Evidence Report
APPG BLOCKCHAIN
UK Parliament

LOGISTICS

Blockchain applications - regulation, policy & strategy

appg

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Group on
Blockchain

BLOCKCHAIN

2020 JUNE

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1. APPG Blockchain Evidence Meeting on Transportation and Logistics.

1.1. Purpose

The mission 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.

This Evidence Report of an APPG Blockchain Evidence Meeting explores the potential of Blockchain and DLT on Transportation and Logistics.

This report provides a summary of the takeaways from the meeting. The Video recording of the session is available on our websites APPG Blockchain *https://www.appg-blockchain.org/* and Big Innovation Centre *https://www.biginnovationcentre.com/*

1.2. Details of the Meeting

- Date, 24th March 2020
- Time, 17:30 – 19:00pm BST
- Location, Webinar
- Participants, 127 attendees

1.3. Discussion Questions

Questions for Discussion at the meeting were:

Logistics & Transport

- What are the potential applications for Blockchain/DLT technology in logistics and Transportation?
- Will Blockchain/DLT enable more efficient operations for transportation and logistics?

1.4. Panellists: Evidence Givers, Chair & Secretariat

The meeting was Chaired by APPG Blockchain Chair Martin Docherty-Hughes Member of Parliament. Parliament has appointed Big Innovation Centre as the Secretariat for the APPG on Blockchain, led by CEO, Professor Birgitte Andersen and Fernando Santiago-Cajaraville as the Rapporteur.

The webinar brought a total of 7 evidence givers from different shipping, logistics & construction industries. Academia was represented in the meeting with representatives from the UCL and Sheffield University.

Industry Representatives

Stewart Jeacocke
Network Development & Customs Lead
TRADELENS / IBM

Dr Jacob Bejoy
Head of Centre of Excellence Blockchain
DEUTSCHE POST DHL

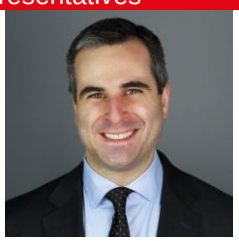
Diarmuid O'Riordan
Director
PING ASSET LIMITED

Ahmed Zghari
Chair
CONSTRUCTION SMART CONTRACTS COMMITTEE

Kevin O'Grady
Associate Director
ARUP

Academia Representatives | **Chair** | **Secretariat**

Prof. Lenny Koh
Director of the Advanced Resource Efficiency Centre (AREC)
THE UNIVERSITY OF SHEFFIELD



Geoffrey Goodell
Senior Research Associate
UCL Centre for Blockchain Technologies (UK)

Martin Docherty-Hughes
MP

House of Commons,
UK Parliament

Secretariat:
Professor Birgitte Andersen
CEO
BIG INNOVATION CENTRE

Rapporteur
Fernando Santiago-Cajaraville
Project Manager,
BIG INNOVATION CENTRE

2. Background

Many claims have been made about the power of Blockchain. It is considered one of the world's most significant development at the moment (Leon Louw, Free Market Foundation) with the ability to create something that is not duplicate in the digital world (Erich Smith, CEO of Google) and with the potential to change the whole world trading (Oliver Bussman, former CIO of UBS.

Blockchain's characteristic of being able to track and record all transactions in an immutable way has found a purposeful application on the Logistics sector, claiming to have the potential to address current inefficiencies across the globe.

As an example, it has been claimed that it will remove the opacity from global logistics and improve collaboration with the purpose of creating a "trustless environment" (Dahan, 2017). Please note that in Blockchain context a "trustless environment" is a scenario where exchanges for value over a computer network can be verified, monitored, and enforced without the presence of a trusted third party or central institution" (Nakamoto, 2008), making that the trust among partners becomes irrelevant as the technology itself will assure it.

Following these expectations, many Blockchain projects have been launched to improve Logistics efficiency. Just in the UK, 25 supply chain and 175 financial projects have been launched over the last two years using Blockchain (Big Innovation Centre, 2018). These projects, which are run by large tech companies and start-ups companies, focus on the traceability, provenance and trust areas of the supply chain. Most initiatives are in the early stages of proof of concept; some have already piloted, and some have undergone implementation.

Many of these initiatives have claimed to be the perfect solution for attaining visibility, traceability and trust in the Logistics sector. In the meeting underpinning this report "Blockchain and Logistics," we have explored use-cases from the Logistics and Construction Industry,

- **Blockchain on Logistics**: DHL, Tradelens and PING asset use-cases were explained at the meeting. The main goal is to improve the traceability and visibility of the materials in the logistics sector, from pallets to shipping containers. Collaboration and Data Sharing are essentials to all of them.
- **Construction Industry**: Representatives from the Construction Smart Contact Committee and ARUP were at the meeting.

Dahan, M. and Casey, M., (2016). Blockchain technology: Redefining trust for a global, digital economy. Digital Economy.
Nakamoto, S., (2008). Bitcoin: A peer-to-peer electronic cash system. [Online] Available https://bitcoin.org/bitcoin.pdf
Big Innovation Centre., (2018). [Online]. Available: https://www.innovationeye.com/

3. Meeting Takeaways

APPG Blockchain Webinar on Logistics, 24th March 2020

Blockchain allows a single, immutable and distributed version of the traceability records for the whole Logistics events. The entire journey of the materials can be recorded on the distributed ledger, including properties, events and transactions. These characteristics allow removing the data silos for the supply chain, increasing the efficiency of the information flows.

These characteristics allow Blockchain technology to have at least five significant impacts for logistics handling and organising:

1) Blockchain will be *the* Change-Maker Technology for the Logistics Sector

From the shipping industry, last-mile delivery or construction sector, Blockchain will be *the* change-maker technology. The potential to "Track & Trace" all the events in the logistics movement will bring, Transparency & Accountability to the sector, and ultimately it will increase in the trust among all stakeholders.

Blockchain will reduce de cost and the risk of the operations and improve the efficiency of the sector. It will create value providing allowing stakeholders interoperate with the same set of data.

"We believe blockchain has the potential to have as much impact on logistics as the shipping container did" *(S.Jeacocke, Tradelens / IBM)*

"Suppliers must be able to maintain order, that counts of track and trace, within their own supply chain *(D. O'Riordan, Ping Asset)*

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2) Blockchain will Unleash New Business Models in the Logistics Sector

The immutability of the shared records in the Blockchain network can boost other types of business models in the logistics industry as, “Mobility as a Service”, “Usership based models”, “Collaborative digital transport engineering” or “Unmanned aerial vehicle (UAV)”.

In combination with other technologies such as Artificial Intelligence (AI) and Internet of Things (IoT), it potentially can contribute to this new idea of “technological singularity”.

New Blockchain use-case should look at areas where the immediacy of decentralised data and results are needed.

“Blockchain has great potential as a service model” *(Professor L. Koh, Sheffield University)*

“We aim at giving value to the customer while giving complete not-for-profit service structure” *(Dr J.Bejoy, DHL)*

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3) Blockchain will Bring Better Value for Money in the Construction Industry

Transparency is critical for the Construction sector. Remove the opacity in the sector can tackle the lowest rates of productivity and highest rates of litigation

A higher level of Data transparency will allow tracking constructions material through the supply chain, allow a paperless industry, and ultimately improve the promptness of the payments.

Blockchain can support the “Suppliers relief due to COVID-19” (Procurement Policy Note 02/20), bringing more transparency and prompt payments to the sector as requested by the Cabinet Office.

“People like to hide bad news. We want to get rid of that by making data more transparent” *(A. Zghari, Construction Smart Contracts Committee).*

“This is not about paying people using cryptocurrency. It is just an authorisation process” *(A. Zghari).*

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4) Blockchain Builds Ecosystem Platforms for Collaboration

Blockchain means sharing information, and this requires trust among participants. To increase the trust, we need a system for increased information which is shared. Governance models and Data Ownership need to be thoroughly studied and agreed before any implementation of Blockchain.

Integrating earlier degrees of collaboration amongst supply-chain parties is needed in order to onboard the necessary ecosystem of companies on the Blockchain network. This is a way to implement holistic Blockchain solutions.

Investments are required in blockchain pilots, collaboration with academia, industry experts and professional institutions. Working Groups, as used in some collaborative research projects in the Construction Industry, could be extrapolated to other areas.

The purpose of having DLT is not having that centralised actor. It should be a collaborative effort among stakeholders.

"Working groups consistent with industrial experts would accelerate the adoption of blockchain and address the logistics and transportation specific challenges." *(K. O'Grady, Arup)*

"We need to be concerned about evaluating platform-based business models" *(G. Goodell, UCL)*

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5) Blockchain Will Spark a Regulatory Push and Robust Standards for the Logistics Sector

Regulators and policymakers should explore the uses in of Blockchain in the Logistics Industry. They should engage with the current initiatives and "help to shape", in real-time, the evolution of the sector.

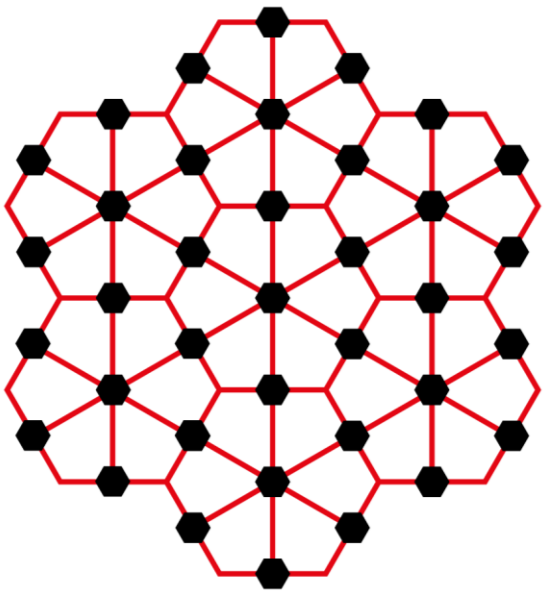
There are use-cases that can improve the Cross-Border interoperability; however, the involvement of the policymakers is vital for the test & implementation of Blockchain The Bill of Landing Use case is a clear field to test Blockchain.

The industry needs a "Regulatory Push". The regulator can set the rules, and the industry lead the implementation in analogy to the Financial Industry

"Regulators can influence Bill of Lading use-case to go much faster."
(Dr J. Bejoy, DHL)

"If we have a regulator who can set the rules, then we can indeed have the industry lead the implementation". *(G. Goodell, UCL)*

"Policies and regulations are urgently required to ensure that straight and honourable dealings." *(K. O'Grady, Arup)*



4. Evidence Giving

Creative transcripts, prepared for presentation purpose, of the evidence giving at the APPG Blockchain meeting on logistics (24th March 2020) are listed below.

4.1. Stewart Jeacocke, Network Development & Customs Lead, TRADELENS / IBM

APPG Blockchain Webinar on Logistics, 24th March 2020

IBM started to work with Maersk on a global blockchain platform for trade, recently other large shipping lines like MSC and Hapag-Lloyd have also agreed to join trade lines as foundational members. Elsewhere IBM is engaged with over 400 clients from across all industries, building the blockchain networks of the future. IBM is a leading contributor to the open-source Hyperledger Fabric blockchain platform. We provide our clients with the consulting systems integration and blockchain technology that they need to design and adopt distributed ledgers, digital identity, blockchain solutions and consortia.

Back 64 years ago, in fact on April 1966, a revolution began. The first container ship, the Ideal-X, sailed from Newark in New Jersey. The shipping container has gone on to become the building block of today's globalised economy and global logistics.

As supply chains have lengthened, they've grown long on data but short on trust, by helping to restore trust.

"We believe blockchain has the potential to have as much impact on logistics as the shipping container did".

Cargo owners are demanding **greater visibility** into every step of the logistics journey. The procurement of transport services is still too manual. It requires lots of phone calls and effort to correct errors. **Mistrust among organisations** has impeded data sharing, and even, when that data is shared is not fully trusted.

To solve these challenges, we see the emergence of shared global industry platforms to optimise business to business processes. **Blockchain provides these platforms, with a technology that helps to establish trust** through mechanisms such as **immutability, consensus,** and **smart contracts. "***A really good case in point is Tradelens.*"

Tradelens is a blockchain-enabled platform that lays the foundation for digital supply chains. It is a global platform that connects all the organisations involved in the logistics process, enabling them,

- To collaborate
- To publish and subscribe to logistics events and documents
- To share a global view of transactions without compromising privacy or confidentiality

Last year, 2019, Tradelens tracked more than 20 million containers. That figure will increase dramatically this year, as we have agreed with additional large ocean carriers like MSC, CMA, Hapag-Lloyd, ONE and CM participation in Tradelens. They are in the process of integrating with that platform.

Tradelens shows that blockchains impact on logistics is not any longer a theoretical thing. It is already having an impact. **Other areas of logistics** in which we expect to see significant benefit from blockchain include things like

1. The procurement of transport services
2. The transfers of title through things like bills of lading improvements
3. The ability to prove the chain of custody
4. The anti-counterfeiting measures

"Blockchain dramatically improves the efficiency in logistics."

We also believe that it is going to have an even more significant impact in areas like improving the end customer experience and enabling entirely new business models that don't currently exist

In the logistics ecosystem, according to an IBM survey of 1,600 executives across eight industries, about a third of those **executives are reallocating massive capital**, estimated about 1.2 trillion dollars, **to launch new platform, business models**.

What should the government do in this kind of environment?

I would advocate that they need to

1. **Engage** collaboratively with these platforms. Not in several years, once they are ubiquitous, but right now.
2. **Help shape evolution**. So that, platforms meet the needs of governments as well as the private sector.

What could that engagement look like?

If we take platforms like Tradelens as an example, companies that are using them will have **significantly increased End to End supply chain security, posing a lower risk to the importing country**.

Governments could consider offering *"Green Lanes"* to companies that make use of these platforms as well as meeting g more common trusted trader criteria. These "*Green Lanes"* would simplify the customs compliance process for the companies, while still maintaining compliance, and enable government to direct resources, to controlling higher-risk trade.

Hopefully that's given you a flavour of how we see blockchain working in logistics, how we are already doing work with blockchain in Tradelens, and how we certainly would welcome additional engagement from the government to help shape how these kinds of platforms of over for the future.

4.2. Dr Jacob Bejoy, Head, Centre of Excellence Blockchain, Deutsche Post (DHL)

APPG Blockchain Webinar on Logistics, 24th March 2020. Dr Jacob Bejoy runs the Group Blockchain Practice for DHL.

DHL runs across four major streams of business on logistics, air, ocean, road, and rail.

DHL's blockchain R&D practice is focused on cross-industry and multimodal transportation. DHL span across 220 countries, with landing rights of over 90 per cent of all the airports in the world, which gives DHL an excellent opportunity to influence the industry, as a market leader.

DHL started the blockchain practice and blockchain research, four years ago, when the finance industry started looking at blockchain or cryptocurrency as a solution for the market. DHL worked very closely with companies in the finance space, found out that blockchain was not a stable practice, but there is vast traction which is coming in the next decade.

DHL works quite closely with a lot of our ocean carriers, air carriers, trucking companies and cross-border traffic.

Practices in the blockchain

We see a few areas, everybody talks of track and trace, track and trace is the most natural part. However, when we see a business tangibility or a use-case for an operational business, we have to think about cases where **Value Creation** comes in place, where operational improvements and operational business practices have to be influenced.

Areas where ***the immediacy of decentralised data and results are needed***. Parties in many researchers that we have seen in the industry, *counterparts are very hesitant to share data* and secure data, in public places or even third-party suppliers.

"We need to give companies an opportunity to holds their own data, while they are able to interoperate and intercommunicate with parties".

We call it the "whisper" that is to query communication and the "announced" and its multi-party communication investment chain

Financial settlements, at the end of the day, everything ends up in dollars and cents. How can we influence **invoice processing,** transparency of invoice processing? How can we influence **customer clarification**? and what are the immutable data that you have, from the time of shipment or order to the time of proof of delivery? What are the activities?

For example, if there is an additional barging requirement if there is any additional service in the ground operations. Do we have that information? How can we give the tangibility of this information to our customers? Providing an extra service, that would bring the turnaround time of settlements much shorter.

Regulatory and customs. This is where the government can play a significant role, introducing more services and knowledge to the regulators. How can we introduce to our custom services and border security controls more tangible information? PDF files have been the latest innovation in the recent for customs documentation.

If you look at other markets exploring new technology, like Singapore or Dubai, they are far ahead of the game to say. They have immutable data which can share on-demand as proof of origin, certificate of origin, proof of details.

We also heard from Stewart, how we can create the certification, and handle of certification easily, and how we can be tangible. Bill of Lading as a use-case is seen as a use case for the future.

"Regulators can influence Bill of Lading use-case to go much faster."

Ecosystem

DHL solution is not a profit-making solution. We aim at giving value to the customer while providing complete not-for-profit service structure, that means the network, the ecosystem, should be open to all and able to connect to all, that means,

- **Interoperability** Blockchain to blockchain, inter blocking, blocking to non-blockchain
- **App-based services for truckers.** Truckers are not going to host a node for themselves. There are small truckers with two truck and the table and a chair, so, how do we help it if they have an app? How do we integrate this in this party into the network?

We want to be inclusive, to set the industry standard or help the industry to have a standard in practice.

These are the main areas for us,

- Interoperability being the key
- Standardisation. How we can influence and help the standardisation in the industry blockchain
- Blockchain to non-blockchain connectivity
- Sharing data, relevant data, for the right parties, while you hold the data in your own space

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4.3. Prof. Lenny Koh, Director, Advanced Resource Efficiency Centre (AREC), The University of Sheffield

APPG Blockchain Webinar on Logistics, 24th March 2020

" Blockchain can have a significant role to play in the logistics and transport area going forward."

Blockchain definitely has a role to play in the area of logistic and transport.

Two years ago, we published a report in partnership with the Transport Systems Catapult, now part of the Digital Catapult. The report investigates the potential disruption of blockchain technology in the transport and logistics sector. It is available on the library resources session on the APPG on Blockchain website.

The report explores a number of potential applications of blockchain in this area. Blockchain has the potential to make a huge difference in the areas of,

- Mobility as a service
- Mass Freight & logistics
- UAV (Drones)
- Data sharing
- Collaborative digital transport engineering

Mobility as a service is going to be potentially a new way of doing business in the transport and logistics sector. Rather than owning the physical vehicles or a fleet of vehicles, it potentially can move to a "**usership based model"**, more personalised and providing end-to-end transport service.

In that sort of environment, Blockchain is needed to trace the authentication of the entire service, in terms of, ownership, maintenance of the vehicle, and service history. In all of these fields, Blockchain has great potential as a service model.

Freight & logistics, it's not just about the movement of goods in the supply chain, also about the movement of people. There are a lot of examples that have been mentioned by previous speakers, in terms of tracing and tracking products, across multi-modality, whether this is road, rail or other transport mechanisms. At the same time there are potential social applications of blockchain in tracing people.

UAV (Drones) is another interesting application. There are increasing interests in the area of electrification in the aerospace and the aviation industry. In particular the use of commercial cargo type drones and smaller drones for rescue services and humanitarian logistics potential use cases. In this field, there is a huge potential gain for the application of blockchain, determining the legal activities without the need to have a specific line of sight

Data sharing is another potential application. It will relate to the use of standard smart contracts, for instance, or data passport. I think these two areas would have a huge potential in terms of authentication, providing the single version of the truth and proof of work

Collaborative digital transport engineering, especially in the transport infrastructure, is going to become more digital. In a digital economy, Blockchain is going to play a significant role, for example, in the Building Information Modelling (BIM) and many other programs. The international nature of the supply chain, and the complexity of the supply chain, where there are multiple SKU, raw material, components, and products coming from different parts of the world, it is very important to ensure that, there is an important standard in place, to ensure efficient and smooth tracking of our product, and to give the level of trust needed for the particular service industry.

Blockchain is one of the many technologies that can be considered in transport logistics. If we consider blockchain in combination with other technologies such as AI and IOT, it potentially can contribute to this new idea of **technological singularity** where smart cities will be connected into systems and ecosystem.

" Data will be shared and in a seamless way with full trust and traceability, and the user would have the ownership of the data in a fully decentralised structure"

There are several industry leaders and players in this field. The number of use-cases is increasingly interesting, and there is a lot of potential financial gains and benefits to users, in terms of the application of blockchain in transport and logistics.

In the context of coronavirus, there is a need and rush to produce and secure new medical equipment, such as ventilators and other important products. Similarly, in the case of food security and food supply chains, authentication is very important, as well as for high-value items.

Last but not least in the context of Brexit, the idea of managing that trade and efficiency of movement of goods, data and information in different parts of the world, across different ports and trade services would be very important.

4.4. Diarmuid O'Riordan, Director, Ping Asset Limited

APPG Blockchain Webinar on Logistics, 24th March 2020

PING Asset spun out of a company called RM2. RM2 manufacture composite pallets, made of like 80 per cent fibreglass and 20% composite. Like most things in the supply chain, there are high loss rates so we focused on developing a low powered tracking solution to monitor the pallets. A lot of the companies that use these pallets in their supply chain networks saw other opportunities to monitor different assets.

At that point, we spun out as a company, Ping Asset, offering end-to-end IoT tracking solutions for supply chains.

To monitor pallets, we use a device that is embedded into the corner of one of the pallet's legs. The device itself is tiny, of the size of a box of cigarettes. The device wakes up itself, once it wakes up, "sniffs" the network locations, Wi-Fi, and cellular networks. The device sends packets of data, and we retrieve it in a secure cloud system, and then we feed data into different companies and systems with an API.

This device informs of location, data, temperature, shock and other events. For example, deployment for a pharmaceutical company, the device monitors the temperature and tracks the location across the supply chain to inform of various events, like "dwell time", mapping out "dwell time" per location.

In the current pandemic, it could be applied to track ventilators, dwell time within a hospital, monitor the number of assets across various locations. With that data, organisations can start to

optimise routes, logistics, inventories, and other metrics, optimising the network as a whole.

These data are sent to the blockchain or a distributed ledger, as the “tangle” (IOTA). It provides “**a single version of the truth”** for logistics and transportation companies. Having a “shared and immutable ledger” becomes essential for a lot of supply chains. For example, the FDA's drug Supply Chain Security Act, it is calling to the pharma industry to maintain secure and verifiable accounts of drugs within the supply chain.

“Suppliers must be able to maintain order, that counts of track and trace, within their own supply chain. Therefore, DLT technology is starting to become very important.”

The stack is hardware, lower level connectivity, a private network, and a Distributed Ledger (IOTA), where we push the data. We maintain federated nodes from where the data can be pushed into different Blockchain systems.

Use-Case, the use case has three layers. At the bottom, a distributed ledger, “the Tangle” (IOTA). Devices push data into the tangle (authorised and secured). Various actors within the supply chain are tapping into the Tangle, maintaining a shared node between them. The couriers have the device embedded inside the pallet.

Every time a pallet moves from A to B, a cost is incurred. Point B can be ringfenced, and once all the pallets have arrived at location B, it triggers an alert. The alert is pushed onto a “chain-link” Oracle, where we can automate and inform smart contracts and consequently trigger, for example an instantaneous payment between the supplier and the pallet courier. This use-case based layer informs the smart contracts and supply chain itself.

What can the government do? Traction and Support for Distributed ledger technology. This kind of technology would certainly help with use-cases and tracking and trace medical equipment at the national level. Companies are trying to work with the government to get some projects (use-cases) off the ground. If Governments are looking to start tracking things like ventilators, this is the right technology.

4.5. Ahmed Zghari, Chair, Construction Smart Contracts Committee

APPG Blockchain Webinar on Logistics, 24th March 2020

Construction sites are primarily a logistics model to service a one-off manufacturing process, where every activity requires the coordination of people, materials, and equipment. Each project could last over a period of months to several years.

Just a brief introduction to the construction sector, to provide a bit of a context to the problems that we are trying to address. Within Britain, the constructions industry accounts for more than three hundred thousand companies, with around 98% of firms employing 25 people or fewer. **The construction sector is primarily an SME activity**.

> ***"The construction sector has been one of the least productive, with the highest rates of insolvencies, and the highest levels of litigation with very little supply chain integration."***

The construction industry is effectively decentralised, but there is no form of coordination and no common data standards or networks. All of this results in a very poor value for money, especially when you are looking at an industry that generates around 110 billion pounds a year of which, the public sector accounts for roughly half.

Construction Smart Contracts Committee is an industry-led blockchain R&D group, not government or public sector-led. The group is seeking to encourage SMEs to increase the

adoption of technology in general. That is the first path, the first step on the ladder up to improving productivity overall.

The Construction sector has gone through a number of very well-funded, and thought-provoking reviews over decades; however, we have never been able to maintain or sustain any kind of meaningful progress. We are building off on the good work done by government initiatives, to improve this sector overall. We think that the blockchain technology has that potential.

Our work began in June 2017. We divided the effort into three specific areas,

1. ***Problem diagnosis and evaluation***. A series of workshops for the first 12 months that incorporated 200 subject matter experts. It was specifically targeting experts who understand the inefficiencies that exist across the broad spectrum of project types and asking them how blockchain can influence improvements and where it would have little impact.

2. ***Identification of the treatments*** To overcome the key issues that people felt that the blockchain technology was best suited

3. ***Development of an execution plan*** for industry adoption. Having an R&D initiative and proving that blockchain can work to improve things is useful but, *how do you then disseminate that through an industry which is largely decentralised and made up of SMEs?*

Some of the good work that we have done has been with the help of SAP, IBM, Arup, Tata Steel, Helium Blockchain Alliance and Network Rail. Also engaging with academia was important. In particular, Cardiff University Business School and their logistics expertise has been instrumental to our work.

The next stage of the work was taking a **Proof of Concept,** which has already been completed, into the pilot stage. The Proof of Concept tracked the lifecycle of a piece of material, that was designed by Arup in a 3D model. It went through the purchasing process and logistics handling, including the haulage, delivery to site, multi-party acceptance, and the automated payment back through the supply chain.

The Goals

Paperless logistics. The sector is flooded with paper and paper. Paper gets lost as soon as it is signed off, it is of no use to anybody because nobody can ever find it.

Tracking material ownership during delivery. Our pilot will be tracking plant and equipment, and most of the big large equipment is leased. On big infrastructure projects, there is the potential for fraud and idle plant. Due to the large amount of equipment used, it is very difficult to keep track of where it is, who is responsible for it, who is paying for it. For example, you may end up with ten pieces of equipment but are billed for eleven.

Prompt Payment to SME. The smart contract nature of our work is, *"if you've done these activities, we can guarantee that there will be an automated message, that's signed off by multi parties, and you will get your payments within a specific period of time that's agreed on upfront"*. This is not about paying people using cryptocurrency. It is just an authorisation process to somebody in an accounts department to say "*you don't need to question whether you need to pay, this just follow whatever smart contract generated email says about payment terms."*

Greater transparency. There is a lack of transparency in the construction industry, which causes litigation risks.

"People like to hide bad news. We want to get rid of that by making data more transparent".

Construction has got an issue about data integration and collaboration. Blockchain and Smart Contracts has the potential to tease that out. We have started by "giving carrots" to SMEs. SMEs will be paid on time and automatically if they engage in the technology adoption phase.

From a **government point of view** and a UK PLC point of view, this project is one of the very few globally, that has taken a deep dive into procurement within the construction sector and how blockchain can tackle the many known inefficiencies. That plague it.

The government has spent tens of millions over the last ten years on understanding the issues of what causes problems in the construction industry. We are coming up with some process steps, building off that good work and giving the UK a first-mover advantage in this sector. Blockchain and construction hold good export potential for UK businesses.

4.6. Kevin O'Grady, Associate Director, ARUP

APPG Blockchain Webinar on Logistics, 24th March 2020

Arup is an independent firm of designers, planners, engineers, consultants and technical specialists working across every aspect of today's, built environment. The firm operates across 33 countries, in 88 offices with over 14,000 employees. **Digital underpins everything Arup does**. We sit on the Construction Smart Contracts Committee and the board of FIBREE, a not-for-profit organisation looking at the use of Blockchain in Real Estate.

When we think about what blockchain use-cases are in the logistics and transportation sector, one of the best use-cases is the one in a cooperative of olive producers in Europe. They use blockchain to identify which olive producer out of the cooperative, supplied the olives to trace an individual product back to the source. This use-case proves that it does not have to be on a grand scale; even small individuals can adopt blockchain.

Regarding **prompt payments** to SMEs, today, a "procurement policy notice" (PPN) titled "Suppliers relief due to COVID-19" by the Cabinet Office to public bodies to ensure prompt payments are made, and more transparency is provided during this period. Blockchain provides that transparency.

"Policies and regulations are urgently required to ensure that straight and honourable *dealings."*

"Now more than at any other time, we must make sure that logistics, transportation and supply chains are maintained. Quoting the PPN, *"Contracting authorities and suppliers must work collaboratively to ensure that transparency during this period"*, meaning that they must make available, to contracting authorities, any data as required and requested to demonstrate payments are made.

Ideas of policy and regulation. Following the recent tragic event in Grenfell, the Hackitt Report called for a "golden thread". Since that report, we have seen the creation of seven working groups. Some of the topics of these working groups could also help logistics and transportation such as;

- *The Occupation and Maintenance Working Group*. Looking to recommend how owners and regulators can ensure that transportation hubs are always safe throughout the lifecycle of the building. Blockchain can help on records, logistics, data integration and regulation.
- The Products Working Group is determining how product testing and marketing can improve tracking materials ownership during deliveries and policies; Blockchain would also help here.

Investments are required in blockchain pilots, collaboration with academia, industry experts and professional institutions. The industry is making the first steps in this area, putting in place investment and guidance and currently working on pilots in the UK and Europe, as infrastructure clients are starting to see the beneficial elements of this transparent and collaborative approach.

The APPG Blockchain is a perfect conduit to ensure that the industry and society benefit from the potential blockchain. Webinars, such as this, are great for sharing knowledge within the industry.

How do we address the blockchain challenges?

"Working groups consistent with industrial experts would accelerate the adoption of blockchain and address the logistics and transportation specific challenges."

Social and corporate responsibility in blockchain and learnings from pilots undertaken show that blockchain will help the circular economy. Using it to track materials back from the point of use and making sure it is embedded in our infrastructure, we can make certain it shapes a better world for trust and collaboration.

4.7. Geoffrey Goodell, Senior Research Associate, UCL Centre for Blockchain Technologies

APPG Blockchain Webinar on Logistics, 24th March 2020

"There is no question that distributed Ledgers can benefit the transport and logistics industry."

We need to understand why distributed Ledgers have this opportunity and what distributed. Ledgers are for. Distributed Ledgers are about establishing a state of the world that everyone can agree on, without agreeing upon a single platform operator, or a single particular authority in order to establish the authenticity of that world state.

When we have this problem or challenge of establishing a state of the world, there are two options,

Pairwise Reporting and Reconciliation. Accounts based approach, drawing an analogy to finance. The problem is that this approach is very expensive, it does not allow the parties at the edges to share global views, and it also requires quite a bit of rapport.

The alternative is to have some kind of a ***Shared World State Ledger*** that everyone agrees on. For this, there are two choices,

1. Elect a **Strong Centralised Party** to act as the sort of master or arbiter of the "state of the world" that can change and approve the transactions.

2. Create a **Distributed Ledger**. An "ex-ante" consensus process, for establishing whether a particular change to the world state is legitimate or not before accepting it, as a transaction. The transactions are synchronised across all the participants in the system.

The **benefits** of the use of Distributed Ledger versus a centralised system with centralised authority can be arranged into three broad categories,

1. ***The reduction of costs and risks.*** Associated with operating a live system and being dependent upon a live system that serves as the master or the arbiter. If we want to have a centralised arbiter, we are going to need to concern ourselves with uptime, with contingency plans, with all the costs for managing the risks of failing to arbitrate in the way that everyone agrees upon. Much of this cost can be significantly mitigated potentially by moving to the distributed model.
2. ***Preventing unilateral actions*** on the part of a single actor or group. Less is more. If we have a single unilateral actor who can behave unilaterally, then we have a host of problems associated with fairness, changing rules of the system or changing the world state in a way, that people do not see or cannot detect.
3. ***Transparency and accountability*** for the participants of the system and the "de-facto" operators of the system. Using a distributed ledger and its protocol, it becomes a way of operating. What gets conducted in the system is potentially limited by what is shared on the ledger. This is a very powerful concept.

For example, in construction project management, we have a huge opportunity that falls into the second category—the opportunity to link the project budget to the project work plan. In many cases, major projects have a budget and a work plan. They tend not to get linked, and indeed there is the problem of fighting bad news. Significant work is being done in this area by Dr Chris Clack (UCL). There is an opportunity to address construction, along the same lines as these other areas.

Whether this is about the industry or whether this is about governance, we may need a regulatory push to address these collective action problems. In many cases, these problems that entail many different actors, give rise to this sort of inclination to operate a platform. We need to be concerned about platforms because platforms can lead to the ability of a particular actor to exert outside control.

"If we have a regulator who can set the rules, then we can indeed have the industry lead the implementation".

As an analogy, we can take the successful Co-regulation in the financial industry, the government will have a big role in these kinds of problems and laying out the ground rules for how this kind of technology will be applied.

There are many **questions to answer and challenges to be solved**. For example, Which regulators are relevant to the transport and logistics industry? Who would have the right positioning in government, to make sure that these systems are applied appropriately? How would

we handle cross-border coordination between regulators in different countries? How do we handle multinational firms? How do we handle cross border disputes? Who is the right the arbitrator from the regulatory perspective?

In the Transportation Industry, it would be particularly interesting to understand why the IBM-Maersk initiative had not achieved earlier success. Verdict suggests that the technology was good, and there are lots of opportunities to improve business. However, in the early days of the IBM-Maersk collaboration, there was some evidence of secrecy and concerns among other industry participants that this was a private platform that existed for the benefit of IBM-Maersk, rather than the benefit on the entirety of the industry.

If it truly were about a benefit to IBM and Maersk, there really would not be much of an argument for using DLT. The purpose of having DLT is not having that centralised actor. Then, this is not a platform (in a business level sense).

"We need to be concerned about evaluating platform-based business models."

In the sort of modern eCommerce sense, there was some suggestion that there was not enough of a multi-stakeholder process some initiatives.

There are many different efforts in this space, led by many different actors, in international standards and a broader effort to achieve a consensus and diverse stakeholder role.

"We need to learn these lessons, and there is a lot to learn from here".

5. Contact details

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