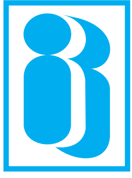
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Paradigm Shift in Banking - Moving towards a Resilient, Inclusive and Sustainable Model

APABI Special Edition

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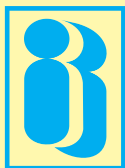

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ध्येय

संस्थान का ध्येय मूलत: शिक्षण, प्रशिक्षण, परीक्षा, परामर्शिता और निरंतर विशेषज्ञता को बढ़ाने वाले कार्यक्रमों के द्वारा सुयोग्य और सक्षम बैंकरों तथा वित्त विशेषज्ञों को विकसित करना है ।

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Editorial

Mr. Biswa Ketan Das
Chief Executive Officer,
IIBF, Mumbai

The global landscape of financial ecosystem is undergoing a paradigm shift and profound transformation. Large scale adoption of technology has revolutionised the product offerings, service standards and delivery of the financial services. Big Data and Artificial Intelligence (AI) are helping banks and financial institutions to achieve unprecedented efficiency in their operations. In this context, the role of human capital assumes much importance and competency will be the new currency. Those who embrace continuous learning will be able to thrive in the fast changing workplaces.

The Indian Institute of Banking & Finance (IIBF) will host the biennial Conference of Asian-Pacific Association of Banking Institutes (APABI) at Mumbai on 14th November 2024. The conference will be attended by the delegates from various countries and banking and finance professionals from India.

The conference will focus on the theme "Paradigm Shift in Banking - Moving Towards a Resilient, Inclusive and Sustainable Model". The key sessions will focus on the various aspects of banking and financial sectors i.e. preparing future ready banking professionals, digital transformation in banking sector, climate risk and sustainable finance and role of AI and big data in the growth of financial sector.

On the occasion of APABI Conference, I am glad to present a Special issue of Bank Quest containing articles from well-known industry leaders and International Institutions of repute.

Under the able leadership of Mr. Atul Kumar Goel, Managing Director & Chief Executive Officer, Punjab National Bank and President, IIBF, the Institute is taking new strides on the path to academic excellence. This issue features an article authored by Mr. Goel on "Emerging Opportunities for Savings and Investment". The article highlights the emerging trends and opportunities in the savings and investment like impact investing and sustainable investing. This article also explains the role of banks and financial markets in revolutionising savings and investment space.

In past few years India has witnessed transformational shift in the banking & finance sector. Bank of Baroda, one of the prominent Public Sector Banks in India has taken several customer centric initiatives under the aegis of Mr. Debadatta Chand. We are glad to share the vision of Mr. Debadatta Chand, Managing Director & Chief Executive Officer, Bank of Baroda on "Paradigm Shift in Banking: Moving Towards a Resilient, Inclusive and Sustainable Model". This article delves into the historical evolution, present challenges and future opportunities for India's banking sector, with a focus on how it can build a more inclusive, resilient and sustainable financial ecosystem.

Bank of India is one of the prominent public sector banks with a strong foothold across India. Mr. Rajneesh Karnatak, Managing Director & Chief Executive Officer, Bank of India has eloquently testified the significant changes in banking through the article on “Paradigm Shift in Banking: Moving Towards a Resilient, Inclusive and Sustainable Model”.

Indian Overseas Bank has is one of the fourteen banks in India which was nationalised in 1969. It has a niche legacy of specializing in foreign exchange business in banking. Mr. Ajay Kumar Srivastava, Managing Director & Chief Executive Officer, Indian Overseas Bank had expressed his views on the “The Role of Banks in Addressing Climate Change” in the next article of this issue.

Our next article on “Democratizing Investments: A New Era for Savings and Investments” is written by Mr. Baskar Babu Ramachandran, Managing Director & Chief Executive Officer, Suryoday Small Finance Bank. Mr. Babu has prudently summarised his thoughts on savings and investments into 6 prominent themes and emphasised that banks should develop trust based relationship with customers and protect their long-term interests and the well-being of the ecosystem.

Indian banking history is rich and multifaceted, reflecting the country’s economic evolution. The next article by Mr. Binod Kumar Mishra, Deputy Managing Director (HR) & Chief Development Officer, State Bank of India on “Paradigm Shift in Banking: Moving Towards a Resilient, Inclusive and Sustainable Model” discusses in detail about how banks in India have evolved over a period of time, keeping in tunes with the current and future requirements.

The recent developments in financial products and policy are shaping a more dynamic, competitive and customer-centric banking landscape in India. The article penned by Dr. Soumya Kanti Ghosh, Group Chief Economic Adviser, State Bank of India and Dr. Tapas Kumar Parida, Economist, State Bank of India on “Changing Contours of Indian Banking” depicts a comprehensive picture of Indian Banking System with valuable insights for a promising future of banking.

IIBF and Chartered Banker Institute, United Kingdom have a long standing relationship with shared commitment to better education, to increased professionalism and to responsible banking. This issue features an article by Dr. Giles Cuthbert, Managing Director, Chartered Banker Institute, United Kingdom on “Where responsibility lies when it comes to AI Ethics in Banking”. This article is based on the research work of Dr. Cuthbert on ethics of using Artificial Intelligence (AI) in banking. Dr. Cuthbert has explained the significant concepts of “agency” and “responsibility” in AI ethics.

AI and Machine Learning brings to the table both opportunities and challenges. To optimise their benefits and also considering the risks associated with it, focus should be on ethical considerations, responsible development and inclusive policies that ensure broad access to AI advancements. In this Special Edition of bank Quest, we are also publishing an article on “A Shared Future for Humankind Underpinned by Artificial Intelligence and Machine Learning Technologies” by Publications Sub-Committee, The Hong Kong Institute of Bankers. This article highlights how AL & ML are reshaping the industry at large.

The Taiwan Academy of Banking and Finance (TABF) is an integral part of APABI and currently serving as the Secretariat, APABI. TABF actively collaborates with APABI member countries to develop policies, foster regional cooperation and promote excellence in banking and finance. The article on “Taiwan responds to increasingly sophisticated fraud models with Financial Education” by Mr. David Stinson, Research Fellow, Taiwan Academy of Banking and Finance discusses in detail the new methods adopted for frauds at Taiwan and benefits of financial education to curtail them.

The integration of AI and big data in banking is driving the wave of innovation in the financial sector. Our next article on “Banking on Data: The Power of AI and Big Data”, penned by Mr. Burra Butchi Babu, Former, General Manager, Bank of India explores the potential of AI in redefining the customer experiences.

This issue also features an article written by Mr. Raj Kumar Sharma, Chief Manager, Union Bank of India on “The F.I.R.E. Movement”. Mr Raj Kumar Sharma has discussed the concept of “Financial Independence, Retire Early” and shared his opinion on avenues of savings and investment in Indian context.

I hope this Special Edition of Bank Quest will ignite many minds to delve deeper into new dimensions of knowledge. I thank all the authors as well as our readers for their continued support in our academic endeavours.

Biswa Ketan Das

Emerging Opportunities for Savings and Investment

Atul Kumar Goel*

Savings provide the necessary funds for investment, which in turn drives economic growth by increasing the capital stock and improving productivity. In case of India, which recorded growth of 8.2% in FY 2023-24 this relationship has proven to be particularly significant. India's saving rate has been relatively high compared to many other countries, which has supported robust investment levels. India's per capita GDP has been on a constant uptrend which has supported growth in household savings. Higher savings have generated demand for newer avenues of investment. Consequently, product differentiation in the saving and investment space has taken place to attract greater number of investors.

In India, citizens have started gradually moving away from traditional modes of saving and investment such as investing in gold, post office savings schemes, fixed deposits, recurring deposits, life insurance policies, etc. However, these traditional methods remain widely used, particularly in rural areas and among the older population, owing to their simplicity and familiarity.

India's economic reforms for e.g. liberalisation, introduction of GST, Insolvency and Bankruptcy Code etc., aimed at improving resource efficiency through market-oriented policies, have positively impacted savings and investment rates. These reforms have led to impressive trends and constantly emerging new opportunities in savings and investment, particularly when compared to other developing countries. These opportunities stem from technological advancements, evolving consumer behaviour and shifting market trends.

In recent years, households have begun shifting from traditional savings instruments to investing in mutual funds as well as directly in the stock market. These are becoming increasingly attractive especially for younger investors. The mutual fund industry is consistently coming up with newer and innovative products with varying risk and returns to cater to different investor appetite.

The mutual fund industry in India has emerged as a powerhouse, attracting a surge of investors seeking avenues for wealth creation and financial growth. The industry achieved a significant milestone when its Assets Under Management (AUM) crossed Rs. 10 trillion for the first time in May 2014. The AUM of the mutual fund industry has become 6 times to reach 61.33 trillion in June 2024. Investor's interest in Systematic Investment Plans (SIPs) of Mutual Fund has grown manifold. With the total outstanding number of SIP accounts in FY21 at 37.3 million, same has grown to 84.0 million by end of FY24 witnessing a Compound Annual Growth Rate (CAGR) of 31%. In contrast, trend of deposit growth graph of Scheduled Commercial Banks (SCBs) is on a declining.

Emerging Trends and Opportunities in the Saving and Investment Space

Sustainable Investing has evolved from a niche sector to a mainstream investment strategy. Investors are increasingly driven by the desire to align their

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portfolios with their personal values and contribute to broader societal goals. This shift is evident from the growing number of investment products and funds that focus on Environmental, Social and Governance (ESG) criteria. One prominent example of this trend is the surge in ESG-focused mutual funds and Exchange-Traded Funds (ETFs). Globally too, Assets Under Management (AUM) in sustainable funds reached $3.4 trillion by the end of 2023 vs. $1.4 trillion from 2018, reflecting a significant increase from previous years. On the sustainability front, banks in India also has something new to offer with the Reserve Bank of India (RBI) introducing a framework for green deposits in April 2023. These financial instruments extend beyond the ordinary; they represent a dedication to environmental preservation, providing investors with a distinctive combination of financial stability and ethical investment opportunities.

Government incentives and subsidies for renewable energy projects are further supporting growth in this sector. For instance, the Electric Vehicle (EV) market is expanding rapidly, driven by advancements in battery technology and increasing consumer demand for eco-friendly transportation. The rise of EV infrastructure, such as charging networks, also presents investment opportunities in supporting technologies and services. Further, green bonds are also gaining traction among retail investors and financial institutions are increasingly re-orienting their portfolios by funding more of environment friendly projects. India too introduced the concept and recently Government has planned to accumulate Rs. 20,000 crore through Sovereign Green Bond during H2 FY25.

Impact Investing goes a step further by targeting investments that aim to generate measurable social or environmental impact alongside financial returns. The Global Impact Investing Network (GIIN) provides a platform for investors to explore opportunities in this space. Through impact investments, investors can support initiatives such as clean water access, renewable energy projects and affordable housing, contributing to positive societal changes while pursuing financial returns.

Financial Technology (FinTech) is revolutionizing how individuals and businesses manage their finances. Innovations in fintech are creating new opportunities for savings and investment, making financial services more accessible and efficient. **Robo-advisors** are automated platforms that provide investment advice and portfolio management services using algorithms. These platforms democratize access to professional financial advice and help investors manage their portfolios with minimal effort. **Peer-to-Peer (P2P)** lending platforms connect borrowers directly with individual investors, bypassing traditional financial institutions. P2P lending offers opportunities for diversification and potentially higher returns compared to traditional savings accounts, though it also involves credit risk and requires careful evaluation of borrower profiles. RBI has come up with guidelines for P2P lending aimed at providing an environment of transparency and protection to both stakeholders while managing risks. **Crowdfunding platforms** have also gained traction recently allowing investors to support innovative ideas and potentially benefit from early-stage equity investments or rewards.

The **real estate sector** is also experiencing significant changes due to technological advancements. Online property platforms have transformed the real estate buying and selling process. Additionally, Real Estate Investment Trusts (REITs) offer a way to invest in real estate without directly owning properties, thereby, facilitating small-value investors to invest in these. According to a recent report by CBRE South Asia Pvt. Ltd (Indian Real Estate consulting firm), the potential market size for Small and Medium REITs (SM REITs) in India is expected to exceed $60 billion by 2026. The rise of specialized REITs, such as those focused on data centres or healthcare facilities, offers further diversification opportunities.

Digital gold investments represent a significant advancement in traditional gold investing, leveraging technology to improve accessibility and flexibility for modern investors. This approach combines the benefits of conventional gold investment with the convenience of digital solutions, allowing individuals to own gold in a digital format that is securely tied to physical gold stored in vaults. Additionally, digital gold can be easily integrated with a range of financial products, such as robo-advisors, savings accounts and investment portfolios, providing a holistic approach to wealth management. Orderly digital gold market growth is crucial to protect savings, ensure transparency and deter misuse. Implementation of guidelines and oversight aligned with the broader digital asset agenda is the call of the hour.

Round-up investing represents an emerging trend in savings technology that streamlines the investment process through small, incremental contributions aimed at constructing investment portfolios. This financial strategy automatically allocates the spare change from routine transactions into a savings or investment account. The method entails rounding each purchase to the nearest dollar (or another predetermined increment) and transferring the resulting difference into an investment account. This approach to investing simplifies the saving and investment process by automating contributions, thereby, relieving users from the need to actively manage their investments or remember to make regular deposits. By consistently investing modest amounts, users can gradually accumulate wealth without placing a significant strain on their daily budgets. This method is especially advantageous for individuals who struggle to save substantial sums at once and can assist users in cultivating regular saving habits. Furthermore, platforms leverage artificial intelligence and data analytics to deliver insights into user behaviour, refine investment strategies and provide tailored recommendations based on spending habits and financial objectives.

Save Now, Buy Later (SNBL) represents a novel approach in savings technology designed to assist individuals in systematically saving for future purchases. This financial strategy enables users to allocate funds in advance for designated purchases or financial objectives, leveraging technology to streamline and oversee their savings efforts. The primary goal is to foster consistent saving behaviour by regularly setting aside modest amounts until the desired total is achieved, thereby, empowering individuals to make purchases or investments without any dependence on credit. General financial regulations and consumer protection laws would apply to SNBL services offered by financial institutions and fintech companies in India.

India's fintech revolution is reshaping the landscape of personal savings, introducing innovative technologies that make saving money more accessible, engaging and rewarding for millions of users. At the forefront of this transformation are digital savings accounts offered by neobanks like Jupiter, Fi and Niyo, which provide higher interest rates than traditional banks, seamless mobile-based account opening and advanced budgeting tools. These digital-first platforms are complemented by micro-savings apps such as Jar and Spenny, which leverage behavioural economics principles to encourage saving habits by rounding up transactions and automatically investing the difference.

The concept of community savings has also gone digital, with platforms offering modern versions of traditional rotating savings groups, peer-to-peer savings challenges and social features that allow users to share progress and motivate each other. Additionally, hybrid savings-investment products are emerging, automatically investing a portion of savings in low-risk mutual funds while allowing users to adjust their savings-to-investment ratio based on individual risk appetites. These technological innovations are not only making saving more convenient and

engaging but also more inclusive, reaching previously underserved populations and promoting financial literacy.

Opportunities in the Existing Savings and Investment Space

The scope of savings technology in India is vast and multifaceted, presenting significant opportunities for innovation and growth. The potential market spans from urban professionals to rural farmers, each segment presenting unique needs. Savings tech can revolutionize how Indians manage their finances, from basic savings accounts to more complex investment products. Mobile-based platforms have the potential to reach millions of unbanked individuals, offering them secure and convenient ways to save money. For the tech-savvy middle class, Artificial Intelligence (AI)-driven savings apps can provide personalized financial advice and automated savings plans. In the realm of micro-savings, technology can enable people to save small amounts frequently, accumulating substantial savings over time.

Pradhan Mantri Jan Dhan Yojana (PMJDY): An integration of savings tech with Government initiatives like PM Jan Dhan Yojana (PMJDY) can further expand its reach. PMJDY has transformed the banking and financial landscape of the country over the past decade. Since its inception, more than 53.14 crore beneficiaries have been banked under PMJDY. Total deposit balance under PMJDY accounts has surpassed Rs. 2.3 lakh crore. From 15.67 crore in March 2015, the number of PMJDY accounts have grown to 53.14 crore (as on 14-08-2024) - growing by 3.6 times. Around 55.6% Jan-Dhan account holders are women and around 66.6% of Jan Dhan accounts are in rural and semi-urban areas. However, there is still scope for further inclusion, as per the Multiple Indicator Survey 2020-21 of Ministry of Statistics and Programme Implementation (MoSPI), there is roughly 10% which do not have a formal bank account. So going ahead, enhancements could include expanding high-speed internet access in rural areas, promoting mobile banking and integrating emerging technologies like blockchain and AI for transparency and personalized financial services. Additionally, comprehensive financial and digital literacy programs, incentives for digital transactions, special schemes for women and marginalized groups can further boost financial inclusion.

Future ready Microfinance Institutions (MFIs): The KPMG in India survey highlights the evolving microfinance sector with fintech partnerships. Nearly 75% of surveyed MFIs have fintech alliances and the rest are planning to explore them. A balance between technology and human touch is crucial, with fintech innovations like Machine Learning improving asset quality. Digital transformation will drive future microfinance, with connected enterprise architecture being key. For a future ready MFI integration with Account Aggregator platforms, workforce training and regulatory standardization are vital for efficiency. This approach can lead to more effective savings strategies. In India, Self-Help Groups (SHGs) have seen substantial growth and transformation mainly propelled by the schemes like Lakhpati Didi.

Improving Entrepreneurship: There are opportunities for startups established fintech companies and traditional banks to innovate in this space. India has the 3rd largest startup ecosystem in the world which is expected to witness consistent annual growth of 12-15% going ahead. Further, the Udyam Registration Portal, launched on July 1, 2020, has witnessed significant uptake. Udyam Portal is an online platform launched by the Government of India to facilitate the registration of Micro, Small

and Medium Enterprises (MSMEs). The number of registrations over the years reflects a robust growth trajectory, with 2.49 crore MSMEs registered in the fiscal year 2023-24 alone. As of July 31, 2024, total number of MSME enterprises registered on the portal stands at 63.41 lakh.

Role of Banks: Banks are playing a crucial role in the backdrop of these emerging trends. They are embracing digital transformation by developing innovative financial products tailored to diverse customer needs. This includes creating user-friendly digital platforms for seamless banking experiences and offering personalized savings and investment solutions. Digital transformation has enabled the integration of advanced technologies like artificial intelligence and data analytics, enhancing customer insights and improving service delivery. Further, by leveraging fintech partnerships, banks are offering a wider range of products such as robo-advisors and mobile banking apps.

Financial Market: In recent years, there has been a retail equity revolution in India. The number of Demat accounts in India grew from 41 million in March 2020 to 154 million by April 2024 with a CAGR of 39%. This growth has been accompanied by a substantial rise in average daily turnover, which increased from INR 7 trillion in FY20 to INR 112 trillion in the first nine months of FY24. Further, the RBI's Retail Direct Scheme has improved access to Government securities for retail investors who are able to directly invest in Government securities (in both primary and secondary market). Since its inception in November 2021, total number of registrations under the scheme have crossed 2.06 lakh with more than 1.49 lakh accounts opened and the scheme is expected to gain greater traction in coming years.

As financial literacy improves and digital adoption increases, the demand for sophisticated savings products is likely to grow in the country. Moreover, the regulatory environment in India is increasingly becoming supportive of innovations, further broadening the scope for savings technology. As the regulatory environment adapts to these innovations, the future of savings in India looks increasingly digital, automated and tailored to individual needs and goals.

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BANK QUEST THEME

The theme for Bank Quest, January - March, 2025 is identified as "Cyber Risk Management".

Paradigm Shift in Banking: Moving Towards a Resilient, Inclusive and Sustainable Model

Debadatta Chand*

The Indian banking sector has been undergoing a significant transformation in recent years. More specifically, the sector has witnessed monumental changes in the last few decades such as addressing long-standing issues including addressing the twin issues of Non-Performing Assets (NPAs) and capital to becoming a leader in adopting digital technologies for financial inclusion. The paradigm shift in the banking industry is aimed towards a more resilient, inclusive and sustainable future. This is important as India seeks to position itself as a global economic powerhouse which will require the banking system to evolve in a meaningful manner in order to meet new demands, such as financing infrastructure development, supporting Small and Medium-sized Enterprises (SMEs) and adopting sustainable business practices to mitigate the risks posed by climate change. Such an approach is also essential as we embark on the journey to become the third largest economy in the world.

This article delves into the historical evolution, present challenges and future opportunities for India's banking sector, with a focus on how it can build a more inclusive, resilient and sustainable financial ecosystem.

The imperative of banking as the enabler of growth

India remains the fastest growing major economy in the world. India's growth potential remains unmatched, with the Government aiming to transform the nation into a developed entity by the centenary of its independence in 2047. While there is no precise definition for a developed economy, it is widely believed that a per capita income of between US$ 12,000-15,000 per annum could be a reasonable threshold for qualifying as a developed country. India's per capita GDP in 2023 stood at US$ 2,731. India could achieve a per capita GDP of around US$ 14,000, by 2041-42, with the overall size of the economy estimated to be ~US$ 22 trillion. In fact, India is expected to become a US$ 5 trillion economy by 2027-28 and US$ 10 trillion economy by 2034, even if we assume a conservative 10% growth in per capita income.

Needless to say, that achieving this ambitious target will require significant investments in infrastructure, manufacturing and innovation and will require massive funding. The banking sector will play a key role in this, as the Indian economy is still dominated bank-led financing as opposed to market-led financing. In fact, a breakup of the funding sources for 2023-24 indicates that banks continued to be major source of finance. In 2023-24, India's GDP was around Rs. 295 lakh crore, of which fixed capital formation was 31% which translates to around Rs. 90 lakh crore. The broad sources of finance were (only illustrative as there would be overlap in some sources):

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- Bank credit: Rs. 12 lakh crore (50% of incremental credit of around Rs. 22 lakh crore go as term loans).
- Corporate bond issuances: Approx. Rs. 8-9 lakh crore.
- External Commercial Borrowings (ECBs): About $ 50 bn which is around Rs. 4-4.5 lakh crore
- FDI was around $ 70 bn which is around $ 6 lakh crore
- Equities of Rs. 1-2 lakh crore in a good year.
- Government capex Rs. 11 lakh crore.
- State capex: Around Rs. 8-9 lakh crore.
- NBFCs incremental credit would be around Rs. 1-2 lakh crore as long term loans.
- Other sources would be around Rs. 15-20 lakh crore through internal accruals and other sources.

While there has been some diversification in the Indian financial landscape, the banking sector still remains the most relevant. This is due to the relatively underdeveloped capital markets, which are still not positioned to provide the scale of financing needed for large infrastructure projects. As a result, banks are the primary source of capital for most industries, including manufacturing, agriculture and Small and Medium Enterprises (SMEs). As per a recent analysis, to achieve the target of US$ 30 trillion GDP by 2047, growth in India's financial sector will need to be scaled up by 20 times. This will require US$ 4 trillion of capital base in banks, 1/3rd of which will have to be fresh capital deployment.

India's infrastructure needs are enormous, with projects like highways, railways, airports and smart cities requiring massive investments. Banks are expected to provide the bulk of financing for these projects, particularly public sector banks. The Indian Government's focus on developing infrastructure projects like highways, railways and smart cities presents enormous funding requirements. Public Sector Banks (PSBs) and private banks are expected to provide long-term financing for these large-scale projects. The role of banks in financing infrastructure development is hence, crucial, as access to credit is a key driver for economic growth.

In the past as well, banks especially Public Sector Banks (PSBs) have played an active role in supporting Government's infrastructure initiatives like the Pradhan Mantri Awas Yojana (PMAY) for affordable housing and the Smart Cities Mission, which aims to develop 100 smart cities across India. This has worked in parallel with supporting major financial inclusion programmes like the Jan Dhan Yojana. PSBs had also taken the lead in funding the expansion in infrastructure in the earlier decade.

A combination of astute Government policies along with a well-functioning domestic financial market will be essential for India to truly emerge as an economic powerhouse. In order to achieve this, banks will play a major role.

Future of Banking

As India's banking sector continues to evolve, it faces both opportunities and challenges in the coming years. The digital transformation of banking, financial deepening and the consolidation of public sector banks will shape the future course of the industry.

The financial sector is experiencing rapid digitalisation and innovation. While all of us strive to enhance financial inclusion, optimise digital payments and

harness emerging technologies like blockchain and artificial intelligence, we also confront the inherent unpredictability and interconnectedness of the global financial system. The one factor which will be closely monitored will the resilience of the banking system on a real time basis. This is so because as the economy expands, growth will never be smooth and there will be different phases that have to be traversed. This is where banks need to be nimble and perspicuous during good times and have buffers in place to be used when the business cycles are not favourable. To ensure this, the structures built revolving around business need to be strong.

Resilience

While the banking system today is on a strong footing led by low NPA levels and more than adequate levels of capital and liquidity buffers, it was not always the case. In the past, Scheduled Commercial Banks (SCBs) were marred by a host of issues including high levels of NPAs, even as returns on assets and equity were declining. The roots of the NPA crisis could be traced back to the aggressive lending practices adopted by the banks during the early 2000s, particularly for infrastructure projects. While much of these loans were initially profitable, delays and cost overruns in several infrastructure projects along with legal challenges in terms of land issues resulted in increasing incidence of defaults on repayments. This led to a sharp rise in NPAs. This marks a strong turnaround from the issues which were plaguing the banking system just a few years ago.

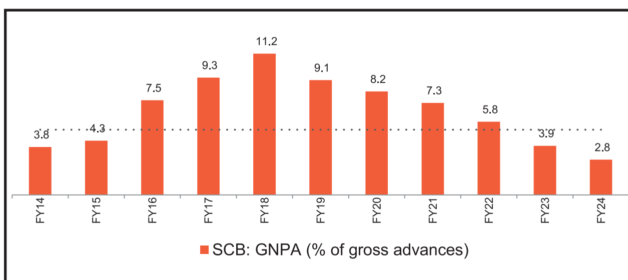
To address this, RBI initiated the Asset Quality Review (AQR) in 2015 with the objective of cleaning up balance sheet of SCBs. The AQR was aimed at ensuring that banks recognized NPAs transparently and made adequate provisions for bad loans. This marked a shift towards better governance and transparency in the banking sector. As a result of this, stressed accounts were reclassified as NPAs and expected losses on stressed loans, not provided for earlier under flexibility given to restructured loans, were provided for. This was complimented by a comprehensive strategy adopted by the Government, namely the "4R's strategy". This consisted of:

1. Recognition: Transparent recognition of NPAs.
2. Resolution: Recovery and resolution of bad loans.
3. Recapitalization: Injecting capital into stressed public sector banks.
4. Reforms: Implementing long-term reforms to prevent future crises.

With the proper recognition of restructured loans, provisioning requirements, especially of public sector banks, surged. In addition to this, the RBI also introduced the guidelines for the revised Prompt Corrective Action (PCA) framework in 2017. Under this, capital, asset quality and profitability were the key areas for monitoring. The PCA was introduced with the objective of timely intervention and taking corrective measures in an opportune manner. This, in turn, could help to restore the financial health of banks that are at risk by limiting deterioration in their health and preserving their capital levels. Under the PCA framework, restrictions were imposed on banks which included limits on lending, dividend-distribution and branch expansion, as well as requirement of higher provisions. At its peak, 12 banks were placed under the PCA framework.

A massive recapitalisation of Rs. 1.57 lakh crore was undertaken by the Government during 2015-2022. This recapitalisation was an important contributor to financial stability of banks and the overall banking system. The pain was severe, but beneficial effects started to show up from 2018, resulting in improved asset quality – the gross non-performing assets ratio fell from a peak of 11.2% in March 2018 to 5.8% in March 2022. By 2022, all troubled banks had exited the PCA. This was also complimented by other regulatory interventions in the form of setting up of Insolvency and Bankruptcy code (IBC) and the National Asset Reconstruction Company Limited (NARCL). These helped in creating an institutional environment for addressing stress in banks' balance sheets on an ongoing basis. Apart from this, Government also undertook bank consolidation, which involved merging smaller public sector banks to create stronger, more resilient institutions. Most significantly, in 2019, 10 public sector banks were merged into 4 larger banks. This move was intended to strengthen the banks' balance sheets, improve operational efficiency and reduce costs.

Figure 1: GNPA ratio of SCBs on a decline

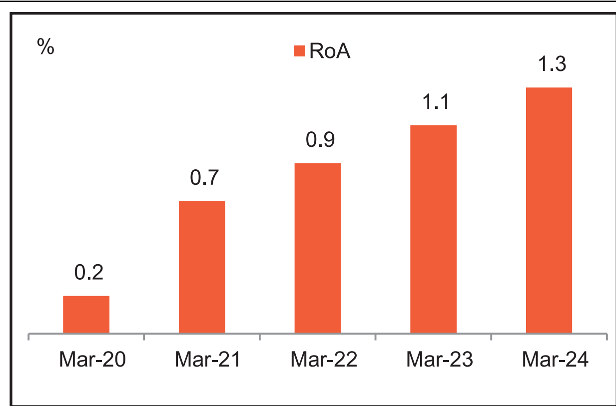


Source: Financial Stability Report, RBI

The financial system went through a different kind of turbulence with the NBFC crisis just before COVID struck which led to considerable risk aversion in the market. The downturn in this segment exposed severe asset-liability mismatches in the NBFC sector, leading to a liquidity crunch and a subsequent slowdown in credit availability. The RBI stepped in with liquidity support and imposed stricter regulations to bring stability to the NBFC sector. This was followed by the COVID-19 pandemic which led to widespread disruptions across all sectors, including the banking sector. The crisis tested the resilience of India's financial system, particularly in areas such as maintaining liquidity, handling loan defaults and ensuring financial stability. The RBI responded swiftly with measures like moratorium on loan repayments, liquidity infusion and restructuring packages for businesses hit hard by the pandemic. Banks played a critical role in ensuring that credit continued to flow to sectors like healthcare, MSMEs and agriculture during the pandemic. Public sector banks extended emergency credit lines to businesses to help them weather the storm.

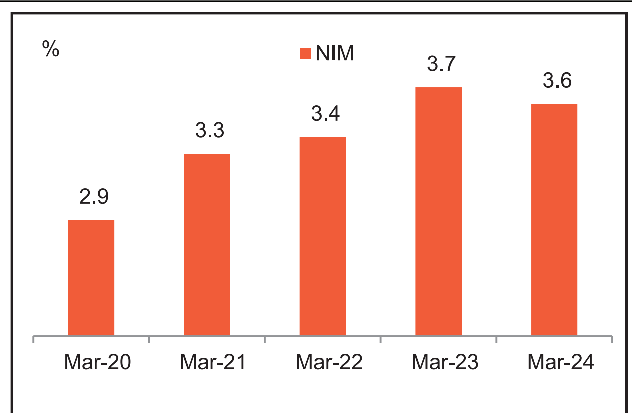
The banking system emerged stronger from the pandemic led by a sustained uptick in the business cycle. There has been a considerable improvement in the profitability of banks as is visible from a sustained increase in banks' Return on Assets (RoA). This is further complimented by decline in NPA ratio leading to strong capital buffers. At 16.8% as of March 2024, the Capital to Risk-weighted Assets Ratio (CRAR) of banks is comfortably above the minimum regulatory requirement. In fact, RBI's Banking Stability Indicator (BSI) shows that overall stability of the banking system improved on the back of stronger capital levels, higher earnings and decline in the stock of NPAs, including restructured asset. In turn, these developments are catalysing a broad-based and sustained credit expansion.

Figure 2: Sustained increase in Return on assets by SCBs



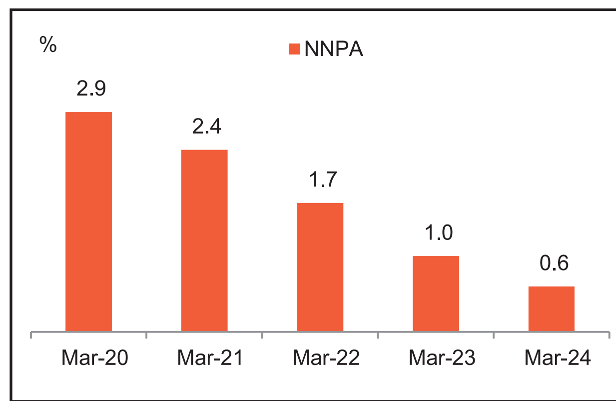
Source: Financial Stability Report, RBI and Bank of Baroda Research

Figure 3: Net Interest Margin (NIM) at comfortable levels



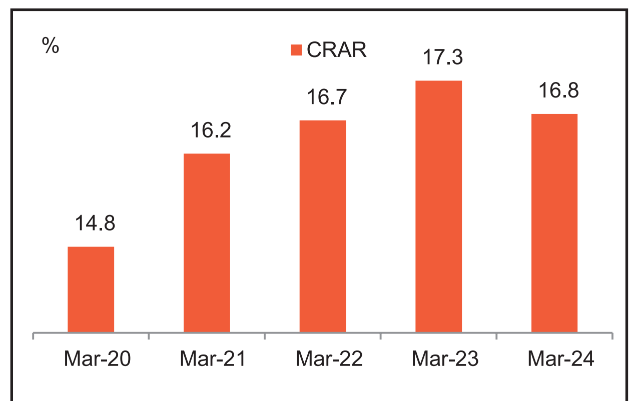
Source: Financial Stability Report, RBI and Bank of Baroda Research

Figure 4: Net NPAs at decadal low



Source: Financial Stability Report, RBI and Bank of Baroda Research

Figure 5: SCBs are well capitalized



Source: Financial Stability Report, RBI and Bank of Baroda Research

In the last few years, the Government has undertaken a series of reforms aimed at credit discipline, responsible lending and improved governance as well as adoption of technology, amalgamation of banks etc. which have contributed to the overall health of the banking system in India. There has been a significant enhancement in the asset quality of banks, led by improved borrower selection, more effective debt recovery and heightened debt awareness among large borrowers. In addition to regulatory capital and liquidity requirements, qualitative metrics such as enhanced disclosures, robust code of conduct and transparent governance structures also improved banking performance. Simultaneously, the financial landscape in India is also undergoing a structural transformation, driven by factors like innovations in technology, financial deepening and changing savings and investment patterns, etc. Each of these shifts has a bearing on how financial entities carry out their business and adapt to the emerging risks.

Digitization

As India emerges as a global leader in digital transformation, its banking sector has been at the forefront of adopting technological innovations to enhance financial inclusion, improve operational efficiency and offer better services to customers. From fintech startups to the rise of blockchain and Artificial Intelligence (AI), technology has revolutionized the Indian banking landscape. This has been facilitated to a large extent by the Digital India Initiative and the subsequent adoption of the Jan-Aadhaar-Mobile (JAM) trinity. The Digital India Initiative was launched by the Government in 2015. The initiative aimed at transforming India into a digitally empowered society. The banking sector has been a key participant in this initiative through the use of the JAM Trinity which includes the following:

- Jan Dhan Accounts: The creation of zero balance bank accounts for the unbanked population.
- Aadhaar: The world's largest biometric identification system, linking citizens to financial services.
- Mobile Phones: The widespread adoption of smartphones and mobile internet has enabled digital banking and payments to become more accessible.

Other reforms such as India Stack, e-KYC and Unified Payments Interface (UPI) led to a tectonic shift in India's financial landscape. While a deep telecom penetration and availability of internet were the major drivers for this process, the catalyst for the transformation was the COVID-19 pandemic. The pandemic necessitated the need for digital payments and banks too recognised the need to respond to customer demand. Banks offered technology that provided financial safeguard, with 24x7 banking, credit and direct benefit transfer among other services.

Digital banking in India refers to the use of digital channels such as mobile banking, internet banking and any other digital platforms for banking operations. With the introduction of digital banking, customers can now carry out banking transactions from the comfort of their homes. It has not only made banking more accessible but also more efficient.

In India, the digital banking revolution began with the introduction of internet banking. Almost all banks in India offer internet banking services which allows customers to perform a wide range of banking transactions, including fund transfers, bill payments and account balance inquiry. Following the success of internet banking, banks started offering mobile banking services. Mobile banking has become increasingly popular in India, particularly because of the widespread use of smartphones coupled with affordable internet access. As smartphone penetration surged, internet data costs plummeted, making online services accessible to a broader audience and setting the stage for an unparalleled digital revolution. Between 2014 and 2022, smartphone penetration skyrocketed from 15% to 66% of the population, while the cost of data came down sharply from Rs. 260/GB to a mere Rs. 7/GB. This transformation, from mobile internet as a luxury to a daily necessity, played a pivotal role in enhancing accessibility to digital banking services across the nation. Customers could use their mobile devices to transfer funds, pay bills and check account balances.

All these developments contributed to the increased use and adaptation of digital channels by individuals in

the country. From a primarily a cash-based economy, India has now become a world leader in real-time digital payment. Estimates suggest that almost 40% transaction in India are now done digitally. This has, in turn, fostered the growth of a thriving FinTech sector in the country. Publicly available information places the number of FinTechs founded in India at approximately eleven thousand (11,000). The sector has received investments of about US$ 6 billion in the last two years alone. The rise of the fintech sector is likely to intensify the competition for banks and can disrupt traditional banking models. These tech-driven companies offer services with lower costs and better customer experience, compelling banks to adapt quickly or risk losing market share. However, it also presents an opportunity which will hinge on a successful collaboration between banks and fintech companies, thereby, creating new opportunities for innovation.

Inclusive lending

Financial inclusion remains a key priority for the policymakers as it is the cornerstone for inclusive growth. The digital banking revolution in India has been beneficial in improving the access of financial services to rural areas, who previously had limited access to banking services. The progress of financial inclusion in India was catapulted by the digital banking revolution and the Pradhan Mantri Jan Dhan Yojana (PMJDY). Under the scheme, more than 53 crore beneficiaries have been brought under the formal banking system by opening a Jan Dhan account (as of Sep 2024), with more than 60% of these accounts in the rural/semi urban centres. Apart from this, these bank accounts have garnered a deposit balance of ~Rs. 2.3 lakh crore and resulted in the issuance of over 36 crore free-of-cost RuPay cards, which also provides an accident insurance cover of Rs. 2 lakh.

RBI's Financial Inclusion Index, which measures the level of financial inclusion based on three broad parameters i.e. access, usage and quality has also shown significant progress. The index rose to 64.2 in March 2024 from 53.9 in March 2021.

Even though, considerable progress has been made in expanding the scope of financial inclusion, digital banking channels will play a key role in ensuring the last mile connectivity. This will involve leveraging technology to deliver accessible as well as customised financial services. The success of digital India initiative has helped in bringing a wide proportion of rural population under formal channels which has also facilitated the steered direct benefit transfers from the Government to beneficiaries.

Priority Sector Lending is also an important aspect of financial inclusion. The scheme which was aimed at ensuring flow of credit to key sectors that had been overlooked by institutional lending, has evolved significantly over the years. This is to ensure that the scheme aligns more closely to the broader economic and social goals. Consequently, the scheme which initially included sectors such as agriculture and small-scale industries, has now expanded to areas such as MSMEs, education, renewable energy and more, while also applying to a broader range of banks.

In the coming years, financial inclusion will involve developing bespoke products and services which are best suited to different strata of the society depending upon their income level. This shall include innovative solutions which make it easier for people to not only access basic but also to use a variety of financial services.

Sustainability

Climate change continues to pose an existential threat to economies around the world. The financial sector and particularly banks, are also not immune to its impact. Banks are increasingly recognizing the risks posed by climate-related events and are taking steps to incorporate sustainability into their lending practices while also ensuring that they play a significant role in financing the transition to a low-carbon economy.

Climate change is manifesting itself at an alarming scale and pace globally. This poses a growing threat to economic growth and requires immediate and sustained action on all fronts. Recently, there have been growing instances of extreme weather events both globally as well as in India such as heat waves, droughts, flash floods and wildfires. While the risks that climate change poses on physical world is more apparent, it also possesses the potential to spill over into the financial sector. Climate events impact the real sector and by extension bank's exposure to these sectors, it has a direct bearing on risk management frameworks for banks and other financial institutions

In India, the agricultural sector is heavily reliant on the monsoon rains and hence, plays a major role in supporting the economy as well as food security. In 2023-24, emergence of El Niño event of 2023-24 brought this issue to the forefront. Due to this, average temperatures recorded in parts of country were much higher than normal years which impacted agricultural productivity, lower rainfall, diminished reservoir levels and contributed to lower agricultural production. This, in turn, impacted prices and inflation, while also affecting agricultural income and rural demand. Intuitively, these events can also have a detrimental impact on the loan-repayment capabilities of the borrowers and hence, the asset quality of banks. While there are serious limitations with respect to predicting these adverse climate events, quantifying their impact on the financial sector is also an uphill task. A key step for enhancing banks' preparedness to such events will require transparency in disclosing the amount of exposure at risk. Further, banks will also need to disclose the carbon intensity of their operations which will be crucial for developing an effective transition strategy.

Climate change also presents an opportunity for banks in terms of the need for green financing. The Indian Government has committed to an ambitious target of becoming a net zero carbon economy by 2070. The success of this will depend on financing key sectors effectively, thus, shaping the pace of decarbonisation. Some estimates place financing requirements to achieve net zero by 2070 to be close to US$ 10 trillion.

In recent times, the need for green finance has garnered considerable attention. Green finance can be loosely defined as finance which is directed towards projects with environmental benefits, such as projects which are aimed at reducing greenhouse emissions, improving energy efficiency or renewable energy. However, there is a need for reliable information on green projects and enhanced transparency. To tackle this, the RBI is working on the draft disclosure framework on climate-related financial risks. This is expected to limit the misplacing of assets and misallocation of capital due to inadequate information in the market. Apart from this, inclusion of renewable energy sector, under priority sector lending and the "Framework for Acceptance of Green Deposits" has also facilitated bank funding towards green activities/projects.

Banks will also need to relook their exposures to sectors which are inherently energy intensive and hence, lead to higher emissions. Sectors such as

steel, cement, aluminium, chemicals, pulp and paper, energy and transport are highly energy intensive and contribute to over 40% of global greenhouse emissions. These sectors will require significant funding to transition to production processes which reduces emissions. This will require devising specialized products which cater to specific needs of a particular industry.

Despite the long-term benefits, there are several difficulties in moving towards sustainable financing. These include scalability, as the market for green bonds is still at a nascent stage. There is a need to expand it significantly to attract larger issuances and diverse set of investors. Further, robust monitoring and reporting mechanisms are also required for assessing the authenticity and impact of green projects, financed through these frameworks. For this, technology will play a significant role in. Artificial Intelligence (AI) and big data analytics can help banks and investors weigh environmental risks alongside opportunities associated with green investments. Apart from this, banks also need to develop new products as well as devise policies to increase the uptake of existing products which align with green and transition finance.

Conclusion

India's banking sector is at the brink of a new revolution which combines a triad of growth with prudence, financial inclusion and sustainability. The challenges of the past, such as the NPA crisis and NBFC failures, have provided valuable lessons. This has led to reforms that have not only strengthened the sector, but have also made Indian banks better capitalized, more resilient and increasingly driven by technology and innovation.

The digital transformation has been fuelled by initiatives like UPI and the JAM Trinity, which is, in turn, enabling greater financial inclusion. The rise of fintech companies and their collaboration with banks, is reshaping the landscape, providing opportunities for banks to expand their services to previously underserved populations.

With changing times, sustainability and climate change have become even more pressing issues. As a result, role of bank has become even more important, as banks are playing a critical role in financing green projects and are incorporating Environmental, Social and Governance (ESG) principles into their risk management frameworks. In coming decade as well, the need for sustainable financing is only expected to rise further and banks will be key players in helping India meet its climate goals, such as net-zero emissions by 2070.

As banks expand their outreach and explore newer avenues, new opportunities will also bring new challenges for the banking sector. Adoption of artificial intelligence, blockchain and cybersecurity measures will become critical tools to navigate in the increasingly digitalized and globalized financial landscape. Regulatory and ESG compliance will also be extremely important for ensuring the long-term success of Indian banks.

India's ambition to become a US$ 30 trillion economy by 2047, will have to be supported by banking sector playing an indispensable role in financing infrastructure, supporting Small and Medium Enterprises (SMEs) and promoting financial inclusion. A resilient and well-regulated banking system is the backbone of economic growth and India's banks stand ready to drive the nation towards this ambitious goal.

Ultimately, India's banking sector 2.0 is on the path to becoming a much stronger, inclusive and sustainable version of its current self. This will also ensure that it remains a cornerstone of our country's growth and development for decades to come.

Paradigm Shift in Banking: Moving Towards a Resilient, Inclusive and Sustainable Model

Rajneesh Karnatak*

The banking landscape is undergoing a significant transformation driven by shifts in the financial ecosystem, technological advancements and evolving consumer preferences. Geopolitical tensions, cyber threats, trade wars, volatile markets and climate shocks emphasize the need for a banking model that is more resilient, inclusive and sustainable.

This shift is essential as we poise towards the vision of 'Viksit Bharat', a developed India by 2047. To prepare ourselves to serve that developed India, banks must focus on the following key issues.

Innovative Technologies

The rapid proliferation of affordable smartphones and the widespread availability of mobile internet have been key drivers of digital adoption in India. The convenience, speed and security offered by mobile-based platforms have made them a preferred choice for millions of users and have revolutionised how customers interact with banks. Technology advancements like Gen AI, blockchain, cloud computing, etc. will challenge traditional banking operations and their business models. While the good old banking is still unmatched in its stability and dependability, we can adapt these technologies into our processes and services to make them more affordable, efficient and secure.

Changing Customer Perception and Demands

India's demographic dividend, marked by a growing population of Gen Z and Millennials is changing customer's expectations. A 2021 NASSCOM report highlights that 52% of India's population comprises these tech-savvy generations and is above the global average of 47%.

These "Digital Natives" are fast emerging as a major influential consumer category in India whose aspirations and demands differ from our traditional customers. To attract and retain them, banks will have to rethink their customer engagement strategies and augment their services with hyper-personalisation and end-to-end digital journeys. This level of broad-based but bespoke solutions requires the employment of advanced data science and modeling tools. However, the strategy for providing hyper-personalised services will be to develop a fine balance between collecting enough data to make informed decisions and respecting customer's data protection rights.

Global Uncertainties and Geo-Political Challenges

The world is passing through one of its most tumultuous periods. Globalisation has coupled the world with itself in ways and forms that are not easily deducible. The interconnectedness of the global economy means that events in one part of the world can have unforeseen consequences elsewhere. The escalating geopolitical tensions, geo-economic

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fragmentation, climate change and disparate monetary policy strategies across world nations can have local repercussions. To face these challenges, banks require adept and robust risk management. Today, in our country, we have built world-class risk management frameworks. As profit-motivated institutions, the challenge is strategically balancing the risk management strategies with business objectives by carefully considering the timing and scale of interventions.

Comprehensive Risk Management

Banks need robust governance structures that can identify and mitigate risks across their entire operation. An effective enterprise-wide risk management approach considers on and off-balance sheet risks across all organisational levels and understand the interconnections between various banking operations.

A core component of risk management is cybersecurity. As digitalisation grows, so does the risk of cyber threats, affecting banking stability and customer trust. The scale and frequency of cyber attacks are on the rise, transforming cyberspace into the new frontier of geopolitical rivalry. Banks have already deployed sophisticated tools to counter such threats and ensure the security of customer data and financial transactions. Beyond technological solutions, banks must focus on strengthening their human firewall through staff training and customer awareness.

Another critical aspect is stress testing. Just as militaries rely on war games, modern banks rely on stress tests to gauge their resilience against adverse scenarios. Effective testing can reveal hidden weaknesses in a bank's balance sheet, lending practices and risk management strategies. By exposing these vulnerabilities, banks can adopt appropriate internal controls and develop contingency plans. To be effective, stress testing scenarios and shocks should reflect the uncertainties of our times and need to be constantly updated. The outcomes of these analyses should be thoroughly reviewed to refine banks' strategies.

Inclusive Business Model

Developing an inclusive business model has become a key focus for every institution. For banks, an inclusive business model begins with prioritizing financial inclusion. The progress achieved under flagship programs like Pradhan Mantri Jan Dhan Yojana (PMJDY) stands as a testament to what can be achieved through well-planned and concerted efforts. So far over fifty-three crore PMJDY accounts have been opened, bringing previously unbanked individuals into the formal financial system. Out of these, around thirty crore accounts belong to women marking a significant stride towards gender inclusive banking.

However, true inclusion extends beyond financial inclusion. It involves a diverse workforce and an inclusive organisational environment. A diverse workforce brings diversity of thoughts, culture and a better understanding of customer needs. This leads to improved performance and profitability.

Embracing Sustainability-Environmental, Social and Governence (ESG)

Sustainability is another key consideration. The impact of business operations on the environment is increasingly becoming a key consideration among corporations and policymakers. Banks also understand the critical role they play in perpetuating

climate-compatible business decisions in an economy. Mobilising climate finance is crucial for achieving sustainable growth and development. As climate risk guidelines are still evolving, banks must prioritise sustainability while proactively developing strategies to address both physical and transition risks.

Businesses across the world have now realised the fact that long-term profitability lies in the value addition of all stakeholders, especially the societies and communities they serve. As facilitators of capital, the positive impact banks create in society is unequaled. Beyond this core function of financial intermediation, banks also have the significant responsibility of providing access to financial services for underserved populations, promoting responsible lending practices and investing in initiatives that address social and environmental challenges. By embracing these responsibilities, banks can build trust, strengthen their reputation and contribute to a more equitable society.

Good governance is one of the fundamental pillars of any organisation, especially banks, as they are entrusted with safeguarding both finances and public trust. The safety and soundness of the banking system rely critically on effective governance, so that the interest of all stakeholders, especially the depositors, are protected. Good governance will help build an environment of trust, transparency and accountability. To achieve organisational resilience, we should continuously evolve by standardising policies, processes, organisational culture and governance.

Conclusion

As the saying goes, “The future belongs to those who prepare for it today.” The future of banking belongs to institutions that embrace innovation, adapt to change and prioritise resilience, inclusivity and sustainability. By leveraging technology, understanding evolving customer expectations and incorporating ESG principles into their operations, banks can navigate this paradigm shift and build a robust, inclusive and sustainable financial system. The journey towards a sustainable banking model requires collaboration among various stakeholders, including policymakers, regulators, financial institutions and technology providers. By working together, we can create a banking system that serves the needs of all stakeholders and contributes to a more equitable and sustainable future.

Bank Quest included in UGC CARE List of Journals

The University Grants Commission (UGC) had established a “Cell for Journals Analysis” at the Centre for Publication Ethics (CPE), Savitribai Phule Pune University (SPPU) to create and maintain the UGC-CARE (UGC – Consortium for Academic and Research Ethics). IIBF’s Quarterly Journal, Bank Quest has been included in UGC CARE list of Journals.

The Role of Banks in Addressing Climate Change

Ajay Kumar Srivastava*

India's ancient culture has long recognized the delicate balance between humanity and nature. For millennia, our forefathers lived in harmony with the environment, understanding that we are but stewards of this Earth, tasked with giving back to Mother Nature what we take from her. The principles of sustainability, conservation and reverence for the natural world are deeply ingrained in the Indian ethos.

In the Vedas, the sacred texts of Hinduism, we find countless references to the sanctity of the elements - water, air, fire and earth. The concept of "Vasudhaiva Kutumbakam," or "the world is one family," underscores our belief that all living beings are interconnected and deserve our care and protection. This holistic worldview has shaped a lifestyle centered on minimizing our ecological footprint and preserving the delicate balance of our planet.

Throughout India's rich history, this deep reverence for nature has manifested in various cultural practices and traditions. The planting of trees during auspicious occasions, the protection of sacred groves and the reverence for animal life are just a few examples of how our ancestors lived in harmony with the environment. The concept of "Chipko movement," where local communities hugged trees to prevent deforestation, is a testament to the ingrained environmental consciousness of the Indian people.

Unfortunately, as the world has rapidly industrialized and modernized, the delicate balance between humans and nature has been disrupted. The relentless pursuit of economic growth, coupled with unsustainable resource extraction and pollution, has led to the current climate crisis that threatens the very fabric of our existence. It is now more important than ever to revisit and revive the environmental wisdom of our ancestors and to find innovative ways to integrate these principles into our contemporary way of life.

The Global Awakening to Climate Change

While India's traditional wisdom has long recognized the importance of environmental stewardship, it is only in recent decades that the world has truly awakened to the pressing issue of climate change. The scientific community has unequivocally demonstrated the significant impact of human activities on the Earth's climate, leading to a global call to action.

The United Nations Framework Convention on Climate Change (UNFCCC), signed in 1992, marked a pivotal moment in the international community's efforts to address the climate crisis. This landmark agreement, later reinforced by the Kyoto Protocol and the Paris Agreement, has galvanized nations around the world to work towards a sustainable future.

These global pacts have set ambitious targets for greenhouse gas emission reductions, encouraged the development of renewable energy sources and promoted the adoption of climate-resilient practices across various sectors. They have also emphasized

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the importance of financial institutions in mobilizing the necessary resources and investments to facilitate the transition to a low-carbon economy.

The Role of the Financial Sector in Addressing Climate Change

The financial sector, including banking institutions, plays a crucial role in the global effort to address climate change. As the primary providers of capital, financial institutions have the power to direct investment flows towards sustainable projects and technologies, thereby, catalyzing the transition to a low-carbon economy.

By aligning their lending portfolios, investment strategies and risk management practices with sustainability principles, banks can incentivize the development of renewable energy, energy-efficient infrastructure and other climate-friendly initiatives. This shift towards "Green finance" not only supports environmental preservation but also creates new opportunities for economic growth and job creation in the emerging green economy.

Moreover, financial institutions can serve as important conduits for channeling climate finance from global sources, such as multilateral development banks and international climate funds, to local communities and projects in need of such investments. This cross-border flow of climate-related capital can be a game-changer in accelerating the implementation of mitigation and adaptation measures in developing countries like India.

India's Commitment to Climate Action

As a signatory to these global pacts, India has emerged as a leader in the fight against climate change. The country has set ambitious targets for renewable energy generation, with a goal of achieving 450 GW of installed capacity by 2030. Furthermore, the Indian Government has introduced a range of policy initiatives, such as the National Action Plan on Climate Change and the Perform, Achieve and Trade (PAT) scheme, to drive sustainable development and emission reduction.

These policy measures, coupled with targeted investments in renewable energy, afforestation and climate-resilient infrastructure, have positioned India as a global pioneer in the transition to a low-carbon future. The country's commitment to the Paris Agreement's goals, its active participation in international climate negotiations and its growing domestic climate action initiatives have earned it widespread recognition and respect in the global arena.

RBI Initiatives and Actions Taken

The Reserve Bank of India (RBI) is weaving climate consciousness into the fabric of India's financial system, underscoring the undeniable link between environmental health and economic stability. In early 2024, the RBI unveiled a draft disclosure framework, a proactive move compelling banks, financial institutions and non-banking companies to face climate risks head-on. This framework is not just a checklist-it is a roadmap for financial institutions to understand, prepare for and mitigate climate-related threats that could ripple through the economy. By naming climate change a risk to financial resilience and price stability, the RBI brings attention to how erratic rainfall and extreme weather events could send shockwaves through prices and supply chains alike, stressing the urgent need for climate-aligned financial strategies.

But the RBI's initiatives extend beyond warnings; they are fostering green growth. Renewable energy projects have now taken their place as priority lending sectors, a clear nod to sustainable development.

The introduction of green deposits reflects the RBI's support for eco-conscious investment avenues, setting a precedent for the industry to follow. With a vision to develop a robust regulatory framework, ensure payment systems can withstand climate impacts and work with the Government to create a unified climate taxonomy, the RBI's agenda is both ambitious and necessary. As one of the countries most vulnerable to the effects of extreme heat, India stands at a crossroads. The RBI's initiatives are a reminder that the path to financial stability is, in fact, green.

The Role of Financial Institution

As the backbone of India's financial ecosystem, Financial Institutions (FIs) are uniquely positioned to play a pivotal role in addressing the climate challenge. These institutions, with their vast reach and deep roots in the local communities, can leverage their resources and influence to catalyze climate-friendly initiatives.

1. Sustainable Lending Practices: Financial Institutions (FIs) can reorient their lending portfolios to prioritize investments in renewable energy, energy-efficient technologies and environmentally-conscious projects. By aligning their credit policies with sustainability principles, these banks can incentivize green investments and steer the economy towards a low-carbon future.
2. Green Financing Schemes: Financial Institutions (FIs) can develop innovative financial products and services tailored to support climate-resilient infrastructure sustainable agriculture and the transition to a circular economy. These specialized green financing schemes can help mobilize private capital and drive the widespread adoption of clean technologies.
3. Environmental Risk Assessment: Integrating climate-related risk assessments into their credit evaluation processes will enable Financial Institutions (FIs) to better understand and mitigate the potential impacts of climate change on their loan portfolios. This holistic approach will strengthen the resilience of the Financial Institutions (FIs) and safeguard the long-term interests of both the institutions and their customers.
4. Capacity Building and Awareness: Financial Institutions (FIs) can leverage their extensive networks to educate and empower their employees, customers and local communities on the importance of climate action. Through targeted training programs, knowledge-sharing initiatives and collaboration with environmental experts, these banks can catalyze a grassroots movement towards a sustainable future.
5. Operational Sustainability: Financial Institutions (FIs) can lead by example by adopting environmentally-conscious practices within their own operations. Measures such as reducing energy consumption, minimizing waste and promoting sustainable IT infrastructure can help these institutions lower their carbon footprint and inspire others to follow suit.

The Synergistic Potential of Public Sector Banks

By harnessing the synergies between the RBI's regulatory initiatives, the Government's climate action agenda and the unique capabilities of public sector banks, India can unleash the transformative potential of the financial sector in addressing the climate crisis.

Public Sector Banks (PSBs), with their widespread presence, deep community ties and trusted brand image, can serve as the conduit for channeling climate finance and catalyzing sustainable development at the grassroots level. These banks can work closely

with local Governments, community organizations and small-scale enterprises to identify and support climate-resilient projects, thereby, ensuring that the benefits of green investments reach the most vulnerable and underserved populations.

Moreover, the integration of climate-related risk management practices within the PSBs' operations will not only strengthen the sector's resilience but also incentivize other financial institutions to follow suit. As these banks lead by example, showcasing the financial and operational viability of sustainable banking practices, they can inspire a ripple effect across the broader financial ecosystem, catalyzing a systemic shift towards a low-carbon, climate-resilient economy.

Indian Overseas Bank's Green Banking Journey

Indian Overseas Bank (IOB) has taken important steps to make banking more environmentally responsible. The bank now do data mining and analysis on the address recorded for all properties and keeps careful track of insurance for buildings, farm animals, machines and vehicles.

For big loans of ₹100 crore and above, they use a special climate risk questionnaire to understand environmental impacts. Working on the study of "The Council on Energy, Environment and Water" (CEEW), an independent, non-profit policy research institution based in India, IOB has created district-level maps that show climate risks, helping them make smarter lending decisions.

We also study how different industries affect the environment by looking at their pollution levels, both direct and indirect and how much money these industries need to become greener. These steps are part of IOB's bigger plan to protect the environment while doing good business. The bank checks how industries create pollution, use energy and plan to become more environment-friendly. Through these efforts, IOB is showing that banks can be successful while helping protect our planet.

We believe that making profit is by-product of sustainable banking and caring for nature. This approach to banking is not just about profits - it is about creating a better future for everyone while running a successful bank. By making these changes, IOB is leading the way in showing how banks can help create a healthier environment while serving their customers well.

Conclusion

As we navigate the uncharted waters of the climate crisis, the role of India's public sector banks becomes increasingly vital. By harnessing their financial might, their extensive reach and their deep understanding of local communities, these institutions can emerge as catalysts for a green and resilient future.

Through a multifaceted approach that encompasses sustainable lending, innovative green financing, climate risk management, capacity building and operational sustainability, PSBs can contribute significantly to India's climate action agenda. By aligning their strategies with the country's broader sustainable development goals, these banks can help secure a brighter, more sustainable tomorrow for all.

The integration of India's ancient environmental wisdom with the modern tools and technologies of the banking sector can create a powerful synergy, positioning Financial sector as champions of climate action and sustainable development. As these institutions embrace their role as custodians of the planet, they can inspire a nationwide movement towards a more harmonious and resilient future, where the prosperity of humanity and the preservation of our natural world go hand in hand.

Democratizing Investments: A New Era for Savings and Investments

Baskar Babu Ramachandran*

Savings and investments are going through a transformative phase. The instruments that were available to only a select population are now widely accessible and tokenized to serve at any ticket size. The wide adoption of technology and intelligence is making a paradigm shift in the way savings and investments are done.

There are six key underlying themes:

I. Digital First: Comprehensive Transformation in Banking

The wide adoption of digital is fundamentally redefining the banking landscape in India, accelerating a more inclusive and efficient financial ecosystem. Innovations such as Video KYC (VKYC) have drastically shortened the onboarding process, allowing new customers to open accounts in a few minutes in any nook and corner of the country. VKYC has contributed to a 30% increase in account openings, particularly in underserved regions where access to traditional banking is limited.

Beyond VKYC, the rise of mobile banking applications has enabled users to manage their finances with unparalleled convenience. With the wider proliferation of payment instruments, India accounts for 48% of digital payments in the world, with 80% of digital payments from Unified Payments Interface (UPI) and total digital payments grew 20 times in 12 years. More than three-fourth of the users are actively using mobile internet banking services and about one-third are investing through mobile platforms, accessing a variety of products, including equity mutual funds, Systematic Investment Plans (SIPs) and Public Provident Fund (PPF). Payment instruments are widely used to make it easy to access and move money.

Artificial Intelligence (AI)-driven chatbots and virtual assistants are now common, providing 24/7 customer support and personalized services.

India, is the highest digital transacting country in the world, in September 2024, UPI transactions grew 42% year on year on volume and 31% of the value at 15bn transactions and Rs. 20tn.

II. Low-Cost, Customer-Centric Banking Model

The low-cost, customer-centric banking model is increasingly vital in meeting the diverse needs of the Indian population. With around half of households still underbanked, financial institutions have a substantial opportunity to provide affordable and accessible services. The key is to solve the unit operating model on the lines of Telecom and FMCG to serve the masses with micro-banking services.

With a high penetration of low-cost smartphones, 100% digital identity and one of the lowest per-GB costs of 4G, India is uniquely positioned to build and serve financial services at a sachet scale.

Financial service provides widely adapted digital services and offers innovative low-cost channels to

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create accounts, monitor, transact and seamlessly shift. Customer service has become a click of a button and is available across multiple channels.

With the wider reach of social media and communication channels, Financial literacy is soon shifting towards understanding and availing advanced instruments. Physical instruments are being turned into digital and made widely accessible.

III. Rise of low & middle income and NRI-OCI umbilical cord

The rise of low-income and middle-income groups in India, including Non-Resident Indians (NRIs) and Overseas Citizens of India (OCIs) from their household and otherwise, is fundamentally transforming the nation's economic landscape, particularly in terms of savings and investment opportunities.

About 5% of the households have more than Rs. 30 lakhs of annual income, 25% have Rs. 7-30 lakhs, 35% have Rs. 3-7 lakhs and 35% are in the less than Rs. 3 lakhs. In the next decade, 85% of the country is expected to move up at least one slab, with less than 15% of households holding sub Rs. 3 lakhs income.

Savings rose significantly and have started moving to multiple investment beyond the banking deposits. The mutual fund Industry's Assets Under Management (AUM) has increased from Rs. 10 trillion in 2014 to Rs. 30 trillion in 2020 and Rs. 67 trillion as of September 2024. The multifold growth is primarily attributed to the wider participation of retail and is expected to continue as discretionary income rises.

NRIs and OCIs play a critical role in this evolving landscape. With an estimated 31 million NRIs and OCIs worldwide, their remittances are vital to India's economy.

India topped the world in remittances received, at $120bn in 2023, nearly equal to the following three countries put together. NRIs and OCIs continue to have a deep-rooted family system.

Remittances nearly doubled in the past decade. With 2.5 million Indians migrating to other countries every year, the remittances are expected to continue growing at a healthy pace.

The Indian real estate market has emerged as a particularly attractive option for NRIs and OCIs. Last year, NRIs invested about one-sixth of the entire real estate in the country, amounting to approximately ₹1.25 lakh crore. The surge in demand for quality housing, driven by rising urbanization and a growing middle class, has been a major catalyst for this trend. Government initiatives aimed at simplifying property purchases for NRIs have further encouraged investment flows into real estate, contributing to the overall economic stability.

The rise of low-income and middle-income groups, along with the increasing engagement of NRIs and OCIs, represents a significant opportunity for India's savings and investment ecosystem.

IV. Formalization of informal - Flow of savings money into investments

Formalization of informal: With 900mn debit cards and 340mn UPI QR codes, 9mn Point-of-Sale (PoS) machines and 700mn+ smartphones, we have appropriate infrastructure to further formalize. GST brings great simplicity and visibility to transactions and real estate registration; land records are completely digitized across the Local Governments. The Government subsidies and schemes are given directly to the beneficiary accounts, avoiding the pilferage and keeping the money in the formal system. Direct Benefit Transfer (DBT) scheme alone disbursed 3.5tn in 2023 coupled with each State Government's local schemes. GST collections nearly

doubled in the last six years at Rs.13.3tn in FY24. All these cash flows migrated into formal saving/ investment instruments, creating higher velocity and multiplier value.

Flow of money from savings to investments is a pivotal mechanism driving economic growth in India. As individuals increasingly recognize the value of not just saving but actively investing their funds, the implications extend beyond individual wealth accumulation to broader economic metrics, such as the velocity of money and the money multiplier effect. This dynamic presents numerous emerging opportunities within the Indian financial landscape.

The current financial climate has prompted a paradigm shift with more individuals seeking avenues that offer higher yields and potential capital appreciation. When savings are effectively channeled into investments, the velocity of money—a measure of how quickly money circulates within the economy—tends to increase.

For instance, the SIP method gained traction, with monthly contributions reaching ₹13,000 crore in 2023. This increased participation enhances liquidity and stimulates economic activity as funds move rapidly through various sectors.

The relationship between savings, investments and the money multiplier effect is another critical aspect. As individuals converts their savings into investments, they contribute to this multiplier effect by enabling banks to lend more, which in turn fuels further economic growth. For instance, if ₹1 lakh crore of savings is mobilized into investments, it could generate approximately ₹4.5 lakh crore in lending capacity, significantly impacting infrastructure projects and business expansions.

The rise of fintech companies and digital platforms has further catalyzed this trend. As of 2023, India had over 10,000 fintech firms, making it the third-largest ecosystem in the world with second largest funding. These platforms offer user-friendly interfaces that make it easier for individuals to invest in diverse asset classes, from mutual funds to Government bonds.

V. Rising Alternative Avenues for Investments

Historically, investments were confined to fixed deposits, gold and real estate. However, the financial ecosystem is rapidly changing with a variety of options and access to the wider population.

Alternative investment options are gaining significant traction with a multitude of choices available to investors. Real Estate Investment Trusts (REITs) give retail investors access to participate in large real estate investments like the stock market. These trusts are gaining traction with small investors, who were once dominated by wealthy individuals or institutional investors. As of 2023, the Indian REIT market has surpassed ₹1 lakh crore in assets under management. This growth underscores a renewed confidence in real estate, particularly as urbanization fuels demand for both commercial and residential properties.

Another rapidly growing avenue is Peer-to-Peer (P2P) lending, which connects borrowers directly with investors, cutting out traditional banks. This model offers attractive returns, typically ranging from 10% to 15% per annum. The P2P lending market in India is projected to grow at a Compound Annual Growth Rate (CAGR) of 27% over the next five years, driven by an increasing demand for alternative financing solutions. This trend is significant for individuals and small businesses that face challenges in securing loans from conventional financial institutions.

Government and Municipal bonds are also gaining popularity as secure investment options. Government bonds provide fixed returns with low risk. Retail

investors started actively participating in these instruments. RBI also started offering direct investment options. Municipal bonds, which finance public infrastructure projects are yet to gather momentum. This trend reflects a growing interest among investors in fixed-income securities with low risk.

Sovereign Gold Bonds (SGBs) have emerged as a popular choice for those seeking to invest in gold without the complexities of physical storage. With subscriptions exceeding ₹30,000 crore since their launch, SGBs highlight the importance of gold as a stable asset in an investor's portfolio.

The startup ecosystem in India presents another lucrative opportunity. Venture Capital (VC) funding has skyrocketed, with annual investments to the tune of Rs. 2.5 lakh crores. High-Net-worth Individuals (HNIs) and ultra-high-net-worth individuals increasingly engage in startup funding, especially in the seed stage, for high returns. The proliferation of incubators and accelerators supports this trend, allowing investors to back up innovative businesses across various sectors.

The rise of fintech companies has democratized investing, providing tools that empower individuals to manage their own strategies effectively.

As we look to the future, these alternative avenues are poised to play an increasingly vital role in wealth management strategies, shaping the way individuals invest and grow their wealth in an ever-evolving financial ecosystem.

VI. Risks and guard rails

With the increasing access to advanced instruments, there is a kind of Euphoria to get rich quickly. Demat accounts grew at a frantic pace from 4 crore in 2020 to 17 crore in 2024. According to Bank of America research – the value of options of the Nifty 50 index averaged $1.64tn per day in 2024, surpassing the daily average daily volumes of $1.44tn S&P 500 index. With the lure of hero-to-zero trades and the mass propaganda of a few millionaires on options, millions of masses are attracted to this and ~92% of retail traders lose money. First-time stock investors entering the market after COVID-19 have seen only upside returns. Nifty 50 nearly tripled from COVID-19 lows and the new investors were simply riding the wave, thinking that they were skilled investors.

Innovative products from discount brokerage and exchanges propelled the adoption. With the weekly option expiry, practically every day, there is a zero-to-hero game retail traders play and they have turned the market into a casino, betting on all their hard-earned savings. Continuous growth in the market with no major correction over the past four years made the reluctant ones to join in with the (Fear of Missing Out) FOMO. Chinese market corrected massively, resulting in a mass exodus of wealth for retail investors. After a three-decade bull run, the Japanese market corrected and gave near-zero returns for the next few decades.

Indian retail investors, especially the newer ones, are yet to go through a reality check of the stock market. Similarly, the market continues to grow on real estate, with cities like Mumbai, Delhi and Bangalore running into per square feet rates comparable to New York, London and Tokyo and giving rental yields significantly lower than their global counterparts. Commercial real estate is the only instrument that gives positive returns on inflation and residential property yield is significantly low, ranging from 1-2.5%, creating net negative value over time. The only reason it

continues to attract is the capital appreciation due to speculation.

Gen Z and Gen X are more speculation-friendly than the prior generation. India, in spite of being a developing country, tops the world with a number of Crypto owners at 93 million, whereas, China and the US got 59 & 52 million respectively.

Rise of gambling - Though gambling is officially prohibited in India, it is rediscovered in various avatars through crypto, stock, commodity, currency option trading, to gaming, all positioned on the platform of skill & knowledge.

Cyber fraud increased multifold from 26,049 recorded incidents in 2019 to 1.5 million in 2023 at a 60-fold growth and the first four months of 2024 grew at a run rate of 1.5 times above 2023. It adversely impacts people across age groups and socio-economic segments of society.

Conclusion

To conclude, we are in the midst of a transformative journey and it is critical that we safeguard our people from potential risks, nudge them to consider the stability of investment returns and then ride the volatility and speculation. We must build deep relationships and trust with customers and protect their long-term interests and the well-being of the ecosystem.

Paradigm Shift in Banking: Moving Towards a Resilient, Inclusive and Sustainable Model

Binod Kumar Mishra*

The World Economic Forum, in its Global Risk Report 2024, mentions the risk of cyber insecurity and extreme weather events as key emerging risks facing the world. Given that the banking industry is one of the critical pillars of economic growth, it is not immune to these risks. The world being one global village, these factors have had an impact on the Indian economy too. When we look at the Indian economy, we have come a long way since we gained independence from the British; it has transposed from a predominantly agrarian economy to a principally service-based economy. Today, the service sector contributes to more than 50% of India's economy, with banking and financial services contributing a significant portion. This phenomenal growth of banking and finance over the years has not been without its challenges. But the challenges that the banking industry has faced in the new century are very much unlike what it faced earlier. The traditional challenges of business growth, customer service, profits and competition have been augmented due to the change in demographics, the stricter regulatory prescriptions, the ever-dynamic societal and economic landscape and more importantly, technology that is changing by the minute. Since banking has an arterial relationship with other industries, the changes happening in other industries have an impact on banking too. It is to the credit of the banking industry that despite these upheavals, it has remained steady on the growth trajectory and more importantly, it has leveraged these challenges into growth opportunities. Over the years, the Indian banking sector has expanded beyond the traditional financial services model and is moving towards a model that is resilient, inclusive and sustainable, provided the following challenges are effectively and efficiently addressed:

- Enhancing cyber-security
- Addressing climate-related financial risks
- Promoting Financial inclusion and literacy
- Balancing innovation and risk
- Meeting new age customers' and employees' expectations

I. Resilience in Banking

The health of the banking industry is intrinsically linked to the country's economy. Changes, whether good or bad, happening in the country have an impact on banks too. Additionally, since banks deal in money, they are more vulnerable to trust-related issues too. The technological advancements that banking has seen in the last two decades have provided a lot of convenience to customers. It has brought along with it problems of security too. These security level issues have impacted both the individual customer as well as the organized banking industry too.

As we have seen earlier, there is an increase in regulatory rigor since the financial crises shook

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the world. Financial regulatory authorities were, in the past, insulated from one another and followed their independent regimes. The 2008 financial crisis brought about a sea-change in the manner in which financial crises were tackled. Probably, for the first time, we had a situation wherein a financial collapse impacted the economy to such an extent as to cause an economic collapse. Earlier, it used to work the other way around, i.e. an economic downturn causing financial collapse.

The crisis brought about a sense of togetherness among regulators worldwide and the crisis was tackled through consultations and commonality of approach. This bonhomie is continuing much after the crisis was overcome and regulators worldwide are going about their task in a more concerted manner. The attitude and indulgence of regulators towards financial improprieties is that of non-compromise and stringent penalties.

The key changes made in the manner of regulation of financial institutions were:

- Bringing about a lot of mandatory regulatory compliances. This made it difficult for financial institutions to function, resulting in it becoming tougher for them to default.
- Banks and financial institutions became more leveraged compared to other businesses and were subject to more stringent capital requirements.
- Banks introduced the framework for dealing with Domestic Systemically Important Banks, popularly known as D-SIBs.

Some of the key challenges, like the Global Financial Crisis (2008), the COVID-19 pandemic (2020) and the rise of digital banking and fintech since the 2000s, have repeatedly tested the resilience of the banking industry. Banking is fundamentally the business of managing risk, amid all these uncertainties. Resilience has, thus, become a cornerstone of the banking industry and all these uncertainties have played a significant role in shaping what banking is today. Along with global banking players, the Indian banks and other financial institutions in India have evolved rapidly over the years to ensure that all stakeholders remain stable in the face of such unprecedented challenges. Banking is one of the most regulated entities and therefore, over the years, the Government and the RBI have introduced several key reforms that have played a major role in reforming the Indian banking sector, especially the Public Sector Banks (PSBs).

a) Regulatory Reforms

Consumer protection, ensuring financial stability, promoting fair competition, risk management, prudential supervision, supporting monetary policy and encouraging economic growth are some of the key reasons behind the regulation of the banking industry. Banking regulations ensure stability, security and efficiency of the financial system of a country.

Since its nationalization in 1949, the RBI has been pivotal in shaping policies that fostered economic growth and strengthened the position of Indian banks. Post-independence, it focused on promoting agriculture and industrial growth, which paved the way for the nation's economic progress. After playing a significant role in the 1991 economic crisis, the RBI aided the Central Government in the implementation of liberalization, privatization and globalization policies, which helped India move to a mixed economy.

The RBI has over the years proven true to the task of bringing in resilience to the banking sector and apart from performing the functions of managing currency,

forex, inflation and monetary policy, is majorly involved in regulating the banking and financial institutions in the country. RBI keeps a close watch on asset health and capital adequacy of banks and Financial Institutions (FIs). Over the last seven decades, several key reforms have played a key role in making the banking sector strong and more resilient.

- **1950s: Nationalization Begins**

Right after independence, the Government of India started with their intervention of banking sector, by nationalization of the Imperial Bank of India in 1955 and creating State Bank of India (SBI), which became the first Government-owned commercial bank. The move was to strengthen Government control over the bank to facilitate rural credit delivery.

- **1960s: Expansion of Government Control**

The Government of India continued the trend of nationalization and in the landmark event of 1969, 14 major private banks were nationalized, increasing the control of Government ownership of banking assets, which paved the way for extension of banking services into the underdeveloped and remote areas of the country. In December 1969, to address the limited rural reach of commercial banks, the Lead Bank Scheme was introduced by the RBI, following the recommendation from the Gadgil Study Group and endorsement by the Nariman Committee. Under this scheme, a designated “Lead Bank” in every district plays the role of a coordinator between the credit institutions and the Government, ensuring unhindered flow of bank finance for the overall development of that area.

- **1970s: Rural Banking and Financial Security**

To continue with its mission of making financial services accessible, the banking sector witnessed the establishment of Regional Rural Banks (RRBs) in 1975. Today, there are 43 RRBs with over 21,000 branches across the country, contributing significantly to the financial inclusion mission of India. The formation of the Deposit Insurance and Credit Guarantee Corporation (DICGC) marked another milestone, providing the required trust and security to the small depositors, enhancing the stability of the financial system.

To add another significant layer to the financial security of the country, the Foreign Exchange Regulation Act (FERA) was enacted in 1973. The act played an important role in controlling the inflow and outflow of the foreign currency and ensuring the economic stability of the country until it was repealed and replaced in 1999 by FEMA.

- **1980s: Strengthening Institutional Frameworks**

The decade marked two more important milestones in banking: six more banks were nationalized and a key institution, the National Bank for Agriculture and Rural Development (NABARD), came into existence to provide specialized financial support in agriculture and rural economies. In later years, by launching key initiatives like the SHG-Bank Linkage program, Watershed Development Fund, Joint Liability Group Scheme, Rural Infrastructure Development Fund, Financial Literacy Awareness program, etc. NABARD played a significant role in furthering financial inclusion in India. To further enhance the penetration, the RBI introduced the Service Area Approach in 1989, assigning each branch of scheduled commercial banks, including RRBs, a designated rural or semi-urban area of 15 to 25 villages, making them responsible for meeting their credit needs. Later, in 2004, the scheme was reviewed and the restrictive provisions of the scheme were removed

while retaining its strengths such as credit planning and monitoring.

- **1990s: Economic Liberalization and Sectoral Reforms**

Hit by a severe balance of payments crisis, Indian banking ushered in a very crucial phase of economic liberalization. Driven largely by the Narasimham Committee report in 1991, these reforms reduced the statutory restrictions and encouraged entry of private banks (ICICI and HDFC) and also focused on improving profitability and autonomy of Indian banks. The committee's 1998 reports focused on addressing concerns over capital adequacy and management of non-performing assets. The adoption of Basel I norms in the year 1999 further provided means of strengthening the capital adequacy of banks in order to prepare them to compete in the global market. This decade was pivotal for reforms, marked by the replacement of the Foreign Exchange Regulation Act, with the more liberal Foreign Exchange Management Act (FEMA), 1999. This reform further facilitated external trade and foreign currency payments while paving a way for increased foreign investment in India.

- **2000s: Strengthening Risk Management and Financial Inclusion**

The year 2002 empowered the banks in their fight against recovery of bad loans and equipped them with the tools of the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, 2002. To further increase the penetration of banking services in underbanked areas of the country, in 2005 the RBI launched Financial Inclusion initiatives by instructing banks to open Basic Savings Bank Deposit Accounts. In the year 2009, the adoption of Basel II norms paved the way for further strengthening the operational and credit risk management framework of banks.

- **2010s: Global Standards and Technological advancement**

Post the 2008 Global Financial Crisis, the Basel Committee on Banking Supervision came out with stricter capital regulations and introduced Basel III norms, which were adopted by India in 2013, in a phased-wise manner. These norms focused on developing a strong capital buffer, stress testing of banks and addressing market liquidity risk.

The years 2014 and 2015 witnessed the launch of three immensely impactful schemes that gave further boost to financial inclusion.

In the year 2015, to fight the growing problem of large NPAs, the Government decided to implement a comprehensive 4R strategy, which focused on recognition and resolution of stress assets, recapitalization of PSBs and reforms to drive clean and smart banking. To continue with their reforms, the Government also approved the merger of a few smaller public sector banks with the objective of improving their profitability and reducing their dependence on recapitalization from the Government.

In 2016, two more important events, Insolvency and Bankruptcy Code and Demonetization, became catalysts in the promotion of formalizing the digital payment landscape, enhancing transparency and strengthening governance in banks.

After successfully addressing the first three objectives of the 4R strategy and promoting a clean and smart banking agenda, the Government introduced a set of reforms called EASE reforms for PSBs. Since its inception in the year 2018-19, EASE has completed 6 phases and it is in its 7th phase in the current FY 2024-

25. The central theme of EASE reforms has been to promote responsible, inclusive and sustainable banking driven by the adoption of modern technology.

- **2020s: Navigating crises and embracing Digital innovation**

The resilience of the previous seven decades of the Indian banking sector was put to the test when the COVID-19 pandemic struck the world. RBI introduced a series of COVID-19 relief measures, including loan moratorium, restructuring schemes and additional lines of credit to support both the banks and the borrowers. Later in 2020, the Government launched a Bad Bank to resolve the issues of rising Non-Performing Asset (NPA) in the industry.

Another significant milestone towards digital payment infrastructure was achieved when the RBI launched its first digital rupee (Central Bank Digital Currency aka CBDC) in 2022.

Looking at the journey of the last seven decades, today Indian Banking system are definitely looking in better shape to handle economic shocks, with strong capital buffers, improved liquidity management and improved financial inclusion pushed by early adoption of digital technology.

b) Digital Transformation and Cyber Resilience

In addition to the regulatory reforms, adoption of digital technology has played a major role in the resilient digital infrastructure of Indian banks. However, with the growing concern of cybercrimes, the RBI has been expressing concerns over the rapidly increasing number of cyberattacks on banks and their customers. According to the Annual report, 2024 of the RBI, the number of frauds related to cards and the digital was 29,082, amounting to a total of Rs. 1,457 crore. This accounted for approximately 10.46% of all bank frauds across various areas of operations, highlighting the gravity of the situation. It goes without saying that such attacks not only expose the banks to financial and operational risks but also damage their reputation, damaging their trust in people.

There is no doubt that the rapid digitalization of banking products and services has exposed the banking system, both customers and processes, to the threat of cyberattacks. However, this same digitalization and modern technology have also paved the way for enhancing the industry's resilience. Various digital banking platforms and digital initiatives like UPI have enabled constant service during periods of disturbances, such as the pandemic. These digital products and services have transformed banking operations. Today, Unified Payments Interface (UPI) is accepted in 7 countries across the globe and RuPay is another payment system that has gained acceptance in 5 neighboring countries. This shows how the digital payment infrastructure of India has reached beyond the national boundaries and has showed the true meaning of being digital. As per the NPCI statistics, the number of UPI live members (banks / financial institutions) has reached 622, with a transaction volume of 15,041.75 million and a transaction value of Rs. 20,63,994.71 crore, boasting 100% uptime. This has been made possible with the efforts of the modern technology-driven infrastructure of Indian banks.

However, the increasing share of digital transactions and availability of most services on banks' digital platforms expose the banks and their customers to the risk of cyberattacks. As a prudent supervisor, RBI came out with its Master Directions on Digital Payment Security Controls of 2021 to provide a comprehensive guide to all the banks in order to safeguard the interests of all the stakeholders in this fight against

cyber attacks. To build a future-ready, cyber-resilient infrastructure, combat data breaches and financial fraud and improve operational efficiency, many major banks worldwide are investing heavily in the latest and emerging technology like Artificial Intelligence (AI), cloud computing, blockchain and data analytics.

Indian banks are also on par with their global counterparts and are now leveraging artificial intelligence tools and techniques such as pattern recognition, behavioral authentication, predictive analysis and real-time transaction monitoring. Many banks in India have successfully employed working models based on AI technology, which are proving helpful in proactive risk management and aiding to provide the much-needed extra layer of cyber security to the banks and their customers. However, AI is a technology and the usage of it would depend upon its users and their objectives. While banks are using AI to fight the cyberattacks, the cyber criminals have also started to use AI tools such as deepfakes, digital human impersonation, automated phishing attacks, etc., to perfect their social engineering tactics. Something that once seemed like a far-fetched idea, such as fraud as a service, which may democratize cyberfraud, now appears to be a possibility with the emergence of AI. To fight against cybercrimes, banks are doing their job; however, the increasing numbers show that customer education is lacking somewhere, which needs the immediate attention of the banks and the RBI. The RBI and Indian banks have been running campaigns, such as RBI Kehta Hai, Vigil Aunty, Mooh Band Rakho (HDFC Bank), Pehchan Con (Bank of Baroda) and Stay Safe (Axis Bank), but the increasing number of cyber-attacks requires more focus on creating customer awareness. The banks, in India, will need to find more innovative and relatable ways to educate the consumers so that they do not fall for the social engineering gimmicks.

II. Inclusion in Banking: Reaching the Unbanked and Under-banked

Banking has always had an element of social commitment, whether it was in the public sector or the private sector. Some portion of the social commitment was due to regulatory prescriptions in the form of priority sector lending, but much of it was also driven by business considerations. After all we, as a bank, lend to the needy entrepreneurs. A lot of success stories of industries today owe their successes to some bank that supported them when they were almost unknown. This social commitment has also undergone a change—a change from poverty alleviation to financial inclusion.

Access to financial services is pivotal for the growth and functioning of an economy. With programs like Pradhan Mantri Jan Dhan Yojana, Pradhan Mantri Jeevan Jyoti Bima Yojana, Pradhan Mantri Suraksha Bima Yojana, Atal Pension Yojana, Pradhan Mantri Mudra Yojana, Stand-up India Scheme, MUDRA, PMSVANIDHI and many more-Government of India (GoI) has been at the forefront of making financial inclusion a reality for its citizens.

Since its inception in 2014, the Pradhan Mantri Jan Dhan Yojana (PMJDY) has reached over 53.14 crore beneficiaries and the total deposit balances in PMJDY accounts have reached an impressive ₹2,31,236 crore, significantly increasing financial inclusion across the country. More than 66.6% of these accounts and beneficiaries are located in India's rural and semi-urban areas. The growth of this scheme has made a tremendous impact on India's Direct Benefit Transfer (DBT) programs as well. The most remarkable fact is that approximately 55.6% of Jan Dhan account holders are women, highlighting the program's impact on empowering women financially. To enhance accessibility, 36.14 crore RuPay cards

have also been issued to PMJDY account holders, facilitating ease of access to banking system.

Apart from the public sector banks, private banks and other FIs, the regional rural banks have also played a key role in the implementation of the aforementioned schemes. RRBs network is being utilized by NABARD, which has partnered with Women's World Banking to enhance financial inclusion and empower women in rural areas. For the implementation of this scheme, NABARD plans to utilize the network of 43 RRBs spread across the country. In addition to pushing forward the success of financial inclusion, NABARD also plans to establish a gender index to measure and address the gender disparities to reinforce gender equality and gender inclusive growth in the rural economy.

The Reserve Bank of India has also made financial inclusion its priority and has made many strides in the right direction, including providing licenses to many small finance banks, which it started a decade ago. In addition to this, the RBI, on the input of the Government, launched a five-year plan, "The National Strategy for Financial Inclusion (2019-2024)," with the objectives of providing access to financial services, in hilly areas of the country.

Recently, the RBI has announced that the Financial Inclusion Index, which measures the three key parameters of financial services, access (35% weightage), usage (45% weightage) and quality (20% weightage), has risen to 64.2 in March 2024 from 56.4 in March 2022. This improvement is a reflection of the success of financial inclusion programs, achieved through the smooth and effective implementation of Government and RBI initiatives by the entire banking industry.

In a recent speech on Reaching the Unreached, Shri Swaminathan J., Deputy Governor, Reserve Bank of India, emphasized the importance of last-mile connectivity, ensuring banking services reach underserved populations in rural and semi-urban areas. The RBI's recent initiative, Unified Lending Interface (ULI), is also expected to play a major role in democratizing access to credit by integrating financial platforms.

Globally, similar financial inclusion initiatives are being implemented, such as the Grameen Bank model in Bangladesh and mobile money platforms like M-Pesa in the African continent.

It would be unjust not to acknowledge how digital technologies have played a major role as an enabler of financial inclusion worldwide. The success of financial inclusion lies on the shoulders of platforms and tools like the Digital Banking Unit, UPI and Aadhaar-based authentication. Looking ahead, integration of blockchain technology in the existing payment infrastructure and products like CBDC is expected to reduce the transaction costs, further advancing financial inclusion in the right direction.

With the rise and success of fintech companies, many banks are now collaborating with them to create tailored financial products and focusing on bringing the new generation under the umbrella of banking. It would not be an overstatement to say that this is an era of digital financial inclusion and access to smartphones and cheap internet will pave the way for the future success of making banking inclusive for everyone.

III. Sustainability in Banking- Aligning Finance with Global Climate Goals

India has made significant strides in tackling climate change and promoting sustainable development.

India, under the “Panchamrit” strategy, will have 500 GW of non-fossil fuel energy capacity by 2030, with a goal of reaching net zero emissions by 2070. Additional initiatives include launching Long-Term Low-Emission Development Strategies (LT-LEDS) at COP 27, co-founding the International Solar Alliance and introducing the National Hydrogen Mission and Mission LIFE (Lifestyle for the Environment). The implementation of these programs and initiatives will depend upon the Indian banking sector.

In the last decade, India has moved up to 7th rank in its Climate Change Performance Index in 2024, up from 31st rank in 2015. This demonstrates our strong commitment to our goal of reaching net zero carbon emissions by 2070. This is the result of aligning policy goals with the environmental guidelines and this is the only way we can handle the transition risk without causing much disruption to the current economic growth of the nation, thereby, achieving sustainability in all our actions and results.

The need for growing focus on sustainability in banking shows the urgency and importance of how the financial sector will play a major role in addressing the environmental and social challenges. Countries around the world are committed to achieving the United Nations Sustainable Development Goals and the commitments of the Paris Agreement on climate change; banks will have to align their business goals with these global objectives.

India is a country with topographic diversity, which makes the climate risk issue more complex to deal with. Adverse climatic conditions can severely impact the repayment capacity of farmers, thereby, increasing the risk of default on agriculture credit.

Due to the rising risk of climate change, sustainable finance is becoming a critical focus for banks globally, especially in Europe. Driven by the high consumer demand, Europe leads globally as a leader in sustainable finance. The European Union (EU) is also a leader in green bond issuance and aims to achieve climate neutrality by 2050 through increased private sector investment.

In February 2024, the RBI issued a draft disclosure framework on climate-related financial risks. The draft guidelines have divided the application of mandatory disclosures into four thematic pillars: governance, strategy, risk management metrics and targets.

With the RBI guidelines in place, Indian banks are also striving hard to achieve their goals of sustainable finance. In the year 2015, Yes Bank became the first Indian bank to issue green bonds. Similarly, State Bank of India, Axis Bank, Kotak Mahindra Bank and other major banks in India have come out with their respective policies on integration of the Environmental, Social and Governance (ESG) framework and plan to focus on reducing their carbon footprints.

IV. Challenges in front of the Banking Industry

a. Technological Disruption

The modern technology and arrival of artificial intelligence in banking are surely going to make waves. From impacting the jobs of thousands of employees to impacting the preferences of the new age (Gen Z) consumers, from disrupting traditional banking (fintech) to the rise of digital-only banks such as Neo Banks, AI is here to stay. Concepts like personalized banking, chatbots and virtual assistants, smart contracts and loan processing automation are becoming reality. Leveraging on these concepts will surely require heavy investment, which may be difficult for smaller banks to implement and may also affect their profitability. Banks will initially have to make hefty investments in upgrading their systems,

training existing employees and hiring new talent and these capital investments will take years to recover.

In addition to fear of rising operating costs with the growing concern of cybersecurity and data privacy, keeping pace with the regulatory requirements in a rapidly evolving technological landscape will pose a significant challenge.

Technological disruptions will present both challenges and opportunities for the banking sector. While technology can be used as an enabler to enhance efficiency, improve consumer satisfaction level and stay ahead in the competitive market, it also exposes the banking sector to the challenges of regulatory compliance, data security and cybersecurity.

b. Sustainability vs. Profitability

Today, profit alone cannot be a criterion for long-term sustainability and financial institutions are increasingly expected to balance their financial performance with long-term social and environmental impact. This balance is particularly important as banks are facing increasing regulatory pressure to adopt sustainable practices while generating a continuous stream of profit for their shareholders.

While sustainable investment may offer long-term benefits, transitioning to a sustainable business model in the short term would lead to reduced profitability. Amid the growing pressure, banks must be careful not to engage in greenwashing, as it may impact their reputation and also harm profitability in the long term. While the regulatory pressure remains, there is still uncertainty as to how the integration of sustainable practices will evolve; therefore, the banks that find a middle ground for delivering expected returns to their shareholders while embracing sustainable practices will likely emerge as a leader in this rapidly evolving financial landscape.

c. Navigating Compliance and Regulatory measures

Banking is one of the most regulated sectors in the world. There is increasing pressure to comply with stringent regulatory requirements, particularly regarding capital adequacy. Since the introduction of new regulations, such as the Insolvency and Bankruptcy Code (IBC) framework, the process of resolving stressed assets has significantly improved; however, the challenges of non-performing assets remain and their adverse impact on Banks's capital will remain a challenge in front of the banks, especially during Basel IV rollout, with more stringent capital adequacy norms. Future regulation may also require the banks to maintain higher Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) to ensure banks are resilient enough to withstand shocks like the COVID-19 pandemic. These would impact the overall demand for credit and may also adversely impact the bank's net interest margin.

V. Conclusion: The way forward towards a holistic financial ecosystem

When discussing the future of banking, it is clear that the industry will continue to evolve in the right direction. To navigate upcoming global, economic, social and environmental challenges, the banking sector must adopt a proactive approach. The paradigm shift in the banking industry is not a one-time event; rather, it is a continuous process of managing various small changes and challenges. To create a banking model that is resilient, inclusive and sustainable, banks must prioritize making informed decisions and shift their focus to seizing the right opportunities. This approach will pave the way for a banking sector that not only drives economic growth but also contributes to social equity and environmental sustainability.

New technologies and products, such as Decentralized Finance (DeFi), digital currencies and artificial intelligence, will play a crucial role in shaping the banking industry's future. However, these innovations are double-edged swords; therefore, banks must focus on developing human resources alongside adopting advanced technologies.

The climate-related financial risks are knocking at our doors and banks around the globe are facing the heat, requiring them to review their financing strategies. The deployment of credit by Indian banks towards renewable energy projects remains significantly lower compared to their funding of the non-renewable energy sector. However, to address these challenges, the RBI and Government have provided the Indian banking sector with the required tools in the form of necessary guidelines to prepare for the future.

The integration of the ESG framework into lending practices and banking investment is no longer optional. Though Indian banks lag behind the EU in the implementation of a sustainable finance framework, the growing availability of products from banks and financial institutes that support renewable energy projects, sustainable agriculture and other climate-friendly initiatives indicates we are on the right path. Similarly, many Government initiatives promoting electric vehicles, solar power and green infrastructure are opening new avenues for investors.

Sustainable finance practices are not limited to environmental issues; banks also need to focus on social sustainability, such as promoting gender equality, rural development and funding public healthcare initiatives. Traditional risks of banking, such as credit risk, market risk and operational risk, are indirectly linked to climate-related financial risks. The banking industry needs to recognize that traditional instruments of risk mitigation are not enough at this moment. The risk arising out of climate change would require all stakeholders, i.e. the Government, banks, regulators and citizens, to work in synchronization. Only then can we envision a sustainable future for banking and other institutions as well.

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Changing Contours of Indian Banking

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Abstract

Banks today are making rapid and irreversible changes due to the developments in technology, customer behaviour and regulations. As we move forward, Artificial Intelligence, Machine Learning and Big Data are becoming central to financial services innovation. The Indian banking system is on the cusp of a transformation. Conventional banking is making way for next-generation banking with focus on digitisation and modernisation.

I. Introduction

The banking system has played a crucial role in the upliftment of our country, especially in the last decade. However, concomitantly in this decade, the sector also went through a large overhang, a constant churn grappling with multiple challenges, including Non-Performing Assets (NPAs), global and domestic economic downturns, adaptation of technology and consolidation and competition from new age fintech companies. The Government and the RBI employed a 4R's strategy of Recognizing NPAs transparently, Resolution and Recovery, Recapitalizing PSBs and Reforms in the financial ecosystem to lay out a comprehensive roadmap for the financial system. In particular, (i) Asset Quality Reviews (AQR) of the banking system initiated in 2015 ensured a fuller recognition of stressed assets and subsequently provisioning being policy-driven; (ii) The implementation of a new framework for resolution of stressed assets under the overarching mandate of the Insolvency and Bankruptcy Code (IBC) speeded up the de-stressing of balance sheets; and (iii) The Government undertaking steps for recapitalisation of the PSBs in order to bolster their financials, improving governance practices, expanding the reach and quality of financial services and enhancing the adoption of digital banking while ensuring that customer interests were protected and the financial sector is well cushioned with capital and liquidity buffers.

Against this backdrop, Indian banking is transforming rapidly. Banks today are making rapid and irreversible changes due to the developments in technology, customer behaviour and regulations. The banks and all the stakeholders like Government of India and RBI have worked assiduously in the last decade to ensure a stable, resilient and adequately capitalized banking system that is a sin qua non for financing India's growth story. For the decade ended FY24, Indian banks consolidated profit was Rs 3.2 trillion, 4 times

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jump over FY14. Deposits and Credits have jumped by 2.7 times during the period with asset quality now among the best along with all operating ratios. In terms of capitalization, in $ terms, market capitalization of Bank Nifty has jumped by a staggering 2.9 times since pandemic.

In this article, the section II will highlight the growth of banking business, especially deposits and credit during the last decade. The section III, IV and V discusses the relationship between bank deposits, savings, credit and other monetary aggregates. Before concluding in section VII, we discuss the challenges and opportunities in the banking sector in section VI.

II. Growth in Banking Business

Banking business remained buoyant during 2022-23, 2023-24 and in 2024-25 too. The combined balance sheet of commercial banks expanded in double digits, driven by sustained credit growth. Lower slippages helped improve asset quality across all bank groups, with Gross Non-Performing Asset (GNPA) to total advances ratio of Scheduled Commercial Banks (SCBs) dropping to a 10-year low. Higher lending rates and lower provisioning requirements helped to improve the profitability of banks and shored up their capital positions.

During the last 3-years, credit growth continued to grow in double digits and has become broad based across sectors. Credit growth continues to outpace deposit growth as shown by the latest fortnightly data with credit growth at 12.8% as on 04 October, 2024 and deposit growth at 11.8%. The sector-wise credit growth numbers reveal a sustained pick up across Agriculture, MSME and Services. In November 2023, RBI increased risk weights on select segments, which slowed unsecured personal loans growth, along with NBFC linkages and credit cards debt.

However, there are many researcher/analysts expressing concern that deposits in the banking system have significantly fallen behind, as household savings in bank deposits are being crowded out to other financial instruments, like mutual funds, equity markets etc. For the record, there are currently 265 crores of deposit accounts in the system against 40 crores credit accounts. Both these concerns need to be fact checked.

With continued economic activity in post-pandemic period, the credit cycle has reversed in December 2021 and continue to grow upward. Deposits growth also reaching an all-time high in FY23 but credit growth surpassed deposits due to higher demand for bank credit. In FY23, ASCBs had registered the highest amount of growth in deposits and credit since 1951-52. Deposits grew by Rs. 15.7 lakh crore and credit by Rs. 17.8 lakh crore, which has pushed the incremental CD Ratio to 113%. The same story continued in FY24 and deposits grew by Rs. 24.3 lakh crore and credit by Rs. 27.5 lakh crore. The incremental Credit-Deposit (CD) ratio again surpassed 100% and stood at 113%. Thus, the myth of a flagging deposit growth is only a statistical myth with credit growth outpacing deposit growth being tom-tommed as a deceleration in deposit growth. Incremental deposit growth at Rs. 68 trillion has outpaced incremental credit growth at Rs. 63 trillion since FY22.

Table 1 depicts the growth of aggregate deposits and bank credit of SCBs from FY14 to FY24.

Table 1: SCBs Deposits and Credit Growth

Year	Aggregate Deposits			Bank Credit			Incremental CD Ratio	CD Ratio
	Level (O/S)	Growth		Level (O/S)	Growth			
	(Rs. lakh crore)	(Rs. lakh crore)	YoY (%)	(Rs. lakh crore)	(Rs. lakh crore)	YoY (%)		
FY14	77	10	14.1	60	7	13.9	77%	78%
FY15	85	8	10.7	65	5	9.0	66%	77%
FY16	93	8	9.3	72	7	10.9	90%	78%
FY17	108	14	15.3	78	6	8.2	41%	73%
FY18	114	7	6.2	86	8	10.0	117%	75%
FY19	126	11	10.0	98	11	13.3	100%	78%
FY20	136	10	7.9	104	6	6.1	60%	76%
FY21	151	15	11.4	109	6	5.6	37%	72%
FY22	165	14	8.9	119	9	8.6	70%	72%
FY23	180	16	9.6	137	18	15.0	113%	76%
FY24	205	24	13.5	164	28	20.2	113%	80%
FY25 (Till 04 Oct'24)	219	14	11.0	173	9	12.8	63%	77%

Source: RBI, SBI Research

III. Financial Savings vs. Bank Deposits

As financialization of household savings has gathered significant momentum post pandemic, households are indeed investing in alternative instruments of savings like mutual funds, equity and non-bank deposits. These instruments accounted for Rs. 3.2 trillion /10.5% of incremental household savings at Rs. 29.7 trillion in FY23. Households still invested Rs 10 trillion in bank deposits and another Rs. 2.5 trillion in small savings deposits out of this Rs. 29.7 trillion pie /42%. The remaining were household investments in pension and provident funds channelized by respective market players. Many analysts mistakenly consider such savings in alternative instruments as a leakage from financial system and hence, a cause for decline in bank deposits. This is, however, incorrect as banking deposits are purely used for transactional purposes through which households change instruments of savings say from bank deposits to mutual funds/equities (except deposits in small savings) and hence, it stays within the financial system.

IV. Bank Deposits, Credit and Money Supply

The apparent slowdown in deposits has also ensured misplaced narratives gaining crescendo with a lower money supply growth being cited as a potent reason

for lower reserve money creation and hence, lower deposit growth. However, in an Inflation Targeting (IT) framework, money is endogenous and also the link between money supply and reserve money is agnostic as digitization has resulted in an increasing money multiplier with much lower currency leakage.

In the IT framework, the central bank targets inflation, through policy rate to bring price stability, with due consideration to the objective of growth. So, the central bank does not target monetary aggregates like M0, M3 etc. but uses interest rate as the instrument variable. In an IT framework, money evolves endogenously in tune with the structural changes in the economy as well as the evolution of the payment system landscape. Endogeneity ensure that bank credit creates deposits and not reserves. Results from our Granger Casualty analysis (data: 1953-2024) also indicate that credit granger cause deposits and hence a decline in credit will lead to decline in deposits going forward.

Table 2: Granger Causality

Null Hypotheses	F-Stat	P-Value
H0: Deposits does not Granger cause Credit	15.13	0.184
H0: Credit does not Granger cause Deposits	3.38	0/-1*

Source: Authors' calculations; *Significant at 1%

V. Digitalization vs. Bank Deposits

Back in mid-2015, Nandan Nilekani had made a presentation in Mumbai and a few other cities, articulating what he reckoned could be a "WhatsApp moment" in finance for India. He said, "Smartphones are going to be the banks for Indians". That would mean smartphones double up as a bank branch and e-commerce replaces the conventional shopping experience.

If we look the digital transactions data today, we feel the words of Mr. Nilekani became true as Indians are adopting digital payments at a scorching pace. The payment system indicators data for 2023-24 indicate that digital payments continued to register robust growth. Large-value transactions through Real Time Gross Settlement (RTGS) system sustained double-digit growth (y-o-y), both in volume and value terms in tandem with the economic recovery. Retail payments expanded strongly across the payment modes. The UPI sustained near 100% growth in volume and value of transactions. The National Electronic Funds Transfer (NEFT), Immediate Payment Service (IMPS) and the National Automated Clearing House (NACH) also demonstrated remarkable growth. Transactions under the Bharat Bill Payment System (BBPS) clocked a triple-digit growth volume.

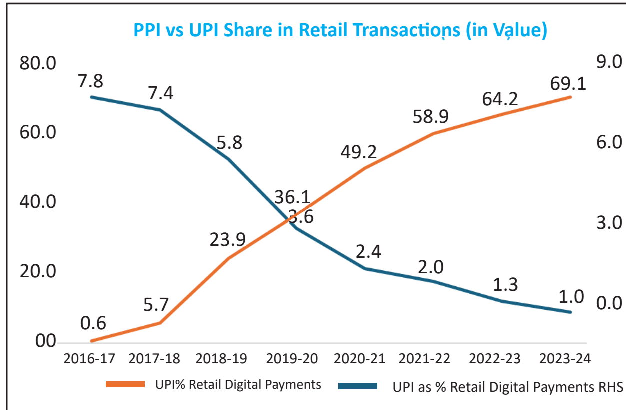
If we look at the data in detail, the total digital transactions (in volume) grew by 748%, from 593 crore transactions to over 16395 crores in the 9-years from FY16 to FY23. The growth was led by the UPI, which has grown at a Compound Annual Growth Rate (CAGR) growth of 168% in volume of transactions and 142% CAGR in value of transactions. IMPS is also registered a CAGR growth of 44.3% in volume and 50.7% in value of transactions during FY16-FY24. It is interesting to note that the 'Paper-based instruments (cheque)' transactions has been declined by -5.4% in CAGR in volume terms and -1.4% in value terms. The share of digital transactions has increased to 97.1% in volume in 2024, compared to 84% in volume in 2015-16.

Table 3: Payment Systems Indicators						
Item	Volume (in mn)			Value (₹ Lakh Crore)		
	2015-16	2023-24	FY24 as x times as FY16	2015-16	2023-24	FY24 as x times as FY16
1. Large Value Credit Transfers – RTGS	**98**	**270**	**2.7**	**825**	**1709**	**2.1**
2. Credit Transfers	**2854**	**148611**	**52.1**	**89**	**675**	**7.6**
2.1 APBS	718	2589	**3.6**	0	4	**21.0**
2.2 IMPS	221	6005	**27.2**	2	65	**40.0**
2.3 NACH Cr	623	1623	**2.6**	3	15	**5.3**
2.4 NEFT	1253	7264	**5.8**	83	391	**4.7**
2.5 UPI	18	131129	**7285.0**	0.1	200	**2872.4**
3. Debit Transfers and Direct Debits	**277**	**1825**	**6.6**	**2**	**17**	**7.3**
4. Card Payments	**1959**	**5847**	**3.0**	**4**	**24**	**6.1**
4.1 Credit Cards	786	3561	**4.5**	2	18	**7.6**
4.2 Debit Cards	1174	2286	**1.9**	2	6	**3.7**
5. Prepaid Payment Instruments	**748**	**7878**	**10.5**	**0**	**3**	**5.8**
6. Paper-based Instruments	**1096**	**663**	**0.6**	**82**	**72**	**0.9**
Total - Retail Payments (2+3+4+5+6)	**6934**	**164823**	**23.8**	**178**	**791**	**4.5**
Total Digital Payments (1+2+3+4+5)	**5936**	**164430**	**27.7**	**920**	**2428**	**2.6**
Total Payments (1+2+3+4+5+6)	**7033**	**165093**	**23.5**	**1002**	**2500**	**2.5**
Source: RBI						

Digital Payments impact on Monetary Aggregates & Deposits

The increasing usage of digital channels have 2-impacts; (i) Substitution of cash; and (ii) PPI/ E-money/Coins etc. The substitution of cash (central bank money) is replaced by UPI/IMPS etc. (commercial bank money). Though, all the money transacted through UPIs are from the deposits of the banks and counted in money supply aggregates. While the money stored in e-wallets are not considered in any of the money supply aggregates of M0, M1, M2 or M3. For example, consumer prefers to use e-money (or PPI in the case of India) vis-à-vis currency. Though, e-money might be used mainly for small value transactions and thus could be used to substitute central bank notes and coins at least

partially. The increased use of pre-paid instruments will change the composition of both reserve money as well as monetary base and has further impacted central bank's control of money supply.



In recent years, the rapid increase in usage of technology has facilitated the ability to make instantaneous bank transfers and withdrawals through UPI/IMPS. This has associated costs in the form of decline in the saving bank deposits. To see the impact of UPI transactions on Current Account Saving Account (CASA) deposits, we have used the quarterly data from FY17 to FY24, which indicate that every Rs. 10 increase in UPI led to redistribution of Rs. 7 in CASA deposits and remaining Rs. 3 moved to other asset classes. Assuming the holding period of 3-5 years, the UPI increase hit the deposits for long-term.

Further, to test the result of UPI transactions on currency in circulation empirically, we carried out a Structural Vector Autoregressive (SVAR) model to find out the of the impact of UPI and Prepaid Payment Instruments (PPI) on the Currency in Circulation (CIC), M0, M3, Money Multiplier (MM) and Bank deposits, individually, with short run constraints. Monthly data has been used for all variables in the unit of INR crores, for the period of April 2016 to July 2024, in the SVAR model with UPI as impulse variable.

The VAR (p) model in its standard form is expressed as:

$$Y_t = \beta X_t + u_t$$

Where, Y_t is the (2*1) vector of the two endogenous variables and X_t is the lag of endogenous variables, U_t is residual of (2*1) vector.

As expected, the results reveal that the increase in UPI is negatively affecting the CIC, M0 and deposits but it has no significant impact on M3 (which is also insignificant). It has also been found that increase in UPI leads to increase in Money Multiplier. It has been estimated that every INR crore increase in UPI leads to decrease in CIC, M0 and SCB deposits by Rs. 1.03 crore, Rs. 1.09 crore and Rs. 0.42 crores respectively.

Table 4: Results from Structural VAR Model

Response variable	Impulse Variable	Coefficient	P-value
CIC	UPI	-1.03	0/-00*
M0		-1.09	0/-00*
M3		0.01	0.9480
MM		0.22	0.0300*
SCB Deposits		-0.42	0/-00*

Source: Authors' calculations; *Significant at 5%

VI. Opportunities and Challenges of Indian Banking

- ***Declining CASA Ratio:*** The CASA ratio of SCBs has been declining and is at 39.3% in Q1FY25, from 40.5% FY24 and 43.1% in FY23 and 44.82% in FY22. The share of CASA in total

deposits decreased as customers preferred higher-yielding fixed deposits and other avenues to park their money. The share of time deposits in incremental deposits has increased to 89% in FY25 (05 October 2024) from 44.39% in FY22, while CASA share has declined to 10.2% in FY25 from 55.61% in FY22.

- ***Shorter Duration Term Deposits:*** According to RBI's Basic Statistical Return (BSR) - 2 (Annual) 2024, the share of term deposits with original maturity period of '1 year to less than 3 years' soared up to 79.1% in March 2024 from 64.2% as at end-March 2023. This is mainly due to higher interest rates in short-term than long duration buckets. However, this strategy exposes banks to risks as banks finance for long-term projects say minimum 7 years to 25 years.
- ***Redefining Financial Inclusion:*** Under PMJDY, banks have opened around 53.74 crore accounts with Rs. 2.4 lakh crore deposits. However, the Overdraft (OD) facility to these accounts is very negligible, which is guaranteed by Government and considered under Priority Sector Lending (PSL) too. So, banks should strategize with the help of technology to funding the unfunded in last mile. This shall include innovative solutions that make it easier for people to not only access basic but also to use a variety of financial services in their fingertip like insurance, MFs, stocks etc.
- ***Transition to a low-carbon economy:*** RBI's latest 'Currency and Finance Report 2022-23' on 'Towards A Greener Cleaner India', offers a valuable glimpse into the potential effects of India's low-carbon transition across different sectors. The report indicates that achieving net zero by 2050 is the most promising scenario, while the National Determined Contributions (NDCs) reflect a continuation of business as usual. In this bank can play an essential role in financing the transition to a low-carbon economy by channelizing finance to sustainable and green projects as well as by developing new financial products that incentivize green initiatives. Our actions will set the course not only for the future of the planet but also determine the kind of environment which we bequeath our future generations.
- ***Use Technology for better Customer Experience:*** By leveraging data analytics, banks can gain insights into customer behaviour, market trends and emerging risks, enabling them to make more informed credit decisions.
- ***Challenges of account aggregators:*** Managing Account Aggregators (AAs) will be one of the key challenges for banks in retaining valued customers/ensuring customer loyalty. As AA is envisaged as a platform for financial services companies to reach out to targeted consumers and seek personal data to optimize product offerings banks falling behind in anticipating, assessing and offering curated products/ services will bear the burnt most.
- ***The rise of Digital Currency/ Internationalization of Rupee:*** CBDCs are the new avatars of fiat money, promising to change the way transactions/payments and settlements are hitherto done, while upending user experiences many times. Both the versions of the e-Rupee (Wholesale and Retail) would revolutionize the money, currency and investments landscape and

banks would need to make suitable strategies to remain ahead of the curve in the evolving scenario, while facilitating transitions towards a better harmonized environment. Also, the pace of internationalization of rupee would gather further traction as Local Currency Settlement System (LCSS) frameworks are increasingly put in place for cross-border transactions between select jurisdictions while seeking enhanced cooperation for interlinking their payment and messaging systems.

- ***Unified Lending Interface (ULI):*** Not only banks are innovating in technological space, but the regulator (RBI) has also taken several initiatives to facilitate digital public infrastructure. Last year, RBI announced the Public Tech Platform initiative through the RBI Innovation Hub, aiming to provide frictionless credit by enabling the seamless flow of digital information to lenders. This open, plug-and-play digital platform, now renamed Unified Lending Interface (ULI) allows financial sector players to connect effortlessly. The ULI platform with the 'new trinity' of JAM-UPI-ULI, is expected to propel India's growth story and is going to revolutionise access to credit, especially for farmers and MSMEs.
- ***Digital Fraud/Cyber Risk:*** We believe that the most pressing challenge is the increasing threat of cyber risk owing to fast pace of digitalization of financial services and collaboration with fintech. This needs to be addressed. Technology risk and cyber risk will have to be optimally addressed to keep digital banking a saleable proposition.

  Recently a gang of fraudsters allegedly duped a 65-year-old woman of Indore (Madhya Pradesh) for ₹46 lakh after subjecting her to fake interrogation for five days, in the latest case of 'digital arrest'. This is one of the examples of Digital arrest: a new method of cyber fraud, in which the fraudsters scare people by making audio or video calls by posing as law enforcement officers and confine them to their homes by giving them the false pretense of arrest. According to the National Capital Region (NCR) police, a staggering 600 cases were reported within a mere three-month period, each involving losses exceeding Rs. 20 lakh.

VII. Concluding Remarks and Future of Banking

A sound and resilient financial system is a prerequisite for a modern economy that involves all sections of its society in sharing equitably the benefits of economic and social progress. The Indian banking system is on the cusp of a transformation. Conventional banking is making way for next-generation banking with focus on digitisation and modernisation. The need for brick-and-mortar branches is being reviewed continuously as digitisation has brought banking to the fingertips of the people, obviating the need to physically visit a bank branch. The transformation of the financial services landscape caused by technological innovations can blur the difference between a bank and a technology company, as technological giants are making rapid strides into areas such as payments, traditionally the domain of banks.

As we move forward, Artificial Intelligence, Machine Learning and Big Data are becoming central to financial services innovation. Analysis of vast amount of data, both structured and unstructured, has been made possible using these techniques. Increasing levels of expectations of compliance to regulations

and a greater focus on data and reporting has brought RegTech and SupTech into limelight. They are being applied in areas such as risk management, regulatory reporting, data management, compliance, e-KYC/ anti-money laundering/Combating the Financing of Terrorism and fraud prevention.

On the last but not least, there is a genuine need to offer tax incentives to bank deposits to keep them competitive and centric to savers. Currently, bank deposits are subject to taxation of interest income at accrual level and we must appreciate that banks in India largely fund themselves through retail deposits rather than wholesale funding as seen in other regions which has been a clear and frequent source of contagion. It may be also reminded that India has limited social security and interest from bank deposits are often used by senior citizens for offsetting consumption expenditure. Ideally, the deposits could be categorized as short-term (less than 1 year) and long-term deposits (more than 1 year) in line with MFs and taxed accordingly as like any other asset classes.

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Where responsibility lies when it comes to AI Ethics in Banking

Dr. Giles Cuthbert*

Introduction

The world of banking has changed a lot since the Chartered Banker Institute was first established almost 150 years ago in 1875 and in recent times some regard it as changing almost beyond recognition, driven by greater competition, greater globalization, significant socio-demographic changes and of course, by the greater possibilities created by new technologies such as Artificial Intelligence (AI). We at the Chartered Banker Institute are determined to keep abreast of all the latest developments in banking and FinTech, whilst retaining pride in our past history and achievements and are keen to ensure that the banking sector's ongoing drive towards its digital transformation is sustainable, responsible and reflecting on the skills, expertise and professional judgement that will be required by bankers of the future.

We are, therefore, excited to see the opportunities that Artificial Intelligence will bring to the banking sector. However, we think that the use of AI is nuanced and caution should be exercised to ensure it adheres to the same professional standards and values as humans. As a professional body, we will continue to help our members identify how AI can enhance and benefit their roles, rather than focussing on the threats often presented in the media and that is why earlier this year, we launched our 'Certificate in Digital & AI Evolution in Banking' to develop the learner's knowledge of digital, AI and automated banking and the role of FinTech and which counts towards that individual becoming an Associate Chartered Banker. Through my own research I have also looked in some detail at the ethics of AI in banking and I wanted to share some of my insights, which individuals working across the sector may find useful as practical guidance going forward.

AI - the concept of emulating human-like intelligence in machines or software, enabling them to execute tasks that humans commonly undertake is an area which also continues to focus the minds of global financial regulators. The use of AI, which include some element of machine learning in banking, is not new but the use of new forms of AI, such as Generative AI, is what is leading to heightened risk concerns in banking and financial services around explicability, capacity, accountability and potential bias. When looking at the use and potential uses of AI and considering whether the current regulatory systems are fit for purpose, there is a need for a heightened focus on ensuring there is a broader understanding of "agency" and "responsibility" across the sector and where responsibility lies when it comes to AI ethics.

One of the key features of an ethical situation is if the person actually has the ability to take an ethical decision. For example, a 3-year-old child would not be expected to make ethical decisions about complex matters - or even basic matters – as they do not

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have the ability to do so. This pinpoints the concept of 'capacity' in ethical decision-making. Capacity is a precursor to responsibility - that is, in order to take responsibility for something, we need to have capacity to make the decision in the first place. There are different forms of incapacity, such as a mental illness, age or a number of other factors.

Once it has been established that a person has capacity in an ethical situation, they then have the ability to take a decision that is seen as valid: this is what we describe as agency. In the context of a professional, 'agency' refers to their capacity to take a decision in a certain situation for which they then have responsibility. So, once we know there is agency, the next step is identifying 'responsibility'.

When identifying responsibility, there are two key features which must be considered: firstly, whether the person has sufficient knowledge of the situation and secondly, whether a person has control of the situation (or certain aspects of the situation). This is important, as a person can be involved into a situation but not have control over the outcome and therefore cannot be considered to be responsible.

It is that first factor of sufficient knowledge where 'professionalism' comes into play, because only professionals can take responsibility in certain situations where professional knowledge is required. For example, an amateur may be involved in an ethical situation, but they could not be seen as responsible as they do not have professional authority or knowledge needed for that situation. It is this factor of responsibility that allows for praise and blame in certain ethical situations.

It is these features of agency, professionalism and responsibility which allow us to understand the distinction between good and bad; this can also be referred to as a value-based (or axiological) distinction. And our role as a professional body is ensuring that we have individuals that are confident in their role as the responsible human to call on their professionalism, expertise and judgement to look at the distinction between good and bad outcomes i.e. is it better or worse that I do this than an alternative action?

The concept of ethical decision-making in relation to AI ethics, centres on how digital systems and AI take automated decisions throughout the course of their daily operations. The key distinction is, therefore, on the unique ability that humans have to intuitively know all these things they are doing are good on a normal, day-to-day basis. When humans are struck by an ethical dilemma, their identification of that ethical dilemma is triggered by their 'ethical sensitivity' - the human capacity to notice that there is a problem or challenge that requires particular ethical attention or analysis. In other words, it is our ethical sensitivity that causes us to stop and think about some things more than others.

Although this may sound simple on the surface, there is a significant history of ethical dilemmas and scandals caused by organisations or individuals who did not stop long enough to reflect on whether there was an ethical problem with something they were attempting to do. It is this failing of ethical sensitivity which lies at the heart of many ethical problems.

That said, it is very difficult in large complex organisations or large complex societies to see where responsibility lies and you could argue that is a very hard in this situation for an individual to be responsible for everything they do because they have such a requirement for the help and support of others to allow them to take the actions they do. This has led people and financial regulators in particular, to think that the concept of 'individual responsibility', which

is very popular in western culture is the right way to think about responsibility. For example, if you look at a large complex organisation you could may be think of it in terms of 'complicit responsibility'.

The concept behind 'complicit responsibility' is that we as individuals all work together, we are all inter-reliant on each other and therefore no one individual is fully responsible, there is always a complicity around the responsibility which we have. In legal terms, you encounter this around joint and several liability, which is very similar to responsibility where we all take a share in responsibility or liability for a situation, so it may sound fanciful at first to say we are all complicit in actions taken by an organisation but perhaps there is some truth in that.

This is even more so the case when we start to consider AI - when we consider the complexity of the number of organisations that may be involved in the production, development and design of AI and the organisations that deploy it and then how all those different digital systems and AI interact with each other, we start to see a very complex map of interactions between different systems, different organisations. So perhaps when we start to think about AI, we need to have slightly different forms of responsibility. May be – it is more about complicit responsibility rather than individual responsibility as we see all these maps of responsibility draw together. This is a contentious concept because we typically find ourselves in a situation in society where people look to blame or look to praise an individual and if we start saying our responsibility and indeed our accountability is complicit then that perhaps undermines a central tenet of our society.

So, can a machine/AI ever be held responsible? We all know we have been in a situation where AI has taken a decision or a digital system has taken a decision and we have to stop and consider bearing in mind what we already know that all decisions are inherently ethical, it may be they are good but they are still ethical. Should we have AI or machines taking decisions on that basis? Are we comfortable for that to happen? This brings us back to the requirements for responsibility so a machine can have knowledge of a situation potentially, they may have control over aspects of the situation and they may be able to influence its outcome but the big question is surely do they have capacity or agency? Typically, only humans have agency – for instance, we would never say a dog is responsible for biting someone, we would typically blame the owner and we would not sue the dog if we were bitten by the dog, we would sue the owner! So, bearing in mind we could not sue the AI, can we say that AI has agency? And if does not have that agency, can it take decisions because after all we know that responsibility requires that agency. This is one of the central debates about AI and ethics and it is why I wanted to explore responsibility in the way I have done in this article because it is really critical to understand what role AI can play; can it replace the professional? Can it replace the human decision maker? This is an area of huge debate and a lot of the literature on AI ethics looks at whether a robot can ever have agency. The key issue for us, in answer to that question, is can we as responsible individuals allow a system which is de facto "not responsible" to take decisions on our behalf?

One further point is, if we know AI cannot be responsible but it is taking highly complex decisions and if we have a concept of individual responsibility rather than complicit responsibility surely we are creating a dangerous situation where individuals are given responsibility for something they cannot control. Because we know control is a requirement, perhaps we are getting into the perfect storm here

where AI can never have agency and can, therefore, never be seen as fully responsible, yet humans do not have full control and therefore, cannot be seen as fully responsible. In which case we analyse responsibility, we find a serious lack in the concept of responsibility at this stage and this undermines some of our most basic ethical thinking.

At the moment, regulators seem to be taking the view that their existing model risk management standards has given them enough powers to deal with the risks around these AI models because fundamentally they believe a human is in control of the model and they need someone to be accountable for the model and those individuals will be held to account. They have also tried to remain technology agnostic up to now but it is possible that this latest round of AI developments might need them to supplement what they have done in some areas, but they feel that have not reached that stage yet.

Nonetheless, regulators are clearly in a hurry to keep up to speed with developments in AI, in terms of the frameworks they are presenting and that is why I have taken into account all the ethical considerations raised above to design a model, which can be applied in AI in banking and which is available from the Chartered Banker Institute. One critically important feature of this model is that it is a reminder that ethical, personal and professional values are not a 'nice to have', they are an essential component of what leads to good ethical outcomes. Digital ethics cannot be approached solely with a good framework or code without the underlying professional competencies, knowledge and ethical commitments that individuals bring to the environment. This model demonstrates how all the different factors at work in the theory and practice can be shown to come together and thus, visualises for individuals a model which they can use to, hopefully, optimise ethical thinking. This is not, of course, a guarantee of positive ethical outcomes, it is a model designed to support ethical decision making.

This last point is a key one, we have a plethora of ethical decision making frameworks, but those frameworks can only support a human to do the right thing. Ultimately, human has to use their intuitions and moral courage to act in the right way. Research in moral psychology has shown that humans have better intuitions, the greater their expertise and we also know that individuals are more likely to have the moral courage to act the right way when placed in a difficult ethical situation. Both these factors, expertise and community, are provided by the professional bodies represented at Asian-Pacific Association of Banking Institutes (APABI), so I can say with some confidence that whatever the future world of AI and digital holds for us, professional banking bodies are an essential part of that future.

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A Shared Future for Humankind Underpinned by Artificial Intelligence and Machine Learning technologies

In recent years, the world has both marvelled and raised concerns at the development and widespread adoption of Artificial Intelligence (AI) and Machine Learning (ML) - a subset of AI - as these evolving technologies revolutionise industries across the globe. While the deployment of AI and ML technologies provide untapped potential for boosting productivity and the associated socio-economic benefits for society at large, it remains to be seen if they will usher in an age of equality for all humankind or intensify inequalities.

Not confined to any particular task, function or sector, with the next iteration of ever-evolving AI/ML technologies likely to be even more transformative than the present generation, beyond the hype, the proliferation of algorithm-driven technologies has put both benefits and risks of overcapacity under the spotlight. The implications for a world characterised by abundance and over-production instead of inefficiency and scarcity is a topic that economists have deliberated for many years. In his 1848 pamphlet, The Communist Manifesto, German-born philosopher, political theorist and economist, Karl Marx described "the epidemic of over-production" as too much substance, too much industry and too much commerce to the extent that the productive forces at the disposal of society no longer favour the development of the bourgeois class over the proletariat or lower socio-economic class.

While the era of AI/ML technologies is vastly different from the era Marx was visualising, instead of over-production attributed to the exploitation of the workers by the bourgeoisie, the current question is, could over-production result from the deployment of AI/ML? PwC's global AI study, Exploiting the AI Revolution, predicts by 2030, AI could contribute up to USD15.7 trillion to the global economy, more than 85% of the current output of Mainland China. Of this, USD6.6 trillion is likely to come from increased productivity and USD9.1 trillion is likely to come from consumption-driven side effects.

While the predictive figures make for impressive reading, there is another dimension of increased productivity to be considered. To prevent the world economy from entering into recession as a result of over-production, monetary policies will need to remain flexible and accommodating. This raises the possibility that Quantitative Easing (QE) could become the norm in the future. In a perpetual cycle of AI/ML-fuelled over-production, free trade agreements and a flexible monetary environment would be necessary to make sure the products produced are available all over the world at affordable prices.

This article is contributed by Publications Sub-Committee, The Hong Kong Institute of Bankers.

Development of AI/ML technologies

Characterised by human-AI/ML interaction modes, high-capacity connectivity, virtual reality systems and Large Language Models (LLMs), the Fourth Industrial Revolution - also known as Industry 4.0 - is the next phase of digitisation reshaping fundamental economic and social changes. Industry 4.0 marks the extension of the Third Industrial Revolution, which took place during the second half of the 20th century. Also known as the Digital Revolution, the Third Industrial Revolution signalled the rise of the Internet, emergence of cloud computing, robotic manufacturing and software-led manufacturing efficiencies. Earlier, industrial revolutions are defined by scientific and technological development. The First, in the mid -18th century, led to the introduction of steam-driven machines and the first factories. The Second, which began in the first half of the 20th century, was largely underpinned by the availability of electricity that led to a period of rapid industrial and technology development as well as social and economic advancements.

Compared to previous technological leaps, in its scale, scope and pace, Industry 4.0 is unlike anything humankind has experienced previously. Because the application of AI/ML is largely based on software development, the utilisation of technologies can spread quickly. A prime example is a desktop computer that was the top of its performance class five years ago would now be considered outdated if put into a smartphone with today's performance capabilities. In simple terms, the speed and expanses can be attributed to Moore's Law, a computing term that has been used since the 1970s which states the processing power of computers or more precisely silicon chips, doubles every two years. It took 75 years for 100 million people to gain access to the telephone - a sharp contrast to the adoption of ChatGPT which gained one million users within five days of its launch in November 2022 and later surpassed 100 million active users within two months of its release.

Applications and Uses

AI/ML technologies can easily be extended, adapted and applied to different business operations. For instance, because of two core attributes - accessibility and versatility - once a LLM is trained on a body of text, a legal document for example, it can be adapted to analyse or summarise a medical or an insurance document. In the banking sector, the integration of AI and ML technologies are transforming personalised financial planning, fraud detection, anti-money laundering and process automation. As adoption of AI/ML technologies grows in the banking sector, Hong Kong's de facto Central Bank, the Hong Kong Monetary Authority, is urging financial institutions in the city to follow a new set of guidelines when using Generative Artificial Intelligence (GenAI) in consumer-facing applications. Banks utilising GenAI in their products should follow a range of principles, including ensuring customers can choose to opt out of using the technology and that AI models do not lead to unfair bias or disadvantage certain consumer groups.

The future of jobs in the era of AI/ML

In spite of reassurances that AI/ML technologies are not meant to replace human capabilities but to augment and enhance them, as they are deployed across different industry sectors, it is unsurprising to see the debate about whether AI/ML complements or displaces human labour raises many questions and triggers uncertainties. The latest iteration of AI/ML is different from past technological innovations as it

affects creative and cognitive jobs as well as physical ones and routine cognitive tasks. In a growing number of business and industry segments, AI/ML is being applied where traditionally people have had limited connections with technology. Few occupations are likely to remain unaffected. Instead of the lowest-paid workers being the most affected, which was traditionally the case when new technologies emerged, many of the highest-paying occupations are experiencing the impact of AI/ML. According to the World Economic Forum's Future of Jobs Report 2023, across 45 economies and covering 673 million workers, nearly a quarter of all jobs will change in the next five years as a result of AI/ML's impact on jobs and employment.

Taking into account that jobs usually comprise multiple tasks, various studies predict that between 30% to 70% of current tasks could be displaced or automated by AI/ML over time. Assuming an average of one out of two tasks is automated by AI/ML, this would mean that 50% of workers could become surplus to requirements. However, at the same time, it is also predicted that job losses from automation are likely to be offset by the creation of AI/ML-related jobs. Even if this is the case, assuming that the jobs lost to the jobs created do not occur in a like-for-like manner, without Government intervention, in major western economies where the current unemployment levels are about 5%, tasks displaced by AI/ML could triple or even quadruple.

The scenario of technology displacing humans is not exactly new. Throughout history, at various times and in various forms, technology has either replaced or displaced humans. For example, the way that ATMs replaced or reduced the need for bank cashiers and, in more recent times, customer support lines that use chatbots to answer customer enquiries. The question that needs to be asked is, what are the best ways that humans can utilise AI/ML and shape its use to their advantage? For instance, AI/ML tools are capable of doing work that people do not want to do, such as repetitive tasks. In theory, this could allow humans to spend more time doing value-added tasks or doing the things they prefer. AI can also be a useful tool for those that have time constraints or need to cover numerous tasks simultaneously. Nevertheless, in the AI/ML era, it is expected that the number of tasks taken up by AI/ML would be faster than the number of new tasks created, which would have an impact on short to medium-term job security.

The impact of AI/ML on the property market

While it remains to be seen how AI/ML will be applied over the long-term to specific sectors such as the property sector, aware of the impending change, property industry participants are already exploring ways to harness AI's transformative possibilities. AI-compliant infrastructure and the ability to plug in multiple systems to rejuvenate the "space-as-a-service" model is an area currently being explored by landlords and developers to create new revenue streams. While property industry participants use AI/ML models to operate their portfolio databases to extract insights on property performance and inform strategies for portfolio improvement, the one thing that AI is unable to do is create physical space. This means the supply of property is finite. People cannot live or conduct a physical business in a virtual space. As such, in the new AI/ML era, when it comes to banks' lending to households, if job security proves to be a concern, banks could lend against collateral such as property, which banks are already familiar with, instead of future income earnings.

Democratising the benefits of AI/ML

In addition to playing a leading role in formulating policies and regulations that govern the development, deployment and use of AI/ML technologies, Governments also have an integral role to ensure that AI/ML is applied in an ethical, transparent and human-centric manner across all segments of society. In doing so Governments can stimulate economic growth and help to offset some of the potential disadvantageous effects AI/ML pose to tasks and jobs.

Because AI/ML technologies are global in nature, Governments can consider exploring collaboration by establishing bilateral and multilateral agreements, sharing best practices and standardising regulations. AI is one of the technologies that many Gulf Cooperation Council (GCC) countries - which comprise Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE) — are investing to diversify their economies away from oil through increased innovation and, in some cases, cross-border convergence of traditional industries.

While not specifically directed at the use of AI/ML, in the context of high quality development, in recent years the Mainland China Government has been advocating the need for “common prosperity”, focusing on raising the incomes of low income groups, promoting fairness, maintaining a more balanced regional development and stressing people-centred growth. In addition to regulatory campaigns, common prosperity policies involve investments and incentives to address development and quality of life issues. For example, the Mainland Chinese Government has embarked on a rural revitalisation campaign which includes the building of infrastructure projects to improve conditions in rural areas. The Government has also initiated strategies to encourage industrial transfer from prosperous areas to less-developed regions. Echoing initiatives the Mainland China authorities have been promoting in recent years, the groundwork could provide the macro-economic context for the development of a global community with a shared future for humankind.

While the development of AI/ML offers significant positive potential for society, there are also profound concerns about the impact and speed at which AI/ML is predicted to spread, not only on the short-term, but also on the broader social and economic environment.

Tawian responds to increasingly sophisticated fraud models with Financial Education

David Stinson*

Since the pandemic, 'pig butchering' or *shazhupan* scams have entered our vocabulary. The name refers to the highly labor-intensive process of building the victim's confidence, frequently spanning months or even years. Due to this workload requirement, it often makes use of slave labor lured by fake job opportunities, particularly based in Southeast Asian countries like Myanmar and Cambodia, resulting in double victimization (Office of the UN High Commissioner for Human Rights, 2023). At its peak in 2022, this employment fraud became so common that Taiwan even started monitoring travel by Taiwanese citizens to Cambodia (Everington, 2022).

Outside of the social engineering aspect, the mechanics of pig butchering fraud are not entirely distinct from the much less sophisticated "Nigerian prince" category of confidence scams. Victims are introduced to investment opportunities and promised outsized, guaranteed returns. The scammers may even allow victims to withdraw a portion of their funds as part of this confidence-building process, before perhaps delaying withdrawals so that they will deposit more, requesting a fee to withdraw more and eventually blocking all communications. The payments may take place on fake trading apps or physically through mules. Although such schemes involve investment, it is important to distinguish them from broader investment fraud, such as Ponzi schemes, which involve a real entity or project, even if the money is eventually misappropriated. Instead, the misrepresentation occurs during the payment stage.

Pig butchering is typically associated with romance scams and its emergence has sparked international discussions about problems like social isolation and victim shame. The name and concept however imply nothing about romance. Especially in the wake of a semiconductor stock market boom, scammers in Taiwan have increasingly found it more advantageous to directly approach victims about investment opportunities, immediately selecting for victims with the ability and willingness to pay. On August 30, Taiwan's Ministry of the Interior started publishing a daily fraud dashboard. Typical daily numbers show that although scams with romantic pretexts are more common, monetary losses from investment fraud are significantly higher, indicating larger losses per incident (Figure 1).

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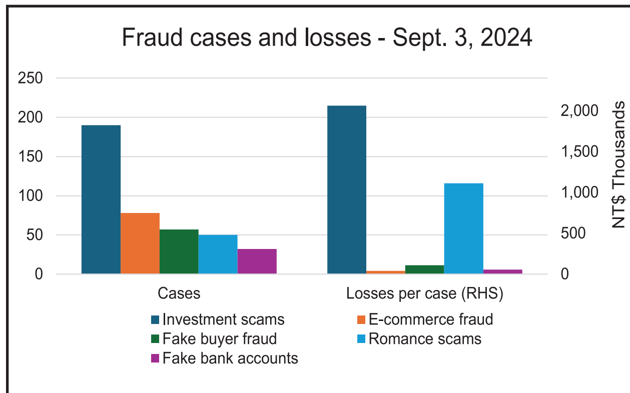
Figure 1: Case count and loss amount by fraud type in a typical 24-hour period



Source: National Police Agency, Ministry of the Interior

Basic Business Model

A victim might see an investment-related advertiement on a search engine, social media or in a public discussion group, perhaps using the likeness of a well-known financial expert, celebrity, doctor or entrepreneur. They are eventually invited to a free private chat group, which in addition to the guru figure at the center of the marketing, will also typically include an assistant, customer service and perhaps dozens of other ordinary investors (Chen, 2024). Some members may also impersonate police officers, providing an additional element of legitimacy.

Unbeknownst to the victim, they may be the only naturally-interacting person in the group; almost every other account is controlled by the threat actor. During the discussion, the different accounts can proactively address any doubts the victim might have, without the victim even needing to voice them. The scammers can also train the victim on how to avoid banks' Anti-Money Laundering (AML) procedures. For instance, one justification for the use of payment rails outside of the banking system is insider trading, which (according to the pretext) does not necessarily harm the victim (Christian Daily, 2024). Later, they may learn that the same AML procedures which are there to protect them are the reason they cannot withdraw their funds.

Experts note that real investment advice is given, indicating more of a targeted model than romance fraud. Some fraud operations apparently cooperate with real financial advisors to deliver daily market updates, particularly for the early marketing stages of the fraud. At the same time, the fraud actors sometimes have also demonstrated unfamiliarity with Taiwanese geography and linguistics, indicating some degree of offshore operations. Many similarities exist between this model and the later stages of a romance scam and elements of recombination might be possible, but the economics appear to differ slightly from the classic version.

Regulatory mitigations

One important logistical challenge for the implementation of fraud is the coordination of dummy accounts, which happens to be the area under the most direct control of Taiwan's financial regulator, the Financial Supervisory Commission (FSC). A previous campaign by the FSC to crack down on personal dummy accounts, blocking or restricting accounts purchased for use by fraudulent operations for up to five years, has apparently proven successful. In response, many scammers have switched to the use of business accounts over the past year, which also have several advantages in the case of investment fraud. Such accounts may appear more legitimate in the context of the investment pretext in case the victim examines the account and they can also receive larger

amounts without triggering AML warnings – although accounts without registered capital or with shorter history, will still attract increased scrutiny (Yang, 2024a). Of course, opening a business account is significantly more difficult than for a personal account, but it is also substantially more valuable.

Most recently, in August, the FSC also issued a warning about the misuse of its own name (Yang 2024b), which also highlights the growing threat from investment fraud. It mentioned four types of documents which it said were most likely to be forged: securities investment advisory business licenses, margin contracts, statements on internal Anti-Money Laundering/Combating the Financing of Terrorism (AML/CFT) controls and other announcements and correspondence.

When thinking about mitigation of this investment fraud model, many of the breakpoints are the same as for romance-based scams, with the main exception being that the initial promotion is more likely to take place on the open web, rather than on dating platforms or through private messages. Technical solutions can be applied at various points like app stores, telecom networks or dedicated apps which a user can download ahead of time to monitor activity on the phone. Legislations requires multinational digital platforms to appoint a legal representative in Taiwan to be responsible for issues related to fraud.

Public financial education

Regarding public messaging, meanwhile, the most important message is to never take investment advice from a celebrity; a real investment advisor would not have an attractive assistant who is available all hours of the day. Nevertheless, after the victim enters the confidence-building stage, there are perhaps fewer general psychological markers of fraud than in other models. There is little need for time pressure and there is also little pretext for secrecy when the 'sales funnel' started on the open web. Moreover, many social manipulation represents the next level of social engineering, altering not only one's emotions, but also one's perceptions of reality. It can be quite difficult to recognize in real time.

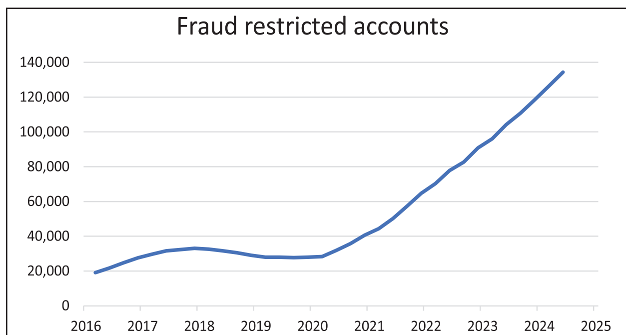
Even if overall psychological hardening may be less relevant for this method, however, because the victims had an original intention of accessing financial services, there may be a more direct opportunity for financial institutions to educate the public about their services. Many victims admit that they did not sufficiently understand how to properly invest. Asked why she thought a bank could not offer the carry trade the scammers could offer, with 12% returns at an interest rate of 2%, for instance, the YouTuber anna_getaway, who was scammed out of NT$ 6 million (US$ 190,000), replied "in fact, I thought about that at the time and asked them about it. But they said their channel required a certain volume…a bank's VIP customers would be offered that opportunity." The arbitrage pretext was not just between Taiwan dollars and foreign exchange, but between the bank itself and the middleman.

Greed is human nature, but financial bodies should do more to educate the public about the benefits of the formal financial system. Taiwanese consumers frequently take an aggressive attitude toward cost-cutting and are receptive to offers to cut fees. They also respond well to terminology like "no risk" and "guaranteed returns," which the financially savvy would understand to signify fraud. This can be another point of emphasis to the public, although it is also to keep in mind that it is a more superficial element of the business model. Scam artists sometimes also prefer to retain some of the more obvious language in

order to initially filter out more skeptical targets.

The other area for public intervention is the dummy accounts and mule operations, which together create large onshore expenses for fraud organizations. The number of suspicious accounts has increased sharply and continuously since the start of the pandemic (Figure 2). Although it has become rarer for people to knowingly sell their accounts, separate fraud models still exist with account takeover as an endpoint. In lending fraud, for instance, targets with no salary history who are unable to obtain lending other ways, often college students or recent graduates, turn to non-traditional methods. Scammers offer a service, whereby, they move money into and out of the account in order to build a history of freelance work on behalf of the client, who can then eventually apply for a bank loan, not realizing they may be held legally liable. Thus, as with offshore slave labor, a dual victimization aspect also exists for onshore operations.

Figure 2: Bank accounts restricted for potential fraud activity

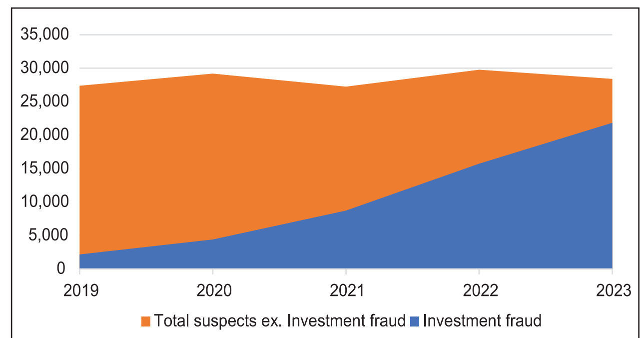


Source: FSC

Regarding dummy accounts, public education can probably focus more on cybersecurity than anything specific to finance. People should understand the dangers of giving out their personal account information, regardless of the degree to which they may trust the other party. Bank accounts are only one particularly sensitive account, out of many.

Mules are generally recruited using traditional employment fraud, meanwhile. Many high-profile arrests of mules have been made, which may explain the growing number of suspects related to investment fraud, which account for most of the growth in fraud suspects over the past several years (Figure 3). Nevertheless, the suspects typically know little or nothing about the core operations, so this is a less useful choke point.

Figure 3: Number of fraud suspects by method



Source: Criminal Investigation Bureau of the Ministry of Interior

List of fraud categories in order by number of arrests in 2023 (categories with >1% of total arrests)

- Investment fraud
- ATM installment payment fraud*
- E-commerce fraud
- Ordinary commercial fraud
- Impersonation of Government officials
- Romance scams
- Lending fraud
- Impersonation of personal contacts
- Gaming fraud
- Employment fraud
- Fraudulent borrowing

**Attackers use information on real e-commerce purchases to convince buyers they mistakenly signed up for installment*

Broader lessons

Investment fraud of this type is mostly an incremental value-added outgrowth of the original romance scam model and it retains some elements of its psychological manipulation. At the same time, it reminds us of the broader role of the financial sector in upholding social order. As the foremost institute in Taiwan responsible for financial training, the Taiwan Academy of Banking and Finance (TABF) has been working to address the trend of investment fraud by proactively teaching investment and saving behavior to the public. Through outreach to primary educational institutions, we have helped young people to enter the workforce with healthy financial habits. In a 2023 pilot project, we also partnered with the Jhe Hui Foundation to not only teach basic financial concepts to rural women, but also track their ongoing results and coach them for further improvement, helping introduce them to formal financial institutions in the process. Through this process, we aim to correct misunderstandings about investment from the source, preventing situations where people need to be rescued later.

Financial inclusion can be defined in terms of three dimensions: access, usage and quality. It is not enough for the proper services simply to exist, particularly when it comes to the higher-value investment services which play an essential role in building lifetime wealth. Ordinary people must feel comfortable using them and they must understand the consumer protection which justify the slightly lower margins. Otherwise, increasingly sophisticated attackers will devise methods which emulate real financial services with increasing precision, requiring genuine experts to tell the difference. When people plan their finances in a deliberate fashion, on the other hand, they are less likely to invest impulsively and more likely to go through the proper, regulated channels, ensuring consumer protection.

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Banking on Data: The Power of AI and Big Data

Burra Butchi Babu*

"Data is not information, information is not knowledge, knowledge is not understanding, understanding is not wisdom". - Clifford Stoll

Data is just raw material in isolation. Analysis, context and interpretation transform it into wisdom.

Artificial Intelligence (AI) and data have been the Buzzwords in the Banking Industry. The banking ecosystem generates massive volumes of data daily through various alternate delivery channels, including social media, website visits, correspondence and credit card transactions.

Various smart devices such as smartphones, tablets and the Internet of Things (IoT) have made it easier for clients to communicate, study and conduct banking transactions online. This data can be linked with third-party data such as market trends, to improve banking analytics. The data can be leveraged for customer profiling, predicting their behaviours, providing customised service and enhancing profitability and efficiency.

Many banks in India have already deployed Data warehouses or Data Lakes or adopted Extract, Transform and Load (ETL) processes to gather and analyse data in their way. Modern financial analytics considers four forms of data: structured, unstructured, relational and streaming. The raw data collected can be in various forms. State-of-the-art techniques are required to translate enormous amounts of data into useful information and using appropriate business tools is the most effective approach to sifting through all sorts of Big Data.

To remain relevant and competitive in this AI-powered digital era, banks will require an analytics and AI capabilities stack that provides intelligent, individualised solutions and unique experiences at scale in real-time.

What is Big Data?

Big Data refers to extremely large and complex datasets that cannot be processed using traditional data processing tools and techniques. The following attributes characterise it:

Volume: Large quantities of data are generated at a high velocity.

Variety: Diverse data types, including structured, unstructured and semi-structured data.

Velocity: Rapid generation and processing of data.

Veracity: Ensuring the accuracy and reliability of data.

Importance of Big Data in Banking

Banking organisations must have vast data of customers to grasp their preferences and demands, improve service quality and profitability. Data analytics allows banks to address particular client wants

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through specialised tools and customisation options. As big data is adopted worldwide, banks capitalise on enormous volumes of transaction data to enhance their operations. Providing customised services and remaining competitive in the financial sector depends on banks knowing customer's behaviour product delivery and industry developments.

Sources of Big Data in Banking

Banks have deployed data warehouses to store the vast amount of structured, unstructured and semi-structured data. It allows to store vast amounts of raw data from multiple sources in various formats in a centralised repository. The figure below lists various Big Data inputs received from numerous channels.

Figure 1: Sources of Big Data

Various Big Data Sources for Banks	
Internal Data Sources	
Customer data	Transaction data, demographic information and customer interactions, like e-mail and social media data.
Operational data	Data from banking systems, ATMs and branches.
Financial data	Accounting data, financial statements and market data.
Risk management data	Data related to credit risk, market risk and operational risk.
Regulatory data	Data required for compliance with regulatory requirements.
External Data Sources	
Market data	Economic indicators, interest rates and market trends.
Third-party data	Data from credit bureaus, data analytics firms and other external sources.
Social media data	Data from social media platforms such as customer sentiment and online discussions.
Regulatory data	Data from regulatory bodies and Government agencies.
Real-time Data	
Transaction data	Data generated from ATM transactions, online payments and other real-time financial activities.
Sensor data	Data from IoT devices such as sensors in ATMs or branches.
Market data	Real-time market data such as stock prices and exchange rates.
Historical Data	
Legacy data	Data from older systems and applications.
Archived data	Data that has been archived for long-term storage.
Generated Data	
Simulation data	Data generated through simulations and modelling.
Synthetic data	Artificial data is created to supplement real-world data.

Building Data-Driven capabilities in Banks

Banks increasingly recognise the power of data in today's competitive landscape. To stay ahead, they are investing in building data-driven capabilities. This involves hiring data scientists, implementing advanced analytics tools and creating data-driven cultures. By harnessing the potential of Big Data, banks derive valuable insights into customer's behaviour, optimise operations and identify new revenue opportunities. The journey towards becoming a data-driven bank is ongoing, but the rewards are immense. Some use cases are given below:

a) Enhances decision-making: Data-driven insights uncover patterns and correlations.

b) Provides predictive analytics: Forecasts future events and trends.

c) Aids in Risk assessment: Accurately assesses credit, market and operational risks.

d) Provides personalised recommendations: It offers tailored products and services based on individual customer preferences.

e) Improves customer experience: Uses AI-powered chatbots and virtual assistants for 24/7 customer support.

f) Prevents fraud: Detects fraudulent activity in real-time.

g) Tailors marketing and product offerings: Identifies distinct customer segments.

h) Predicts customer churn: Predicts customer churn and retains them.

i) Increases operational efficiency: Automates repetitive tasks.

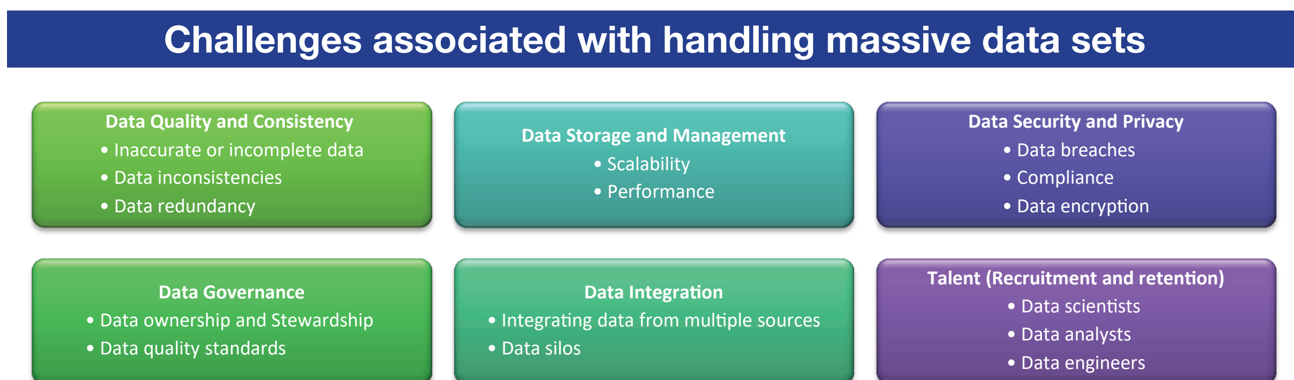
j) Drives innovation: Develops innovative products and services.

k) Identifies new revenue streams and business opportunities: Utilises data-driven analysis.

l) Provides Competitive advantage: Risk management, Customer Relationship Management (CRM), Fraud detection, marketing, compliance and operations.

Challenges associated with Data-Driven Banking

Figure 2: Challenges of handling Data



Some use cases using Big Data and AI

Big Data and Artificial Intelligence (AI) offer powerful tools for addressing various challenges across various industries, particularly banking. Here are some use cases using Big Data and AI:

Figure 3: Use Cases of AI and Big Data

Use cases of leveraging Big Data using AI	
1. Fraud Detection and Prevention - Real-time fraud detection - Anomaly detection - Predictive fraud analytics	**7. Marketing and Customers insights** - Targeted marketing - Customer segmentation - Sentiment analysis
2. Customer Experience and Personalization - Customer behavoiour analysis - Personalized recommendations - 24/7 support	**8. Supply Chain Management** - Vendor management - Logistics optimiztion
3. Regulatory Compliance - Automated KYC (Know Your Customer) - AML (Anti-Money Laundering) compliance - Automating reporting processes	**9. Credit Scoring and Loan Underwritting** - Alternative data source - Dynamic credit coring - Loan underw
4. Risk Management - Credit risk analysis - Market risk management - Operational risk reduction	**10.Customer Retention and Churn Mangement** - Churn prediction - Personalized retention stategies
5. Cybersecurity - Threat detection - Behavioral analysis - Automated threat response	**11. Predictive Analytics and Forecasting** - Customer behaviour prediction - Financial forecasting - Risk forecasting
6. Operational Efficiency - Process automation - Resource optimization - Performace analytics	**12. Customer Feedback and Sentiment Analysis** - Analyzing untrauctured data - Identify key pain points

How Banks are Using AI for Enhanced Customer Experience

Banks are currently using Big Data and AI in the following areas.

1. Enhancement of customer experience: Chatbots & predictive analytics have revolutionised how banks interact with customers.
2. AI-driven data analysis: AI-driven data analysis has empowered banks to delve deeper into customer's behaviours & preferences, enabling banks to offer personalised financial advice & foster stronger customer loyalty.
3. AI in shaping user interfaces: Digital-first banks leverage AI to continuously refine app interfaces, ensuring that features & functionalities are intuitively accessible & relevant to each customer's banking habits.
4. Bolster fraud detection.
5. Fortify cybersecurity measures and optimise network performance.
6. Predictive analytics, regulatory compliance tools and streamlined operational workflows.
7. Anti-money laundering: AI algorithms can analyse vast volumes of data & identify patterns, anomalies and potential risks in real-time.

Some focus areas in Big Data analytics

Providing Personalised Banking Solutions to Customers

Big Data analytics give us insights into customers based on the information they receive. This covers their investment preferences, purchasing habits, motivation and personal or financial histories. For example, having a complete client profile and data allows them to predict and prevent turnover. Also, determine the best strategy to resolve existing issues.

Customer Segmentation

By applying machine learning, Artificial Intelligence and Big Data, banks will get valuable insights into user's behaviour. Additionally, it helps them to optimise their customer experience accordingly. Moreover, by tracking and tracing every customer transaction, banks can categorise their customers on various parameters, such as preferred credit card expenditures or net worth.

Effective Customer Feedback Analysis

Big Data tools can provide banks with customer questions, comments and concerns through feedback. This feedback helps them respond promptly. Customers, when feel that their banks value their feedback and communicate with them promptly, may remain loyal to the particular organisation.

Better Employee Performance and Management

By keeping up with Big Data analytics, Chief Executives of organisations can get a bird's-eye view of the branch's performance. This means better visibility into the day-to-day operations. Also, we can solve any issues proactively, including employee efficiency and turnover, customer acquisition and retention, etc. The use of big data in the banking industry is growing relentlessly.

Fraud Detection and Prevention

One of the banking sector's biggest problems is identifying fraud and preventing dubious transactions.

Big Data in banking ensures the safety and security of the entire banking industry. Moreover, by monitoring customer spending patterns and identifying their unusual behaviour, banks can leverage Big Data to prevent fraud and make customers feel more secure.

Enhanced Customer Experience

Personalised recommendations: Artificial Intelligence (AI) and Machine Learning (ML) can analyse customer's data to provide tailored product recommendations.

Use cases for enhanced customer experience

Personalised Recommendations

Product recommendations: AI can suggest products and services tailored to their needs and preferences.

Investment advice: AI-powered algorithms can provide personalised investment recommendations based on risk tolerance, financial goals and market trends.

Chatbots and Virtual Assistants

24/7 customer support: AI-powered chatbots can provide instant customer support, answer queries and resolve issues.

Personalised interactions: Chatbots can learn about customer's preferences and tailor their responses accordingly.

Fraud Detection

Anomaly detection: AI can identify unusual patterns in transaction data that may indicate fraudulent activity.

Real-time monitoring: AI can monitor real-time transactions and flag suspicious activities.

Biometric authentication: AI can authenticate customers using biometric data.

Risk Assessment

Credit scoring: AI can assess creditworthiness more accurately by analysing various factors.

Market risk analysis: AI can help banks in identifying and managing market risks.

Operational risk assessment: AI can assess operational risks and identify potential vulnerabilities.

Process Automation

Robotic Process Automation (RPA): AI can automate repetitive tasks like data entry and processing.

Intelligent process automation: AI can automate complex processes that require decision-making and problem-solving.

Data Analytics

Customer segmentation: AI can help banks in identifying different customer segments and tailor products and services accordingly.

Customer churn prediction: AI can predict which customers will likely churn and take proactive steps to retain them.

Customer sentiment analysis: AI can analyse customer's feedback to identify areas for enhanced customer satisfaction.

Some popular Tools used in AI and Big Data Analytics

Banks often employ Business Intelligence (BI), Big Data and Artificial Intelligence (AI) tools to analyse and utilise this data effectively.

Big Data Platforms are used to extract valuable insights from their vast datasets. These platforms offer a powerful toolkit for managing the massive data generated by banking operations.

BI tools help organisations collect, analyse and visualise data to gain insights and make informed decisions.

AI tools are used to build and deploy AI models for various tasks, such as machine learning, natural language processing and computer vision.

Some popular tools used in banking

Big Data Platforms

Stand Alone: Hadoop ecosystem.

Cloud-Based: Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP).

NoSQL Databases: MongoDB. Cassandra, Neo4j.

Data Warehousing and Data Lakes: Teradata, Snowflake, Databricks.

Real-Time Data Processing: Apache Kafka, Apache Flink.

Business Intelligence (BI) Tools: Tableau, Power BI, Qlik, SAP Analytics Cloud.

AI Tools: TensorFlow, PyTorch, Keras, Watson Studio.

By leveraging these tools, banks can:

- Analyse huge datasets to discover trends and patterns.
- Create interactive dashboards and visualisations to communicate insights to stakeholders.
- Build predictive models to forecast future events and trends.
- Automate tasks and improve operational efficiency.
- Personalise customer experiences by providing tailored recommendations and services.

AI in Banking - The Double-Edged Sword

In the ever-evolving world of finance, integrating Artificial Intelligence (AI) and Machine Learning (ML) into banking operations is rapidly transforming the landscape. This technological revolution brings unprecedented opportunities for efficiency & innovation but also significant challenges & uncertainties.

Most major financial sector regulators worldwide have stressed the critical need for vigilance. Their message underscores that using AI in banking presents important prudential and financial stability challenges. They warn that unchecked AI and ML models could potentially amplify future banking crises, posing a significant threat to global financial stability. The oversight of financial regulators on the risks and challenges of AI and ML in banking is crucial, providing a safety net for the industry.

Across the financial services landscape, AI has emerged as a game-changer, revolutionising how banks and financial institutions operate and interact with their customers. McKinsey Global Institute estimates that AI could add between $200 bn and $340 bn annually to banking revenues worldwide, underscoring its pivotal role in driving industry transformation.

Democratizing Data and AI in Banking

Data sharing is not just a necessity but a gateway to a world of possibilities in the banking industry. It empowers banks to share anonymised and aggregated data with external parties, fostering a culture of research and innovation. Open data standards pave the way for seamless data exchange and interoperability. Ethical AI development,

focusing on bias mitigation and transparency, is the cornerstone of this transformation. A supportive regulatory environment fuels innovation and encourages experimentation with AI. Collaboration and partnerships between banks, technology providers and research institutions are the bedrock of this revolution. Industry standards for data sharing and AI usage are the guiding stars.

Some key steps are given below to democratise data and AI in the banking industry, as well as banks and regulators:

- Promotion of Data Literacy.
- Open Data Initiatives like Data sharing and adoption of open data standards.
- Ethical AI Development measures include bias mitigation, transparency and explainability and ethical guidelines.
- Accessibility and affordability through Cloud-Based solutions and cost-effective tools to promote using cloud-based platforms to make AI and data analytics accessible to smaller banks.

Mistakes to avoid while embarking on an AI journey

Unawareness of the risks associated with AI: Banks can leverage AI only by mitigating its challenges. The primary concerns include data protection and security, compliance with regulatory frameworks, legacy systems and the development of requisite AI competence.

Over-focus on technology without Domain Expertise: AI teams should know that creating AI solutions without sufficient domain expertise can be risky. Collaborating with domain experts who deeply understand the business context and organisational requirements is crucial for successful AI implementation.

Poor data quality: Substandard data can yield suboptimal results and forecasts when used as input for AI algorithms. Commercial data quality solutions can only address data drift, generate a restricted data profile and provide type and null validations. Massive data breaches and noncompliance may result from the company's activities becoming disjointed and unmanaged due to a lack of a suitable data management framework.

Lack of Enterprise Data Management: A well-thought-out data management architecture that enables business lines to register their data assets as products and make them discoverable throughout the company should be implemented to get around this.

Non-compliance of Responsible AI: Artificial Intelligence requires responsibility and accountability, although the operational AI team frequently needs more awareness of these compliance obligations. Also, banks must improve the explainability of AI, mitigate bias and manage risk effectively.

Summary

We are currently in the AI-driven digital era and banks fully capitalise on its advantages. The applications of AI in financial services are diverse and ever-developing. The technology not only diminishes expenses but also enhances automation and augments the speed and precision of human decision-making, rendering the future of banking optimistic.

Banks store and analyse data from various sources to provide a comprehensive view of internal processes

and customer interactions. By harnessing this data, banks can perform advanced analytics, improve decision-making, enhance customer experiences and remain compliant with regulatory standards.

Big Data and AI provide a vast array of solutions to tackle some of the most pressing challenges the banking industry faces today. From fraud detection and regulatory compliance to customer experience enhancement and operational efficiency, these technologies revolutionise how banks manage risks, deliver services and maintain security. However, successful management of these challenges requires banks to overcome implementation hurdles such as data integration, security concerns and investment in advanced technology infrastructures.

Banks can create more personalised, efficient and secure customer experiences by leveraging AI and Big Data to increase customer's satisfaction, loyalty and revenue.

Choosing the right combination of BI, Big Data and AI tools depends on the specific needs and goals of the bank. It is important to evaluate the capabilities of different tools and select those that best align with the bank's technology stack and business objectives.

Data privacy concerns, regulatory complexities and ethical considerations loom large as banks navigate the adoption of these powerful technologies. To reap the benefits of AI while limiting its dangers, we must be vigilant, collaborate and practice proactive governance. Adopting a balanced approach when integrating AI into banking is essential to address significant prudential and financial stability concerns.

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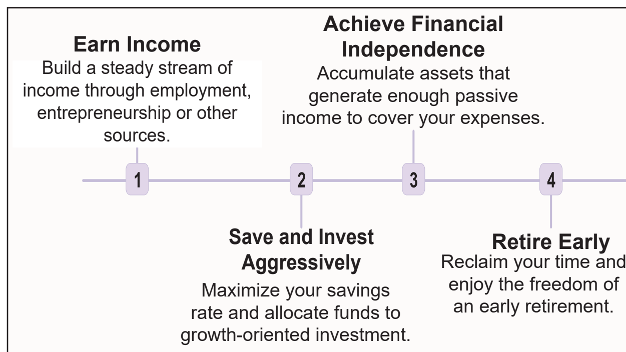
The F.I.R.E. Movement

F.I.R.E. stands for Financial Independence, Retire Early. It is a movement aimed at achieving financial independence and retiring much earlier than traditional retirement ages. The core idea is to save and invest a significant portion of your income during your working years so that you can live off the returns of those investments and retire early.

Figure 1: Understand F.I.R.E Concept



Historical Background

The concept of F.I.R.E. (Financial Independence, Retire Early) has its roots in the United States of America, significantly influenced by the publication of book "Your Money or Your Life" by Vicki Robin and Joe Dominguez in 1992. This book introduced the idea that individuals could achieve financial independence by radically altering their relationship with money, emphasizing frugality, saving and investing. The central message was that by saving a significant portion of income and living simply, people could retire much earlier than the traditional retirement age. Throughout the 2000s and 2010s, the F.I.R.E. movement gained traction, particularly after the Great Recession of 2008, which heightened interest in financial security and independence.

In India, the F.I.R.E. movement began to gain traction in the mid-2010s as global awareness of the concept grew and the Indian middle class expanded. Several factors contributed to its adoption in India. Rapid economic growth and rising incomes allowed more people to consider long-term financial planning and wealth accumulation. Increased access to the internet and smartphones facilitated the spread of information about F.I.R.E. through blogs, social media and online communities. Growing awareness of personal finance and investment opportunities, driven by financial education initiatives and a burgeoning financial services industry, also played a crucial role. Additionally, there was a noticeable shift in mindset among the younger generation, who started valuing financial independence and quality of life over traditional career paths and material accumulation.

The Indian F.I.R.E. movement saw significant milestones between 2015 and 2020. Personal finance blogs and forums discussing F.I.R.E. principles such

*Chief Manager, Union Bank of India.

as "The Wealth Wisher" and "Jago Investor" began to gain popularity around 2015-2016. By 2017, Indian YouTube channels and podcasts focused on personal finance, investing and F.I.R.E. reached a broader audience. Increased media coverage in 2018-2019 featured the F.I.R.E. movement and success stories in major newspapers and magazines. The COVID-19 pandemic in 2020 further heightened interest in financial security and independence, popularizing the F.I.R.E. movement among Indian professionals and millennials.

Why F.I.R.E.?

The benefits of F.I.R.E. (Financial Independence, Retire Early) are profound, offering individuals the freedom to pursue their passions, hobbies and personal interests without the constraints of a traditional 9-to-5 (now a days 9-to-9) job.

Figure 2: Benefits of F.I.R.E.

Achieving F.I.R.E. offers freedom to retire well before the average retirement age of 60. By achieving financial independence, one can reduce stress and anxiety related to financial instability, enhance their quality of life and enjoy more time with family and friends. Additionally, F.I.R.E. promotes a frugal and mindful lifestyle, encouraging better financial habits and long-term wealth accumulation. Ultimately, F.I.R.E. provides the flexibility to choose how to spend one's time and resources, leading to a more fulfilling and balanced life.

Types of F.I.R.E.

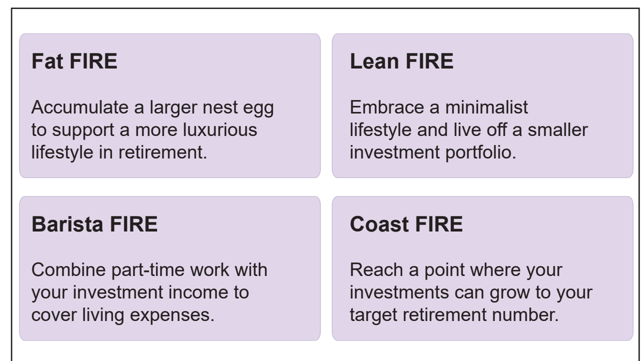
The F.I.R.E. (Financial Independence, Retire Early) movement encompasses several variations tailored to different financial goals and lifestyles.

Fat F.I.R.E. is for those who want to achieve financial independence without significantly altering their current lifestyle, requiring a higher savings rate to maintain a comfortable standard of living in retirement.

Lean F.I.R.E. on the other hand, involves a more austere approach, where individuals live frugally both before and after retirement, necessitating lower savings but greater discipline.

Barista F.I.R.E. represents a middle ground, where individuals achieve partial financial independence, covering most expenses through investments but working part-time or in less stressful jobs to supplement their income and gain benefits.

Figure 3: Types of F.I.R.E.



Coast F.I.R.E. allows individuals to stop aggressive saving once they have accumulated enough investments to grow passively and reach their retirement goal by traditional retirement age, permitting them to reduce their work hours or shift

to lower-paying, fulfilling work in the meantime. Each type of F.I.R.E. caters to different personal and financial priorities, enabling people to choose a path that aligns best with their desired lifestyle and financial situation.

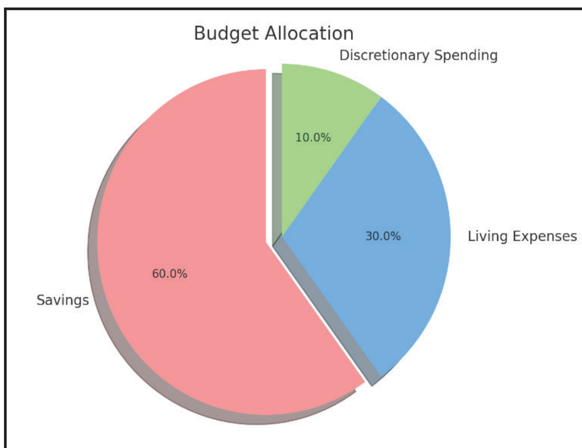
Key Principles of F.I.R.E.

Aggressive Saving: Save a large percentage of your income, often 50% or more of your income.

Wise Investing: Invest in low-cost index funds, stocks, real estate and other assets.

Frugal Living: Live below your means, cutting unnecessary expenses.

Figure 4: Key Principles of F.I.R.E.



Comparing the applicability of F.I.R.E. concept among Developed Countries and India

Let us see the following table for the comparison:

Developed Countries	India
Income Levels	
Higher average incomes make it easier to save more money quickly, but higher living costs can offset this benefit.	Average incomes are generally lower, making it challenging to save a large percentage. However, lower cost of living can help in accumulating wealth.
Cost of Living	
Higher costs of living mean you need to save more money to achieve the same level of financial independence.	The cost of living is relatively lower in most places. Expenses like housing, food and transportation are cheaper, allowing for a more frugal lifestyle.
Saving Rates	
The savings rate tends to be lower, around 10-20%, but higher income levels can still make significant savings possible.	Culturally, Indians have a higher propensity to save, often around 30% of their income, which aligns well with F.I.R.E. principles.
Investment Opportunities	
A wider range of investment options, including more established stock markets, retirement accounts and diversified mutual funds.	Investment options include stocks, mutual funds, fixed deposits and real estate. The stock market is growing, but there is still some risk perception.
Financial Products	
Advanced financial products and services. Greater access to diverse investment vehicles and financial planning resources.	Emerging financial products and awareness. Increasing access to mutual funds and Systematic Investment Plans (SIPs).
Retirement System	
Better social security systems and state pensions, which can supplement personal savings and investments.	Limited social security benefits. Most people rely on personal savings, pensions from employers and family support.
Conclusion from comparison In India, lower living costs and a high savings culture can make F.I.R.E. achievable even with lower incomes. In developed countries, higher incomes but higher living costs require strategic financial planning to achieve F.I.R.E.	

Achieving F.I.R.E. (Financial Independence, Retire Early) in the Indian context

Here are some strategies which may be adopted by an Indian individual:

- ***Increase Income***

  Enhance Your Skills: Invest in education and professional development to increase your earning potential. Online courses, certifications and higher education can lead to promotions or better job opportunities.

  Side Hustles: Consider starting a side business or freelance work. Popular options in India include tutoring, digital marketing, content writing and graphic designing.

  Real Estate: Invest in rental properties. Real estate can provide a steady income stream and appreciate over time.

- ***Aggressive Saving***

  High Savings Rate: Aim to save at least 50% of your income. This can be challenging but is crucial for achieving F.I.R.E.

  Automate Savings: Set up automatic transfers to your savings or investment accounts to ensure consistent saving.

  Avoid Debt: Minimize the use of credit cards and avoid high-interest loans. Pay off any existing debts as quickly as possible.

- ***Smart Investing***

  Bank Term Deposits: Bank terms deposits are considered safe and high yielding instrument of saving as well as investment.

  Stocks and Mutual Funds: Invest in the stock market through direct stocks or mutual funds. Use SIPs for disciplined investing. Diversify your portfolio to spread risk.

  Public Provident Fund (PPF): PPF offers tax benefits and a guaranteed return. It is a safe investment for long-term goals.

  Employees' Provident Fund (EPF): If you are a salaried employee, EPF is a great way to save for retirement with additional employer contributions.

  National Pension System (NPS): NPS is a Government-sponsored retirement savings scheme offering market-linked returns and tax benefits.

  Real Estate: As mentioned earlier, real estate can be a good investment in the long term, especially in growing cities.

- ***Frugal Living***

  Budgeting: Create a monthly budget to track income and expenses. Use apps or spreadsheets to monitor spending and identify areas to cut back.

  Minimalism: Adopt a minimalist lifestyle by focusing on needs over wants. Avoid unnecessary purchases and opt for quality over quantity.

  Housing: Live in affordable housing. Consider renting rather than buying if it makes more financial sense. If you own a home, think about renting out a portion to generate income.

  Transportation: Use public transport, carpool or buy a fuel-efficient vehicle to reduce transportation costs.

  DIY Approach: Do-It-Yourself (DIY) for household repairs, cooking and other tasks to save money.

- ***Emergency Fund***

  Build an Emergency Fund: Set aside 6-12 months of living expenses in a liquid funds or a short-term fixed deposit. This provides a safety net for unexpected expenses and prevents you from dipping into your investments.

- ***Continuous Learning and Adaptation***

  Stay Informed: Keep up with financial news, market trends and investment opportunities. Read books, follow financial blogs and attend webinars.

  Adapt Strategy: Regularly review and adjust your financial plan based on changing life conditions, market conditions and new opportunities.

- ***Community and Support***

  Join F.I.R.E. Communities: Engage with like-minded individuals through online forums, social media groups and local meetups. Sharing experiences and strategies can be motivating and informative.

  Financial Advisors: Consult with financial advisors to get personalized advice and ensure your investment strategy aligns with your goals.

Example of F.I.R.E.	
Income and expenditure	**Investment**
• Income: ₹12,00,000 per year • Savings Rate: 50% = ₹6,00,000 • Annual Expenses: ₹6,00,000	• SIP in Mutual Funds: ₹3,00,000 annually with an expected return of 12% • PPF Contribution: ₹1,50,000 annually with return of 7.1% • NPS Contribution: ₹50,000 annually with a return of 10% • Bank Deposit: ₹ 50,000 in bank deposit with a return of 7.5% • Stocks and Real Estate: Remaining ₹50,000 diversified across high-potential stocks and a small investment in real estate

By following these strategies, Mr. ABC aims to accumulate a corpus of around ₹2.5-3 crores over 15-20 years, which would allow him to withdraw ₹10-12 lakhs annually (considering a safe withdrawal rate of 4%), enough to cover his annual expenses and achieve F.I.R.E.

Roadblocks in Achieving F.I.R.E.

Achieving F.I.R.E. (Financial Independence, Retire Early) in India, while appealing, comes with its own set of challenges and potential problems. These challenges can be categorized into economic, social and personal factors. Here are some detailed insights:

- ***Economic Factors***

  Inflation: India has historically experienced relatively high inflation rates, which can erode the purchasing power of savings and investments. This makes it challenging to accurately calculate the amount of money needed for a secure retirement.

  Market Volatility: Indian financial markets can be highly volatile, influenced by both domestic and global events. This volatility can impact the returns on investments, making it difficult to rely on consistent growth.

  Limited Social Security: Unlike many developed countries, India lacks a robust social security system. The absence of extensive Government-provided retirement benefits means that individuals must rely heavily on their personal savings and investments.

- ***Social Factors***

  Family Obligations: In India, there is a strong cultural expectation to support extended family members, including parents, siblings and in-laws.

These obligations can strain finances and reduce the ability to save and invest aggressively.

Changing Lifestyles: Rapid urbanization and changing lifestyles have led to increased living costs in cities. Balancing a modern lifestyle while adhering to the frugality required for F.I.R.E. can be challenging.

Healthcare Costs: Healthcare costs in India are rising and access to quality healthcare can be expensive. Without adequate health insurance, medical emergencies can deplete retirement savings quickly.

- ***Personal Factors***

  Financial Literacy: Despite improvements, financial literacy in India is still relatively low. Many people lack the knowledge to make informed investment decisions, which is crucial for the F.I.R.E. journey.

  Longevity Risk: With increasing life expectancy, individuals may outlive their savings. Planning for a longer retirement period requires more substantial savings and careful investment planning.

  Job Market Dynamics: Job security in India can be uncertain, especially in the private sector. Layoffs, economic downturns and changing industry dynamics can impact the ability to maintain a high savings rate.

Solutions and Mitigations for Roadblocks

Despite these challenges, several strategies can help mitigate the risks associated with pursuing F.I.R.E. in India:

- *Inflation-Protected Investments:* Investing in assets that provide returns above inflation, such as equities, real estate and inflation-indexed bonds, can help protect purchasing power.
- *Diversification:* Spreading investments across different asset classes, such as stocks, bonds, real estate and mutual funds, can reduce the impact of market volatility.
- *Health Insurance:* Investing in comprehensive health insurance can protect savings from being depleted by medical emergencies.
- *Financial Education:* Improving financial literacy through courses, workshops and financial advisory services can empower individuals to make better investment decisions.
- *Contingency Planning:* Building an emergency fund and having a contingency plan for family obligations can provide financial stability and ensure the F.I.R.E. plan remains on track.

Conclusion

The F.I.R.E. movement, while rooted in global principles of frugality, aggressive saving and smart investing presents unique challenges and opportunities within the Indian context. Achieving F.I.R.E. in India requires navigating high inflation rates, market volatility, limited social security and strong cultural family obligations. Despite these hurdles, the rise in financial literacy, the availability of diverse investment options and increasing economic growth provide a solid foundation for those aspiring to retire early. By adopting inflation-protected investments, diversifying portfolios, securing comprehensive health insurance and enhancing financial knowledge, individuals can successfully work towards financial independence. The pursuit of F.I.R.E. in India, with its tailored strategies and careful planning, not only promises financial security but also a fulfilling, balanced and stress-free post-retirement life.

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