Simple Economics of Blockchain

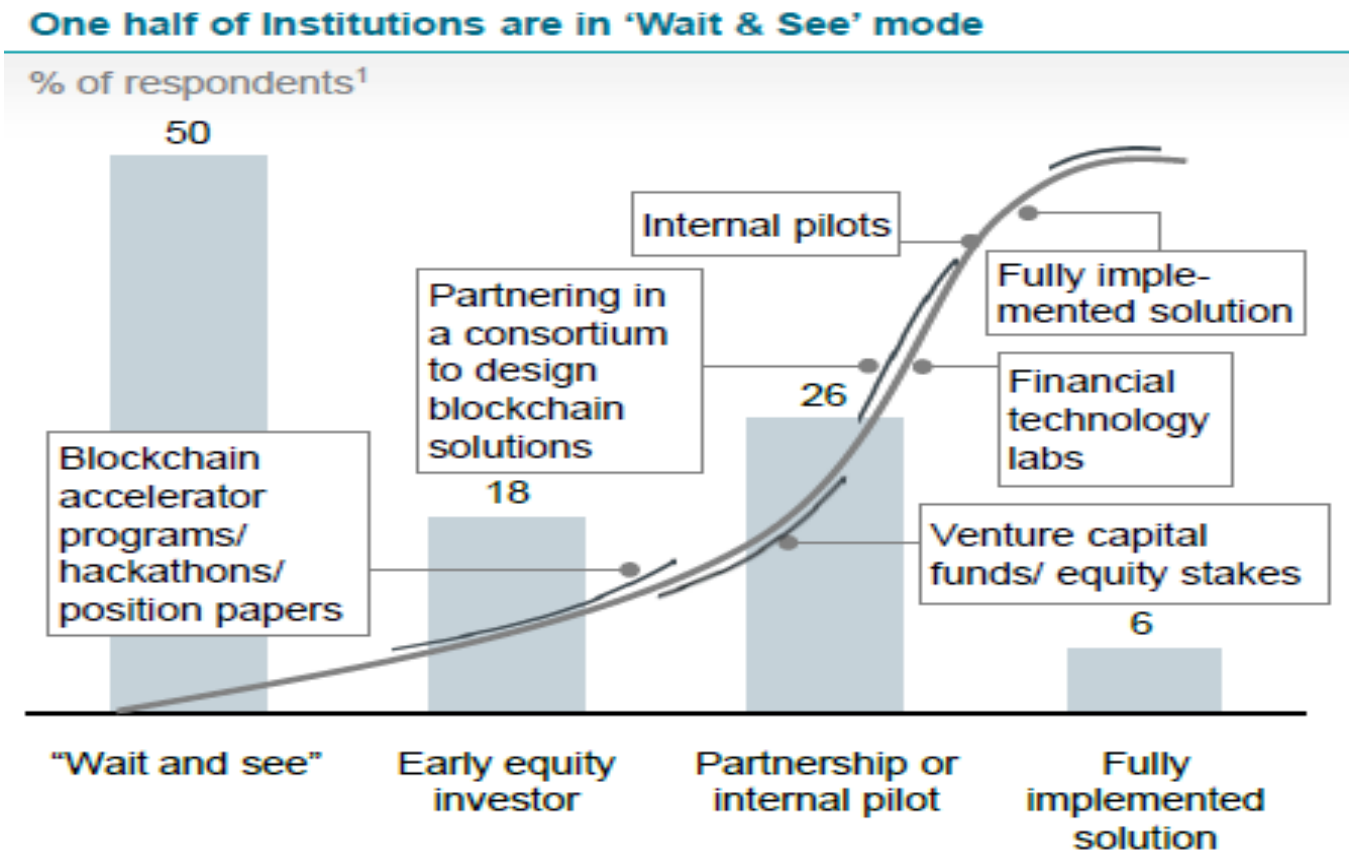
How the Technology behind bitcoin could change the world

Agenda

what is Blockchain

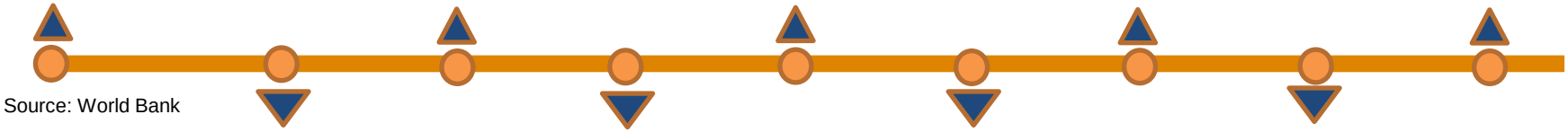
Blockchain: Hype or Opportunity ?

Blockchain: Industry Outlook



Although institutions are at different stages of experimentation, most now believe it could take 3-5 years for blockchain to have a material impact

Blockchain: Timeline



Source: World Bank

October 2008
The first blockchain was conceptualized in 2008 by an anonymous person or a group known as Satoshi Nakamoto.

2009
Blockchain is firstly implemented as a core component of bitcoin, where it serves as the public ledger for all transactions.

May 2010
First Bitcoin Purchase

LHV Pank
June 2014
Starts research on blockchain technology and its digital security with their app (Cyber wallet)

Ethereum Project
July 2014
A blockchain platform with the ability to build decentralized app

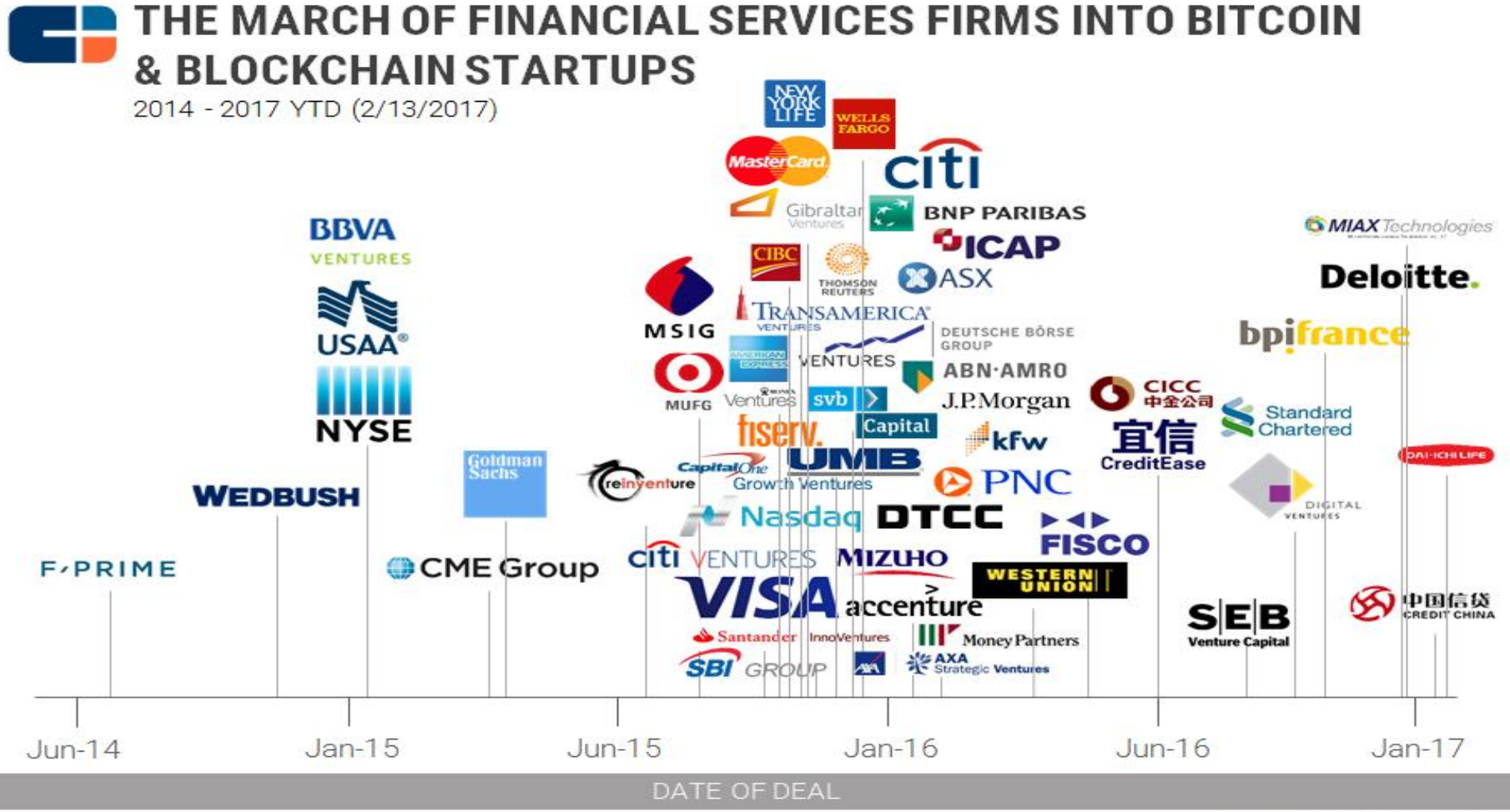
R3
September 2015
Major Financial companies form R3- a consortium of over 40 institutions are committed to discover and implement blockchain technology

September 2015
Visa, citi, Nasdaq, & capital one invest $30m in the blockchain startup (Chain)

2016
New programmable blockchain and monetization models beyond Bitcoin
Ex: smart contracts

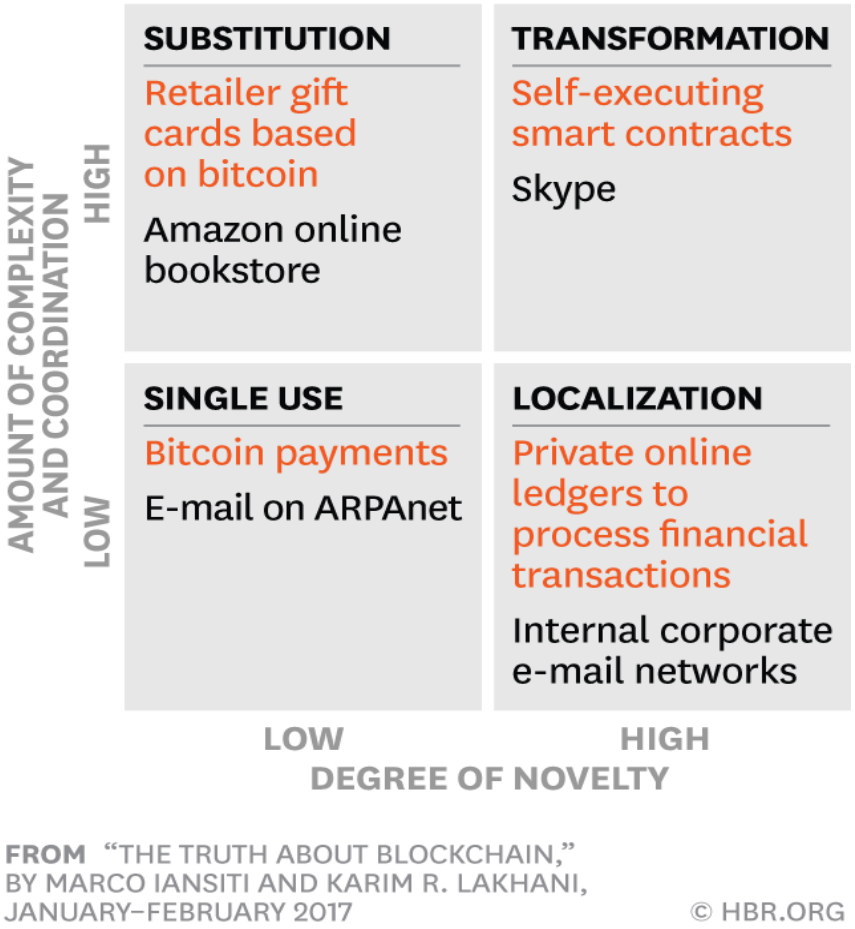
2018
WEC estimates that 80% of all banks will initiate projects concerning DLT- the underlying function supporting blockchain

Blockchain: Financial Industry Overview



Blockchain: Adoption of Foundational Technologies

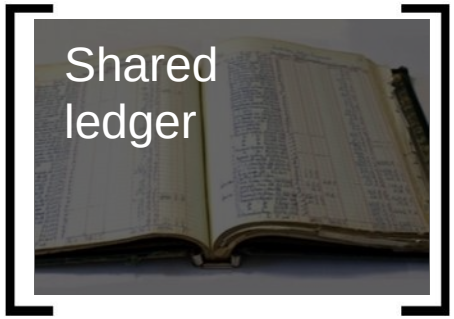
"The adoption of foundational technologies typically happens in 4 phases. Each phase is defined by the novelty of the applications and the complexity of the coordination efforts needed to make them workable. Applications low in novelty and complexity gain acceptance first. Applications high in novelty and complexity take decades to evolve but can transform the economy. TCP/IP technology, introduced on ARPAnet in 1972, has already reached the transformation phase, but blockchain applications (in red) are in their early days."!



Blockchain: Requirements of blockchain for business

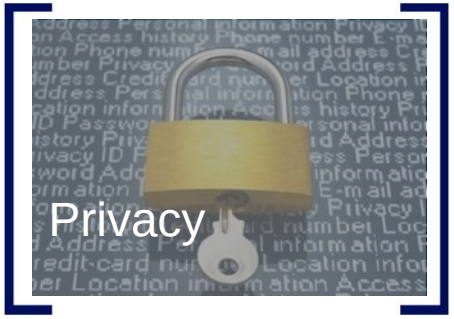
Broader participation, lower cost, increased efficiency

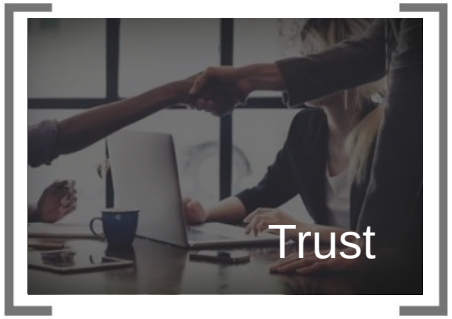
Append-only distributed system of record shared across business network



Business terms embedded in transaction database & executed with transactions

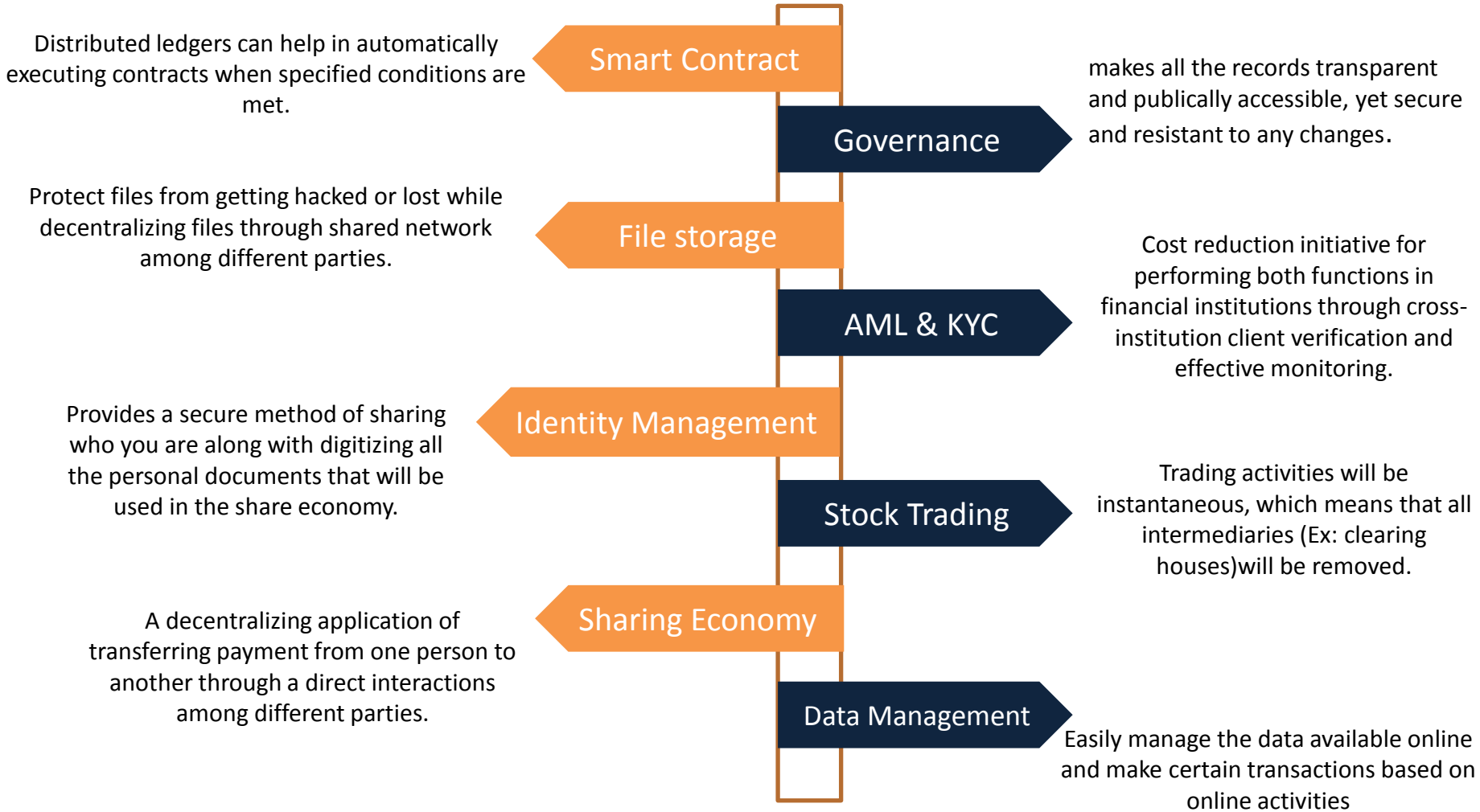
Ensuring appropriate visibility; transactions are secure, authenticated & verifiable





Transactions are endorsed by relevant participants

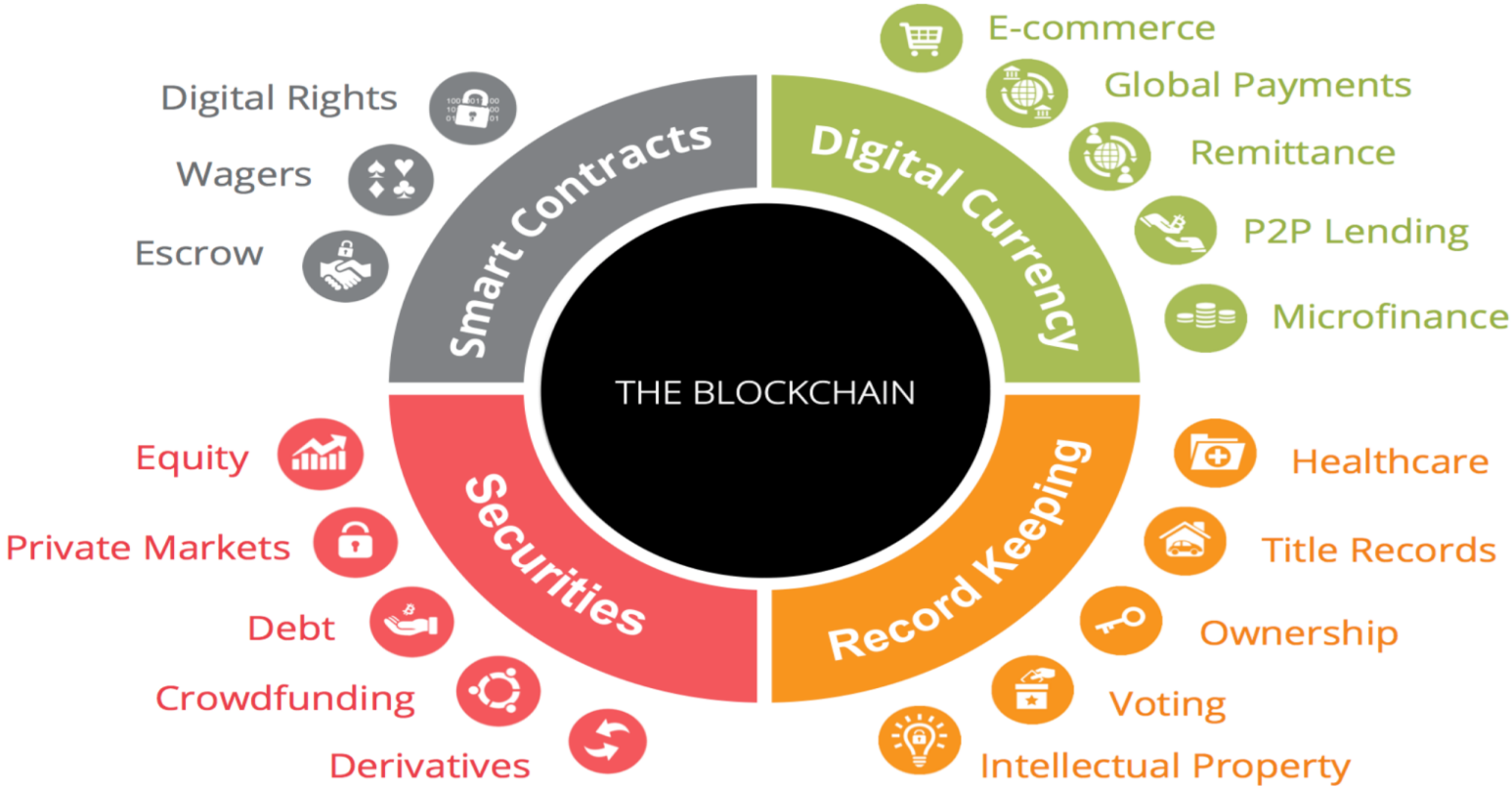
Blockchain: Uses of Blockchain



Blockchain: Potential Applications & Disruptions

Blockchain Potential Applications & Disruption

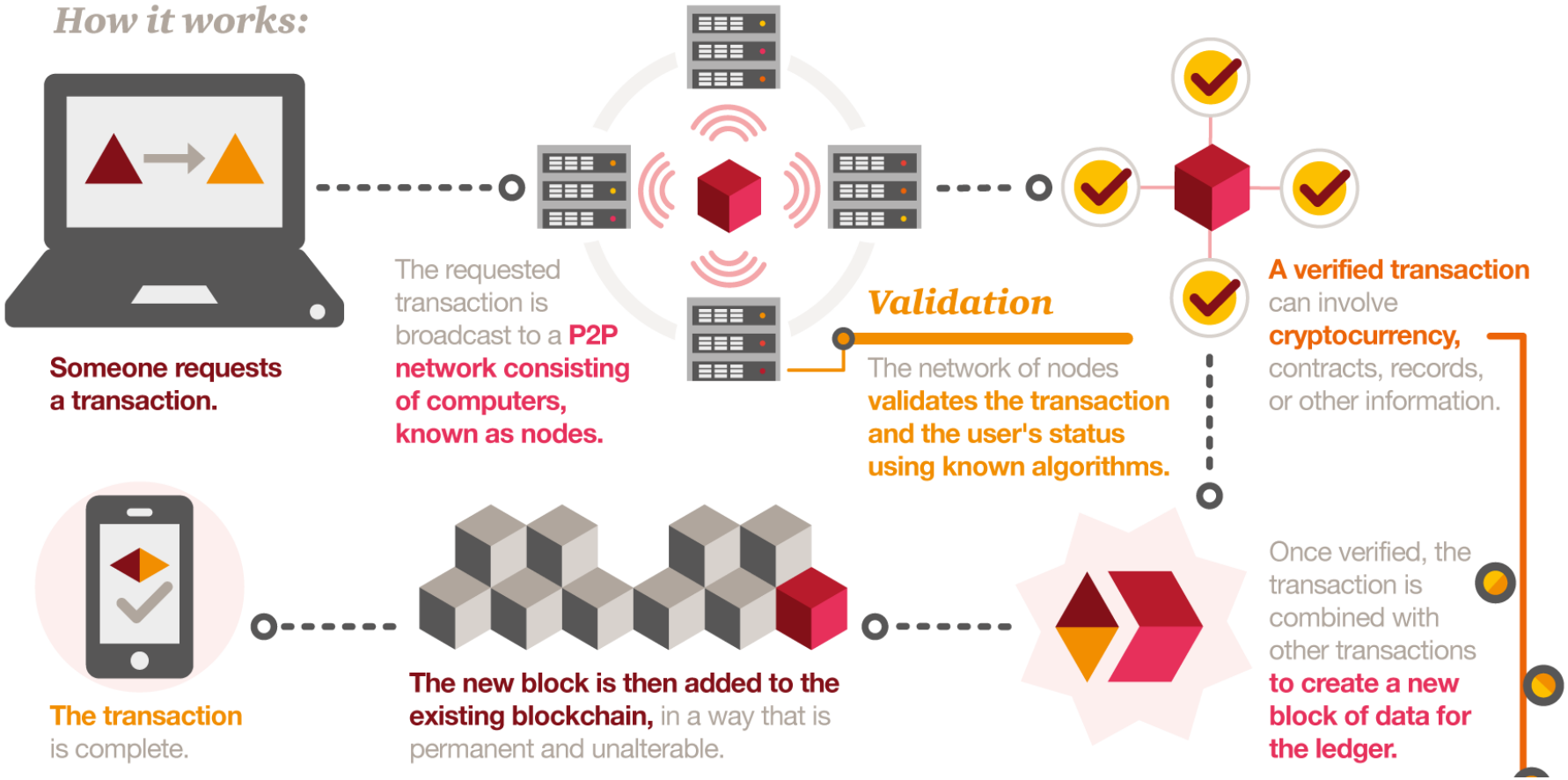
The blockchain is radically changing the future of transaction based industries



Mechanism of Blockchain

Mechanism of Blockchain: How It works

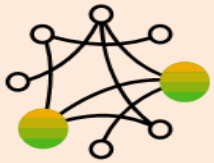
The distributed ledger is a **permanent**, **secure** tool that makes it easier to create **cost-efficient** business networks **without** requiring a **centralized** point of **control**. With distributed ledgers, virtually **anything of value can be tracked and traded**



*Source: **Price Waterhouse Coopers (PWC)**
Report: Making sense of bitcoin, cryptocurrency, and blockchain

Mechanism of Blockchain: How to implement it

*Consortium Blockchain

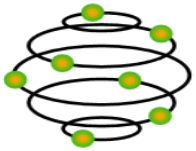


In a consortium blockchain, the consensus process is controlled by a pre-selected group – a group of corporations, for example. The right to read the blockchain and submit transactions to it may be public or restricted to participants. Consortium blockchains are considered to be “permissioned blockchains” and are best suited for use in business.

Semi-private Blockchain

Semi-private blockchains are run by a single company that grants access to any user who satisfies pre-established criteria. Although not truly decentralized, this type of permissioned blockchain is appealing for business-to-business use cases and government applications

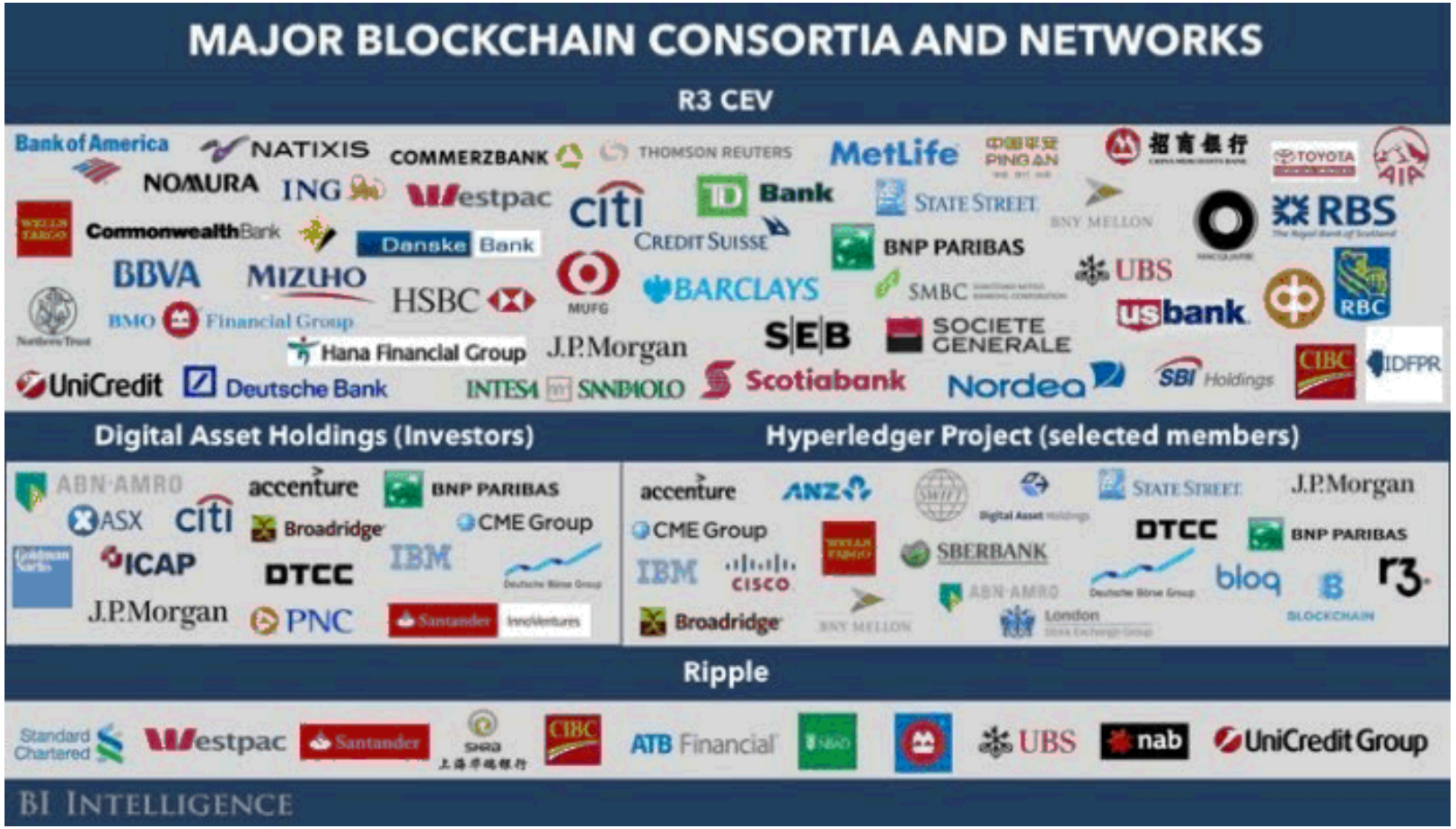
Public Blockchain



Anyone can read a public blockchain, send transactions to it, or participate in the consensus process. They are considered to be “permissionless.” Every transaction is public, and users can remain anonymous. Bitcoin and Ethereum are prominent examples of public blockchains

* The most common type is the consortium blockchain, R3 is basically a consortium of over 40 institutions that are committed to discover and implement blockchain technology. This part will be covered later on a couple of slides.

Mechanism of Blockchain: Consortium Types



Mechanism of Blockchain : Consortium Membership Benefits

1

Fewer Intermediaries

Blockchain is a true peer-to-peer network that will reduce reliance on some types of third-party intermediaries – like banks, lawyers, and brokers.

2

Faster Process

Blockchain can speed up process execution in multi-party scenarios – and allow for faster transactions that aren't limited by office hours.

3

Transparency

Information in block chains is viewable by all participants and cannot be altered. This will reduce risk and fraud, and create trust.

4

Security

The distributed and encrypted nature of blockchain mean it will be difficult to hack. This shows promise for business and IoT security.

5

Automation

Blockchain is programmable – which will make it possible to automatically trigger actions, events, and payments once conditions are met.

Mechanism of Blockchain: Consortium Theme

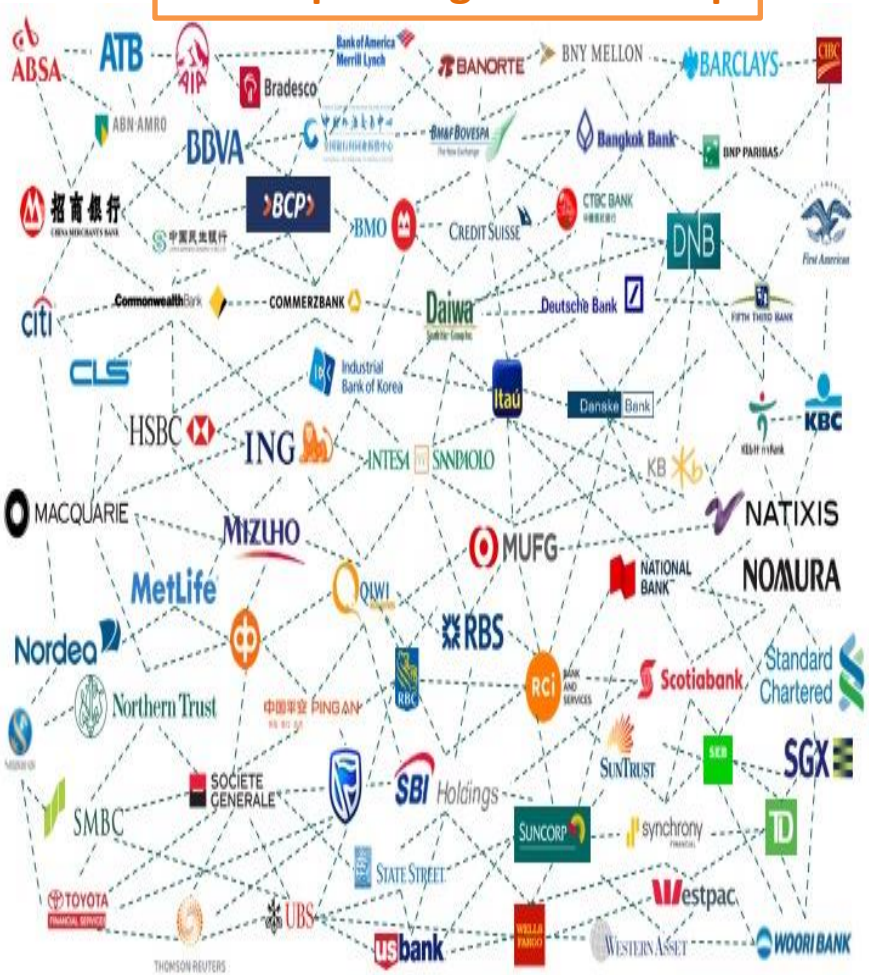
The R3 consortium is the world's largest alliance committed to delivering the next generation of financial infrastructure based on distributed ledger technology (DLT)

With the potential rewards available, no company can afford to be without an DLT strategy…
R3 can provide that strategy

R3's Current Projects:

- Cash / Payments
- Identity/KYC
- Trade Finance (Inc. supply chain)
- Capital Markets
- Liquidity & Securities Services
- Insurance

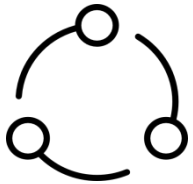
R3's Expanding Membership



Mechanism of Blockchain: Consortium Service Offering

Research & Education

Education through, regular newsletters, updates and worldwide conferences.



Incubator

Fast track ideas by developing POCs and market proposition quickly to graduate to accelerator or stop.

Accelerator

Accelerate the learnings of POCs into CorDapp production.

Professional Services

Drive delivery with dedicated Corda business and technical experts.

Community

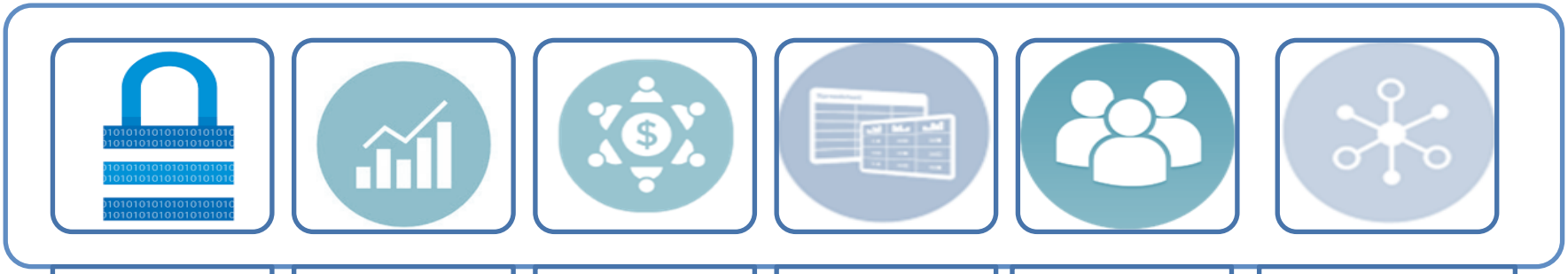
Collaborate with industry experts and contemporaries within other R3 member organizations.

Mechanism of Blockchain: Consortium Membership Challenges

Current Challenges

- Impossible to choose which information can be viewed by others on the system
- Lack of third party's interaction
- Transactions and actions conducted with this technology cannot be reversed automatically
- Implementation of the technology is not instantaneous

Required Changes



1	2	3	4	5	6
secure transactions	Reduce cost and better manage resources and funds	Facilitate business arrangement	Multiple layers of security to private database	Create layers of trust between parties	Provide fast and efficient communication

Financial Industry & Blockchain

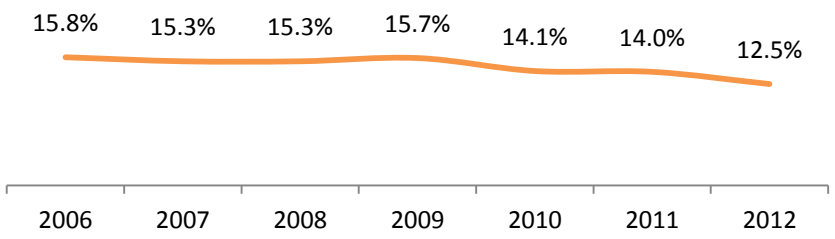
Financial Industry & Blockchain: Economic Outlook in Egypt

On the Economy

Financial Inclusion

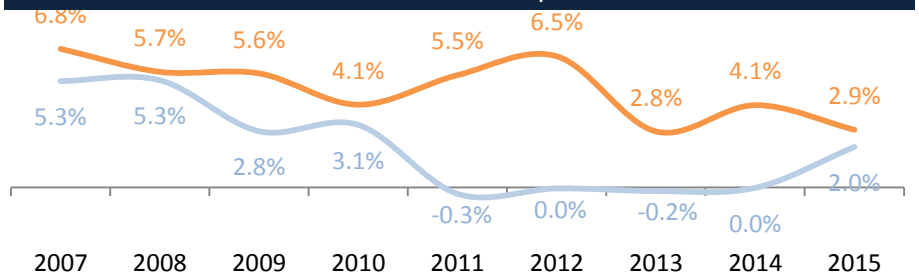
On the Individual

Egypt's Tax Revenue (% of GDP)



Source: World Bank

Cash Flow Gap



Source: World Bank

- Studies reports estimates informal economy to be around 65-70% of the formal economy. This is equivalent to EGP 1.2 trillion.
- Tax evasion is an end result of financial exclusion. Current tax base in Egypt stand at 12% of GDP while it averages at 28% in emerging countries.
- Slower GDP growth rates as a result of SME's low credit penetration and high unemployment level as a result of low business expansions.
- Leads to societal inequality in opportunity

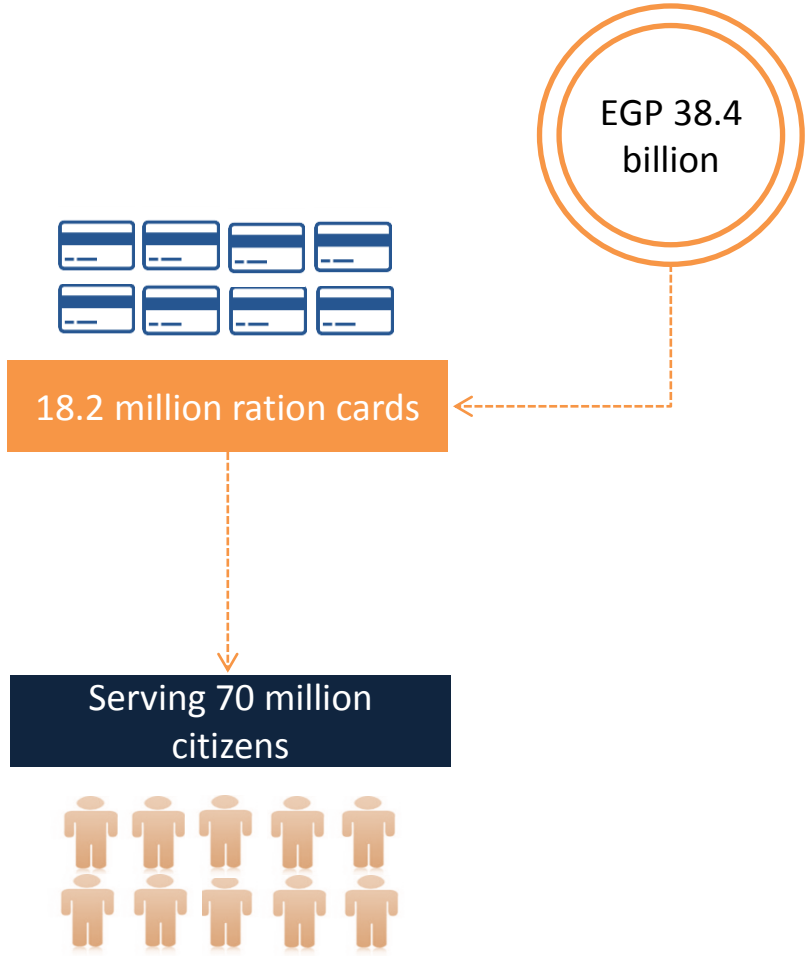
- 60% of the poorest 40% have a hard time finding access to emergency funds.
- Diminished growth possibilities for SME's as well as individuals due to limited credit access.
- Individuals need microcredit for working capital, investment activities, household consumption, education services, healthcare and consumer durables. Hence, not having access to credit limits transactions in all of the above. This results in lower standard of living
- Reduces Individual's purchasing power

Financial Industry & Blockchain: Economic Outlook in Egypt

Government Assistance Programs: Ration Cards

The Problem of Incorrect Targeting

- The Egyptian Government is paying almost EGP 38.4 bn on food subsidies alone this fiscal year.
- There is an absence of an accurate database that identifies who should receive subsidies.
- This incorrect targeting creates a huge costly leakage. More importantly, increases economic inequality.
- According to the World Bank, the government could save up to 73% of the cost of food subsidies if they successfully eliminated leakages in the system.
- If the government was able to restructure their subsidy system they would have what experts refer to as a "triple win". These are fiscal savings, reaching most vulnerable and improved nutrition.

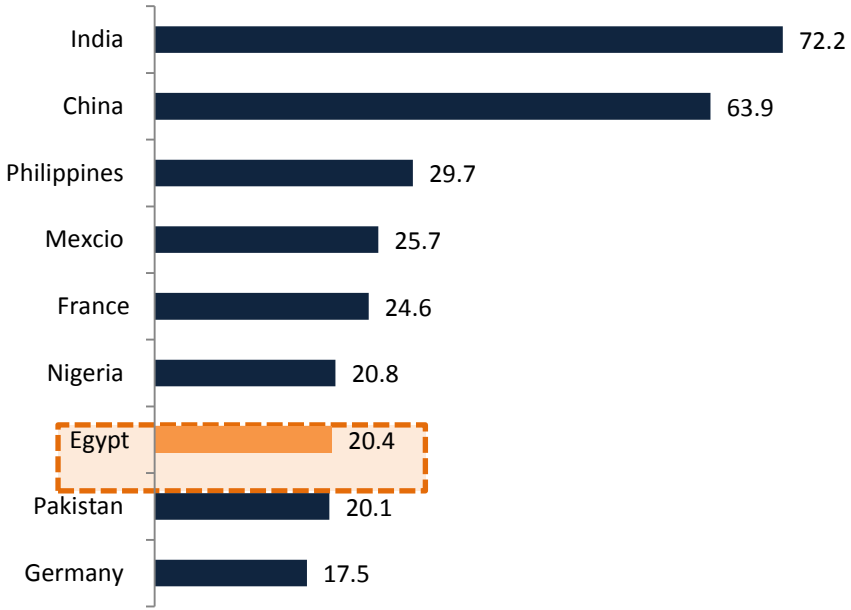


Source: Ministry of Finance,(fiscal year 2016)

Financial Industry & Blockchain: Economic Outlook in Egypt

International and Domestic Remittances in Egypt

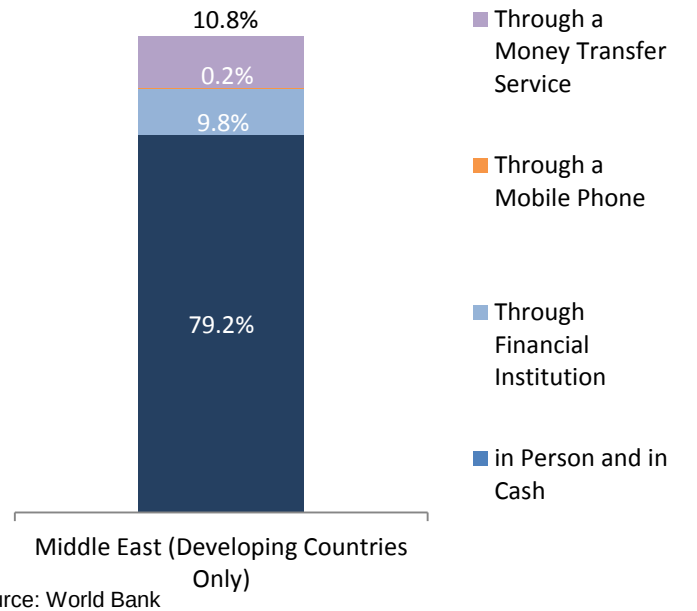
International Remittances, 2015f



Source: Immigration and Remittance Factbook

- Egypt become the top remittance receiver in the MENA region, with remittances of more than three times the revenue from the Suez Canal

Domestic Remittances Received*



Source: World Bank

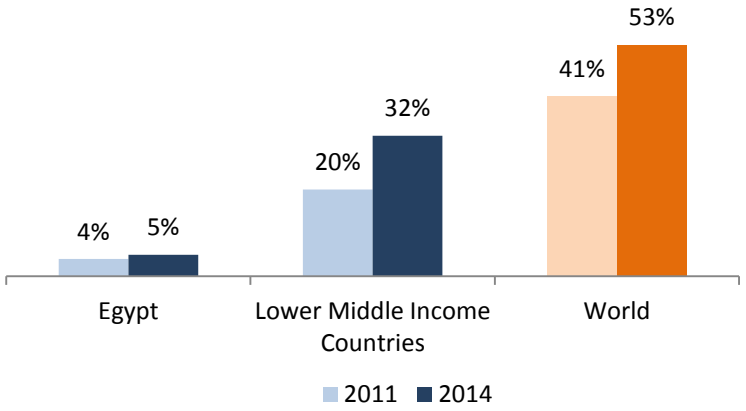
- 79% of the money send to family and friends domestically is done through through people. This presents both a challenge and opportunity for mobile money.

*Denotes the percentage of respondents who report personally receiving any money in the past 12 months from a relative or friend living in a different area of their country

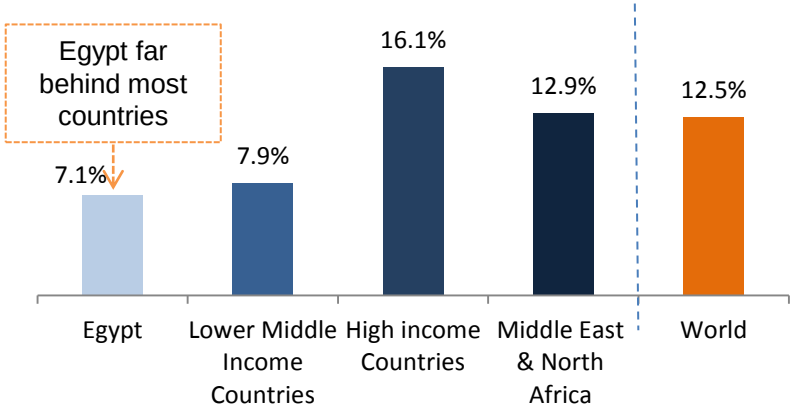
Financial Industry & Blockchain: Financial System Participation

Egypt's population that holds accounts at financial institutions is far less than lower middle countries. Sluggish domestic credit growth with an average of -7% during the past 9 years

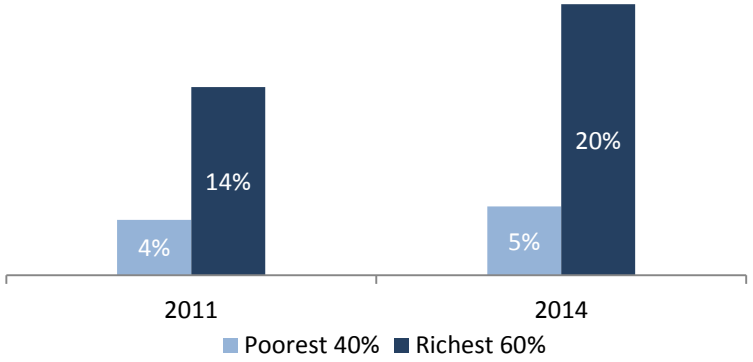
% of Population Holding Bank Accounts



Domestic Credit by Banks to Private Sector (% of GDP)

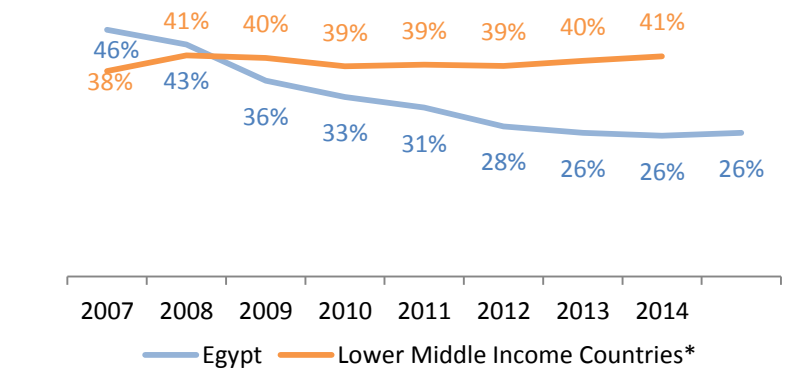


Breakdown by Income in Egypt



Source: World Bank

Domestic Credit Trend Slowing Since 2012



Source: World Bank

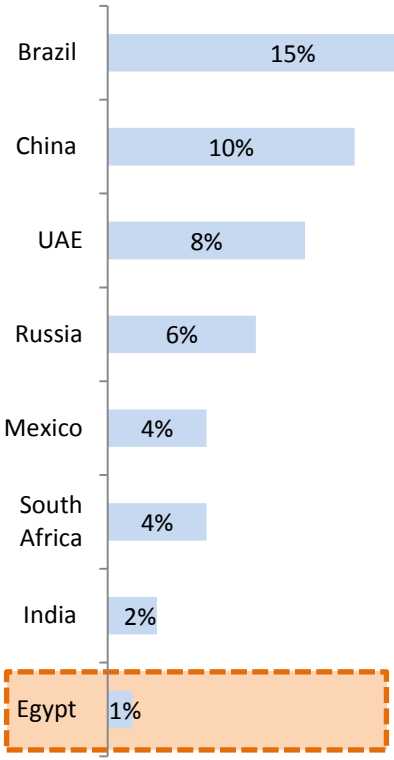
* Lower middle World Bank Classification: defined as having a per capita gross national income of US$1,026 to $12,475

Financial Industry & Blockchain: Egypt Outlook

The Digital Banking in Egypt: Potential for Future Growth

Payment through digital platforms in Egypt is <1% → But Innovative payment technologies are emerging → Online banking usage still lags behind and has a lot of potential

% of non-cash payment transactions



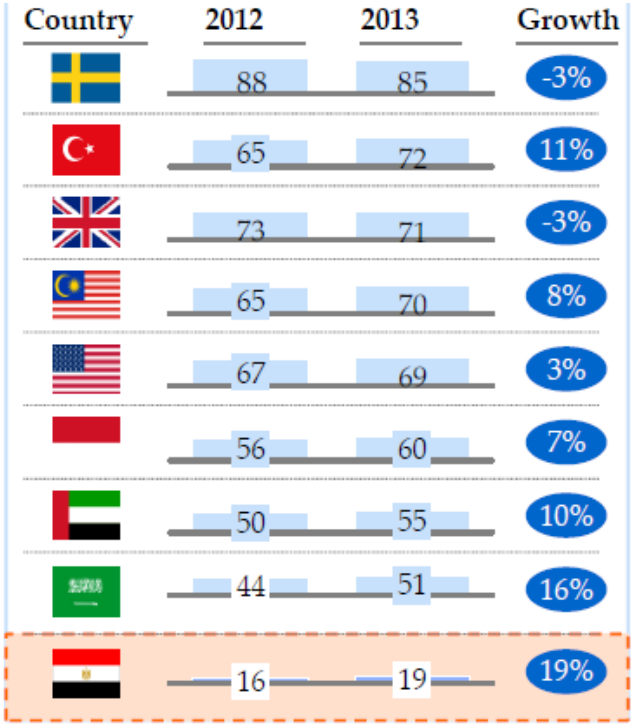
Collaboration between NBE, MasterCard, Fawry and EBC that allow customers to send money, pay bill and make purchases.

Serves customers who already have bank accounts, through their own banks channels
Customers can make bill payments, installments, purchase airplane tickets etc.

Flous : Mobile Wallet offering telecom company Etisalat in partnership with MasterCard

CashU is a third party payment service provider with good network of merchants (thousands) that accept online CashU payments

% of people who used IB through any device



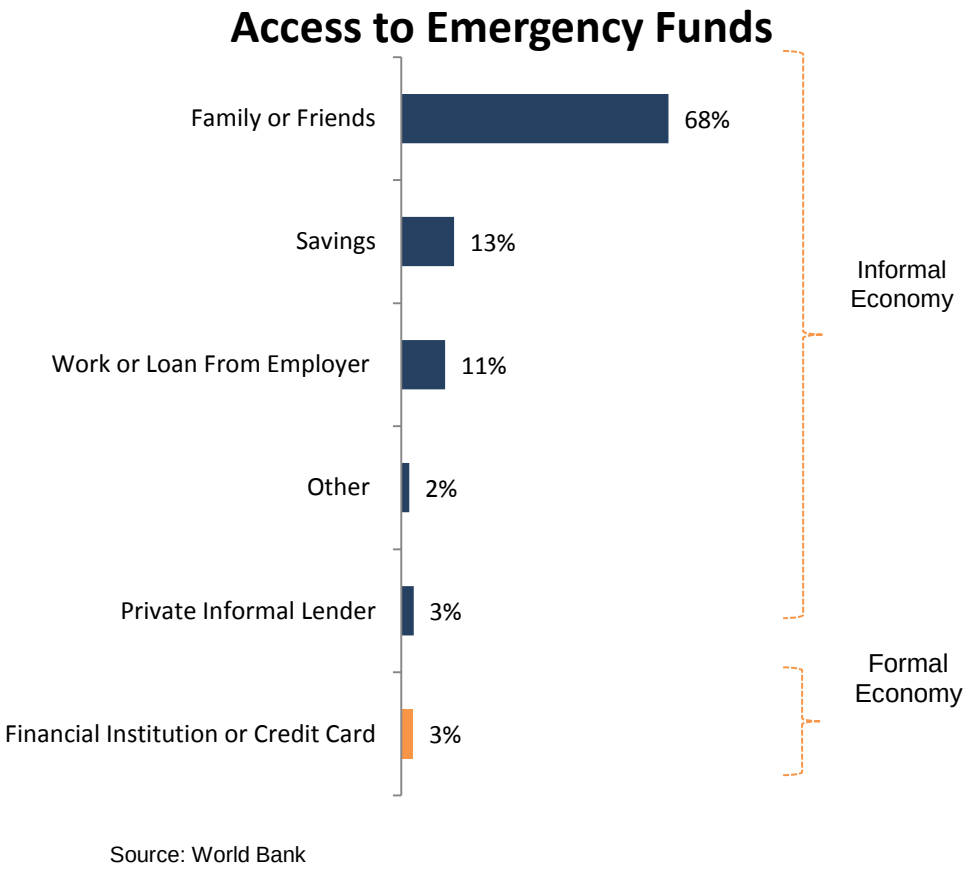
Country	2012	2013	Growth
	88	85	-3%
	65	72	11%
	73	71	-3%
	65	70	8%
	67	69	3%
	56	60	7%
	50	55	10%
	44	51	16%
	16	19	19%

Source: McKinsey and Company

Financial Industry & Blockchain: Credit Analysis

Limited Access to Credit

Even though the poorest population have higher difficulty in accessing funds, yet it remains high across all levels of income



Source: World Bank

Likelihood to Access Emergency Funds	Poorest 40%	Richest 60%
Not at All Possible	60%	33%
Not Very Possible	10%	9%
Somewhat Possible	25%	38%
Very Possible	5%	20%

Source: World Bank

- 33% of the Egypt's poorest 40% borrowed money in the past year (against 28.8% for the richest 60%). This shows that there is higher appetite for credit for the lower income population
- The Poorest 40% have very limited access to credit
- An enormous opportunity for financial institutions to increase their pie of total domestic credit by finding the right tools to target the base of the pyramid

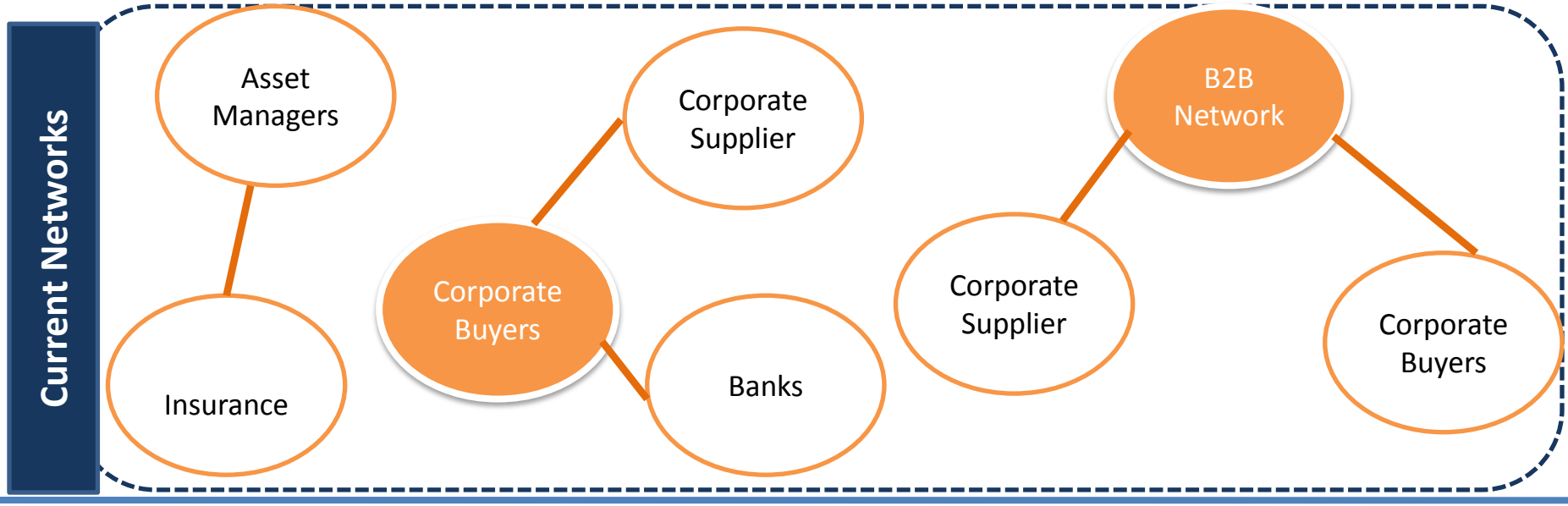
Implementation of Blockchain

Application # 1

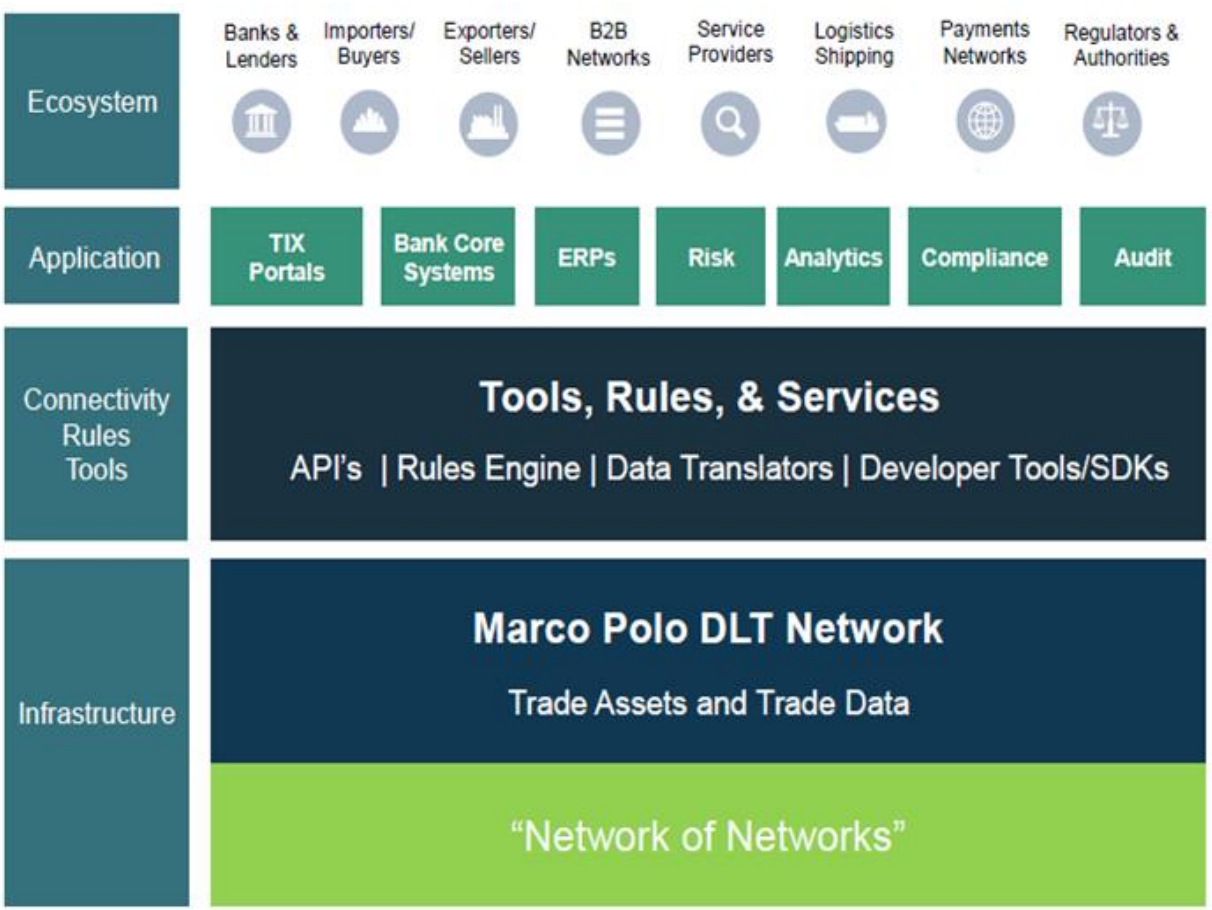
Trade Finance & Blockchain

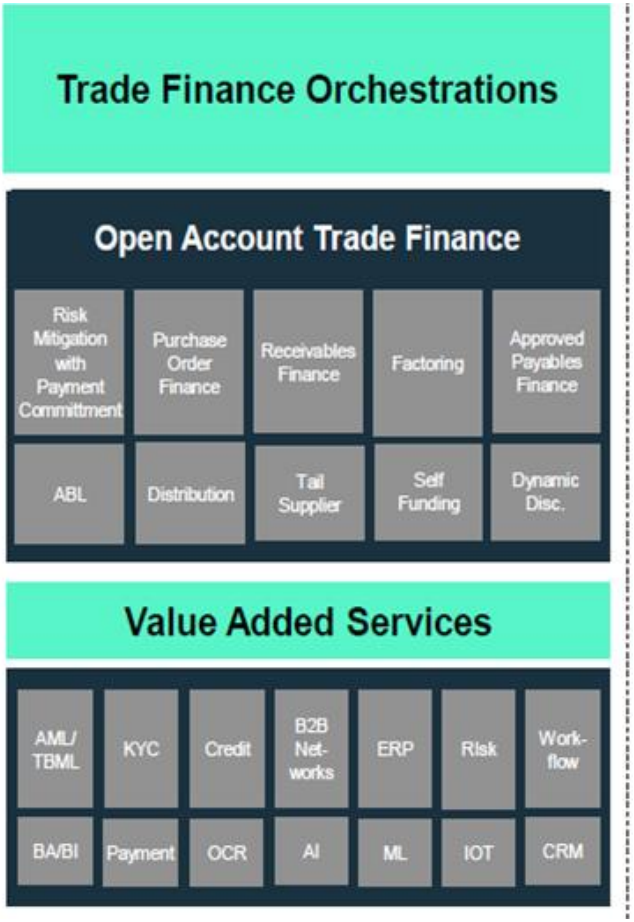
Trade Finance & Blockchain: Trade Finance Today

- The financial and IT system that support trade process are manual intensive that injects significant costs, risks, frictions in the trade process.
- These disconnected , inefficient systems places limits on business models that lead to bad customer experience, and restrictions on facilitating corporate trade processes.
- These trade data are trapped in silos that makes it hard to verify.
- Regular technology makes client integration very slow, costly, and complex
- This creates major fraud, compliance, and audit risks as trading parties has no access to this critical trade data
- Thus, an inefficient distribution channel among financial institutions are managed.



Trade Finance & Blockchain: Marco Polo Business Model





Trade Finance & Blockchain: Marco Polo Objectives

Provide a smarter, simpler, easy to integrate technology infra-structure for the entire trade ecosystem

Standardized trade orchestrations leveraging digital smart-contracts to drive automation and interoperability

Utilize light, modular, and API-driven systems that provide a superior customer experience

Collaborative approach working with many banks and technology companies to provide the next generation trade finance solution

Provide a secure, global, open business network for trade finance that can be linked to other business networks

Reduce risk, operational and compliance costs by providing participants real-time visibility into a single source of truth

Application # 2
KYC & Blockchain

KYC & Blockchain: Challenges

These key challenges are faced by CIB in complying with KYC requirements for its customers:

KYC Process Challenges

Data Collection	Data Validation	Data Privacy & Security	Customer Experience
• Credibility of Source of data provider • Data maintenance: Inability to collect data for small corporations & SMEs due to their limited presence • Limited access to customers' data due to privacy regulations and laws	• Sustainability of audit trail of data collected. • Setting benchmarks for data validation. • Missing data fields that might hinder KYC process • Presence of human errors (incorrect/ duplicated data collected)	• *Conflict between data aggregation and data privacy (KYC regulation contradicts with AML requirements) • Data residency requirements limit flexibility and inhibits efficiency	• Delays in executing transactions till KYC process is completed. • Higher cost per client . • Increase inefficiencies due to duplication in KYC process. • Possibility of losing new customers due to such inefficiencies.

KYC & Blockchain: KYC & AML Importance

- KYC is intended to reduce the risk of money laundering and/or terrorist financing.
- The indicators and methods for due diligence are different which has lead to confusion in the market for KYC requirements and AML regulations.
- In light of the increased regulatory requirement on AML/KYC matters, some financial institutions are currently reviewing their KYC programs

That's why it is important that a new innovative KYC process should be currently implemented in CIB

Reason # 1 **Better Customer Due Diligence**

Global systems (Ex: FATCA)are currently imposing customer identification and validation rules that go well beyond what is currently generally required for AML/KYC purposes. These operations

- can easily help in reviewing and validating customer data
- identify tax evasion and fraud cases.

Reason # 2 **Process and technology coordination**

- By implementing blockchain technology, all information collected as part of account opening can be made accessible to review accounts and validate documentation and other regulatory purposes.
- CIB can collaborate with regulatory authorities (ex: Tax authority) to better implement *the AML/KYC function. This can typically be achieved by obtaining data from the account opening function and communicating it with other authorities for complying with regulations.*
- *Review and validation is a significant change from current practices that will require a review of operating models, data privacy rules and customer onboarding processes.*

KYC & Blockchain: Suggested Solution for Implementation

DLT based system as a KYC solution for customers (Retail & corporates)

- Automatic system where customers are allowed to enter their data and its validation documents
- Customers can share data with permissioned counterparties
- Data sources are validated by authoritative parties

Specific system for trade finance can be implemented in collaboration with other networks

- CIB can be a part of the suggested trade finance platform supported by DLT (R3 consortium)
- Reduce risk through transparency and better access to data
- Be more connected with many banks and technology companies for better trade finance solution
- Achieve better client relationship through providing automated and smart services.

Intensive training course for users and developers

- Learn overall architecture, key areas, and components of system
- Ability to understand security, network design, and other required aspects of architecture
- Understand flow of information among parties and how nodes can play an effective role in designing networks

KYC & Blockchain: Benefits for CIB

Risk Reduction

Audit and compliance

Achieve higher transparency and better tracking of transactions

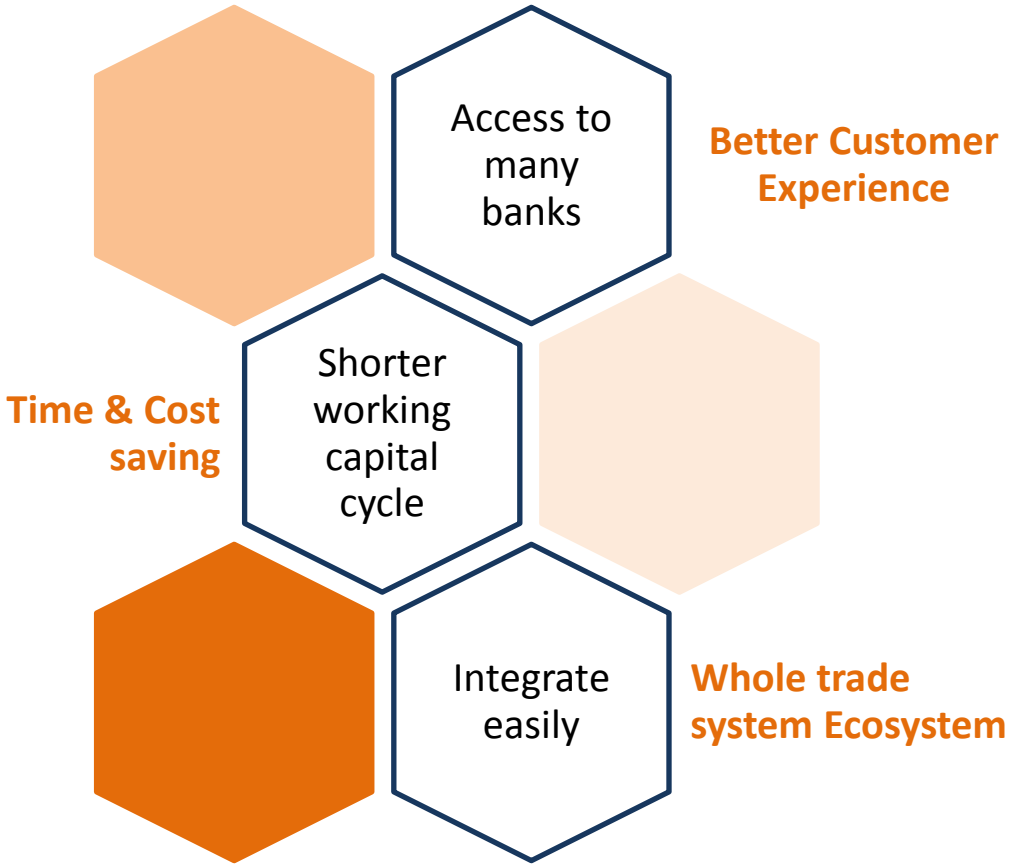
Collaboration and integration

Communicate with big network and exchange best practices through a fast growing network

New Revenue streams

Access to new clients and markets in a cost-effective way

KYC & Blochchain: Benefits for CIB Customers



Thank You