while there has been an onslaught of studies that cover the impact of disruptive technologies on BFSI industry, the current study aims to drive home the point that AI is not an option anymore but should be integrated with enterprise strategy. As such, AI application strategies or use cases that BFSI companies need to adopt not just to enhance customer experience, mitigate privacy and ethical concerns but also to survive the fierce competition are discussed.

2.2. **Theoretical Framework**

Theoretical framework in research has multiple purposes. Primarily, to explain the theoretical foundation upon which the research is based, secondly, to position the study in the context of broader existing literature in the field. As such, in view of the premise of the current research, prominent theories that propose technology as a resource, capability or competence to bring about effective organizational transformation, have been chosen. These include leading organization studies theories and notable insights on resources, capabilities, disruptive technologies, and digital transformation of organizations.

Resource-Based View and the Dynamic Capabilities Approach may be applied to the adoption of disruptive technologies as they are considered as a medium to access resources or to re-structure organizational capabilities and competencies to defy the dynamic external challenges (Zahra et al., 2022). The Core Competencies Theory - CCT proposes that employees or enterprise associates collaborate in order to enrich their core competencies or capabilities thereby achieving sustainable competitive advantage (Menz et al., 2021). The 'Digital Capability Framework'- DCF by Uhl, (2014) can be used to explain the technology intervention for transformation, where companies can analyze their transformation potential using the DCF to leverage business and technology innovations in building appropriate transformation and innovation capabilities. Of particular relevance to the current research is the disruptive innovation theory that advocates three factors for disruptive innovation: technology, business model innovation and a superior value network that repositions stakeholders in the enterprise network (Christensen, Raynor and McDonald, 2015)

2.3. **Research methodology**

The research objectives are

1. To analyze if privacy risks and ethical implications of using AI has an impact on AI adoption in the BFSI industry.
2. To examine if AI adoption in the BFSI industry enhances customer experience.
3. To explore the transformation potential of AI in the BFSI industry in India. This is done by means of identifying the top AI use cases in the Indian BFSI industry

The hypotheses of the study are as follows

$H_0$1: The privacy risks and ethical implications of using AI have no impact to increased use of AI in the BFSI sector in India

$H_0$2: AI and Machine Learning tools have no positive impact on customer experience in the BFSI sector in India

Mixed methodology that uses both qualitative and quantitative methods was adopted i.e., online survey and semi-structured interviews of key executives working for BFSI organizations in India were used to collect the primary data.

The questionnaire was mailed out to the employees in the Indian public and private sector as well as multi-national BFSI companies operating out of Bangalore, Chennai, and Hyderabad. Out of 215 responses received in total, 150 were analyzed. The rest of the responses were rejected due to their poor quality such as incompleteness of information sought or respondents not meeting the criteria. 75 responses were from banks and financial services companies, 30 from the insurance sector, and the rest from independent consulting and other organizations operating within the industry. The survey results have been analyzed at stage one comprehensively to understand the impact of AI on BFSI customer experience including the privacy and ethical concerns introduced by the use of AI. This was followed by stage two of primary data collection, where semi-structured interviews with 10 CTOs/ key IT executives from BFSI companies were conducted, for sector-specific understanding of AI application. The semi-structured interviews were designed to be more of info-sharing sessions centred around the solutions to key issues and questions regarding sector-specific AI use cases and the related challenges.

3. Data Analysis and findings

$H_0$1: The privacy risks and ethical implications of using AI have no impact to increased use of AI in the BFSI sector

When asked if AI powered systems are robust enough to take decisions about customer eligibility 65 responded saying they strongly agree, 60 somewhat agree, 13 saying they strongly disagree, 8 somewhat disagree and 4 being neutral. This shows that there is strong belief that AI powered applications are mature enough to take decisions on customer's eligibility. This domain currently is very manual and is time taking. It is also plagued with inconsistencies over application of standards. With AI powered applications, it is expected to significantly speed up the process and apply standardized parameters and remove arbitrary application of rule sets. There is also an appreciation of the applications being mature enough to remove any bias upfront.

When asked if the customer data may be misused from a privacy viewpoint/perspective - there were 83 respondents who said they somewhat agreed that there is scope of the data that is being collected to be /being misused from a privacy perspective. There were 43 who said they strongly agree, 15 were neutral, 7 said they somewhat disagree and 2 strongly disagree. This shows that there are some concerns with respect to the data not being adequately safeguarded and the data not having stringent access restrictions. There is a need to fully anonymize data and for it to be encrypted both in transit and at rest. Table 1 presents the response summary of the questionnaire items.

Table 1: Questionnaire with response summary

S. No	Question	Strongly Disagree	Partially Disagree	Neutral	Partially Agree	Strongly Agree
1	There is a strong need to use AI in the BFSI field	8	8	0	40	94
2	Does your organization have a well-defined strategy to implement AI	7	36	14	51	42
3	The benefits from AI far outweigh the huge infra costs such as data processing costs	8	20	11	68	43
4	The customer's issue is resolved by services powered by AI	11	18	8	69	44
5	AI powered systems are robust enough to take decisions about customer eligibility	13	8	4	60	65
6	The customer data may be misused from a privacy viewpoint/perspective	2	7	15	83	43
7	Do you believe companies take the issue of privacy seriously when they are using AI to make decisions	14	26	15	40	55
8	As increasingly AI models are passing the Turing test (where one cannot distinguish whether they are talking with a human or not) do you think customers need to be informed upfront that the conversation or any decisioning is being handled partly or completely by AI	0	36	0	50	64
9	Do you believe decisioning by AI on loan eligibility can be influenced by 'Algorithmic bias' impacting the	4	8	7	54	77

S. No	Question	Strongly Disagree	Partially Disagree	Neutral	Partially Agree	Strongly Agree
	outcome					
10	How confident are you that the AI models can detect financial fraud in real time and alert the customers	6	19	14	65	46
11	How confident are you that AI powered applications will significantly improve customer experiences	5	12	15	63	55
12	Do you believe AI powered applications enhance customer loyalty	10	16	13	52	59
13	Do you believe deep fakes would impair the AI powered applications used in Identity verification	15	20	10	45	60
14	Do you believe that existing AI powered models and applications are mature/equipped enough to address ethical concerns like	20	30	5	45	50
15	Are you concerned with the apparent lack of regulation around AI and ML leading to increasing misuse	10	15	10	55	60
16	Are you confident that self-regulation by the AI industry is sufficient to address the concerns	30	40	10	30	40
17	Do you feel Governments should step in and frame regulations for the industry to safeguard interests of end consumers	10	18	6	53	63

With 15 respondents being neutral, it shows that this area is not fully understood and people are somewhat swayed by news of big data exposes that come out frequently.

When asked if they believe companies take the issue of privacy seriously when they are using AI to make decisions, 55 respondents said they strongly agree, followed by 40 somewhat disagree, followed by somewhat disagree with 26 responses, followed by 15 as neutral and 14 as strongly disagree. This again shows that there is confidence that the companies are tackling the privacy concerns well, however, there is concern that it might not be enough to address all the concerns effectively. Companies would need to be more transparent and proactive on how they are working to address the concerns.

When asked if they would like to be told upfront that the process is using AI, there were 64 responses for strongly agree, followed by 50 for somewhat agree, and 36 with somewhat disagree. The distribution of responses clearly shows that there is strong agreement on being told upfront that the feature actively uses AI in the process flow.

When asked if they believe decisioning by AI on loan eligibility can be influenced by 'Algorithmic bias' impacting the outcome, strongly agree had the highest of 77, followed by 54 somewhat agree, followed by somewhat disagree of 8, followed by neutral with 7 and strongly disagree of 4. This shows that there is considerable concern about the biases creeping into the credit decisioning process. This is in line with the responses for the ways to mitigate the risks, a proactive removal of bias inducing data attributes during data engineering stage would address this concern to a great extent.

When asked if they believe deep fakes would impair the AI powered applications used in identity verification, the highest responses were for strongly agree with 60, followed by 45 for somewhat agree, followed by 20 for somewhat disagree, followed by 15 for strongly disagree and 10 for neutral. As with the earlier responses there seems to be concerns about deep fakes impacting the results of the identity verification. This would have great implications if they are not addressed promptly as it would impact the overall confidence on the AI as a technology itself. Companies have to keep innovating to identify deep fakes and make the technology universally available for use across the spectrum.

When asked if they believe that existing AI powered models and applications are mature/equipped enough to address ethical concerns, the maximum responses with 50 for strongly agree, followed by 45 for somewhat agree, followed by 30 for somewhat disagree, followed by 20 for strongly disagree and with 5 for neutral. This shows that there is confidence that the current AI models and applications are mature enough to tackle the complex ethical concerns on data usage, storage and access.

When asked if they are concerned with the apparent lack of regulation around AI and ML leading to increasing misuse, strongly agree had the maximum responses of 60, followed

by 55 for somewhat agree, 15 for somewhat disagree and 10 each for strongly disagree and neutral. This shows that even though the respondents have shown confidence in the use and maturity of AI powered applications (responses for other questions in the survey) there is concern on the lack of regulation on the use and processes around the data being used.

When asked if they were confident that self-regulation by the AI industry is sufficient to address the concerns, the maximum responses were for strongly agree and somewhat disagree with 40 responses, followed by 30 for strongly disagree, and somewhat agree and 10 for neutral. The distribution of responses shows that there is no consensus around the self-regulation question. This shows that there is concern that the AI industry should not be allowed to self-regulate.

When asked if they feel the government should step in and create laws relating to regulating the use of AI, 63 respondents said they strongly agreed with the government creating laws, followed by 53 for somewhat agree and the rest distributed among somewhat disagree, strongly disagree and neutral with 18, 10, and 6 respectively. This shows that overwhelming respondents believe the government has to step in one form or other and create laws around regulation of AI.

The responses for the last three questions clearly show that there are concerns about the current state of regulation and confidence in the industry managing it through self-regulation. This shows that the AI industry has to invest considerably in addressing these concerns and get people to become more confident in the usage of AI. This will help in increasing the areas where AI can be used effectively.

3.1. **Hypothesis Testing**

$H_0$1: The privacy risks and ethical implications of using AI have no impact to increased use of AI in the BFSI sector in India

Table 2: T-Test Results for H01

Sample Mean	3.871
Standard Deviation	0.495
Test statistic (t) = (sample mean - hypothesized mean) / (standard deviation / square root of sample size)	95.766
Degrees of freedom	149
Critical t	1.976013

Since the estimated t-value (95.766) exceeds the critical t-value (1.976), we can reject the null hypothesis. Thus, there is evidence substantiating the alternative hypothesis that the privacy risks and ethical considerations associated with the use of AI have a significant influence on the rising adoption of AI in the BFSI industry.

$H_0$2: AI and Machine Learning tools have no positive impact on customer experience in the BFSI sector

134 respondents agreed that there is a need to use AI in BFSI. 118 respondents felt that AI can play an important role in enhancing customer experience. They went on to say that they believe AI will significantly enhance operational efficiency and deeply transform core financial processes. Regarding the most imperative reason to implement AI, 'Enhancing customer experience' had the highest responses with 56 followed by 'Increase in demand for digital services' with 51 responses and then 'Improve efficiency' with 25 responses and 18 for 'Cost reduction'. This shows the growing importance of AI to enhance customer experience and the unlocks that are possible with implementation of AI driven applications. With AI driven chatbots taking the primary role of information delivery in both sales and services domains, great improvements are in store in the customer experience area.

When asked about what is the most promising area for implementing AI in their organization, 'Credit Eligibility Decisioning' was ranked as the biggest opportunity with 48 responses followed closely by 'Detecting Financial Fraud' with 46 responses. This was followed by 'Automation of Operational tasks' with 35 and with 21 responses for 'Identity Verification'. This shows the respondents see a lot of value in implementing AI in Credit eligibility decisioning which is both manually intensive, repetitive and error prone.

Every new technology implementation has to take risk mitigation strategies into account as part of the implementation plan. This becomes more significant with an implementation of size and complexity of AI driven applications. The respondents feel that 'Filtering out potential bias attributes upfront' is the most important risk mitigation strategy with 60 responses followed by 'Robust testing' to identify potential biases with 38 responses with 'Auditing to remove bias attributes' with 28 and 24

responses for 'Continuous Review'. This shows that there is all round appreciation of bias being introduced into the learning process in the AI/ML learning process and the need to filter out the bias triggering attributes right at the data engineering stage itself rather than identifying the same late in the game when the results are corrupt or completely in different dimensions.

With respect to having confidence that the customer's issue is resolved by services powered by AI, the highest responses were for somewhat agree, followed by 44 for strongly agree, followed by 18 for somewhat disagree and 11 for strongly disagree and 8 for neutral. This shows there is considerable confidence that the AI powered applications would improve resolution rates. First call resolution is a primary KPI which is followed by many companies. An increase in first call resolution by AI applications would be a big cost benefit from increased use of AI.

With respect to confidence in AI applications to detect financial fraud in real time, the maximum responses were for somewhat agree with 66, followed by 46 for strongly agree, followed by 19 for somewhat disagree, followed by 14 for neutral and 6 for strongly disagree. This is one of the most promising use cases for AI where the ability to glance through millions of transactions and identify trends for each customer would be the single biggest benefit of AI. This would increase the fraud detection rates and reduce money lost to fraud considerably.

There is considerable evidence that AI powered applications would significantly improve the quality of customer experiences by reducing the number of manual steps required thereby reducing the time taken to complete these. The use of AI to resolve operational issues by increasing proactive identification of issues and potentially resolving them automatically will improve the quality of customer experiences which would as a natural corollary improve customer loyalty thereby converting customers into promoters. One key metric to watch would be 'before' and 'after' Net Promoter Score (NPS) to gauge the impact of AI powered applications on customer loyalty following the adage of customer retained is customer earned.

3.2. Hypothesis Testing

H02: AI and Machine Learning tools have no positive impact on customer experience in the BFSI sector

Table 3: T-Test Results for H02

Sample Mean	3.8
Standard Deviation	0.557
Test statistic (t) = (sample mean - hypothesized mean) / (standard deviation / square root of sample size)	85.617
Degrees of freedom	149
Critical t	1.655145

Since the estimated t-value (85.617) exceeds the critical t-value (1.655), we can reject the null hypothesis. Thus, there is evidence substantiating the alternative hypothesis that the use of AI in the BFSI sector has a significant positive impact on customer satisfaction.

3.3. Research objective 3: To identify the top use cases of AI in BFSI

The trends in sector specific AI deployment are captured in Fig 2. AI is increasingly finding its application to fill the void of personal touch and customized attention to customers, in online transactions. Even though there is a clear shift in consumer preferences to virtual transactions for reasons of ease of transaction and time saving among others, the traditional online portals can only address the 'reach' part of the problem. AI fills in by providing personalized advisory services 'almost' like that of an employee, by delving deep into the customer data and 'learning' their preferences and needs.

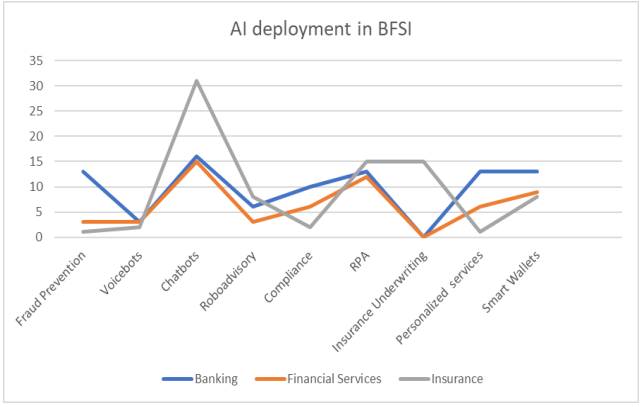

Fig. 2. Sector-specific trends in AI use-cases in BFSI

The following table (Table 4) is an account of AI use cases in BFSI which is compiled based on the primary data of the current research and the 2018 NASSCOM-CMR report on AI applications in BFSI.

Table 4: Use Cases of AI

S. No	Business Objective	Use case
1.	AI for Customer Service Chatbots and Voicebots	● Bank of America's Erica drills deep into customer data to pre-empt their needs and suggest solutions ● Commonwealth Bank of Australia's Bot performs 200+ banking tasks for customers like activating cards, paying bills, sending bank statements, etc ● Amazon's Echo and Facebook's Messenger platforms extend their voicebot /chatbot technologies to companies to enhance their customer engagement ● MasterCard uses FB Messenger's chatbot to allow its customers to review their purchase history, spending habits and account balance ● CapitalOne, a diversified bank and fortune 500 company added its voicebot ENO's skill to Amazon's Alexa ● Fullerton India Credit Company Ltd.'s ASHA is a loan acquisition and fulfilment chatbot ● HDFC Life Insurance launched an AI based chatbot for insurance advice ● HDFC Bank's Electronic Virtual Assistant, or EVA has become India's largest banking chatbot ● Emma, OCBC Bank Singapore's AI-based Chatbot answers home loan queries and generates leads ● Policybazaar's Chatbot, PBee is an AI-powered chatbot to sell insurance online.
2.	AI in Back-End BPM	● JP Morgan Chase processes contracts faster with fewer mistakes ● ICICI Lombard Leverages Robotic Process Automation ● ANZ Wealth ties up with University of Technology in Sydney to explore AI based insurance under-writing and claims processing ● Japan's Fukoku Mutual Life Insurance Company is planning to implement IBM's Watson ● HDFC Life Insurance's AI-based insurance Email Bot
3.	AI in Risk and Compliance	● Deutsche Bank analyses conversations for risk and compliance monitoring ● Citigroup uses an AI based system to pass the US federal govt.'s stress test. ● Danske Bank has used an AI Framework to increase its fraud detection rate by 60% ● PayPal developed an in-house fraud detection engine using Open-source tools
4.	AI in Customer Service	● AmeriTrade, a US-based brokerage firm facilitates stock trading through Twitter ● SmartBiz Loans' AI tool offers loan advice to every SME customer irrespective of their size ● IndiaFirst Life Insurance's virtual assistant provides real-time customer resolution

(Source – NASSCOM-CMR report)

3.4. ChatGPT and Banking: Pros and Cons

ChatGPT launched on Nov 30, 2022 by Microsoft is an intelligent conversational AI platform that has gained immense popularity. One of the most promising AI for banks is ChatGPT, a generative pre-trained transformer language model that can be used to provide virtual assistants for customer service and support, handle complex financial goals and investment decisions, and improve real-time responses to customer inquiries. ChatGPT can assist banks in identifying and managing potential risks by analyzing vast amounts of data and identifying potential risk factors. Banks can also use ChatGPT to monitor transaction activities, flag suspicious transactions, and identify potential fraud. With its ability to process vast amounts of data, AI in banking can provide personalized financial advice and support, enabling banks and financial institutions to better serve their clients (Coforge, 2023)

4. Discussion

Reinforcing the earlier studies in the area, the study adds more evidence that AI is being adopted at varying levels of complexity in the BFSI industry for various purposes: identifying and preventing fraudulent activities, evaluating creditworthiness, providing personalized banking services, automating trading strategies, managing risks, deploying

customer care chatbots, executing predictive analysis in insurance, ensuring compliance with regulations, facilitating debt collection, and optimizing portfolio management. Additionally, it enables expedited processing, immediate decision-making, and the automation of repetitive jobs.

Our findings suggest that the need for digitized, structured data has surpassed all strategic priorities of organizations. The single most takeaway of the empirical research was that - operational processes simplified by Intelligent Automation (IA) of the digitized data powered by Artificial Intelligence (AI) is the key for much sought agility and resilience of organizations. However, the majority of executives - seven out of ten executives who were interviewed conceded that adoption of Big data and AI is a challenge in ways more than one, leading to unmet digital transformation goals.

With regard to $H_0$2, various kinds of privacy risks and ethical concerns, and the possible ways to address them are discussed below. As society takes advantage of the advantages offered by new technology in the financial industry, regulators must be vigilant in monitoring the potential hazards involved. With the rising usage of AI, questions arise about transparency, data biases, governance, privacy, and algorithm robustness. Therefore, BFSI organizations should ensure adequate checks and balances to prioritize responsible utilization, safeguarding of data, protection of privacy, and mechanisms for oversight and control to ensure adherence to legal requirements, and consideration of ethical concerns in relation to new technologies. The training data for tech models should be comprehensive, precise, diverse in order to eliminate any biases, and the algorithms should be auditable.

The stronger collaboration between banks, non-banking financial companies (NBFCs), and financial technology companies (FinTechs) has made it possible to introduce model-based lending. Therefore, ensuring cybersecurity in banking institutions is crucial for maintaining public confidence in the financial system. Cyber risks can involve the potential for customers to have their personally identifiable information (PII) exposed to threats. Organizations incur significant expenses due to the operational impact on businesses, the demand to pay ransoms, and the need to build new infrastructure from scratch, in the instance of any cyber-attack. Further, financial institutions can be vulnerable to third-party or supply-chain attacks as they increasingly depend on Software as a Service (SaaS) solutions.

Modern technologies have introduced complex products and models that come with inherent risks, which users may not be aware of. Potential risks include the proliferation of fraudulent apps, deep fakes, and mis-selling through dark patterns. Digital innovation has the potential to cause fragmentation in the financial industry by creating different systems that may divide user groups and countries from each other. Common protocols, standard APIs, and secure communications channels are needed for cross-border digital financial infrastructures. These standard protocols must be applied to financial system legacy infrastructures to manage increased demand.

Another area that must be properly monitored is Quantum Computing that is expected to multiply computational abilities. Quantum Computing can quickly break codes, raising concerns about the fragility of conventional cryptographic systems that secure financial transactions. Ensuring a balance between benefits and risks requires enhancing the capabilities of regulated entities (REs) and oversight authorities' surveillance, developing or revising appropriate legal and regulatory frameworks, actively involving stakeholders to identify potential risks, and increasing consumer education. In order to effectively navigate the evolving digital landscape, BFSI companies will need to invest in reskilling and upskilling their current workforce. The BFSI industry has been completely transformed by technology adoption during the past three decades (Kalyani and Gupta 2023). India is now a global hub for BFSI technology services, which accounts for more than half of India’s IT and BPM exports. Added to this, the pandemic has changed forever the way most BFSI businesses operate resulting in an almost instantaneous shift of traditionally high-touch business models to virtual mode. With all aspects of organization impacted by COVID -19, the need for digitized, structured data has surpassed all strategic priorities. To stay relevant in the new normal and to remain nimble in the digital era, adoption of enabling digital technologies and fostering digital innovation for addressing emerging risks have become imminent to BFSI businesses.

The ease of adoption of tools that comprise Artificial Intelligence (AI), the business impact or the benefits a company can possibly derive and most importantly the cost implications of adopting AI – all these renewed the interest in AI in the BFSI industry. While it is established beyond doubt that AI took BFSI by storm, its adoption was not uniform across the sectors in BFSI. The rate of AI adoption varies based on the kind of AI applications specific to the sector. For instance, the rate of adoption of AI by the financial sector was 74% followed by the banking sector at 71%. However, it has been the highest at 85% by Insurance sector (NASSCOM-CMR survey), as depicted in the Fig 3

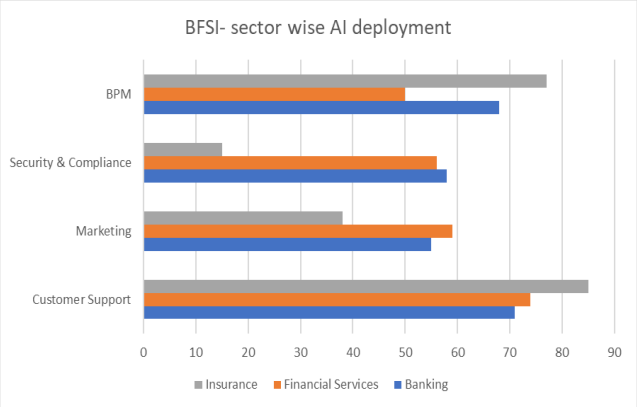

Fig 3. Sector-wise breakdown of AI objectives in BFSI

The BFSI industry has been among the early adopters of AI and the pandemic-triggered- crisis has put massive digitization on a rapid upward trajectory. Access to large amount of digitized data in the Indian BFSI sector is leading to massive AI-led transformation opportunities. Some of the key drivers for AI adoption in the BFSI industry are personalized, cost-effective customer experience, fault-free back-end processes, quicker response time, consumer behaviour tracking, security, and compliance to name a few.

Employing AI to augment customer support to offer a more proactive and individual experience effectively seems to be the primary driver across sectors with 44% of respondents choosing it. AI for Marketing was chosen by 27%; AI is used for understanding consumer behaviour to provide customer advisory services and offering customized products based on their preferences and needs. AI for security was chosen by 22%, and 7% for compliance. AI is being explored to build, implement, and operate an efficient risk management system. This is due to the increasing need for a robust platform for risk identification and analysis that helps in tracking issues and managing loss by establishing internal controls by mapping regulatory requirements to business processes and defining relevant controls to manage compliance risks. (Fig 4) However, with volatility both in market and organizations, to say all the four priorities would now compete for top position across the BFSI sectors, would perhaps not be an understatement.

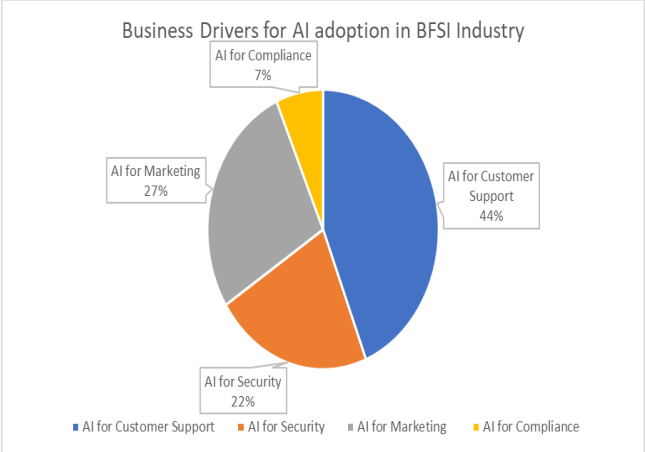

Fig 4. Top 4 drivers for AI adoption in BFSI businesses

Deeper analysis of sector wise preferences of AI deployment showed that banks, financial services, and insurance sectors found top use in customer support, while the relative preferences seemed to change after that as shown in Table 5 below. AI for marketing by tracking consumer behaviour and offering customized products came as second priority for financial services, while security and compliance came at third for both banking and financial services sector. Automating back-end processes was rated as second priority by banks and insurance companies, while it was rated as top four priority by financial services. AI for their marketing efforts was at third while AI for security and compliance was rated least among the four options by insurance.

Table 5: BFSI sector-wise ranking of AI use-cases (that have been deployed)

Rank	Banking	Financial Services	Insurance
1	Customer support	Customer support	Customer support
2	BPM	Marketing	BPM
3	Security & Compliance	Security & Compliance	Marketing
4	Marketing	BPM	Security & Compliance

The current estimate of internet base in India stands at 730+ million, according to the Telecommunications Regulatory Authority of India, TRAI. Mobile as the chosen mode for accessing the internet has contributed to a huge expansion of online customer base for the banking and insurance sectors. Serving seamlessly the new generation of digital-literate customers requires the BFSI organizations to hire the right span of talent to support the on-going processes and to drive the AI transformed newly digitized systems as well.

4.1. Recommendation/ Suggestion for future research

Understanding and managing the expectations of an ever-increasing customer base and retaining them before they quickly fall off the radar could be an important topic of online customer behaviour studies. The opportunities and threats posed by the proliferation of digital channels for

financial transactions for such a massive customer base is an area of study that will never lose relevance especially for the fintech industry. How to stand tall in the heavily crowded online space dominated by social media and e-com giants would be an area of study that is likely to have huge practical implications in terms of usability and design decisions of banking & insurance apps.

4.2. **Practical implications of the research**

The findings suggest that the need for digitized, structured data has surpassed all strategic priorities of organizations. The present research contributes to the evidence of use cases on disruptive technologies and digital transformation by suggesting that digitization that results in integrated data when supported by AI, drives speed and smart decision making not just for organizational resilience but also in opening up lucrative revenue opportunities by impacting a range of business areas such as cost, processes, innovation, customer - to name a few. Digital transformation can be daunting, however, if organizations have a decisive vision i.e., clear, and complete view of its architecture and application landscape, organizations could embark on a successful transformation. The key factors for successful transformation include – motive/case for transformation, organizational capabilities, process compliance, and technology. Building a strong case for digital transformation in a BFSI organization helps business leaders to prioritize organizational goals (for example, improving customer base vs increasing product portfolio vs improving the transaction channels), find ways (processes) and means (capabilities and resources such as enabling technology – AI, for instance) of achieving them. As suggested by Frank Engelbert, Philips, aligning the business model to the operating model is key for transformation (PEX, 2020). In a disruptive market, the differentiating organizational capabilities that drive processes act as competitive advantages that become critical enabling capabilities for technology adoption. The choice of technology therefore is dependent on capabilities and processes.

5. **Conclusion**

Operational processes simplified by Intelligent Automation (IA) of the digitized data powered by AI is the key for much sought agility and resilience of organizations. The BFSI industry has been completely transformed by technology during the past three decades. India is now a global hub for BFSI technology services, which accounts for more than half of India's IT and BPM exports. Furthermore, the pressing urgency for BFSI organizations to transform, digitize and adapt their processes to changing business environments and customer preferences has never been greater, with the fast adoption of fintech by the common man in India. The BFSI industry in India has seen a rapid growth in digital transactions with tens of millions of individual customers and thousands of small business customers opting for mobile/ online mode for their banking, investment, asset management and other financial services. Along with these trends came the need for the companies to keep up with regulatory compliances. This was enabled by aggressive adoption of digital technologies which provided a platform for process transformation, process management, enterprise architecture management and application integration. Disruptive technologies such as AI aid in creating an integrated model with tools to handle processes efficiently, decrease regulatory compliance risks, increase stability of deployed solutions, and accelerate response time to customers. More and more BFSI companies are leveraging AI to create a custom platform that supports thousands of transactions per second across various business lines and customers are provided with a seamless, omnichannel customer experience as well. The current research findings will be a stride forward in the AI journey for Indian banks and financial services institutions. The research strongly proposes that India given its strengths and attributes has the capability to place itself among the leaders in the international AI map. Some experts predict that by 2025, AI will have a market size of more than $20 billion in the banking industry alone. Chatbots and virtual assistants, powered by AI technologies like ChatGPT, are expected to play a significant role in this growth, offering customers a more seamless and personalized experience while reducing costs for financial institutions. ChatGPT is transforming the fintech and banking industry by enabling banks and financial institutions to offer personalized and efficient customer service, streamlining operations, and reducing costs. The overall AI market in BFSI is projected to grow to over $ 100 Billion by 2032 with a growth rate exceeding 20%. While there are initial teething troubles with the adoption of ChatGPT it is safe to say that banks will need to leverage this technology to stay ahead of competition. However, it is important to consider the challenges associated with using ChatGPT and other AI technologies in the financial services industry, including the risk of bias, traceability and the importance of data security. As the financial services industry matures and continues to leverage new AI technologies it will be essential for banks and financial institutions to carefully consider the role of ChatGPT in their operations and service offerings.

AI is unarguably one of the most rapidly evolving, high-impact fields with far reaching ramifications underscoring the importance of stricter supervision and regulation. While the role of statutory and regulatory bodies such as SEC and SEBI, and regulations such as GDPR, CCPA, Sarbanes Oxley continue to regulate technology adoption, internal guidelines on ethics, privacy and empathy should drive AI technology adoption in organizations across sectors. Reflecting on what Elon Musk once had to say – 'once super AI becomes a reality; it might lead to the extinction of the human race as we know it today'. Perhaps to bridle the

excesses of technology and to take care of ethical dilemmas which are a commonplace in BFSI especially in the areas where technology cannot be left unsupervised for independent functioning, IEEE has been working on Ethically Aligned Design which demands that transparency, accountability, algorithmic bias etc, will have to be well-thought-out right at the time of design of processes or systems and not retrospectively. The ideal scenario would be where human intelligence is complemented by machine intelligence and coexist with each other for the overall common good for humanity. The need to uncompromisingly adhere to three key tenets - culture, governance and opportunity – is key for successful AI adoption in BFSI organizations. Strong organizational culture that drives all systems, processes, and procedures; a robust data governance mechanism that regulates the scale of data assimilation, and finally the business opportunity or use-case for AI adoption - all these factors are key for successful AI deployment.

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