Evidence Report

APPG BLOCKCHAIN

UK Parliament

HEALTHCARE

Blockchain applications - regulation, policy & strategy

appg

ALL-PARTY
Parliamentary
Group on
Blockchain

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Table of Contents

1. APPG Blockchain Evidence Meeting on Healthcare

1.1. Purpose

The purpose of the All-Party Parliamentary Group on Blockchain (APPG Blockchain) is to ensure that industry and society benefit from the full potential of blockchain and other distributed ledger technologies (DLT) making the UK a leader in Blockchain/DLT's innovation and implementation.

The eighth evidence meeting explored the use of Blockchain technology in the healthcare sector. This report provides a summary of the takeaways and evidence from the meeting.

The video recording of the session is available on our websites APPG Blockchain *www.appg-blockchain.org/* and Big Innovation Centre *www.biginnovationcentre.com/*

1.2. Details of the Meeting

- Date, 12th March 2019
- Time, 17:30 – 19:00pm GMT
- Location, Portcullis House, House of Commons
- Participants, 67 attendees

1.3. Panellists: Evidence Givers, Chair & Secretariat

The eight APPG on Blockchain evidence meeting was Chaired by APPG Blockchain Chair Damien Moore MP and Vice-chair Lord Truscott.

Big Innovation Centre acts as the Secretariat for the APPG on Blockchain, led by CEO, Professor Birgitte Andersen and Fernando Santiago-Cajaraville as the Project Manager and Rapporteur.

Building a robust Blockchain ecosystem is part of the mission of the APPG on Blockchain. This APPG meeting on healthcare had representatives from Blockchain start-ups, business leaders and platform providers in order to bring the latest developments in the application of Blockchain technology.

Evidence Givers

Dr Navin Ramachandran, Healthcare specialist IOTA foundation

Dr Manreet Nijjar Co-Founder & CEO Truu

Raja Sharif, CEO and Founder, FarmaTrust

Chair

Damien Moore
MP
House of Commons, UK Parliament

Vice-Chair

Lord Truscott
House of Lords, UK Parliament

Secretariat

Professor Birgitte Andersen
CEO
Big Innovation Centre

Fernando Santiago-Cajaraville
Project Manager & Rapporteur
Big Innovation Centre

2. Background

The APPG on Blockchain evidence meeting on healthcare explored the current uses of Blockchain and most successful use-case within the health and pharmaceutical sectors.

The APPG on Blockchain presented the following questions to the Evidence givers,

Healthcare

- How can Blockchain be applied to healthcare?
- Can drug traceability be improved?
- Will transactions between manufacturers, wholesalers, doctors, and patients be verified to tackle counterfeit drugs?

Healthcare evidence givers from left to righ: Dr Navin Ramachandran, Dr Manreet Nijjar, and Raja Sharif

3. Meeting Takeaways

Blockchain could break the data silos across the healthcare system

Healthcare data have to move across several institutions, hospitals, GP practices and third-party providers. Using Blockchain technology all the data will be kept on the same platform and accessible to the institutions and the data owner (patient) in a distributed and safe way. It will empower the citizens with the control of their own data.

"We need systems that empower citizens and caregivers, rather than the owners of data platforms" *(N. Ramachandran, IOTA)*

Digital Credential for doctors.

Blockchain allows the NHS staff to have their professional and academic records on a distributed database shared across the NHS institutions (Hospitals, medical centres, etc.), Easy, secured and one-platform access allow seamless data flow among institutions. The record and other data can be verified and trusted by the Healthcare providers by checking its source on the blockchain. This will reduce the cumbersome activities of verification allowing organisations to speed up the onboarding and administrative processes. Thus, the use of technology will potentially increase the number of clinical encounters in half a million.

"Doctors are spending days doing physical identity checks every year." *(M. Nijjar, Truu)*

"Verifiable digital credentials using a Blockchain allows verifying who has issued a credential in seconds." *(M. Nijjar, Truu).*

Blockchain can save lives fighting against counterfeit drugs

Blockchain allows for tracking and tracing medicines from the point of production to the point of consumption, and every data point in between. Data in Blockchain systems are immutable and tamper-proof, allowing them to be audited by the regulators.

"Counterfeits drugs affect every country and members of society, whether rich or poor." *(R. Sharif, FarmaTrust)*

Blockchain can prove the provenance of the medicines in the market, allowing to fight against a counterfeit market that accounts for more than 20% of the total market in some developing countries.

"Blockchain can save lives and make a significant impact and can be done right now. "*(R. Sharif, FarmaTrust)*

4. Evidence Giving Transcripts

4.1. Dr Navin Ramachandran, Healthcare specialist, IOTA foundation

Dr Navin Ramachandran, Healthcare specialist, IOTA foundation

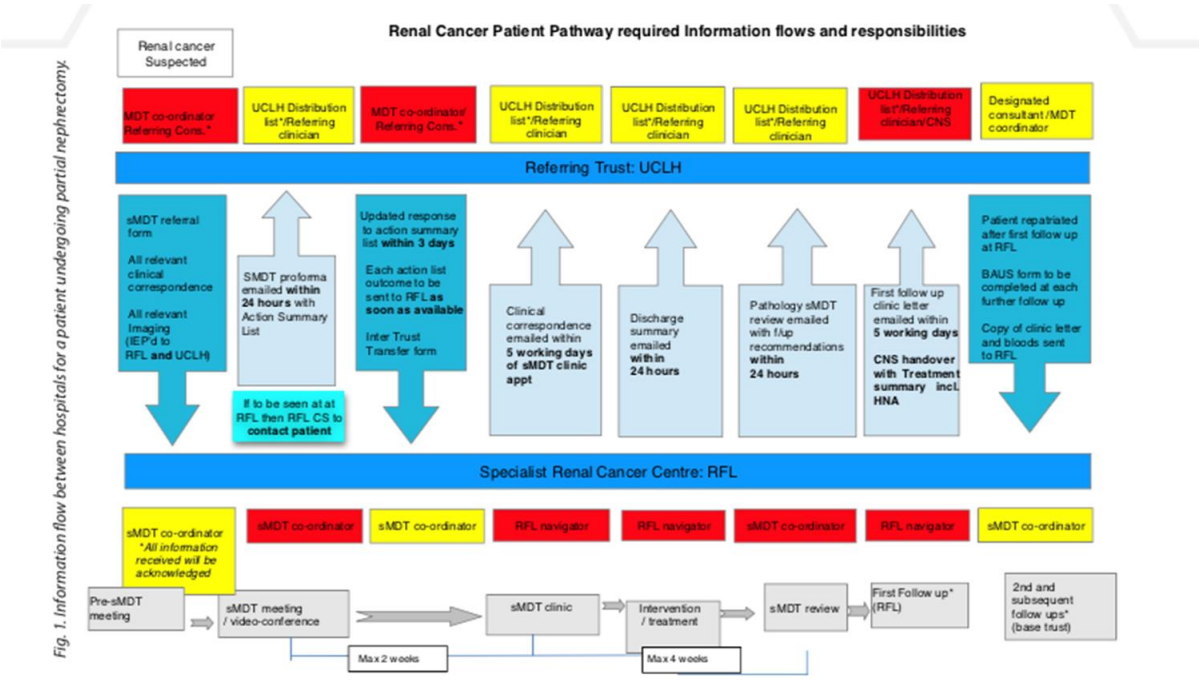
Healthcare delivery models are changing

Most people look at healthcare from a traditional view of the healthcare system and medical records. Most people think of healthcare is being delivered in institutions and records held at hospitals on a record system, nicely secured on its own server with a firewall around it. However, this seems to be not relevant anymore.

For the last few years, I have been working on a few different projects. One of these projects is focused on the semantic interoperability. We try to understand the meaning of data and how data share it between system. How information is sent from the GPs to the hospital and how easy it is to understand.

Figure 1 shows what happens with one patient to have one operation. The primary treatment is a UCL Hospital, if they want to see the surgeons in a different institution as the Royal Free Hospital for one operation, these are the number of data exchanges that need to happen.

Figure 1. information flows between hospitals for a patient undergoing a surgery.



The reality is that data are not held at just one institution, and data have to move across to several institutions, hospitals, GP practices and third-party providers. All the institutions want to work together with the same data, to provide care closer to home and by the best possible provider.

The concept of having a secure database and then put a firewall around it, it does not work anymore.

Current wearable technology or phone senses tell a lot more about patients' health than a visit every six months to the hospital or GP. Monitoring people when they wake up could help to treat depression or how much they move around after an operation could support the recovery. However, these data are not in any healthcare system. Data is in the patient mobile and the big data providers. *How do we get access to it?* In addition, we see more and more the use of social data, where patients go, what friends, what they like. We start talking more about wellness.

The future of the healthcare system is not about treating sickness is preventing them.

If that is the future, then where is our health data network, where does it end, where do we put that firewall? We should empower the citizens providing them control over their data. However, the current systems with our data in close hospitals servers go complete against to provide the citizens with the control of their data.

We need systems that empower citizens and caregivers, rather than the owners of data platforms

What Iota is trying to do is to move data from a very centralised system towards a distributed system where everyone is as equal as they can be. Iota has not miners has not a centralised control of the data. Any participant that put a transactional on the network I validate two other transactions. This allows no longer need to worry about scalability and cost.

To prove this, Iota and UCL have started embedding the technology into an open-source platform to make the exchange of data much easier to do. Previously the only way to move data from A to B was to rely on those big data providers.

Iota has separated the transmission of data and the storage of data, proving the integrity. Underpinning the concept that data is produced somewhere and get into action later on in other systems, we released a paper about that system, a unique ID that belongs to the patient, and no one controls it. Free to use to send data to the hospital from wearable devices.

GDPR

Whenever we talk about Blockchain, we should talk about GDPR, in another paper we were looking at a system when using a combination with this public ledger and of growing rapidly dying IPFS ledger, using that combination allows DLT technology to comply with the GDPR.

4.2. Dr Manreet Nijjar, Co-Founder & CEO, Truu

Dr Manreet Nijjar, Co-Founder & CEO, Truu

As doctor and patient, we trusted individuals; however, trust relationships are broken within the NHS.

Technology can be used to get higher levels of trust.

As a personal experience, when I started four years ago, I was working on nights, and I was working with an agency doctor. I was not sure that he was skilled enough to do the job, and he was with a patient at risk. However, there were no mechanisms about verify his identity or skills.

At a corporate level, organisations within the NHS are not trusting each other. As personal experience and after rotating through 10 and 11 hospitals, as a doctor, I have to do a physical identity check, every time I join a new hospital within the NHS. Hospital A, which is five miles away from hospital B, do not trust hospital B, and when a doctor from hospital A joins hospital B, the doctor has to go through a physical identity-check

Doctors are spending days doing physical identity checks every year. Roughly calculated is estimated on almost half a million clinical encounters a year, just "wasted" on pre-employment identity checks. The idea is, how the end-user can be empowered, in this case, the doctor.

As a personal example, I, as a doctor, have eleven physical credentials from multiple organisations that I have to show every time I join a new hospital, ranging from the passport, the DVLA, the DBS, the university degrees etc. How can a doctor be on control of that?

Truu has created a wallet where a doctor can have the equivalent digital credential to the physical credentials. Instead of having to go in in person, we have created this trust network where a doctor can remotely send the credentials. It allows to organisation A to trust that organisation B has issued that credential, and there was no tampering, nothing has been changed since it was emitted, and the doctors have not done anything to it.

This is foundational in health care because if we want data flow, we want to trust the source of the data. It is not only in healthcare data and credentials, but current global centralised data stores are also honey pots for people to hack.

Data is not property, although it has "property like" aspects. Two interactions have two data points that generally can have a value. However, if we treat data as property, we are going to start getting into harmful patterns. We have an opportunity here to learn from how to look at data. If healthcare data go in the wrong hands, it can ruin people's life.

Proof of Concept

We have created and carried out a proof of concept with the NHS to test if we can use verifiable credentials using a DLT layer to verify who has issued the doctor's credentials. Private by design, built-in a hybrid public permissioned network, Fabric and Sovereign, although we are ledger agnostic as long private concerns are met. We are engaging with GMC, NHS, and trusted organisations outside of healthcare

Breaking down data silos

How we break down the silos in the healthcare sector is linked to how we are going to break them down in the other industries, because we can learn from each other. A lot of that is tied up in policies, but the patents are very similar.

The standards are higher in healthcare, we have always wanted the gold standards because ultimately, it is the people's lives, and there's accountability on the front line. But the question is how we can bring that accountability into the digital world. Currently, it has been left to the big players to do what they want to do.

There's interest globally to deploy solutions like this, but regulations need to be adapted to it.

4.3. Raja Sharif, CEO and Founder, FarmaTrust

Raja Sharif, FarmaTrust

Farmatrust was set up to three years ago with the initial aim to eliminate counterfeits drugs from the pharmaceutical supply chain. The numbers are quite staggering, it is a two hundred-billion-dollar industry, and about a million people died worldwide due to counterfeits drugs.

Yesterday, The Guardian reported that doctors are worried as will counterfeit and substandard drugs could find their way into pharmacies in the UK because of a no-deal Brexit. Counterfeit drugs are not just a problem over there, in Asia or Africa.

Counterfeits drugs affect every country and members of society, whether rich or poor.

Farmatrust, a Blockchain and AI company, provides services to the pharmaceutical and healthcare sectors. Essentially we are built to eliminate waste, create efficiencies and make sure there is availability of healthcare products when they did where they. Ultimately it is about consumer safety.

Farmatrust operate in is four main areas,

- Pharmaceutical tracking and data services. We track medicines from the point of production to the point of consumption and every data point in between
- Tracking of medical devices. Hip transplants and other expensive implants that are available in the counterfeit markets.
- Clinical trial services. To record processes and procedures that satisfied the regulator in the US or Europe
- CGT of personalised medicine space. For example, a DNA is taken from the patient,

and a specific and bespoke treatment is designed to treat her/him.

Farmaturst is in the process of installing some of the products. Products are already installed in one of our partners in the US, System one, and they're trying our Blockchain service. We just finished a feasibility study in Mongolia, and now that's making its way through various processes to install our systems in the country, a very cost-effective solution rather than the old traditional servers and scanner processes that they have been used

We have found that the US FDA and the emerging markets are so much more accepting and pro blockchain than our European regulators.

For example, the CDT or personalised medicine solution that we developed was edgy for an extensive German client who was hinted at by the FDA to use blockchain for the CGT processing.

Farmatrust is part of the FDA DSHEA pilot program as a consortium some other partners which should be decided on at the beginning of April and the healthcare lead for the Retail Blockchain Consortium.

There is a lot of talk about theoretical concepts in terms of what can Blockchain do, what are the issues, how can we improve it, and how can we get people to use.

The future

People need to try Blockchain. People need to see which solutions are out there and which solutions are working.

Blockchain providers, as Farmatrust is struggling with the ability to find the right people in the UK who are willing to test out our blockchain systems which are working and are installed in other corporate organisations elsewhere in the world.

Blockchain is changing fundamentally, not just healthcare but society generally, and the benefits are here now.

We're one of the few companies headquartered here in the UK which has a solution that meets the requirements for healthcare in pharmaceutical, and the only blockchain company approved under the FMD regulations to provide regulated services throughout Europe

Blockchain can save lives and make a significant impact and can be done right now.

APPENDIX – Speakers' Bios

DR NAVIN RAMACHANDRAN, HEALTHCARE SPECIALIST IN DISTRIBUTED LEDGERS AND IOT, IOTA FOUNDATION

Dr Navin Ramachandran is a Consultant Radiologist at University College London Hospital and an Honorary Senior Lecturer at the UCL Centre for Health Informatics and Multiprofessional Education.

He is a member of the IOTA Foundation, a non-profit organisation working on the IOTA permissionless ledger. He has recently published a peer-reviewed article on novel uses of DLT in healthcare, which he will discuss today.

DR MANREET NIJJAR, CO-FOUNDER & CEO, TRUU

Manreet Nijjar is trained as a Consultant in Infectious Diseases and General Medicine. He has over a decade's experience in frontline NHS services. He is the co-founder of Truu, and for the last four years, he has been working locally, nationally and internationally, creating a decentralised digital identity solution for healthcare workers.

His work has to lead him to contribute to The Lord Holmes report on Distributed Ledger Technology for the public good, nomination to co-chair the IEEE blockchain in healthcare standards subcommittee on decentralised identity and he is an NHS Clinical Entrepreneur.

RAJA SHARIF, CEO AND FOUNDER, FARMATRUST

Raja is the Founder and CEO of FarmaTrust and is driving the company's vision and mission of creating efficiencies for the pharmaceutical and healthcare industries as well as protecting consumers of medicines.

Raja is a UK qualified barrister. He has been General Counsel and Board Member of several European companies, with over 20 years of business experience in the global media and technology industries.

Contact details

APPG Blockchain Secretariat

Big Innovation Centre
62 Wilson Street
London EC2A 2BU
United Kingdom

info@biginnovationcentre.com
www.biginnovationcentre.com