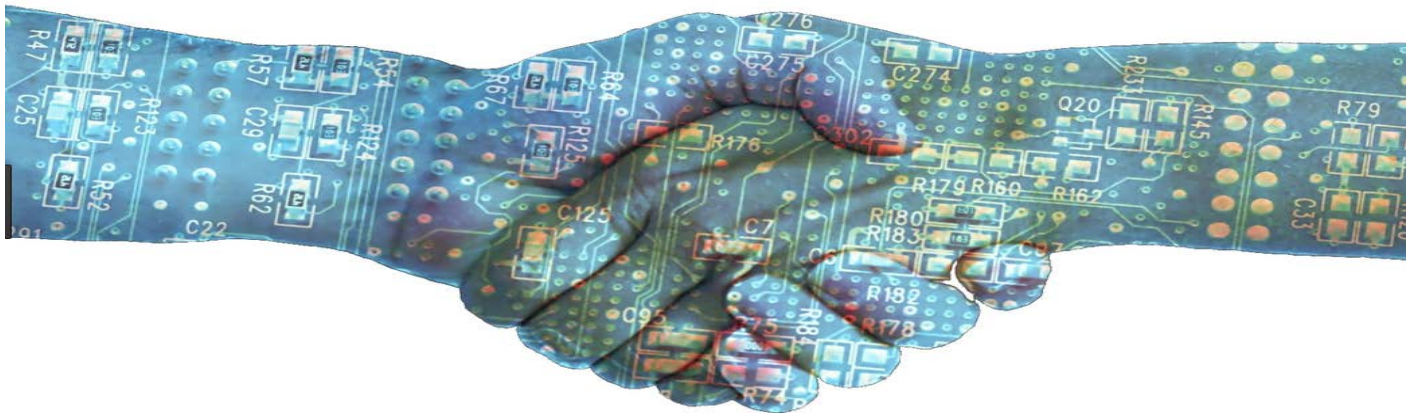
The disruptive potential of Blockchain and Distributed Ledger Technology



Alex Sims, 6 September 2017

University of Auckland

The Law Foundation NEW ZEALAND

Brief Outline

- Some context:
  - Autonomous car scenario with blockchain and cyrptocurrencies
  - The technologies that are bearing down on government/society
  - The Regulator of 2030
  - The path of disruptive technologies
- Blockchain
  - How does it work and the defining features of a blockchain
  - Terminology
  - Relevance of Blockchain to government
  - Why is Blockchain a foundational technology?
  - Change
  - What is happening internationally?
  - What happens if nothing is done?
- Solutions/the way forward

Imagine in five or so years time…

Smart contract = self executing computer programme

DAO (Decentralised Autonomous Organisation) = new form of “company”

Tokens (grants right to vote and share of profits, and can be traded/sold) – similar to shares, but tradable within seconds

Cryptocurrency (Ether, Litecoin, Dash etc)

Cryptocurrency wallet, essentially a “bank account”

Smart contract instantly sends correct % of crypto to IRD and share of profits to token holders – with token holders’ tax remitted to IRD

Information on traffic conditions, temperature, rain, UV levels, pollution, state of road etc all relayed in real time to relevant bodies/organisations

Imagine in five or so years time…

Car “decides” who to pick up, no human involvement

Car monitoring itself, it decides when to recharge (if insufficient energy from solar panels) books and pays for charging using smart contract and its wallet

Car uses smart contract to book itself in for a service and pays from its wallet

How AI and Blockchain Might Make Cars “Free”

By Joel Hans

To sell Millennials on new cars, personalized digital experiences using artificial intelligence and blockchain are on the horizon.

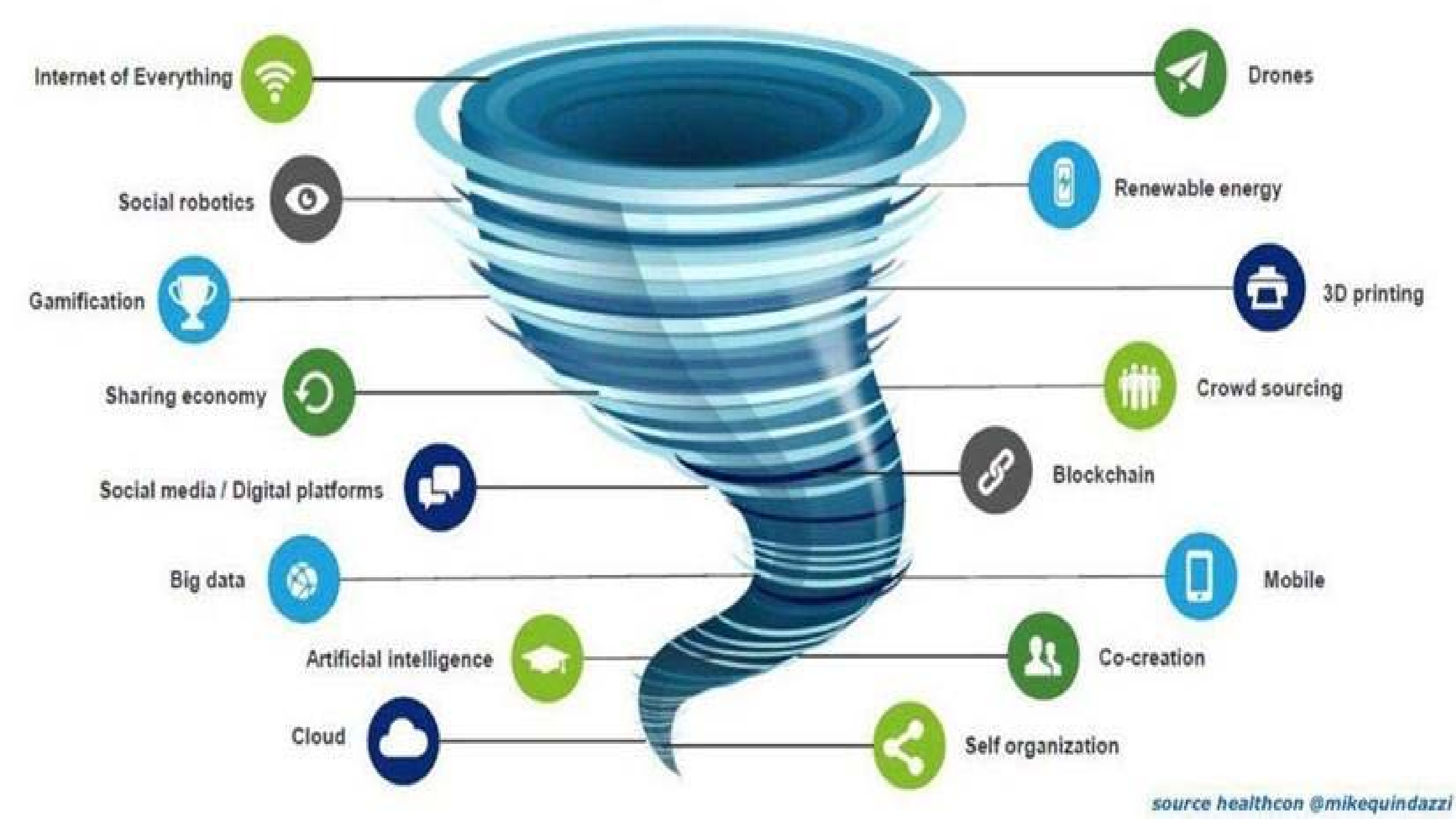
According to a recent report on the automotive finance industry from the White Clarke Group, we’ve collectively entered what they call “Industry 4.0: Connected Intelligence.” It’s not only the pace of tech innovation that create a “connected intelligence” era, but also how rapidly young people—who will soon be the majority of the population and control a vast amount of purchasing power—are adopting new ideas.

The ways in which this new industrial era affects the automotive finance industry are complicated and multifaceted.

“We are experiencing an explosion of innovation, which has a profound impact on how we interact with each other, and how businesses build and maintain a relationship with their customers,” said Brendan Gleeson, Group CEO of White Clarke Group.

“To succeed in the new ecosystem, organizations must adapt fast—learning new skills, staying abreast of new technology, and developing new models for the delivery of finance to avoid the threat from disruptors.”

https://www.rtinsights.com/automotive-finance-new-car-technology-ai-blockchain/


Internet of Everything
Drones
Social robotics
Renewable energy
Gamification
3D printing
Sharing economy
Crowd sourcing
Social media / Digital platforms
Blockchain
Big data
Mobile
Artificial intelligence
Co-creation
Cloud
Self organization
source healthcon @mikequindazzi

The Regulator of 2030:

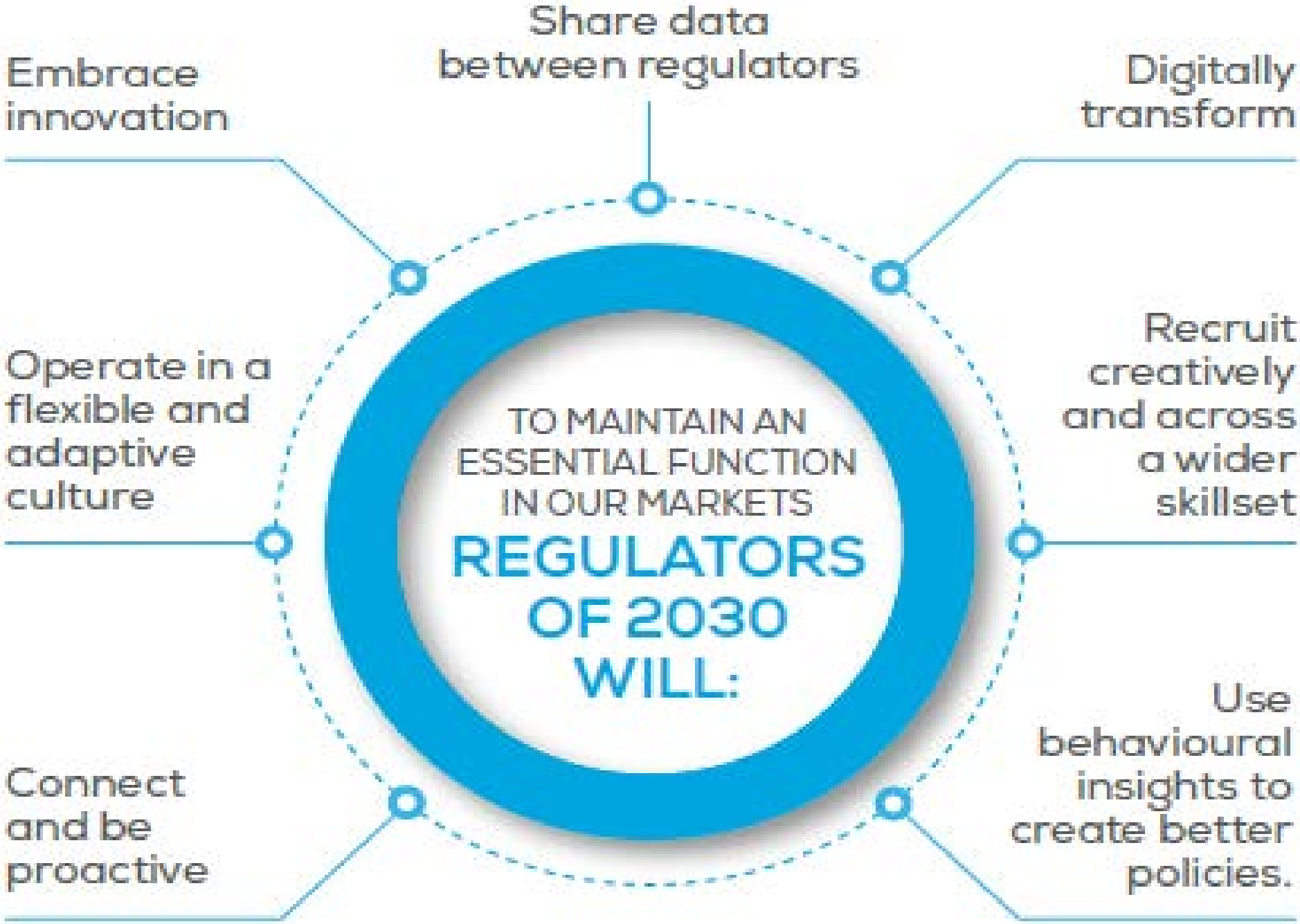
REGULATING OUR DIGITAL FUTURE

charteredaccountantsanz.com/futureinc

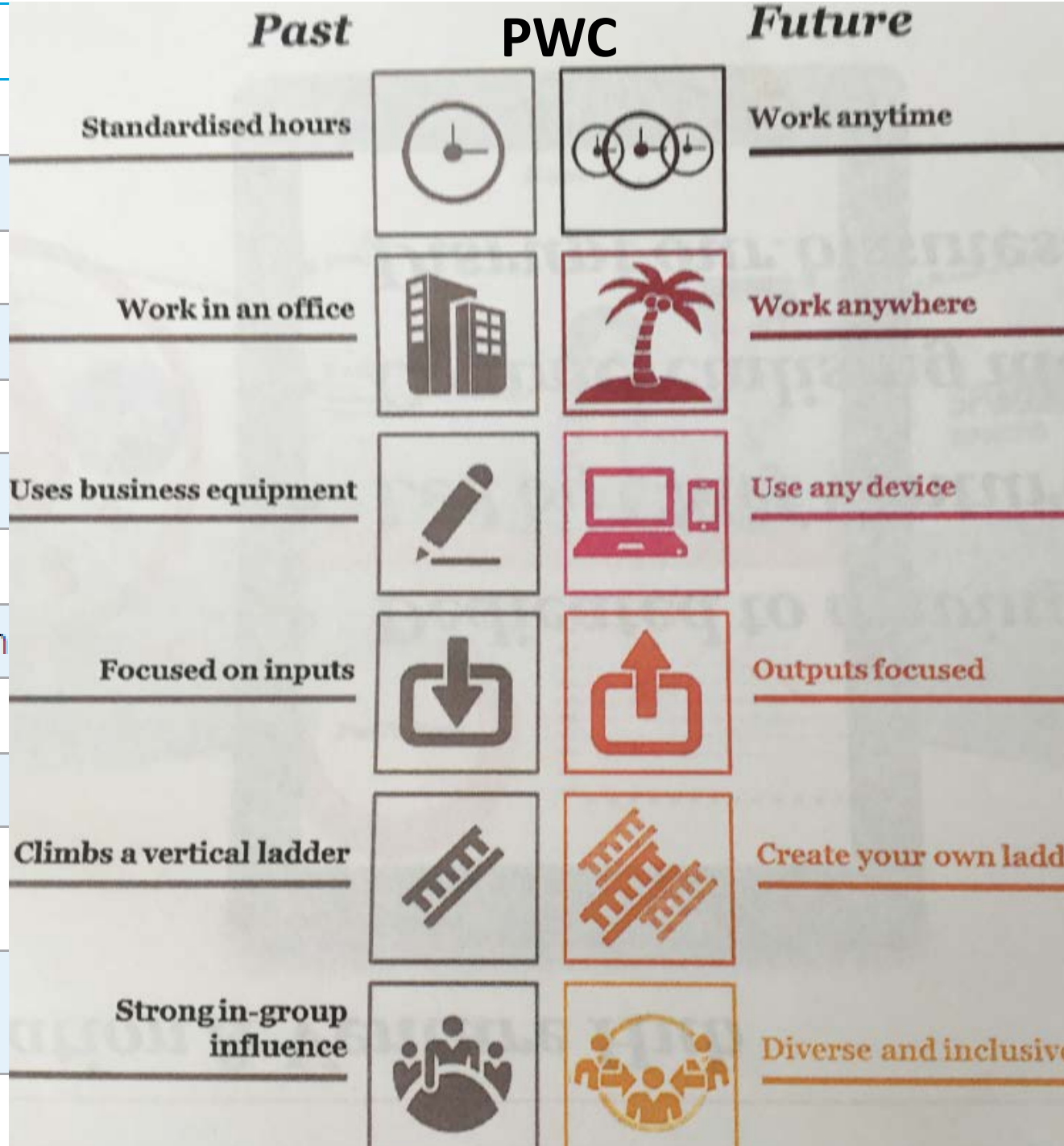
CHARTERED ACCOUNTANTS™
AUSTRALIA + NEW ZEALAND

"The regulator of 2030 will no longer be playing catch up as markets continue to be disrupted by innovation. They will have heeded the advice of the World Economic Forum founder and futurist Klaus Schwab, who warned that their survival would depend on behaving more like entrepreneurs than bureaucrats." at page 3

www.charteredaccountantsanz.com/news-and-analysis/insights/future-inc/the-regulator-of-2030-regulating-our-digital-future.

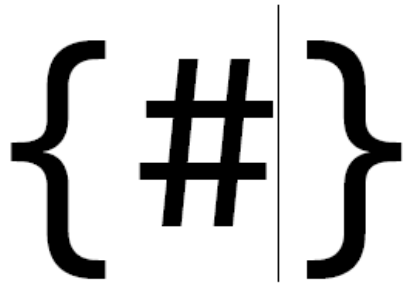

Share data between regulators
Embrace innovation
Digitally transform
TO MAINTAIN AN ESSENTIAL FUNCTION IN OUR MARKETS
REGULATORS OF 2030 WILL:
Operate in a flexible and adaptive culture
Recruit creatively and across a wider skillset
Connect and be proactive
Use behavioural insights to create better policies.

The 'traditional' regulator	The regulator of 2030
Retrospective review	Real-time regulation
Process based	Digital
Solitary	Collaborative
Corporate cop	Facilitator
Job for life	Seeking diverse talent
Slow to react	Agile
Risk averse	Innovative
Outreach: formal submission	Nimble, flexible outreach
Waits to be approached	Engages early
Manual	Tech savvy
Regulations	Standards and guidelines
Standalone	Cross-agency and jurisdiction
Reactive	Horizon scanning



Path of Disruptive Technologies

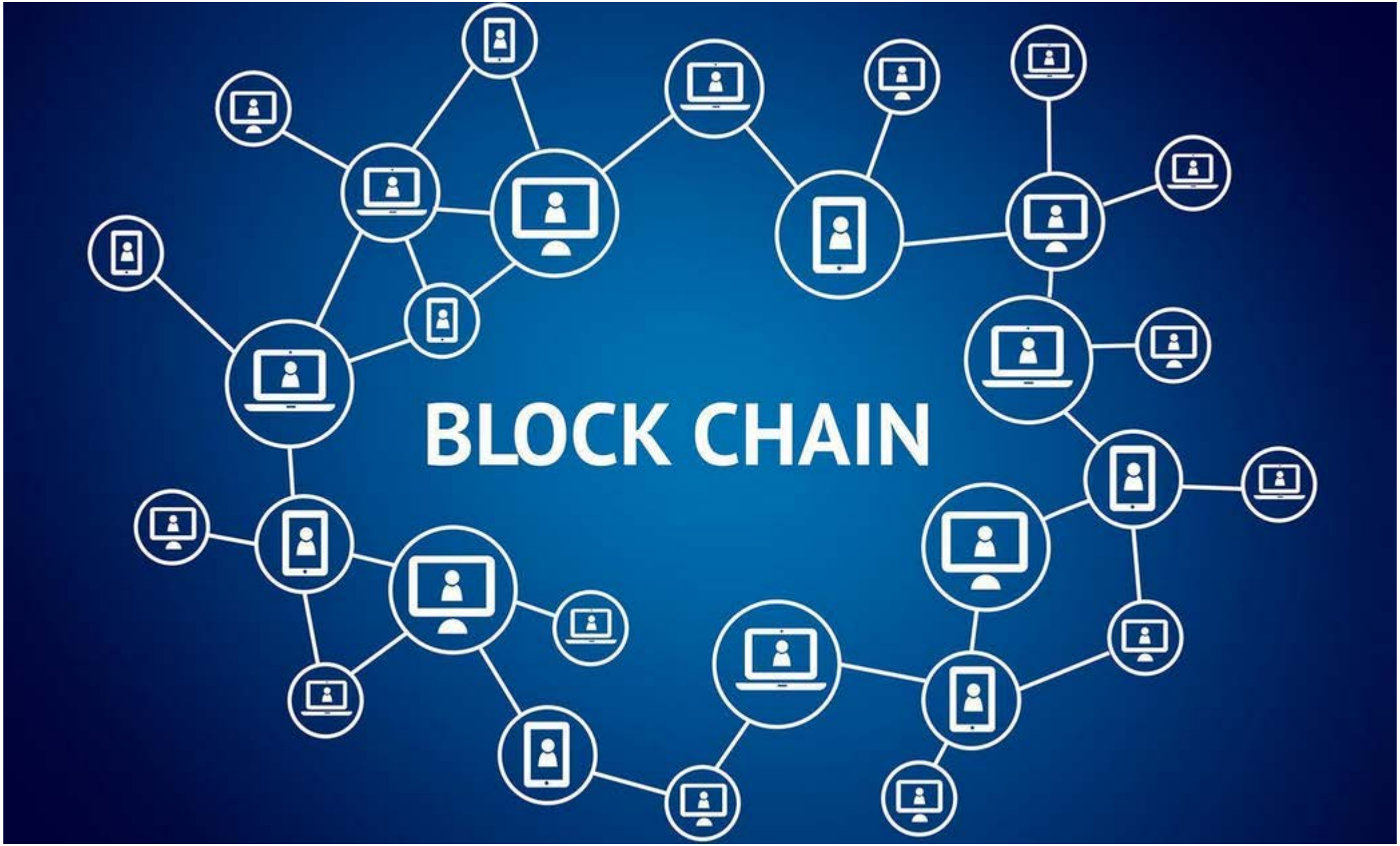
Institutions -------> Platforms --------> Protocols



Post ----------> Email

Telco ----------> Skype ----------> VoIP

Banks ---------> Payment Processors --------> Cryptocurrencies


BLOCK CHAIN

Is Blockchain the most important IT invention of our age?

John Naughton

The technology behind Bitcoin could revolutionise the way governments provide healthcare, deliver benefits, collect taxes – you name it...

The Guardian – 24 January 2016

https://www.theguardian.com/commentisfree/2016/jan/24/blockchain-bitcoin-technology-most-important-tech-invention-of-our-age-sir-mark-walport

How does blockchain work...?

https://visual.ly/community/infographic/technology/bitcoin-infographic?utm_source=visually_embed

What is Blockchain?

A Blockchain is a single version of the truth made possible by an immutable and secure time-stamped ledger, copies of which are held by multiple parties

Text from this slide and the next three are from a video here: http://www.zdnet.com/article/microsoft-debuts-coco-framework-to-improve-blockchain-performance-privacy/?mkt_tok=eyJpIjoiTkRKaFl6ZGxOV1l3WkdFMCIsInQiOiJucDc1alwvZjAwTHhnaDNPZDkxcmk5Z3JcL1lBUzhlYm9zM0tRZXlodG9hQldxaTJQXC9vUHlnU2dEbHpKbm9TOXp1NDYwNHo4MGZhUHhubzRFRFhJY1RvK1BVZmRDb3AzU0Q0Tjd2Z2krWWtOVWl3Sndua2txZlJHbSt6bktyOUZNNiJ9

Why Blockchain matters?

It shifts trust in business from an institution or entity to software

How Blockchain works

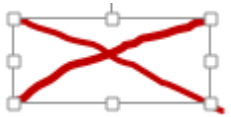
Cryptography secures the data and new transactions are linked to previous ones

For more details see: https://visual.ly/community/infographic/technology/bitcoin-infographic?utm_source=visually_embed

Why Blockchain is disruptive

It will make firms' and governments' back-end operations more efficient and cheaper. Eventually it could replace companies altogether

Blockchain could change our world over the next decades as the internet has over the last two



Defining Features of a (public) Blockchain

1. A database so **secure** it can be made **public**
2. A**ltering a copy** of the database **has no effect** & transactions can only be appended, **never deleted or updated**
3. Underpinned by a **Peer to Peer protocol that strictly enforces transaction validity prior to writing** to the database

Some terminology…

- Blockchain
  = public and distributed – open source
- Distributed Ledger Technology (DLT)
  = permissioned or private – closed/proprietary
  (permissioned = industry/consortium only permitted to write and view,
  Private = one person has ability to write)
- To not confuse everyone will use “blockchain” for both public, permissioned and private
- Once move away from public blockchains lose some of the benefits of Blockchain

Blockchain’s effects will be as transformative as the Internet has been, but the changes will be faster and more profound than the Internet’s were

We are, however, in the first 100 metres of a unmapped marathon

“Visionaries see a future of telecommuting workers, interactive libraries and multimedia classrooms…. Baloney. Do our computer pundits lack all common sense? The truth is no online database will replace your daily newspaper, no CD-ROM can take the place of a competent teacher and no computer network will change the way government works ... We're promised instant catalog shopping—just point and click for great deals. We'll order airline tickets over the network, make restaurant reservations and negotiate sales contracts…. Even if there were a trustworthy way to send money over the Internet—which there isn't—the network is missing a most essential ingredient of capitalism: salespeople.”

Clifford Stoll, “Why the Web Won’t be Nirvana” Newsweek, 26 February 1995 http://europe.newsweek.com/clifford-stoll-why-web-wont-be-nirvana-185306?rm=eu.

Relevance of Blockchain to government?

1. Regulating activities' of others
2. Improving government's processes including reducing cost

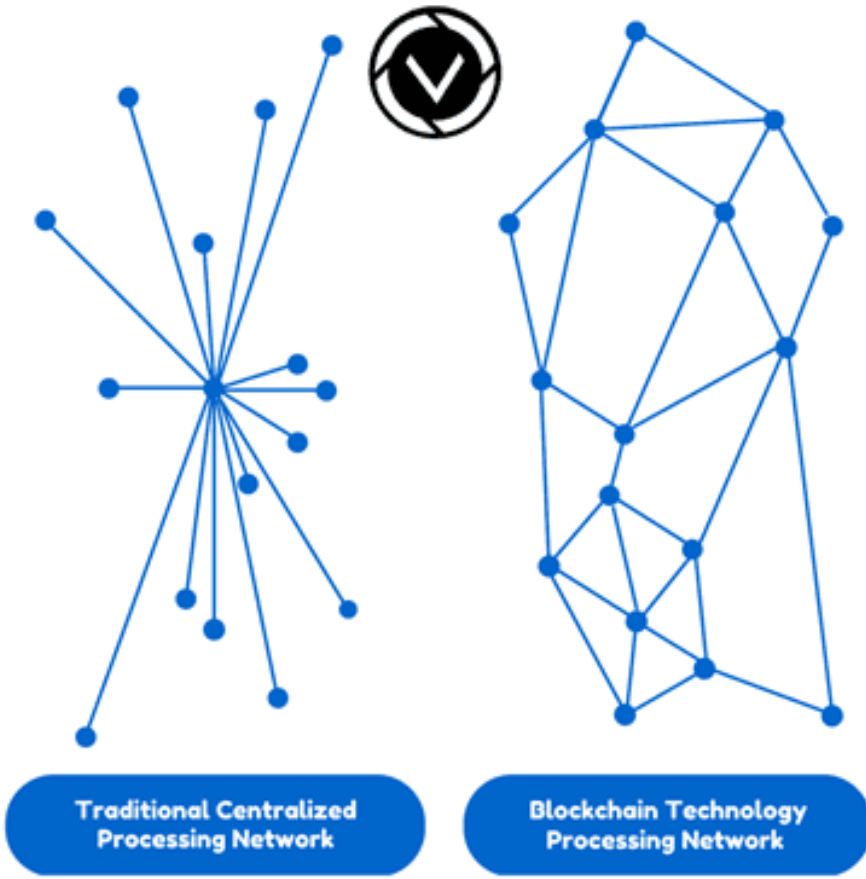
~~Why is Blockchain so disruptive?~~

Why is Blockchain a foundational technology?

https://hbr.org/2017/01/the-truth-about-blockchain

Database

- We have lots of databases, Blockchain is just another database!
- But a blockchain is not a traditional database, because:
  - Traditional databases need to be controlled by one entity – no one entity controls a blockchain (unless it is a private blockchain)
  - Traditional databases can be altered – a blockchain cannot be changed, it is immutable
  - Problem of updating traditional database if copies held by other parties – updating a blockchain happens within minutes, if not seconds



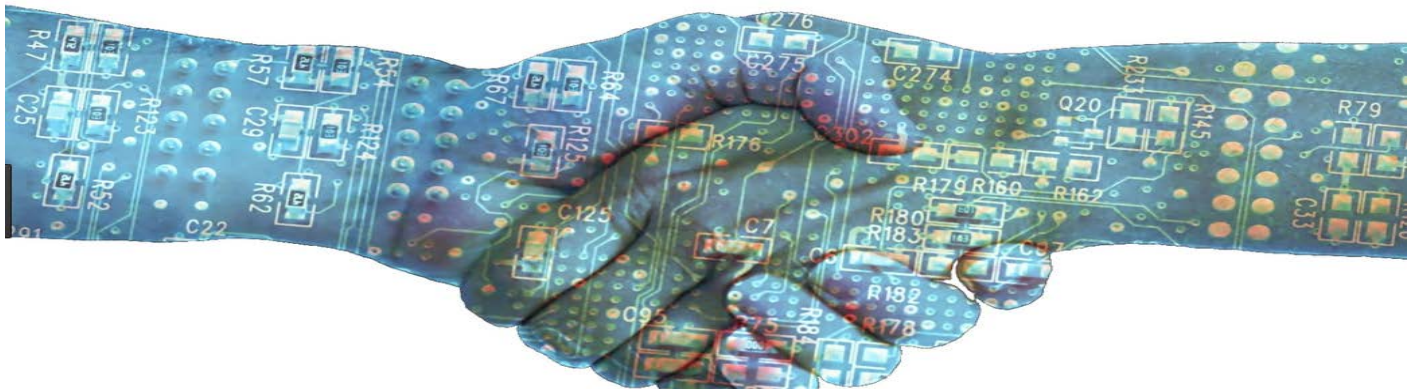
Blockchain:

- Needs no trusted intermediaries to validate transactions
- Creates digital scarcity so can be used to transfer value quickly and with no intermediaries
- End purpose of some Blockchain applications is to build a new internet, one free from cyber security hacks and spam
- Can have truly secure decentralised storage system, no need to use a centralised cloud storage controlled by one entity

Smart contracts

= self executing computer programme

- Smart contracts are not “smart” – depends entirely on what has been programmed
  - Can be: if X then Y
- Not limited just to “contracts” can be and is being used in all sorts of settings
- Currently main platform used is Ethereum, but can use the Bitcoin blockchain and others



Change……

- Some people/organisations find change harder than others
- And/or stick to “our systems work just fine”
- Or wanting to just make current (inefficient) systems faster, eg “a faster horse”
- But while disruptive and **painful** at first, the benefits are compelling – indeed for many institutions will be a case of cannibalise or be cannibalised
- We are very used to change and have changed more than we realise in recent years, eg:
  - Mission Impossible
  - Smart phones

Radio Shack add from 1991 – everything now can be done with smart phone

http://www.zmescience.com/research/technology/smartphone-power-compared-to-apollo-432/

Business dislikes uncertainty, people/businesses need answers…

- Questions I've been asked, or partners in large law firms that I know have been asked:
  - How are the profits of my cryptocurrency exchange taxed?
  - What tax do I pay if I am buying and selling cryptocurrencies?
  - I want to buy into a mining pool in New Zealand, what are the legal implications?
  - How do I satisfy the AML/KYC requirements
    - Answer =
    - No one can give a straight answer and depends upon who you ask

https://bitconnect.co/bitcoin-news/594/us-state-montana-grants-bitcoin-mining-company-416000usd.

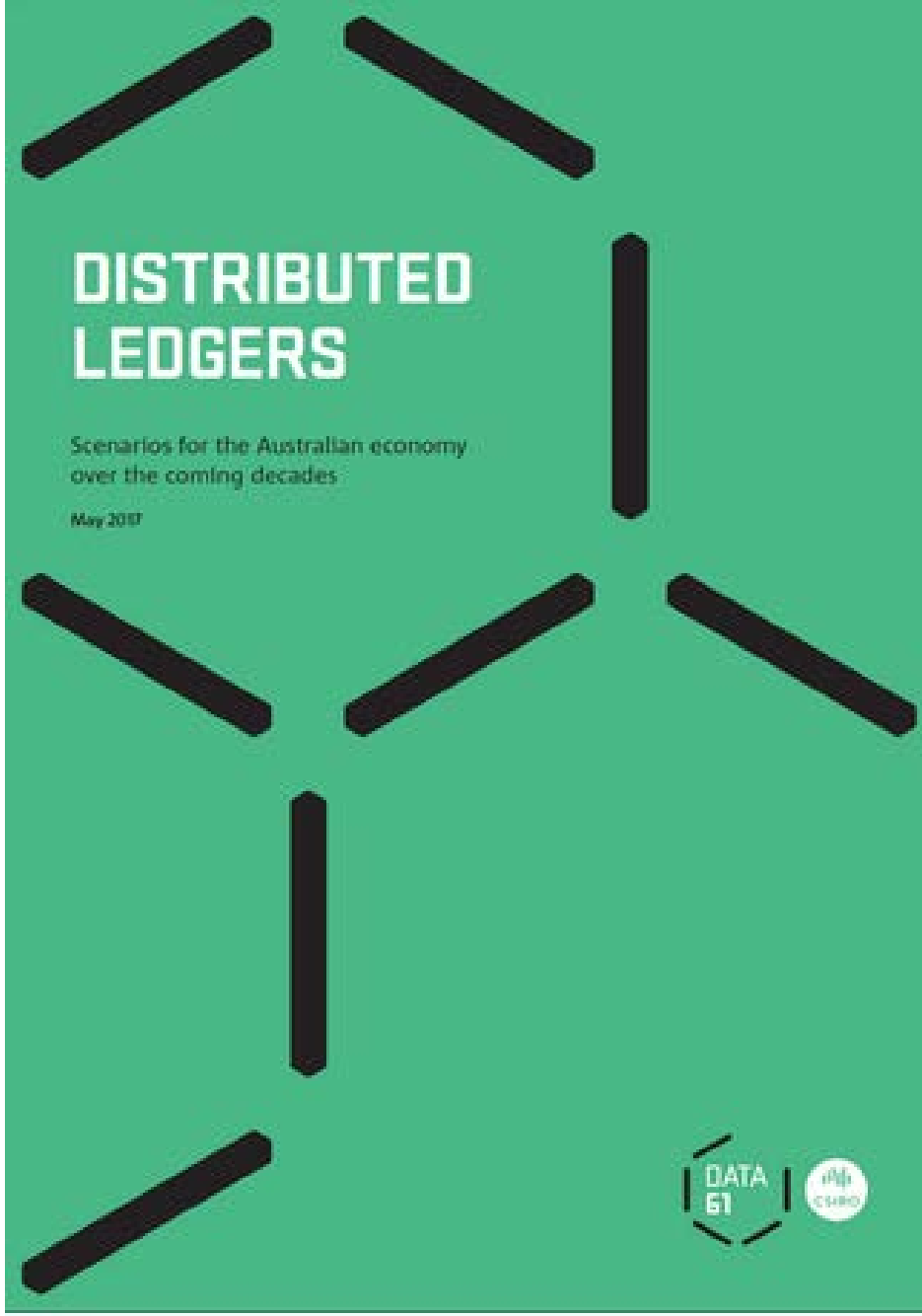
What is happening internationally…?

United Kingdom

https://www.gov.uk/government/news/distributed-ledger-technology-beyond-block-chain

Australia

Australian government Working on the basis that the technology will be there, not looking at the current state of technology



http://www.data61.csiro.au/en/Our-Work/Safety-and-security/Secure-Systems-and-Platforms/Blockchain

Singapore - “The future is here Project Ubin: SGD on Distributed Ledger”

A report developed with the contributions of Bank of America Merrill Lynch, BCS Information Systems, Credit Suisse, DBS Bank, HSBC, J.P. Morgan, Mitsubishi UFJ Financial Group, OCBC Bank, R3, Singapore Exchange and UOB Bank

The report “provide[s] a brief overview of DLT along with how Deloitte is pioneering innovation in the market, while outlining Project Ubin, which places a tokenized form of the Singapore Dollar (SGD) on a DLT. Singapore may be the first major financial centre in Asia to fully explore the benefits of DLT across a broad set of transformative applications.”

http://www.mas.gov.sg/~/media/ProjectUbin/Project%20Ubin%20%20SGD%20on%20Distributed%20Ledger.pdf

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GIBRALTAR FINANCE
HM Government of Gibraltar

Gibraltar

Proposals for a DLT Regulatory Framework

Published for public consultation by:

HM Government of Gibraltar
Ministry for Commerce
Gibraltar Finance

http://www.gfsc.gi/uploads/20170508%20DLT%20Consultation%20.pdf

What happens if nothing is done?


KODAK


Kodak

What happens if nothing is done?

- New Zealand businesses increasingly lose competitiveness compared to international competitors
- Online New Zealand businesses unable to sell to large segment of international consumers/businesses
- Innovative companies based on blockchain (and other new technologies) will not set up in New Zealand, will be lost overseas (= loss of jobs/tax revenue)
- New Zealand consumers pay more
- New Zealand consumers relatively unprotected
- Government delays its ability to improve/transform services and cut costs

Solutions/the way forward…

1. Break down silos – there is the Strategic Futures Group which is an excellent initiative, but also need cross fertilization lower down

2. NZ government needs to be a **very fast follower**

3. IRD, RBNZ, FMA, MoJ, Treasury, DIA etc need to work together and not develop contradictory positions/regulations

4. A unit, either existing one, created from scratch, possibly run by a new Chief Technology Officer, leads and drives work on the government as an enabler of blockchain/new technologies – “whole of government” so don’t have different people recreating the wheel

5. As part of 4, the unit works closely with industry rather than keep it all in house or outsource everything – so will need to build/acquire some talent

Solutions/the way forward…

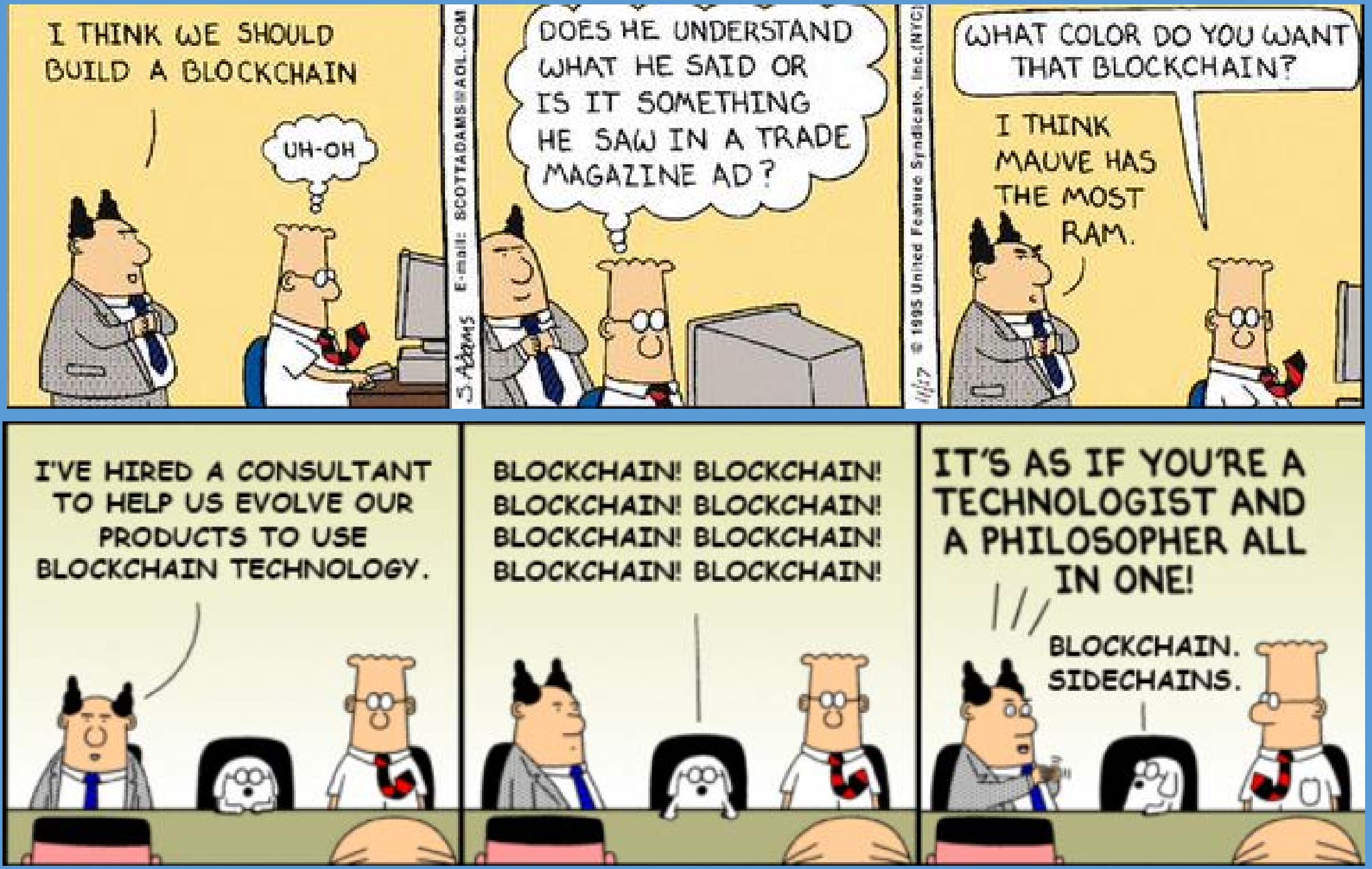
6. Greater input from industry/academia from the beginning – this was highlighted in CAANZ's Regulator of 2030 Report – is happening in Singapore.

7. To achieve the greater input, recommend:

- Secondments from academia/industry into government departments
- Government officials imbedded within universities/industry and even government departments/other entities overseas (as part of **fast following**)

7. Position needs to be taken quickly on cryptocurrencies:

- Cryptocurrencies are not unlawful in NZ, but banks' behaviour of shutting down accounts means de facto they are illegal in NZ
- Japan, cryptocurrencies now treated as valid payment channel
- Australian Tax Office is agnostic, just wants to collect tax
- NZ consumers/businesses disadvantaged if can't use cryptocurrencies
- To businesses to fully utilise Blockchain need to use cryptocurrencies
- Is not a case of blockchain good, cryptocurrencies bad


I THINK WE SHOULD BUILD A BLOCKCHAIN
UH-OH
DOES HE UNDERSTAND WHAT HE SAID OR IS IT SOMETHING HE SAW IN A TRADE MAGAZINE AD?
WHAT COLOR DO YOU WANT THAT BLOCKCHAIN?
I THINK MAUVE HAS THE MOST RAM.
I'VE HIRED A CONSULTANT TO HELP US EVOLVE OUR PRODUCTS TO USE BLOCKCHAIN TECHNOLOGY.
BLOCKCHAIN! BLOCKCHAIN!
BLOCKCHAIN! BLOCKCHAIN!
BLOCKCHAIN! BLOCKCHAIN!
BLOCKCHAIN! BLOCKCHAIN!
IT'S AS IF YOU'RE A TECHNOLOGIST AND A PHILOSOPHER ALL IN ONE!
BLOCKCHAIN. SIDECHAINS.

“In a world of change, the learners shall inherit the earth, while the learned shall find themselves perfectly suited for a world that no longer exists.”

Eric Hoffer