BLOCKCHAIN 201

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Quite a bit has happened in the world of blockchains since we authored Part I of this series in July 2018. On the one hand, cryptocurrency prices have descended from their stratospheric heights amid skepticism from all directions. On the other hand, a steady drumbeat of perseverant efforts continues to march towards the integration of distributed ledger technology ("DLT") into everyday business processes. In this Part II, we focus on the work currently afoot to harness DLT for greater transparency, efficiency, and security in energy and commodities trading, shipping and supply chains. We are currently aware only of limited attempts to utilize DLT in coal trading or transportation within the U.S., but these related industries seem to be pointing the way forward. In closing, we offer some conclusions as to what may lie in store for 2019 and beyond. Overall, DLT may have its challenges, but its momentum in the industries we surveyed indicates that it is more than a passing phase.

APPLICATIONS OF DLT IN COMMODITIES, SHIPPING AND LOGISTICS

A wide range of market participants—from startups to consortia of established players—already have sought to apply DLT in commodities trading and finance, shipping and logistics.

A recent survey by Boston Consulting Group determined that venture capitalists alone have invested approximately $300 million in startups developing DLT-based applications in logistics and transportation since 2013, including $53 million in shipping, freight management, and related platforms.[1] Some of those applications are currently in use, while others remain in development. But in each case, these applications seek to improve existing processes with the efficiency and security that DLT can potentially provide. For example, international shipping line Maersk tracked a container of roses and avocados in 2014 as it moved from Kenya to its destination in Europe.[2] Maersk determined that almost thirty persons or organizations played a role in processing the shipment.[3] The shipment required thirty-four days, which included ten days waiting for a single document to be located in a stack of papers.[4]

Given the continuing enthusiasm for DLT, we are unable to cover the full spectrum of proposed uses here. But below, we describe some of the most interesting ones, including examples that are currently operational. If successful, we would expect to see similar uses of DLT in the future for U.S. coal trading and transportation.

Commodities Trading and Finance

VAKT

VAKT is a consortium of energy majors, independent traders and international banks that is currently using DLT to support the post-trade processing of physical oil trades. The original nine investors in VAKT included oil majors, international trading companies and financial institutions. The platform went live in November 2018, supporting crude oil transactions related to five North Sea oilfields. In January 2019, VAKT announced that it had added as investors three additional global participants in the oil industry. According to VAKT's website, the platform uses DLT to reconcile trade data, share digital documents and manage trade logistics and settlements, including the "full post-transaction lifecycle." Once the parties agree to a trade, they enter transaction details into the system; those trade details flow to a shared leger; and once trades are matched, the system establishes a single source

of truth with respect to each transaction. Users can nominate banks to provide trade finance based on the blockchain, permit inspectors and shippers to enrich trade data and submit additional documents, and share invoices. In the future, VAKT expects to permit parties to enter into smart contracts, to exchange payments with digital tokens, and to integrate with all physically traded energy markets, including U.S. crude oil pipelines and Northwest Europe refined product barges. VAKT projects that the first use of its platform by non-consortium licensees will occur in early 2019.[5]

Komgo

Komgo, a consortium involving several international banks and trading companies, announced that the first transaction on its platform took place in December 2018. The consortium currently has fifteen members, including a major oil company, international trading companies, and several global financial institutions. It aims to streamline trade and commodity finance through two products: the issuance of digital letters of credit, which product is now available and in use by at least some members, and a KYC solution, which is expected to become available in January 2019. The digital letter of credit process allows parties to submit trade data and documents to their banks electronically; the KYC solution will use DLT to "standardize and facilitate" the KYC process without storing documents in a centralized database.[6] In the future, Komgo aims to develop a smart contract solution that would allow parties to match on the platform, to institute a receivables discounting function for financing purposes, and to allow users to procure insurance coverage. Komgo has integrated its platform with VAKT, described above.[7]

Enerchain

The Enerchain Project, founded in 2016 by information technology service provider Ponton and a growing coalition of major participants in the European power and gas market, offers a decentralized, autonomous market for physical gas and power trading in Europe using DLT. The platform has been designed to permit parties to trade directly without intermediaries, and thereby optimize trading, minimize transaction fees, and improve settlement and clearing. Over forty market participants, including utilities, producers and traders, have joined the platform.[8] According to one source, the platform is currently operational but (due to regulatory concerns) only with respect to "arranged trades," as opposed to "regular trading," but the platform is preparing for its next "phase," which it expects to occur during 2019.[9]

"The platform has been designed to permit parties to trade directly without intermediaries, and thereby optimize trading, minimize transaction fees, and improve settlement and clearing."

Trade Finance

Four major platforms have emerged that use DLT with respect to trade finance.

Voltron

Voltron is a group of twelve banks from the "R3" consortium that intends to use DLT to digitize letters of credit. Voltron estimates that its system can cut paperwork time from as much as ten days to one day by streamlining the issuance of letters of credit and the presentation of necessary documentation. The platform conducted a successful pilot in May 2018. Voltron is currently inviting additional parties to join its network, considering additional new features, and targeting an official launch date in 2019.[10] Voltron was developed using the R3 Corda blockchain, an open source solution that was designed to promote interoperability between platforms.[11]

we.trade

This platform targets exporters in Europe with respect to open account trade finance.[12] It is backed by a coalition of thirteen international banks, and uses IBM's Blockchain Platform as well as additional technology from the Linux Foundation[13]. The platform launched in July 2018 and relies upon DLT and smart contracts to achieve the advantages described above and in Part I. This technology establishes the security of the ledger, creates trustless relationships in international trade, and thereby minimizes the diligence necessary to vet a counterparty. It also aims to increase efficiencies in information flow and payment processing.[14]

Marco Polo

Marco Polo is an electronic trade finance platform for financial institutions and entities involved in international trade. It provides payment commitment solutions like guarantees and open account finance solutions like receivable discounting and factoring.[15] TradeIX and R3 are partners in the platform, the members of which also include nine international financial institutions. Among other innovations, the platform uses DLT as a single source of truth for trade finance transactions, and seeks to improve upon the antiquated, paper-based procedures

that still characterize the industry. Like many of the other platforms described herein, Marco Polo intends to provide better access to trade data, better data security, and effective means of sharing such data among banks and logistics providers. Its system will permit banks to check financing and credit risk rules automatically and process transactions more expediently. Parties will thereby have better, quicker and cheaper access to trade finance, and use trade data from the platform to reconcile invoices and shipment tracking information. Like Voltron, Marco Polo stores data on the Corda R3 blockchain, which promotes interoperability.[16]

Batavia

Batavia is a fourth platform that uses DLT to facilitate open account trade finance and letters of credit. Its members currently include two banks, with IBM as the technology partner. Like the other platforms above, Batavia seeks to enhance the transparency and efficiency of international trade. Pilot transactions using the platform were conducted in early 2018. Much like the others above, the platform establishes a single version of all necessary documentation with respect to a transaction, and shares that information with the parties to such trade and other relevant players. The platform thus provides all such parties with the information they need to complete the transaction, which includes the closing of trade agreements and smart payments that occur automatically upon the occurrence of events. Batavia estimates that it can significantly shorten the time necessary for a seller to receive payment for goods shipped to a buyer.[17] In a potential setback, however, three former members of the consortium joined we.trade as of October 2018, and Batavia is subject to rumors regarding possible mergers with another platform.[18]

INTERNATIONAL CONTAINER SHIPPING

Three major consortia have initiated the use of DLT in international container shipping. Much like the commodities trading and trade finance platforms described above, these competing consortia have wagered that DLT can provide greater transparency, security and efficiency in international freight.

TradeLens.

TradeLens launched in August 2018, and announced its commercial availability in December 2018.[19] A partnership between IBM and container shipping line Maersk, the platform seeks to make international container shipping more efficient by using DLT and by permitting interactions between the blockchain and the "Internet of Things" or "IoT" (including, for example, sensors to determine the temperature and weight of shipping containers).[20] It allows the tracking of arrival times of vessels and container "gate in," and produces automated shipping documents like customs releases, commercial invoices and bills of lading.[21] The TradeLens website indicates that it has tracked approximately 300 million shipping events thus far.[22] Through DLT, it serves as a single, secure repository for such information and documents,[23] and attempts to foster collaboration between ocean carriers, rail providers, truckers, terminal operators, beneficial cargo owners, freight forwarders, non-vessel operating common carriers, and customs authorities.[24] The members of TradeLens include at least ninety entities involved in international trade, like large shippers Torre/Camposol and Umit Biskilet, and 234 global gateways.[25] TradeLens has received criticism regarding its neutrality, however, because (other than Maersk) its members include only a single major international carrier, Pacific International Lines.[26] To combat this criticism, TradeLens is using open source architecture and actively recruiting a broad cross-section of members.[27]

Global Shipping Business Network

A new consortium of ocean carriers and terminal operators announced in November 2018 their intent to develop the "Global Shipping Business Network," a DLT-based platform to streamline international container shipping. Members include carriers CMA CGM, Cosco Shipping, Evergreen Marine, and Yang Ming; port operators DP World, Hutchison Ports, PSA International, and Shanghai International Port; and CargoSmart, a provider of shipment management software owned by Cosco Shipping. The consortium seeks to provide the "top down" data that others can use in their business relationships rather than provide "bottom up" individual solutions. It is specifically considering the need to develop international standards for container shipping processes and interoperability with other platforms.[28] A press release in November 2018 stated that its first pilot application, which would allow parties to digitize their dangerous goods documents and hasten the receipt of necessary approvals, would be available in December 2018.[29]

AB InBev, APL, Kuehne + Nagel, et al.

In early 2018, a consortium of AB InBev, APL, Kuehne + Nagel and an international consulting firm announced that, along with an unnamed European customs agency, it had tested a DLT-based solution to eliminate paper-based shipping documents in international trade. The coalition estimates that typical shipments of retail or consumer goods generate more than twenty documents in order to transport the goods from the exporter to the importer, and that such documents often replicate up to seventy percent of the information therein. Streamlining this process—including by removing the need for manual data entry, simplifying the amendment of documents, and reducing exposure to customs compliance penalties—could thus save hundreds of millions of dollars annually.[30]

OTHER SUPPLY CHAINS AND LOGISTICS

Established incumbents and startup companies alike have proposed a wide range of new uses for DLT in supply chains.

- **ShipChain**, a U.S. startup, has created a solution that uses DLT to track and trace a product from its source to its ultimate destination, including all modes of freight. The ShipChain system ultimately will be able to track information throughout the supply chain, including information gathered from the IoT, like the time a pallet reaches its destination, or the temperature and humidity of a container. The system enables smart contracts that settle in "SHIP" tokens upon the occurrence of a required event.[31] In 2018, ShipChain's initial offering of SHIP tokens raised approximately $30,000,000.[32] In January 2019, ShipChain announced its full product launch.[33]
- **CargoX**, a startup in Slovenia, has developed a DLT-based bill of lading solution, and recruited freight forwarder Fracht AG. Its platform is not associated with a particular carrier, which creates an appearance of neutrality, and employs open source software to facilitate interoperability with other platforms.[34]
- **CargoSmart**, a software company and member of the Global Shipping Business Network, has devised a shipping documentation platform that employs DLT to enable users to execute bookings, share multiple carrier shipping information, track shipments and print invoices.[35]
- **300 Cubits**, based in China, built a booking deposit module that employs DLT and digital tokens that it refers to as "Bitcoin for the shipping industry."[36]
- A startup from Singapore called **BlocBox** recently unveiled a DLT-based system to collect and secure data from airplane black boxes and maritime voyage data recorders. Tracking and tracing lost cargoes using the company's system could be less expensive and more secure than manually retrieving the necessary data.[37]
- Global diamond company DeBeers has developed **Tracr,** an industry-wide system to track the provenance of diamonds using DLT. The solution aims to collect and securely encrypt provenance information, foster efficiency at a host of points in the supply chain, and promote confidence in the diamond industry.[38]
- **IBM, Ford, Huayou Cobalt, LG Chem and RCS Global** recently announced that the group will use DLT to "trace and validate ethically sourced minerals" for the automotive and consumer electronics industry, including cobalt, a critical component in lithium-ion batteries.[39] A pilot program already is underway using blockchain to create an "immutable audit trail" for cobalt purchased from Huayou's mine in the Democratic Republic of Congo.[40] The group expects the pilot to be complete by mid-2019.[41]
- **Ambrosus**, another startup, has built a DLT-powered IoT network to track and trace food, pharmaceuticals, high-value products like specialized parts for aviation or electronics, and commodities. Its system permits detailed analysis of secure data, tracks shipments throughout the supply chain, provides secure data regarding product quality, and prevents fraud through an immutable blockchain. The system permits settlement or collateralization of transactions using its "Amber" tokens and smart contracts. The Ambrosus website specifically mentions that its Ethereum-based system promotes interoperability with other blockchains.[42]

CONCLUSIONS

DLT appears to have outgrown the days when traders dreamed of "Lambos on the moon."[43] Large incumbents in the commodities, financial services and shipping industries—alongside smaller startups—are proposing DLT-based solutions to accomplish a range of objectives. One common theme among those objectives is the elimination of manual and paper-based processes. If the proposed applications of DLT can make information available in a quick, transparent and secure manner, and save time or money for parties involved in international trade, those parties may be willing to discard established practices and adopt these new solutions.

Nevertheless, the adoption of DLT continues to face headwinds. Boston Consulting Group's recent survey of transportation and logistics executives learned that eighty-eight percent of the respondents believe that DLT will disrupt the industry to some extent.[44] Seventy-four percent of those same respondents, however, stated that they were exploring DLT only superficially, or have not considered DLT at all.[45] These inconsistent results illustrate the confusion that still plagues DLT.

Indeed, many have questioned the utility of private, or "enterprise," blockchains. In such systems, like all the ones described herein, a centralized entity or group of entities determines the parties that can participate in transactions as well as the transactions

that ultimately become part of the ledger. Such systems contrast markedly with DLT applications like Bitcoin, which relies on a public ledger that is not subject to any centralized administration. To the extent that the benefits of DLT derive from decentralization, private blockchains may not be able to achieve the radical transparency that originally animated DLT enthusiasts. Administrators of private blockchains also will need to act judiciously in order to maintain confidence in their ledgers.

Similarly, concerns about the neutrality of such an enterprise platform may deter competitors of the founding consortium from using the platform, especially given sensitivities about the confidentiality of data that is uploaded to the ledger. Of the industries surveyed here, this concern appears to be most prevalent in international container shipping. This concern is particularly problematic where a proposed system requires scale to attain the benefits of DLT, like systems for KYC compliance, the value proposition of which depends directly on the availability of many potential trading partners.

Due to these concerns, interoperability has emerged as a key issue for the integration of DLT. If a particular DLT-based system is not interoperable, several factors may cause a party to hesitate before adopting that system. For example, transactions on that system might be difficult to enforce upon an event affecting the administrator, such as an insolvency; if that system is interoperable, however, parties could simply move their transactions to a different system. Also, users might not be capable of novating a transaction to a party that uses a different system, or a merger or other corporate transaction might be delayed if an acquirer does not participate in the same platform as the target. Therefore, platforms that develop with an eye to interoperability between blockchains may have an advantage in luring potential users off the sidelines. Indecision over which system to use, or which consortium to join, could keep potential users on the sidelines until the proverbial dust settles. But—like the chicken and the egg—the dust may never settle until DLT-based solutions reach the necessary scale.

In any event, progress may be slow and inconsistent, but DLT is gaining momentum in industries that can take advantage of its potential benefits. It remains to be seen whether those potential benefits are available in the U.S. coal industry, but time will tell. ▲

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