



ROUND TABLE REPORT

THE BLOCKCHAIN REVOLUTION
How will it change the way we
do business and interact
with government?

26th of May 2016, Brussels

Report

Round Table

The Blockchain Revolution - How will it change the way we do business and interact with government?

Brussels, 26th of May, 2016

Silken Berlaymont, Boulevard Charlemagne 11, 1000 Bruxelles

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Round Table Report
The Blockchain Revolution: How will it change the way we do business and interact with government?

Speakers

Fabrizio Sestini

Senior Expert for Digital Social Innovation,
European Commission DG CONNECT

John Palfreyman

Director - Blockchain, IBM Cloud Division

Daniele De Gennaro

Team Leader, European Banking Federation

Catherine Mulligan

Associate Director, Imperial College London

Complete recordings of the various speakers' introductory speeches are available online, on OpenForum Europe's [Youtube channel](#).

Moderator & Rapporteur

Dr. Alea Fairchild, Director, The Constantia Institute and Docent, KU Leuven

Other details of the event, and the speakers' presentations, are available [here](#).

Credits

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Foreword

Blockchain technology has created huge excitement in the IT market. It is set to reform our financial markets, supply chains, consumer and business-to-business services, but how? The technology can incorporate rules, smart contracts, digital signatures and an array of other new tools. But what is this technology all about, how does it work and what is meant by a ‘distributed’ ledger? And how can ledger technology assist governments in providing better suited services for citizens?

European Commission officials suggest it may be too early to regulate such a nascent technology, but MEPs are closely looking into the topic, with the EP plenary set to adopt the ECOFIN report on “Virtual Currencies” this month.

Alea Fairchild

Alea Fairchild opened the event by introducing OpenForum Europe, the topic and speakers. This is a moderated discussion, with an inclusive debate on the topic. We started with informal presentations by the four speakers, then opened the floor to discussion and debate with the other attendees. Alea explained that the Chatham House Rule would apply, in that the speakers could be quoted, but no other participant in the debates would be quoted in their contributions.

The topic is on the use of blockchain in the automation of transaction processing, and in this event we tried to focus on blockchain applications beyond that of Bitcoin, although the questions from the floor were directed towards the topic.

Alea opened the discussion with an introduction about the use of blockchain. To process a transaction, you need first to make sure the sender owns the asset he wants to transfer, and make sure he will not trade it twice. In the blockchain, information is stored in blocks that record all transactions ever done through the network. Hence, it allows validating both the existence of assets to be traded and their ownership. Startups are already working on this technology to disrupt industries. Every time a third-party is involved to process a transaction, the blockchain could possibly replace it. Some examples: companies such as Bitproof and Blocknotary are disrupting contracts by recording them on the blockchain; instead of completing your house sale in front of a notary, just store the contract on the public ledger. Colu is using the blockchain to manage property through digital tokens that can unlock either online services or physical objects. In the area of intellectual property, Verisart is using this decentralised technology to verify art pieces. It encodes copyrights of artwork, and records them on the blockchain. ProofOfExistence, as well, is leveraging the public ledger to keep track of files you have created. The blockchain could also be used to identify people. ShoCard encodes and stores personal information regarding identity. She then invited the four speakers make their opening statements.

- **John Palfreyman**, Director - Blockchain, IBM Cloud Division;
- **Daniele De Gennaro**, Team Leader, European Banking Federation;
- **Catherine Mulligan**, Associate Director, Imperial College London;
- **Fabrizio Sestini**, Senior Expert for Digital Social Innovation, DG CONNECT.

John Palfreyman

In opening the discussions, John Palfreyman stated that blockchain is often overhyped and can be confusing. IBM has focused on making blockchain real for business, majoring on permission closed and trusted business networks. John started by explaining the benefits of using blockchain within a business network, then when on to illustrate this with three use cases. He explained that businesses and government never work in isolation; all are members of business networks. The owners of assets (both tangible and intangible) within these networks keep their own ledgers which are updated every time an asset moves into or out of their organisation. Ledgers have existed for many centuries, are well tried & tested but have their issues - including costs (due to inefficiencies), and susceptibility to fraud. The novel blockchain architecture gives participants the ability to share a ledger which is updated every time a transaction occurs through peer to peer replication. Privacy services are used to ensure that participants see only the parts of the ledger that are relevant to them, and that transactions are secure, authenticated and verifiable. Blockchain also allows the contract for asset transfer to be embedded in the transaction database for execution with the transaction. Network participants agree how transactions are verified through a process known as “consensus”.

Oversight and compliance can co-exist in this network, which makes this more efficient and easier to implement. John discussed reduction of costs and complexity with improved resilience to fraud or cyber attack as key benefits of Blockchain technology usage.

John went on to describe three cases for the use of blockchain. The first was the use of Blockchain to improve Supply Chain Management. All members of the chain share a ledger of asset ownership and location resulting in improved efficiency, oversight & verifiability. He then described the use of Blockchain for improving manufacturing provenance in a complex system such as an aircraft. Blockchain holds a complete audit trail of component parts, resulting in increased trust and more efficient maintenance or recall interventions. John also described the application of Blockchain to the management of a complex asset, such as an oil rig. Blockchain enables members of a multidisciplinary and geographically distributed management team to share “one view” of the asset through its lifecycle, thus improving efficiencies and risk management.

John concluded by discussing the importance of open governance, open source and open standards in Blockchain, hence IBM's contribution to the Linux Hyperledger Project. He mentioned that blockchain is still very new and suggested that organisations focus on awareness and experimentation at this stage, rather than regulatory policy.

Daniele De Gennaro

Daniele De Gennaro started his discussion with some background about the European Banking Federation (EBF), which represents around 4,500 small and large banks around Europe, and is based in Brussels. Banks have been very active in blockchain since its inception. He feels that blockchain technology is seen in industry as a magic box to solve the problems found presently in banking, and stated that his plan was to frame where blockchain can make a relevant contribution. He believes distributed ledger is certainly not limited to payments and trusted central authorities, and blockchain is attractive because of ownership visibility and electronic commitments with cryptology for verification. One of the first benefits discussed about blockchain is transparency – and Daniele agreed with the previous point made by John on the distribution of information and the reconciliation of information across operators, regarding a single source of truth. Information is kept on multiple servers and updated simultaneously. It is also easy to check from a transparency point of view. Blockchain technology reduces cost, makes things faster and reduces settlement risk for payments and trading. Daniele sees that the financial industry can do certain things in the short term with blockchain. First, with the secured permission of blockchain within a network where everyone has a copy of the distributed ledger, as all are trusted partners in a private network, benefitting from the decentralisation. Benefits for private bank networks include cutting costs and gaining speed, as well as scalability and gaining security. There are some concerns with blockchain, relating to risks of confidentiality and the potential for misuse of information. There is also the problem of cybersecurity and hacking possibilities, as well as the growing bank network and how this will be managed in a scalable way. Trading (or transferring) securities from one place to another is also challenging. There are other issues on the regulatory side, in that resiliency and stability are important as well, as the use of blockchain technology can potentially disrupt the need for central authorities. Daniele also agrees with

John that it is still too early for regulatory policy to be imposed. They were in favour of the recent statement from the Commission proposing the creation of a task force at Commission level, and hoping for industry participation. The other important aspect is whether any regulation should be self-imposed by industry or should be defined by European regulatory measures. Daniele concluded that although blockchain is not an industry panacea, it can help best when the problems which it would solve are better defined and well applied.

Catherine Mulligan

Catherine Mulligan then provided her contribution to the discussion of use cases by opening with the statement that blockchain is a technology, just like a generation of technologies before it, but it still involves people and governance, and will not get rid of governance but perhaps will find a better way to manage it. She described the work of her Centre for Cryptocurrency Research at Imperial College and their interdisciplinary approach, given that blockchain is broadly applicable technology. This Centre includes people from the areas of medicine, social science and economics. Catherine believes that this is one of the first truly digital economy products; she believes that you cannot work with technology and protocols of the blockchain if you do not understand the economics and incentive mechanisms, and you cannot work with its economics aspect unless you understand how the technology is actually built.

The Centre focuses on two broad areas of research: the first is the computer science and economics, in terms of scalability and robust protocol. They look at both smart contracts and non-determinism, and here Catherine discussed the difference between contracts written by lawyers, and 'smart contracts' which are better viewed as distributed applications.

Catherine also discussed who is legally responsible for writing bad code within these so-called smart contracts, and compared it to self-driving cars and who holds legal responsibility if they collided. These are challenging areas for society right now. She then went to describe some of their initial implementations for governance, with an example on how one can use these contract for efficiency and cost reduction for waste management for local councils in the UK. The other

solution that the centre built and released in 2013 that Catherine explained was identity management for students at the university: i.e., proving the identity and qualifications of the students for reference requests. This removes delay in the hiring process to verify qualifications for graduates and saves cost on reference request for what up to now has been paper records. She also explained that systems will be running in parallel, while the proof points for blockchain are being worked out. The Centre is currently looking at the “sharing economy” and the use of blockchain in humanitarian solutions, as well as at the protection of distributed ledgers in critical infrastructure in the context of smart cities (with the embedding of sensors and registering the current firmware of the sensor and getting an early warning if something is tampered with in the network). Catherine highlighted some of the Centre’s research work in examining the power relationships in the sharing economy, with one example being nodes in the network in the use of Bitcoin. One of the challenges with distributed ledgers is getting so many people in the network to agree before you can build the ledger itself (or agree on the block size). Finally, Catherine discussed the Centre’s research using game theory and incentives for improving protocols. From a regulatory perspective, she believes that industries will play a role in governance and regulation.

Fabrizio Sestini

Fabrizio Sestini introduced his work in digital social innovation in DG CONNECT, and began his presentation by saying that blockchain is a basic technology that can be used in many applications. He wanted to talk about particular implementations of blockchain to solve regulatory problems. Instead of looking at technological domains, DG CONNECT decided to focus on level playing fields for many stakeholders and how to define responsibilities. He touched on big data and how to define transaction frameworks, citizen privacy, and digital sovereignty within the context of data governance and the dominant data platforms (Facebook, Google, etc.). He touched upon some of the risks of dominant data platforms, in terms of the potential for data privacy leakage, and of innovation being stifled through unfair competitive advantage over new entrants. Other than regulatory solutions, he stated that perhaps network architectures can help address some of the issues of centralised architecture and power relations. Fabrizio touched upon distributed architecture under the control of the user, mentioning micro clouds

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and personal devices as means of storing data at local levels, which he described as being subject to on demand aggregation through simple or standardised content licences for ease of use for decentralised data governance.

Fabrizio believes that the technologies are already there for decentralised data sharing, such as peer to peer technologies (robust and reliable) and blockchains/ distributed ledgers for the possibilities of scalability and data exchanges. He talked also about open data and explicit permissions for data management for use from citizens. The distributed data governance concept can be applied to clouds, social networks and Internet of Things (IoT). The ultimate goal would be to create a decentralised ecosystem, similar in concept to an app store model, open to new service for social innovation and with lowered entry barrier for new entrants.

He mentioned a call recently closed by the Commission for research in this area of distributed architecture which had a significant amount of interest. They are also actively working in collective awareness platforms, looking at pilot platforms for social collaboration models.

Fabrizio concluded his presentation by mentioning two upcoming events that are sponsored by the Commission: the first will be a workshop on blockchain for social good (non-financial applications), to take place on 21 June with EPSE in Brussels; and the second event, on the topic of social innovation, will take place on 29 June, also in Brussels.

Alea then opened the discussion to include the whole panel, with a few questions on decentralised data governance, focused on a few existing use cases in recording of asset transactions (notarial transactions with real estate) and property management, as well as identity management. How do you incentivise people to use these into wider applications? John talked about learning and exploration using these new applications. Alea discussed scalability and the impact of using a network architecture to build out, and then Daniele talked about pilot projects and scaling as the project evolves as regulatory issues helps frame that growth. Issuing a security is one issue that regulates growth and does not allow scalability. John added that people are focusing on blockchain functionality, and as the technology matures scalability will be an issue. Catherine discussed trust and parallel usage and what proof points will be needed for blockchain. She gave parallels for trust

in ATMs and the use of a PIN code for cards. In a UK government report on distributed ledgers, there was a use case from the Department of Work & Pensions (DWP) for the use of coloured coin (cryptocurrency) which restricts the kind of spending (no alcohol, cigarettes) - clearly there are some ethical issues here. There are folk who are underbanked in the UK who need to understand how to use the technology and how to back up their technology. Alea asked Fabrizio what it will take for the public sector to incentivise and support blockchain usage. He talked about solution providers and supporting what possible solutions can be used for blockchain, including for refugees. He talked about the business models for these under demanded applications and creation of social networks for decentralised information usage including choosing for free or almost free services. Alea then brought up the proof points for trust in a distributed ledger system, including rating of applications. Catherine mentioned change of how these codes are audited or how the outcomes are audited. John came back to the point about how public sector can help by promoting awareness and education on how to use the technology and taking a small number of pilots with big risks to see how best practices can be shared across geographies. Catherine mentioned a suggestion she had made on creating trust by grant spending by public sector being administratively handled by blockchain. Fabrizio mentioned the Commission's idea of a "participatory badge" for transparency purposes. Daniele mentioned the EBF's activities in education as an example of what can be done with financial education for blockchain. Remuneration and reward for using blockchain, such as Bitcoin, is a system of incentives. The question for non-financial remuneration still needs to be addressed, and whether it will be centralised or decentralised, and how democratic the systems.

The conversation then went to a discussion of standards and whether standards are needed at this time, or if it is still too early. John and Daniele agreed that it might be too early in the maturity of the technology, but stated that standards are important. Catherine believed that we have not yet defined the stack properly, which is a standards discussion. She believes that blockchain interoperability could be useful via an open API, but standards will likely evolve via industry standards. Alea agreed and gave an example of a closed supply chain network within aircraft maintenance and use of APIs. John pointed out the open interoperability issue, and the possibility of proprietary blockchains and why they were working with Open Linux Foundation and the Hyperledger Project. Alea brought up the possibility of industry-specific use cases driving adoption, and John agreed that

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industry-specific cases would come first.

Alea then opened up the floor for audience questions. An audience member opened with a question about Bitcoin and the announcement of the virtual currency task force, and wanted to know who was responsible. Another contributor had been involved in the previous day's discussion on the subject and gave an update on what was mentioned with regard to the Fintech task force and its mandate. Alea tied back the discussion of Bitcoin to smart contracts and compensation, and John mentioned the articles from the EMF on characteristics of Bitcoin and how it is/can be used. Daniele and Catherine also remarked on Bitcoin and separation from what cryptocurrency does and other blockchain usage.

A participant then asked about standards, and the conversation returned to a discussion of technology maturity. Another contributor had a question about business return from blockchain usage, with the example of valuable asset management, and again the comment was made that it might be too early in the technology adoption yet to define that.

Another audience participant asked whether blockchain needs regulation in order to evolve, and the panel discussed how blockchain may make things more efficient, with a focus on awareness and education.

The panelists then had a few minutes for final remarks. John stated that it will be a transformational technology, but awareness and education are important to get hands-on and try the technology. Daniele said that it is still new, and a lot of discussion is required before full usage and implementation. Catherine then said again that it is just a technology, but with some fascinating crossover with economics, which will have some impact on societal collaboration. Fabrizio concluded that piloting projects with blockchain is important to get momentum.

Alea thanked the panelists, and concluded the discussion.

Speakers' biographies

Fabrizio SESTINI,

Senior Expert for Digital Social Innovation, DG CONNECT



Fabrizio Sestini is leading the multidisciplinary initiative “Collective Awareness Platforms for Sustainability and Social Innovation”, which aims at stimulating bottom-up innovative ideas for collaborative platforms. He is also pioneering a new area of research on distributed architectures for decentralised data governance, leveraging on peer-to-peer and distributed ledger technologies. He has a PhD in Information and Communication Engineering and has published some 30 scientific papers. As an IEEE Senior Member he has served on boards organising several scientific conferences. Fabrizio is an Internet Policy Fellow at the University of Cambridge.

John PALFREYMAN,

Director Blockchain, IBM Cloud Division



John joined IBM in 1996, as part of the acquisition of Data Sciences where he was General Manager of the Aerospace Division. John worked at a European and Global level in IBM as leader of emerging technology businesses including Pervasive Computing, Linux Services, Grid Computing and Open Source Services before joining the Global Defence, Intelligence and Public Safety team. After four years in this role, John moved into the Europe CTO Team where he focuses on National Security, Open Computing and the cross industry application of IBM Blockchain.

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Daniele DE GENNARO,

Team Leader, European Banking Federation



Daniele joined EBF in 2015. He is a policy advisor operating within the EBF Financial Markets team where he specifically focuses on the post-trade aspects within the financial markets regulatory policy mandate. He is also currently coordinating all the EBF initiatives related to the European Commission plan on Capital Markets Union (CMU) and he is leading on the EBF blockchain project. Prior to joining EBF, Daniele worked as an Account Manager in a consultancy dealing with financial services and developing lobbying strategies and overseeing their subsequent implementation.

Catherine MULLIGAN,

Associate Director, IC3RE (Imperial College Centre for Cryptocurrency Research and Engineering)



Dr. Catherine Mulligan is a Research Fellow at Imperial College London, with a joint appointment between the Business School and the Department of Computing. Her research interests include digital economics and the economic, social and environmental impact of digital technologies on a variety of industries. She is the Associate Director of the Imperial College Centre for Cryptocurrency Research and Engineering (IC3RE) and is Imperial College lead for the EPSRC grant: Cryptocurrency Effects in Digital Transformations (CREDIT).

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