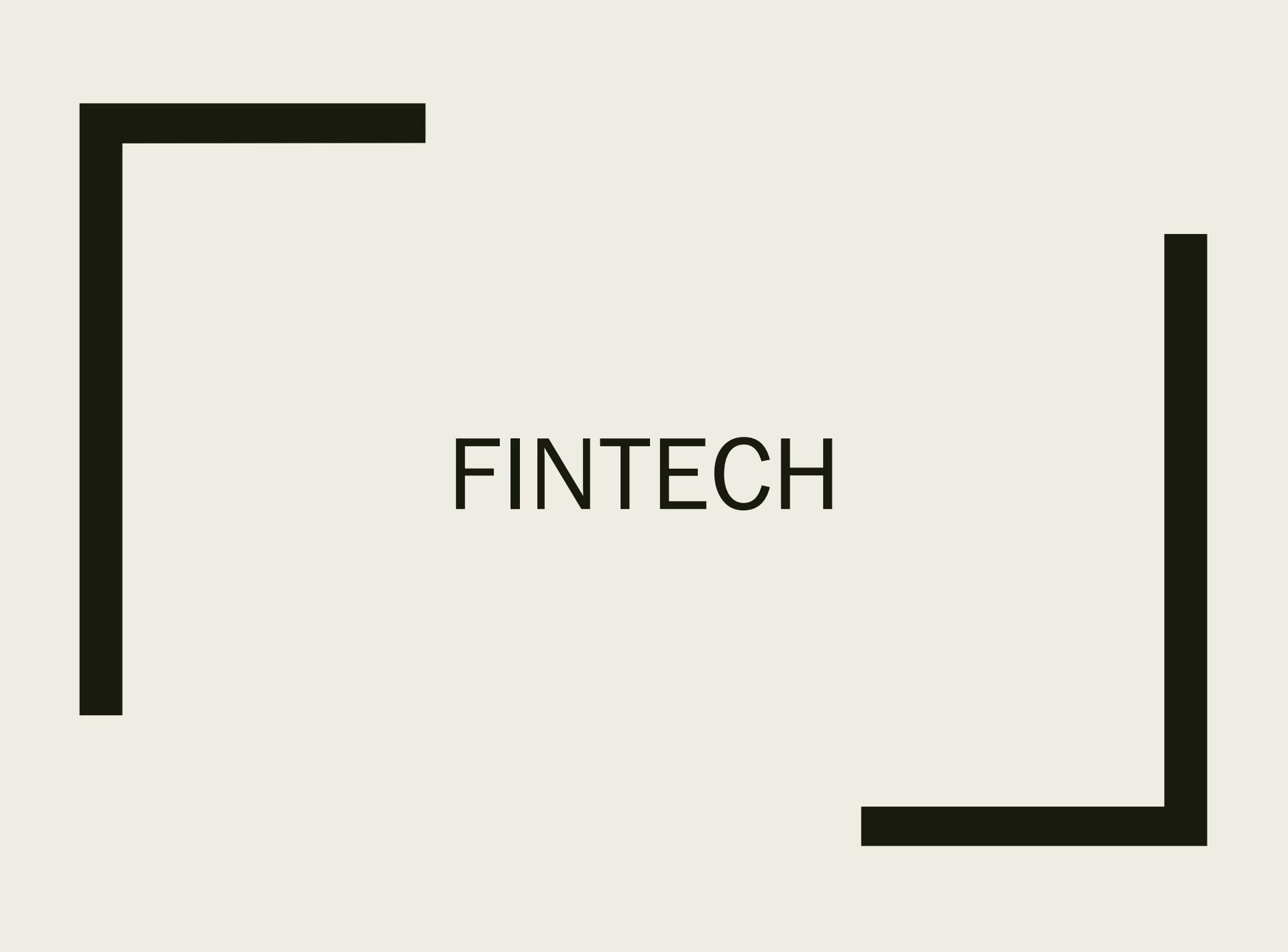# FINTECH AND FINANCIAL INCLUSION IN INDIA

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Organization of the presentation

- Fintech

- AI

- Blockchain

- Financial inclusion

- Regulation

FINTECH

Fintech

- Fintech is broadly an omnibus term used to describe emerging technological innovations in the financial services sector, with ever increasing reliance on information technology (RBI, 2018)

- Innovations that are central to Fintech include

➢ Crypto currencies and blockchain

➢ Artificial intelligence and machine learning

➢ Peer to peer lending

➢ Mobile payment systems etc.

Major fintech innovations

Payments, clearing & Settlement	Deposits, lending & capital raising	Market provisioning	Investment management	Data analytics & risk Management
Mobile and web based payments	Crowd funding	Smart contracts	Robo advice	Big data
Digital currencies	Peer to Peer lending	Cloud computing	Smart contracts	Artificial intelligence & robotics
Distributed ledger	Digital currencies	e-Aggregators	e-Trading	
	Distributed ledger			

Need for fintech

- Philippon (2016) – current financial system rather inefficient

- Unit cost of financial intermediation – declined marginally since the crisis for US and other advanced economies

- Current regulatory approach focuses exclusively on incumbents – top down approach

- Alternatively, approach to contain incumbents, and prevent regulatory abritrage - bottoms up apparoach

Innovative technologies

- The DLT is a novel way of sharing data across multiple data stores (or ledgers) (World Bank, 2017)

- The popular use cases which have gained traction with the Indian industry are Intra-bank applications, authentication and document management, trade finance and invoice discounting

- AI is defined as "the scientific understanding of the mechanisms underlying thought and intelligent behaviour and their embodiment in machines"

- Fintech companies are using AI to advance consumer protection, risk management, user experience, fraud detection etc. Other prominent use cases are credit scoring, chat bots, capital optimization, market impact analysis, trade signalling, and Reg-tech applications
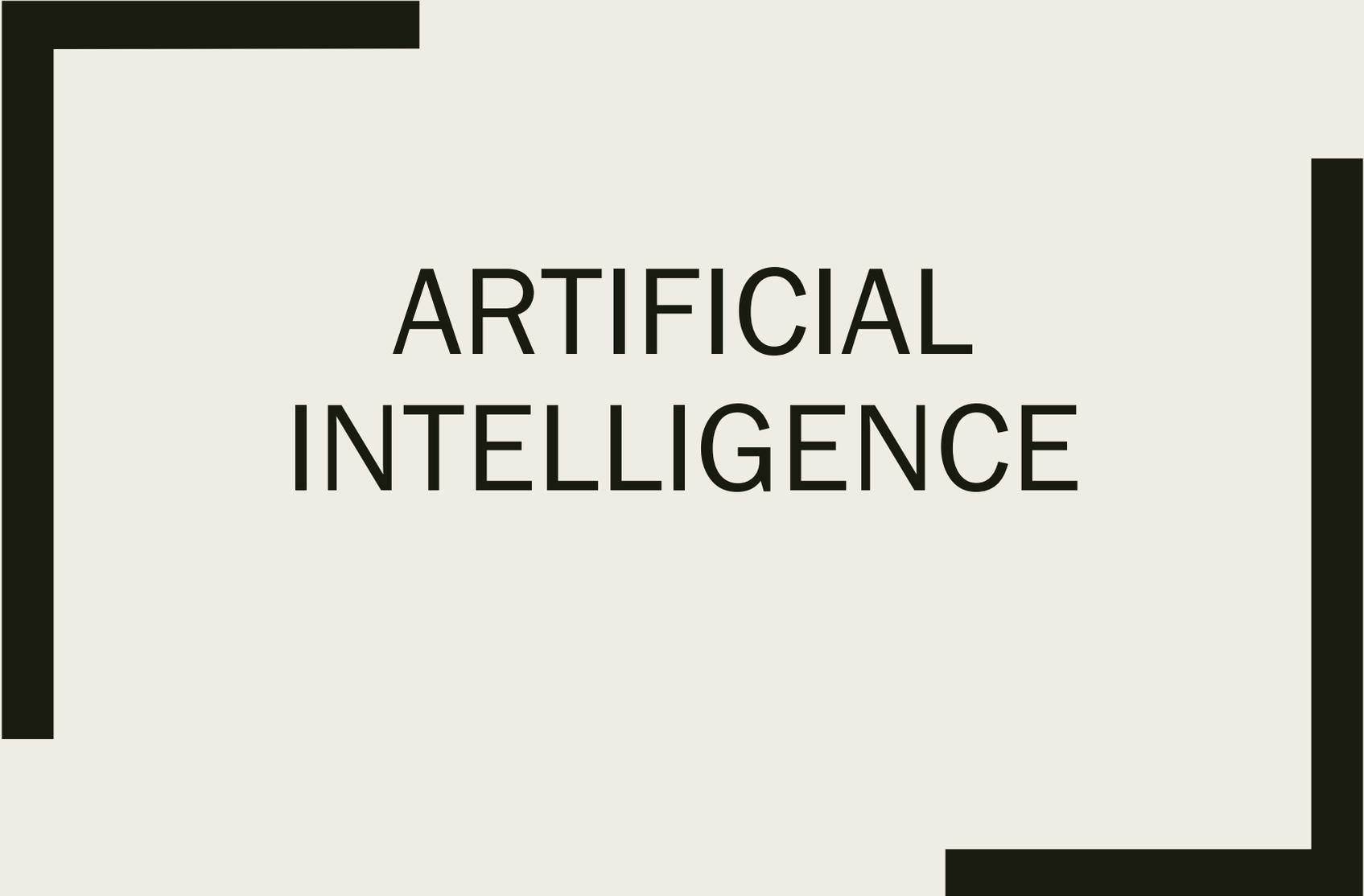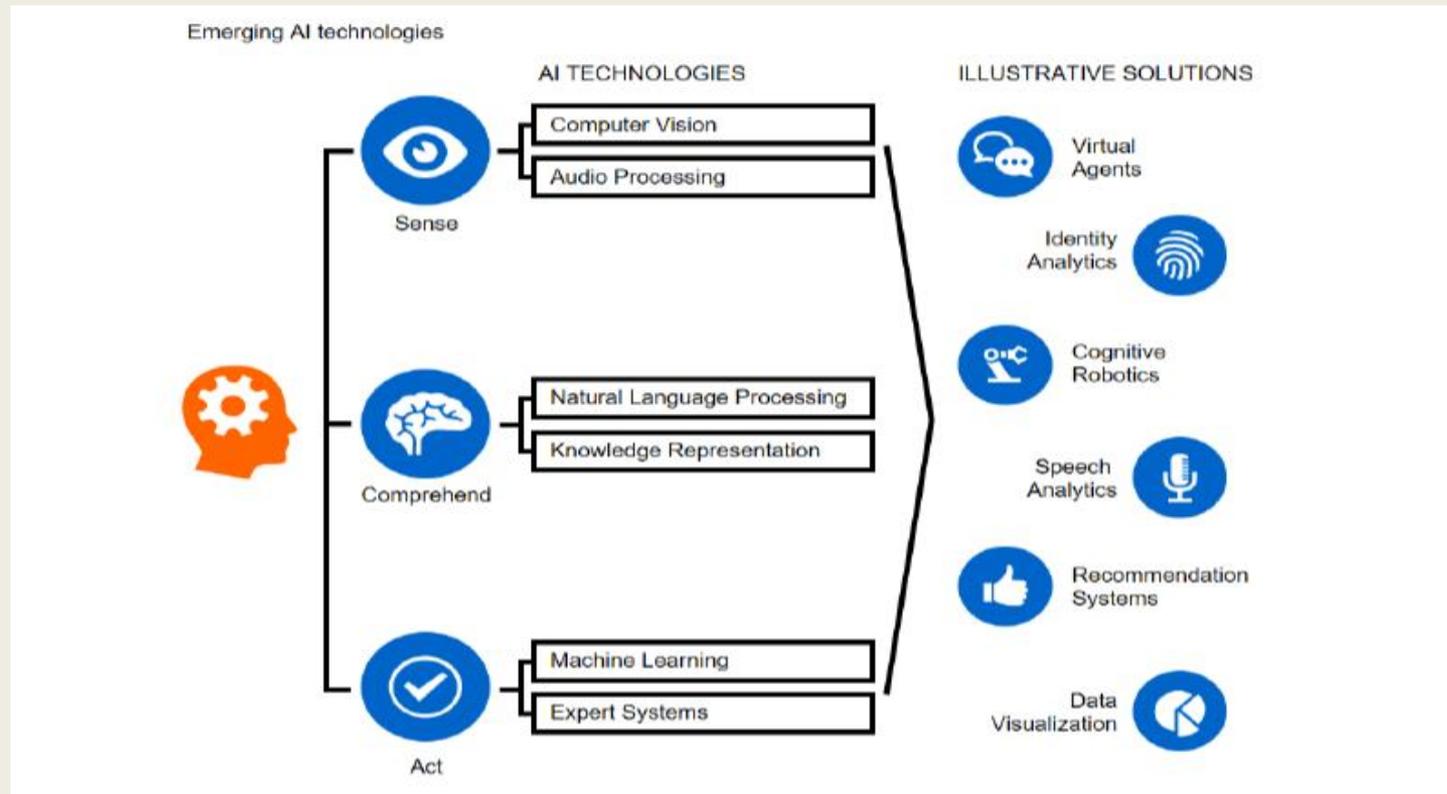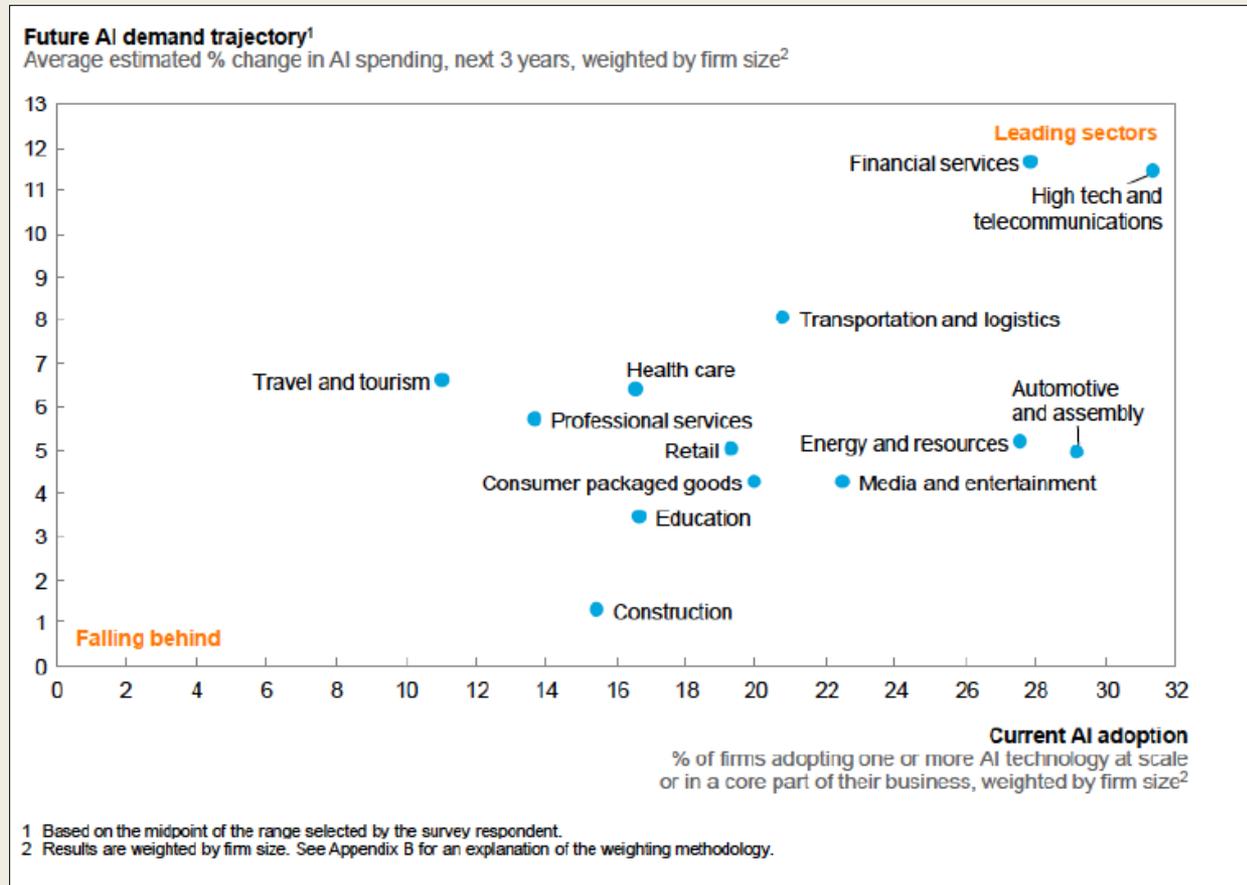
ARTIFICIAL INTELLIGENCE

What is AI?

- Artificial intelligence has been defined as 'the theory and development of computer systems able to perform tasks normally requiring human intelligence'

- Consists of machine learning, robotics, and symbolic logic

- General purpose technology

What is Artificial Intelligence?

Current AI adoption and future AI investments by sector

Future AI demand trajectory[1]
Average estimated % change in AI spending, next 3 years, weighted by firm size[2]

Leading sectors

Financial services

High tech and telecommunications

Transportation and logistics

Travel and tourism

Health care

Professional services

Automotive and assembly

Retail

Energy and resources

Consumer packaged goods

Media and entertainment

Education

Construction

Falling behind

Current AI adoption
% of firms adopting one or more AI technology at scale or in a core part of their business, weighted by firm size[2]

1 Based on the midpoint of the range selected by the survey respondent.
2 Results are weighted by firm size. See Appendix B for an explanation of the weighting methodology.

Adopted from Discussion Paper National Strategy for Artificial Intelligence, NITI Aayog

Use of AI in India

Customer Support and Helpdesk: Chat bots are increasingly being adopted by Indian financial organizations to increase efficiency and reduce cost of customer support – e.g. HDFC Bank's EVA (Electronic Virtual Assistant) , City Union Bank's Lakshmi chatbot etc..

Fraud Detection : Anomaly detection to prevent frauds and improve monitoring - e.g. NSE intends to use machine learning to identify market patterns to improving monitoring and prevent manipulation of its high-frequency trading (HFT) markets

Risk Management: More personalized products to clients based on historical data, risk analysis, minimizing human errors

Security: AI-enabled cyber security systems to guard against and prevent possible security breaches

Wealth management : Robo advisors that provide automated financial planning services like tax planning advice, insurance advice, health, investment advice

Digitization and automation in back-office processing

# BLOCKCHAIN

What is blockchain?/1

- A blockchain is a ledger in which agents known as nodes take turns recording information sequentially in data structures known as blocks

- Information could consist of payment histories, contracts outlining wages or ownership of domain names

- Possible to use blockchain in any application where it is necessary to record information

- Double entry book keeping ledger

What is blockchain? /2

- Blockchain is a type of distributed ledger

- Blockchain is a particular type of data structure used in some distributed ledgers which stores and transmits data in packages called 'blocks' that are connected to each other in a digital 'chain'

- 5 key components of Blockchain – cryptography, peer-to –peer network, consensus mechanism, distributed ledger and validity rules

- Technology is characterised by decentralised networks, absolute digitization, and real time transfer

- DLT refers to a protocol that allows peer-to—peer transfer of assets over the internet

What is blockchain?/3

Key constructs of Blockchain technology
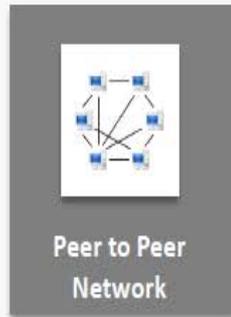
Peer to Peer Network
Transactions are broadcasted through the network and travel from one node to another

A chronological **record of transactions** in a distributed ledger (book-of-records) shared across a business network
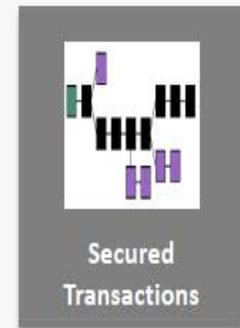
All participants agree to a **network verified transaction** by consensus

Distributed Shared Ledger

Network Consensus

Smart Contracts

Security

Business logic (rules) embedded in ledger that can be triggered when certain conditions are met

Cryptography is a central feature, transactions are secure, authenticated & verifiable

Secured Transactions
Transaction stored in the Distributed Ledger

Lower Cost **Increased Transparency** **Greater Security** **Faster Settlement**

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Payments

- Clearing and settlement of financial transactions requires

➢ Network of participants

➢ Assets that are transferred among participants

➢ Transfer processes that define the procedures and obligations associated with the transactions

- Transfer of funds involves four steps:

➢ Submission

➢ Validity

➢ Conditionality

➢ Settlement

- These processes are facilitated by the 'payment system' which is a set of instruments, procedures and rules for transfer of funds

- Include large value fund transfer systems, automated clearing

Use of blockchain in payments

■   In the Payments space, the immediate applications would be

➢   *Smart Contracts: To emulate regular contractual constructs and can be made partially or fully self executing, self enforcing or both. This can potentially replace standing instruction, electronic clearing service (ECS) etc.*

➢*Authenticate identities and documents through a digital Blockchain recorded version. This can have potential application with respect to KYC authentication, due diligence etc.*

➢ *Application of DLT: The distributed ledger technology can be used to execute transaction in real time by making an irreversible/undeletable transaction entry into DLT copy which would be available to all participating entities.*
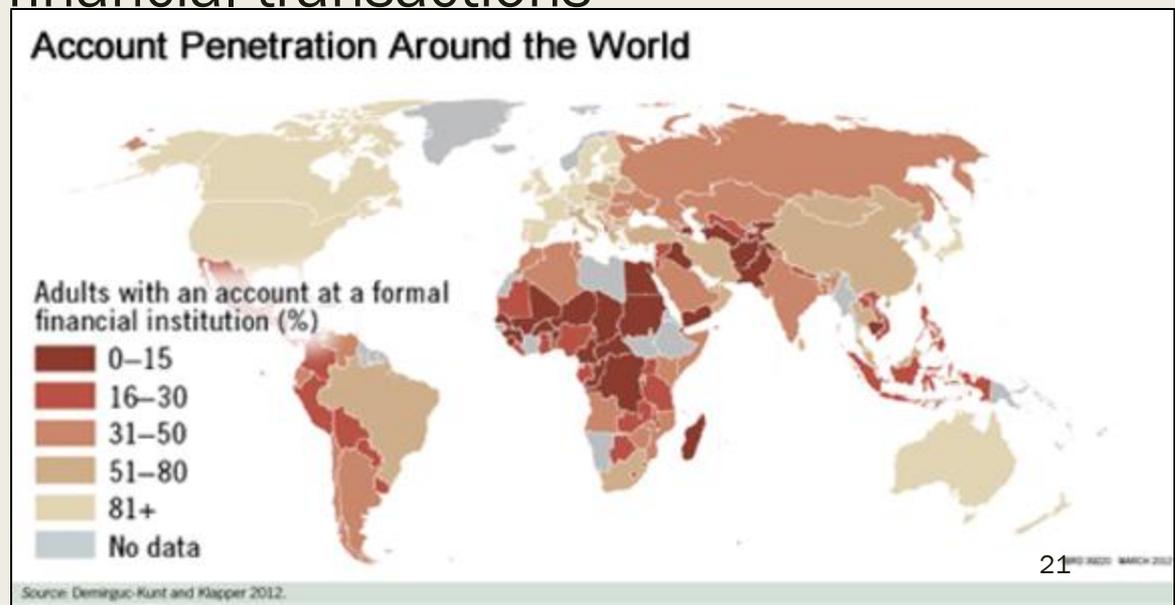
FINANCIAL INCLUSION IN INDIA

Financial inclusion in India

- The Fintech industry, especially payments vertical greatly benefited from digitization policy of government

- AADHAR, envisaged to provide residents of India with a unique identity and a digital platform to authenticate anytime, anywhere has been the biggest enabler – it is widely adopted by all the players for customer on boarding and digital KYC verification

- Unified Payments Interface (UPI), promoted by NPCI is fully interoperable across all payments system players. It powers multiple bank accounts into a single mobile application (of any participating bank), merging several banking features, seamless fund routing & merchant payments into one hood

- The digital India campaign and demonetization also substantially contributed to the growth of digital transactions

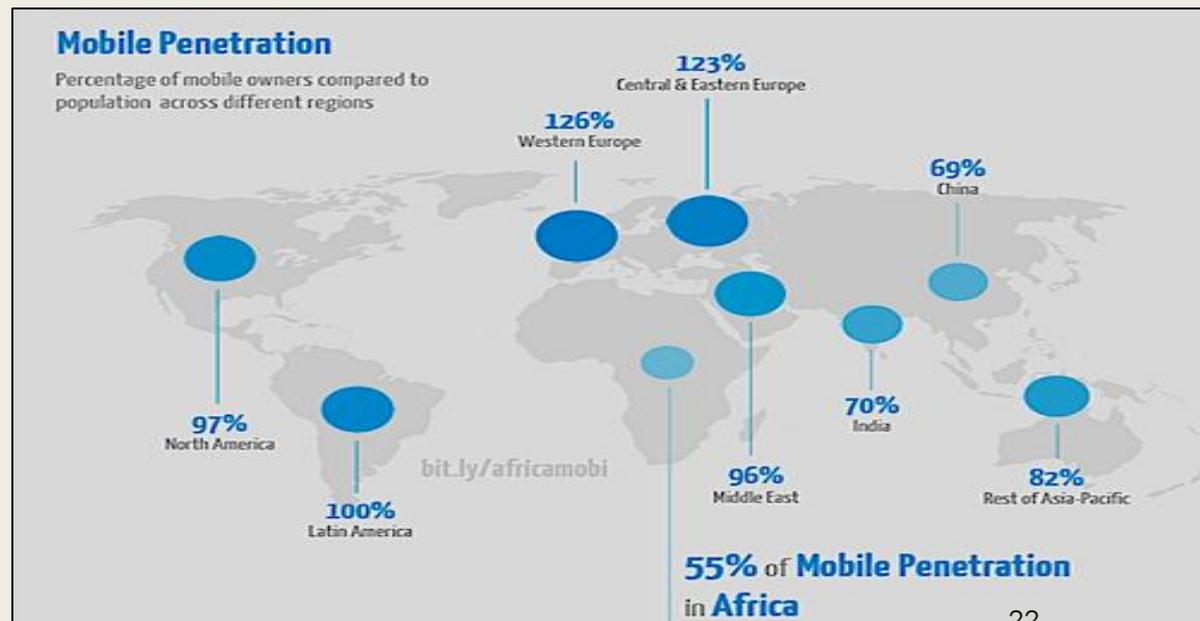- Sustained growth in Smartphone penetration and internet connectivity

Account penetration

- Payments, transfers and lending are receiving maximum attention in the recent past

- Innovations in this category are targeted at improving the speed and efficiency of payments, clearing, and settlement, reducing cost and changing the ways people access financial services and conduct <u>financial transactions</u>

Account Penetration Around the World

Adults with an account at a formal financial institution (%)

- 0–15
- 16–30
- 31–50
- 51–80
- 81+
- No data

Source: Demirguc-Kunt and Klapper 2012.

Internet penetration

■ The Asian region is expected to fuel the growth in this sector as financial inclusion and quality access is an unfinished agenda in region while mobile and internet penetration is fast increasing

Mobile Penetration
Percentage of mobile owners compared to population across different regions

123%
Central & Eastern Europe

126%
Western Europe

69%
China

97%
North America

100%
Latin America

bit.ly/africamobi

96%
Middle East

70%
India

82%
Rest of Asia-Pacific

55% of **Mobile Penetration** in **Africa**

How can blockchain help in financial inclusion?

■ Opening an account – individuals can open an account or deposit cash through their phones

■ Usability of an account – transfer of funds using blockchain takes 10 minutes which is faster compared to such transfers through conventional means in developing countries

■ Costs to the financial institutions – payments via blockchain do not need to go through the national payments system and hence there is no need of physical branches. The cost of transfer of funds is a percentage of the value of the transferred and makes payments more feasible.

■ Individuals and small and medium enterprises (SMEs) have the option of adding funds in the fiat currency. This shift the volatility risk to the FIs.

■ FIs are using bitcoin as vehicle currency – the dollar is the dominant vehicle currency and used in 88% of trades. Using boitcoin as vehicle currency and blockchain's platforms means that the recipient and the sender are not exposed to the volatility of the virtual currency.

REGULATION

Need for regulation of fintech

- The financial sector covers five broad functions. These are to (i) make and receive payments, including across borders; (ii) save to be able to consume or invest later; (iii) borrow to be able to consume or invest now; (iv) manage risks to income, savings, and transactions; and (v) receive advice on all above

- Fintech may spur efficiency gains in the financial sector, offer better and more targeted products and services, and deepen financial inclusion in the developing world. However, it may also pose risks if its application undermines competition, trust, monetary policy transmission, and financial stability.

Need for regulations

- Partly due to a regulatory void, and lack of competition from traditional banks, fintech companies have quickly moved into areas such as trading, investment, and retail banking (shadow banks).

- Rules and standards need to be developed to ensure integrity of data, algorithms and platforms

- Assess costs and benefits of increasing access to settlement systems or offering digital national currencies

- Managing risks to transactions - Aspects of privacy protection, operating costs, speed and transparency.

- Clarify rights and obligations of different stakeholders in the new global financial landscape

Emerging technologies could raise financial stability risks

- Emerging technologies may significantly accelerate the speed and volume of financial transactions. This either may promote financial stability through more efficient price discovery, or lead to greater volatility and instability.

- Wider adoption of certain algorithms and technological solutions may increase vulnerabilities to cyber attacks.

Sytemic risks/regulatory arbitrage

- Regulators should provide incentives for institutions to take into account systemic risk

- Protect consumers where information is difficult or costly to obtain

- Support competition and prevent oligopolistic behavior

- - Regulation should be proportional to contribution of entities and activities to systemic risk

- Boundaries for regulation should be flexible, enable arbitrage between the unregulated and regulated perimeters

- Right balance between privacy and transparency

- **International cooperation** is essential for effective regulation – harmonisation between national regulatory frameworks (MoUs)

- **Regulatory sandboxes**

Objectives of financial regulation

- Financial regulation should: (i) provide incentives for institutions to take into account systemic risk; (ii) protect consumers where information is hard or costly to obtain; and (iii) support competition and prevent oligopolistic behaviour (IMF, 2017)

- Regulation should be proportional to the contribution of entities and activities to systemic risk.

- The boundary for regulation should be flexible and enable regulatory arbitrage between the unregulated and regulated perimeter to be monitored and adjusted to ensure that systemic risks are contained and the goals of regulation are sustained.

Data Localization debate

- Increasing trend of data localization across the world - explicit requirement by law or as the de facto result of a culmination of other restrictive policies that make it unfeasible to transfer data

- Rationales for data localization and other barriers to data flows

- Privacy and Cyber security Rationales

- Economic Development—"Digital Mercantilism" - as a way to force high-tech economic activity to take place within their borders

Why do we need to rethink the current regulatory, supervisory and licensing frameworks

- Developments in the fintech can gives rise to new risks that go beyond the scope of prudential supervision, as other public policy objectives may also be at stake – *consumer protection, data protection, competition and cyber-security* etc. - This warrants increased cooperation between regulating entities and competent authorities as there could be overlaps

- International coordination and cooperation between bank supervisors for regulatory treatment of cross border tech companies

- Current bank regulatory, supervisory and licensing frameworks may not be compatible with emerging models of operation and could hamper innovation or can give rise to unintended regulatory gaps or create barriers to entry for new players

Current regulations in India

- Multiplicity of firms and business models distribute the fintech activities across the scope of different financial regulators – RBI, SEBI, TRAI,IRDA etc.

- The payment space is one of the most regulated sectors in India

- This sector is regulated by the RBI under the Payment and Settlement Systems Act, 2007 and the Payment and Settlement System Regulations, 2008

- Non financial regulations include The Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data or Information) Rules 2011, Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act 2016, The Information Technology Act 2000, The Prevention of Money Laundering Act 2002 etc.

Current international initiatives to regulate fintech

- Many efforts are already underway to actively monitor Fintech developments both domestically and in cooperation with international organizations. Some of the developments are

- Basel Committee on Banking Supervision (BCBS) has set up a Task Force on Fintech (TFFT) to identify and assess the risks arising from the digitalization of finance with a focus on the impact of financial technology on banks' business models, the provision of finance and systemic risk, as well as associated supervisory challenges

- Financial Stability Board (FSB) has set up a task force named Financial Innovations Network (FIN) for the assessment of Fintech, inter alia recommending that innovations be examined through the lens of authorities' and Secretarial Standards Board' (SSB) responsibilities

- Committee on Payments and Market Infrastructures (CPMI) is looking at digital innovations as well as Fintech developments and their implications for payments and market infrastructures. The CPMI is continuing to monitor developments and evolution of digital currency schemes and their wider implications

THANK YOU