Fabric of Fintech 3.0

Dissecting value chains and exploring emerging trends

VARANIUM

GLOBAL FINTECH FEST

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Foreword

In our year-long reflection since the “Fabric of Fintech 2.0", the world has witnessed a rapid deceleration of the global economy, with a noticeable slowdown in startup investments and fintech ventures both globally and within India. However, amidst this backdrop of uncertainty and economic challenges, there shines a resilient light – fintech startups that not only endure but thrive with a steadfast commitment to profitability.

Amidst the gloom, August 2023 is a historic milestone in the annals of digital finance, India witnessed the first-ever month in which over 10 billion transactions were conducted digitally on a single platform, namely UPI. This remarkable feat underscores the incredible utility of the UPI platform and, in turn, sets the stage for a powerful ripple effect in lending, insurance, and wealth management for small businesses.

While the harsh winds of a funding winter continue to blow, startups built on a foundation of prudent financial management and a relentless focus on profitability are not only weathering the storm but also attracting capital and expanding their operations. Moreover, larger publicly listed startups like Paytm and Policy Bazaar are inching closer to profitability, with year-on-year growth in their share prices, albeit below their initial listing prices.

Government initiatives aimed at fostering open banking frameworks, public technology platforms, and push in insurance, such as 'Bima Sugam and national health claim exchange platform', hold the promise of becoming the next catalyst for growth and democratization of financial access. Indian regulatory bodies are recognizing the importance of innovation and working diligently to create the necessary frameworks to support such innovations.

When data is the new currency and cyber-attacks have become the modern-day equivalent of piracy; privacy, and security are no longer mere buzzwords; they are the foundational pillars of the fintech edifice. As we transition our financial ecosystems onto digital platforms, safeguarding the confidentiality of personal information and preserving the integrity of financial transactions have assumed paramount importance. Today, privacy and security are not merely technological prerequisites; they have evolved into societal imperatives, and it is at this crucial juncture that data privacy laws come into play.

In our third Fintech report, we aim to be your guide in this intricate landscape. We delve into business models, technology stacks, government-led initiatives, and the evolving regulatory environment shaping fintech in India and globally. Together, we explore the nodes and networks, platforms, and protocols that form fintech's complex tapestry.

Scan this code to read
Fabric of Fintech 2.0

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Global Landscape

Fintech Verticals

Global : $ 674.5 Bn
India : $ 34.4 Bn

Payments

Global : $ 207 Bn
India : $ 15 Bn

- UPI
- Wallets
- Payment Gateways
- POS
- Cards
- Rewards
- Payments Banks
- Payments Infrastructure
- Agent Based Payments
- Fraud Analytics Platform
- Others

Alternate Lending

Global : $ 188 Bn
India : $ 9.1 Bn

- Business Loan
- Retail Loan
- Business + Retail Loan
- Buy Now Pay Later
- Invoice Discounting Platform
- Gold Loan
- Revenue Based Financing
- P2P Lending
- Debt Analytics and Scoring
- Loan Comparison
- Structured/Syndication + Financing
- EMI Conversion and Down Payment
- Assitance
- Others

Investment Tech

Global : $ 108 Bn
India : $ 3.18 Bn

- New Age Brokers
- Robo Advisory
- New Age Investment Platform
- Fractional Investments
- Money Management Apps
- Private Market Inventing
- Analytics Platform
- Micro Savings

Insurance Tech

Global : $ 69.5 Bn
India : $ 3.72 Bn

- Internet Manufacturers
- Insurance Brokers
- Micro/Contextual Insurance
- Insurance Aggregators
- Health Ecosystem
- Internet of Things
- Insurance Analytics
- Process Facilitation
- Fintech Platforms

Neo Banks

Global : $ 102 Bn
India : $ 3.37 Bn

- Business
- Millennials

Source: Tracxn

Note: Global includes India

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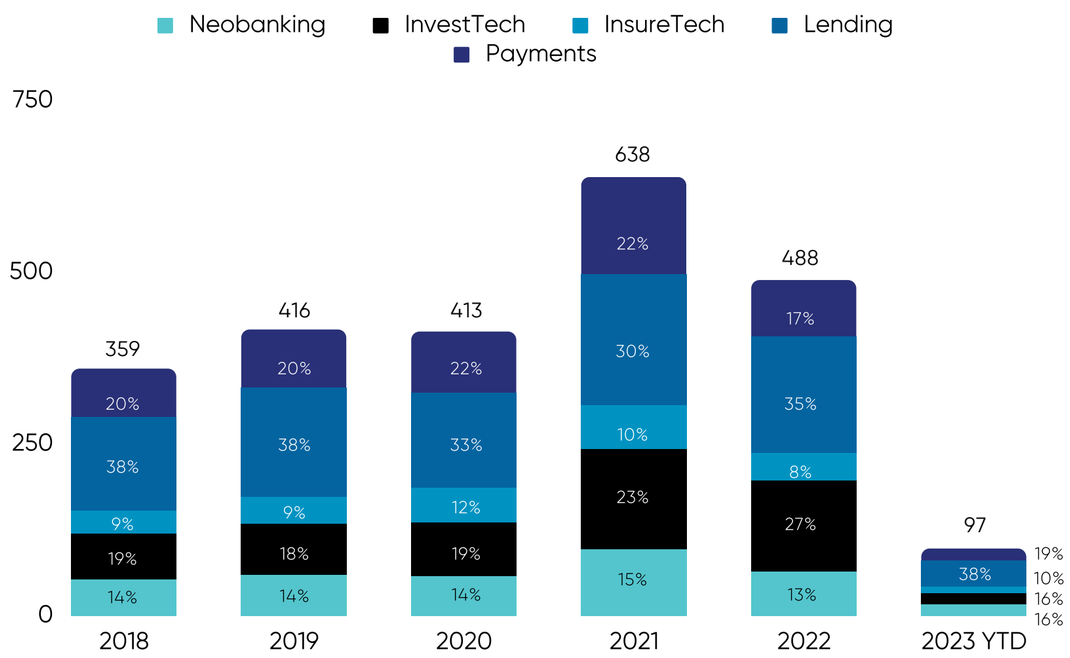
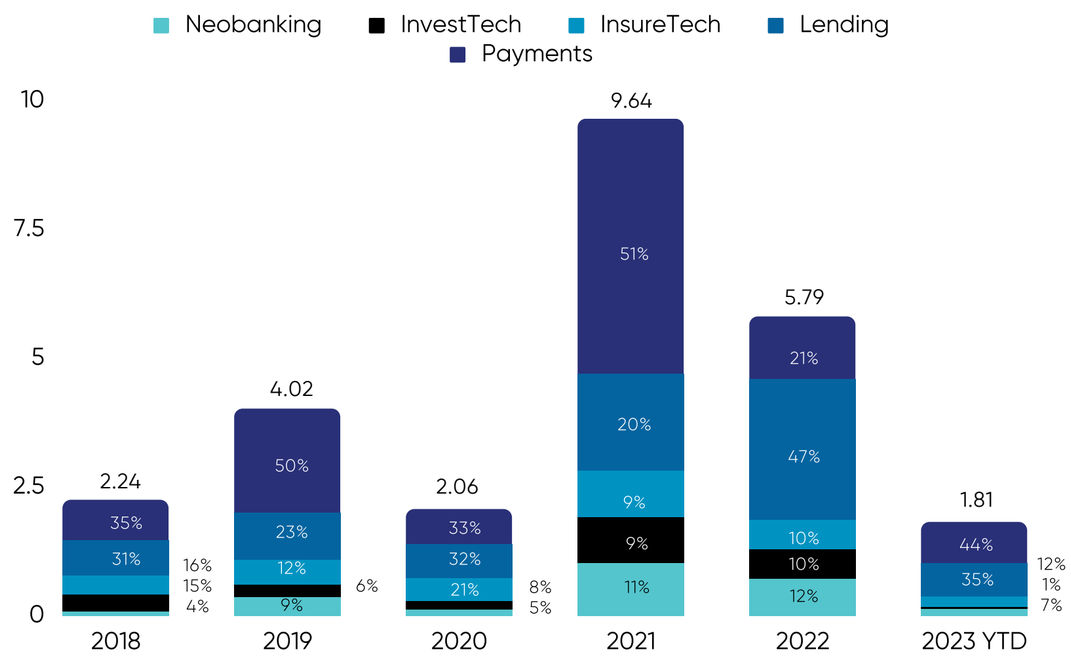
Fintech funding in India

Indian Fintech Funding by Number of Deals



Indian Fintech Funding by Value ($ bn)



Note: YTD is till July 2023

Source: Tracxn

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Digital Infrastructure, Enablers and Regulations

Data protection Regulations

Data protection is the process of safeguarding important information from corruption, compromise or loss.

India, one of the world's largest data markets after China, has finally come with data privacy law: Digital Personal Data Protection Act ('DPDPA") 2023. It will now provide tighter and better control to users over the use of their personal information. The key differences in the EU's GDPR and India's DPDPA are as follows:

Parameters	DPDPA	GDPR
Classification of Personal Data	Applies to all categories of personal data in digital form and does not classify it into special categories of personal data.	Classifies personal data in special categories: genetic data, biometric data, personal data revealing ethnic origin, etc.
Processing of Personal Data	Covers only processing of personal data by partly or wholly automated means. Non-automated methods have been excluded.	Doesn't draw any distinction between means of processing of personal data.
Classification of Data Fiduciaries	Certain data fiduciaries (akin to data controllers under GDPR) are classified as significant data fiduciaries (SDF). This is on the basis of volume + sensitivity of personal data processed, risk posed to the rights of the data principal, national security, public order etc.	There is no equivalent of a significant data fiduciary.
Extra-territorial Applicability	Limited to cases of a data fiduciary outside India processes personal data in connection with an activity to data principals in India.	Applies to data controllers established outside EU where processing activities related to monitoring of data subjects' behaviour within EU.
Cross-Border Data Transfer	Blacklisting Approach	Whitelisting Approach
Children's Data	Below 18 years of age.	Below 16 years of age, reducible to 13 by member countries.
Consent Manager	Yes (Act as single point of contact point to enable data principals give, manage, review, withdraw their consent)	There is no equivalent concept of consent manager in GDPR.
Cookie Law	No	Yes
Penalties	Capped to INR 250 crores.	Variable (upto 4% of worldwide revenue of preceding financial year).

Source: Varanium Research

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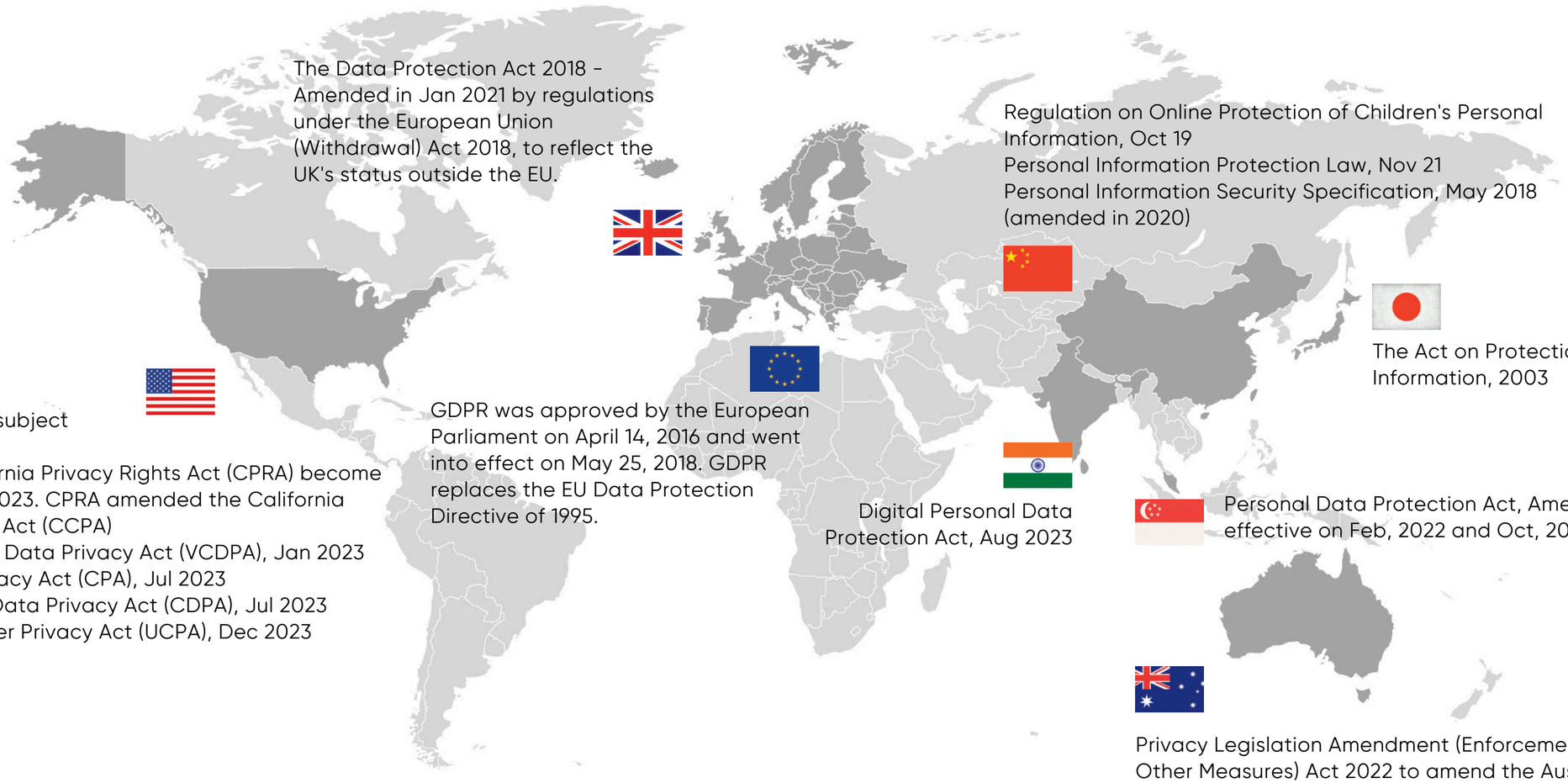
Consent based data economy



The Data Protection Act 2018 - Amended in Jan 2021 by regulations under the European Union (Withdrawal) Act 2018, to reflect the UK's status outside the EU.

Regulation on Online Protection of Children's Personal Information, Oct 19
Personal Information Protection Law, Nov 21
Personal Information Security Specification, May 2018 (amended in 2020)

The Act on Protection of Personal Information, 2003

Privacy is a state subject

California - California Privacy Rights Act (CPRA) become effective on Jan 2023. CPRA amended the California Consumer Privacy Act (CCPA)
Virginia Consumer Data Privacy Act (VCDPA), Jan 2023
The Colorado Privacy Act (CPA), Jul 2023
The Connecticut Data Privacy Act (CDPA), Jul 2023
The Utah Consumer Privacy Act (UCPA), Dec 2023

GDPR was approved by the European Parliament on April 14, 2016 and went into effect on May 25, 2018. GDPR replaces the EU Data Protection Directive of 1995.

Digital Personal Data Protection Act, Aug 2023

Personal Data Protection Act, Amendments became effective on Feb, 2022 and Oct, 2022

Privacy Legislation Amendment (Enforcement and Other Measures) Act 2022 to amend the Australian Privacy Act 1988

Source: Varanium Research

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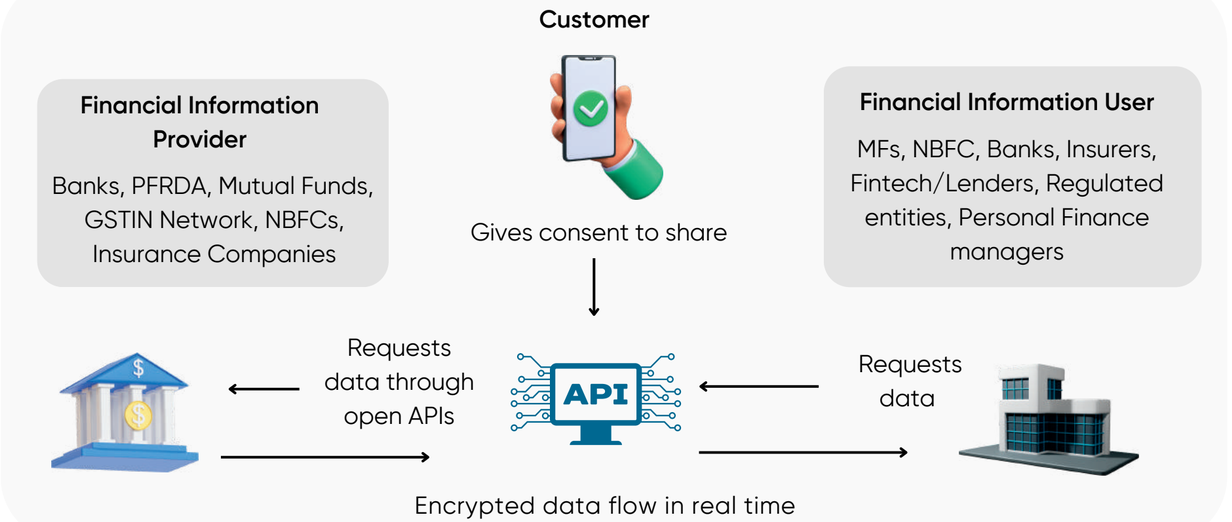
Account Aggregators

RBI-regulated entity (with an NBFC-AA license) that helps individuals/ corporates securely and digitally access and share financial information (Bank accounts, GST, Insurance, Investment, etc.) from one financial institution to other regulated financial institutions in the AA network.

Parameters	Aug-21	Aug-22	Aug-23
Consents processed	0.01 Mn	1.36 Mn	18.06 Mn
Handles created	0.01 Mn	1.32 Mn	18.63 Mn
FIPs Onboarded	6	15	92
FIUs Onboarded	3	26	259
AA operating entity	4	6	13
Live Data Items	Banking	Banking	Banking, GST, NSDL, CDSL, Insurance



What it will bring

- Temper-proof data ingestion, ease of integration, and aggregation.
- Provides infrastructure for greater financial inclusion.
- Better Data Privacy & Control for user's financial data.

Potential Impact

- Reduction in cost of processing loans.
- Reduced time and increased accuracy by doing straight-through processing of data.
- Real-time early warning systems through account monitoring access.
- Creation of more customized personal and automated finance management tools, which can include expense analysis, easy accounting, and investment recommendations.

Source: Varanium Research

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Comparision

of AA and equivalent Global Models

	India	China	Australia	Singapore	Korea
Centralized sharing of customer data	Account Aggregator (AA)	✗	Pursuant of Customer Data Right and Open Banking Regs	Singapore Financial Data Exchange (SEDX)	My Data
Customer consent for data sharing	✓	Routed through Licensed agency	✓	✓	✓
Mandatory sharing of customer data by incumbent lenders to third party	Joining ecosystem is voluntary, but mandatory sharing of data	✗	Joining is voluntary	Joining voluntary, but mandatory sharing of data	Joining voluntary, but mandatory sharing of data
Fintech and other financial institutions partnership to share customer data	Data can be shared with regulated entities after customer consent	✗ Direct sharing banned	On accreditation from regulators	✗ Subject to Personal Data Protection Act	NA

Source: Credit Suisse

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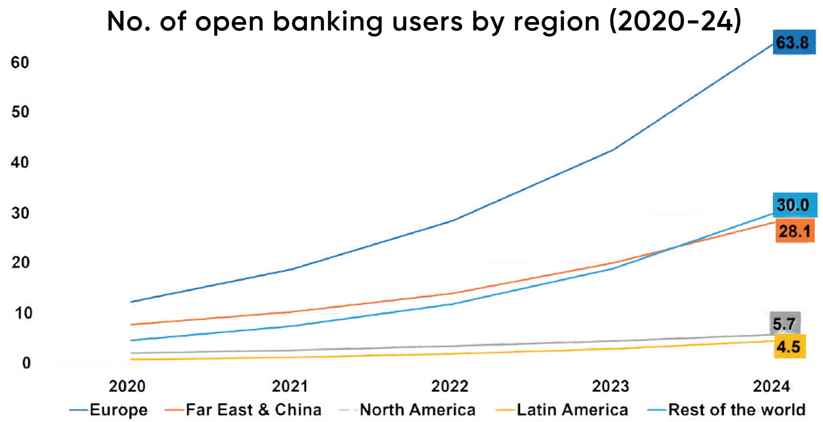
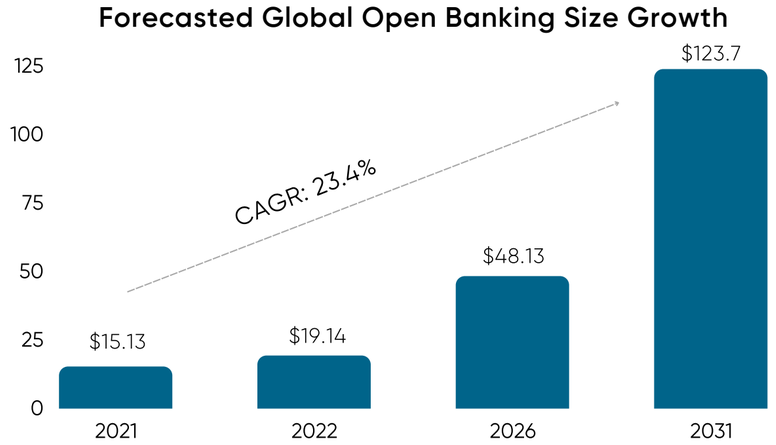
Identity Infrastructure

	 Aadhar	 Resident ID Card	 e-Estonia	 SingPass	 UAE Pass
No. of users	1.4 bn	1.4 bn	1.3 mn	4.5 mn	2.0 mn
Population coverage	96%	98%	99%	83%	20%
Government data ownership			 (User-controlled)		
Use Cases	ID proof & verification, Digital Sign (Aadhar-based e-sign), Filing returns, Digital Life Certificate, DBT, AePS, BHIM Aadhar Pay, Digital Document Vault Access	ID Proof & verification, residential permit, driving license, opening bank accounts, hotel check-in, social welfare programs	ID Proof, Digital Login Password (via PIN), Digital signature, i-Voting, Medical Proofs, Filing tax returns, e-Health Record & e-Prescription	ID proof & verification, Prefill Forms, social welfare programs, digital document vault, tax filing, access healthcare, product purchase, building entry, donations, etc	ID Proof, Prefill Forms, Digital Login, Digital Signature/E-Seal, Document Sharing, Access Govt & some Non-Govt Services, Digital Document Vault Access
Authentication	Biometrics: Fingerprints, Iris Identity: address, DOB, phone number	Hierarchical: Weak: Wechat Strong: Facial recognition/ biometric	2FA	2FA: Singpass app, SMS OTP Biometric: Fingerprint, Iris Re-enrolment: at 30 & 55	Basic: OTP (treated as unverified), Basic + SmartPass: Dubai /Emirates ID Basic + biometrics: at kiosk

Source: MIT Report, Country-specific websites

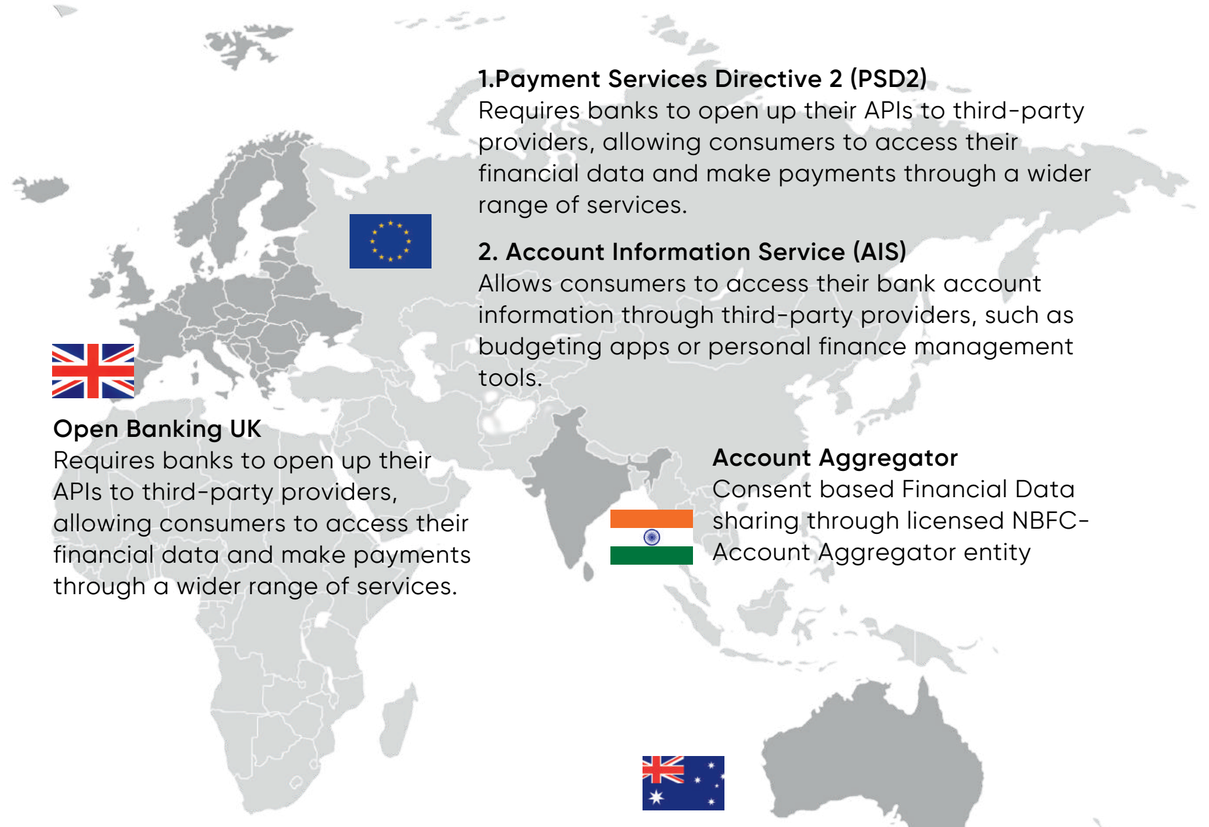
Open banking around the world





Note: The open banking market refers to sales of open banking services by entities (organizations, sole traders, partnerships)

Source: Juniper Research, The Business Research Co., Allied Market Research



1.Payment Services Directive 2 (PSD2)
Requires banks to open up their APIs to third-party providers, allowing consumers to access their financial data and make payments through a wider range of services.

2. Account Information Service (AIS)
Allows consumers to access their bank account information through third-party providers, such as budgeting apps or personal finance management tools.

Open Banking UK
Requires banks to open up their APIs to third-party providers, allowing consumers to access their financial data and make payments through a wider range of services.

Account Aggregator
Consent based Financial Data sharing through licensed NBFC-Account Aggregator entity

Open Banking Australia
Requires banks to make available certain customer-permissioned data and services through APIs, allowing consumers to access their financial data and make payments through a wider range of services.

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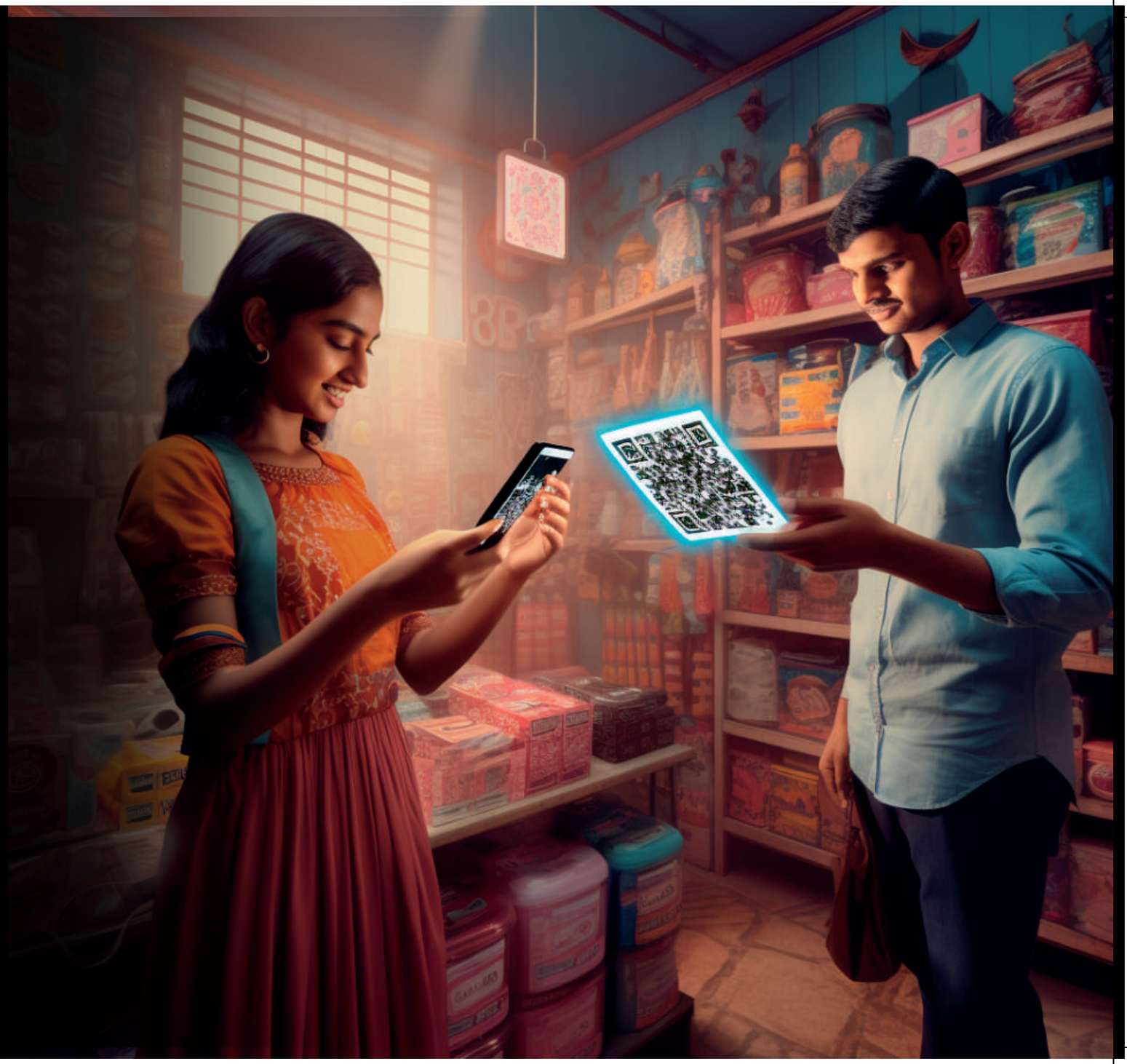
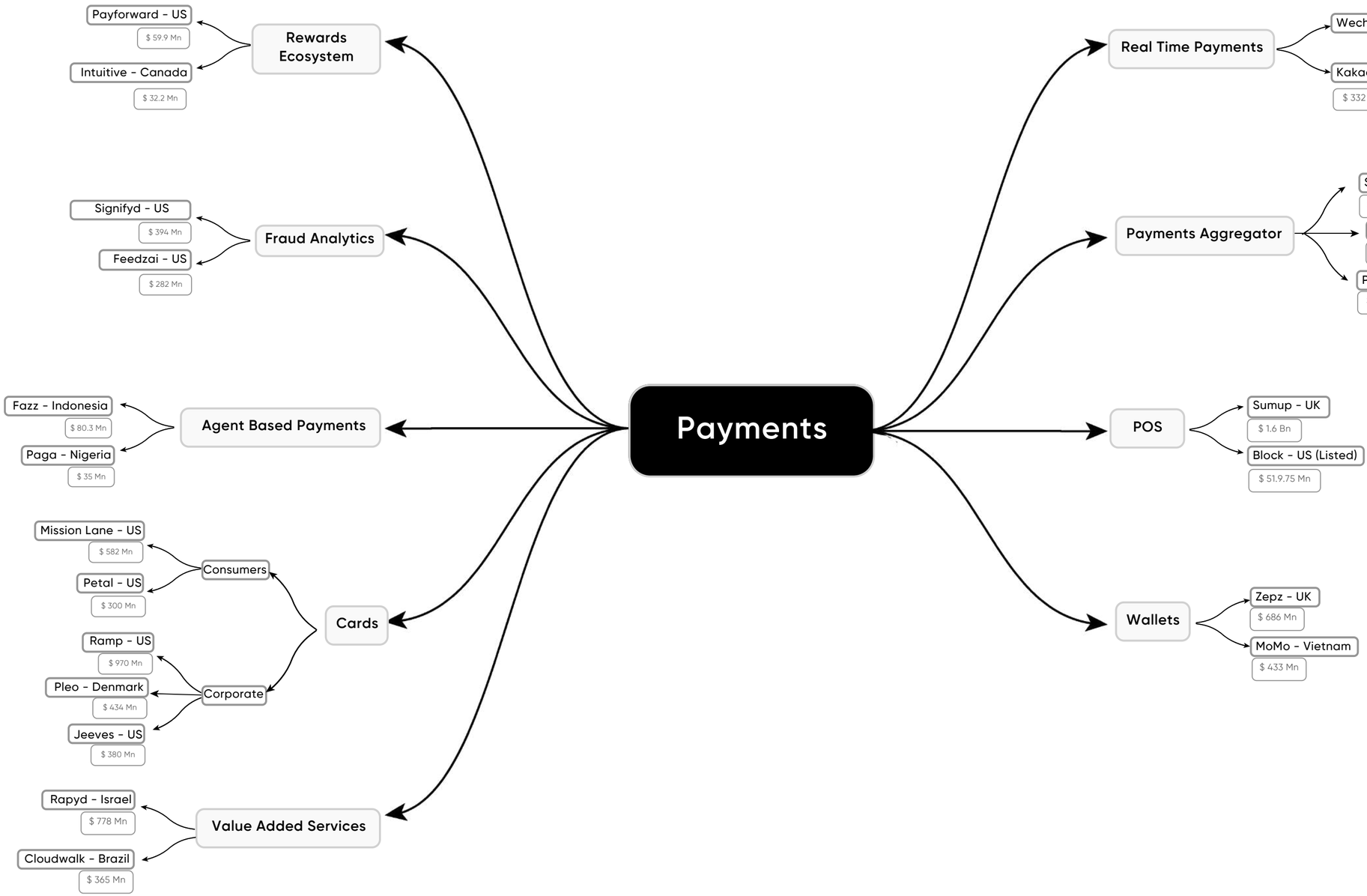
Payments



Global Landscape



Source: Tracxn

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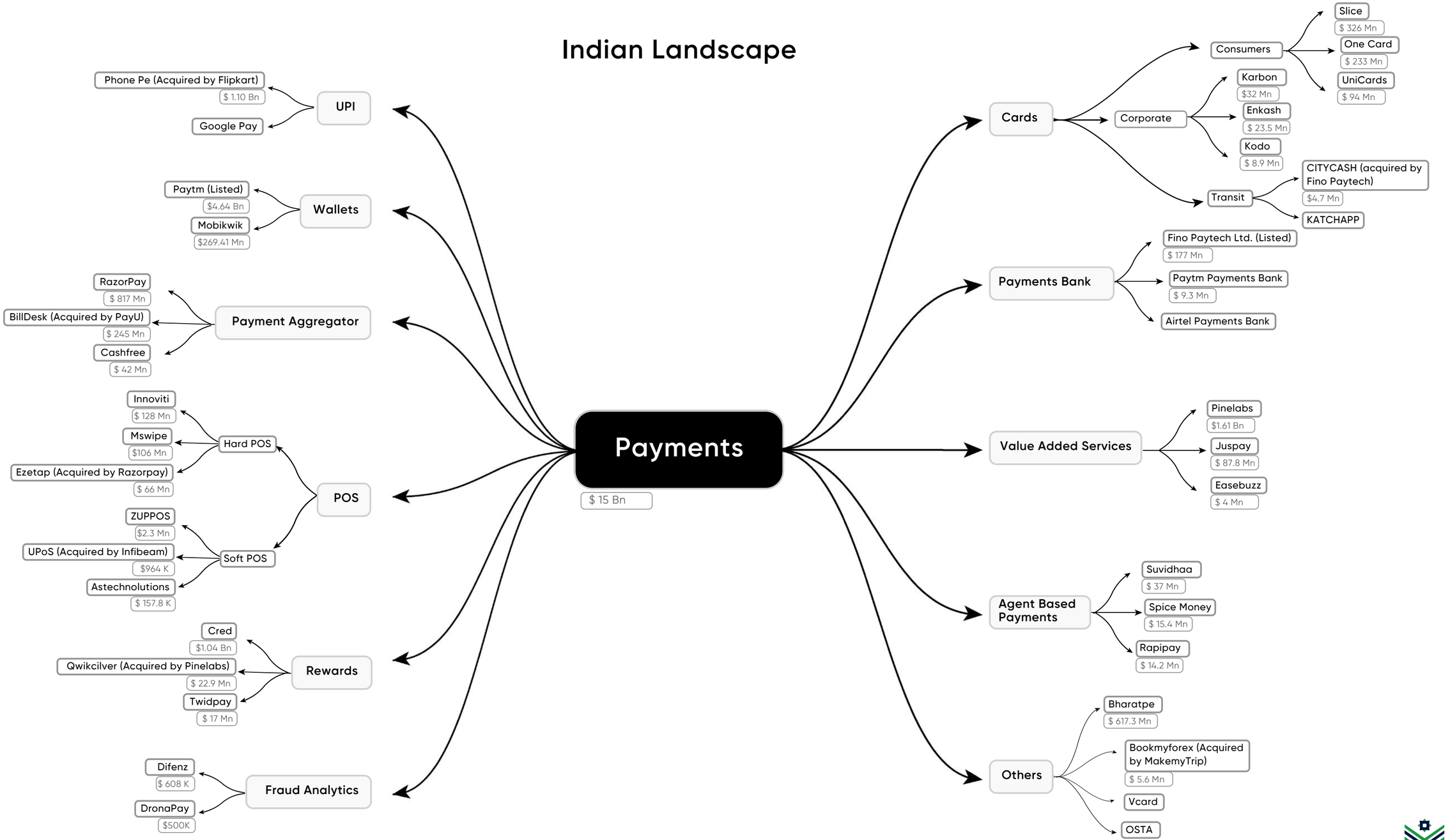
Indian Landscape



Source: Tracxn

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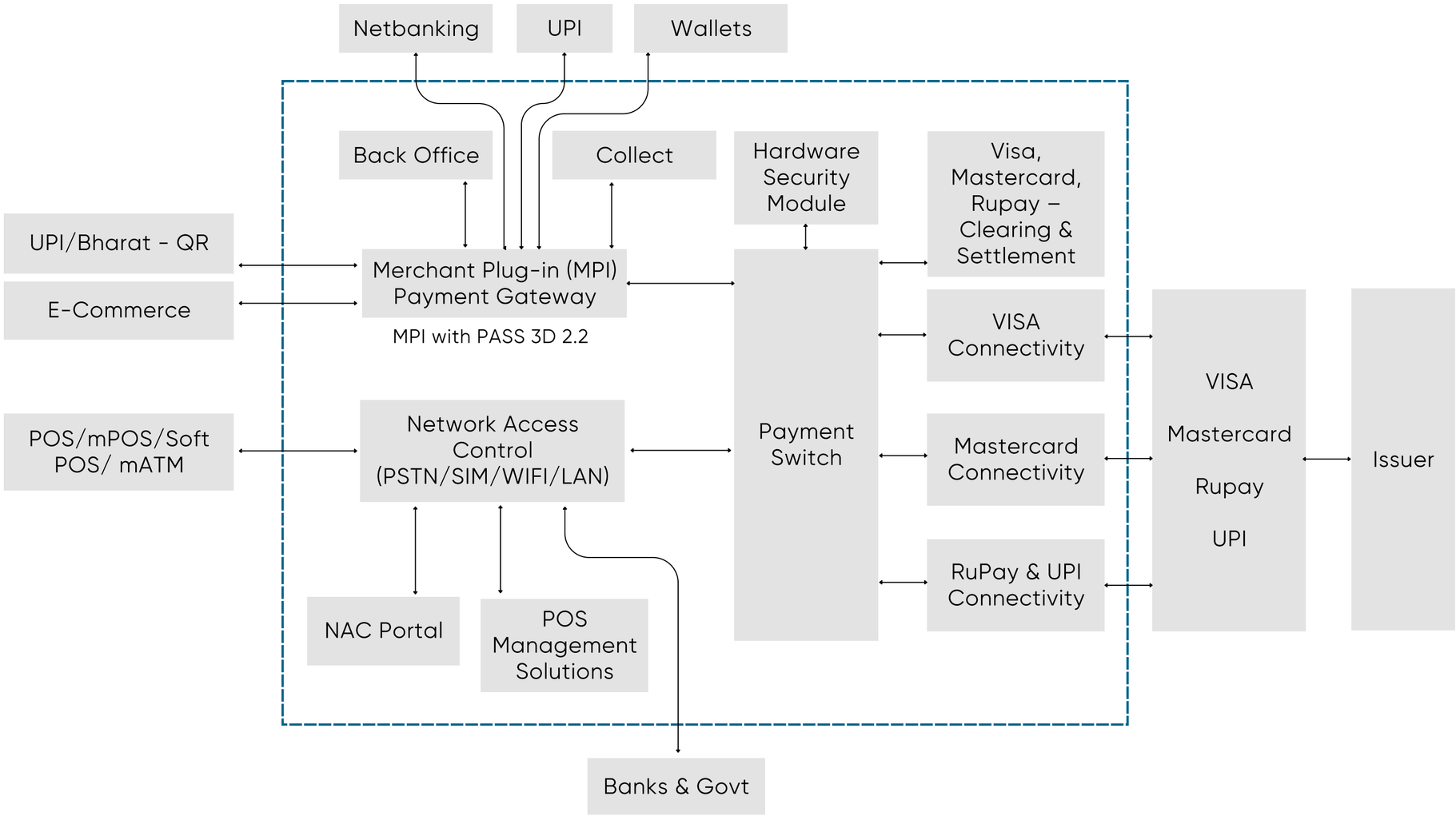
Payments Stack

Payment Aggregators

Source: Industry experts, Varanium Research

Payments Stack

Payment Switch



Source: Industry experts, Varanium Research

Payment: Revenue Model

POS (offline)

Subscription: Rs. 400 – 600 per month
Net MDR: 4 – 15 bps per transaction

Payment Aggregator (online)

MDR
Collections: 0.4 - 2% (domestic), 3% (international) per transaction; pass through ~ 75%
Payouts: Rs. 2 - 10 per transaction; pass through ~ 30%

Payment Switch

Gross Revenue: One-time integration fee (15L-1.5crs) and either a flat fee of INR 1-2 or 10-15 bps per transaction (depending on volumes); pass through ~ 8-10 bps

Agent-based payment model

Service	Interchange	Interchange / Cost detailing	Trade Income / Passthrough
AEPS: Cash Deposit & Withdrawal	✓	0.5% (max Rs 15)	60-70%
mATM (Card plus Pin) - Cash withdrawal	✓	0.5% (max Rs. 15)	70-75%
Domestic Money Remittance	Customer Cost	1%	70-75%
Cash Collection (Agent Model)	✓	20-30 bps (basis entreprise to entreprise)	70-75%
BBPS: Loan Repayment (Customer model) Electrcity /GAS/ Water bills PostPaid/Broadband/landline bills Fastag Recharge	✓	 30 bps Rs 2.25 per bill Rs 5 per bill 25 bps	 70-75% 50-60% 50-60% 60-70%
Mobile Prepaid Recharge	✓	1%-3.5% of the transaction Value	70-75%

Source: Industry experts, Varanium Research

Note: Interchange includes Bank, NPCI share as well

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Real-Time Payment systems

A comparision

	UPI	Paynow	FPS UK	FPS China	Instapay Philippines
Volumes (Bn)	74.00	0.29	3.94	16.55	0.55
Value (local CCY in Tn)	125.95	0.38	3.20	278.65	3.54
Value (in Tn $)	1.60	0.28	3.95	41.40	0.01
Cross Border	✓	✓	✓	✗	✗
P2P	✓	✓	✓	✓	✓
P2M	✓	✓	✓	✗	✓
Payment Speed	30 sec max	15 sec max	30 sec max	20 sec max	NA
Transaction Limit	IMPS: 2,00,000 UPI: 1,00,000	SGD 2,00,000	GBP 2,50,000	CNY 1 million, participants can limit it further	PHP 50,000
User charges	IMPS: ~ INR 5 to 15 UPI: Nil (govt reimburses banks)	Decision of banks, free for retail use	Decision of banks	Decision of banks	Decision of banks/ participating institution

Source: World Bank (Fast Payment System - Global Tracker), IRS USA

Notes: Data for the year 2022. $ value based on average exchange rate for 2022

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Pay Later Models

BNPL
Buy Now Pay Later

Selection

Checkout

BNPL Approval

Purchase

Repayment (within ~7-10 days)

If not repaid, converted to Loan

HNPL
Hold Now Pay Later

Amount Blocked in Account but not debited

Multiple Purchases upto amount blocked

Amount repaid in 7 to 15 days

If not repaid, account unblocked after debiting amount spent

SNPL
Save Now Pay Later*

Goal creation for future purchase

Selection of partner brands

Recurring amount saved for a period net of partnered brands dicounts

On Maturity, amount is sent directly to the partner

Note : *User can withdraw prior to maturity subject to non-availability of partner discount

zest ePayLater Simpl Pay Later

osta TRUSTAP

multipl tortoise hubble

Source: Varanium Research

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Types of Payment Fraud

By nature of fraud

Investment scams

Fraudsters send emails/texts that appear to be from a legitimate company offering tips on investments that provide good returns (forex/funds). They help victim open account on a fake site and make gains initially before getting victim to invest a larger amount of money.

Romance scams

Fraudsters create fake profiles on dating websites or social media platforms. They then build relationships with victims. Once they gain victim's trust, they ask for money for various reasons (to pay medical bills or travel to see the victim)

Impersonation scams

Fraudsters pretend to be from bank or the police. They say that the victim's account has been compromised and that they need to transfer money to a new account immediately. They are directed to a fake website where the fraudsters steal victim's payment information.

Tech support scams

Fraudsters call or text victims and pretend to be from a legitimate tech support company. They say that the victim's computer has a problem and that they need to pay for remote assistance to fix it. When the victim enters their payment information on the fake website, the fraudsters steal it.

Fake invoice/ Bill scams

Fraudsters send emails or texts that appear to be from a utility company (power, water, electricity, etc). The emails/ texts say that there is a problem with the victim's account and that they need to pay a certain amount of money. The victim is then directed to a website.

Source: Industry experts

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Types of Payment Fraud

By payment mode

Card Specific Frauds

Card not present:
Usage of stolen or fraudulent card data to execute transactions on e-commerce sites by fraudsters is a common problem statement faced by card issuers.

Card present:
In card present cases, the fraudsters could have temporary use of the card, or the fraud may be a dispute / first party instance where a customer does not remember or want to pay for the transaction.

Contactless:
The use of NFC has created a new set of scams where fraudsters manage to bill customers without them being aware or by debiting a transaction twice.

Mobile Banking, Internet Banking, and UPI frauds

SIM Swap:
Fraudsters manage to obtain a replacement SIM and transfer the UPI app to a new device before executing transactions linked to the customers bank account.

Remote takeover (RTO):
Fraudsters use screen or device sharing apps like Anydesk or Teamviewer to get control of the device and use this to transfer funds.

Account takeover (ATO):
Fraudsters obtain user credentials based on data leaks, open network traffic (like airport wifi) and use this information to obtain access to client accounts.

Global Average	Confidence tricks	▲	26.9%
	Identity theft	▼	11.6%
	Card details theft	▼	26.3%
	India		44.6%
	Nigeria		40.4%
	Saudi Arabia		33.2%
	USA		30.7%
	Australia		28.1%
	Thailand		25.7%
	Singapore		25.3%
	Canada		24.6%
	New Zealand		24.4%

% only represents respondents who were impacted by fraud in last 4 years

New fraud such as Confidence Tricks are on the rise, while Identity Theft and Card Details Theft are declining.

Source: Industry experts, ACI Worldwide Report

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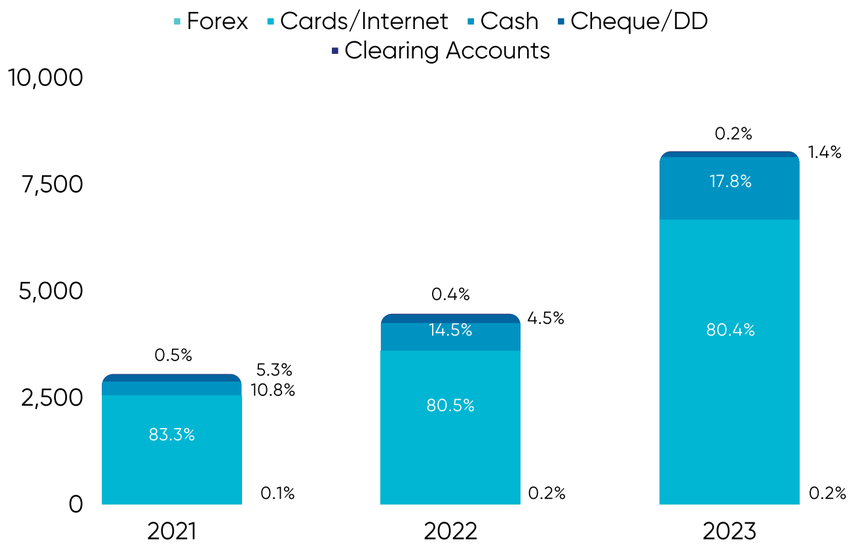
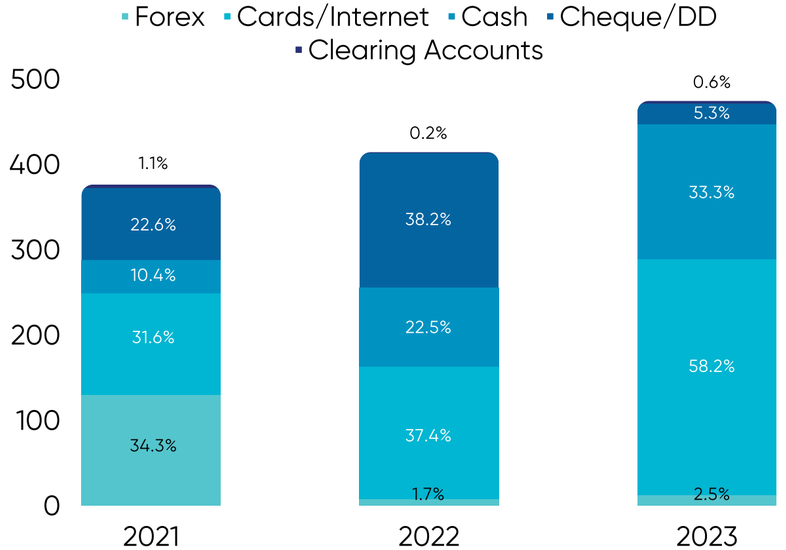
Reported payment frauds in India

Payment Frauds (by number)



	2021	2022	2023
Payment Frauds	3,055	4,469	8,278
Total Frauds	7,338	9,097	13,530
Payment Frauds	42%	49%	61%

Payment Frauds (by value - in crores)



	2021	2022	2023
Payment Frauds	376	414	474
Total Frauds	132,389	59,819	30,252
Payment Frauds	0.3%	0.7%	1.6%

The reported numbers are far lower than actual number of frauds in the industry

Note: Data are in respect of frauds of Rs. 1 lakh and above reported during the period.

Source: RBI

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Transaction Fraud Monitoring Methodology

Parsing

Payer
Payee
Device
Location
Value

IP Address
App
OS
City
State

Historic Profile

IP Address	City
App	State
Velocity	

Real-time Profile

OS
City
State

Rules & Models

Blacklist
Velocity
Superman
Score
ML Model

Source: Industry experts

Emerging Trends Rise of IoT and M2M

Internet of Things (IoT) refers to a network of physical devices, vehicles, appliances and other physical objects that are embedded with sensors, software and network connectivity that allows them to collect and share data. These devices — also known as "smart objects" — can range from simple "smart home" devices like smart thermostats to wearables like smartwatches and RFID-enabled clothing, to complex industrial machinery and transportation systems. Technologists are even envisioning entire "smart cities" predicated on IoT technologies. The technologies to support Smart Payment are already well established. However, payments are still predominantly triggered by humans. With Smart Payments, machines will replace manual payments, which means devices will initiate transactions depending on their capacity to function autonomously. Here are four levels of transactions in Smart Payments.

How Autonomous are IOT Payments

Level 0 - Informational

When the device has permission to access a user's bank account
Example- A smart speaker accessess a user's banking details though voice service

Level 1 - Permissioned

When the device must request explicit consent of the user before triggering a payment
Example- At a fuel station, a push notification appears on a smart phone for requesting refueling payment

Level 3 - Fully Autonomous

When the device uses both pre-defined deterministic condition and adaptive behaviours of the device
Example- A system that automatically orders and pays for repairs in a smart city

Level 2 - Conditional

When the device triggers a payment for toner replacement when the level is low
Example- A smart printer automatically triggers a payment for toner replacement when the level is low

Use Case	Description
Toll payment	Cars can automatically pay tolls without the need for human intervention. Suitable Technologies: RFID tags, QR codes, or blockchain.
Smart TV payments	Users can purchase content or services directly from their smart TV without having to enter their credit card information. This can be done using a variety of payment methods, such as in device pre-paid instrument, subscription services, or one-time payments.
Smart fridge payments	Users can automatically order groceries or other products from their smart fridge when they are running low.
Connected car payments	Connected cars can automatically pay for parking, fuel, and other services.
Industrial automation	Machine-to-machine payments can be used to automate payments in industrial settings. This can be used to pay for raw materials, finished goods, or services.
Smart metering	Smart meters can automatically send data about energy usage to utility companies. This data can be used to bill customers for their energy usage or to offer them discounts for using less energy.

Source: Lumenci, Varanium Research

Emerging Trends

New form factors of payments

Dynamic CVV Cards

Smart ring payment

2-in-1 Cards (Credit and Debit)

Smart Watch payments

Palm scanners

EMI Cards

Source: Company specific websites, public domain

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Emerging Trends

Cross-border payments

Asset Linked Conversions

- This innovation involves the use of digital assets (like digital precious metals, fractional shares etc) as a medium of exchange in cross-border transactions.
- The sender converts their currency into a digital asset, which is then sent across borders and converted back into the recipient's local currency.
- This method can potentially reduce transaction costs and increase speed however, in many countries, there are additional regulations that one needs to follow, and capital gain at every transaction makes this tax inefficient.

Card-to-Card Transfers

- This technology allows for direct transfers between debit or credit cards issued by different banks or in different countries. It simplifies the process of sending money abroad by eliminating the need for bank account details and can be faster than traditional bank transfers.
- It should be noted that in many countries, Credit to Credit and Credit to Debit Card transfers are prohibited.

Visa B2B Payments

- A platform developed by Visa for direct B2B payments.
- It uses a distributed ledger technology to simplify and speed up the process.
- This allows businesses to make secure, direct transactions with each other globally.

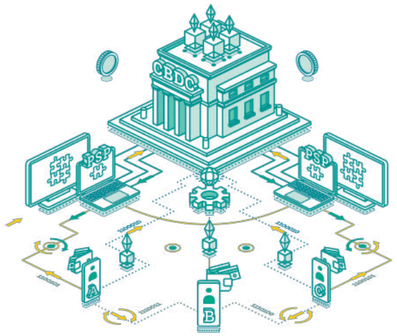
SWIFT GPI (Global Payments Innovation)

- This service by SWIFT enhances the speed, transparency, and traceability of cross-border payments.
- It allows banks to provide end-to-end payment tracking to their customers and reduces the time taken for international transfers.

Source: Industry experts

CBDC

A New Chapter in Fiat Currency



A Central Bank Digital Currency (CBDC) is the digital form of a country's fiat currency. Like fiat currency, it is also a claim on the central bank, but instead of printing money, the central bank issues electronic coins or accounts backed by the full faith and credit of the government and economic activity.

Benefits

- Supporting a resilient payments landscape, no counterfeiting is possible.
- Avoiding the risks of new forms of private money creation.
- Supporting competition, efficiency, and innovation in payments.
- Meeting future payment needs in a digital economy by creating programmable money
- Improving the availability and usability of central bank money
- Making monetary and fiscal policy more effective.
- Addressing the consequences of a decline in cash.
- Building block for better cross-border instant payments.

Challenges

- Privacy risks due to potential tracking.
- Too much control: the government can direct where and how much to spend.
- Operational risks and security vulnerabilities.
- More power in the hands of dictator and authoritarian governments by allowing them to put punitive sanctions again opposition.

Where 130 Countries and Currency Unions Stand on CBDC Progress in June 2023

Source: CBDC Tracker

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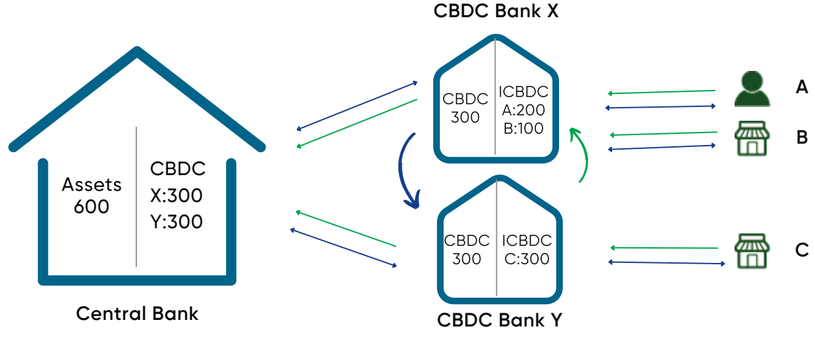
CBDC Architectures

An overview of potential retail CBDC architectures

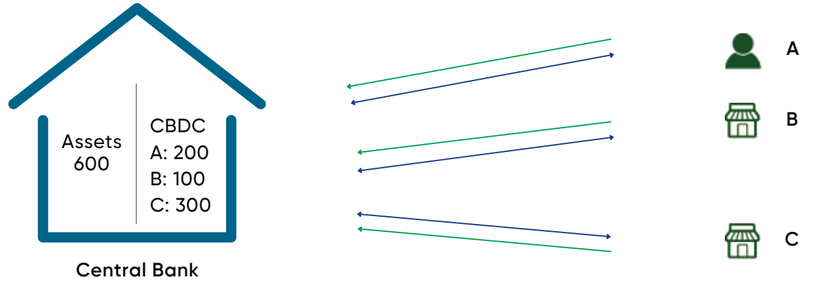
Indirect CBDC
(synthetic two-tier/ multi-cell)

- ICBDC is claim on an Intermediary
- Intermediaries onboard (KYC) and handle retail
- payments
- The central bank handles wholesale payments



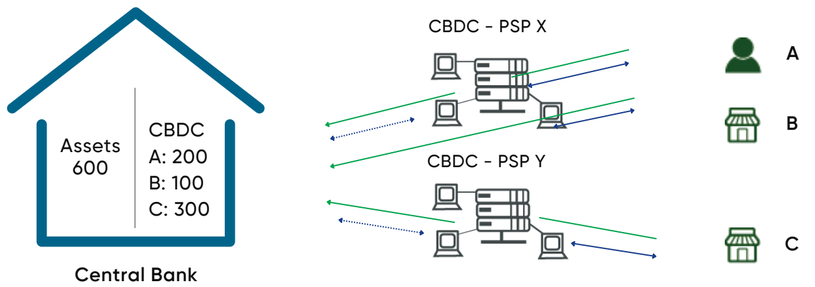
Direct CBDC
(digital banknotes/ central bank accounts/ single-cell/ central bank currency)

- CBDC is a claim on the central bank
- Intermediaries or central bank onboard (KYC)
- Central bank handles retail payments



Hybrid CBDC

- CBDC is a claim on the central bank
- Intermediaries onboard (KYC) and handle retail
- payments
- Central bank periodically records retail balances



Legal claim communication during payment · Real-time · Deferred · Person (if account-based) or pseudonym (if token-based) · Merchant

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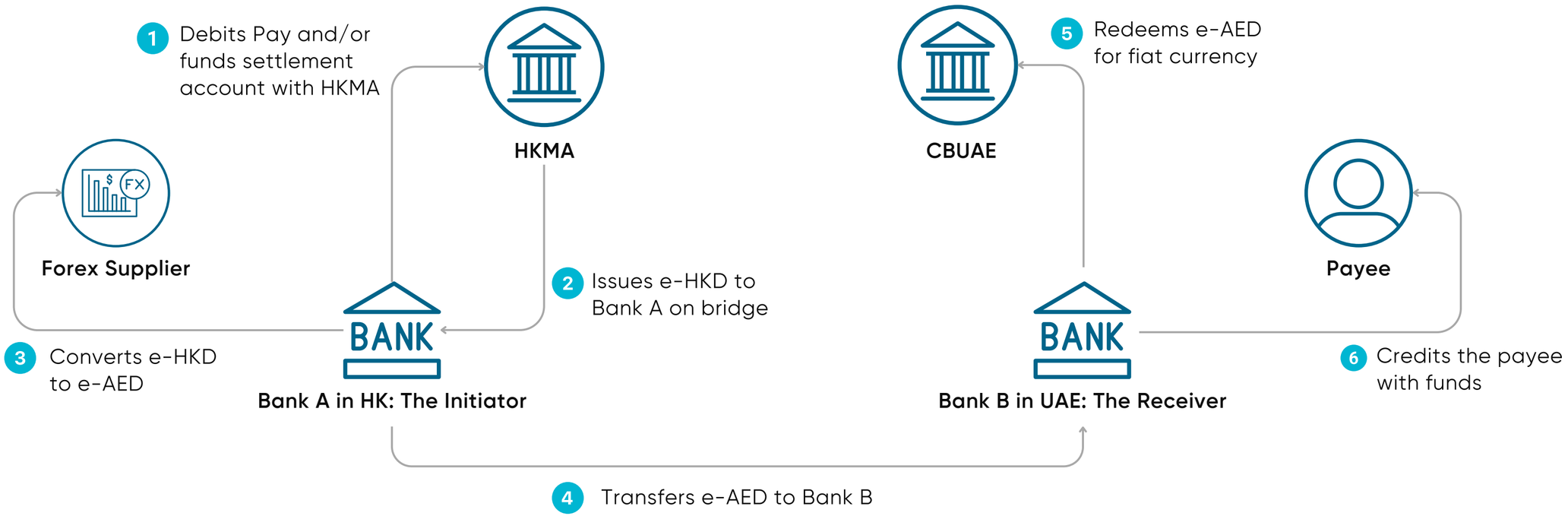
Wholesale CBDC cross-border payment

The procedure of cross-border payments on bridge from Hong Kong to UAE



Source: TABInsights

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CBDC across the world

	India (e-Rupee)	China (DP/EP)	Sweden (e-krona)	The Bahamas (Sand Dollar)	Eastern Caribbean Currency Union (DXCD)	Marshall Islands (SOV)
Main Motivation	Operational efficiency, financial inclusion	Monetary sovereignty, Internationalisation	Declining use of cash, financial stability	Payment effciency, financial inclusion	Resilient payment system, financial inclusion	Financial inclusion, seigniorage
Interest Bearing	✗	✗	✗[1]	✗	✗	✓[2]
Limits on Holding & Transactions	✗[7]	✗	✗	✓	✓	✗
Offline Usability	✗	✓	NA	✓	✗	✗
International Access	✗	✓	✓	✗	✗[4]	✓
Technology	DLT	NA	DLT[5]	DLT[6]	DLT	DLT

1. Not finally decided yet, but probably not interest-bearing as the initial focus of the pilot is on non-interest-bearing e-krona.
2. The SOV will be indirectly interest-bearing as monetary supply increase will be mostly allocated to SOV holders (75%)
3. Although cross-border payments are announced, capital controls might limit them.
4. The Eastern Caribbean Dollar is subject to capital controls that will likely also hold for the DXCD.
5. The e-krona prototype uses DLT. The technological choice for the final CBDC-if indeed continuing with CBDC - has not been finally decided yet.
6. It has not been officially confirmed that the Sand Dollar utilizes DLT. However, the technological focus of the technology provider argues for using DLT. Except for Sweden, all countries will enable CBDC access without a bank account. The mentioned central banks aim to include banks (and partly other firms) as intermediaries for distributing minted CBDC units (two-tiered operating structure).
7. Only with full KYC

Source: CBDC Tracker

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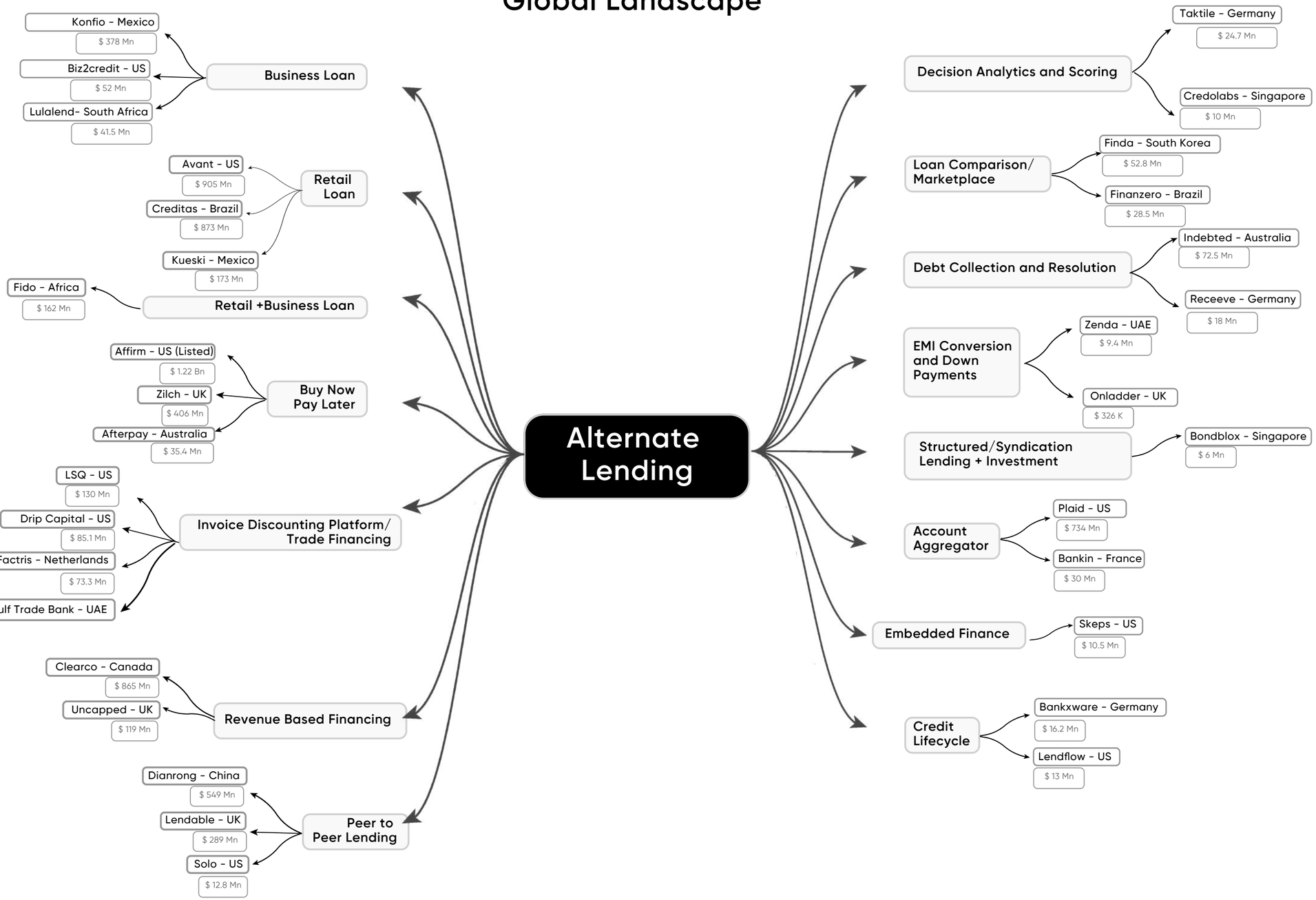
Noteworthy Cross Border CBDC Projects

Project Name	Countries Involved	Description	Use Case
Multiple CBDC Bridge (mBridge)		A project for creating a multiple CBDC arrangement for faster, cheaper, and more efficient transfers and foreign exchange operations.	Wholesale
Project Dunbar		Explored a platform for international settlements, successfully building two prototypes for international settlements across multiple CBDCs.	Wholesale
Project Sela	BIS	Explored the cybersecurity implications of a two-tier, retail CBDC.	Retail
Project Icebreaker	BIS	Tested interlinking and interoperability between different retail CBDCs, exploring a model for permitting retail CBDC payments across borders.	Retail
Project Mariana	BIS	Explored using automated market makers (AMMs) to facilitate exchange between Swiss franc, euro and Singapore dollar on the wholesale level.	Wholesale

Source: CBDC Tracker

Lending

Global Landscape



Source: Tracxn

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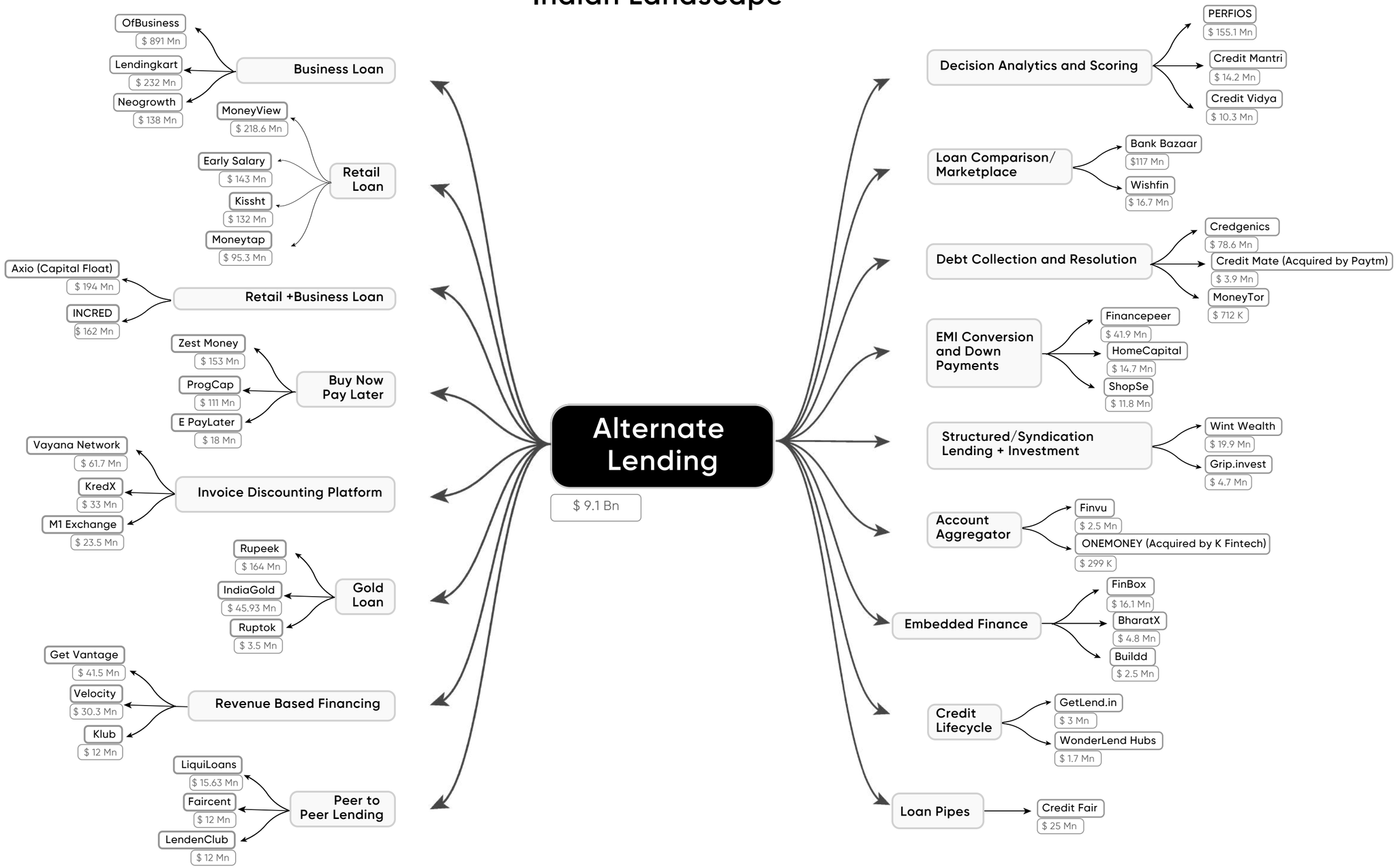
Indian Landscape

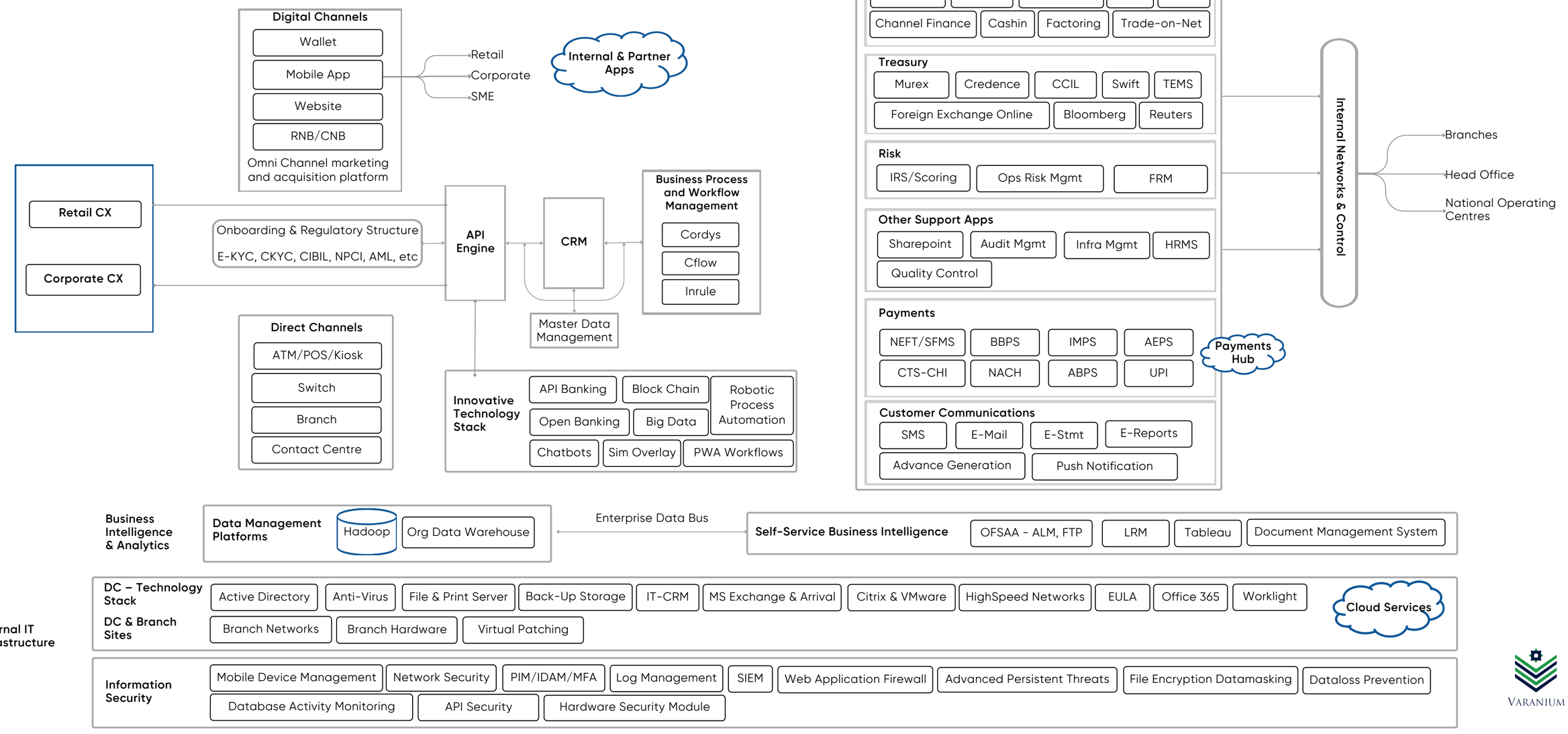


Source: Tracxn

Source: Industry experts

Banking Stack

Traditional banking structure



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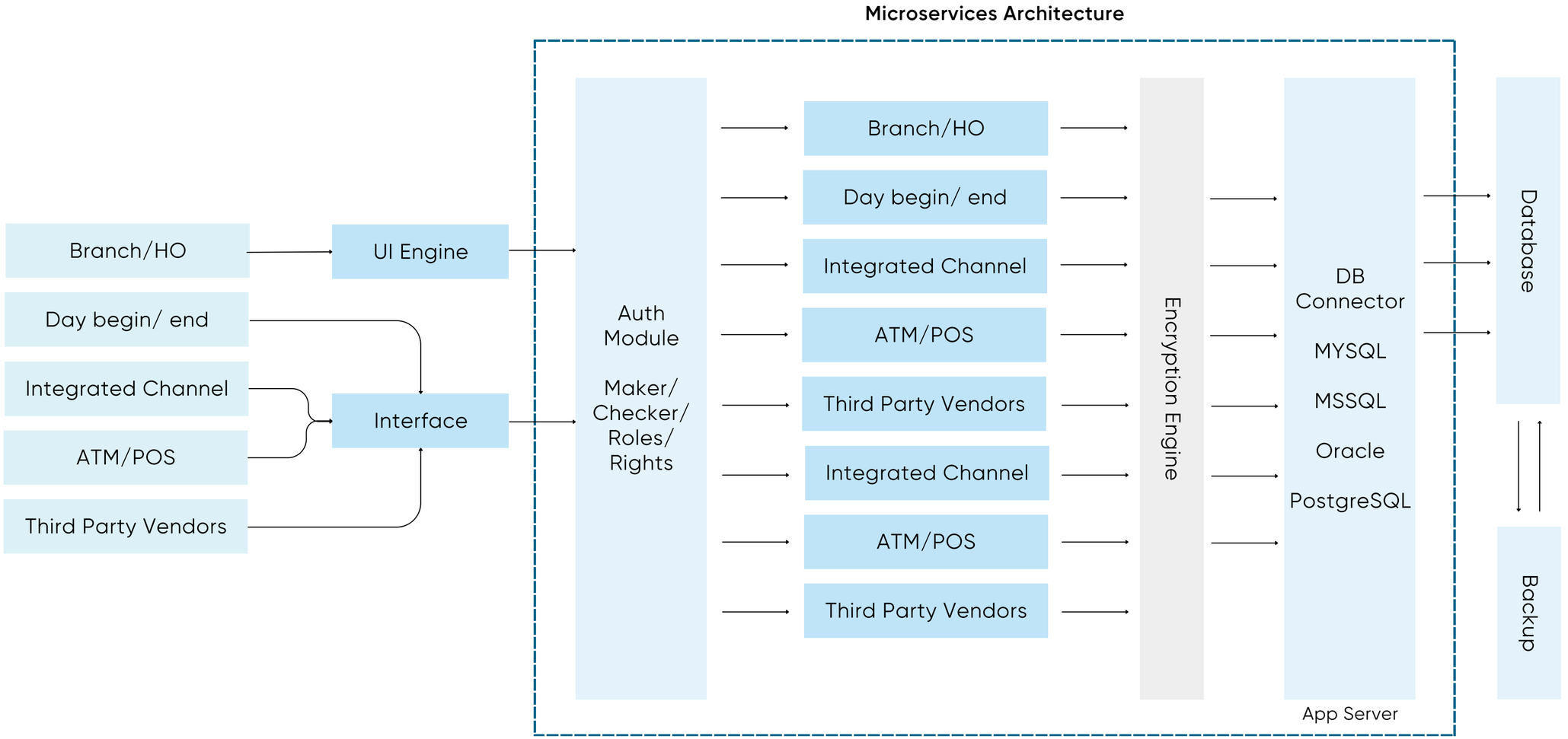
Banking Stack

New stack built on microservices architecture



Source: Industry experts, Varanium Research

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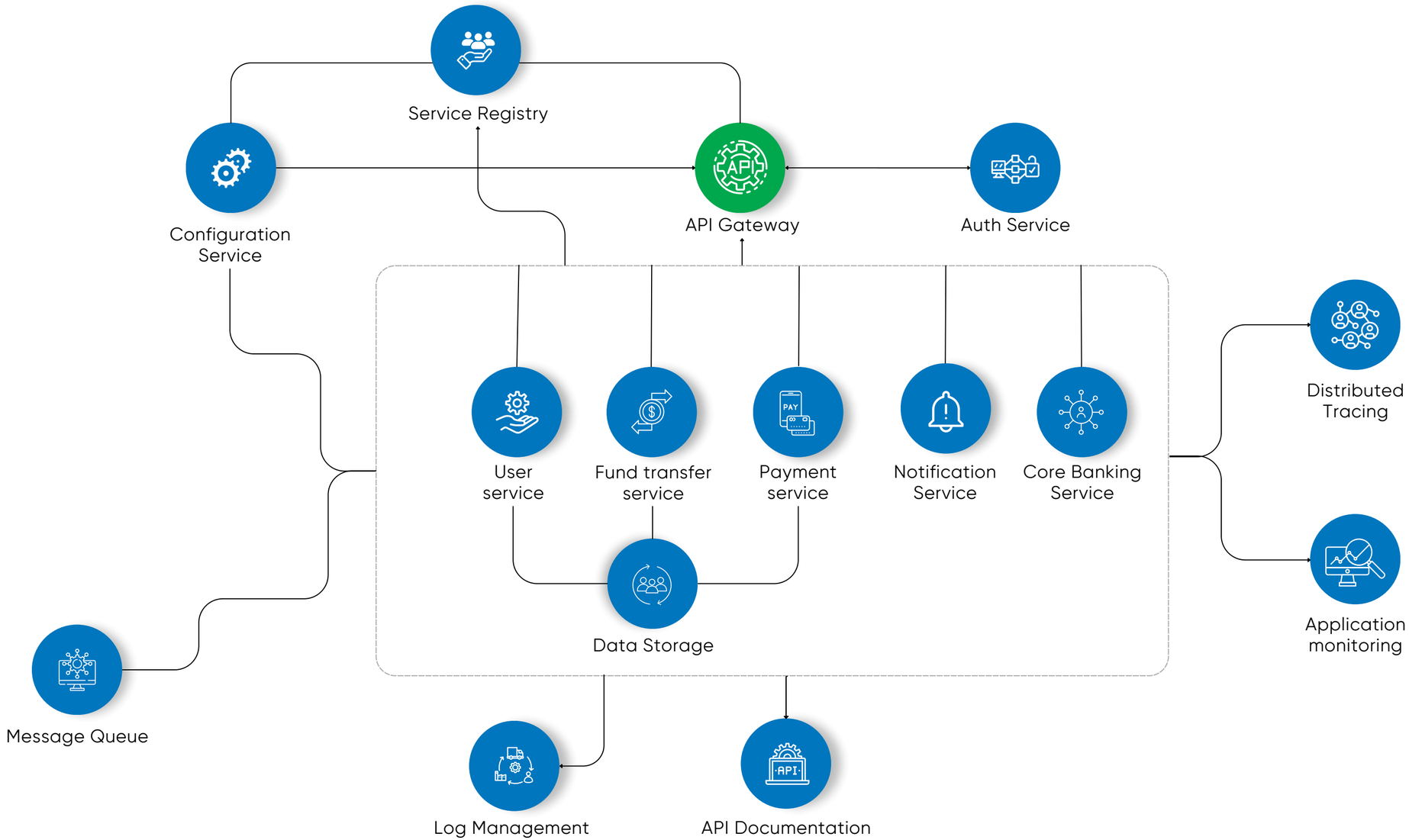
Micro Services Architecture



Source: Industry experts, Varanium Research

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Loan Operating System

Evolution over decades

Particulars	Upto 2000	From 2001 - 2015	From 2015 onwards
System Architecture	Monolithic & Tight coupled systems	Monolithic & Tight coupled systems	Open System and auto scalable
Integration Difficulty	High	Medium	Low
Support Multiple App	✓	✗	✗
Data Storage	Own Server based	Own Server based	Cloud based
Cost	One time set up fee and AMC	One time set up fee and AMC	Pay per use/ Subscription based
Implementation time	High	Medium	Low
Data Protection	Security talent required	Security talent required	In-built security within cloud and additional layer developed by system providers
Tech Updates	Frontended	Frontended	Backended
in-built Credit Assessment	Manual and file upload	Manual and file upload	Available through BRE
Processing timelines	15 to 30 days	7 to 10 days	1 to 3 days
Regulatory Reporting	Manually filed using data warehouse	Manually filed using data warehouse	Automated through System
User	Public/Private Sector Banks	NBFCs	Banks/NBFCs/Fintechs

Source: Industry experts, Varanium Research

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Loan Operating System

Tech Stack

Data Verification (API Driven)

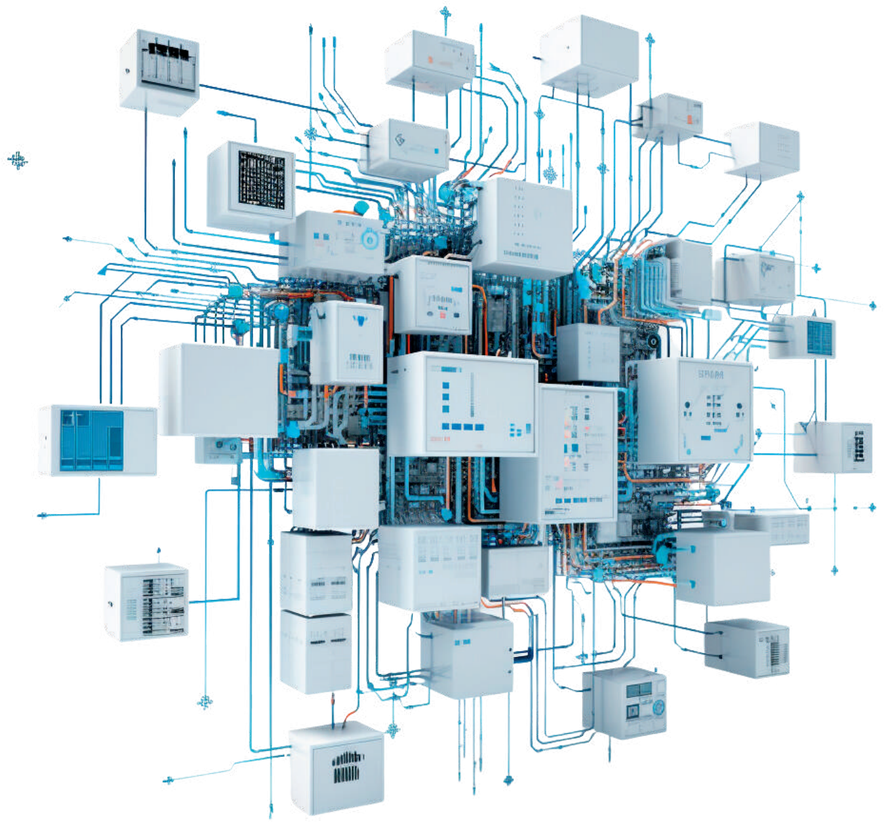
Aadhar	NSDL	Bank Statement	ITR & GST	OCR	Address Verification

Underwriting, Sanction & Decisioning

Hunter	De-Dupe	CERSAI	Portals	BRE	Bureau
E-Sign	E-Stamp	E-Mandate	Video PD	CKYC	AA Framework

Collections Platform

3rd-Party Data Usage	External Data analytics	Social Media	System Triggers	
Behaviour Tracking	Segmented Approach	Auto Debit	PG Link	UW Feedback



Source: Industry experts, Varanium Research

Emerging Trends

Parameters	Litigation Finance	Green Finance	Income Sharing Agreement
Meaning	An unrelated third party to the litigation provide funds to cover the legal fees. Litigation finance is at an infant stage in India.	Structured financial activity (loans, debt, investments) for a better environmental outcome, resilient future via development of green projects, minimize the climate impact of existing plans, or both.	Education Funding with repayments linked to future salary, unlike a fixed EMI under traditional student loans.
Underwriting Parameters	Expense to claim ratio, Judiciary Authority, Case type (commercial vs consumer dispute), Probability of recovery, Financial merit of both the plaintiff & the defendant.	Parameters largely remains the same as traditional lending. Incrementally, the project risk is also assessed. (Eg: energy generation and environmental impact, IOT based performance capturing, type of battery/solar panels)	Potential for future income, Course tenors, Value-add to borrower from the course, Existing income & knowledge. One may require a co-signer depending on the course .
Revenue Model	• Processing fee (only applicable abroad) • Share in claim amount on successful outcome of the suits. (prevalent in India currently)	Interest, carbon credits, subsidies and various benefits announced by Governmental bodies	• Share in the future incomes generated post course completion. • Standard ISA terms: share in the future income, sharing tenure, minimum income levels and may/ not have a payment cap.
Benefits	Creates a separate asset class for Investors	• Enabler for more climate impact projects • Regulatory push and support (green deposit scheme)	• Financing without a co-signer. • Student Loans repayment continues even if income drops. ISA's do not take payments if income drops below minimum threshold.
Challenges	• No particular guidelines or policies to regulate this alternative lending model. • Lack of clarity on licensing (NBFC/AIF/CIS license) requirements to function	• Depositors have no compelling reason to switch as interest rates are lower or par with fixed deposit offering. • ALM mismatch, Yearly audits, High amounts of compliance and transaction load.	• Variable payment amounts based on future income levels. • Refinancing options are not available. • Standard borrowing limits. Student loans are borrower-specific

Source: Industry experts, Varanium Research

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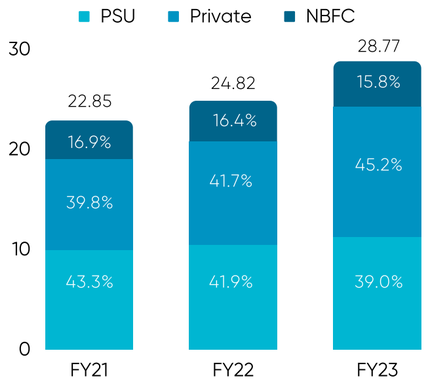
Emerging Trends

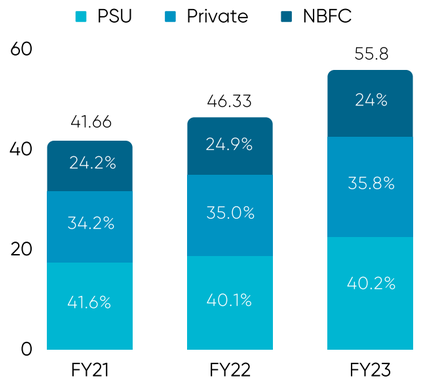
Parameters	Gig Economy Finance	Gamified Underwriting
Meaning	Financing against prediction of future revenues to be generated by social media backed catalogue.	Generation of non-invasive instant credit score for new & existing customers using psychometric data, device data, digital interactions, etc.
Underwriting Parameters	Viewership data, Subscriber count, type of content, Potential brand partnership, etc. of the content creator.	• Gamified Psychometric Assessment tool to assess personal traits (literacy, spending habits, thought process, response time) of prospective borrower. • Alternatively, some players are using metrics like : data points from digital interaction with form, device used, OS used, mode used (incognito/normal), VPN usage, etc.
Revenue Model	• Financier takes licenses for existing videos for certain months (say till target IRR achieved). • Generates additional income by posting videos on other platforms or in other languages. • Leverage content and creator network to get additional revenue from brand partnerships	Monthly subscription or per API fee
Benefits	Enables content creator to invest in creating content. (Eg; buy new camera, travel, etc).	• Alternative to traditional assessment model relying on historical credit data • Enabling Credit for NTC segment.
Challenges	• No set model for underwriting. • Branding Risk: Account Ownership is transferred from content creator to financier. Hence, new content could only be revenue-generating, which may not be in niche category.	• Low adaptability due to few use case. • Standalone reliance on the model will not be possible.

Source: Industry experts, Varanium Research

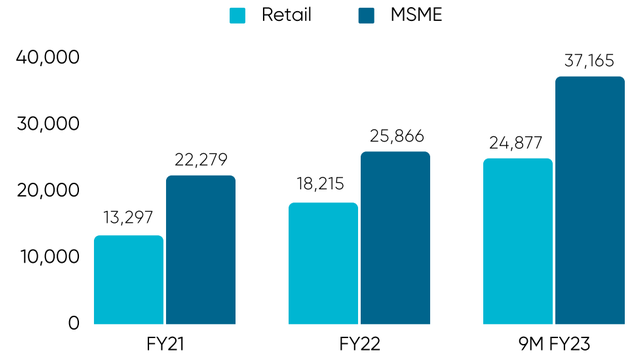
Lending Growth & NPA Trends



MSME - AUM (in INR lakh crores)

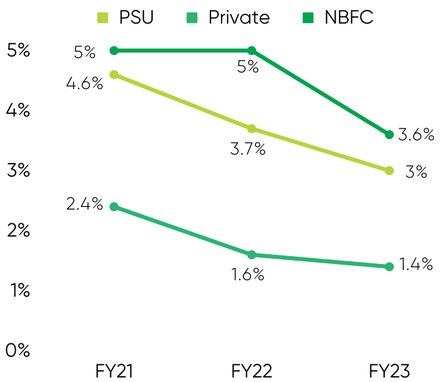


Retail - AUM (in INR lakh crores)

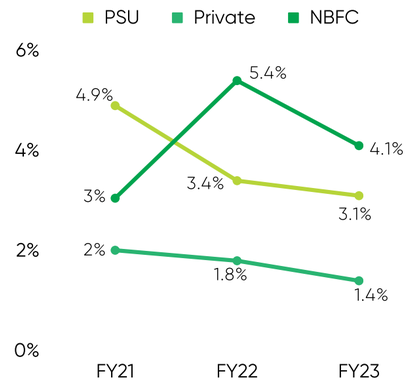


Fintech - AUM (INR in crores)

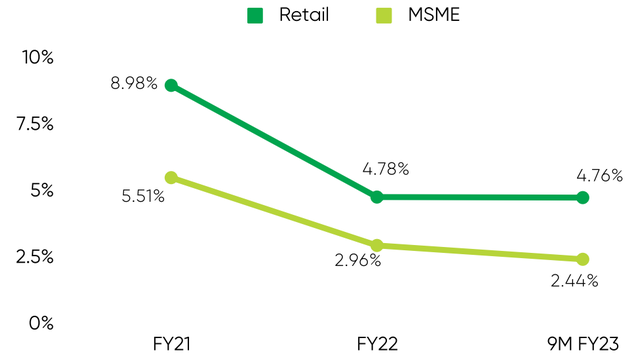
Note: AUM as of 31st March 2023 is INR 60,922 Crore



MSME NPAs



Retail NPAs



NPA Trends for Fintech

Source: RBI, BCG, Equifax, Varanium Research

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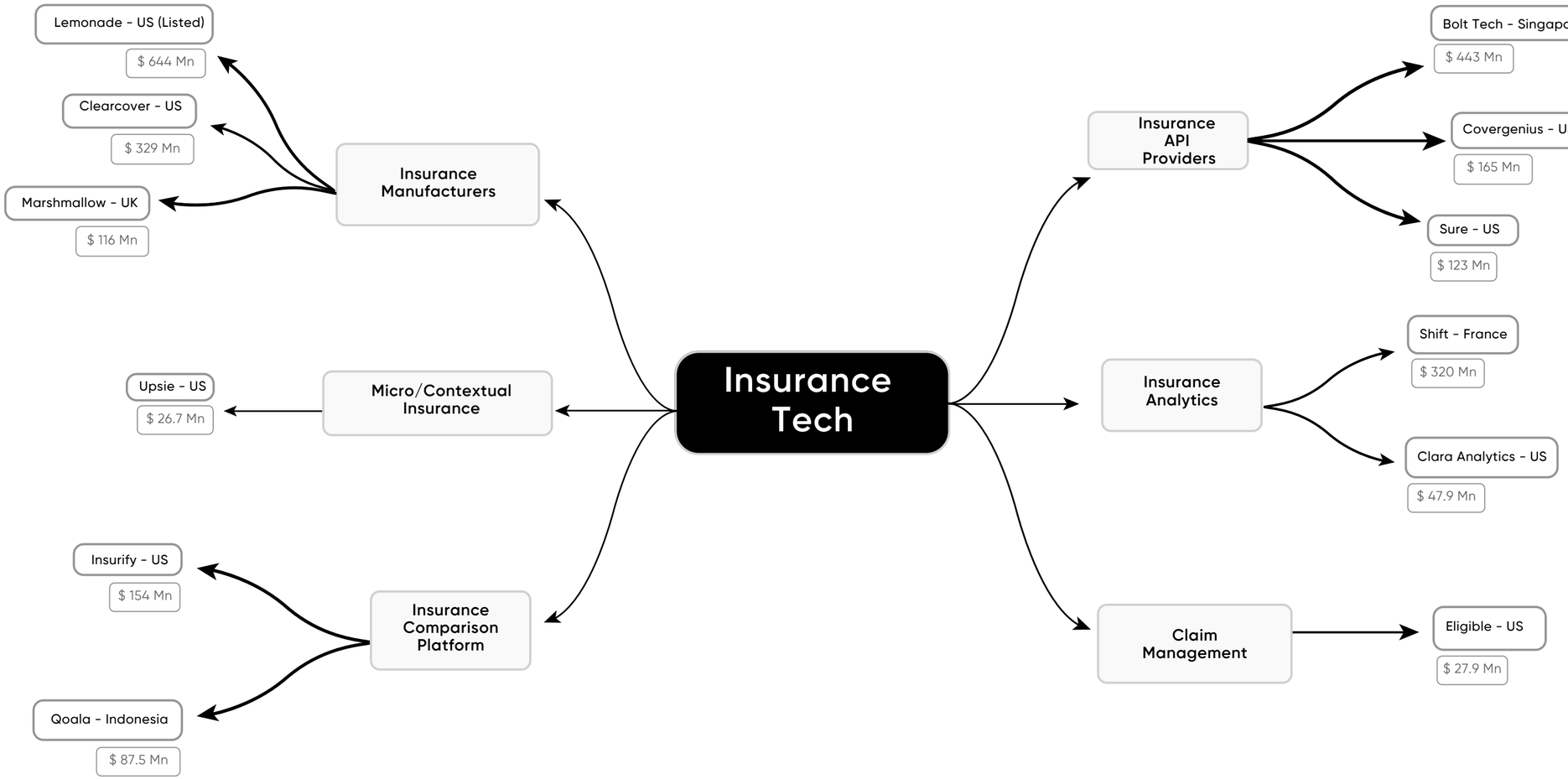
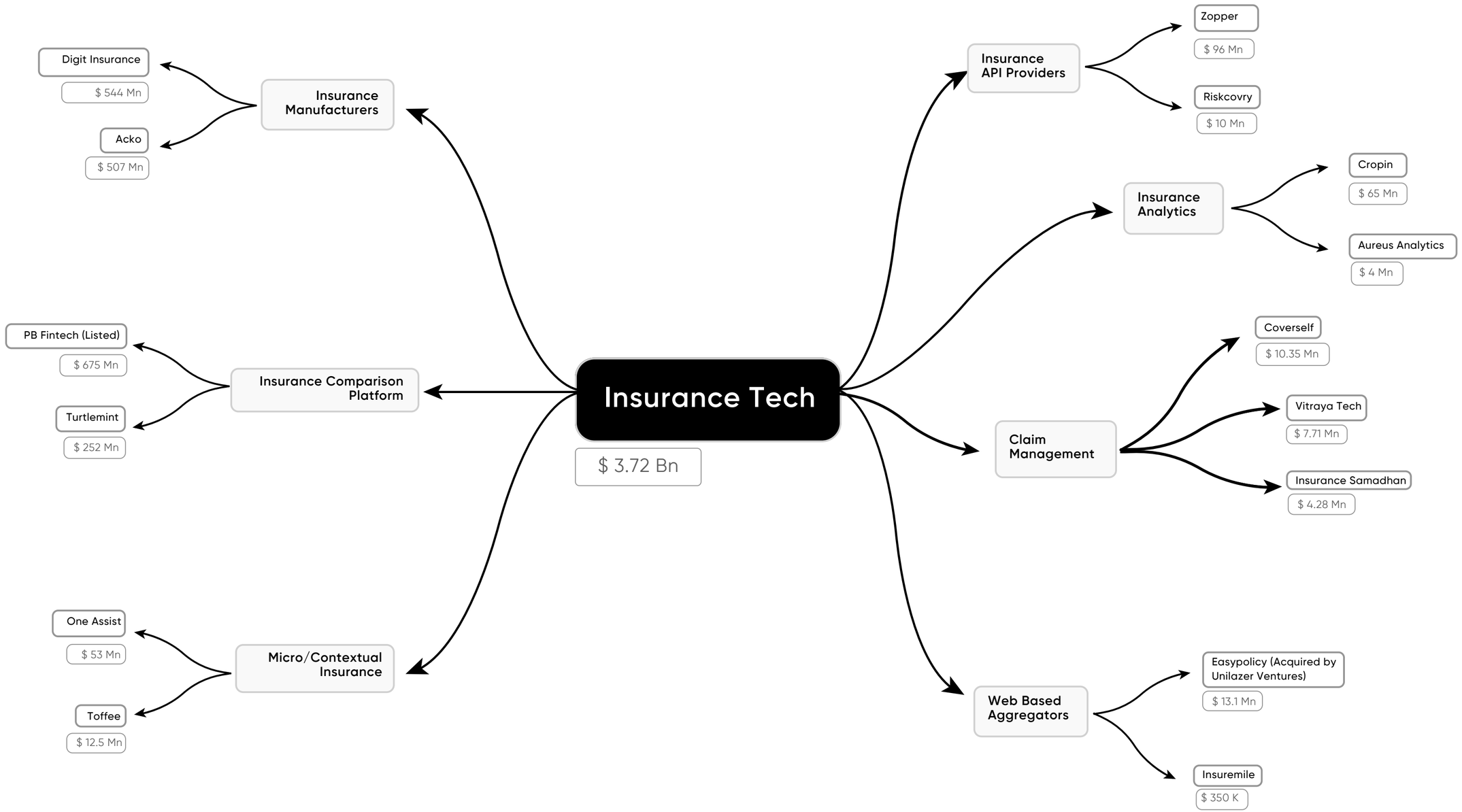
Insurance

Global Landscape



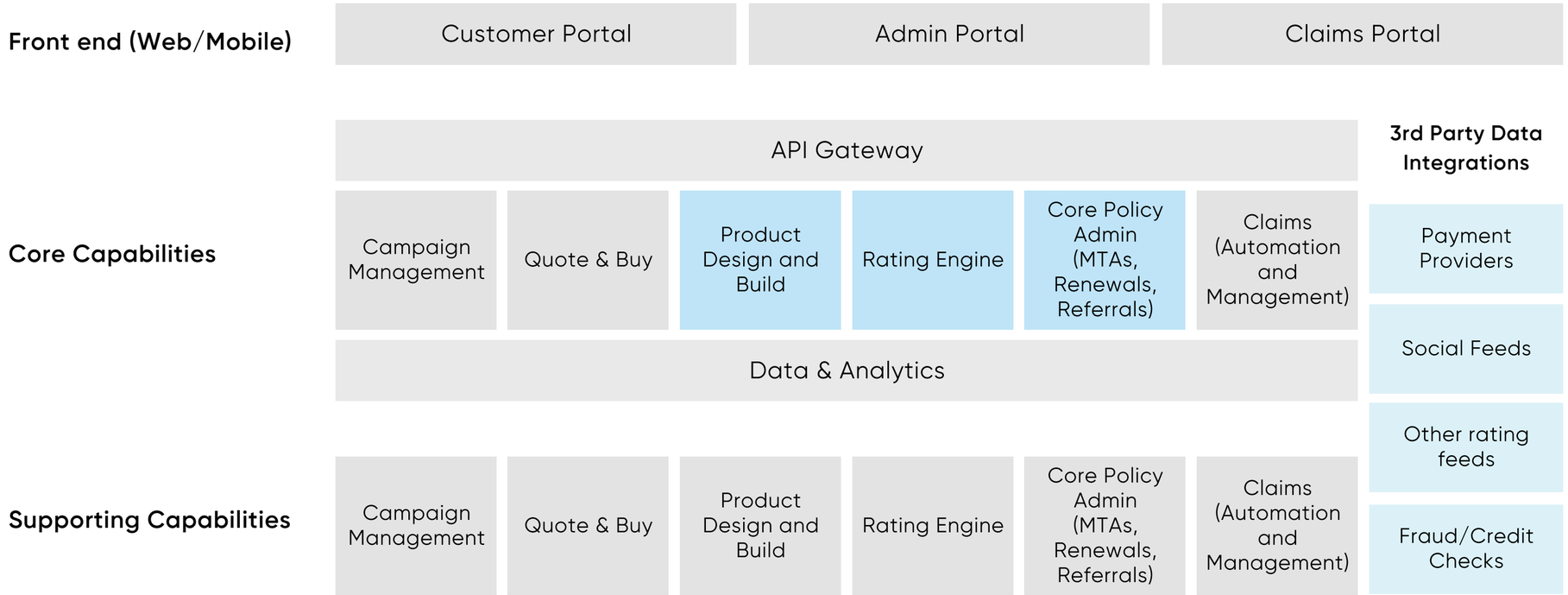
Source: Tracxn

India Landscape



Source: Tracxn

Insurance Stack



Source: Industry experts, Varanium Research

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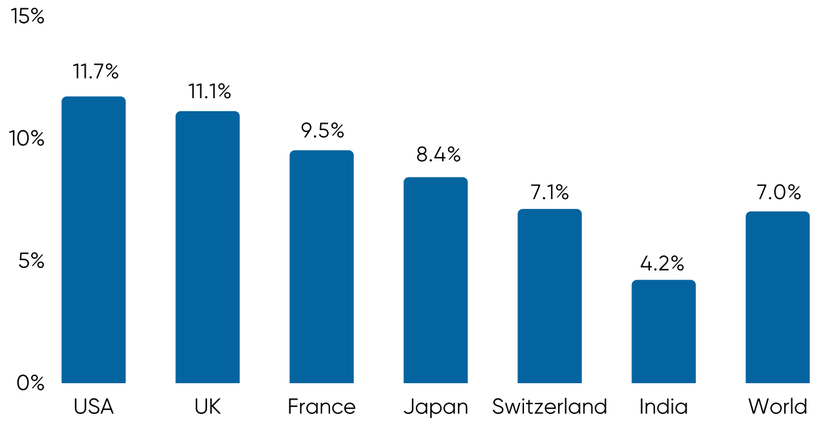
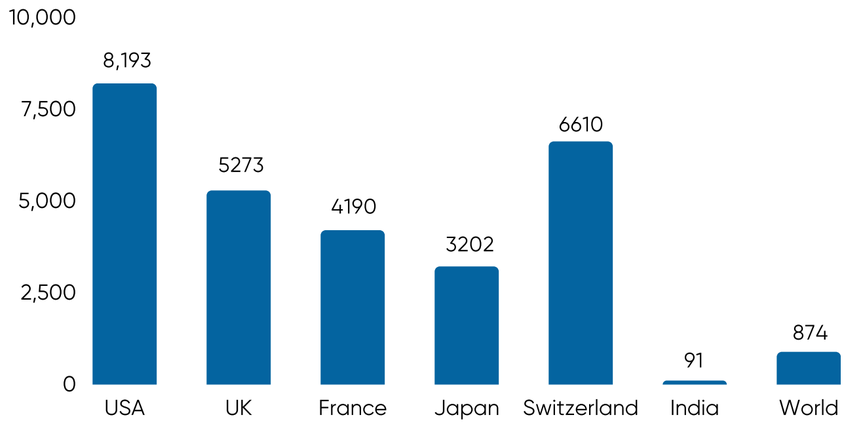
Insurance: India vs World

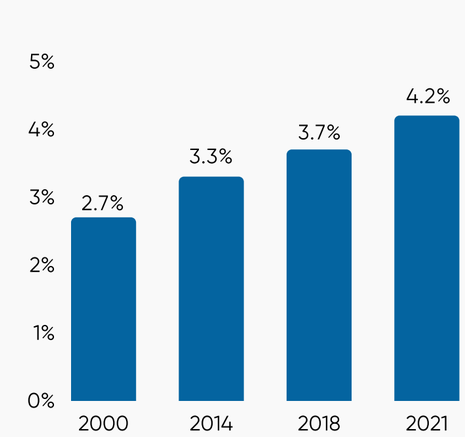


Insurance Penetration - 2021

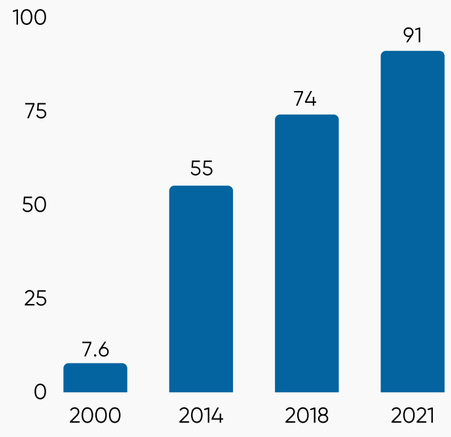


Insurance Density - 2021 (in $)

Density means premiums collected by insurance companies to the country's population.



Insurance Penetration



Insurance Density (in $)

India's insurance density stands much below at $91 in comparison to the world average of $874.

Source: IRDAI Reports

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Challenges in penetration in India

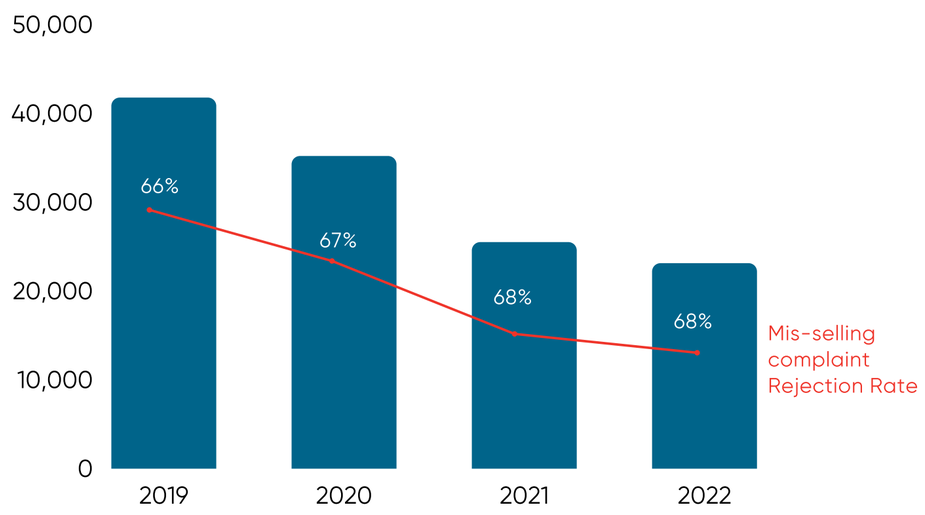
Claim Settlement
The process is largely paper-driven and lack of innovation by insurance intermediaries.

Removal of Tax Deduction
New Tax Regime removes the deduction on life insurance premium. This may act as a deterrent to increase in life insurance coverage.

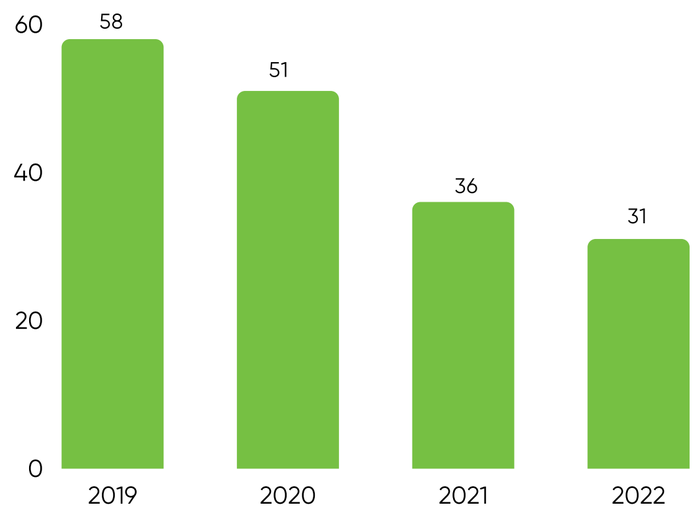
Mis-selling of policies
Majorly done by banks and brokers. Additionally, the rejection rate of mis-selling complaints has been high at more than 50%.

No Sachets or Bundling
Whitespace in bite-sized customer-centric and embedded products (bundling insurance with purchase of third-party goods/ service).

Consumer Mindset
A large section of consumers still Look insurance as an expense, rather than as protection cover.



Reported Mis-selling Complaints



Reported Mis-selling complaints per 10,000 policies

Source: IRDAI, Annual Reports

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Initiatives to Drive Penetration

Proposed, but yet to be launched

Bima Sugam
Marketplace

- It is a marketplace for buying, selling and post sales services (renew, policy servicing, and claim settlement.)
- Initially, platform will serve as a databank and subsequently list insurance products.
- Brokers, web aggregators, insurance companies, and other intermediaries will be part of the platform.
- Further, onboarding the Health Claims Exchange will help in creation of an unified source for claims and policyholders' medical history, reducing the number of insurance frauds.
- The platform is expected to have cheaper premiums and would have a direct and intermediary-assisted mode
- All the policies will go to insurance repositories via e-Insurance Account – digitizing the claim settlement process
- Potential threat to existing web-based insurance aggregators

Bima Vahak
Distribution Network

- It is a women centric distribution channel to distribute insurance products and increase insurance coverage in rural India at Gram Panchayat level, similar to the Bank Correspondent model
- Individual Bima Vahak will be appointed by a Corporate Bima Vahak (engaged by an Insurance Company) or directly appointed by an Insurer
- They will solicit insurance business and facilitate policy and claims servicing.
- KYC & AML compliance shall remain Insurer's responsibility for Bima Vahak sourced policies
- Limited product range - Sell and service the Bima Vistaar product and other IRDA approved products
- A Bima Vahak can **work with only 1 life insurer, 1 general insurer, and 1 health insurer** and, where permitted, with the Agriculture Insurance Company of India Ltd

Bima Vistaar
Product

- It is an insurance product aimed to provide comprehensive cover for life, health & and property of the rural population.
- It will be a Bundled parametric insurance product offering benefit-based insurance plans
- Aimed at rural population in the event of natural disasters, such as floods and earthquakes

Source: IRDAI, Varanium Research

Initiatives to Drive Penetration

Proposed, but not implemented yet

Managed General Agencies

- MGAs are insurance agents who would carry out functions similar to insurers
- MGAs can onboard customers, manage products, underwrite customers and share the risk with larger insurance manufacturers.
- MGAs will provide an opportunity to fill the gap in the current insurance distribution setup by offering specialized insurance products, expanding distribution channels, using technology to improve the customer experience, offering value-added services, and focusing on customer education.
- This would increase the scope of insurance intermediaries.
- MGAs currently don't exist in India but exist in other countries such as Singapore, UK & US and have played an important role in insurance penetration.

Composite Licenses

Particulars	Standalone Licenses	Composite License
Segment-wise license required (Life, General and Health)	✓	✗
Economies of Scale	✗	✓
Separation of Business	✓	✗
Bundled Product Offerings	✗	✓
Difficulty in supervision of risk	✗	✓ (supervise composite risks and composite capital requirement)
Potential diversion of funds for different line of business	✗	✓
Separate a/c for receipt and payments of each class of business	✓	✓

Source: Varanium Research

Emerging Trends in Insurance

AI-based policy analysis & and recommendations

Product Management	Marketing	Sales & Distribution	Underwriting & Risk Mgmt	Policy Aquisition & Servicing	Claims Management	Finance & Accounts
• Product Definition • Product Configuration • Product Maintainance • Product Filing • Product Testing	• Market Development • Product Branding	• Acquisition & Sales Mgmt • Sales Tracking & Monitoring • Distribution Channel Mgmt • Commission Mgmt • Sales Planning • Direct Sales • Sales Execution	• Risk Acceptance • Policy Validation • Quotation Valuation • Referrals & Negotiation • Rating Management • Reassurance Facility • Loss Control	• In-force Business Admin • Rewrite, Reissue, Cancellation • Policy Endt • Policy Reinstatement • Policy Renewal • Issue Quote • Issue Policy	• Loss Reserve Creation • Claims Litigation • Claims Financials	• A/C Receivable & Payable • Collections Proc. • Asset Mgmt • Financial Acct. • Costing, Budg & Taxations • Payroll Acctg • Book Keeping • Audit
• Product Design	• Channnel Support		• Risk Inspection	• Quick Quote	• Claims Registration	• Commission • Processing
• Actuarial Process • Product Pricing	• Market & Research Analysis • Market Promotion	• Account & Contract Management	• Risk Analysis • Risk Monitoring	• Contracts & Portfolio • Management	• Claims Validation • Claims Assessment • Claims • Adjudication • Fraud Mgmt • Claims Subrogation	• Statement Preparation • Remittance Processing

Low Impact Medium Impact Significant Impact

Source: Swiss RE

VARANIUM

Emerging Trends in Insurance

Use cases for AI in Insurance

AI for underwriting

Leverage more data from images, wellness records, sensors and convert to actionable insights. Use supervised learning for U/W processes like triaging. Use unstructured data in decision-making and understanding exposure. This will enable customised coverage and pricing of policies.

Improved claims processing

All parametric policies meeting the claim requirement can be automatically processed.

Understanding requirements

Understanding purchasing patterns, tailor offerings and optimizing sales processes.

Automate repetitive knowledge tasks

Analysing documents, document categorizing, data extraction & summarizing. Classification of claims into different categories for triaging and routing.

Potential Issues

- IP issues on the training data used for the LLMs
- Potential risks in the form of data quality issues, data mining biases
- Non-compliance risk with data privacy regulations

P2P/Social Insurance

Peer-to-Peer (P2P) insurance is a risk sharing network where a group of individuals pool their premiums together to insure against a risk.

Challenges

- As the size grows overtime, maintaining the same group profile would be difficult, defeating the main cause of P2P Insurance
- P2P insurance premiums are costlier

	P2P Insurance	Traditional Insurance
Pool Profile	Individuals in the pool have similar risk profiles/goals	Individuals in the pool have varied risk profiles/goals
Alignment between Insurer and policyholder	Low, any excess post claim disbursal is used to reduce premium payments or charity cases	High, any excess post claim disbursal is kept as profit
Probability of Fraud	Low ↓	High ↑
Reinsurance of the pool	✓	✓

Source: Swiss RE, Varanium Research

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Emerging Trends in Insurance

Parametric Policies

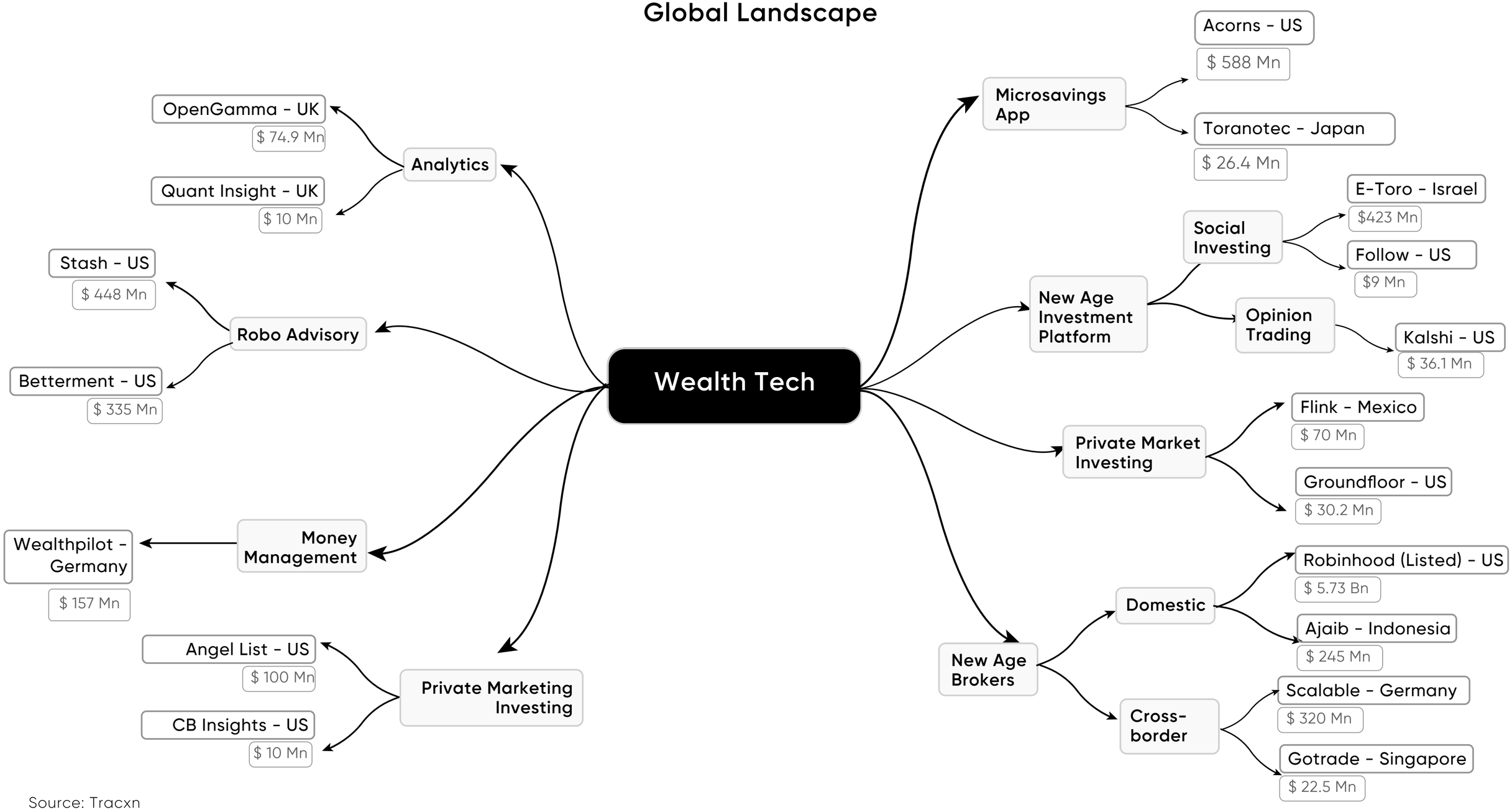
Parameters	Traditional Insurance Policies	Parametric Insurance Policies
Meaning	Indemnify the insured based on the amount of damage suffered due to insured peril – Indemnity based model	Non-traditional insurance product that offers pre specified payouts based upon a trigger event.
Payment Trigger	On Actual Loss	On occurence of event with parameter above the listed threshold
Recovery	Assessed actual loss amount post claim investigation	Pre-agreed payment structure
Claim Process	Complex & Time Consuming	Transparent, Index (parameter) based, quick claim settlement
Customization	Low ↓	High ↑
Use Cases	Traditional Use-cases for Life Insurance, Health Insurance	General Insurance policies – Weather based crop insurance, warehousing, natural calamity-based protection

Policy Type	Index Considerations
Agriculture Parametric Policies	Weather-Based Index: Rainfall (accumulated precipitation, precipitation type, and probability of precipitation: off-season, deficit/ excess/ inadequate rainfall distribution), temperature (high/low), relative humidity, windspeed, sunshine hours Others: Chilling requirement, Pest-disease congenial climate, Soil conditions
Flight Delays & Cancellation Policies	Departure delay duration, Cancellation reason, Missed connection severity, Airport closure, Flight distance (longer hauls), Airspace restrictions, Strike/regulatory restrictions, Airport congestion
Marine Insurance Policies	Storm Intensity (scale of 1- 5 [max damage]), Vessel Size, Route taken, Cargo Type, Environmental Conditions on the route, Port Congestion, Piracy Risk zone, Weather based Triggers

Source: Varanium Research

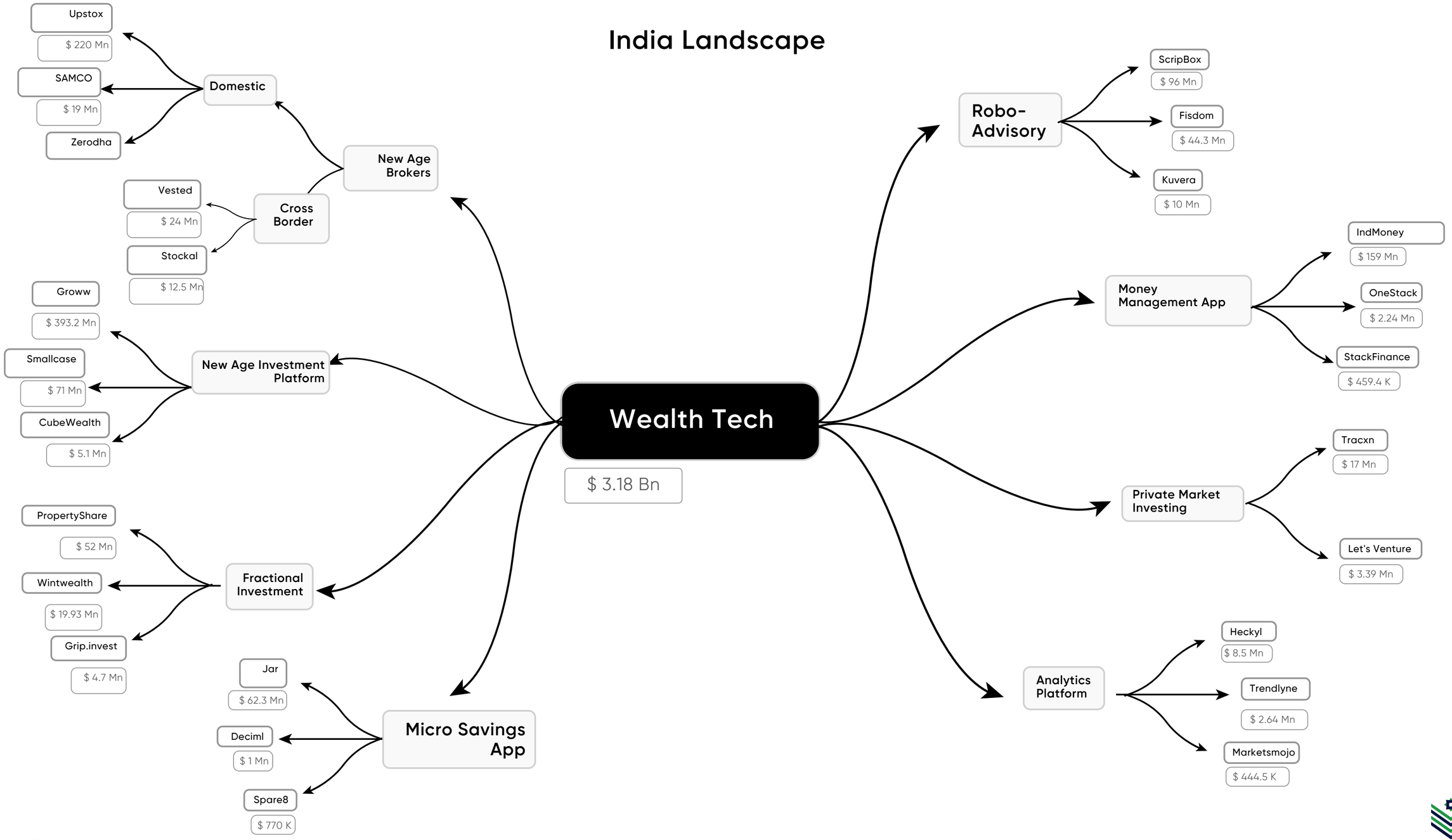
Wealth Tech

Global Landscape



Source: Tracxn

India Landscape



Source: Tracxn

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Wealth Stack

Front Office	Middle Office	Back Office
Portfolio Analytics	Trade Confirmation & Settlement	Fund Accounting
Investment Selection & Research Systems	Investment Accounting	
Portfolio Construction		Valuation
Pre-trade Analytics	Client Reporting	
Performance Analytics & Distribution		Fund Administration
Compliance Systems		
Order and Execution Management Systems	Regulatory Reporting Systems	
Risk Management Systems		Custody Systems

Internal APIs

Internal APIs

Data Management

Referrence Data	Transaction Data	Corporate Actions	Positions	Derived Data

Source: Industry experts (Joshua Lloyd-Lyons)

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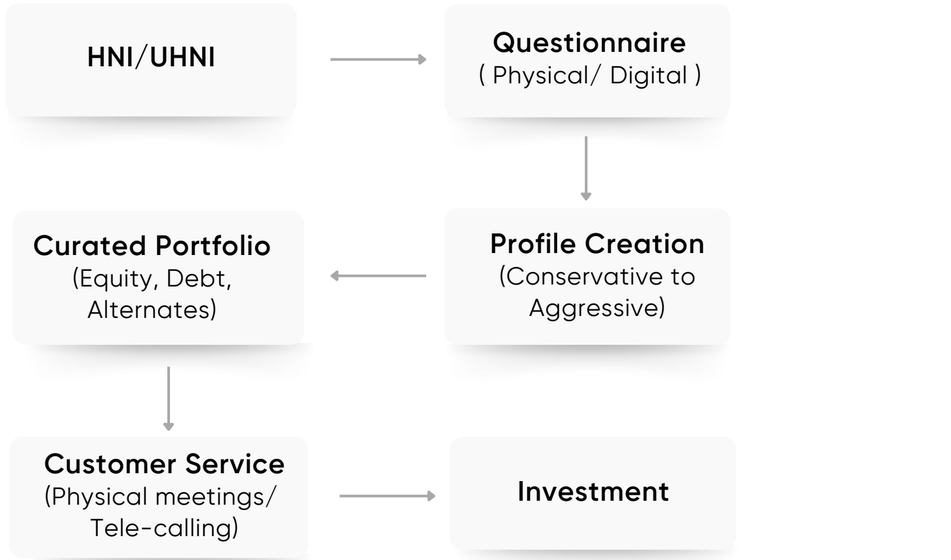
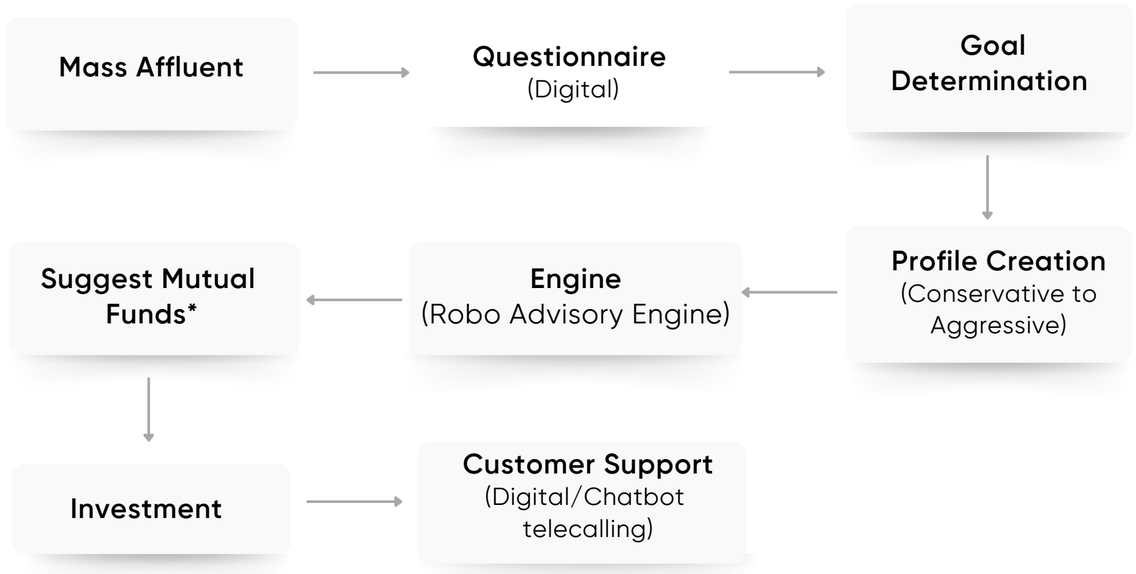
Wealth Management Process

Traditional Wealth Management Process



Robo Advisory Process



*Started with mutual funds and now suggets other products as well.

Source: Varanium Research

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Leading firms

Largest robo-advisors by AUM in the US

Company	AUM	Clients
Vanguard (Vanguard Digital and Personal Advisor)	$206.6 billion	1,100,000
charles SCHWAB (Schwab Intelligent Portfolio)	$65.8 billion	262,000
Betterment	$26.8 billion	615,000
wealthfront	$21.4 billion	307,000
EMPOWER (Previously Personal Capital)	$16.1 billion	26,000

Leading firms based on capital raised

Wealthsimple	Online robo advisory and stock trading platform	901
Human Interest	Employer-enabled retirement planning	500
STASH	Automated investment and robo-advisory platform	447
guideline	Automated 401K platform	344
Betterment	App-based automated investment & retirement planning platform	335
wealthfront	Robo advisor and financial planning platform	205

Note: The numbers are in $ million

Source: Tracxn, Forbes

Microsavings

Spending to Investing Process

Snapshot of Microsavings

- Effortless saving
- Frictionless and seamless journey
- Doesn't require to change spending behavior
- Challenge to build AUM

Total Funding (in $)

acorns	587,836,188
Jar	62,276,330
TORANOTEC	26,400,000
plinqit	10,000,000
DECIM.L	1,000,000
spare8	770,000

Source: Tracxn, Varanium Research

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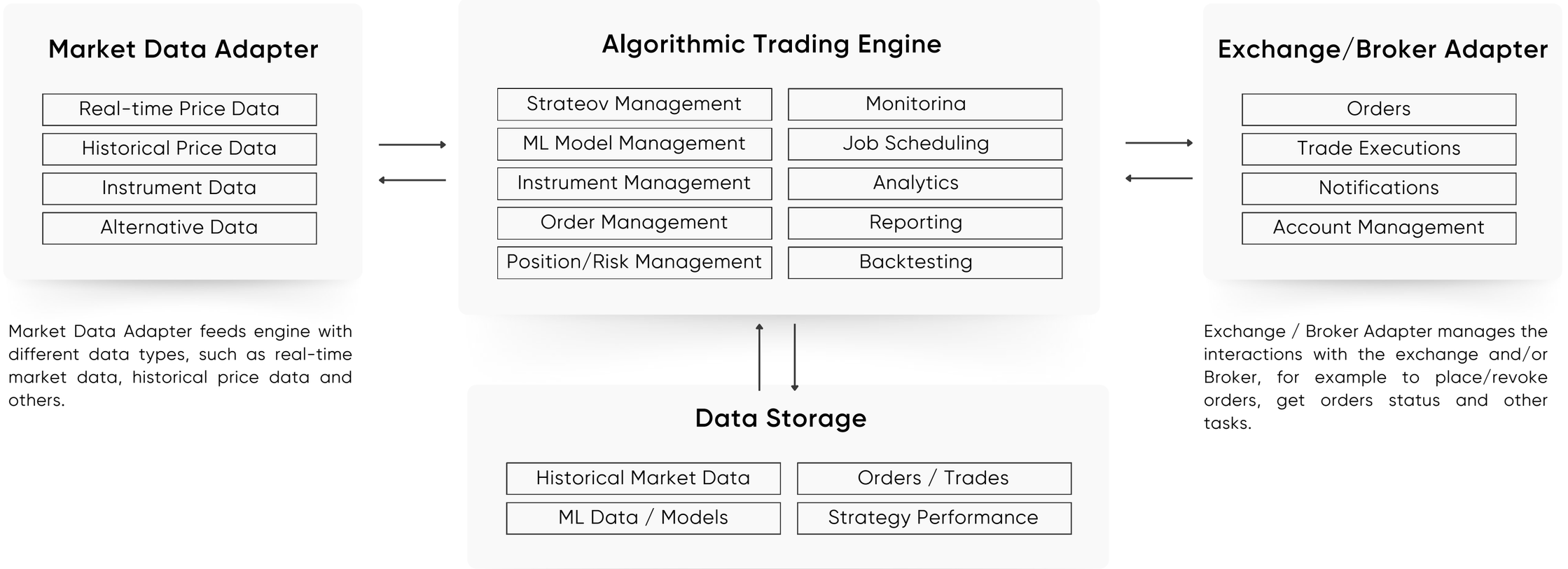
Key Components for AlgoTrading

Algorithmic Trading Engine is the solution core, where, for example, trading strategies are created, tested and operated using historical and real-time data, managing interactions with other solutions components and providing users with Analytics and reporting capabilities



Market Data Adapter feeds engine with different data types, such as real-time market data, historical price data and others.

Exchange / Broker Adapter manages the interactions with the exchange and/or Broker, for example to place/revoke orders, get orders status and other tasks.

Data Store provides a durable and secure data repository, used by engine.

Source: AWS

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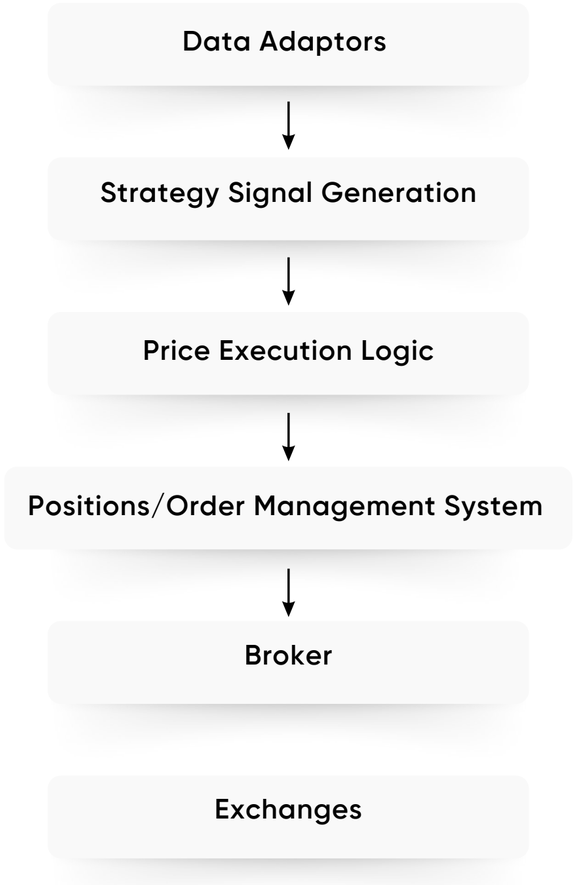
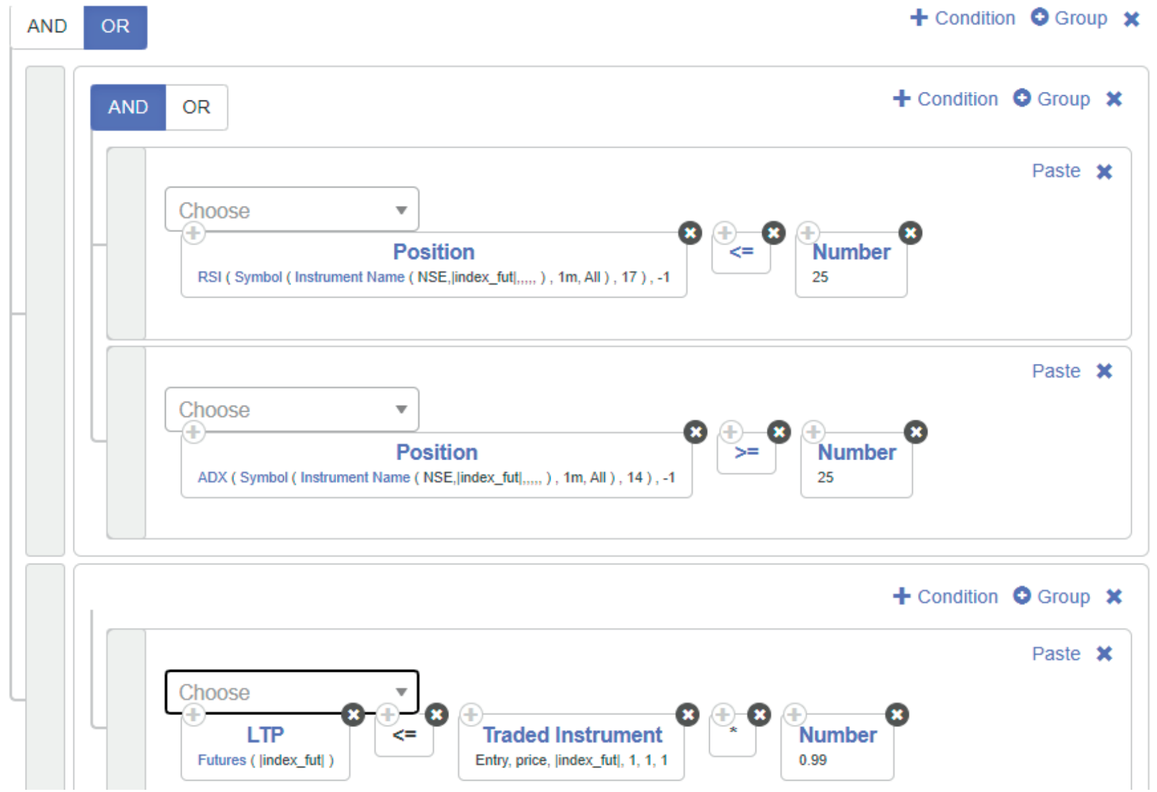
Retail Algo Strategy Platforms & Marketplace

(Pre-approved Algos)



Condition Builder



Source: Zerodha Streak, Tradetron

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Group Savings & Digital Chit funds

Digital application

Group registration and its members using a digital solution on a tablet or by using a USSD code.

Integration

Members to consolidate their savings and pay through the mobile app that is integrated to the core banking software.

Group management and support

Verification of transactions.
Address queries raised by members through the digital app.

Documentation and approval

Approvals are done electronically through verifications by group officials and bank staff.

Training

Train lead trainers to on-train the remaining group members in mobile app, business 8888 planning, budgeting, record keeping, and safety and health practices.

Building trust and transparency

Savings and payments to the bank are verified by group officials.
Notification messages of the savings and loan repayments.

Loan application

Loan application is applied through a software application or by using a USSD code.

Building trust and transparency

Instant message confirmations on payments.
Arrears notifications to the individual members.
Access to loan balances and savings.

Source: Varanium Research

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New Age Alternative Investing Platforms

Aggregators
InCred Money · TradeCred · Altifi · JIRAAF

International Equity
stockal · Vested

Revenue Based Financing
klub · N+1

Debt
PLUTUS · GoldenPi · BONDSINDIA · Harmony · IndiaBonds · wint

Lease Financing
GRIP · pyse · Leaf · LIFESET CITY · + Fivesto

Fractianal Real Estate
STRATA · PROPERTY SHARE · BHIVE WORKSPACE

Artwork
FRACTIFY · MASTERWORKS

P2P
FAIRCENT · LIQUILOANS · Lenden club · Lendbox · MONEXO

Crowdfunding & Fractional Funds
WEFUNDER · RAISON

Pre IPO Equity, Deal Intelligence and M&A
altius · EQUITYZEN · MergerDomo · Ok! Acquired · Leadoff.

Wine Investments
vino vest

Farm Financing
Growpital

EV Financing
URJAGROW

Movie Financing
Better invest

Brand Loyalty based Debt
Bevy

Startup Micro-investment
tyke · pod

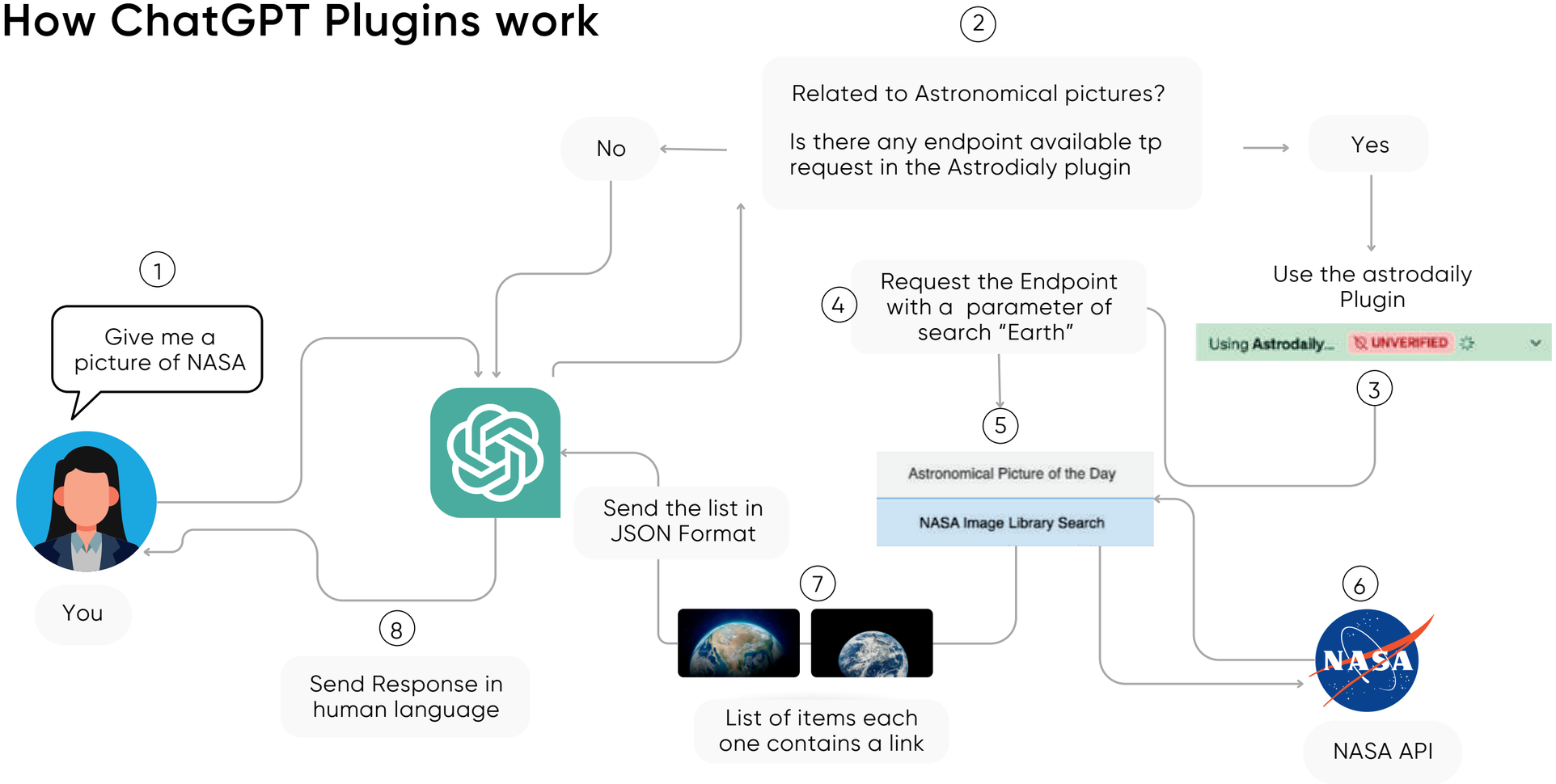
Angel Investing
Let's Venture · AngelList · connexdoor

Source: Tracxn, Varanium Research

Future Trends in Fintech

Conversational & Embedded Finance using ChatGPT

How ChatGPT Plugins work



ChatGPT plugins are extensions that can be added to ChatGPT, a large language model chatbot developed by OpenAI. These plugins provide ChatGPT with additional capabilities, such as the ability to access financial data, generate financial reports, and provide investment advice.

Source: OpenAI

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ChatGPT Plugins

Plugin	Description	Use cases
PortfolioPilot BY GLOBAL PREDICTIONS	Helps users manage their investment portfolios.	Tracking the performance of stocks, bonds, and other assets. Providing recommendations on how to improve the portfolio's risk-adjusted returns.
FiscalNote	Provides users with access to real-time regulatory data.	Tracking changes in regulations that could affect a company's business.
GOLDEN	Helps users research companies.	Providing information on a company's financial performance, its competitive landscape, and its legal and regulatory risks.
_zapier	Allows ChatGPT to interact with other apps, such as Google Sheets and Docs.	Automating financial tasks, such as tracking expenses or generating reports.
public.com	An artificial intelligence investment exploration tool powered by OpenAI's GPT-4 technology.	Getting real-time and historical market data, including asset prices, news, research, and comprehensive financial analysis.
WOLFRAM	Allows ChatGPT to access computation, math, curated knowledge, and real-time data.	Financial calculations and research.
	Helps users analyze stocks and financial data instantly.	Providing information on a stock's technical indicators, its valuation, and its potential for growth.
SIMPLY WALL ST	Provides users with access to a variety of financial data, including company financial statements, analyst ratings, and news articles.	Researching companies and making investment decisions.

Note: Now there are more than 1000 ChatGPT plugins

Source: ChatGPT

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Generative AI use cases in Fintech

Large Language Models are changing the way we interact with the computer. The following table outlines various subdomains within which Generative AI can be a game changer.

Select Pre-trained LLM
OpenAI, Google, Meta AI, Microsoft Research, Hugging Face, Anthropic

Specify NLP Task
QA/Chatbots, Extraction, Summarisation, Auto-correct, Translation, Classification

Prep Enterprise Training Data
Prioritize use case(s), Gather training and validation data, Annotate data

Select fine-tuning strategy
Prompt engineering, LLM retraining, RLHF

Deploy Enterprise Model
Taking enterprise data into context applying selected fine-tuning strategy

Source: Varanium Research

Use Cases	Description	Examples
Personalized Marketing	Generative AI can be used to create personalized marketing messages that are tailored to individual customers.	Copy.ai, Phrasee, Persado
Process Automation	Generative AI can be used to automate repetitive tasks such as data entry or document processing.	UiPath, Automation Anywhere, Blue Prism
Fraud Defense	Generative AI can be used to detect fraudulent activity by analyzing patterns in data.	Feedzai, Forter, Kount
Risk Assessment	Useful for assessing risk by analyzing data from multiple sources.	Ayasdi, DataRobot, ZestFinance
Customer Success	Can provide personalized support to customers by analyzing their behavior and preferences.	Poly.ai, Ada, Intercom, Zendesk
Product Development	AI helps create new products or services based on customer feedback and preferences.	OpenAI Codex, GPT-4, DALL-E
Persona Clone	AI Avatar using Deepfakes, Voice cloning and Large Language Model	Synthesia, ElevenLabs, GPT4/Pi

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Rise of Generative AI

Large Language Models are changing the way we interact with the computer.

Following table outlines various subdomains within which Generative AI can be a game changer.

Select Pre-trained Large Language Model (LLM)

- Open AI
- Google
- Meta AI
- Microsoft Research
- Hugging Face
- Anthropic

Specify NLP Task

- QA/Chatbots
- Extraction
- Summarization
- Auto-correct
- Translation
- Classification

Prep Enterprise Training Data

- Priortize use cases
- Gather training validation data
- Annotate data

Select Fine Tuning Strategy

- Prompt Engineering LLM
- Retraining RLHF

Deploy Enterprise Model

Taking Enterprise data into context applying selected fine-tuning strategy

Source: Varanium Research

Privacy Related Solutions

Data Privacy Brokers

They provide a personal data dashboard that allows users to track and manage their personal data online. They provide users with a comprehensive overview of their online footprint, including:

- Which websites have your data?
- What data do they have about you?
- How are they using your data?

It also allows users to take steps to protect their privacy, such as:

- Requesting access to your data
- Deleting your data
- Opting out of data sharing

incogni

Mine

IDX

DeleteMe

Privacy as a Service Startups

They provide a privacy-preserving data vault that allows businesses to store and share sensitive data without compromising the privacy of their users while reducing compliance burden.

- **Zero-knowledge encryption:** Encrypts all data before it is stored in the vault, so even Skyflow cannot access the data.
- **Homomorphic encryption:** Uses homomorphic encryption, which allows businesses to perform computations on encrypted data without decrypting it.
- **Tokenization:** Tokenizes all data before it is stored in the vault, so the data is not linked to the user's identity.
- **Differential privacy:** Uses differential privacy, which adds noise to data so that it is not possible to identify individual users.
- **Federated learning:** Using federated learning it allows businesses to train machine learning models on data without collecting the data in a centralized location.
- **Secure multi-party computation:** Provides secure multi-party computation, which allows businesses to perform computations on data without sharing the data with each other.

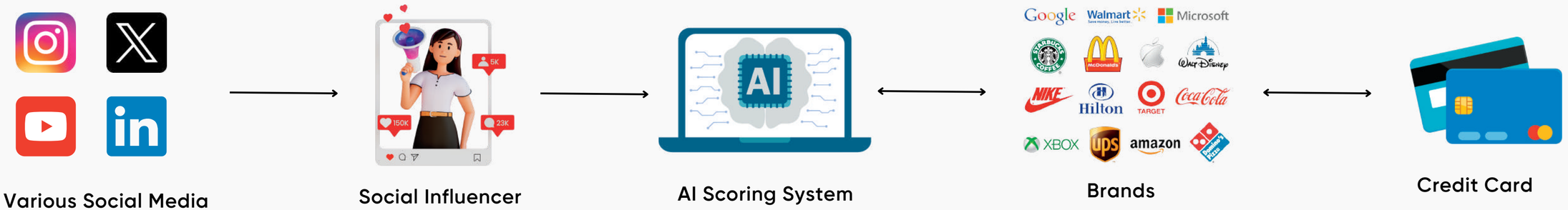
Basis Theory

skyflow

onetrust

Source: Varanium Research

Pay with Social Currency



Step 1: Influencer Connects Social Media Accounts

Step 2: An AI social scoring system is determined by the number of followers, reach, engagement, frequency of posts, and other such parameters. This takes away the sole focus from the follower count to the real and organic traction that the person acquires on a daily basis.

Step 3: The next time influencer buys something from partner brands, they post about it while tagging the brand.

Step 4: Based on the score money would be credited to the card, thus digitizing word of mouth. cashback ranges from 30% all the way up to 100% of the purchase value within 30 days.

Source: Varanium Research

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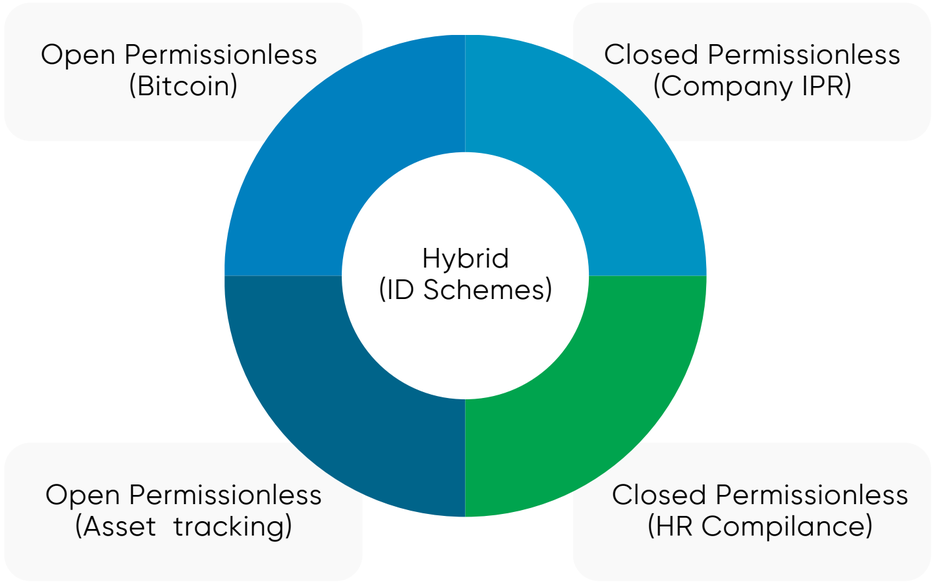
Enterprise Blockchain

Enterprise Blockchain provides immutable framework with better transparency.
It eliminates intermediaries and save reconciliation efforts as everyone on the network have synced ledger.

Network Type	Description	Access	Consensus Mechanism
Public Permissionless	Anyone can join and participate in the network	Anyone can read and write data on the blockchain	Proof-of-Work (PoW) or Proof-of-Stake (PoS)
Public Permissioned	Anyone can join the network, but only authorized participants can participate in the consensus process	Only authorized participants can read and write data on the blockchain	Delegated Proof of Stake (DPoS), Practical Byzantine Fault Tolerance (PBFT), Proof of Authority (PoA), Proof of Elapsed Time (PoET)
Private Permissioned	Access to the network is restricted to a specific group of individuals or organizations	Only authorized participants can read and write data on the blockchain	PBFT, PoA, PoET

Source: Varanium Research

Examples of Network Types



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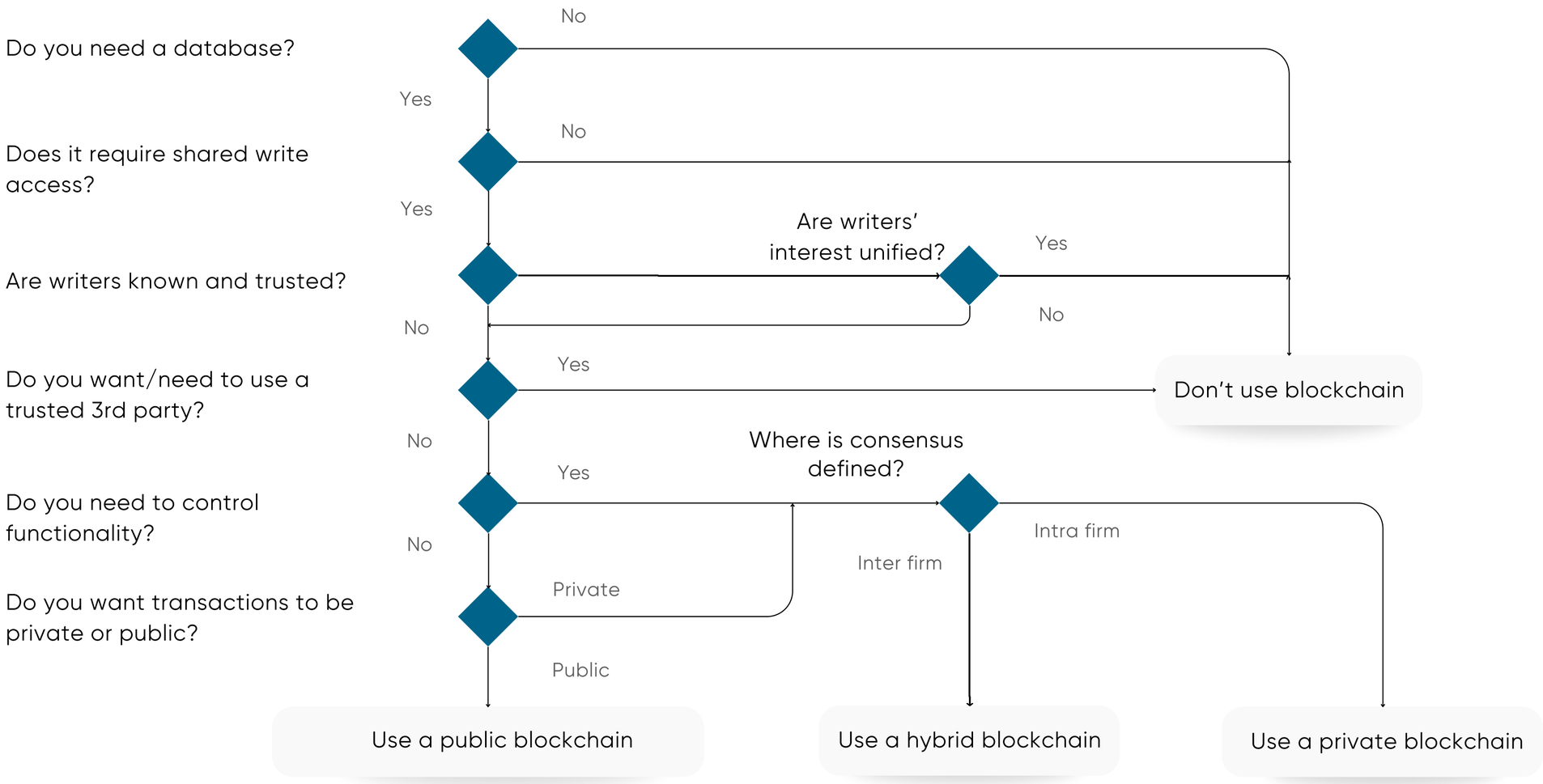
When to use Blockchain



Source: Varanium Research

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About Varanium

Global Multi-Asset Management Firm, focused on Emerging Market Strategies, India in particular

Managing ~$1 billion in Assets Under Management (AUM) with offices in Mumbai, NCR, Singapore and Dubai

T.S Anantakrishnan

Founder & CEO

Ex - GSAM, Shumway, Prime, Religare
MBA - NYU Stern, BE - IITR, CFA & FRM

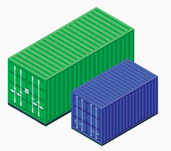
Sajeeve Thomas

Principal

Ex - Citibank & Shinsei Bank
PDGBA IIMA

Portfolio Management & Advisory

Alternate Investment Management



Offshore Products

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About Varanium Group

Varanium Capital is a global boutique investment advisory firm that offers asset management solutions to HNIs and institutional clients in India and abroad through a basket of customized investment products across a wide spectrum of traditional and alternate asset classes. Varanium Capital manages ~ USD 1 Billion in Assets Under Management (“AUM”).

Our products include offshore structured fixed income, portfolio management services (domestic public listed equities), fintech focused venture capital fund, venture debt fund and hospitality fund.

About Varanium NexGen Fund

Varanium NexGen Fund is a SEBI registered CAT-1 AIF, focused on early-stage fintech start-ups based out of India. We are India’s first fintech-focused Venture Capital fund. We invest across Seed to Series A stage.