

# Blockchain

How it's being used and what's next

David Smith, Chief Executive  
Global Futures and Foresight



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## Introduction

Blockchain broadly refers to any distributed electronic ledger that uses software algorithms to record transactions with reliability and anonymity<sup>i</sup>. In a digital economy, there are clear attractions of a technology that enables transactions and interactions to be recorded securely and transparently in addition to being auditable, efficient and resistant to outages.

The technology chronologically records and links every piece of 'information' created across the network<sup>ii</sup>, where the 'information' could represent transactions, contracts, assets, identities, or anything else that could be scribed in digital form. Use in the supply chain is therefore a natural fit; just 6 percent of relevant executives have full transparency of their entire supply chain, while 65 percent have limited visibility or none<sup>iii</sup>.

Blockchain technology can be used beyond improving current processes, however. Deloitte suggests that '...like the Internet reinvented communication, blockchain may similarly disrupt transactions, contracts, and trust—the underpinnings of business, government, and society<sup>iv</sup>.' It has also been suggested that the potentially transformational impact of blockchain is '...like the early Internet. There's an inability to know in advance all the uses it could be put to<sup>v</sup>.' What the net was

and is to information, blockchain could be for notions of value. The business value-add of blockchain is forecast to reach \$176bn by 2025, and then exceed \$3.1Tn by 2030<sup>vi</sup>. Ultimately, there are very few industries that could not in some way utilise the blockchain, especially when one considers the twin emergence of data analytics and the IoT as these technologies could accentuate the possibilities of blockchain. Indeed, by 2019, 20 percent of all IoT deployments are forecast to have basic levels of blockchain services enabled<sup>vii</sup>.

As with many technologies, the real change is strategic (and related to business and organisational models) rather than purely technological. Computer systems and networks must be agile enough to be able to scale up to handle '...an immense volume of transactions as industries and governments begin using the technology to handle their core organisational processes — and complete their tasks in seconds rather than minutes<sup>viii</sup>.' Building the skills, partnerships and models appropriate for harnessing blockchain will take time, but as ever, use cases are being tried and tested now. The best of blockchain may still yet lie in the future, but those wishing to harness it need to start their own exploration now.

## Retail

Benefits from a given technology have usually either helped on the back-end or else on the consumer facing side. Blockchain promises to assist both concurrently by enabling a more transparent supply chain. The entire life-cycle of a product – who made it, where they made it and with what materials, as well as how it was transported could all be recorded on the blockchain and be retrieved by retailer or consumer instantly. This could help engender consumer trust whilst also helping retailers ensure compliance with their own standards and claims.

Supply chains that manage global commerce account for around \$50 trillion, or close to 70 percent of global GDP<sup>ix</sup>. Since an estimated \$3.4 trillion of working capital is tied up in this at any given time, small percentage improvements can yield hundreds of billions in efficiency savings. Transparency, and in some cases, disintermediation, enabled by blockchain could help reduce time and save money, not to mention help retailers' IP with regards to stopping counterfeit goods, for example. The OECD states that '...imports of counterfeit and pirated goods are worth nearly half a trillion dollars a year, or around 2.5 percent of global imports<sup>x</sup>.' Tracking goods on an immutable blockchain rather than vulnerable QR codes could help remedy this.

Blockchain could also help retailers overcome the challenge of combining the physical and digital in new and more secure ways. In-store sensors, for example, can yield a lot of information about consumers, often in real-time. Coupled with a decentralised ledger, this could ensure data privacy when entering a store whilst allowing for personalisation<sup>xi</sup>.

### Uses in the sector

- Walmart performed a blockchain supply chain test to track mangoes and reduced the time to track from 7 days to 2.2 seconds<sup>xii</sup>.
- In 2018 IBM and Danish shipping giant Maersk announced a joint venture to use blockchain in shipping supply chains<sup>xiii</sup>. Maersk foresees savings of around 15 percent '...mostly by eliminating the bureaucracy and corruption risk in manual procedures.'
- The largest online retailer in Russia, Ulmart, is reportedly considering blockchain in efforts to eliminate counterfeit items that regularly appear on its marketplace<sup>xiv</sup>.
- Soma is a platform for social buying and selling that aims to leverage the decentralised nature of the blockchain. The name stands for 'Social Marketplace,' and is aiming to re-establish trust by adding in the social dimension

whereby users are incentivised for being more social<sup>xv</sup>.

#### Possible future consequences

- Blockchain could turn a given supply chain into a demand chain<sup>xvi</sup>, shifting the balances of power between supplier, retailer and consumer – towards the latter.
- Blockchain technology allows for creators and users alike to share content via peer-to-peer networks, which could emerge as powerful independent retail platforms, or else as adjuncts whereby individuals ‘...work directly with and sell content to online retailers<sup>xvii</sup>.’
- The potential for a realignment of retail is possible, with micro-transactions earned by consumers for viewing ads, giving referrals or posting social reviews<sup>xviii</sup>.
- Will blockchains eventually replace the likes of Amazon and eBay? Blockchain based services could arguably lower fees and cut out the middle man<sup>xix</sup>.

## Financial Services

The collision of the financial services industry with blockchain could generate serious disruption, or perhaps transformation, depending on how the industry approaches this issue<sup>xx</sup>. Central to its disruptive potential is that blockchain ‘...decentralizes trust in financial transactions by distributing it among the participants<sup>xxi</sup>.’ IBM’s James Wallis suggests this is already more secure than most of the current financial systems it could replace<sup>xxii</sup>. Permissions and trust zones can also be established by users in the network, beyond the open public ledgers to include permission-shared or else private blockchains in which participation is limited to select entities.

The capacity, scope and impact of blockchain are all set to evolve. First, blockchains’ hitherto limited capacity is set to expand. Deloitte estimates that blockchain-based payment systems could equal the volume of the United States’ Automated Clearing House financial transactions network by 2020-2025 (it processes 23 billion transactions annually<sup>xxiii</sup>). This is no doubt still a constraint but not to the extent it currently is.

Second, analysis suggests that ‘...distributed ledger technology could reduce banks’ infrastructure costs attributable to cross-border payments, securities trading and regulatory compliance by between \$15-20 billion per annum by 2022<sup>xxiv</sup>.’ Third, in a WEF

survey of financial institution executives and experts, 58 percent believed that by 2025, we would hit a tipping point for blockchain. This was defined as ‘10 percent of global GDP will be stored on the blockchain<sup>xxv</sup>.’ Such an expression reveals a sea-change in attitudes towards digital assets and an appreciation of their ability to invert business models and unlock value.

### Uses in the sector

- 17 percent of banks have already generated revenue via blockchain<sup>xxvi</sup>.
- Blockchain can help investment banks save \$8 billion per year<sup>xxvii</sup>.
- Ripple, which runs on blockchain, wants to supplant the international Swift network and promises to accelerate cross-border payments. Sweden’s SEB bank says it used Ripple software for fast cross-border payments between accounts held by some of its corporate clients; Santander is expected to launch a cross-border payments app using Ripple’s technology to clients in Europe and America<sup>xxviii</sup>.
- Innovative banks have started experimenting with smart contracts - several foresee them as mainstream within next few years<sup>xxix</sup>.

### Possible future consequences

- Use of blockchain in financial markets likely to disrupt infrastructure providers like clearing houses and custodians.
- The benefits promise to be significant though, not least for the world's estimated 2.5 billion unbanked people<sup>xxx</sup> since the blockchain could enable better micro-payment efficiency and economic participation that is not dependent on physical bank branches.
- A 'trustless' system that enhances identity management, ownership and management of data and customer facing processes could deliver long-term strategic benefits, argues Ernst & Young<sup>xxxi</sup>. For example, 70 percent of all people who own

land have a tenuous title to that land<sup>xxxii</sup>. Blockchain could change that.

- By 2030, blockchain can cease all traditional banking services, says the State Bank of India<sup>xxxiii</sup>.
- 45 percent of banking execs think blockchain will change the industry as we know it and deliver better customer service<sup>xxxiv</sup>.
- Blockchain could enhance compliance; once the conditions of a blockchain based smart contract are fulfilled, exchanges and transfers could happen automatically, with associated tax and compliance done automatically.
- A.I and blockchain could detect money laundering and fraud more readily.

## Insurance

Blockchain technology is already impacting insurance markets<sup>xxxv</sup>, with twenty blockchain start-ups offering insurance services of one form or another in 2016<sup>xxxvi</sup>. More are likely since potential savings are significant at \$5-10bn in the reinsurance sector alone<sup>xxxvii</sup>, thanks to increased operational efficiencies. Across at least 80 real opportunities to apply blockchain tech cited in 2017, nearly one quarter existed in insurance<sup>xxxviii</sup>.

As a trust and efficiency engine, blockchain has the potential to drive radical change in the insurance industry, primarily through transparency. It could also act as a springboard into new geographic markets, especially those hitherto considered too risky. For example, '...a blockchain-based claims validation network could serve as a utility benefiting the entire industry by recording in a semipublic blockchain ledger the physical status of an insured asset, which in turn could help improve insurance penetration and adoption rates in emerging and developing markets<sup>xxxix</sup>.

Furthermore, blockchain adoption could drive new and emerging models of insurance, including P2P insurance, parametric insurance and microinsurance. However, a mere 30 percent of insurers believe that senior management has the necessary skills to make full use of data and analytics<sup>xl</sup> - indicating spaces for FinTech and

InsTech to thrive as adjuncts in the ecosystem.

### Uses in the sector

- New distribution methods like P2P could restructure the entire market - for example Dynamis is a P2P supplemental unemployment insurance protocol that '...uses the policy holders' social capital to replace underwriters<sup>xli</sup>.'
- Allianz Insurance recently launched a prototype for captive insurance. Allianz's blockchain connects to Citi's CitiConnect API to accept instructions and pay-out contracts and is designed for professional and property insurance. Automated processing replaces the exchange of thousands of emails and massive data files<sup>xlii</sup>.
- Allianz has also partnered with Nephila to use blockchain technology to execute a natural catastrophe insurance swap through smart contracts<sup>xliii</sup>.
- B3i is a consortium formed by some of the biggest names in the insurance and reinsurance arenas, to explore the blockchain. B3i's members include AIG, Aegon, and Swiss Re.
- Travel insurance policies are available where flight delays are monitored and smart contracts



automatically execute pay-outs if conditions are met<sup>xliv</sup>.

#### Possible future consequences

- Existing IT departments may not have the expertise or time to handle the sizeable technical aspects of digital transformation. Insurers could therefore look to partner or invest in third parties with relevant expertise – especially when it comes to technologies such as blockchain<sup>xlv</sup>.
- Successful blockchain use will itself require other technologies to be leveraged concurrently – from advanced data and analytics to AI. Implicit in this is a renewal and redesign of existing

processes and the introduction of new services and sources of value.

- P2P insurance could form an interesting adjunct the insurance markets, or else help in restructuring it.
- P2P insurance platforms may begin to use smart contracts to set claims and match demand between consumers in an online market<sup>xlvi</sup>.
- Insurers could reposition themselves as trusted partners and shift their business model in such ways.
- Adjunct revenue streams could open through consultancy services enabled through combined IoT and blockchain data.

## Legal Services

There is both a tendency to overestimate the impact of a technology in the near term, whilst underestimating its potential long-term consequences. This invariably leads to hype, limited use cases and, ultimately, disillusionment - all before disruptive changes then appears. This could accurately describe what has occurred to date with blockchain and the legal sector, where many of the ‘...promising transformative benefits are largely yet to become reality<sup>xlvii</sup>’.

Nevertheless, a group of law and tech firms have formed the Global Legal Blockchain Consortium, which ‘...aims to push forward blockchain technology adoption and standardization of blockchain in the legal industry<sup>xlviii</sup>’. The rationale for law firms, notes participant Bob Craig, CIO at Baker Hostetler is that blockchain tech could ‘...align law firms, clients and tech companies to transform the business of law<sup>xlix</sup>’.

Early case uses in other industries – especially in the form of smart contracts - point the way forward as the concept promises to do away with long legal paper chains. Blockchain could also play a role safeguarding IP; various musicians from Imogen Heap to Bjork have collaborated with blockchain start-ups. Another legal related case is with regards to land ownership registries. Interest from Honduras and Greece has been documented in the last couple of

years, and Sweden is currently making concrete moves.

### Uses in the sector

- Karim Derrick, head of R&D at Kennedys, suggests that much of the alleged involvement in blockchain amounts to ‘hot air.’ He does note, however, that Kennedys has built a fraud-focused insurance blockchain prototype<sup>i</sup>.
- Sweden is the country that’s furthest along in putting land registries on a blockchain<sup>ii</sup>. Forecasts suggest it could save the Swedish taxpayer over €100 million a year by eliminating paperwork, reducing fraud, and speeding up transactions.
- ‘Blocknotary is a company that seeks to apply blockchain technology to legal documents, and offers “timestamps and fingerprints for media files”, thereby eliminating the need for the rubber stamp of today’s notary public<sup>iii</sup>’.
- Steptoe & Johnson has begun to explore the applications of blockchain to different business functions and have announced that they will accept Bitcoin as payment<sup>liii</sup>.

### Possible future consequences

- Joanne Frears at Lionshead Law believes that commercial and dispute resolution lawyers could be out of a job within ten years. She suggests that ‘...once real services are put into blockchain, the role of a lawyer to do due diligence about the good or services, to check what can be offered under a contract, prepare the terms and present them to a purchaser is negated entirely<sup>liv</sup>.’
- The skillset for law and legal services will change, requiring new talent pathways, new education curricula and a new executive focus.
- New cross industry platforms are being created, as in the Netherlands<sup>lv</sup>. Involvement in such platforms is likely to prove critical.
- Whether or not large swathes are made redundant, relatively few are made redundant, or else lawyers need to upskill in preparation is still in debate. It is likely, however, that ‘...drafting a smart contract will require expertise and creativity in order to set the check and balances as well as safety nets and solutions for failures<sup>lvi</sup>.’
- However, as some doors close, others open. ‘Gains and losses from cryptocurrency transactions will need tax law advice, and regulatory needs like AML compliance will need its own set of guidelines unlike those that currently exist in the banking world that lawyers will need to help clients through. The banking industry itself is facing its own disruptions, one that will need lawyerly guidance<sup>lvii</sup>.’

## Health and Pharma

The pharma industry has a complex supply chain replete with multiple changes of ownership – from manufacturers to distributors, re-packagers, and wholesalers before products reach the customer<sup>lviii</sup>. Visibility throughout the chain can at times be opaque, potentially leading to issues such as counterfeiting as well as financial loss. The medicines supply chain thus represents perhaps the most obvious candidate for blockchain instigated improvement. An increase in security, greater efficiencies and less costly externalities could all ensue.

In fact, a blockchain based supply (or demand) chain management system would allow all players – from manufacturers, distributors, wholesalers and retailers to track the movement of materials across the globe<sup>lix</sup>.

It is possible that this may become the bare minimum, since the European Union's Falsified Medicines Directive '...stipulates that pharma companies and others in the drug supply chain will need to serialise their products for track-and-trace by February 2019<sup>lx</sup>.' The US has until 2023 to institute a similar national law. Adhering to these regulations is possible without blockchain, but as far as impending use cases go, it would seem hard to develop a better scenario for its use. ROI could be instant too, given that the World Health Organization cites figures of

\$200 billion in lost sales each year thanks to counterfeit medications, which comprise roughly 10 percent of global consumption<sup>lxi</sup>.

As a boost to consumer trust, the bottom line and efficiency within the supply chain, this is significant, but if used to achieve regulatory compliance alone, it won't provide a competitive advantage since one would assume blockchain solutions could predominate throughout the healthcare ecosystem for this very reason. Rather, enabling better customer experiences will likely prove the future killer app.

### Uses in the sector

- 'Gem Health is a network for developing healthcare applications and infrastructure on the Ethereum blockchain that gives patients control of their medical data. The company is working to allow patients, providers, and insurers to view a patient's health timeline in real-time and bring greater efficiency to the claims process. Gem Health has partnered with Philips to build permissioned blockchains that can be used in enterprise healthcare<sup>lxii</sup>.'
- MedRec is a decentralised content management system for medical records from MIT. 'It indexes medical records on the blockchain, allowing records to

be accessed by providers who have been granted permission. This is meant to help guarantee patient privacy, while creating an audit trail that makes it easy to find and verify patient information on the blockchain<sup>lxiii</sup>.

- In January 2018, Blockchain start-up Viant announced a new collaboration with pharmaceutical giant GlaxoSmithKline, Microsoft, and others to develop blockchain-based supply chain tracking solutions<sup>lxiv</sup>.

#### Possible future consequences

- In the future, patients could monetize access to their (blocks of) personal data<sup>lxv</sup> and mitigate security concerns related to data-sharing between different healthcare ecosystem players.
- Patient directed healthcare or at least more patient involvement in their own healthcare is likely as a result.

- A new healthcare ecosystem is likely to emerge, with current players needing to define their own positions within it.
- A blockchain-based payment process system ‘...can improve the efficiency of the hospital revenue cycle, in part by eliminating the need for intermediaries between hospitals, physicians, insurers and patients<sup>lxvi</sup>.’
- ‘Drug developers running clinical trials might be able to share clinical data and medical samples more securely and simply, while in healthcare, vaccine registries could be more easily set up and relied upon<sup>lxvii</sup>.’
- In an about turn from the cyberattacks directed at hospitals and healthcare providers, blockchain could help secure sensitive industry data from malicious attack<sup>lxviii</sup>.

## Marketing

Blockchain could significantly mitigate a process already underway, in which data held by organisations becomes 'toxic.' Often held and monetized without explicit consumer consent, the legal basis underpinning many data related businesses will almost certainly come under closer scrutiny.

The consequences of this have already been outlined by the World Economic Forum, which has proposed the concept of a data bank account. A person's data, it suggested, should '...reside in an account where it would be controlled, managed, exchanged and accounted for<sup>lxxix</sup>.' This previously fringe view is gaining currency; 'a senior Microsoft researcher has also proposed that '...by 2027 a significant proportion of personal income is likely to be derived from the data people generate<sup>lxx</sup>.' Blockchain is the technology that makes this possible.

The creation of a blockchain-based identity would allow consumers to control all aspects of their digital identity; choosing to share, sell or 'bank,' since the very nature of the technology is well geared towards micropayments. The implications for the marketing paradigm newly adjusted to digital, and aiming in many cases for better personalisation, could be profound in the mid to long term.

Assigning value to customer interaction is already common practice in

marketing, albeit not when it comes to paying consumers for interacting with marketers or the consumption of media<sup>lxxi</sup>. Acquiring consumer data is likely to become increasingly expensive for marketers, but concurrently result in better ROI. For one, data accuracy is likely to improve under such a scenario, meaning better targeting and one would hope, better data security. Ultimately though, the nature of the marketing conversation changes, with consumers increasingly in control of their interaction with brands<sup>lxxii</sup>.

### Uses in the sector

- Blockchain companies such as BitClave are focusing on search-data privacy, giving users full control over their data<sup>lxxiii</sup>, potentially disrupting data heavy marketing platforms such as Google and Facebook.
- Blockchain can '...embed a tracker to verify ad delivery and trace its journey across web to give you data on its impression, audience and action<sup>lxxiv</sup>.'
- Data should be more readily available to marketers by providing transparency and enabling the accurate analysis of marketing claims<sup>lxxv</sup>.

### Possible future consequences

- Paid ad platforms could be eliminated, or else highly modified.

- Proof of claims on products could be quickly verified by consumers.
- SAP suggests that, using the blockchain, it would be possible for customers to trade loyalty points with each other. IBM is already working on a blockchain infrastructure for loyalty and reward program in partnership with a start-up called Loyyal<sup>lxxvi</sup>.
- Data and analytics should become a cross-silo initiative, informed by compliance and legal issues but ultimately consumer-facing. For CMOs, ubiquitous data is likely to emerge as a key part in building

trust and new consumer propositions – in terms of how data is (mis)used, how it enables better lives for individual consumers and the degree of control that consumers retain over it.

- The use of blockchain for example, could radically alter how CIOs achieve this but would require complex legacy issues to be tackled. Marketing could morph into a trusted health advisor type position, offering personalised insight and recommendations in exchange for data access.

## Education

Unlike many other industries, education has multiple uses cases covering a wide range of processes. Nevertheless, its future disruptive potential is still high, since the European Commission explains that ‘...within an educational context, the term is on its way to becoming synonymous with the empowerment of individual learners to own, manage and share details of their credentials, without the need to call upon the education institution as a trusted intermediary<sup>lxxvii</sup>’. Companies are already exploring this area, with Sony wanting to digitize education records using the blockchain<sup>lxxviii</sup>. This, and the long list of use cases are unsurprising given that global higher education is worth anywhere between \$4-6 trillion and has not witnessed much disruption to its core model in decades<sup>lxxix</sup>.

Thomas Frey of the DaVinci Institute suggests that ‘...by 2030 the largest company on the internet is going to be an education-based company that we haven't heard of yet<sup>lxxx</sup>’. The chances of achieving such growth without blending digital technologies – including blockchain– would appear low.

Stephen Trachtenberg of George Washington University believes digitisation will allow learners to choose courses more compatible with their learning style. He suggests that ‘...earning a degree will lose importance as the range of credentials widens.

Certificates from schools, workplaces and industry, alongside something akin to the merit badges earned by Scouts, will gain in respectability – especially once a new system of accreditation for them is developed<sup>lxxxii</sup>’.

### Uses in the sector

- The UK's Open University UK is using blockchain to ‘...improve access to higher education and transparency of qualifications through MOOCs, open badges, and e-Portfolios<sup>lxxxii</sup>’.
- The University of Nicosia on Cyprus issues academic certificates onto the blockchain<sup>lxxxiii</sup>.
- The On-Demand Education Marketplace (ODEM) is a blockchain platform that aims to provide learners and teachers with a flexible educational hub where they can directly connect, plan and confirm in-person courses<sup>lxxxiv</sup>.
- ODEM students can place requests for specific courses and teachers can directly respond to those requests.
- Likewise, LiveEdu is working on a Blockchain based learning platform. They ‘...connect different participants like content creators, learners, API developers and moderators<sup>lxxxv</sup>’.
- LiveEdu incentivises its content creators. They receive EDU coins



for creating content. The more learners engage with the content the more its creator is rewarded<sup>lxxxvi</sup>.

- EchoLink verifies a job candidate's education, skills and work experience, saving time to recruiters<sup>lxxxvii</sup>.

#### Possible future consequences

- Educational attainment is still largely presided over by traditional gatekeepers of higher education. There are MOOCs and other online courses, workshops and conferences, co-learning spaces and boot camps, but these rarely carry a comparable weight. This could change.

- However, the centralised model of present-day learning is under pressure from various sources, not least the sustainability of charging people high sums of money for knowledge that can, in many cases, be gained online for free. Blockchain is the technology that could allow for a total disintermediation and disaggregation of higher education.
- Micro-accreditation could take place through a blockchain, allowing for the easy validation and transfer of skills and credentials<sup>lxxxviii</sup>.
- Education models could shift in terms of their delivery and recording, as well as duration, focus and attainment standards.

## Automotive

It is likely that ‘...in the next 30 years, we are likely to see more change in transportation technology than we've seen in the last 100 years<sup>lxxxix</sup>.’ As the ultimate mobile device of the future, cars and the wider automotive industry are exposed to a wide range of technological developments; 5G, artificial intelligence and the IoT readily come to mind. With blockchain, automotive manufacturers are now facing another potentially transformational technology.

Many new technologies are not plug and play – they can be applied at either the consumer interface or the back-end, but most require a change in organisational or business model. Blockchain is slightly different in that it compels changes in organisation and business models first and foremost. Since 69 percent of industry executives rate ‘...creating new services-based offerings,’ as a significant growth area for the industry<sup>xc</sup>, it is likely that blockchain will be pursued, and in a number of different directions.

### Uses in the sector

- Car manufacturer ZF Friedrichshafen, UBS and IBM are ‘...working to develop a blockchain-based mobile payment system for the automotive industry. Car eWallet is a digital assistant in the car that allows secure and

convenient payments on the go<sup>xci</sup>.’

- Porsche is testing the use of blockchain tech to pass data between parties without the fear of fraud<sup>xcii</sup>.
- Renault is piloting ‘...a digitized car maintenance program, which uses blockchain as a shared ledger to log all car repair and maintenance history in one place. Renault’s next pilot will focus on vehicle-based microtransactions – essential to integrating the IoT with the exchange of value<sup>xciii</sup>.’
- In 2017, Mahindra (India) created a blockchain incubator focused specifically on automotive financing<sup>xciv</sup>.
- ‘A company called BigChainDB is developing CarPass in an effort to centralize all information about a car to a shared immutable and transparent database involving telematics data, device data, and financial services data logged onto a blockchain<sup>xcv</sup>.’

### Possible future consequences

- In 2017 The Toyota Research Institute announced its exploration of blockchain for use in the ‘...development of a new mobility ecosystem that could accelerate development of autonomous driving technology.’ The aim, together with multiple partners is to ‘...foster a digital

environment where users – both businesses and consumers – may securely share driving and autonomous vehicle testing data, manage ride-share and car-share transactions and store vehicle usage information that could be used in the setting of insurance rates<sup>xcvii</sup>.

- IBM notes the possibilities of using the blockchain for personalisation, since it could be used to ‘...identify the digital identity of a driver, a rider and a car. The configuration and preferences of a specific car can be locked to an individual’s identity<sup>xcviii</sup>’.
- New business models could emerge, once both

micropayments and driver/rider identity are confirmed, such as pay per mile<sup>xcviii</sup> and insurance (if still needed) by the mile.

- It is plausible that the future automotive ecosystem, will resemble modern technology ecosystems with their platform business models, permission-less innovation by developers, and domination of software-centric companies
- Without OEM involvement in blockchain ecosystems, it is possible that customer relationships and data are at risk of capture by new-entrant mobility providers offering increasingly integrated travel solutions.

## ICT

Depending on where a given organisation is in the expanding tech ecosystem, blockchain could have very different implications. For budding tech companies like GE, blockchain could twin nicely with their IoT based business model, whilst for others, their core business model could be under threat if blockchain does indeed allow consumers to better control their data. In fact, Tim Berners Lee has said that blockchain technology could help reduce the power and influence of big-tech companies, even if it could come with some of the same problems as the web<sup>xcix</sup>.

Perhaps crucial is the way blockchain and the IoT dovetail. By 2019, some 20 percent of all IoT deployments could have basic levels of blockchain services enabled<sup>c</sup>. The range of services that could flow from this include analysis, forecasting and consulting. Indeed, online platforms like Augur are already looking to create global decentralised prediction markets.

Tech companies are already populating a range of blockchain consortiums—including the Enterprise Ethereum Alliance, Hyperledger Project, R3, and B3i – that are aiming to develop a range of enterprise blockchain solutions<sup>ci</sup>. However, the emergence of multiple, often industry specific, protocols and platforms has hindered the development of standards (either process or

technical) and mass market uptake would appear to be partially blocked by the state of many companies stalled digital transformation. As with other technologies, siloes, a lack of understanding and inertia could prevent short term penetration of blockchain into some industries.

### Uses in the sector

- As of March 2018, IBM reported involvement with 63 blockchain clients on 400 projects<sup>cii</sup>. Its list of clients includes the likes of Walmart, Visa, Nestle, and HSBC.
- Samsung and IBM are using blockchain technology for a new concept called ADEPT, which will create a decentralised network of IoT devices. If successful, this ‘...would eliminate the need for a central location to handle communications between them. The devices would be able to communicate to each other directly to update software, manage bugs, and monitor energy usage<sup>ciii</sup>’.
- Cisco, Bosch, Gemalto and others have set up the Trusted IoT Alliance as another blockchain platform<sup>civ</sup>.
- Blockchain increases security for cloud storage, with Storj one such example of a cloud storage network using the technology<sup>cv</sup>.

- Several other enterprise software vendors have developed Blockchain as a Service offerings, whereby customers leverage blockchain in cloud environments.

#### Possible future consequences

- Blockchain could be the next cybersecurity frontier by 2025<sup>cvi</sup> and a key enabler of privacy and security. However, security risks do exist with current prototypes and releases.
- Gartner claims ‘...blockchain is estimated to have delivered \$4 billion in business value-add or technology innovation in 2017, with that growing to \$21 billion by 2020, \$176 billion in 2025 and

\$3.1 trillion by 2030<sup>cvii</sup>.’ Such figures tend to suggest a wide range of markets using it.

- Currently, almost six in ten large corporations are considering using blockchain<sup>cviii</sup>.
- McKinsey predicts commercial deployment of blockchain technology at scale by the year 2021<sup>cix</sup>.
- New value and business lines will almost certainly be unlocked, enabling consultancy, forecasting and analysis to form the core of future offerings.
- New skills, new partnerships and agile organisation will all be key to developing successful blockchain related propositions.

## Conclusion

Blockchain is a disruptive technology for a wide range of industries as it digitises, decentralises, secures and incentivises the validation of transactions<sup>cx</sup>. Whilst it may not even be the host technology of future cryptocurrencies (though likely is), it has the potential to disrupt existing ways of doing things, especially with relation to ‘...transaction processing, settlements, accounting, reporting and auditing in a wide range of industries<sup>cxii</sup>.’ An overarching, if under-appreciated versus these technocratic processes, is of consumer empowerment.

A digitised supply chain allows the shift from product-centric to service-centric business models. For example, with a constant flow of data about product usage, the customer could be charged based on outcomes. Jim Kavanaugh, IBM chief financial officer, notes the ability of their ‘...clients to simplify complex, end-to-end processes in a way that couldn’t have been done before<sup>cxiii</sup>.’

For those who take the time to build a blockchain ready organisation – most notably relating to staff competencies and skills, ‘...creating a blockchain based company will become as easy as creating a facebook group<sup>cxiii</sup>.’ It should be of at least mild concern then, that some 39 percent of senior executives at large US organisations still report little or no knowledge of blockchain<sup>cxiv</sup>. Remedying this should be of prime importance at both boardroom level and throughout the executive suite and given its strategic importance, this means more than just the CIO.

This haste should not be mistaken for diving into the technology without asking some critical questions, however.

- How could blockchain enable our strategic objectives over the next year, the next five years, and the next ten years?
- How can we use it to improve our back-end processes? What about consumer experience?
- What should our implementation roadmap look like?
- Where can we find talent replete with both technical insight and commercial experience?
- Is IT prepared and able to work across silo boundaries to deliver business value?
- If we go with off the shelf products, can we evaluate both the participating entities and the underlying platform? The choice of the latter ‘...could pose limitations on the services or products delivered, both now and in the future<sup>cxv</sup>.’
- What does a suitable risk assessment look like for blockchain<sup>cxvi</sup>?

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