



OPEN ACCESS GOVERNMENT

BLOCKCHAIN INNOVATION

DISRUPTIVE INNOVATION: HOW DISTRIBUTED LEDGER TECHNOLOGIES ARE ABOUT TO CHANGE SOCIETY

EUROPEAN COMMISSIONER FOR DIGITAL SINGLE MARKET,
ANDRUS ANSIP SHARES HIS THOUGHTS

IN THIS ISSUE

12

The founder and co-founder of the Blockchain Federation provide insight into the use of blockchain in business, including cryptocurrency

16

The Crypto Valley Association's **Tom Lyons** argues that decentralised culture and democratic tradition have made Switzerland an epicentre of the blockchain revolution

20

R3's **Chase Gordon** describes the cutting-edge distributed ledger technology available for businesses in the financial services industry



DECENTRALIZED 2018

REGISTER TODAY

Don't miss your chance to participate
in Europe's premier Blockchain conference

14-16 NOVEMBER 2018

PARKLANE RESORT, LIMASSOL, CYPRUS

www.decentralized.com

Powered by



UNIVERSITY
of NICOSIA



Jonathan Miles
Editor

Production Coordinator
Nick Wilde

Designers
Andrew Bosworth
Ben Green

The editor does not necessarily agree with or endorse any of the views or contents of the articles and features within this document. All articles and editorials remain the copyright of the authors, organisations and other relevant authorities by whose kind permission they are reproduced. All information has been checked and is correct at the time of going to press. The publisher will not be liable for any loss suffered directly or indirectly as a result of the use of or reliance on the information contained herein.

© Adjacent Digital Politics Ltd 2018

Adjacent Digital Politics Ltd and its suppliers collect and process personal information for the purposes of customer analysis and market research. Our group/affiliate companies may also wish to contact you about our products or services, or the products of carefully selected third parties that we think you may be interested in.



Adjacent Digital Politics Ltd
Datum House
Electra Way
Crewe Business Park
Crewe
Cheshire CW1 6ZF

Registered in England & Wales.
Company Reg No. 8667479.
VAT Registration No. 169 9152 64.



INTRODUCTION

Welcome to the February 2018 Blockchain Innovation supplement. We begin with an article by Vice-President and European Commissioner for Digital Single Market, Andrus Ansip, who shares his thoughts on how digitisation is changing both people and society, including disruptive technologies such as blockchain.

Updating us on the latest developments in the industry, both the founder and co-founder of the Blockchain Federation provide insight into the use of blockchain in business, including how the Telegram app is said to launch its own crypto payment network.

Turning to a compelling country perspective, The Crypto Valley Association's Tom Lyons argues that along with Switzerland's competitive advantages, decentralised culture and democratic tradition have made the country an epicentre of the blockchain revolution.

In addition, we interviewed R3's Chase Gordon in the United States to learn about cutting-edge distributed ledger technology for businesses in the financial services industry today. The supplement ends with an opinion piece by Director of Developer Ecosystem at Hyperledger, Marta Pierkarska, who asks if we are ready for a blockchain world in the future.

I hope that you find this fascinating supplement insightful. I would certainly welcome any comments you have on this edition. Please also feel free to drop me a line about any suggestions for content you would like to provide in 2018 and beyond.

Jonathan Miles
Editor



CONTENTS

04 Disruptive innovation: How distributed ledger technologies are about to change society

06 University of Nicosia – School of Business, Dept of Management and MIS

08 Etherify

12 Blockchain in business: Telegram app said to launch its own crypto payment network

14 Tieto

16 Switzerland, blockchain's spiritual home

18 B3i

20 Distributed ledger Blockchain technology for the financial services industry

22 The UCL Centre for Blockchain Technologies

26 Are we ready for a blockchain world?

28 Aalto University – Business School

Disruptive innovation: How distributed ledger technologies are about to change society

European Commissioner for Digital Single Market, Andrus Ansip shares his thoughts on how digitisation is changing both people and society, including disruptive technologies such as blockchain

It is often said how much digitisation is changing people and society and how much it affects every sector of the economy. Technology facilitates access to social and economic services.

People's awareness is growing – along with their demands and expectations.

With financial technology, for example, one-third of digitally active consumers worldwide use two or more Fintech services, according to Ernst and Young's Fintech Adoption Index. It is a good reason why, so many industry sectors are investing in new and emerging areas, such as distributed ledger technologies or blockchain.

“Blockchain-inspired technologies are being widely discussed around the world and tested across multiple industry sectors – energy, logistics, automotive, health among others – where the potential is being increasingly understood. According to a recent PWC report, more than 77% of financial institutions are expected to adopt blockchain by 2020.”

Disruptive technologies like blockchain can help to reduce costs while increasing efficiency and transparency. They have huge potential for making social and economic transactions more secure online by guarding against an attack and removing the need for any middleman.

Today, most people use a trusted intermediary like a bank to make a transaction. By contrast, blockchain allows groups of users, like consumers and suppliers, to link directly.

Image: © European Union, 2017



Andrus Ansip, Vice-President, European Commissioner for Digital Single Market

It can be used to record transactions carried out across many computers so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the collusion of the network.

This provides an inexpensive and easy way to verify and audit transactions, which then become traceable and transparent: both essential elements in the fight against fraud.

What I also find inspiring about blockchain technologies is that they can allow mathematics and algorithms to create trust between parties that interact only occasionally, or may not know each other at all. They can co-create and share the database – safely and securely.

In its White Paper on blockchain published last year, the World Economic Forum said that the technology was “pulling us into a new era of openness, decentralisation

and global inclusion". Unlike the internet alone, it said: "blockchains are distributed, not centralised; open, not hidden; inclusive, not exclusive; immutable, not alterable; and secure." It is early days, but blockchain is definitely moving out of the lab and going mainstream.

Many people know it as the technology that enables cryptocurrencies like Bitcoin and Ether on Ethereum. But blockchain's potential uses extend far beyond digital currencies.

Blockchain-inspired technologies are being widely discussed around the world and tested across multiple industry sectors – energy, logistics, automotive, health among others – where the potential is being increasingly understood. According to a recent PWC report, more than 77% of financial institutions are expected to adopt blockchain by 2020.

Europe should see it as a new opportunity to innovate in services, to create businesses and new models. While it is too early to make firm predictions, blockchain can be expected to enable new enterprises to form, while transforming others. It will certainly create new jobs.

We should be ready to take up all opportunities that these technologies can provide, to innovate across many sectors – both public and private – while keeping an eye firmly on proper governance, security, protection of users and transparency. Other countries are already moving ahead.

That is why the EU is funding development of distributed ledger technologies, via the Horizon 2020 research and innovation programme, as well as pilot projects funded by the European Parliament.

We are also funding projects for testing blockchain in handling medical data, in social applications, RegTech and in media applications. This should expand further in 2018 and beyond, as the technology matures with an accompanying rise in interest and demand.

For this to work, a coordinated European approach is essential, rather than a patchwork of national initiatives – and one that is also technically interoperable. Fragmentation among countries will only hold us back as we continue to build a functioning Digital Single Market.

We are launching the EU Blockchain Observatory and Forum to expand our expertise on blockchain development, map existing initiatives, to explore use cases and any barriers to them and to monitor trends and developments. It will also gather all parties involved to address the various implications of blockchain: technical aspects, legal and regulatory concerns, governance and interoperability issues.

“Disruptive technologies like blockchain can help to reduce costs while increasing efficiency and transparency. They have huge potential for making social and economic transactions more secure online by guarding against an attack and removing the need for any middleman.”

We plan to build on Europe's substantial talent base and excellent start-ups to become a leading world region that will develop and invest in the rollout of blockchain.

First, however, we need to formulate a clear European vision and strategy so that the right environment and conditions are created for EU countries and industry – from large companies to start-ups – to work towards this goal.

Blockchain development is still at an early stage – and Europe is still in a strong position to lead in this area. It is a new opportunity to innovate in services, to create businesses and new models and to be competitive on the global stage. We should not hesitate to do so. ■

Andrus Ansip
Vice-President, European Commissioner
for Digital Single Market

European Commission

cab-ansip-web@ec.europa.eu

https://ec.europa.eu/commission/commissioners/2014-2019/ansip_en

www.twitter.com/Ansip_EU

Blockchain and AI research at the University of Nicosia

Prof. Spyros Makridakis and Prof. George Giaglis, Directors of IFF at University of Nicosia lift the lid on the institution's blockchain and artificial intelligence (AI) research, including the launch of The Institute For the Future (IFF)

2018 may prove to be a historic year: as a number of technological innovations are reaching maturity and are converging with each other, it is now possible to imagine a singularity that will irreversibly transform the world as we know it.

Blockchains and digital tokens traded on them are at the epicentre of this transformation. If one looks beyond short-term discussions around the recent valuation spikes (and inevitable subsequent fall) of some of these tokens, we can't miss the promise of the newfound ability to create trust among people, who do not even need to know each other, without intermediaries, with only the help of distributed networks and the clever combination of public key cryptography and game theory economics. Such innovation promises to create a wholly new type of Internet; one on which value exchange will be as democratised as information exchange is on the Internet we know today.

Such innovation will surely be transformational in its own right, changing forever the role, structure and functions of today's prevailing markets, economies and perhaps even nation states. Just imagine then the possibilities opened up in a world in which such trustless networks will be connecting, not only humans, but also intelligent machines and even autonomous organisations. Ongoing developments in the field of artificial

intelligence (AI) have enabled scientists to design algorithms that learn on their own, without the need for supervised human training. And they can learn so fast that, after a few 24 hours of self-training, are able to surpass human performance in fields like playing chess, beating poker champions, recognising faces in images, synthesising speech, even negotiating with humans (and with each other).

As such algorithms become powerful, cheap and widespread enough to replace humans across various jobs and functions, they will usher an era in which machines will engage in human-to-machine (H2M) and machine-to-machine (M2M) commerce. The impact to competitiveness, productivity and growth will be so immense that people will soon find themselves unable or unwilling to compete with their algorithmic partners, delegating more and more economic activity to machines and being freed up to engage in other, mostly unthought-of and unsearched activities.

Drawing on such convictions, the [University of Nicosia](#) (UNIC), has been among the first universities in the world to embrace the technologies of the future and bring them together into a new interdisciplinary research centre devoted to advancing their technological, business, social, regulatory and ethical implications.

The Institute For the Future (IFF) aims at expanding our understanding of blockchain and AI as well as their effective integration, contributing to their effective application in industry, government, education and society in general. IFF's vision is to become a leading academic institution and a top global player spearheading interdisciplinary research and innovation inside the university, in Cyprus, in the EU and the world.

IFF is headed by [Professor Spyros Makridakis](#) and [Professor George M. Giaglis](#) and its blockchain activities by [Professor Soula Louca](#). IFF is staffed by a growing number of professors, post-doc researchers, doctoral candidates, graduate students and admin staff, also offering visiting positions to prominent scholars from industry and academia.

IFF also sponsors, either from UNIC funds or from industry backers, Ph.D. students and IFF post-doctoral researchers to work in the above areas with it's in residence scholars, senior associates and visitors. Finally, IFF is also working toward establishing an incubator/accelerator for promoting promising technology entrepreneurs and dynamic start-ups in its areas of expertise.

IFF has already made significant progress in the field of blockchain and AI. UNIC is today considered the leading university globally in the digital



UNIC CEO, Antonis Polemitis, Interviewing Member of European Parliament, Eva Kaili, at Decentralized 2017

currency and blockchain field. As the first university to offer a course on cryptocurrency, a free online course Introduction to Digital Currencies, taught by Andreas Antonopoulos and Antonis Polemitis, the MOOC has enrolled over 15,000 students from 80 countries since 2014.

Furthermore, UNIC's MSc in Digital Currency was the first academic degree programme in the world in this field, graduates of which have been involved in leading blockchain organisations worldwide. Over 350 students from around the world have enrolled in the programme, representing a wide range of backgrounds, including financial executives, blockchain entrepreneurs and software developers. Graduating students have gone on to work at key firms in the industry, created startups in the blockchain space or work in government and academia. Similarly, its AI publications have appeared in both academic and practitioners' journals.

Adding to its leading position, UNIC is the first university in the world to offer instant, electronic authentication of its certificates (Bachelor, Master and Doctoral Degrees), via an online verification tool on its website. Specif-

ically, all certificates issued as of Spring 2017 have been digitised using blockchain technology and are available to students online. Each certificate's fingerprint has been added to Bitcoin's blockchain, offering users (e.g. potential employers) immediate, secure and digital authentication.

UNIC's prominent role in academia has been recognised by blockchain industry publications in their evaluation of UNIC's position among universities in the field as it is confirmed by their rankings – CoinDesk (#1, 2016), the Merkle (#1, 2017). UNIC's blockchain initiatives have drawn immense interest from global media over the years, with over 300 articles written about UNIC's activities by global media organisations such as the Wall Street Journal, Associated Press, Euronews, Forbes, Time, Fast Company and many others (for more information about UNIC's digital currency and blockchain initiatives, see <https://digitalcurrency.unic.ac.cy>).

Today, UNIC, through its School of Business, School of Sciences, The Institute For the Future (IFF), has probably the largest team in the academic world working on cryptocurrency and blockchain issues, with over 35 faculty,

industry lecturers, administrative staff and guest lecturers involved with the initiative, across teaching, research and software development. In addition, it is developing its AI activities and, as mentioned, their integration with blockchain.

Recently UNIC organised DECENTRALIZED 2017, a major conference in Europe focusing on the business and political implications of blockchain technologies, across several key industries, including shipping/supply chain, financial services, government, accounting/auditing and legal and governance, along with predictions on the long-term implications of blockchain and artificial intelligence on our society and firms.

The event hosted over 500 participants from all over the world for a three-day summit, showcasing 50+ speakers from various sectors of the industry and academia. This year's conference, DECENTRALIZED 2018, to be held in November, will bring together more than 1,500 attendees and more than 70 speakers in a two-day world-class event (see more details and register at <https://www.decentralized.com>).



UNIVERSITY
of **NICOSIA**

Prof. Spyros Makridakis
Director of IFF

University of Nicosia

Tel: +357 2284 1948

digitalcurrency@unic.ac.cy

digitalcurrency.unic.ac.cy

<https://twitter.com/MScDigital>

Leading Portugal's blockchain revolution

In a special interview with Open Access Government, Justin Wu from Etherify sheds light on the firm's role as a leader in Portugal's exciting blockchain revolution

Etherify is the first Ethereum consulting and software development firm in Portugal. Etherify was started in April 2017 by two young entrepreneurs: Justin Wu and Fernando Moreira. Since then the firm has grown to become a leader in the blockchain revolution in Portugal. With projects ranging from commercial banking, the charity fundraising industry and video-games, Etherify's CEO Justin Wu sat down with Open Access Government (OAG) to discuss his experience.

OAG: Where did the idea of Etherify come from?

JW: I've been involved in cryptocurrency in one way or another since 2013, during the first big Bitcoin bull-run. Although it was exciting to watch the price action, I was also very interested in the technology behind Bitcoin: the blockchain. When Ethereum came out in 2014 and had a programmable blockchain with its own programming language, I knew that I had found something special. It was like catching a glimpse of the future. Programmable money! Now that's an amazing idea. I knew I had to be a part of this, so I began studying it in my free time. Then in late 2016 I met my partner Fernando, who runs a start-up incubator in Lisbon, and Etherify took off from there.

OAG: Why did you choose Portugal, of all places, to start your business?

JW: Portugal has an incredible entrepreneurial spirit and a heart for innovation. I came here several years ago at the bottom of the economic crisis in the country and I saw many people who were down on their luck. But then entrepreneurs took it upon themselves to create a renaissance in the city and redefine what it means to do business here in Portugal. I think Ethereum is a sort of force multiplier for start-ups, because it allows them to compete with larger incumbents in ways that they couldn't before.

A great example is funding. Nowadays, a start-up can do an Initial Coin Offering (ICO) and get funding for their idea or to bring their prototype to finished product and then to market. Before these start-ups would have to go to VCs and the process was much harder and you'd have to give up equity. Etherify wants to help other Portuguese start-ups get funding through ICOs and/or use Ethereum to help them both compete and innovate.

From a regulatory standpoint, the Portuguese government has started initiatives to help both start-ups and fintech firms. We at Etherify are pushing to get blockchain recognised as a

huge untapped business opportunity for the country on the national level. We are a member of Associação Fintech e Insuretech Portugal (AFIP) and we helped to organise the Blockspot Conference, the first international blockchain conference based in Lisbon, Portugal.

OAG: Why did you choose Ethereum as your focus, why not other blockchain platforms?

JW: For us, Ethereum is the most flexible blockchain to use. From a development standpoint, Ethereum has the most developers and developer tools out there of any blockchain ecosystem currently available, so it is the best for a firm such as us. Ethereum has the most network effects as well, indeed it handles more transactions per day than all other blockchains combined, including Bitcoin. At the enterprise level you have many Fortune 500 companies joining the Enterprise Ethereum Alliance, so I think we are in good company.

OAG: Why not just use Bitcoin, for example?

JW: Ethereum will very soon become the #1 cryptocurrency in terms of market cap. It already is #1 in developers and developer mind-share. This



Fernando Moreira and Justin Wu

is important because everyone nowadays is talking about Bitcoin. But it is just a matter of time before Ethereum overtakes it in price and this is important to have as the leader in the cryptocurrency space, a platform that actually cares about things like scaling, decentralisation and privacy.

Bitcoin is like a pocket calculator. It is only good for one thing: moving value from one person to another. Ethereum is like a brand-new smartphone. Developers can create any type of application for Ethereum for any use case. The programming language for Ethereum called Solidity is much more flexible, useful and easier to learn than Bitcoin's programming language. There is much more developer support and documentation for Ethereum developers than for Bitcoin, in my opinion.

Scaling the network is a huge issue too. Currently, no blockchain technology can scale to the level where it is ready to handle the transaction demands of the entire human race. Only Ethereum has scaling solutions in development and ready to both test and deploy in the early part of 2018. Bitcoin currently has no viable scaling solution and their leadership is questionable, at best.

“What we are witnessing is the birth of a new asset class that I believe will grow to dominate both the economy and finance over the coming years. I’ll tell you what the real bubble is: The Federal Reserve and other central banks printing money out of thin air like there is no tomorrow.”

Ethereum’s core developers are unified behind their leader Vitalik Buterin

on Ethereum’s scaling vision. Currently, Ethereum can handle around 20 transactions per second. To get on the level of Visa/Mastercard, Ethereum would have to increase this to at least 4,000-5,000 transactions per second.

Network upgrades to Ethereum such as Proof of Stake, Raiden and Sharding would allow Ethereum to surpass these transaction capacities. These upgrades are all slated to come out during 2018.

OAG: Can you tell us about some of the projects you are working on?

JW: We have two ICOs in the pipeline right now: Gamestatix and Hustle for Humanity.

Gamestatix is going to do the video-

games industry what AirBnB did to hotels. The video-games industry has two fundamental problems: discoverability and lack of robust incentives for co-creation of video-games.

The discoverability issue is the major problem. Big game studios dominate the charts time and time again because they just release further iterations of the same game franchise. Thus, you have Battlefield 4, Final Fantasy 17, etc. etc. Newer game studios and franchises can't break into the public consciousness because these incumbents have millions of dollars to market and stay on the top.

“Bitcoin is like a pocket calculator. It is only good for one thing: moving value from one person to another. Ethereum is like a brand-new smartphone. Developers can create any type of application for Ethereum for any use case.”

Gamestatix is creating a token that will be rewarded to gamers for playtesting new video games, from early-stage development and for being an active member of that game's community. Gamers are also rewarded for both creating and curating content. So, we are tackling the two big problems in the video-game industry, with our token and platform.

Hustle for Humanity is a fantastic project in that it aims to disrupt the for-profit charity fundraising business. And it is a business. Did you know that many charity fundraising firms routinely keep up to 80% of the funds raised through them, only leaving 20%

to go to the charity? Some fundraising firms even lose money. We think that is very unfair and we want to cut out the middleman in charity fundraising using blockchain technology and a unique incentive structure.

OAG: Sounds interesting. But many people are asking, 'are cryptocurrencies in a bubble'?

JW: Absolutely not. What we are witnessing is the birth of a new asset class that I believe will grow to dominate both the economy and finance over the coming years. I'll tell you what the real bubble is: The Federal Reserve and other central banks printing money out of thin air like there is no tomorrow. These people are imposing a hidden tax on the public, which is to erode their spending power over time. People are buying into Ether and other cryptocurrencies, because they want to preserve their purchasing power and even see it grow. The supply of cryptocurrencies cannot be artificially inflated by some bureaucrat. The rules are set by code, decentralised consensus and mathematics.

The key to first-time investors is to choose the right projects to invest in and avoid the others like the plague. Ethereum (ETH) is the best bet, in my view. Of course, I am biased, but if you do your research you can see that of the Top 100 coins on Coin Market Cap, 88 of them are based on Ethereum, or are Ethereum itself. The Enterprise Ethereum Alliance is the biggest blockchain consortium in the world

and counts among its members Microsoft, JP Morgan, Reuters and the CME, to name a few.

Lastly and this is important, beware of scams and keep yourself safe. Always use a hardware wallet like a Ledger Nano S and buy from their official website. What I'm saying is not investment advice and you have to do your own research and due diligence. Please be careful out there.

OAG: What's in it for the future of Etherify?

JW: The future is bright for Etherify. We are planning on launching our ICO projects and expanding to hire more people and to be a part of the emerging start-up and blockchain scene in Portugal. Please check out our website at <http://www.etherify.io/> to discover more.



Justin Wu
 Etherify
 Tel: +351 967 461 477
justin@etherify.io
www.etherify.io
www.twitter.com/etherify_io#

TAILOR-MADE PROMOTION

As part of our package of information services, Open Access Government are proud to present the option of a bespoke publication.

Our ebooks can be used by you to target a specialised readership with informative content. They can be 8, 12 or even 16 pages promoting your profession and services.

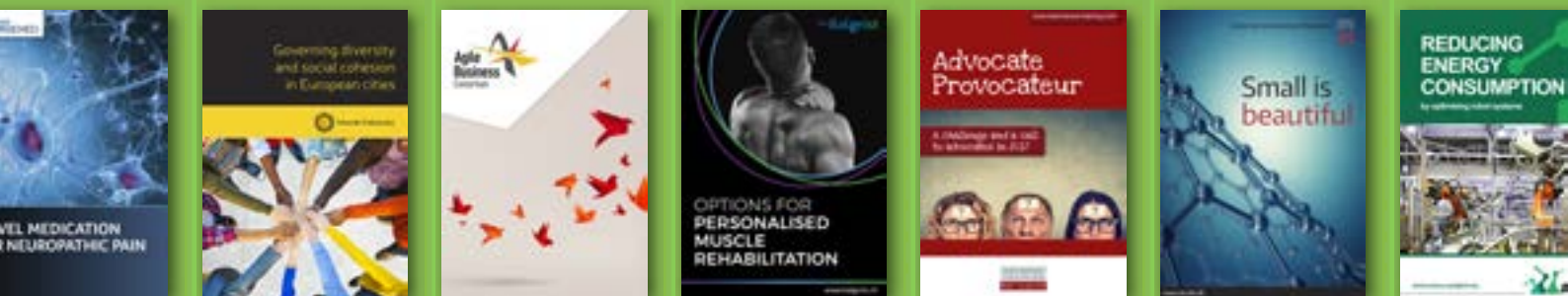
Our production, editorial and design teams will work with you to identify and develop your message before delivering it

electronically to a targeted audience using the latest digital publishing technology for ease of reading.

We have access to an extensive database of contacts within specialised areas, so you can be confident that your message will be delivered to the right people at the right time.

Get in touch today to plan your communication strategy.

Tel: **0843 504 4560**



Blockchain in business: Telegram app said to launch its own crypto payment network

In this article, the founder and co-founder of the Blockchain Federation provide insight into the use of blockchain in business, including how the Telegram app is said to launch its own crypto payment network

Ever since the smartphone, we all know Telegram as a worthy and very secure alternative to WhatsApp, hence the 200 million active users of the popular app. What's more, over the past years Telegram has matured into a multi-application platform allowing for games, exchange of photos/videos/stickers, audio and other files, secret chats and more. The most recent strategic move Telegram's is said to make is the launch of its own cryptocurrency: Gram.

Gram is supposed to allow users to perform (international) payments quickly and securely. The crypto is to be integrated with the encrypted platform. Based on preceding successes of other cryptocurrencies, the network is referred to as a third-generation blockchain application. This entirely new blockchain is to be called TON (Telegram Open Network). According to unconfirmed information, the TON network is a lightning-fast, multi-blockchain architecture automatically splitting in two before the blockchain(s) become too large there-with increasing capacity, referred to as 'scalable infinite sharding'.

All TON blockchains can quickly share data using a smart routing system. It uses direct payment channels to transfer value in milliseconds, smart contracts included, based on Proof-of-Stake (PoS). Each block in a TON blockchain can become a blockchain of its own, making the structure immensely flexible. If TON can indeed securely handle 'millions of transactions per second', every financial institution on the face of this earth is in dire straits – VISA and Mastercard in particular. This could well be a reason why the owners have stated not to sell Telegram, not even for \$20 billion. TON is also said to easily accommodate billions of users and thousands of applications. When thinking of other applications such as in hedge funds, FX trading



Eddy Wagenaar and Irina S. Zimakova

and similar financial uses to name a few, the sky and future net worth of Telegram are limitless.

Telegram was launched in 2013 by Russian brothers Nikolai (an award-winning mathematician and programmer) and Pavel Durov, who had previously founded the Russian social network VK (basically a Russian Facebook equivalent – very popular), however left VKontakte following acquisition by the Mail.ru Group, one of Russia's largest internet companies oper-

ating e-mail service and Russia's other most popular social networking site Odnoklassniki.

Telegram's end-to-end and server-to-client encryption is regarded to be extremely safe and reliable, sadly making the app very popular with terrorists as well. Registered as both an English LLP and an American LLC, Telegram does not disclose where it rents offices or which legal entities it uses to rent them, citing the need to "shelter the team from unnecessary influence" (FBI) and protect users from governmental data requests. It's that safe. Durov is said to be moving from country to country with a small group of computer programmers, currently based in Dubai. They left their home country Russia with an estimated \$300 million from the VK sale and 2,000 Bitcoin.

“According to unconfirmed information, the TON network is a lightning-fast, multi-blockchain architecture automatically splitting in two before the blockchain(s) become too large therewith increasing capacity, referred to as ‘scalable infinite sharding’.”

As Telegram is a very well-known and established app and not exactly a start-up anymore, there is a profound interest within investors worldwide to go "all-in" in the alleged upcoming biggest ever ICO (the crypto/coin equivalent of an IPO – Initial Public Offering, the first time the stock of a private company is offered to the public). Apart from sky-rocketing pre-ICO investment figures, the upcoming ICO would be set to break records with an estimated rise of \$2 billion, expected to even exceed \$5 billion. While the public sale isn't scheduled to launch until March 2018, its whitepaper and investor prospectuses were leaked across the internet, unfortunately resulting in a scammer's dream.

At least four fake websites emerged making false claims to either have pre-ICO low-priced tokens in stock or otherwise. This is exactly why governmental regulatory bodies, such as the English FCA (Financial Conduct Authority) and its international counterparts regularly warn for -or sometimes even prohibit- invest-

ing in ICO's since they are not (yet) regulated by the state. Carefully verifying and fact-checking details from multiple sources before participating in a token sale, is an absolute must to prevent investing in a scam.

Telegram management, by the way, tweeted its official announcements are published only at telegram.org. We, the expert authors of this article, would question how Telegram intends to overcome or bypass the Byzantine Fault Tolerance problem. Also, a state free community with its own cryptocurrency almost sounds too good to be true at this particular stage of global blockchain developments. Mind you, many of today's blockchain solutions targeted at overcoming speed issues are hybrid blockchain solutions that run on a slapped-together-sandwich-combination consisting of vulnerable off-chain legacy systems (speed) and on-chain recording (immutability). Marketing still performs miracles in the world of the ignorant. ■



Eddy Wagenaar
Chairman, Digital Embassy
founder, Blockchain Federation

Irina S. Zimakova
President, Digital Embassy
Co-founder, Blockchain Federation

<https://blockchainfederation.org>

<https://digitalembassy.org>

<https://fintechfederation.org>

www.twitter.com/EUBlockchainFed

Security and responsibility around decentralised personal data

Simon Kavanagh from Tieto explores the importance of both security and responsibility when it comes to decentralised personal data

Do you remember that café in Barcelona which served you a delicious cortado while you surfed their free WIFI? Do you remember the personal information you gave them when you signed up? Surely you read their terms and conditions? More importantly, do you know who has your information now and what they are doing with it?

If you are not working in the area of online privacy and security and are not a member of a group such as [Necessary and Proportionate](#) or routinely [paint your face](#) to confound facial recognition algorithms, then chances are you didn't know you were giving personal information away and you certainly don't know where it is now. It's also likely that you don't really care. The majority of people who regularly use online services don't know or care about the leakage of their personal information. The old adage states that if a service is free then you are the product ([think GAF](#)A), but it's also true that the most common response is: meh (expressing a lack of interest or enthusiasm).

What exactly is the problem with a café holding onto your email address, IP address, date of birth and name? What impact does this have on your life? Well, if you're lucky then none at all. But luck is hardly a long-term strategy for online security. As more and more of your personal data is being vacuumed up, stored in dubious loca-



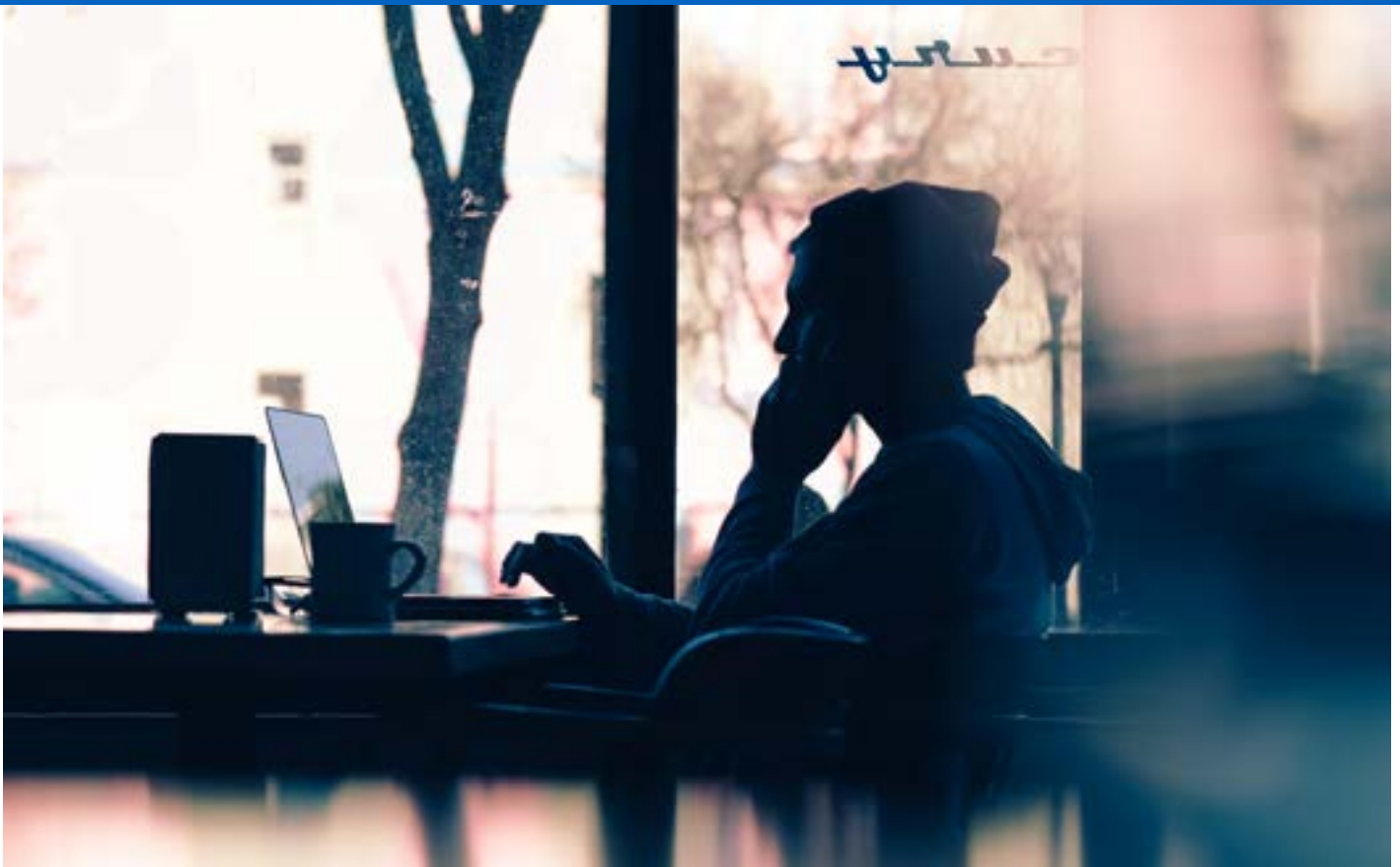
tions and used without my informed consent, then you will soon run out of luck.

Identity theft is one of the most obvious risks. And it's a frighteningly trivial thing to accomplish. All that's needed is some basic personal information (name, address, phone number, social security number etc.) which can be used to trick a phone company (for example) into thinking you are your victim. When this is accomplished you can re-route SMS traffic (including one-time-passwords) and voilà. The attacker now has access to your bank account.

A [recent study](#) by a research group showed that in the US alone identity theft hit a record 15.4 million people in 2016, a rise of 16% on the previous year. And if you think it's only your public Facebook profile which is leaking sensitive data then take a deep breath and [have a look at this map](#) showing known medical data breaches in the US from 2009-2016. Closer to home, we have this [nice guideline](#) from the Finnish consumer authority, which urges you to take precautions to prevent the same thing happening to you.

Nefarious use of your personal data is one downside of the IT-saturated lives we live. But there are also fantastic possibilities for positive uses of your personal data. This is an area Tieto are especially interested in. For example, why does one identical twin develop a hereditary disease when their sibling does not, though they grew up together, shared the same experiences and have ([almost](#)) identical DNA? Unravelling this puzzle involves combining Genotype data with Phenotype data from disparate sources in coordinated research focused on uncovering the links between the two.

And here's the tricky thing: this data needs to move as per the owner's informed consent. A citizen-centred, consent network is essential here. This is the challenge that Tieto (together with California start-up Gem) [has undertaken](#). We see a future where anyone can see where their most valuable information is. From there they can take control and make informed decisions as to its use. We don't see technology as the major stumbling block here (although recent innovations in distributed ledger technology have made a consent network more secure). Raising awareness and



combating apathy is much more challenging. Most people simply don't care. To get over this, Tieto are focusing heavily on user-centred design. The challenge we've set ourselves is: how do we design for empowerment?

Outside of research, a citizen-centred consent network which is naturally cross-border is also useful if you ever want to invoke your EU right to have a medical procedure carried out in another member state. This EU right is related to the freedom of choice vision in the Finnish SOTE reform – but exposes the limits of that vision too. In Finland, to realise the Freedom of Choice vision your healthcare data needs to move fluidly between the different professionals. Kanta is the national platform backed by the Finnish government, which will certainly help the movement of your data between Finnish health providers (public and private). That's excellent, but it works right up to the edge of the Finnish national border and no further.

As of now, there is no easy way your health data moves electronically

between EU member countries – instead health tourists are forced to carry a USB drive, a DVD or a folder under their arm (see this report here commissioned by the government of Estonia for more information on the restrictions to the free movement of Health Data). A fundamentally different sort of network is needed for the age where EU medical tourism becomes the norm. One where citizens themselves control who does and doesn't have access to their medical data. There are many aspects of a successful network such as this. As explained earlier, citizen-centered consent is one. Two others are Identity Verification and Information Veracity (Tieto are also working on these two aspects of trusted transactions together with the Sovrin foundation).

Unfortunately, instances of identity theft and other forms of data-based attack show no signs of decreasing. But these negative consequences of living in the digital age should be balanced against the enormous possibilities we have to build more citizen-centred and empowered IT

solutions and services. Tieto is committed to this positive future and we want you to be in control.

Read more about our thoughts on blockchain here:

Self-sovereign identity delivers MyData in practice.

It's your data. Take it back. Unlocking your health data with blockchain.

The Tieto logo is displayed in a bold, lowercase, blue sans-serif font.

Simon Kavanagh
Head of innovation and design in
healthcare, welfare and education

Tieto
Tel: +47 912 43949
simon.kavanagh@tieto.com
www.tieto.com
www.twitter.com/TietoCorp

Switzerland, blockchain's spiritual home

The Crypto Valley Association's Tom Lyons argues that along with its competitive advantages, decentralised culture and democratic tradition have made Switzerland an epicentre of the blockchain revolution

Few places in the world are more idyllic than the Swiss city of Zug. Situated on a pristine alpine lake, snow-capped peaks in the distance, church towers hovering over cobblestone streets, it gives off an aura of stability and old-fashioned traditions. Yet these quaint airs can be deceiving. As an epicentre of blockchain, the revolutionary technology behind Bitcoin and other cryptocurrencies, Zug is cutting edge.

The Ethereum Foundation, which oversees the technology behind ether – the second-most popular cryptocurrency after Bitcoin – was established in a ground floor conference room 5 minutes' walk from the Zug train station. Zug is home to early innovators like the cryptocurrency exchange Bitcoin Suisse, which among other things runs Bitcoin ATMs in most Swiss cities and the Zug government itself, which caused a media stir when it became the first in the world to accept Bitcoin as payment for government services.

It was one of Ethereum's founders who, impressed by the blockchain scene he found in Zug 4 years ago, coined the term Crypto Valley. We now use that term to refer to the blockchain community in all of Switzerland and that community is burgeoning. Switzerland, for instance, has become one of the world's most favoured locations for blockchain fundraising through initial coin offerings (ICOs). It is also headquarters to many of the most important blockchain companies, with new start-ups seeming to arrive every day.

The innovation magnet – what's the draw?

The world's most competitive country 6 years running according to the WEF, Switzerland has always been a good place for technology or other high value-add enterprises.

It has excellent infrastructure, some of the best academic

institutions in the world, a highly skilled and motivated workforce, as well as low corporate and individual taxes. It is also prized by businesses for its political stability, rule of law, strong, stable currency and deep pools of capital.

The Swiss regulator has been open and supportive of blockchain technology. To foster innovation, it introduced a Fintech "sandbox" that allows start-ups – including blockchain-based ones – to safely experiment with innovative products having to do with money. It has also taken a generally liberal approach to cryptocurrencies, ruling that not every token is a priori a security and must be regulated.

“The world's most competitive country 6 years running according to the WEF, Switzerland has always been a good place for technology or other high value-add enterprises. It has excellent infrastructure, some of the best academic institutions in the world, a highly skilled and motivated workforce, as well as low corporate and individual taxes. It is also prized by businesses for its political stability, rule of law, strong, stable currency and deep pools of capital.”

Local governments have been supportive too. Along with accepting Bitcoin for government services, Zug recently implemented a blockchain-based digital ID system for residents. In the Swiss city of Chiasso, residents can pay local taxes in Bitcoin. You can buy Bitcoin at any of the Swiss national railways' more than 10,000 ticket machines.

All this has helped the Swiss blockchain ecosystem grow at a torrid pace. When we started the Crypto Valley Association (CVA) at the beginning of 2017 to help support the ecosystem here, we had 16 members. We ended the year with over 550.



The spirit of the thing

While Switzerland has much to offer blockchain as a technology, it is not the whole story. What makes Switzerland special for me and many others in the community is also its affinity with blockchain as an idea.

One way to understand blockchain is as a shared database that allows complete strangers, even antagonists, to come to an agreement on information – and record that information in a way that makes it both unalterable and accessible to all. That has far-ranging consequences.

The real revolution behind what The Economist called blockchain's "trust machine" is not cryptocurrencies, but decentralisation. Look closely at almost any blockchain project and you will likely find an effort to replace some top-down, centralised model with a bottom-up, flat, decentralised one. Thanks to the trust that blockchains make possible, we no longer need a central authority to keep the records and make the ultimate decisions. Now the community can do that on its own.

That makes blockchain profoundly democratic – which in turn makes it profoundly Swiss. With its federalised political structure, under which a great deal of decision-making is devolved to the local communities, and its system of direct democracy, in which citizens

vote on almost everything, Switzerland may be the most decentralised healthy country in the world. With its deep respect for personal privacy and strong data protection laws, it is also one of the most respectful of individual rights.

These things appeal deeply to the idealists of blockchain, of which there are many. So, while Switzerland has much to offer blockchain on a practical level, you can argue that it's the spirit of the place that has made it such fertile ground for this revolution – and should continue to do so for a long time to come. ■



Tom Lyons
Chair, Communications Working Group

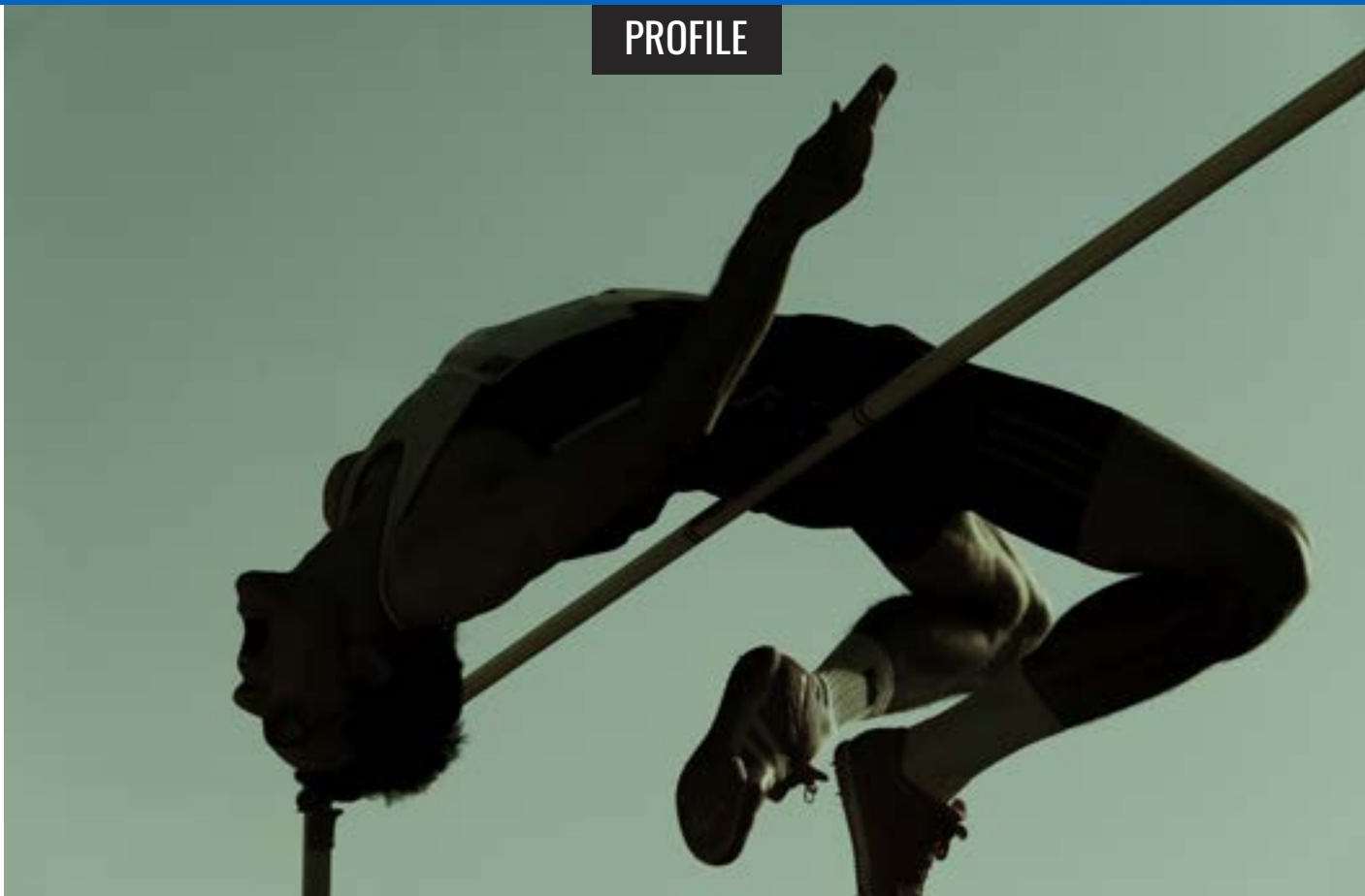
Crypto Valley Association

Tel: +41 79 247 1371

tom.lyons@cryptovalley.swiss

<https://cryptovalley.swiss/>

www.twitter.com/thecryptovalley



Blockchain – a “Fosbury flop” for the insurance industry?

Jags Rao, from Swiss Re explores how a maverick mentality can turn the tables on tradition and have a global impact

Mexico City, 1968. The Summer Olympics. And the scene is the men’s high jump final. The whole stadium was stunned when a 21-year-old lanky American called Richard Douglas Fosbury took Gold that day with a record-breaking jump of 2.24 meters. That in itself wasn’t so much the point but the manner in which he did it was. Fosbury jumped with his face to the sky. Until then, everybody did what was called “straddle” jumping facing the ground. His technique has since been famously called the “Fosbury flop”.

The athletics coach for the American team announced at the time that

those who followed Fosbury’s method risked breaking their necks. The only things that were broken were high jump records and the Fosbury flop has been almost universally adopted.

Uniquely, Fosbury challenged the status quo and adopted a style that contradicted the established convention. Decades later, his innovation is still discussed. And yet all he did, in fact, was to seek a better way of jumping over a high bar.

Fast-forward to January 2009 when a peer-to-peer electronic cash system called bitcoin network came into existence. This offered a unique way of

moving currency from point A to B without any intermediaries. It demonstrated that “trust” could be generated digitally from within the system. It contradicted the traditional process of building trust externally through intermediaries such as correspondent banks, clearing houses and sidestepped legal and regulatory oversight.

Much like the Fosbury flop, blockchain, the underlying technology behind bitcoin, challenged the status quo by offering an alternative that was fundamentally opposed to the traditional way of building trust. After over nine years the market capitalisation of Bitcoin continues to

soar to billions of US dollars, while the underlying blockchain technology continues to unravel its latent potential for the financial services industry and beyond.

So, what can blockchain do for insurance? In fact, the industry is financially healthy, but could operationally improve. It relies on multiple layers of counterparties generating “trust”, but with high frictional cost through their interactions. Over time, counterparties have improved operational efficiencies, but gains have been confined to “silos”. And the reality is that there still exists noise, friction, duplication, excessive paperwork and bureaucracy, with shared and common business processes leading to huge reconciliation costs and contract uncertainty. It is no surprise that this has contributed to the insurance industry’s not-so-customer-friendly reputation!

However, with the advent of cryptography, smart contracts and distributed ledger technology (blockchain), there are clear opportunities to tackle inefficient processes. The potential exists for commercial entities to track all their data-driven interactions securely on a smart-contracts resident on a blockchain without having to build different systems. Blockchain can enable the transaction flow across multiple layers of counterparties from original insured to brokers to reinsurers and all the way to capital markets. It could feasibly redefine the standard for digital transaction processing and deliver significant efficiency gains.

There are a number of experiments going on in the industry to test the hypothesis, validate the benefit and

convert prototypes into production-ready states. B3i, the Blockchain Insurance Industry Initiative, remains at the forefront of approaching this innovative technology with a clear purpose to bring real business change to our industry. This spirit around rethinking insurance is brought to life by some B3i members and captured on [video](#).

The formation and success to date of B3i is in itself breaking moulds. Formed initially by 15 insurers and reinsurers and later expanded to 38 market participants including brokers, the project has shown that where there is a common sense and purpose across the whole value chain, genuine collaboration is possible.

The project is an innovation and not just a dream. It has delivered hard results. In its first year, it moved from small in-house prototypes to an industry-wide global proof of concept and on to a market-tested property catastrophe excess-of-loss application in the largest industry-wide distributed ledger network to date. In 2018, B3i aims to transfer this into a self-sustaining entity to further develop and run the platform to settle legally binding contracts.

Nevertheless, there are a number of challenges ahead. Key issues such as collective standardisation, systems integration, legal and regulatory frameworks, privacy and confidentiality need to be addressed. However, the expected benefits in the form of reduced cycle time, cost and friction, as well as enhanced transparency, are hard to ignore as they are expected to create significant material savings.

Sharing these savings with the ultimate insured could help to drastically reduce the global protection gap.

The fact that over 7.5 billion people on our planet have no or limited access to insurance or cannot afford it, as much as anything else, provides an incentive to close this gap especially when the untapped premium could be as much as USD 800 billion. So, it is not just about increasing margins or improving service but providing an opportunity for social good and for a just cause. Let’s not forget that our role is to share the misfortune of the few across the many.

Much like the Fosbury flop, blockchain technology is once-in-a-generation kind of innovation, which if applied with clear sense and purpose as postulated in a [blog](#) by Paul Meeusen of Swiss Re, can make insurance more affordable, accessible and attractive for millions of underprivileged across the globe and make our world more resilient.



Ken Marke
Chief Marketing Officer
 B3i
 Tel: +44(0)7766 202 832
ken.marke@B3i.tech
www.B3i.tech
www.twitter.com/B3i_tech

Distributed ledger Blockchain technology for the financial services industry

We interviewed R3's Chase Gordon to learn about cutting-edge distributed ledger technology for businesses in the financial services industry today

R3 builds cutting-edge distributed ledger technology for businesses. Corda, an enterprise-grade, blockchain-inspired DLT platform was designed by and for the financial industry, with input from over 100 banks, financial institutions, regulators, trade associations, professional services firms and technology companies.

This blockchain-inspired DLT platform was designed to meet the highest standards of the financial services industry, one of the most complex and highly regulated industries in the world, which also means it can be applied to all other areas of commerce. Applications of this blockchain-inspired DLT platform will in 2018 include, collateral lending, FX matching, syndicated lending and open account trade finance.

Chase tells us that other areas of application for such distributed ledger technology include insurance, reinsurance, healthcare and many more as the interview begins. He offers his thoughts on the role of Blockchain in the financial services world, first of all, in his own words.

"There are many benefits of using Blockchain in the financial services industry. The industry is known for using financial systems that date back 30 years or more, so it's not surprising that it has embraced Blockchain widely to improve upon such legacy systems. Blockchain enables the financial services industry to create better efficiencies and save money in the process.

"One of the key areas of financial services that blockchain can enhance is settlement of trades, which in some cases can take as long as a week, which is completely inappropriate for today's operating environment. Blockchain can reduce this time to minutes or even seconds.



Chase Gordon, Associate at R3

"In addition, blockchain can help the industry move closer towards full automation with the use of smart contracts that execute automatically once pre-set conditions are met. Our Corda platform uses smart contracts that link business logic and data to associated legal prose to ensure that the financial agreements on the platform are rooted firmly in law.

"This blockchain-inspired DLT platform is the foundation of a vibrant ecosystem of interoperable applications for finance and commerce. These apps are built by a growing network of partners, harnessing the power of DLT to overcome the specific challenges faced by their customers."



The conversation then moves to how one would explain distributed ledger technology to somebody with little or no knowledge of it, something that Chase is eager to explain to us.

“There are many benefits of using Blockchain in the financial services industry. The industry is known for using financial systems that date back 30 years or more, so it’s not surprising that the it has embraced Blockchain widely to improve upon such legacy systems. Blockchain enables the financial services industry to create better efficiencies and save money in the process.”

“Distributed ledger technology is essentially an immutable record of an agreement, which is secured cryptographically through hashes and keys, and it has an audit trail which is evaluated by separate nodes.

“On a traditional blockchain, each entity has its own node and information is shared to each of these nodes to validate a transaction. Corda tweaks this approach to data privacy and security by only sending data to those who have a “need to know.”

“This unique feature of Corda emerged from the requirements of financial institutions which need to ensure the confidentiality of trades and agreements, while also capturing the benefits of a distributed ledger infrastructure.”

In closing, Chase underlines the vital role that research and development (R&D) plays in the field.

“Back in September 2015, we launched an architectural working group with our members, which was the largest collaborative R&D effort in the industry. The learnings from this helped us to build Corda. We currently have around 60 R&D projects on the go and continue to use the findings from these as we ready Corda for commercial roll-out.” ■

Chase Gordon
Associate

R3

www.r3.com

[www.twitter.com/inside_r3](https://twitter.com/inside_r3)

Blockchain technologies for automatic regulation and compliance

Professor Tomaso Aste from The UCL Centre for Blockchain Technologies shares his perspective on the use of blockchain technologies for both automatic regulation and compliance

Blockchain technologies have the potential to radically change compliance and regulation improving efficiency, reliability and transparency whilst redefining the services industry landscape generating new business models and radically innovating the present industry structure.

In the heavily-regulated financial sector, each financial institution maintains its own records on its own ledger system and reports data to the regulatory authorities accordingly with compliance rules. Over the whole market, this creates large duplication of efforts, lack of transparency and, unavoidably, inconsistencies that can cause litigations. These duplications and inconsistencies are associated with large costs and risks making the system inefficient.

Blockchain technologies can provide a transparent and secure environment where transaction records are made accessible to both industry and regulators. Through blockchain technologies and smart contracts, regulation and compliance can be automatised, thus removing strains from both regulators and industry while activating paths for new business models.

Blockchain technologies can reverse the way regulation and compliance are presently performed, creating an environment where both market players and regulators have access to

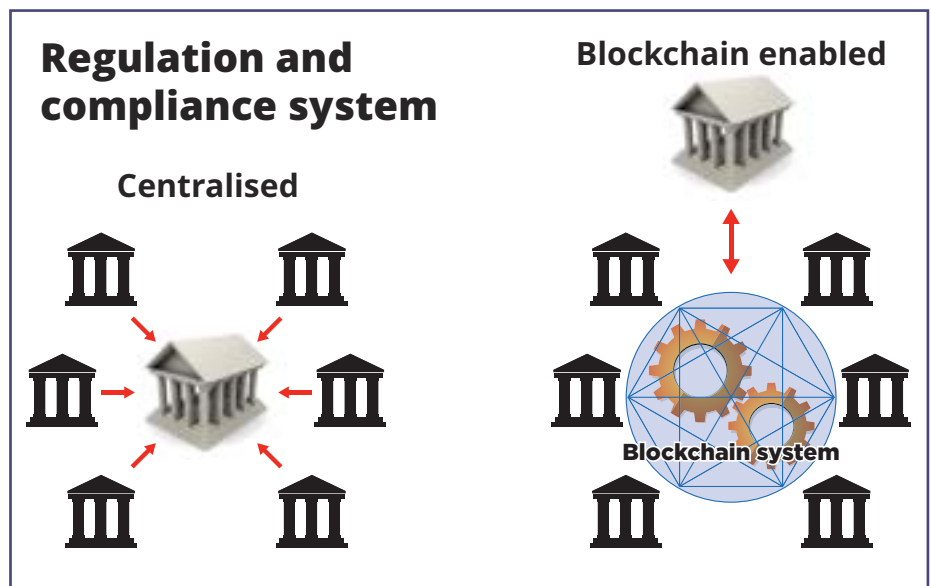


Fig. 1. Decentralised compliance and regulation can eliminate duplications, increase transparency and efficiency creating an environment where auditable compliance data can be directly accessed by regulators and rules can be automatically executed with smart contracts

trusted auditable data relieving firms from compliance duties and compliance risks (see Fig.1). Blockchain technologies bring about the following main elements of disruptive innovation:

- Access to auditable data which are verified and hard to tamper with, creating time-stamped, immutable and historical records;
- Constitution of a transparent, interoperable environment where rules can be implemented, enforced and adapted by monitoring their effects in real-time and by using feedback from the participants;
- Provision of instruments to monitor and quantify both the reliability and reputation of users;

- Creation of a platform where rules can be encoded within the system – enabling automated review via audit software and;
- Create a unique source of truth approved by the community via consensus.

Furthermore, blockchain technologies can reduce counterparty risk, settlement risk and help to prevent fraud. They have potential to radically change risk management and fraud prevention with implications for regulation and capital allocation. Blockchain technologies have the potential to bridge the trade-off between a regulation that guarantees market stability and a regulation that boost financial innovation. This con-



vergence of industry and government interests is unique and as such, opens great opportunities. To this end, at a time when the financial sector is seriously investing in the development of these technologies, it is essential to develop an adequate research infrastructure to investigate the adaptation of blockchain technologies to regulation and compliance.

The general purpose of financial regulation is to forestall or alleviate the effects of market failure and promote innovations beneficial to public welfare. However, the ability of financial regulation to foster innovation in the services sector and financial sector, in particular, is challenged by the financial community that sees regulatory duties as detrimental to desirable change¹. The Financial Conduct Authority, the Bank of England and their counterparts around the world face two linked transformative trends. One trend is the growth in the number of financial technology (FinTech) firms utilising cutting-edge technologies to offer innovative services.

The other trend is the prospect of using some of those same technologies to better extract and analyse firm and market information to enhance regulation, making it more efficient (RegTech).

FinTech firms are hard to monitor by means of traditional instruments. FinTech population is fast-growing: in 2017 the FCA has regulated around 60,000 financial services firms and markets, about twice the number regulated in 2013. A growing number of these services providers are new small firms that use cutting-edge technologies exploiting innovative business models. Given these proliferating number of platforms and interfaces, there is a clear and present danger that, without proper regulation, consumer risk and fair competition will be imperilled.²

In addition, the financial crisis increased regulatory complexity and heightened levels of supervision and, correspondingly, increased costs for both regulatory authorities and regu-

lated firms, including both incumbents and FinTechs. Automation in regulation and compliance can increase efficiency and decrease costs. Blockchain technologies can be the vehicle for such an innovation providing elements of transparency auditability and usability, by both regulators and industry that other systems cannot offer.

All industries and services are under some sort of regulation and they need to comply by reporting information to the relevant authorities and government bodies. The services sector contributes to 80% of the entire UK economy³, with the financial sector alone contributing £129 billion/year and the FinTech part generating over £20 billion in revenue every year, making the UK the world leader of the sector⁴. Automation in this sector will have a major economic impact on the economic prosperity of the UK.

In addition, although Blockchain technologies have been pioneered by the financial services industry, they have the potential for an even greater

CBT

The UCL Centre for Blockchain Technologies (CBT) is a cross-disciplinary academic research centre established at UCL in 2016 to investigate blockchain technologies from a cross-disciplinary perspective. CBT research is based on three main pillars: Science & technology, economic & finance and regulation & law. It counts on the support of eight UCL departments, about 100 researchers and faculty members, fellows from all over the world and a large student community which counts about 600 units.

For further information: <http://blockchain.cs.ucl.ac.uk/>

BARAC

BARAC is a research project funded in 2017 by the Engineering and Physical Sciences Research Council. Researchers from UCL, London School of Economics, KCL and University of Reading with background in computer science, economics, mathematics, business and law investigate the feasibility of using blockchain technology for automating regulation and compliance producing a proof-of-concept platform and facilitating knowledge transfer, by means of a bottom-up cross-disciplinary approach developed, together with industry and regulators.

impact on government. Indeed, blockchain technologies can create trusted, safe records of agreements and transactions and therefore applications for government are widespread. For instance, blockchain technologies can provide access to tamper-proof public records such as licenses, vehicle registration, passports or building permits and official records such as land titles, patents, certificates, degrees or HR records.

The use of blockchain technologies in the services industry and for the purpose of their regulation poses fundamental scientific and technological challenges. It rises also legal/regulatory and business challenges because players are asked to do a paradigm shift from trusting humans to trusting machines and from centralised to decentralised control. These new challenges demand an in-depth study of feasibility to test the soundness and applicability of ideas and approaches. There are indeed several open questions concerning how blockchain technologies can be used to develop better instruments to regulate services industry.

For instance, can blockchain technologies be scaled to the speed and size of financial data while preserving fundamental properties, such as community distributed verification and consensus? What is an effective model of governance of blockchain technologies systems that guarantees protection to consumers and fair competition? What are the legal implications for code misbehaviour? (Some codes might even be automatically generated within a distributed unsupervised system). And who will regulate/supervise the regulatory codes? Can blockchain technologies be made future-proof to preserve integrity and privacy, even when historic information stratifies and if some cryptography protections get broken in the future? These issues are currently investigated at the UCL Centre for blockchain technologies and within the EPSRC-funded project BARAC (see boxes).

1 Bank Governance Leadership Network, View Point, 'Accelerating the technological transformation of banking' EY June 2016, [http://www.ey.com/Publication/vwLUAssets/ey-accelerating-bankings-technological-transformation /\\$FILE/ey-accelerating-bankings-technological-transformation.pdf](http://www.ey.com/Publication/vwLUAssets/ey-accelerating-bankings-technological-transformation/$FILE/ey-accelerating-bankings-technological-transformation.pdf).

2 EBA. Warning to Consumers on Virtual Currencies. European Banking Authority, EBA/WRG/2013/01, 2013.

3 Financial Times 31 March 2016 <https://next.ft.com/content/2ce78f36-ed2e-11e5-888e-2eadd5fbc4a4>.

4 FinTech Futures: the UK as a world leader in Financial Technologies, a report of the UK Government Chief Scientific Advisor, 18th March 2015, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/413095/gs-15-3-Fintech-futures.pdf.



Professor Tomaso Aste

UCL Computer Science Department &
UCL Centre for Blockchain Technologies
http://www.cs.ucl.ac.uk/staff/tomaso_aste/
<http://blockchain.cs.ucl.ac.uk/>



YOUR OPINION MATTERS

Whether you agree, disagree, or have another viewpoint with any news and features on our website, we want to hear from you.

Leaving a comment on any item on our website is easy, so please engage and join the debate today.

Are we ready for a blockchain world?

Marta Pierkarska, Director of Developer Ecosystem, Hyperledger asks if we are ready for a blockchain world in the future

Blockchain, the hype, the buzzword of the decade, the fairy dust that is supposed to solve all our problems. Technology that underlies Bitcoin and most other cryptocurrencies and is often confused with it. However, the umbrella of distributed ledger technology has applications beyond cryptocurrency.

Today, we see adopters in business environments in nearly every industry, ranging from financial and banking, through manufacturing and supply chain all the way to intellectual property, healthcare or real estate. Blockchain brings a promise of a secure, cost-efficient, transparent and easily auditable way to track any asset. Physical goods can be tokenised, traded and tracked through virtual peer to peer, distributed business networks without requiring a centralised point of control.

Hopefully, with the excitement around it, this technology can become pervasive in enterprises, government agencies and perhaps even the public sector. Why?

Because, at any time a community of organisations need to have a common system of record and build useful automation on top of it, so a blockchain will make sense. It cannot solve the issues of authenticity – we still need auditors to verify what is put on a blockchain but distributed blockchains in business settings will probably become the invisible backend piping that helps almost any industry. Most industries use transactions to get work done. Most industries have trust challenges. Most industries suffer from contracts being manually executed and assets being opaque.

Also, we find that most industries are looking for cost savings. We observe some fields being particularly eager to jump in and others are more in observation mode, but even the less brave ones have early adopters. The biggest challenge is lack of technical talent that can help with defining the use cases and deploy production system. This is a skill that will be highly relevant for many years to come.

What this all means for consumers is anyone's guess. Blockchain most probably will be completely invisible technology that just improves the systems we have today. Today, most users do not know that mobile devices include several chips and 2 operating systems. Many consumers don't even know what an operating system is.

Similarly, they should not be expected to know that the sustainably caught fish they ordered in a restaurant was tracked and certified with the use of distributed ledger technology, which meant it became affordable to them. The prospect for using this tech to go beyond a common system of record, to create actual digital assets on a chain (an insurance contract, an options contract, shares in a company, etc.) is very real and people are already piloting this.

We're encouraged to see so many regulators, banks, governments and others working to build up their own competencies in this space so that as industries start to implement their business processes as blockchain applications, the regulatory and statutory hurdles can be addressed. At Hyperledger, we're focused on creating an open framework for a cross-industry distributed ledger that can revolutionise the way we do business, increasing trust, accountability and transparency, while simultaneously streamlining business processes.

As with any technology, young or mature, we have challenges we are facing every day. There are issues around regulations and adaptability of the solutions – how do we plug new solutions into the existing legacy systems, even if we know that there are huge benefits to it, the technical questions still need to be answered. What stops many enterprises from moving from POC to deployment is performance, scalability and interoperability.

We need mature stable technologies and techniques for scaling transactions across chains. This is true even in a consortium chain setting, where you can achieve much higher transaction rates than on the public chains. Getting to tens of thousands of transactions per second across geographically diverse networks with non-trivial validation logic running on each node will be an architectural and design challenge for developers working in this space.

The good news is there are many use cases requiring lower transaction rates (land titles, medical records for a small country, supply chain flows for a given industry) and developers at Hyperledger are working on solutions for addressing scalability. This is just a function of time. This technology is still very young and we're still addressing the management, monitoring and design challenges – what you might call the “DevOps of blockchain.” We'll expect substantial progress in 2018, but these are still early days.

So, are we ready for a world powered by blockchain? Are we ready to usher in a new trustless paradigm, where people no longer need to trust organisations but instead trust the software? I think so – it's not too crazy to think that in the next 5 years, nearly every Fortune 500 company will have a distributed ledger as part of their back-end system somewhere. However, let's remember – blockchains are based on a peer-to-peer network, so you need peers to build that a common system of record. In this space, we need to collaborate and interoperate.

It also means that anywhere where a company participates in a network of trading partners, a supply chain, a regulated market, etc., then they likely will see an operational and strategic investment in blockchain tech. I have some personal wishes. I wish to be able to manage my personal healthcare records through a “wallet” of some sort. I wish to have inter-bank or even international payments settle immediately rather than over the course of days.

I hope that the provision of government services – particularly when it comes to property registry, permits, voting registration and other process/transactional touch points – will dramatically change. Most of all I hope that blockchain will bring people closer than before – collaboration and cooperation for the better of mankind and especially that we will not have just a single blockchain to rule them all. ■

Marta Pierkarska
Director of Developer Ecosystem

Hyperledger
info@hyperledger.org
www.hyperledger.org
www.twitter.com/hyperledger

Blockchains, trust and power: Governance models of the future

Sari Stenfors, PhD from the ReCon Blockchain Research Project at Aalto University looks at how distributed and open technologies transform our interactions

In a forward-looking research project at Aalto University's Business School in Helsinki, together with partner companies and public organisations such as the Finance Ministry of Finland, we are studying one of the future change drivers, blockchain technology. Much media attention is given to blockchain and its best-known use case, Bitcoin. However, the most impactful business and societal implications of blockchain are yet to be discovered, despite ongoing experimentation ranging from finance and logistics to healthcare and beyond.

The power of blockchains

Different types of blockchain technologies and other decentralised ledger technologies are important building blocks of our future. When they are combined with AI, AR/VR, IoT, robotics or 3D printing, they provide completely new ways to set up the societies we live in. They hold the potential to disrupt not only the internet, but the way our societies are governed and what we know of as the current way of doing business. The impacts could be vast. Blockchain technologies are already being applied to the fields of finance, government, IoT, energy, accounting, logistics, insurance, healthcare, education, record keeping and governance.

Why are they so powerful? Blockchain technology is a novel data-architecture. We live in the data-driven era. The most important businesses, such

as Google and Amazon, are about data. Blockchain technology stores data in a decentralised way in multiple computers to make sure it is not tampered with. There are hundreds of different decentralised ledger technologies today and their governance structures ensure that a single computer cannot decide what data is stored. This way, we can trust that the stored information will not be corrupted by a party that would benefit from it. The system creates programmable trust.

Trust in the data-driven society

Trust is the building block of any transaction and our society is based on transactions. If there were no trust, we would not dare to make any transactions. To ensure trust, we have traditionally done business with people and businesses who we were familiar with, or if that was not possible, we used third parties to ensure trust.

In a data-driven society, we would like to find trust fast, at the location of the transaction and with low cost. The availability of internet and all the different mobile apps have opened up a possibility to engage in transactions with far more people and businesses than the generation before us did. We cannot know all of these new business partners and if they broke their part of the deal, how would we go after them? It is costly to be cheated, so there is a price for being able to prevent it, i.e. trust. Also, the market for

trust has grown as there is more demand for it. Traditionally, for example, banks, agents, referees or custodians have been able to take high fees in exchange for trust. However, the market mechanisms for buying trust as we knew previously, do not serve us anymore. Trust needs to be more readily available and have a lower price point per transaction. There are two new solutions to trust: reputation systems and blockchains.

Governance models of the future

In 2008, an unknown author with the pseudonym Satoshi Nakamoto wrote a whitepaper which described the governance model of the bitcoin blockchain. It detailed a governance structure that enabled a currency without a central authority watching over it. That introduced new power structures to the financial world. It showed that blockchains can change business models and governance systems. Potentially, we could do all transactions in peer-to-peer networks and third parties would not be needed anymore.

Today there are a variety blockchains with a variety of governance systems. There are also different types of options on who is allowed to access and store data on them. There are public blockchains, federated blockchains, private blockchains, permissioned and permissionless blockchains. Generally, the more

“Much media attention is given to blockchain and its best-known use case, Bitcoin. However, the most impactful business and societal implications of blockchain are yet to be discovered...”



closed the system is, the more focused it is on creating process efficiencies for a defined number of users. For giving more power to the larger community and for creating new business models, the blockchain governance systems need to be more open and permissionless. Blockchain-based identification systems can further enhance novel governance structures, by giving the ownership of data to the people who created it. There are numerous ways to enhance and redesign blockchain governance systems to better fit our understanding of fair societies.

An opportunity

Blockchains will be part of our lives. It may take even a decade to develop the infrastructure to the point that blockchains will be mainstream. They are over-hyped and as such, many pilots will fail. The beginning will be

slower than what we expect, but they are here to stay. Before long, blockchains will be used in everyday lives and they will dictate how we are governed.

How we create trust and whom we trust, how we exchange value and how power is distributed will be completely transformed. We are still at the beginning of the blockchain era and it is a good time to affect the governance of a society and to reimagine how it could serve you in the best possible way.

Our research

These are the types of questions that we at the ReCon research project are thinking about and experimenting on. Certainly, we engage in pilot projects, hackathons, studies, workshops and keynotes. Our mission is to describe, analyse and experiment on the poten-

tial societal impact and new business models of blockchain-like technologies. More information regarding the ReCon research team and our partner organisations can be found at <http://recon.site/>



Sari Stenfors PhD
ReCon Blockchain Research Project
 Aalto University
 Tel: +358 50 496 7134
sari@alead.com
<http://recon.site/>



SUBSCRIBE FOR FREE

Open Access Government is pleased to offer a **FREE** subscription service to all our products including our regular newsletters.

We can offer you news and features focusing on a specific topic plus a monthly round-up.



CLICK HERE TO SUBSCRIBE

You can choose from a variety of newsletters from our selection of subject areas

www.openaccessgovernment.org

 OPEN ACCESS
GOVERNMENT