McKinsey&Company

Blockchain Technology in the Insurance Sector

Quarterly meeting of the
Federal Advisory Committee on Insurance (FACI)

Jan 5, 2017

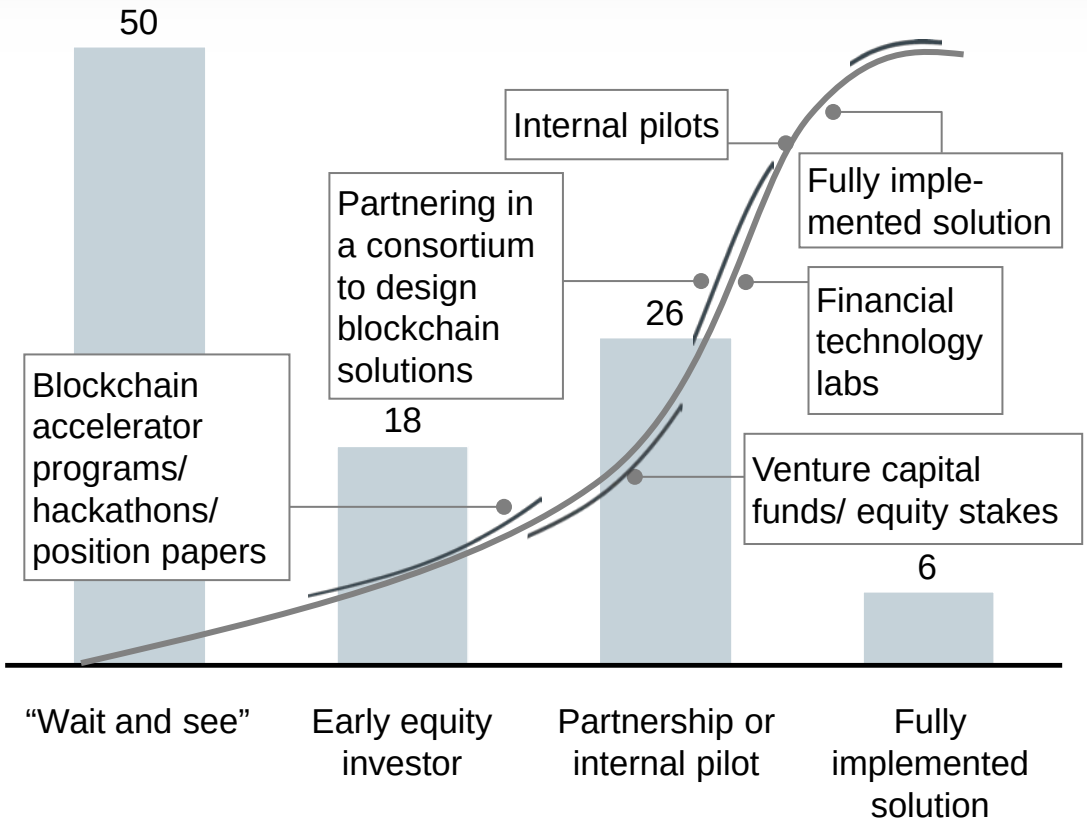
10 things you should know about Blockchain

What is blockchain?	**1** Blockchain is a **nascent technology** with the **potential** to bring about step-function improvements in efficiency and security to the financial industry - or it **could simply be over-hyped and unnecessary**
	2 **>60 Nascent use cases**[1] exist across multiple industries with a **primary focus in financial services (~40%) and cost reduction (~70%)**
What is the implementation level across the industry?	**3** Investment in blockchain is gaining momentum (~**$1Bn of Venture Capital investment over the last 24 months)** and is expected to grow rapidly; **the banking industry is expected to spend ~$400MM** by 2019
	4 The success of these investments is highly dependent on the **collaboration** in an **emerging eco-system** primarily **driven by innovation in the Insurtech and fintech industry**
	5 **70% of financial organizations** are in the **early stages**[2] **of experimentation;** most executives **expect to see material impact** from this technology only **in 5+ years**
What is the impact for financial institutions?	**6** **Most of the impact** from blockchain in financial services is likely to come **from payments**, and **capital markets**. **Preliminary sizing of 4 use cases** suggest significant value creation - the estimated impact of these use cases alone is **$70-$85B** but **feasibility varies significantly**
	7 However, **blockchain is not the silver bullet solution for all** the pain points in the industry
	8 **Enabling collaboration, shaping a positive regulatory environment and identifying clear business cases justifying the transition costs** will pose the biggest challenges to implementation
	9 By overcoming these challenges, blockchain technology could **reach its potential within 5 years**
	10 Organizations can unlock the value of blockchain through a deliberate **five-step journey**: Education, Strategy, Solution design, Implementation, and Approach

1 Blockchain solutions other than solutions that are purely related to Bitcoin
2 “Wait and see” and Early equity investor stages

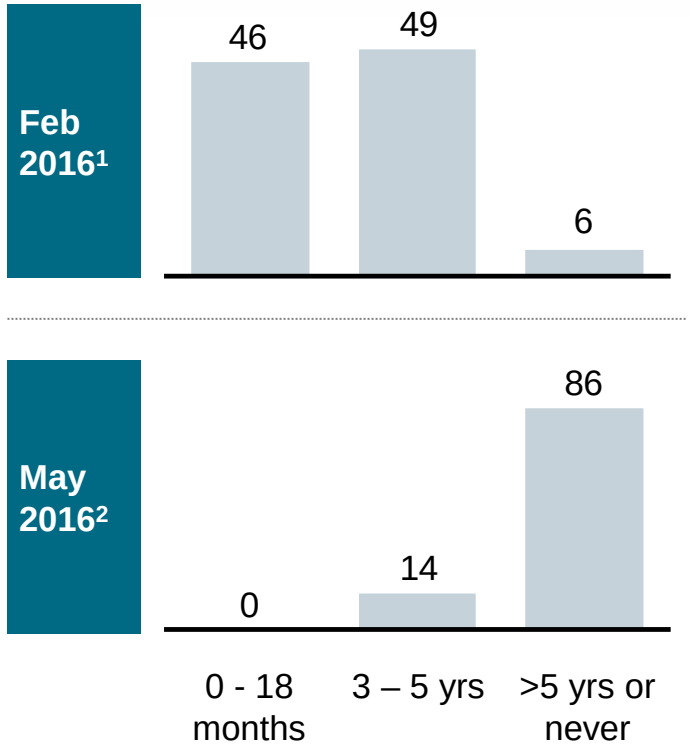
Although institutions are at different stages of experimentation, most now believe it could take 3-5 yrs for blockchain to have a material impact

One half of Institutions are in 'Wait & See' mode



1 N = 35

Increasingly, impact expected to take 5 yrs



2 N = 15

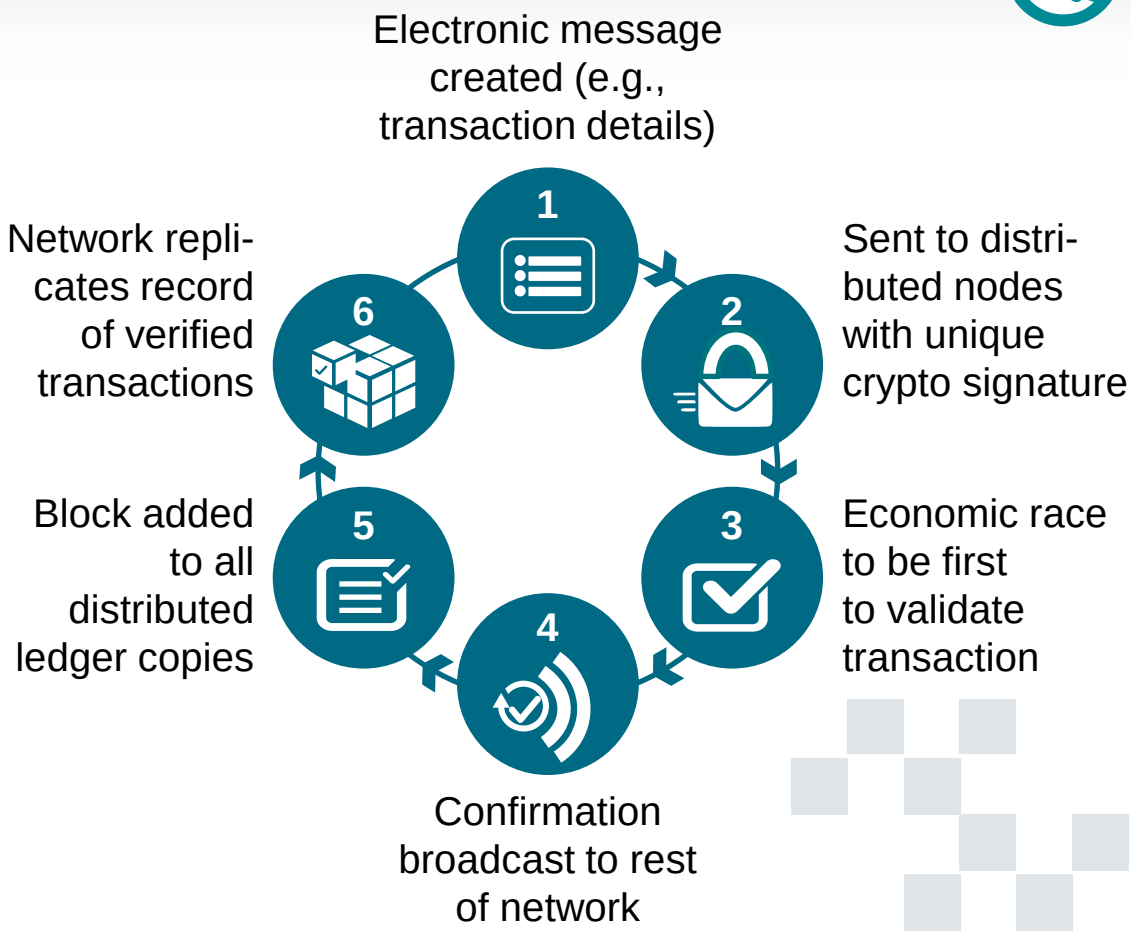
SOURCE: Based on survey of senior executive leadership in financial institutions, Feb 2016 and May 2016

1 Blockchain could be one of the most disruptive innovations since the advent of the internet

What on earth is a blockchain?

- A **cryptographic or encoded distributed ledger,** comprising a **digital log of transactions** that is shared across a **public or private network**
- Database well suited for applications requiring a **rapid, permanent time** and **date stamp** such as:
  - Payments
  - Financial asset transfers
  - Smart Contracts
  - Ownership splits and notary services
- A technology that brings substantial benefits in terms of **speed, security, convenience** and **costs**

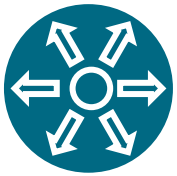
How does it work?



1 Core innovation and supporting elements in all blockchains

Core innovation

First ever solution to the double spending problem / **data conflict resolution** that doesn't require a central administrator or clearing agent



Decentralized solution

Solving the double spending problem in this manner provides a decentralized, unbroken historical record of all data transactions

Process integrity

The randomness of verification agent selection is imperative to maintain the integrity of the database

Data security

Messaging system with read-write access protected by cryptographic keys, generated by latest security technology

Valuable Redundancy

Multiple copies of the same data across a large network reduces downtime and increases resistance to malicious attack

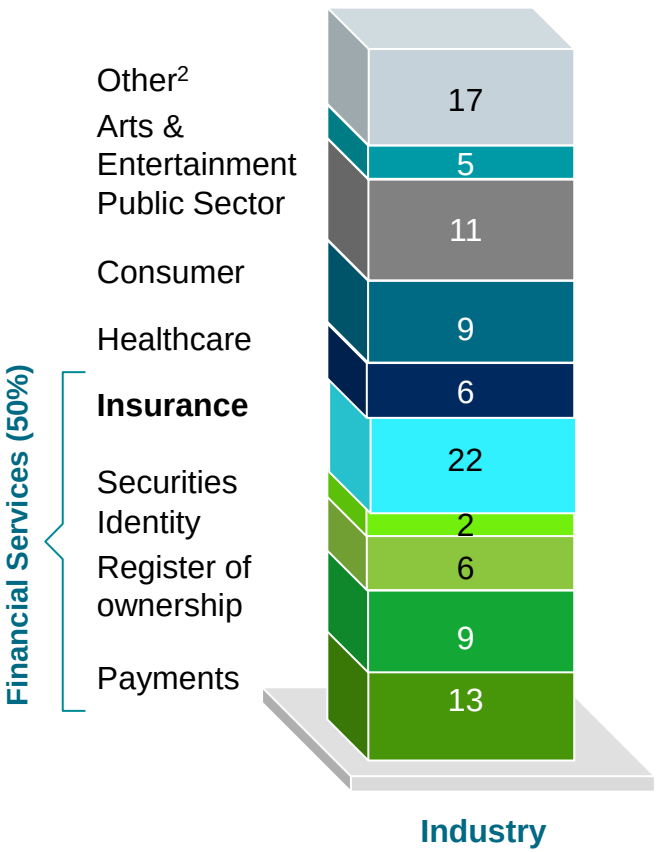
2 Blockchain technology is applicable across multiple use case categories as a static store of secure information or dynamic store of tradeable information

Needs addressed by blockchain		Description	Real world example applications
Record keeping ▪ Stores of static information	**1 Static Registry**	▪ Manage registry of asset ownership ▪ Provide automation of specific assets	▪ Land title ▪ Gift card ownership ▪ Chain of custody
	2 Identity	▪ Securely store, confirm and distribute identity-related info ▪ Revise personal/ other data	▪ Store bank/ credit card identity info on blockchain to enable user to easily access proof of identity
	3 Smart contracts	▪ Create and execute semi-autonomous contracts on distributed digital platform	▪ Insurance claim payouts ▪ Cash equity trading ▪ Release of new music
Transactions ▪ Registry of tradeable information	**4 Dynamic registry**	▪ Exchange of physical and digital assets on a digital platform	▪ Streamlined low transaction settlements to address liquidity mismatches in loan funds
	5 Payments infrastructure	▪ Efficient payment transfers with lower friction, improved record keeping	▪ Peer-to-peer lending through the Bitcoin blockchain, dis-intermediating banks
	6 Verifiable data	▪ Store of information and easy access to secure, dynamic information	▪ Event tickets ▪ Registry of independent artists' work Protection of Intellectual property

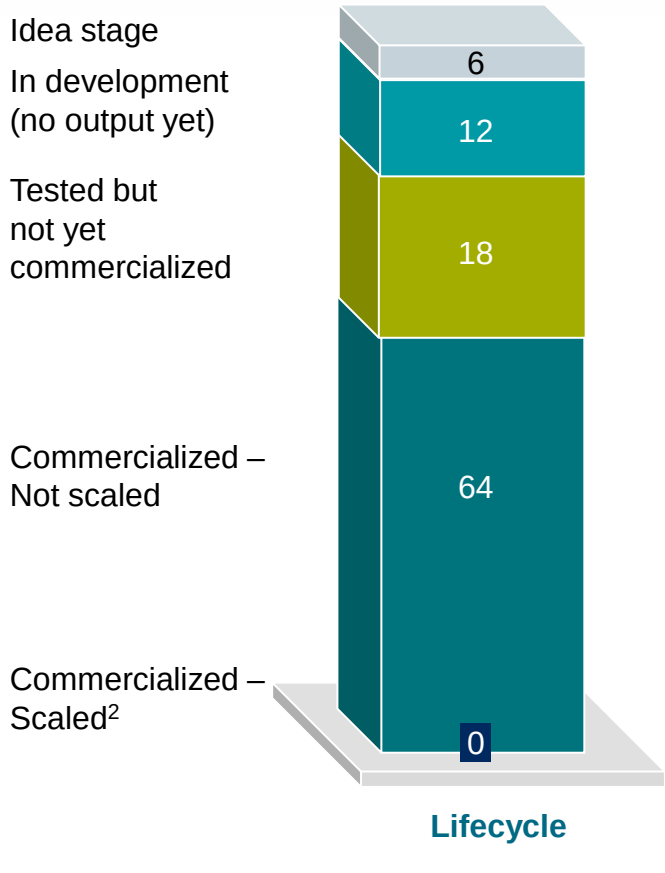
3 Across at least 80 nascent but real opportunities to apply blockchain technology[1], nearly one quarter exist in insurance

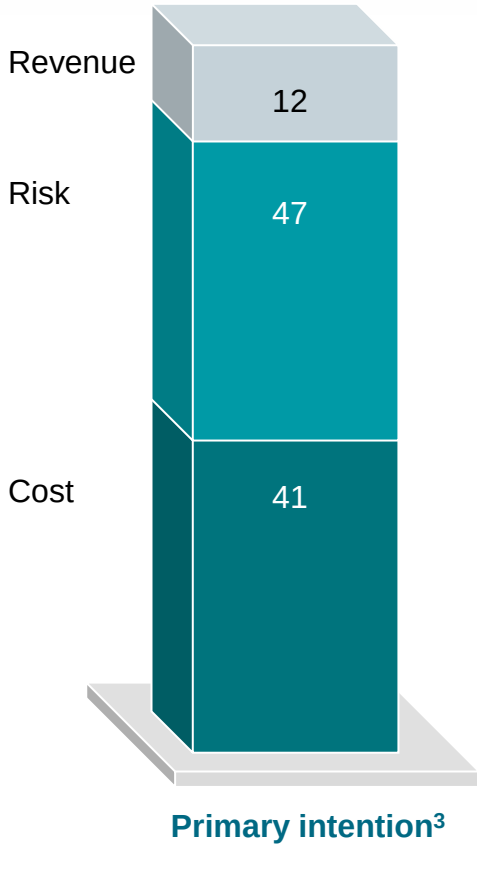
Distribution of current non-Bitcoin, blockchain solutions[1]

Number of use cases, % by category



For the Insurance use cases…





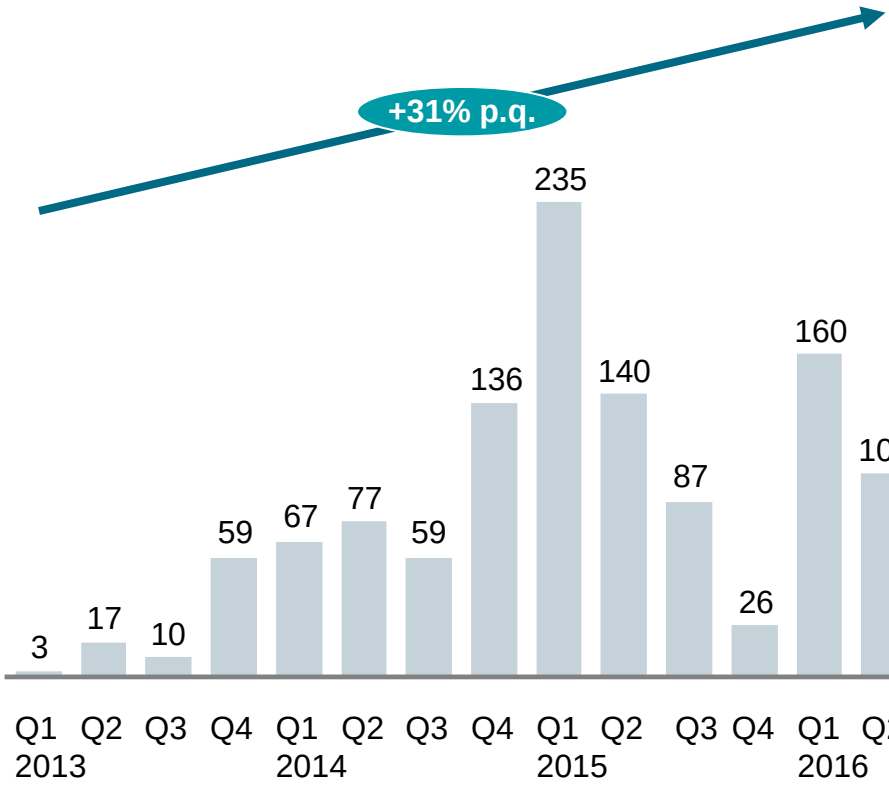
1 Blockchain solutions excluding solutions that are purely related to Bitcoin; 2 Annual revenues US$1+ MM
3 In many instances use cases have a secondary intention

SOURCE: McKinsey Panorama, web search

4 Investment in blockchain has already started to gain momentum and is expected to grow at a very high pace in the near future

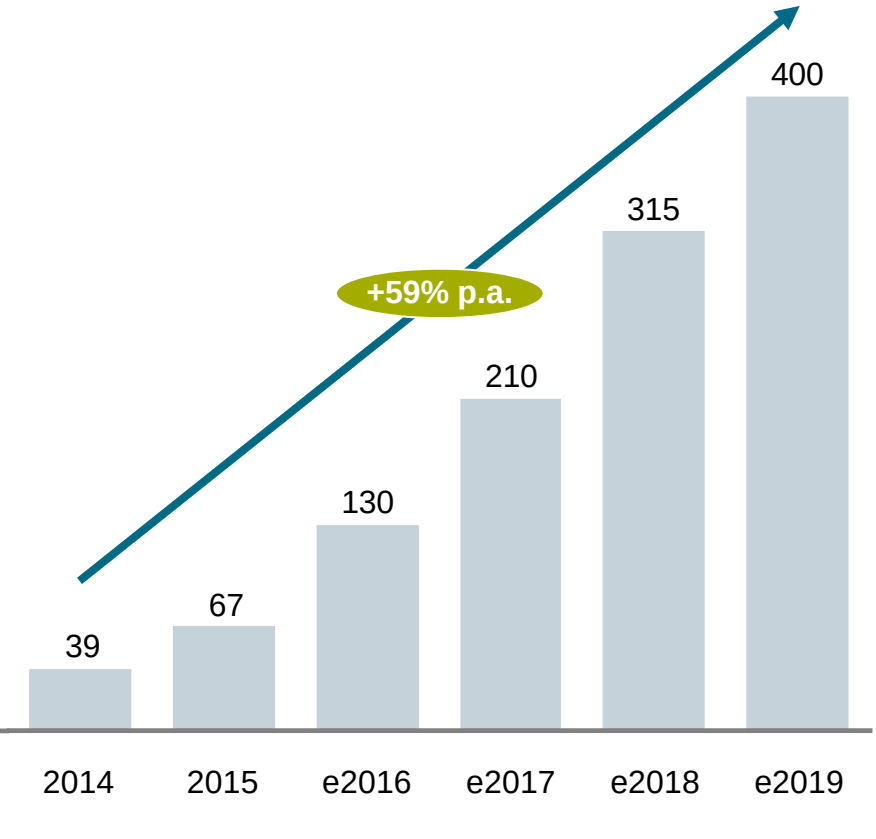
Venture capital is pouring in, developers are excited and industry players are taking note...

Investments in blockchain-related startups
(USD MM)



…And the banking industry is expected to spend ~$400MM on distributed ledger technology by 2019

Estimated capital market spending, 2014-2019e
(USD MM)



SOURCE: AITE Group, Tabb Group, CoinDesk

5 Effective use case execution will depend highly on strong collaboration among players in an ecosystem (financial services example)

Associations

Explaining blockchain use cases with few actual experiments and multiple roundtable

Swift Payment · canadian payments association · IIF · TCH

Banks/financial institutions

Growing interest in disruptive blockchain solutions with ~$400MM estimated capital market spending by 2019

VISA · MasterCard · CIBC · Bank of America · UBS · Santander · BARCLAYS · BNY MELLON · BNP PARIBAS · RBS · BBVA · BMO Financial Group · SEB · CommonwealthBank · CREDIT SUISSE · citi · SOCIETE GENERALE · COMMERZBANK · Danske Bank · RBC Royal Bank of Canada · Goldman Sachs · Westpac · Deutsche Bank · J.P.Morgan · TD Bank · HSBC · ING BANK · INTESA SANPAOLO · usbank · Mitsubishi UFJ Financial Group · MIZUHO · Scotiabank · National Australia Bank · NOMURA · UniCredit · NATIXIS · Nordea · Northern Trust · STATE STREET · SMBC · 三井住友銀行 · WF WELLS FARGO · Morgan Stanley

Non-banks

Assessing the potential of blockchain technology

WESTERN UNION · ups · Walmart

Fintech companies

Leading the innovation in connection with blockchain technology

symbiont · intel · IBM · Digital Asset Holdings · ripple · HYPERLEDGER · ethereum · R

Blockchain ecosystem

Industry utilities/platforms

- Much attention from industry utilities paid to blockchain developments due to the risk of disintermediation of utility functions
- Platforms interested in deploying blockchain, leading implementation

DTCC · Nasdaq · ICE · euroclear · Broadridge

Regulators

No strong focus yet, likely to grow as blockchain proliferates

SEC · OSFI CFTC · OSFI BSIF · OCC · FINRA · European Commission

Central bank

Strong interest in block-chain's evolution, certain publications (especially on Bitcoin)

Federal Reserve System · BANK OF ENGLAND · MAS Monetary Authority of Singapore · BANK OF CANADA BANQUE DU CANADA

SOURCE: Expert interviews, web search

6 McKinsey has identified 7 genuine use cases and associated pain points; all of those sized could generate ~$80B to 110B in impact

64 Identified **>60 viable use cases** from a database of >200 fintech startups, press clippings, and research

24 Focused on **24 financial services applications**

7 **Selected 7 use cases** for analysis, based on initial hypothesis of **potential for disruption** and **size of impact**

	Value generated by blockchain ($B)	Blockchain benefits	Examples of impacted players	Drivers of cost today	Application by type of bank: CIB	Application by type of bank: Retail	Impact levers: Cost	Impact levers: Revenues	Impact levers: Capital
A Trade finance	14 – 17	▪ Lower cost and operational risk, faster turn-around, increase in revenues	WAL*MART, HSBC, DHL	▪ Paper-based and labor heavy structure ▪ Error-prone processes ▪ Capital that is locked up in the TF processes	✓	✓	✓	✓	✓
B Cross-border B2B payments	50 – 60	▪ Lower cost and fees ▪ Increased security and speed	HSBC, citibank, JPMorganChase	▪ High fees and slow processing due to intermediaries ▪ High operational costs	✓	✓	✓	✓	✗
C Cross-border P2P payments	3 - 5	▪ Lower cost and fees from competition, increased security and transparency	ABRA, Western Union, Bank of America	▪ Paper-based ▪ High fees due to lack of intermediary competition ▪ Capturing incorrect receiver information	✗	✓	✓	✓	✗
D Repurchase agreement transactions (repos)	2 - 5	▪ More effective netting ▪ Lower systematic risk ▪ Reduced operational costs	DTCC, BNY Mellon, JPMorganChase, BlackRock, Bank of America Merrill Lynch	▪ Inability to net the obligations ▪ Counter-party risk ▪ Credit sensitive repo buyers	✓	✗	✓	✗	✓
E OTC Derivatives	4 - 7	▪ Reduced operational costs and capital due to streamlined processing and settling	JPMorganChase, Goldman Sachs, DTCC, CME Group	▪ Manual and duplicative data entry and verification processes ▪ High capital requirements	✓	✗	✓	✗	✓
F KYC / AML manage-ment	4 - 8	▪ Reduced duplicative efforts in on-boarding customers ▪ Improved transaction monitoring	citibank, Wells Fargo, JPMorganChase, Capital One, Bank of America	▪ Manual and duplicative data entry and verification processes ▪ Low visibility into transactions	✓	✓	✓	✗	✗
G Identity fraud	7 - 9	▪ Secure storage of ID credentials ▪ More secure account opening, transaction authentication		▪ Direct losses due to fra-udulent activity (90-95%) ▪ Fraud prevention infrastructure and processes (5-10%)	✓	✓	✓	✗	✗

SOURCE: McKinsey analysis

7 In Insurance, blockchains have potential for impact across the entire value chain

NOT EXHAUSTIVE

	Product development and distribution	Pricing/ underwriting	Payment & collections	Claims	Policy/ administration and back offices	Risk capital & investment management
Potential						
Potential use cases		▪ Use blockchain as a reliable registry for on-demand / usage-based insurance or micro-insurances	▪ Using blockchain as payment infrastruc-ture (especially across multiple countries)	▪ Leverage blockchain for information about insured goods and events in order to fight fraud	▪ Use blockchain for onboarding of new customers or verification of policy-holder identity	▪ Make data available for re-insurers or other parties in a controlled way
Potential use cases with smart contracts	▪ Offer P2P insurance via blockchain for customer to customer promotion and sales, and automated ops with smart contracts	▪ Use blockchain for P2P insurance underwriting, include external data, smart contracts and peers (humans) to determine tariff	▪ Automate payments through smart contracts evaluating conditions for paying out claims	▪ Automate claims triggering and handling with smart contracts, and e.g., with sensors (IOT)		▪ Use smart contracts to automatically determine payouts – e.g. triggering process of catastrophe swaps and bonds
Key benefits	▪ Reduce cost related to commission and sales and operations ▪ Increase trust of customers due to open, distributed system	▪ Reduce cost of operations ▪ Reuse platform for other types of insurances ▪ Include external data for (semi-) automatic pricing	▪ Reduce cost and increase speed for payments	▪ Reduce average claims cost related to – Claims administration – Damage from fraud and fraud detection ▪ Improve identification of claim events	▪ Reduced admin cost and speed-up process for onboarding	▪ Reduce admin costs ▪ Automate and increase reliability, auditability and speed for financial instruments transactions based on defined events
Examples[1]	InsurETH, RISKebiz, DYNAMIS	safe share, DYNAMIS	ripple, coinbase, RSK, ETHEREUM SmartContract	everledger, edgelogic, BLOCKVERIFY, RSK, ETHEREUM SmartContract, QuantoZ	ONENAME, ShoCard, Tradle, CRYPTID, DNA Bits, Genecoin	SLEM, Allianz Risk Transfer

1 Not all insurance-specific

7 Applications of blockchains in P&C Insurance (including true P2P insurance contracts) will improve efficiency and customer experience

Applications	Shortcomings of current landscape	Blockchain enhancements
Data continuity	▪ Consumer data is especially valuable in telematics and **Usage-Based Insurance** ▪ But, **insurer**, not customer, **owns usage data** and associated benefits ▪ **Consumer data does not migrate** with customer from one insurer to the next	▪ **Consumer data exists independently of insurer** ▪ **Data access can be granted by consumer** through their public key to any third party ▪ **Enhanced risk-assessments and underwriting** made possible by more complete behavior history
Smart contracts	▪ Claims typically **processed manually**, requiring extensive **central validation** ▪ **Manual processing** can introduce both **decision subjectivity and errors** ▪ Subsequently claims **processing is slow**, complex and subject to **human error**	▪ **Automated insurance policy** written into a smart contract which **enforces and pays out against insurable event without manual administration** ▪ Claims processed and paid on **a logic-based system** requiring all information to be complete ▪ Distributed validation network ensures **only legitimate and complete claims are paid out** on basis of **independently verifiable oracle feed** ▪ Claims processing and management is **transparent, accurate and irrefutable**
Valuables provenance	▪ Tracing provenance relies upon **faithful record-keeping along with item** ▪ **No secure documented trail** back to origination of article (e.g., art, diamond)	▪ Initial **provenance recorded with immutable time and date stamp and proof of existence** (e.g., photograph) ▪ Subsequent ownership and location can be recorded in **secure, immutable, chained history of object**
Fraud reduction	▪ Growing threat from **fraud based on false claims for staged incidents** ▪ Claims often made against **several policies held by independent insurers** ▪ Fraud detection almost impossible **without cross-party industry data**	▪ **Distributed network independently validates (by consensus) contracts** and claims to be paid ▪ Network verifies true identities and **rejects multiple claims for same incident** ▪ Storing history of claims in **distributed cross-industry database** enables detection of fraudulent behavior patterns

7 And a growing number of companies is working on blockchain use cases for insurance

InsurTechs, insurers and other companies are working on blockchain use-cases for insurance

Start-ups[1]

ETHEREUM, EDGELOGIC, RSK, EXAMPLES, everledger, SmartContract, InsurETH, DYNAMIS, BLOCKVERIFY, Tradle, RISKebiz, safe share, ChainThat Blockchain Innovation

Insurers[2]

AXA, USAA, GENERALI, Allianz, Manulife, John Hancock, 中国平安 PINGAN 保险·银行·投资, AIA

Others[1]

R3, Yen, Digital Asset, Microsoft Azure, IBM, BLEM, ...

Selected cases

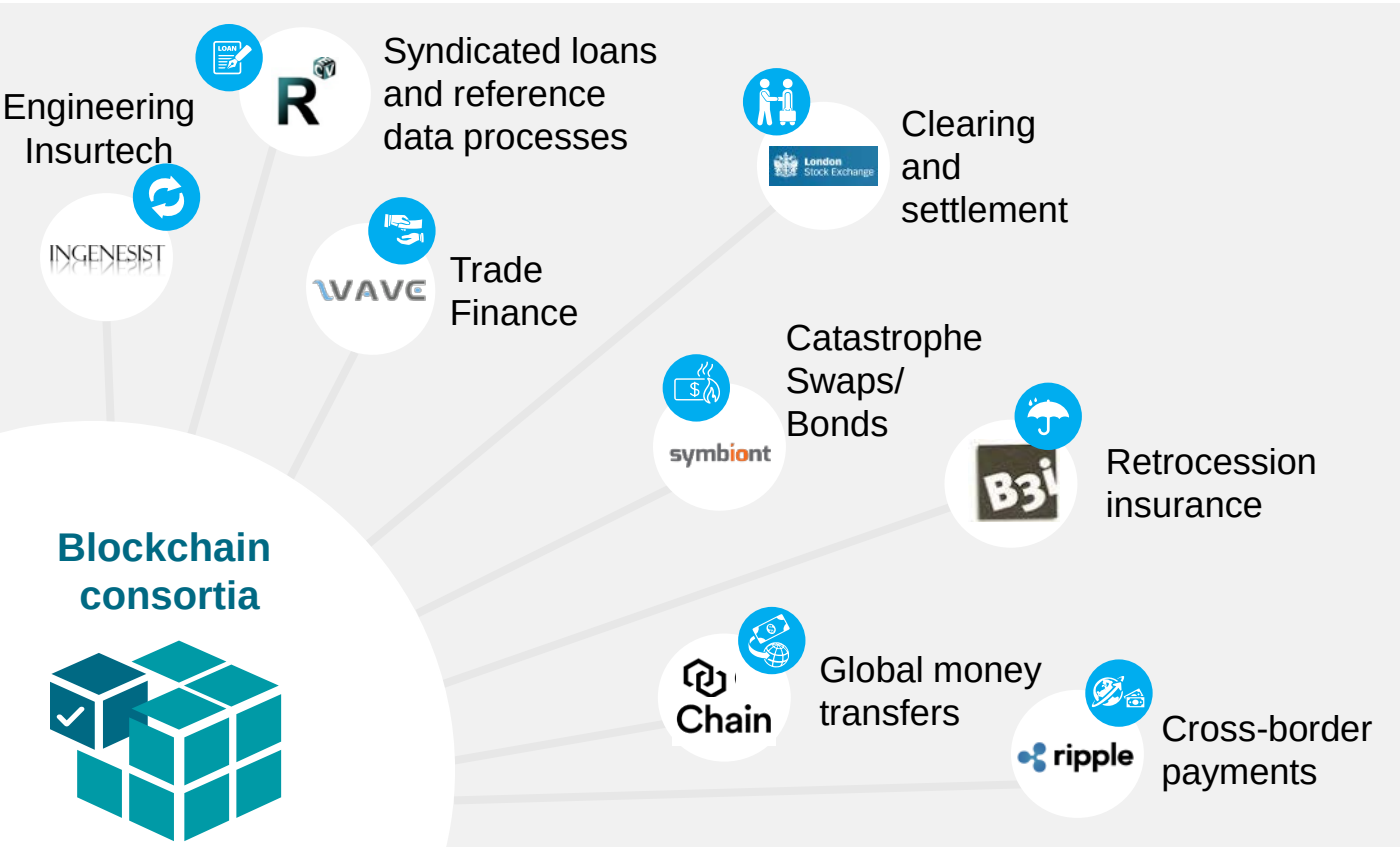
- Tradle provides Know-your-customer application to ease and speed up onboarding processes (POC phase) ***Aug 2015***
- SafeShare has launched a blockchain-based platform to register on-demand insurance in UK (underwritten by Lloyds of London) ***Mar 2016***
- Allianz announced a successful prototype to automate catastrophe swap transactions ***Jun 2016***
- Blem, a provider of reinsurance solutions, is working with z/yen group to record claims in a blockchain for accurately dividing cost between insurer and reinsurer ***May 2016***

1 Activities not necessarily limited to insurance industry
2 Different types of activities: direct/indirect investments, participation in R3 consortium or own prototypes

SOURCE: McKinsey Panorama Database, Web search

7 Early successes have been achieved primarily by consortia working together, including in Insurance

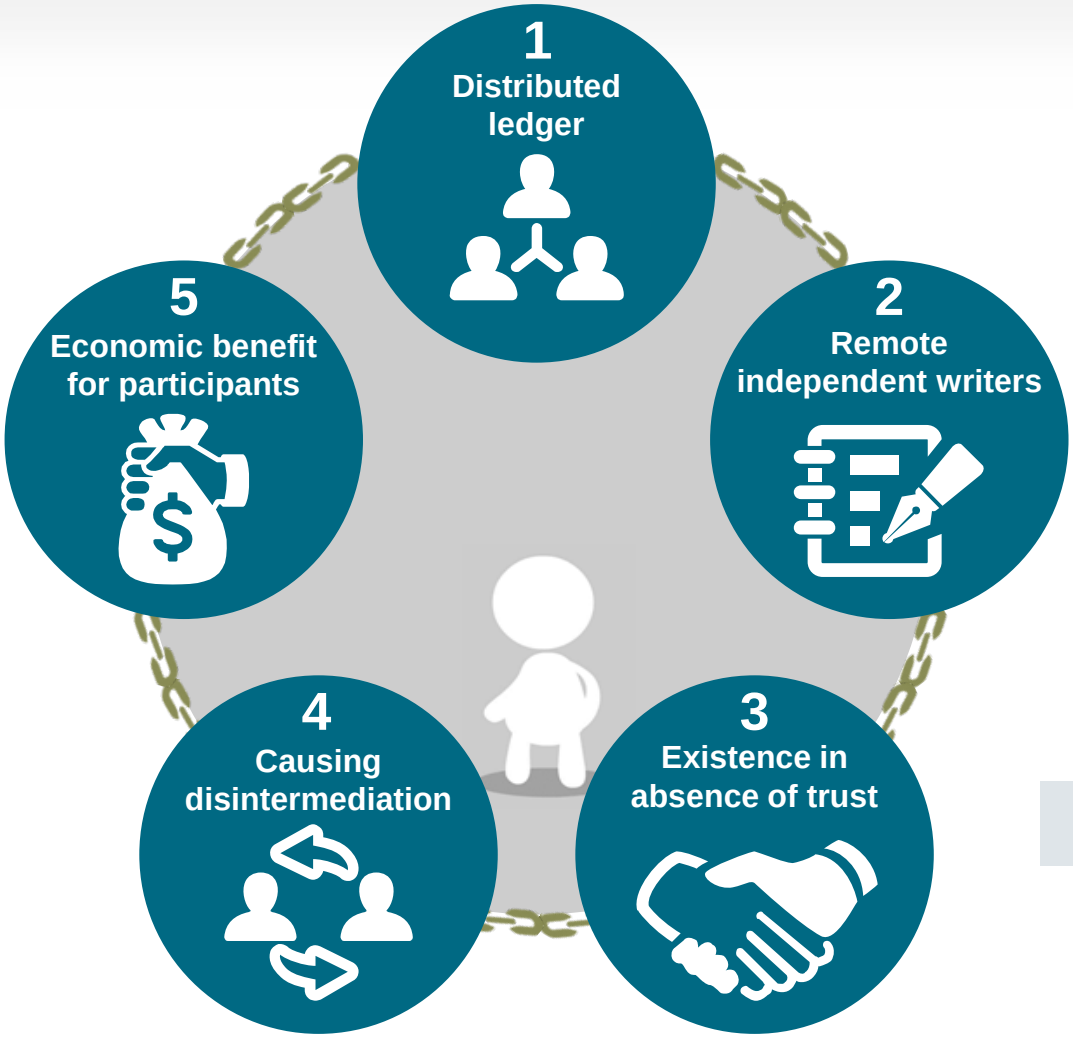
NOT EXHAUSTIVE



- The insurance industry is beginning to collaborate on blockchain via consortia (e.g., B3i)
- Consortia are developing Proofs of Concept using distributed ledger solutions to replace some part of the traditional infrastructure to improve speed and reduce risk

8 However, blockchain should be employed only under certain conditions and requirements

5 key criteria for blockchain



9 Shaping the regulatory environment is the biggest challenge to unlocking the potential value of blockchain

Regulatory environment challenges

- Decentralized ownership
- International jurisdiction
- Encryption and user anonymity
- Blockchain transactions of non-digitized assets will require legal consideration of off-chain settlement

Key considerations

- **Educate and involve regulators**
- **Propose solutions to unique regulatory questions**
- **Communicate regularly, especially on uses related to consumers**

Overall attitudes from NA regulators appear to be "**do not harm**" as distributed ledger technologies evolve

10 Based on the current rate of evolution, we believe blockchain solutions could reach their full potential in the next 5 years

Future of blockchain

Ages of block-chain

Dark age

Bitcoin age

bitcoin

New era

Momentum and hype building

Exploration of use cases

Expansion of proofs-of-concept

Commercial deployment at scale

Block-chain solutions & Criteria for survival

Only Bitcoin based solutions

100+ solutions explored

20-30 use cases tested

10-20 successful business cases

3 initial hurdles

- View on potential benefits ($) of use cases
- Relevance to, and severity of current pain points and proof that Blockchain is the best solution
- Critical number of players willing to move

3 main hurdles

- Establishment of legal / regulatory framework
- Viability of business cases (incl. justifying costs of implementation incl. integration)
- Agreement on key standards and active collaboration across all required players

2009 2016 2017 2018 2019 2020 2021

SOURCE: Mckinsey, expert discussions