

Blockchain: Finding Real Opportunities Behind the Hype

Magdalena Ramada, PhD (WTW Research & Innovation Center)

CAS Ratemaking Seminar
March 21, 2018

Disclaimer

Please read carefully and note that:

- I am NOT a registered investment advisor, nor an attorney, nor a tax advisor.
- During this presentation I will mention firms that are relevant to the examples that I am presenting. The opinion expressed on those companies is solely my own, it is based on publicly available information and DOES NOT constitute professional or investment advice, nor should be used to value or invest in these companies.
- None of the opinions shared today with you should be understood as nor used in the context of any past, current or future ICO.
- You should NOT rely on anything I say today as investment advice.
- You should NOT act upon any information presented on this presentation without seeking proper professional and/or legal counsel.
- The opinions expressed by me here today are solely my own and not the views of my employer.

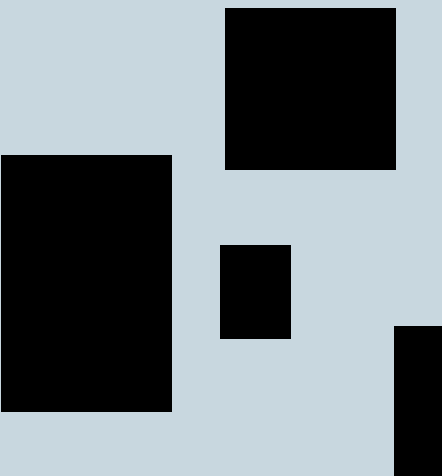
Disclaimer

This document was prepared for marketing, training and/or general information purposes only and should not be considered a substitute for specific professional advice. In particular, its contents are not intended by Willis Towers Watson to be construed as the provision of specific investment, legal, accounting, tax or other professional advice or recommendations of any kind, or to form the basis of any investment decision to do or to refrain from doing anything. As such, this document should not be solely relied upon for investment or other financial decisions and no such decisions should be taken on the basis of its contents without seeking specific advice from your Willis Towers Watson consultant.

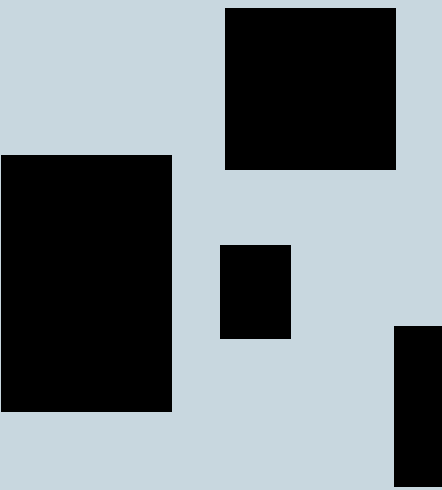
This document is based on information available to Willis Towers Watson at the date of issue, and takes no account of subsequent developments after that date. In addition, past performance is not indicative of future results. In producing this document Willis Towers Watson has relied upon the accuracy and completeness of certain data and information obtained from third parties.

This document may not be reproduced or distributed to any other party, whether in whole or in part, without Willis Towers Watson's prior written permission, except as may be required by law. In the absence of its express written permission to the contrary, Willis Towers Watson and its affiliates and their respective directors, officers and employees accept no responsibility and will not be liable for any consequences howsoever arising from any use of or reliance on the contents of this document including any opinions expressed herein.

Contents

- 
1. **Why now?** – Reasons why the *#...tech* ecosystem is accelerating and blockchain is gaining relevance
 2. **What?** – Understanding Blockchain
 3. **Where?** – Areas in which it is being applied
 4. **What now?**

Things happen for a reason

- 
1. **Why now?** – Reasons why the *#...tech* ecosystem is accelerating and blockchain is gaining relevance
 2. **What?** – Understanding Blockchain
 3. **Where?** – Areas in which it is being applied
 4. **What now?**

Three key global trends are affecting the insurance industry

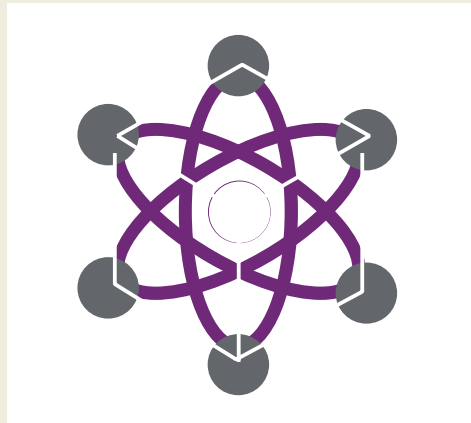
 **1**

**New (social)
interaction paradigm**



 **2**

**Transformation of
Risk**



 **3**

**Acceleration in
#...tech**



SIMPLICITY transparency

TRUST

Self-Sovereignty

Personalización

IMMEDIACY

IMPACT

#Blockchain or Distributed Ledger Technology

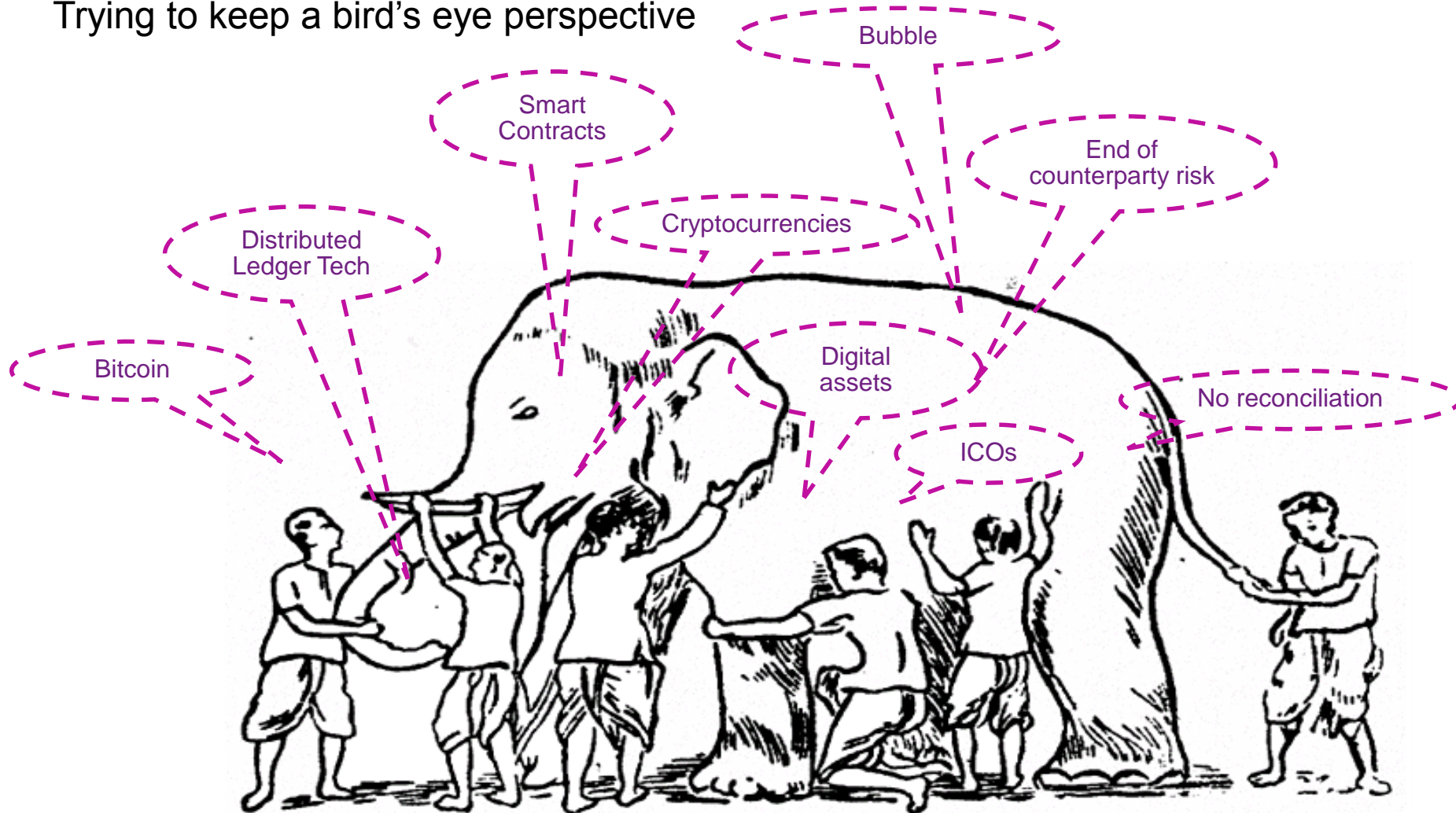
...is a soci(ologic)al innovation

Blockchain 101

1. **Why now?** – Reasons why the #...tech ecosystem is accelerating and blockchain is gaining relevance
2. **What?** – Understanding Blockchain
3. **Where?** – Areas in which it is being applied
4. **What now?**

What is the blockchain?

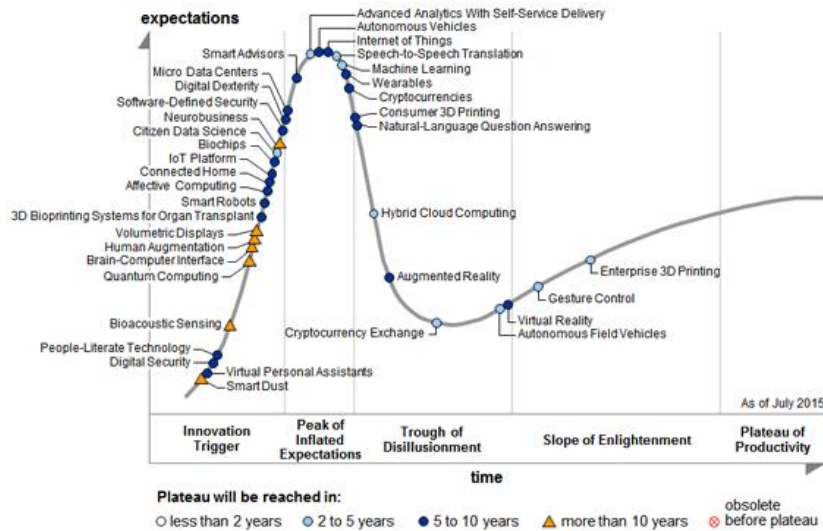
Trying to keep a bird's eye perspective



Source: John Godfrey Saxe,
Based on ancient Indian fable

2016: Blockchain is the only new kid on the block

Gartner Hype Cycle for Emerging Technologies 2015

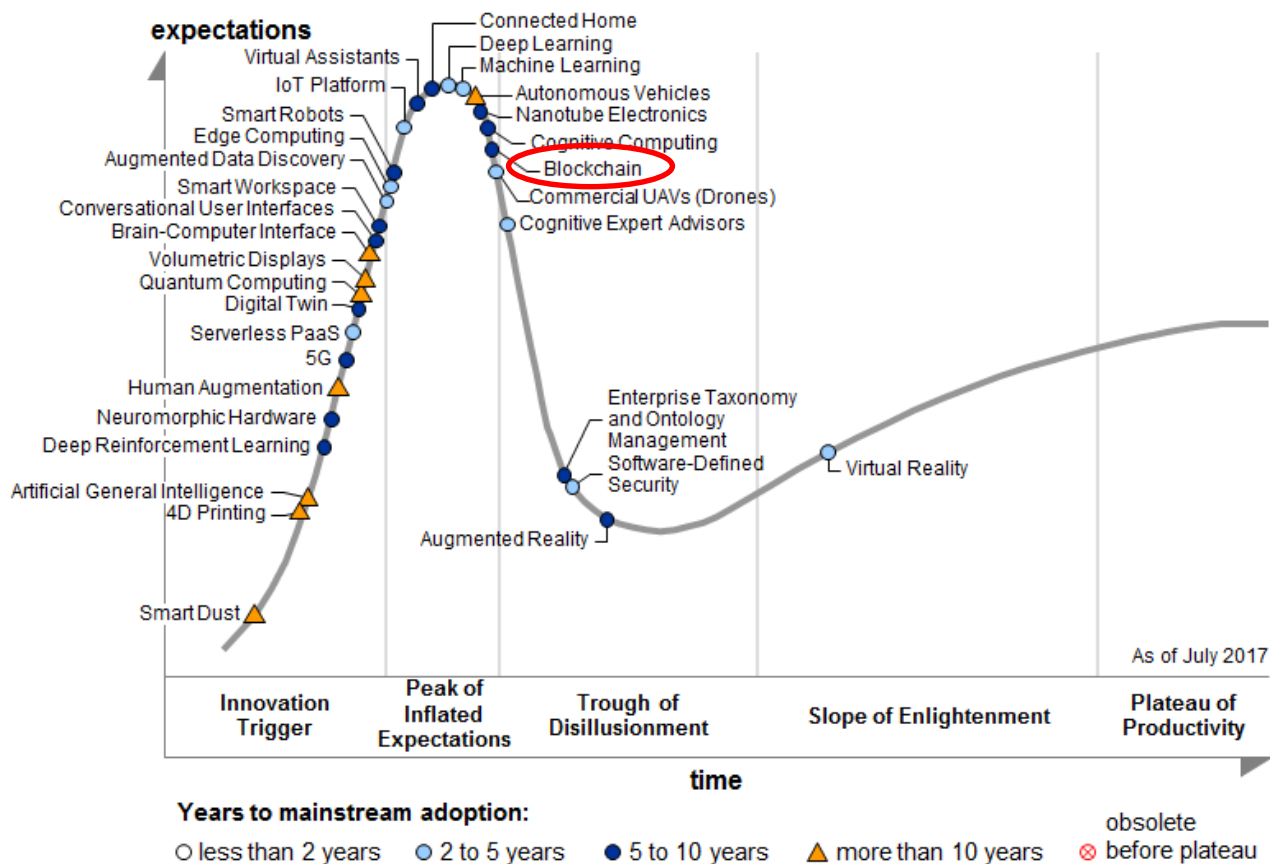


Gartner Hype Cycle for Emerging Technologies 2016



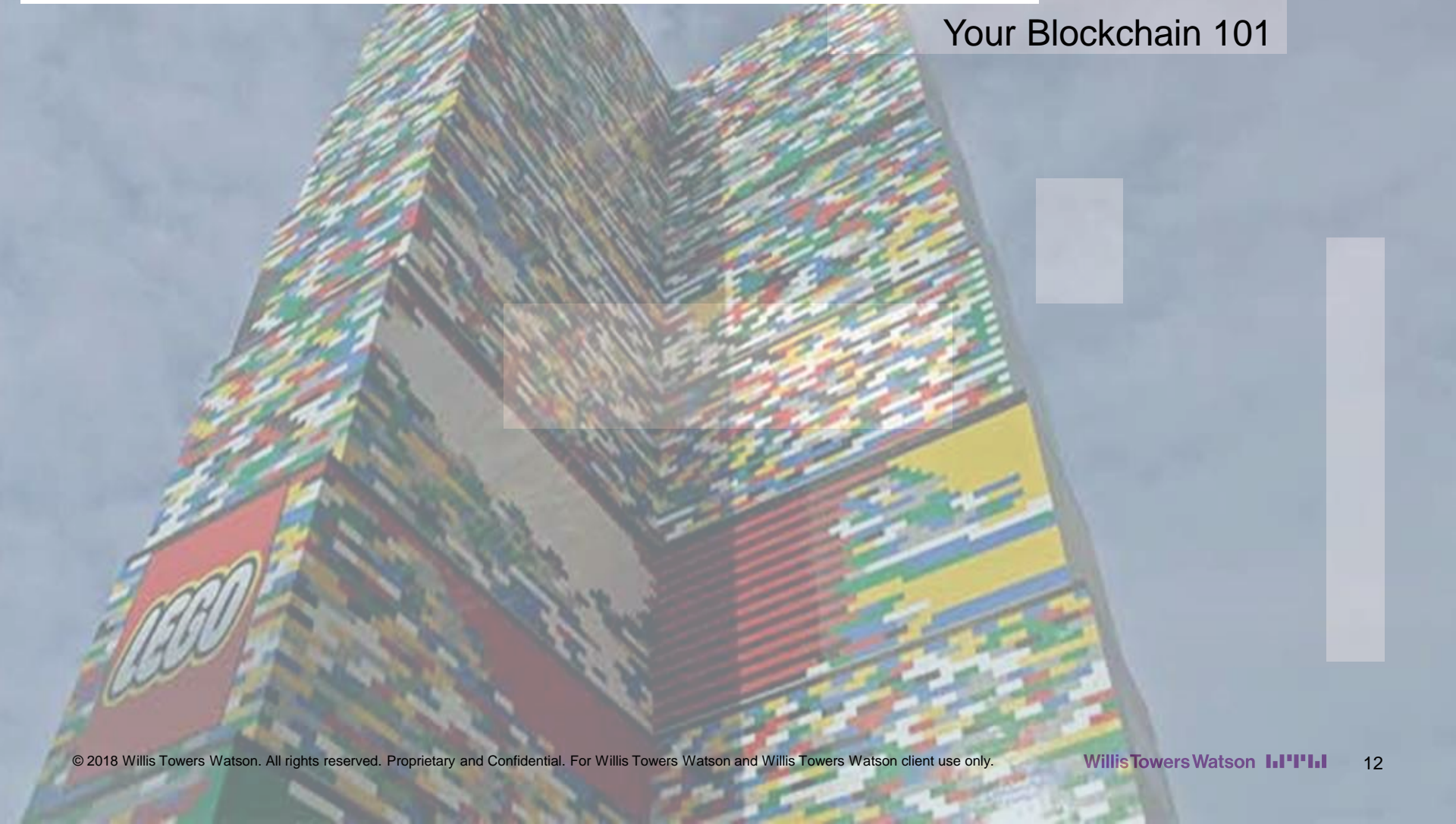
2017: Blockchain is almost entering the Trough of disillusionment

Gartner Hype Cycle for Emerging Technologies 2017



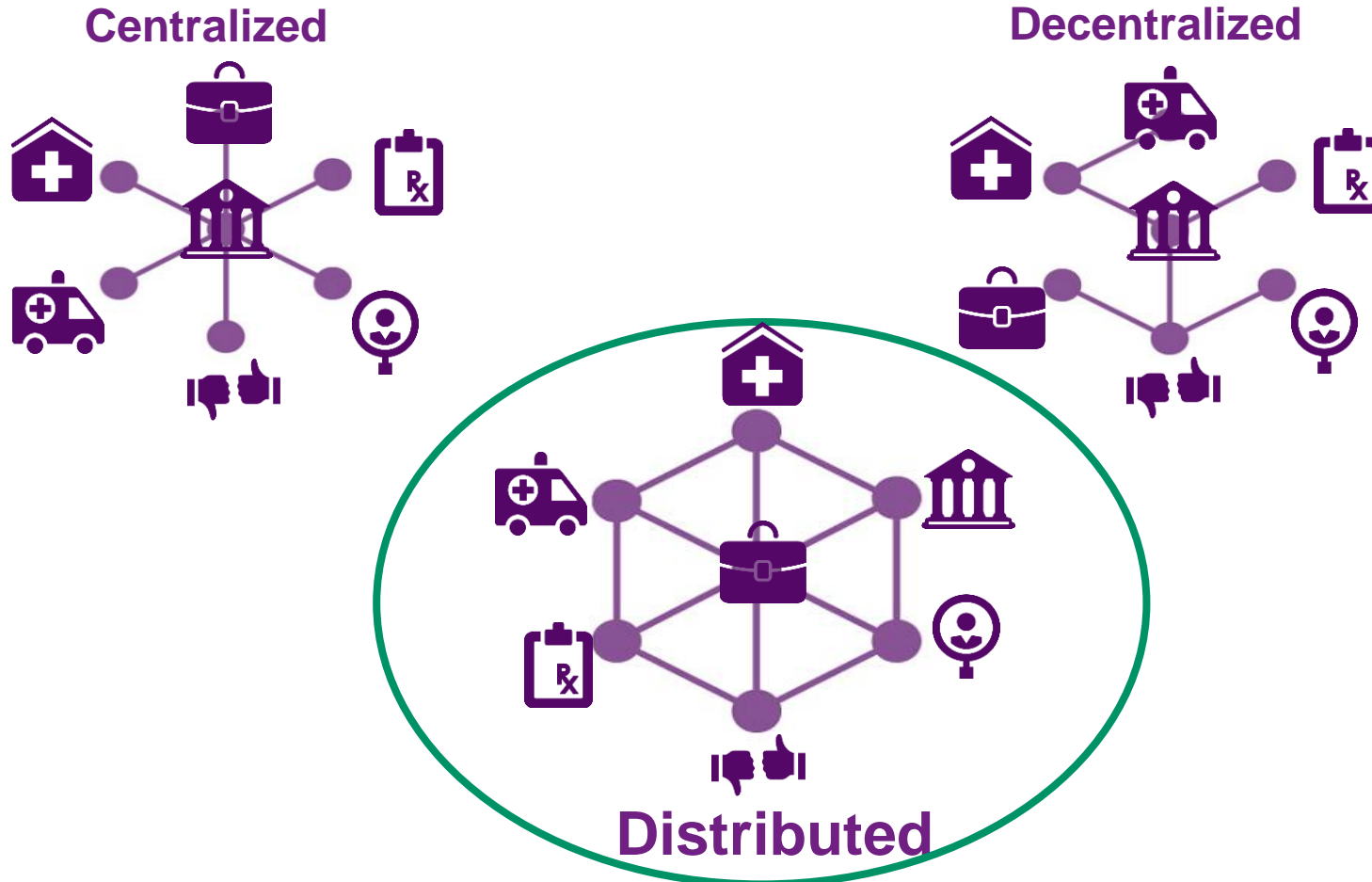
So, what is the Blockchain?

Your Blockchain 101



101: What is Blockchain?

It is a **shared distributed** (digital) ledger technology



101: What is Blockchain?

It is a **shared distributed** (digital) ledger technology

Most DLTs combine **P2P** file sharing with

Cryptographic consensus

Basis for verification and incorruptibility

- Hashing of info
- Hashing of blocks
- Public & private keys
- Zero-knowledge algorithms

Mechanism to reach agreement among untrusted parties

- Systematic
- Trustworthy
- Consistent
- Impartial
- Byzantine Fault Tolerant
- Resilient to attacks



101: What is Blockchain?

It is a **shared distributed** (digital) **ledger** technology

- **Independent**, reconciled ledgers **vs.** replicated, **identical ledger**
- A blockchain is a **digital file** that is built in blocks
- **Each block** of the chain can be seen as the **pages in a book**
- Blocks are chained through **cryptographic fingerprints**
- So, **each block references the previous block** with a fingerprint uniquely generated through that block's content
- **Hacking/changing** any data in a block implies **REgenerating all fingerprints** after the hacked block in every ledger on the network, simultaneously
- Cannot be done without modifying whole blockchain, huge (economic) disincentives to do so. Believed to be impossible for an active DLT.



101: What is Blockchain?

It is a **shared distributed (digital) ledger** technology

Main attributes:

- **Distributed**
- Immutable
- Transparent
- Safe
- Non-trusted partners

Different types:

- Private vs. public
- Permissioned vs. permissionless
- **Consensus** design



What is Blockchain? – going into more detail

Cryptographic magic:

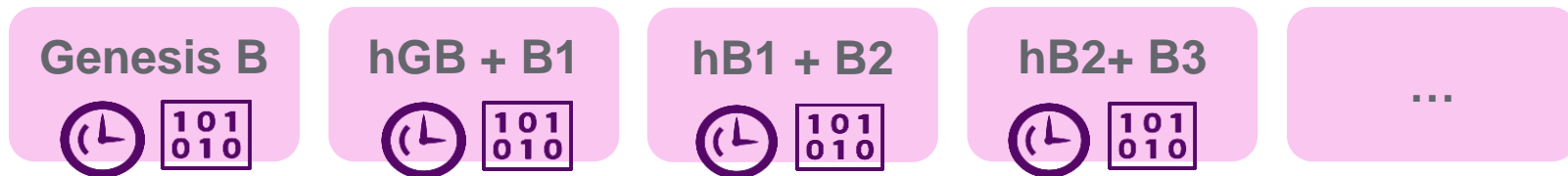
- This is a contract between you and me.
- This is **my** contract between you and me.

Keys



Hash

f65gh87jisd34axv09
6hjpg98dslmno043sdr



- To encrypt and decrypt you need a **Set of Keys**:

Public Key → **Hash** → **Private Key** e.g. recipient only

Private Key → **Hash** → **Public Key** e.g. Identity ✓

What is Blockchain? – going into more detail

Structure of a transaction in Blockchain:

1. Two (or more) network users **agree on a value** transaction
2. Transaction is **requested** in the blockchain
3. **Network checks provenance** and **validity**: i.e. that transaction can be executed
4. **Consensus** is reached among validator nodes **authorizing** transaction
5. Transaction is **executed**
6. Transaction gets **cryptographically recorded**
 - Who
 - What
 - When
 - For how much
 - New asset ownership



What is Blockchain? – Maintaining the ledger

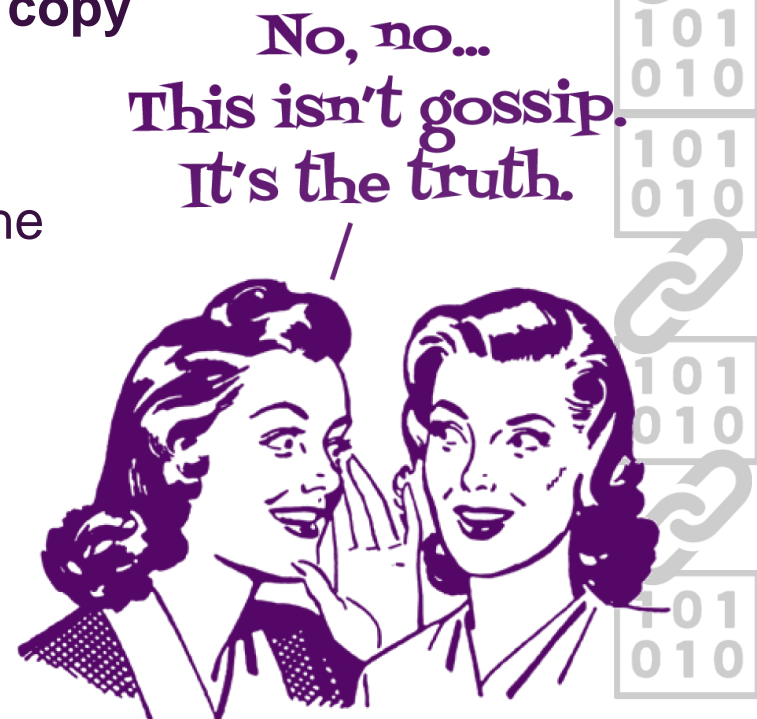
Different ways of building and maintaining Consensus:

- Proof of Work
- Leader based systems
- Economy based systems
- Virtual voting



What is Blockchain? – Maintaining the ledger

- Public and permissionless blockchains get maintained through **economic incentives**
- Usually paid out in a **cryptocurrency**
- Network nodes – acting as *miners* – **validate transactions** and add them to their own copy of the ledger
- Example of “**truth**” propagation: using the **Gossip protocol**



101: What are Smart Contracts...

...and why are they so fashionable today?



101: Different types of DLTs



HYPERLEDGER

eris
INDUSTRIES

Transacting value in a decentralized way

Why do we need clearinghouses, banks and other trusted third parties to oversee transactions of value?

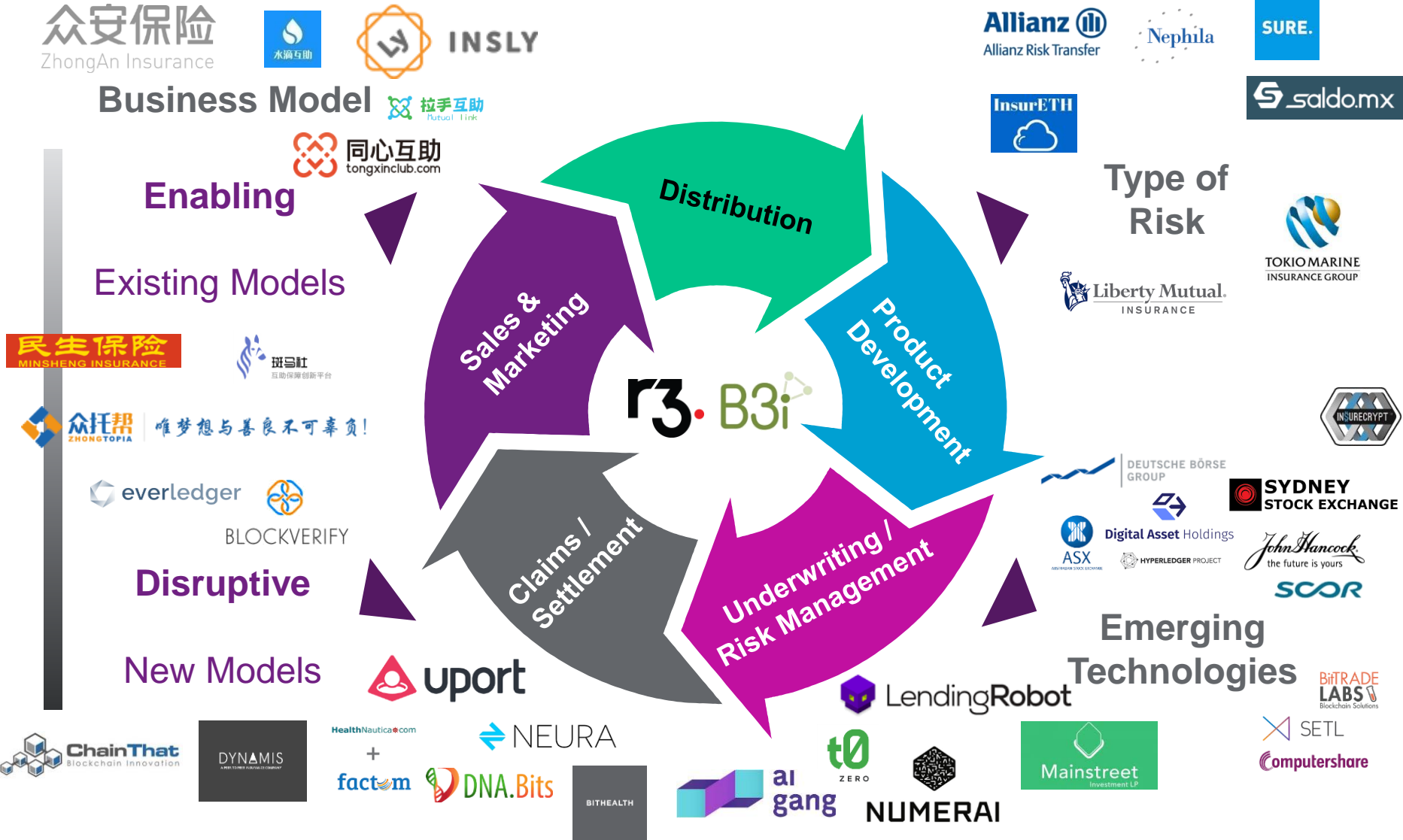
- **Safe and secure transfer:** it has to get there
- **Record transfer of value:** people must have a way to verify that it happened
- **Guarantee legitimacy of transfer:** buyer and seller must have ownership of transacted asset and of funds used to buy them

Blockchain is a technology that empowers trustless, digital peer-to-peer networks to do exactly that, without the need for a third party.

Let's navigate the #insurtech meets #blockchain hype

- 
1. **Why now?** – Reasons why the #...tech ecosystem is accelerating and blockchain is gaining relevance
 2. **What?** – Understanding Blockchain
 3. **Where?** – Areas in which it is being applied
 4. **What now?**

Mapping blockchain in the #insurtech space



Six ways Blockchain is generating disruption



Event-triggered
smart contracts



Increased
back-end efficiency



Disintermediation



Better pricing and
risk assessment



New products, reaching
underserved



Increased transparency:
identity & provenance

Six ways Blockchain is disrupting insurance



Event-triggered smart contracts

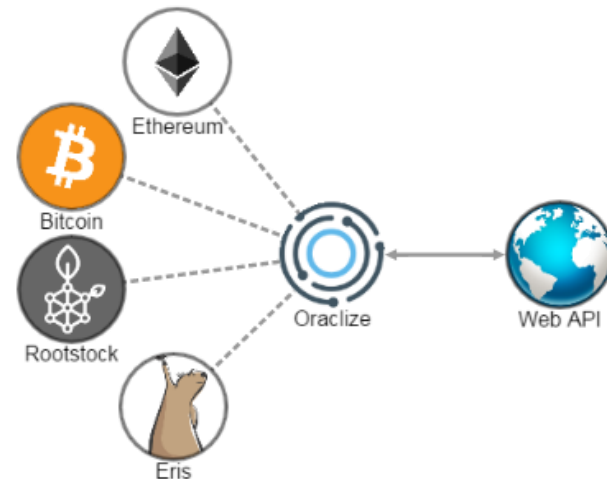
- Automated claims
- Self-executing contracts
- Reduced fraud, improved customer experience

Fly with InsurETH



What is Automated Flight Insurance?

- Decentralised = Unstoppable
- Automated = Instant Compensation
- Trustless = Provably honest



- Smart contracts cannot fetch external data on their own
- Oraclize as connection between Web APIs and Dapps
- Trustworthiness through cryptographic proof

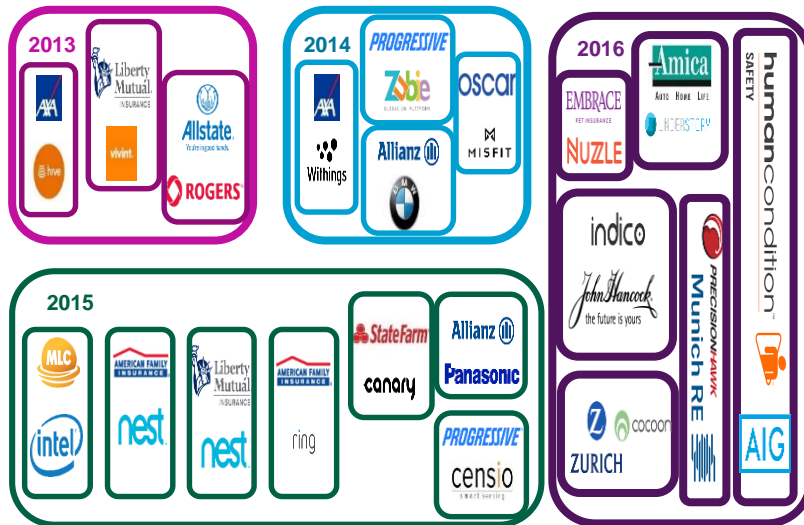
Six ways Blockchain is disrupting insurance



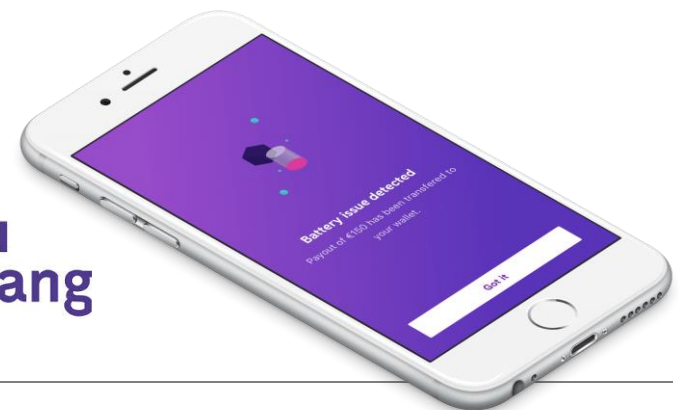
Event-triggered smart contracts

- Automated claims
- Self-executing contracts
- Reduced fraud, improved customer experience

A powerful trio for insurance: IoT, AI and SmartContracts



- IoT oracles
- Applicable to **any type of parametric insurance**
- **Experimentation with Life Insurance**
- **PoCs in Marine**
- **PoCs in product insurance**
- Crowdsourced oracles



Six ways Blockchain is disrupting insurance



Increased back-end efficiency

- Distributed relational databases
- Less human error, no data duplication
- Less processing delays, transaction costs



IBM Blockchain



- Cat Swaps, Cat Bonds, payment processes in international fronting for captives
- Employee rewards application
- Real-time clearing and settlement of securities
- Real-time synchronized ledgers: no reconciliation
- Reinvent industry **processes and biz architecture** – e.g. **subrogation**



Six ways Blockchain is disrupting insurance



Disintermediation

- Decentralized carrier consortium
- Automatic identity validation
- Self-executed transactions
- No need of trusted partners

DYNAMIS
A PEER TO PEER INSURANCE COMPANY

- **Dynamis'** vision is fully distributed insurance organization which does not need an underwriter. A P2P DAO.
- Their first (launched!) product is “**peer to peer supplemental unemployment insurance** protocol which uses policy holders' **social capital to replace underwriters**” and it is programmed on Ethereum

Consequences on reserves and regulation: **unbreakable escrow**

- **Chain That:** their vision is a fully digital and automated, blockchain and **Smart Contract version of Lloyd's of London**
- No need for a physical central authority overseeing the marketplace



Six ways Blockchain is disrupting insurance



Better analytics and risk assessment

- **Real-time**, individualized
- **Automatic data sharing** for analytics and pricing
- **Risk transparency** through data self-sovereignty



ENTERPRISE
ETHEREUM
ALLIANCE



Nautiluscoin



LendingRobot



BITHEALTH

HealthNautica.com



factom



T ZERO



NUMERAI



NEURA



Force Diagnostics
The Power of Knowing...Now



Bodhi



augur



GNOSIS

- From segmentation to **personalization**
- **Tracking and forecasting behavior**
- Risk tolerance **real-time tracking**
- New sources of **prediction data**
- Blockchain provides unprecedentedly secure environment for real-time and data sharing



Six ways Blockchain is disrupting insurance



New products, new
(underserved) markets

- P2P, shared economy, spot-insurance, hybrids
- More transparency, less costs
- Social media and crowdsourced oracles



唯梦想与善良不可辜负!



斑马社
互助保障创新平台



teambrella



insurepal



- enable the transparency and scalability of **new types of products and business models (P2P)**
- self-regulating organizations among non-trusted partners

Mapping the unmapped:

- Mobile technology provides access to
 - Unbanked/Undocumented/Distrustful
 - Geographically dispersed
- Blockchain could in addition deal with:
 - Admin costs due to low customer loyalty & high volume of cancellations
 - Immutable database tracking risk and behaviour

Six ways Blockchain is disrupting insurance



Increased transparency: ownership

Real Estate



TECHNOLOGY
Regulator warns of blockchain settlement usage
 report by FINRA outlined potential issues of utilising DLT for settlement actions.

Securities & LLCs

You Don't Really Own Your Securities; Can Blockchains Fix That?



The Delaware Blockchain Initiative

2016



Six ways Blockchain is disrupting insurance



Increased transparency: provenance

Walmart 



ascribe[®] for Artists & Creators

VERISART™

BLOCKVERIFY

 MONEGRAPH

 everledger

Six ways Blockchain is disrupting insurance



Increased transparency: identity

bron.tech

civic

Cambridge
Blockchain

COGNITO

CRAYONIC
YOUR TRUSTED DIGITAL SIGNATURE

CrossVerify
THE TRUST VOUCHER

KYC-CHAIN

KEEEX

CHAIN[®]
PRIVACY BY DESIGN

UNIQUID

@Spidchain



Blocknotary

ShoCard

NETKI

micity

uport

Blockchain in China

Consortia

ChinaLedger



CyberLedger



China Blockchain Research Alliance



Financial Blockchain Shenzhen Consortium



Products/applications

More platforms, fewer specific applications
Most applications are in financial industry



ZhongAn Tech

T series products based on Annchain (ZhongAn's blockchain) and cloud, including

- Ti-Capsule for data storage
- Ti-Sun for ID authentication
- Ti-Packet, one-stop service for data storage and verification



Bubi Chain

Applications in digital asset platform



- One open-source blockchain platform (JUICE) based on Ethereum
- Another open-source platform (BCOS), is developed with Wanxiang Blockchain and WeBank



Fuzamei Blockchain

- Blockchain receipt platform with Midea for intelligent transaction, credit rating, etc.
- Blockchain receipt application with Rongshang Supply Chain and Haihang

What do you think about P2P insurance on the blockchain?

1. **Why now?** – Reasons why the #...tech ecosystem is accelerating and blockchain is gaining relevance
2. **What?** – Understanding Blockchain
3. **Where?** – Areas in which it is being applied
4. **What now?**

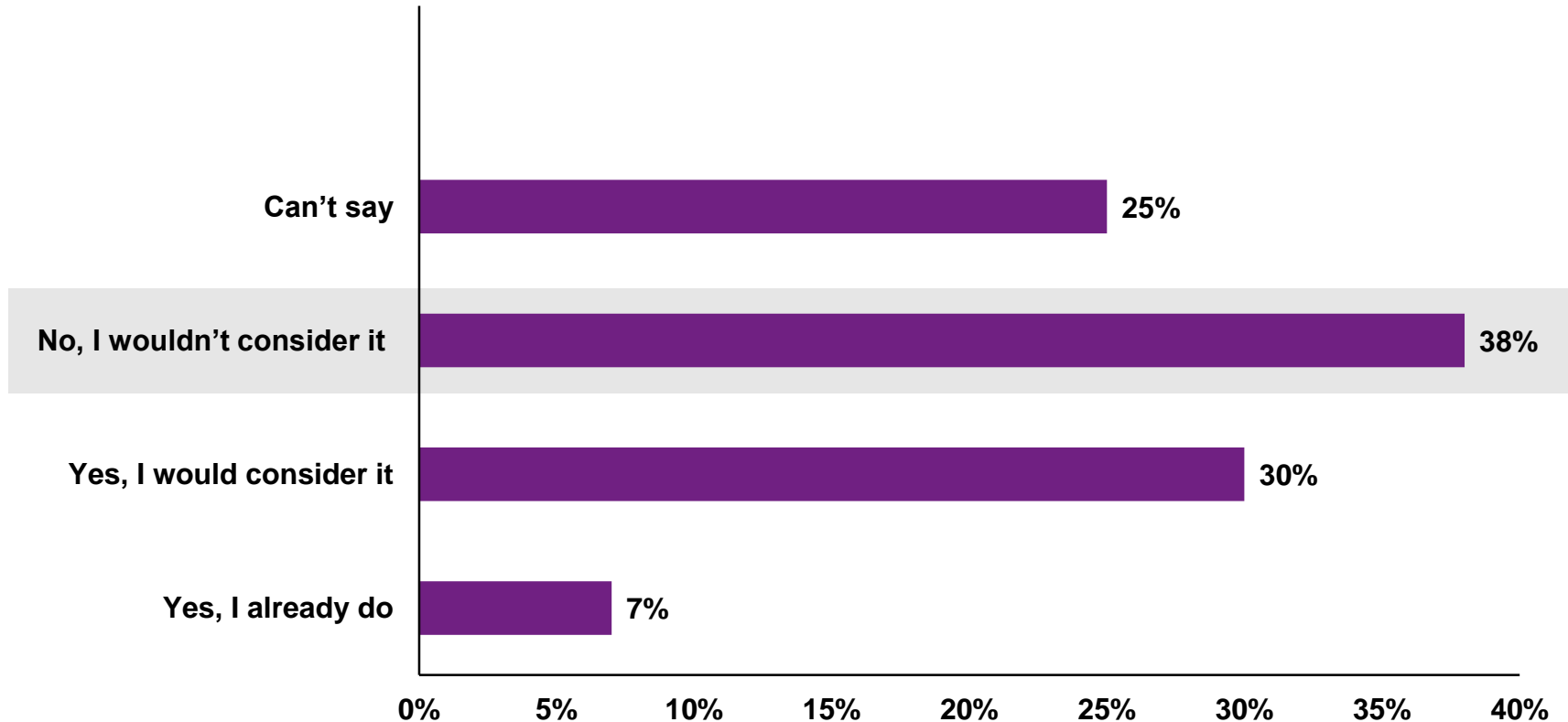
Question

Would you purchase peer-to-peer insurance?



- 1 Yes, I already do
- 2 Yes, I would consider it
- 3 No, I wouldn't consider it
- 4 Can't say

Likelihood of customers purchasing peer-to-peer insurance* in the United States in 2017



Source: <https://www.statista.com/statistics/683588/likelihood-of-customers-purchasing-p2p-insurance-selected-countries/>

Key Players in the P2P Insurance space



Etherisc

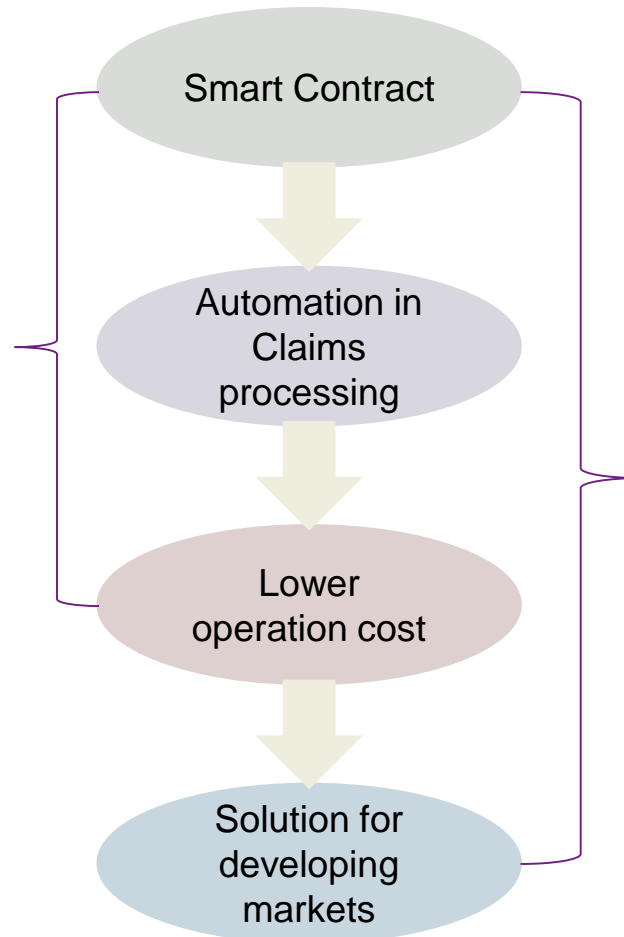
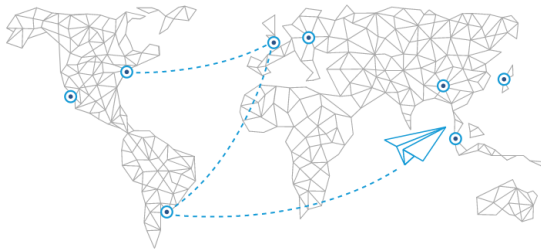
Flight Delay Insurance and Crop Insurance



Flight Delay Insurance

Ethereum based smart contract decentralized application (DApp)

- Automated issued policy that can be bought with ETH
- Automated claims payout in case of delay



Jamii Crop Insurance

Ethereum based smart contract application

- Crops to be covered are selected by the user
- Applying for a policy by sending Ether to a Dapp
- Automated payout in case of a drought or flood

Source: <https://etherisc.com/>

Question

What do you think makes this product most attractive to consumers?

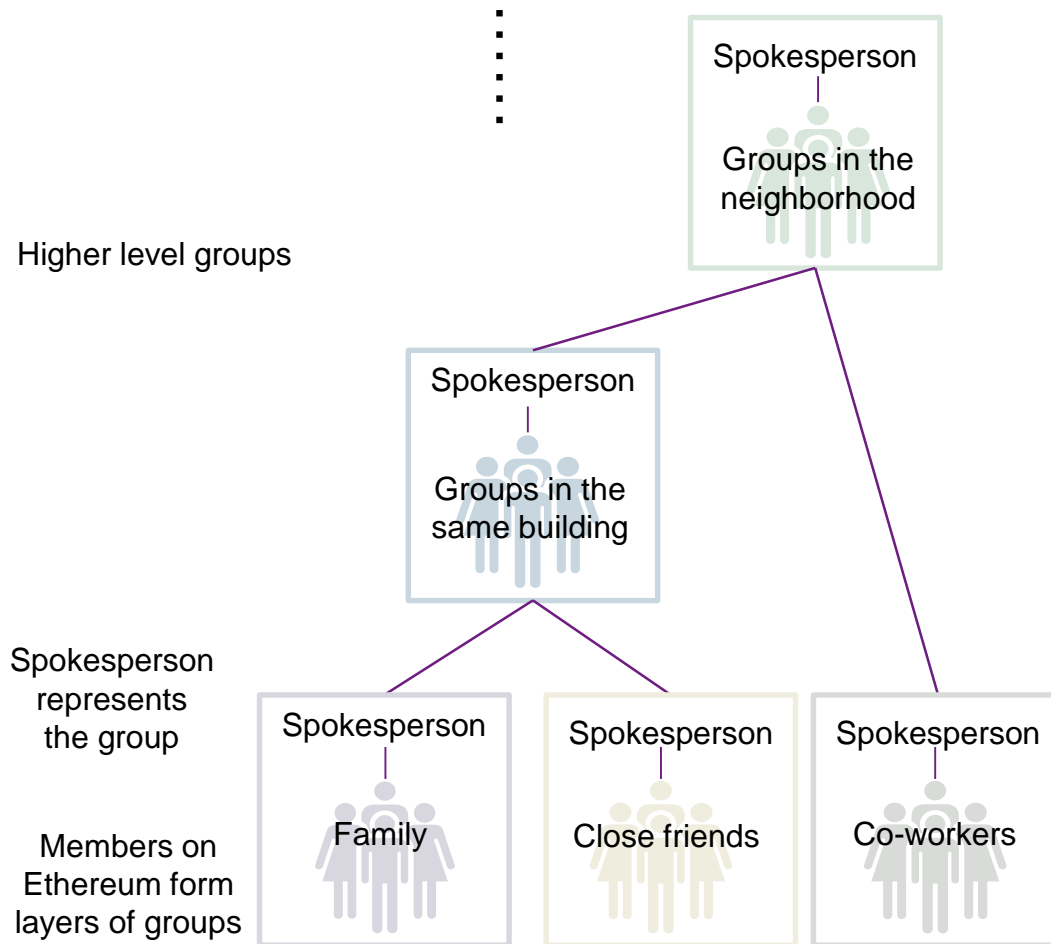


- 1 No need to file a claim
- 2 Unstoppable
- 3 Simple and transparent
- 4 I do not think it is an attractive product

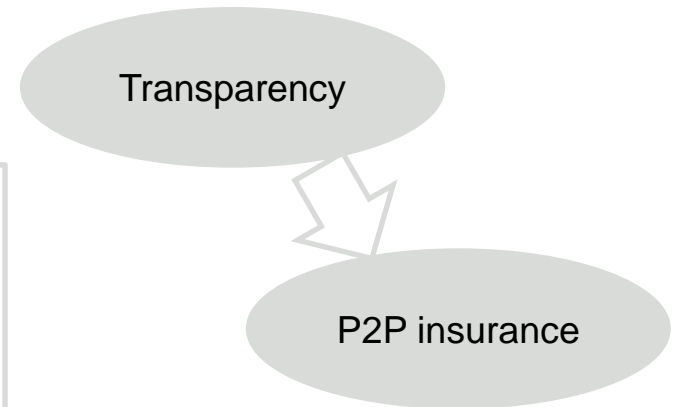


Etherisc

P2P “Social Security” (Micro)Insurance: harnessing the power of social networks

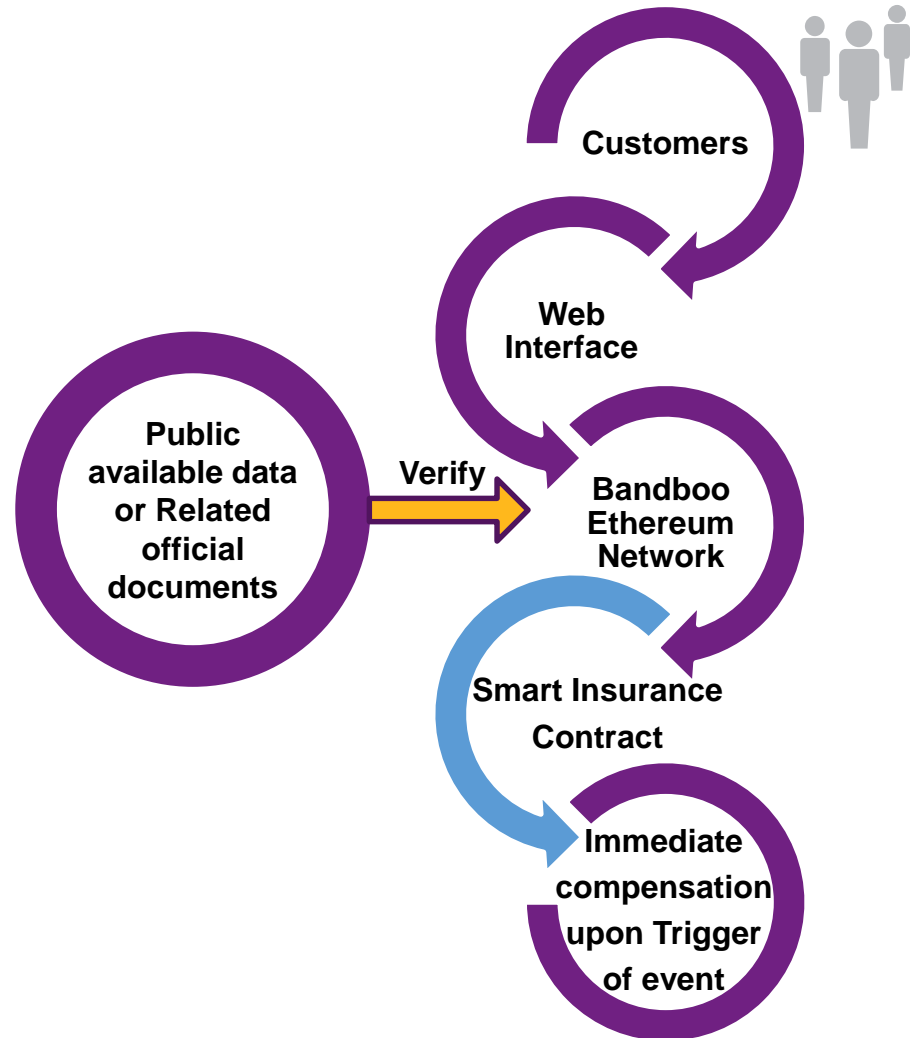
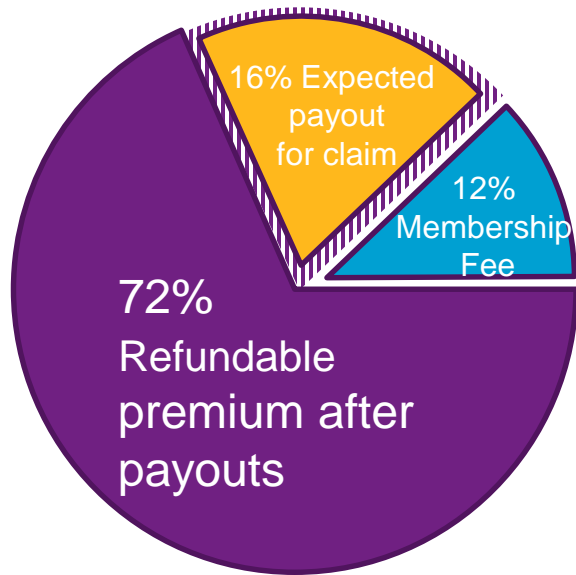


- Each member pays a fixed small premium
- Spokesperson is responsible for checking the claim and triggering a payout
- In case of event, the system pays out a fixed sum



Source: <https://etherisc.com/>

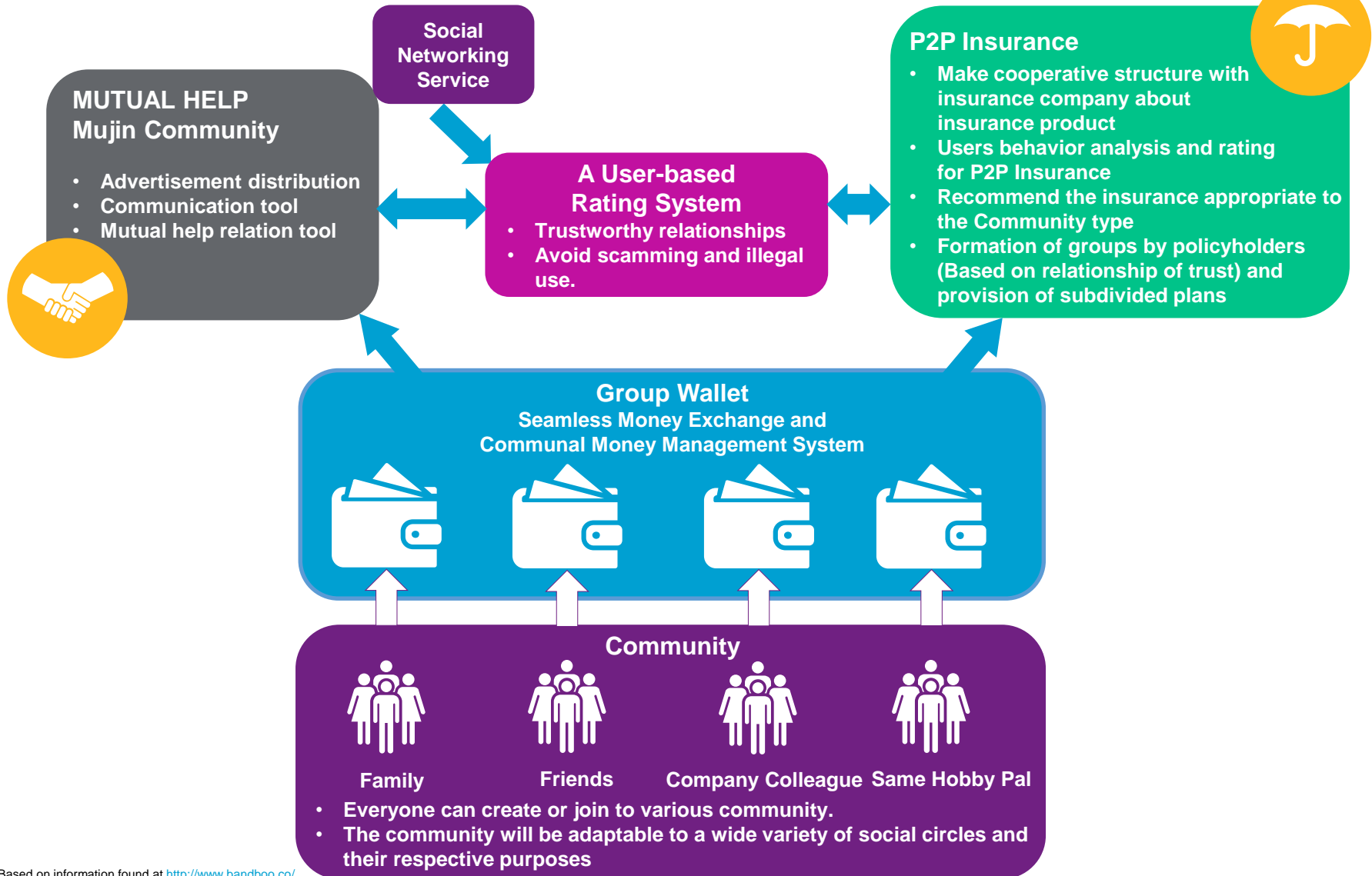
Bandboo



Source: Based on information found at <http://www.bandboo.co/>



Bandboo



Source: Based on information found at <http://www.bandboo.co/>

If it looks like a duck and walks like a duck...

How different do you think that this is from a Mutual?

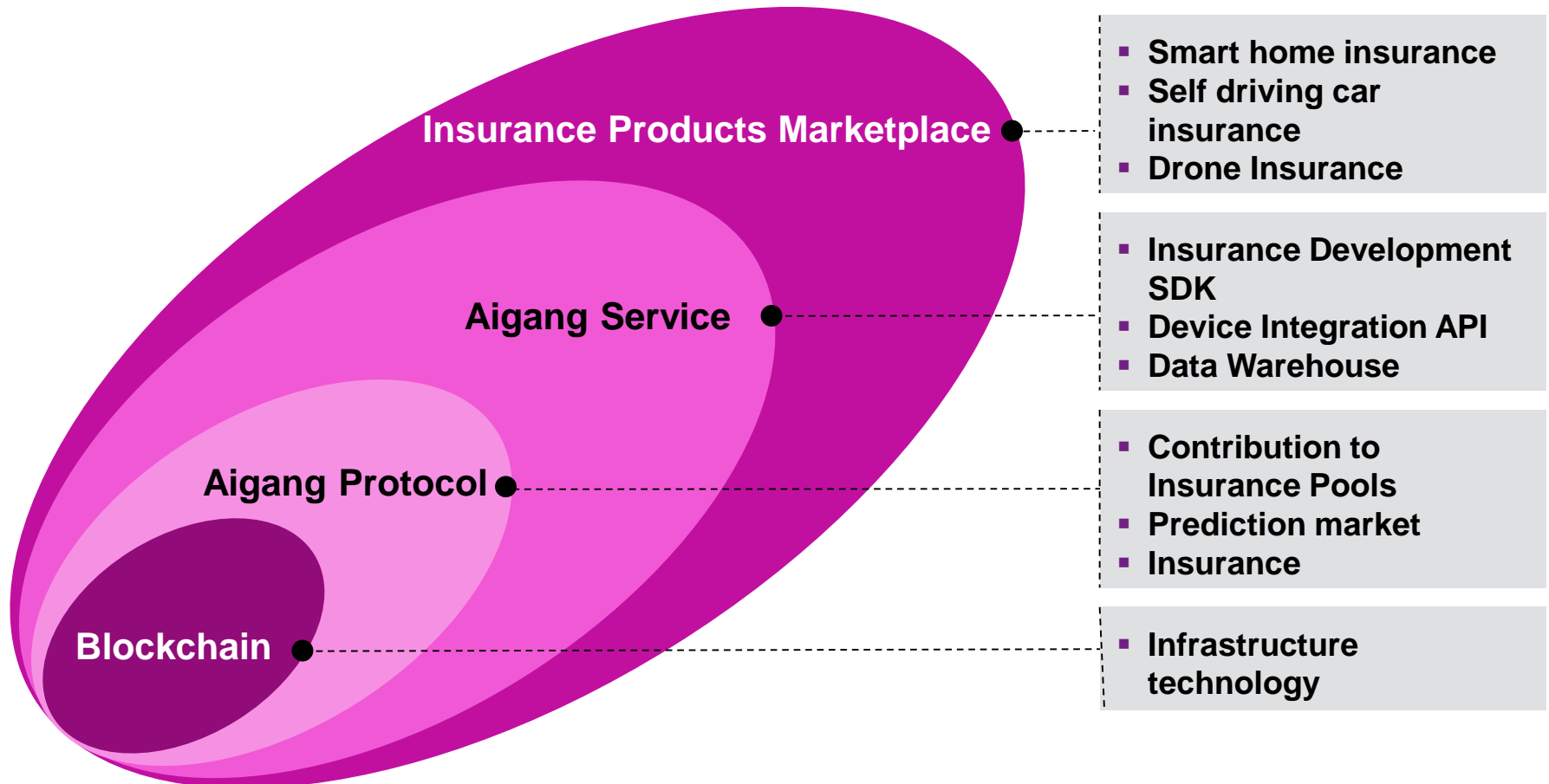


- 1 Not different at all
- 2 Based on same principles and differs only in non-key attributes
- 3 Based on same principles but differs in key attributes
- 4 Significantly different



Aigang

Vision of combining Blockchain and DAOs with IoT, AI and Prediction Markets to enable P2P insurance



Source: <https://aigang.network/#roadMap> and White paper: <https://drive.google.com/file/d/1qUuXmBta-qn5ze-aPPMUdPlqKitNRpQq/view>



Aigang

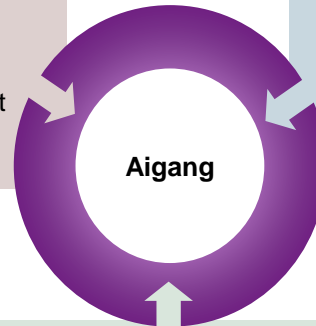
Vision of combining Blockchain and DAOs with IoT, AI and Prediction Markets to enable P2P insurance

Harness the wisdom of the crowd

- Form prediction markets whose members (token holders) are subject specialists and insurance enthusiasts
- Combine prediction markets with insurance pools
- Use prediction markets to assess insurance risk
- Conduct algorithms that price the policy premiums and predict profitability of insurance pool
- Develop a token model that incentivises and rewards members for accurate insurance market predictions
- Create a network effect so that all token holders benefit from the efficiencies of the system, regardless of their individual forecasting success

Automate through smart contracts

- Create a Decentralized Autonomous Organization (DAO) that use smart contracts to connect intelligent devices with insurance policies
- Connect to devices that communicate their need for maintenance or replacement
- Automate insurance pay-outs
- Use reinsurance to handle exceptions
- Automatically sell tokens or issue payments to keep reserves within target range



Partner with data providers

- Seek out manufacturers who already collect data on their devices' operating states
- Collect data from drones and sensors that would help inform insurance risks
- Use device data as intelligence in creating and valuing policies
- Subject to regulatory environment, encourage third parties to create insurance offerings using the platform
- Cooperate with manufacturers wanting to pre-install insurance policies

Source: Aigang Whitepaper, <https://drive.google.com/file/d/1qUuXmBta-qn5Ze-aPPMUdPIgKjtNRpQq/view>

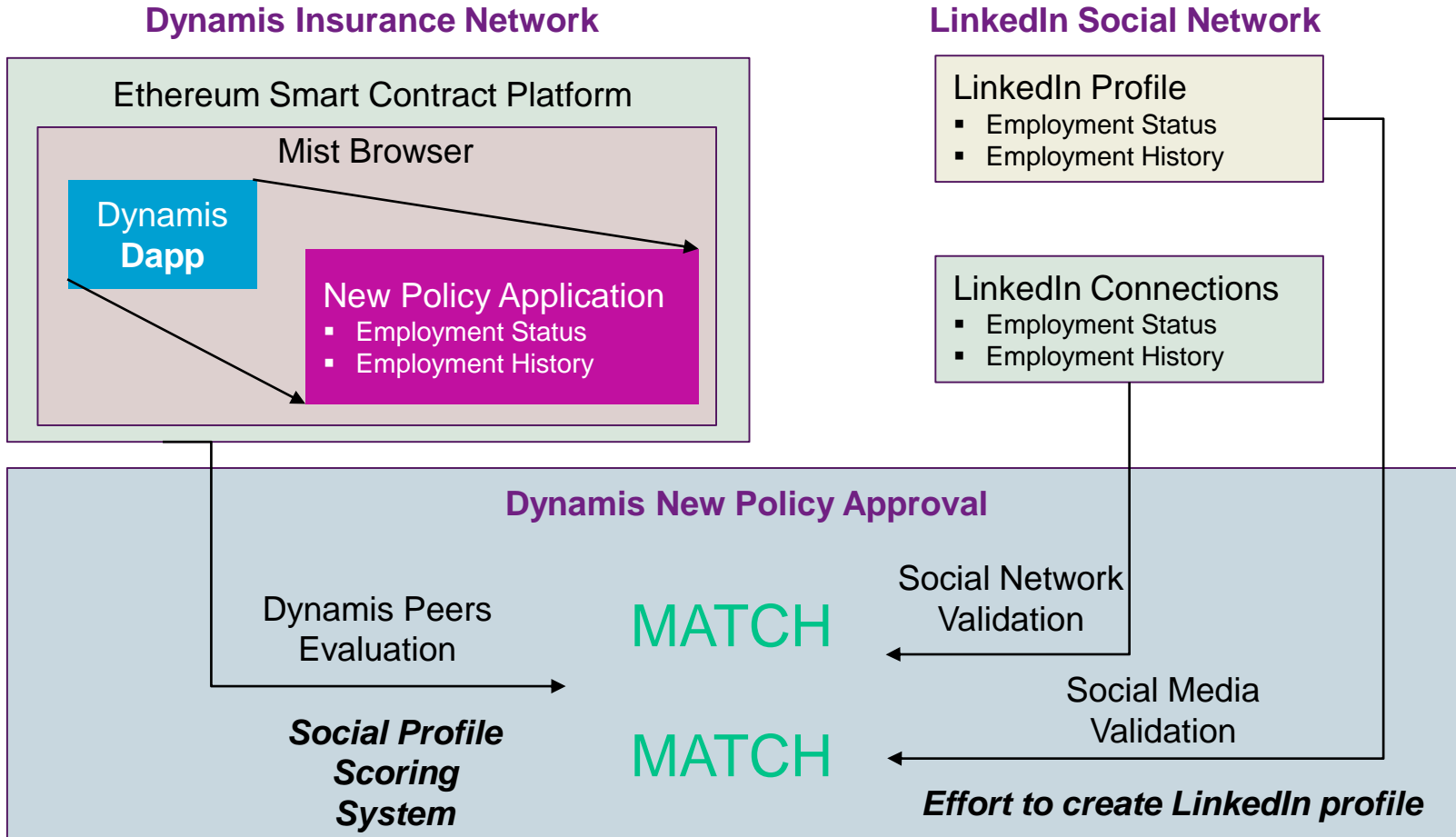
Question

What do you think is the biggest risk/challenge introduced by this type of product?



- 1 Unbreakable escrow
- 2 Inability to price complex risks through crowdsourcing
- 3 Cyber risks associated to oracles
- 4 Other
- 5 Can't say

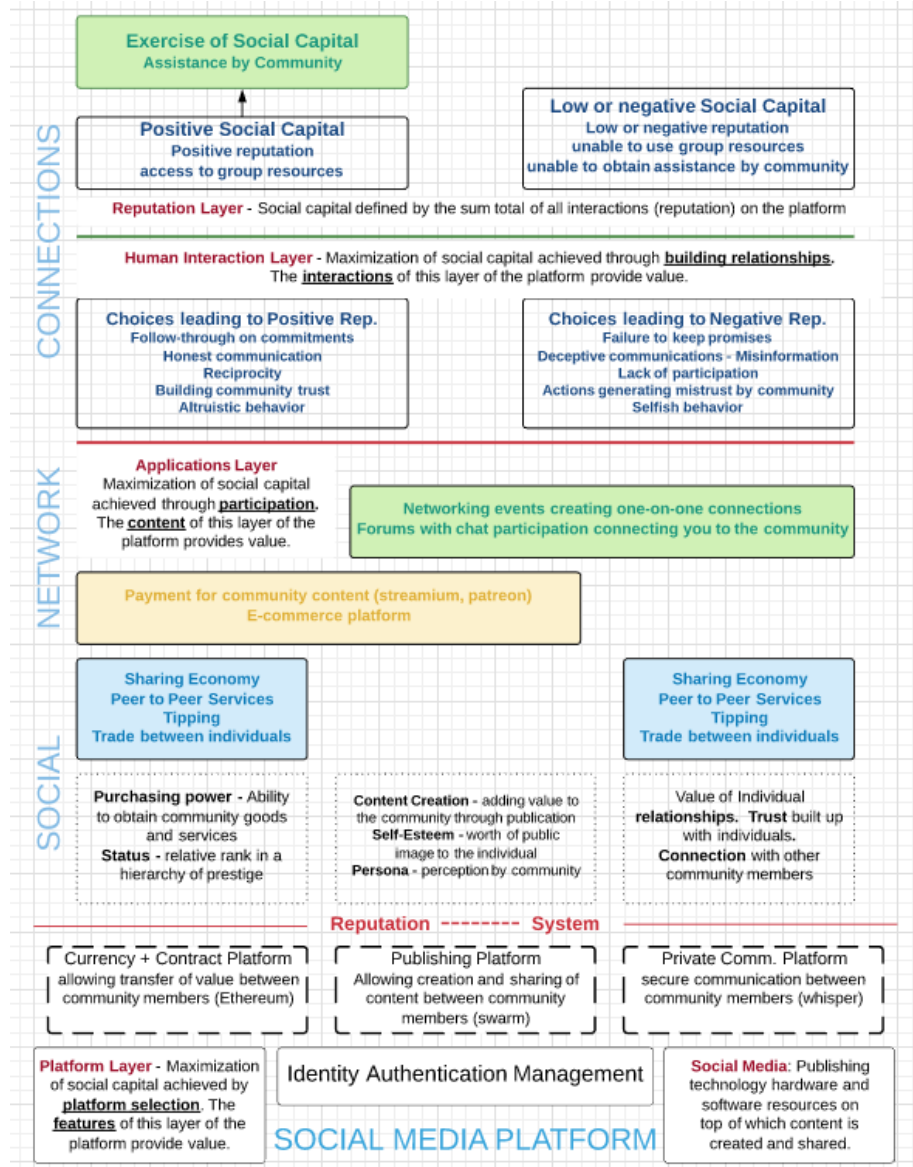
Supplemental unemployment Insurance Process



Source: . <https://www.lucidchart.com/documents/view/1035fab7-7ef5-48ca-b4fe-58ca035b7efb>

Dynamis

Social Capital

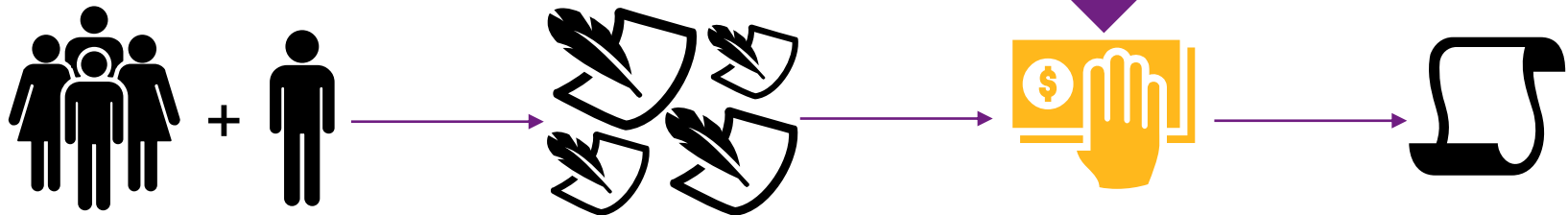


Source: <https://www.lucidchart.com/documents/view/0b8beb0c-ef67-4ebd-b339-cad32baad454>

Teambrella

P2P Insurance within a Team

- Teammates' deposits funds into a personal Ethereum wallet
- Each teammate's wallet is jointly controlled by the team.
- The funds can only be spent with Ethereum multisignature (i.e. a transaction will need co-signature from both the user's and 3 out of 8 semi-randomly selected members of the team)



A user joins a team to get covered.

The team may be composed of friends, acquaintances or even strangers

Teammate votes for everything: new members, rules and claims.

Vote weights are determined by the user's previous claim payouts

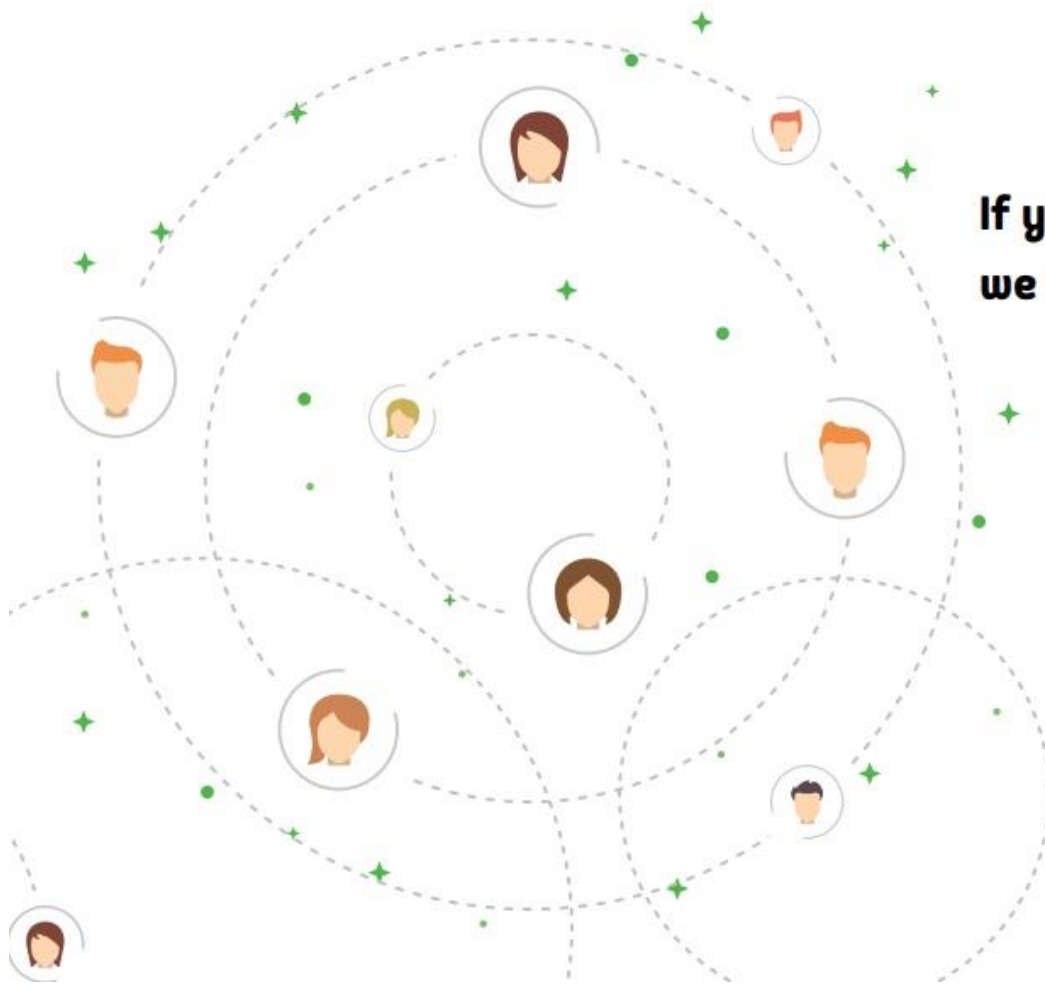
When the team approves a claim, payouts are made from teammates' personal wallets.

Open-source client software enables automated payments.

Source: Based on information found at <https://teambrella.com/>

Insurepal

Distributed social proof insurance



**If your friends trust you,
we trust you.**

BUT...

**They will have to be
willing to pay, just in
case you prove to be
riskier than they
thought.**

Source: https://insurepal.io/InsurePal_whitepaper.pdf

Insurepal

Distributed social proof insurance

Andrew and Susan want to make a business transaction,
but don't completely trust each other.



They sign a smart contract defining breaching penalty,
arbitrage body and arrangement's due date and insure
their business transaction with InsurePal.

- InsurePal provides insurance coverage to Andrew making business transaction with Susan.
- If their contract is breached, InsurePal pays the penalty to Andrew partly from InsurePal insurance pool and partly by collecting deductibles from his endorsers.
- Deductible structure can be recursive and transitive and extend to higher degrees of separation in your social network
- The data of each transaction is also used to calculate Social Proof Trustscore of each (directly and indirectly) participating endorser.

Contents

1. **Why now?** – Reasons why the #...tech ecosystem is accelerating and blockchain is gaining relevance
2. **What?** – Understanding Blockchain
3. **Where?** – Areas in which it is being applied
4. **What now?**

Industry efforts: mostly seeking back-end efficiency



- 80+ systemically important financial institutions
- Largest collaborative group working on blockchain-solutions
- Corda – proprietary DLT platform
- May: raised \$107M (Series A funding from 40 institutions)
- Dedicated insurance vertical (CoE) since April



- Excess of loss PoC
- Presented prototype reinsurance platform at 2017 Monte Carlo RDV
- 23 new members to test it

RiskBlock™ Alliance

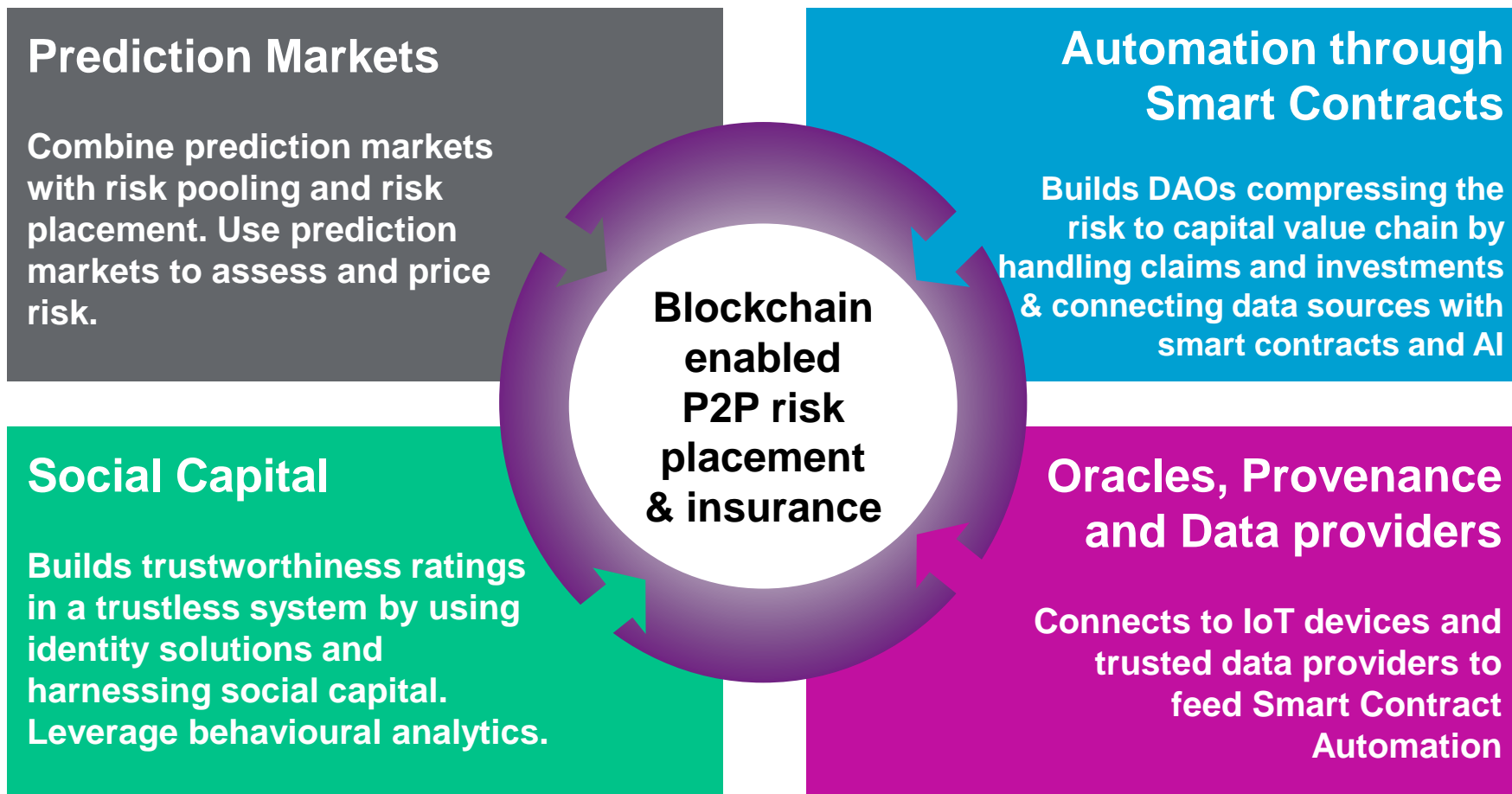


- 30 risk management and insurance industry organizations
- Awards at Insurance Industry Innovator Award (2017 ACORD Insurance Innovation Challenge (AIIC))

- Blockchain Insurance Alliance (SMEs)
 - Financial Blockchain Shenzhen Consortium
-

Start-up efforts: envision trustless P2P risk transfer protocols

Towards the tokenization of social capital, behavior and risk



New models may introduce new risks or transfer old ones

Disintermediation and potential consequences of **underwriting without underwriters:**

- Unbreakable escrow and **solvency models**
- **Too big to fail: scalability of P2P risk mutualization** may lead to **systemically important DAOs**
- **Who is responsible** in the event of a catastrophic event/black swan?
- Broker vs. Insurance Carrier vs. “community administration platforms”

Even what looks as “**mere automation**” brings in “new” risks :

- Unbreakable Escrow
- How safe are Oracles?

Risk transfer to Blockchain frontier

More **accurate and personalized risk assessment:**

- Pool of one is not a pool.
- Model exhaustion leading to uninsurable people?

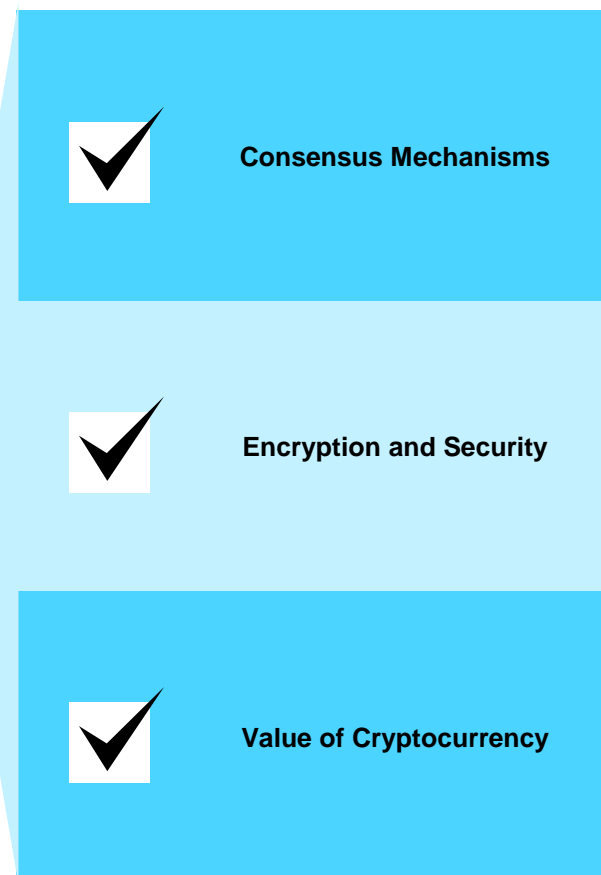
Even in the context of self-sovereign data sharing we will need governance for dark-side of analytics

Insurability of blockchains themselves and of crypto ecosystem

We may not have to reinvent the wheel

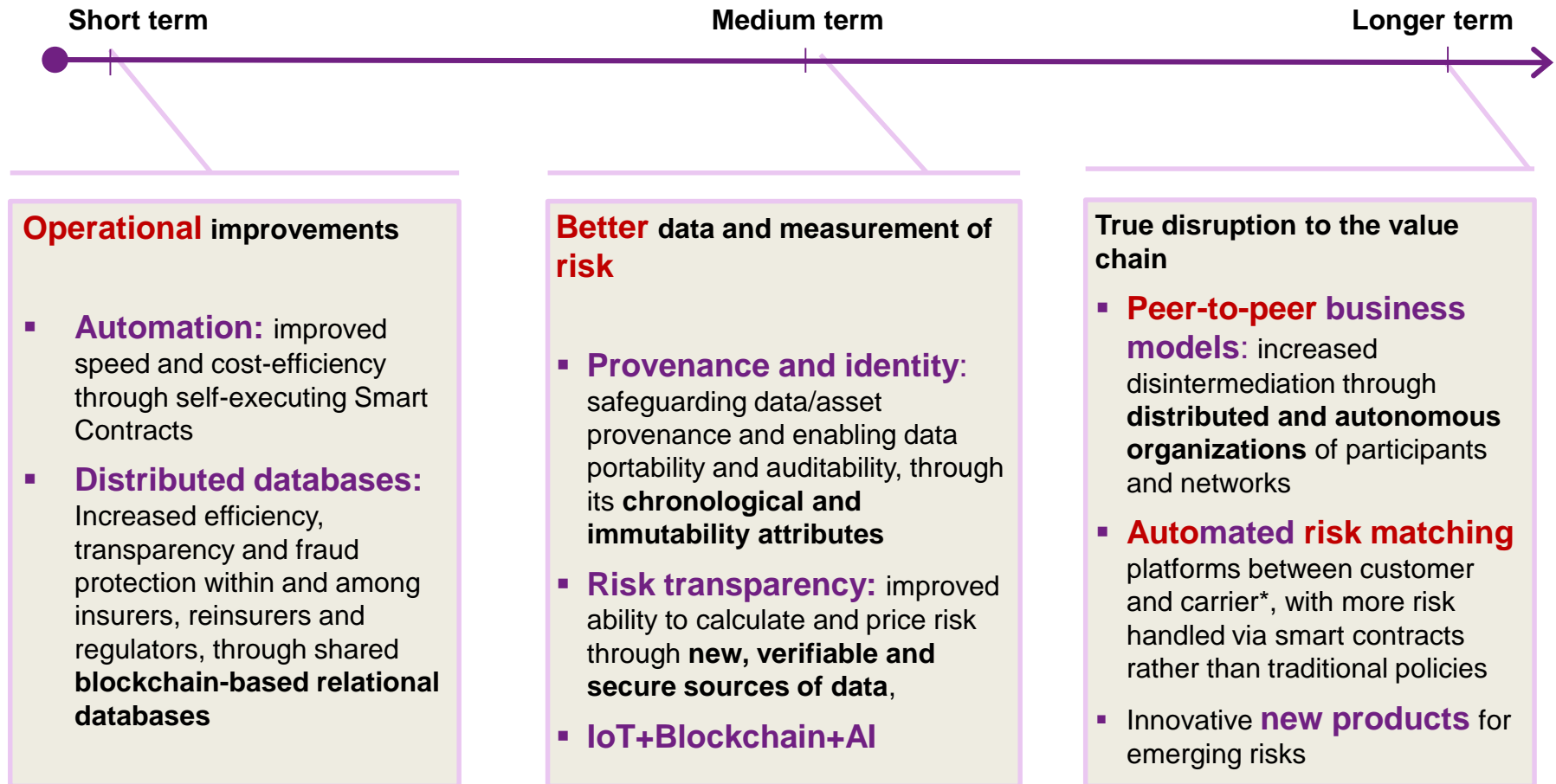


Assessing key DLTs risks



This is not going to happen tomorrow, but we need to prepare for it

Likely effects of blockchain over time



*For less complex risks, this may happen sooner

The road ahead

- 400+ Blockchain patent applications in 2017 in US

General challenges:

- **Needs scale:** everyone needs to get on board
- **Needs scope:** works across all parts of the value chain and through all activities
- **Needs standards**
- **Needs safe oracles**

Industry specific challenges:

- Lack of **standardized processes** make it difficult to replicate flow with algorithms in smart contracts
- Disruptors challenged by translating **B2C advances into B2B**

High-stakes technologies and new ways of social interaction **are here to stay** – we need **better governance** and a **quantitative framework** to **assess** their **riskiness**

Questions?

Willis Towers Watson 

Thank you!

Willis Towers Watson 

Magda Ramada

Magda.Ramada@willistowerswatson.com



@MagdaRamada
@WTWrisk



Magdalena
Ramada Sarasola, PhD