Global Supply Chains Supporting International Franchise Expansion: The Impact of Blockchain Technology

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I. Introduction

A successful franchise system relies on the ability of company-owned and franchised outlets operating under the franchisor's brand name and business system to deliver high quality products and services in the most efficient and sustainable way possible. This is best achieved through strategic and competitive use of a franchise system's supply chain. A broken or compromised supply chain can have deadly consequences on a franchise system including failing to timely deliver products to outlets necessary to meet consumer demand or providing adulterated products for consumer consumption.[1]

Blockchain's reputation as a dynamic delivery system has its origins in cryptocurrency transactions such as Bitcoin.[2] Bitcoin utilizes blockchain as its shared ledger to track the movement of any asset and record any transaction.[3] Although Bitcoin is the first "use case" for blockchain, other companies also use blockchain to "manage the flow of goods and related payments, or enable manufacturers to share production logs with original equipment manufacturers (OEMs) and regulators to reduce product recalls".[4] For example, Wal-Mart has utilized blockchain technology to drastically reduce food tracking times.[5] With the use of blockchain, it now only takes seconds to locate the tracking information when it took days of searching through paperwork before.[6]

Moreover, the application of the blockchain to the global supply chain may soon become the "standout" example of how blockchain technology can revolutionize the world's product delivery systems including solving a myriad of problems that plague the international franchise development process.[7] As IBM's Manav Gupta has explained:[8]

> "Supply chains are prime examples of blockchain's potential for transformation that spans industries. Initial blockchain efforts could have quick impact by transforming even a small portion of the supply chain, such as the information used during importing. If import terminals received data from bills of lading earlier in the process, terminals could plan and execute more efficiently and without privacy concerns. Blockchain technology could make appropriate data visible in near real-time (for example, the departure time and weight of containers) without sharing information about the owners or value of the cargo. Costly delays and losses due to missing paperwork could be avoided."

Recognized as the "leading enterprise blockchain provider",[9] IBM's cloud-based IBM Blockchain Platform is helping companies across various industries such as banking, finance, insurance, consumer goods, government, healthcare, automotive, travel and transportation, and media and entertainment to enhance their visibility and add value to their businesses.[10] In addition, the IBM Blockchain Platform allows users to build on a complete blockchain platform as well as develop and operate the blockchain all while counting on the highest level of blockchain security available, IBM Z, to protect against insider attacks and malware.[11]

Furthermore, IBM and Maersk, a Danish global leader in container logistics, have announced plans to create a joint venture that will use blockchain technology to provide more secure and efficient methods for global trade.[12] After the regulatory approvals are granted, the joint venture's goal "will be to offer a jointly developed 'global trade digitization' platform built on open standards and designed for use by the entire global shipping ecosystem".[13]

II. What is Blockchain?

Blockchain is a ledger containing certain attributes that make it attractive for doing business in a digital world.

Unlike most existing ledgers, a blockchain ledger is distributed and shared across a network. There is only one ledger and, thus, only a single source of reliable information. In the world of blockchain, there are no "trusted third parties" or intermediaries such as a bank or a broker. Instead, the network participants themselves essentially police the system and verify transactions through a process called consensus.

The mechanics of the consensus process vary depending on the application. In the bitcoin example, the system is public and the requirements for verification are more onerous. In other use cases, where the network may be private, the verification process may be less demanding. In each case, the blockchain is designed to reward truth and transparency. Hijacking the blockchain is not easy, because a majority of participants would have to conspire to provide false information. Because the ledger is distributed and shared by an unlimited network of users, there is even greater visibility and auditability.

It's not perfect, but over time there is a snowball effect made possible by the scalability of massive digital networks. Once a series of transactions is committed to a block, the creation of new blocks depends on the accuracy of the previous blocks. That process is repeated ad infinitum. In that way, the resulting "blockchain" is said to be virtually immutable and incorruptible. (See figure 1 – refer to end of chapter.[14])

Blockchain's utility in a supply chain supporting an international franchise system is far more impactful than its currency and bookkeeping uses. (See figure 2 – refer to end of chapter.[15])

This article will address the key benefits of using a blockchain strategy for international franchising and supply chain purposes as well as key business and legal challenges inherent in such a strategy.

III. Smart Contracts

In a blockchain, smart contracts are computer programs that assume the role of agreements where the terms of such agreement may be pre-programmed with the overall ability to self-enforce and self-execute the terms of each agreement. The primary purpose of a smart contract is to allow multiple anonymous parties to a given transaction to do business with one another. By leveraging this technology, the contract becomes easier to structure and deploy. Smart contracts are autonomous and automatic, eliminating human interference and reducing the potential for human error and increasing a party's access to valuable and timely information.[16]

Specifically, the terms of the contract are written directly into lines of code through a series of "if-then" functions.[17] "If" a certain condition is met, "then" the smart contract proceeds to the next coded step in the transaction with the process repeating until all of the necessary if-then conditions are met.[18] However, the smart contract cannot proceed to the next step until a node confirms and validates that the current transaction satisfies the pending condition.[19] A node is an individual device on a blockchain network that carries out a variety of tasks, including maintaining a copy of the blockchain as well as validating transactions.[20] When determining whether a transaction is valid, the node always independently comes to its own conclusion, irrespective of what the other nodes conclude.[21]

Uniquely, smart contacts enable the parties to observe one another's performance of the contract. Smart contracts can verify if and when a contract has been performed and further guarantee that only those particular details necessary for completion are revealed to the relevant parties. They also save valuable time and resources by possessing the ability to be self-enforcing and therefore making policing the contract less burdensome. Most importantly, smart contracts eliminate the need for a trusted intermediary.[22]

The "smart contracts" concept was originally conceptualized and utilized by Nick Szabo in 1994 through the use of Ethereum:

A smart contract is a computerized transaction protocol that executes the terms of a contract. The general objectives are to satisfy common contractual conditions (such as payment terms, liens, confidentiality, and even enforcement), minimize exceptions both malicious and accidental, and minimize the need for trusted intermediaries. Related economic goals include lowering fraud loss, arbitrations and enforcement costs, and other transaction costs.[23]

Moreover, Ethereum is the most prominent public blockchain platform for smartcontracts.[24] Specifically, it is a programmable blockchain that allows users to create their own operations.[25] Similar to other blockchains, Ethereum is a peer-to-peer network that utilizes nodes to maintain and update the database.[26] In the Ethereum blockchain, smart contracts are executed through internal codes in a Contract Account.[27] When a transaction is sent to a Contract Account, programs execute and users are able to create new smart contracts by deploying code to the Ethereum blockchain.[28] For instance, an Ethereum project called Provenance conducted a six-month pilot that used blockchain technology and smart contracts to successfully track "responsibly-caught fish and key social claims down the chain to export".[29] Consequently, projects such as Provenance demonstrate blockchain's success in enhancing visibility in the global supply chain.

Whether domestic or international, the traditional supply chain management system's operations are based on utilizing reams of paper. This system requires complex combinations of paper and the need for a third party to update information in the system leads to a party's inability to see and, in some cases, not even have access to the most recent transactions that have occurred in their transaction.

For example, after a company sends a purchase order to the supplier, the company often has no means of tracking the order's status until the shipment is received at the warehouse. As a result, there is "manually intensive and inefficient supply and demand management and reduced order fill rates".[30] In addition, "there is no central repository of data available to enable an analysis of what went wrong and how suppliers, carriers, and other third-party participants performed. This is primarily because the data required is distributed across various systems in warehousing, purchasing, transportation management, supplier systems, and carrier systems".[31] Moreover, in certain cases, the data does not even exist.[32]

In contrast, smart contracts are managed with a decentralized public distributed ledger and therefore are transparent to allow parties to see every detail of their transactions in an instant. Smart contracts integrate payment with blockchain technology as they arrange payments automatically at the same time as deliveries occur, ultimately making the transaction and payment more efficient and transparent. As a result, it's possible to self-monitor terms of agreements, certify transactions and facilitate or evidence certain transfers of payments, and automate performance of contracts. International franchisors and their franchisees and suppliers would surely appreciate a more transparent and reliable supply chain because finding, negotiating, and enforcing supply contracts across countries can fail to meet even the most humble of expectations, resulting in the demise of a franchise relationship and the franchised business.[33]

Companies across various industries have already begun to utilize smart contracts. For example, French multinational insurance firm, AXA, is the first major insurance group to utilize smart contracts to offer flight delay insurance.[34] When a customer buys the insurance through the "fizzy" platform, the transaction is recorded on the Ethereum blockchain.[35] The smart contract is connected to global air traffic databases and if the flight is delayed for more than hours, then compensation is triggered automatically.[36]

In addition, the company Slock.it is utilizing smart contracts to change the sharing economy through automating payments, sharing and rentals.[37] Specifically, the company Share&Charge, uses Slock. Its smart contracts automate the payment process for renting electric vehicle charging stations.[38]

Further, smart contracts are also being used for buying and selling real estate. Propy was one of the first companies to do so when a customer purchased an apartment in the Ukraine for $60,000.[39] Both parties to the transaction participated in the smart contract which ensured specific steps were taken to foster fair and legal play despite the challenges of the "across-borders" real estate marketplace.[40]

IV. Tracking and Faster Shipping Times

Franchisors must decide how to best source and assist in establishing sourcing and supply arrangements for its international franchisees. Sometimes these sourcing and supply arrangements can be established regionally in the franchisees' markets, but many times, at least initially, the arrangements must originate in material part from the U.S.[41]

Regarding the shipments of goods, the blockchain can transform the traditional, inefficient shipping protocol inherent in many international franchise systems into a process permitting standardization and transparency, allowing senders and recipients

to track their orders in real time. One of the primary documents used in the shipping process is the "Bill of Lading". The Bill of Lading refers to the documents that specifies the party responsible for a particular obligation in the shipping process at any given point from the time the goods leave the place of origin to the delivery destination. It lays the foundation for the terms for transport and delivery of the goods.[42]

By incorporating blockchain technology into the shipping process, a record of the Bill of Lading and the shipment's transport and transfer history is maintained and transparently available. For example, when a shipping company signs for a particular shipment of goods, accepting that shipment for future transport to its next destination, that signature will be recorded to the blockchain. The blockchain technology possesses the critical transparency necessary for maximized efficiency making that blockchain record available anywhere in the world with an appropriate timestamp. The recipient of the shipment or an invested party could effectively see the information about which company was responsible for transporting the goods at the moment and exactly where they last signed for it.[43]

If a problem arises with the company responsible for the shipment during transit, the traditional (non-blockchain) system steals away valuable time from the sender and recipient to troubleshoot the problem, thereby monopolizing resources and incurring expenses that could have been used for a more worthy purpose. In general, shipping agreements are often complex as they may be bundled together or even subcontracted in such a way that the company responsible for the shipment lacks knowledge of anything about the entity who paid for the shipment or where the target destination lies. Because of the transparency protocol that blockchain inherently implements, all parties have the ability to see each and every completed block in the whole chain to successfully identify what issue occurred and how to find the appropriate solution, saving valuable time and resources while the shipment is still in transit.

Finally, blockchain technology has the potential to aid in certification. Currently, a company must place implicit trust in the shipping company to deliver goods safely. The blockchain essentially presents an automated service for the certification of the delivery itself, tamper protection, and certification of the authenticity of a given shipment's contents. This means that a company can have full certainty whether and how a shipment will arrive once it placed its order.

V. Advanced Security Systems and Fraud Reduction

When fraud occurs in a company, the repercussions can be devastating to its integrity including loss of money, reputational harm to the franchisor's brand or other intellectual property ("IP") issues. Fraud may go undetected for a long time and is often hard to uncover resulting in a loss of valuable time and resources. Blockchain has the ability to minimize these risks and a franchisor's susceptibility to fraud.[44]

The blockchain contains transaction data that is continually reconciled, shared across a peer-to-peer network, and is decentralised.[45] Therefore, there is no single point of failure. Authorization and management of the transaction data is distributed across the network and therefore there is no "honey pot" for an individual to instigate a fraudulent scheme. Decentralization increases the transparency and visibility of the transactions completed between members throughout the supply chain. Because of this, parties have the ability to see the transfer of assets and the history of those transfers making fraudulent transactions easier to identify. To successfully tamper with the transaction records, an individual or group acting in collusion would essentially have to control the majority of the system.[46]

The blockchain is also immutable because the transactions recorded cannot be changed or deleted. Before a block of transactions can be completed and attach to the blockchain, the network parties must agree that the transaction is valid through a process known as consensus.[47] After agreement, the block of transactions is given a timestamp secured through cryptography and subsequently linked to the previous completed block in the chain. The benefit of being immutable is that a party can see the provenance of an asset such as the origin location, its history of where it has been, and who at any given point had ownership over it.[48]

Authenticity of a company's products is subject to challenge in a traditional supply chain because they are typically lengthy, complex and ultimately lacking in transparency. Implementing blockchain technology creates an immutable transaction history, which in effect will make it difficult to counterfeit a product.[49]

Franchisors routinely deal with trade secrets and other confidential data and information, the secrecy of which is critical to the brand's success; therefore, security must be maximized to the fullest extent to protect a franchisor's most valuable assets. Blockchain technology can ensure franchisors that unauthorized individuals or entities cannot access, corrupt, or steal their trade secrets, confidential information and other records by ensuring all persons having accesses are "permissioned". Permissioned networks restrict who is allowed to participate in transactions. Even if allowed to participate, permissioned networks can limit the extent of participation. Parties of a permissioned network must be invited and subsequently validated before they can be involved and contribute.[50]

A reoccurring issue that many franchisors face is the lack of adequate protection of IP such as trademarks, copyrights, and patents, which involve much more than simply securing protection for the purpose of attaining their full value. Considerable resources, time, and effort are required to implement an effective IP security protocol. This becomes even more important for non-registrable IP rights including certain copyrights and unregistered designs, since their lack of registration in the context of reconciling transactions results in complications concerning ownership, jurisdiction, creation, and overall usage given the internet's fluidity, and the fact that it is relatively easy to infringe upon IP rights more complicated.

To help protect against these and other IP issues, projects such as Valutitude utilize blockchain technology as a "notary-like" tool for IP protection.[51] Valutitude is "browser-based software, which provides users with a clear overview of their IP and helps solve previously-complex issues such as secure storage, proof of authorship suitable for legal proceedings, the safe and easy exchange of confidential information by placing non-disclosure agreements ("NDAs") on the Blockchain and a marketplace for the risk-free selling and licensing of IP".[52] For example, artists using the project can receive proof for the actual application of their copyrights and universities can ensure researchers are capable of protecting their findings.[53]

Currently, IP rights generally remain unharmonized with the exception of European Trademarks and Registered Community Designs.[54] Despite the increasing integration of information and recordation among national and international IP government and quasi-governmental offices, each nation has its own registration offices and systems for registering and protecting trademarks, copyrights and other IP. Particularly, transactions based on IP rights do not require registration to give effect between parties, but only as to third parties in terms of publication. This may imply that the "registered" owner of a specific IP right (as officially indicated in

an IP office database), is not necessarily the actual current owner of that IP right. Conducting a due diligence procedure may also come with complications considering the IP may not necessarily be traced. There is no database for IP rights that are not registrable or simply, not registered.[55]

Incorporating the blockchain system for the purpose of creating a database will address such issues. Because of the blockchain's immutability characteristics and its capability of storing a bullet proof record, the creation of an unalterable "digital certificate of authenticity" is made possible. With a digital certificate, issues such as ownership, evidence, and publication can be addressed. For trademarks, a blockchain database would essentially allow a particular user to gain access to a given product's digital certificate of authenticity, which would show the origin of the trademarked product and who has ownership of the rights to that trademark.[56] As a result of this ability to track an IP right's entire life cycle, the due diligence necessary for IP transactions during mergers and acquisition could be simplified.[57] In addition, if information on a trademark's use in trade or commerce was collected on a blockchain-based official trademark register, then the relevant IP office could be notified immediately.[58]

VI. Jurisdictional Issues

Currently, there is no concrete regulatory recognition of blockchain technology, which does implicate uncertainty for the blockchain community, as lack of regulatory recognition may cripple the overall implementation of blockchain technology across various industries and undermine infrastructure conversion of a traditional supply chain to a blockchain model. Given non-existent regulatory guidance, uncertainty over jurisdiction, inconsistent and sparse court decisions, there is an implied sense that the blockchain user community is generally free of law and therefore of legal enforcement to a certain extent. Therefore, the infrastructure users naturally escape any sense of legal norms as the infrastructure itself does not fall under any form of jurisdiction.[59]

The anonymity of blockchain transactions and the lack of identifiable users create a clear separation between crypto and real-world transactions. Without identifiable parties, subject matter jurisdiction, diversity jurisdiction, personal jurisdiction, and federal question jurisdiction have no effect. Smart contracts contribute to these jurisdictional issues as physical presence, domicile/place of business, minimum contacts, and consent are nearly impossible to use by the courts as none of the above elements to jurisdiction are known by the parties in a smart contract.

Use of smart contracts makes a compelling case for customized dispute resolution mechanisms. Since smart contracts are coded for and contemplate potential breaches, it appears that a substantial number of enforcement situations would be contemplated and dealt with through coding; however, the subjectivity of almost every business relationship including mistakes, intentions of the parties and other intangibles are not contemplated. For enforcement purposes, a blockchain-focused dispute resolution protocol appears needed.[60] If not, the traditional legal system approach to enforcement would interfere with the primary benefits of the blockchain.

One approach receiving attention is "Distributed Jurisdiction".[61] For example, in the Aragon Network,[62] if a user wants to dispute the execution of a contract, the user must post a bond and submit a brief of their argument.[63] Next, five judges who have also posted a bond are randomly selected from all of the users of the network.[64] After the judges read the briefs, they issue their judgments and a majority decision is needed to determine the dispute's outcome.[65] Judges are rewarded monetarily if they voted with the majority and are punished with the loss of their bond if they did not.[66]

In addition, the Aragon Network allows two appeals.[67] If a party disagrees with the initial outcome, the party may appeal by posting a larger bond with their brief.[68] A prediction market is then opened where any user may post a bond and become a judge.[69] Again, briefs are read and all judges issue their judgments with a majority needed to determine the result.[70] Rewards and punishments are then given to judges based on the results.[71] Lastly, after posting a larger bond, a user may make a final appeal to a panel of nine "supreme court" judges who are the most successful judges in the Aragon Network.[72] This is the only form of dispute resolution allowed on the Aragon Network and users are not allowed to opt into different dispute resolution mechanisms.[73]

In contrast, OpenBazaar is a cryptocurrency trading platform that uses a "Distributor Jurisdiction" type of dispute resolution mechanism predicated on use of notaries that have different skill sets and permit the parties to a claim to choose notaries, encouraging notaries to continue developing expertise in legal areas. From the beginning of a transaction, users are able to choose whether to involve the notary.[74] If the users do not choose to use the notary, then there are no transaction fees. However, a transaction without notaries increases a user's risk because no arbitration is possible.[75]

If the users do choose to use the notary, then the parties can agree to choose a particular pool of notaries with a certain expertise before the contract is signed.[76] The notary's primary job in OpenBazaar is to electronically verify that both parties signed the contract and there are available funds in escrow.[77] Next, after confirming that both parties agree the terms of the contract have been fulfilled, the notary releases the funds from escrow and sends it to the vendor.[78] Lastly, if either party is not satisfied with the transaction, then the notary serves as an arbiter in the dispute.[79]

Despite the initial success of Aragon Network and OpenBazaar's dispute resolution mechanisms, improvements to the approaches to Distributed Jurisdiction are inevitable and ongoing with no recognized network or mechanism having worked the bugs out yet.

VII. Next Steps for the International Supply Chain Environment

To enjoy the current and long-term benefits of a more efficient, sustainable and dependable supply chain that reduce the ultimate costs of the finished product while maintaining a high performance and quality levels will require involving technology and legal advisors to assess the client's needs, risk and the ramifications of an evolving and necessarily changing environment. Issues that a client will need advice and direction for include the following:[80]

A. Jurisdiction

Blockchain has the ability to cross jurisdictional boundaries as the nodes on a blockchain can be located anywhere in the world. This can pose a number of complex jurisdictional issues which require careful consideration in relation to the relevant contractual relationships.

The principles of contract and title differ across jurisdictions. Therefore, identifying the appropriate governing law is essential and in a decentralized environment, it may be difficult to identify the applicable rules. Every transaction could potentially fall under the jurisdiction(s) of the location of each and every node in the network. This could result in the blockchain needing to be compliant with an

unwieldy number of legal and regulatory regimes. In the event a fraudulent or erroneous transaction is made, pinpointing its location within the blockchain would be challenging.

The inclusion of an exclusive governing law and jurisdiction clause is essential to ensure that a customer has legal certainty as to the applicable law to determine the rights and obligations of the parties to the agreement and which courts will handle any disputes. Recently the United States District Court for the Southern District of California denied plaintiff Founder Starcoin, Inc.'s motion for preliminary injunction against defendant Launch Labs, Inc.[81] Although the court did not explicitly state why it had jurisdiction, Founder Starcoin, Inc. argued in its Complaint that the United States District Court for the Southern District of California had original jurisdiction under 18 U.S.C. § 1836(c) and 28 U.S.C. § 1331 and supplemental jurisdiction under 28 U.S.C. § 1367(a) because the claims were for breach of contract, trade secret misappropriation, intentional interference with prospective economic advantage and unfair competition.[82] Founder Starcoin, Inc. also argued venue was proper under 28 U.S.C. § 1391(b) (2) because a substantial part of the event that gave rise to the claims occurred in that district and a substantial part of property at issue is located in that district.[83]

B. Service Levels and Performance

The willingness of vendors to commit to performance assurances is likely to be inconsistent, with vendors preferring to offer the technology and service on an "as is" basis, with limited service levels, and excluding warranties regarding performance. This can leave customers without any assurance that the technology will function as described or that the service be reliable and available and for any business. Customers are unlikely to accept such a proposal. The balance of performance risk will therefore be a key issue to determining blockchain's use.

C. Liability

The risk to customers of a systemic issue with a trading-related infrastructure such as blockchain could be material if trades are not settled or are settled incorrectly. Likewise, the risk relating to security and confidentiality would be a top risk issue.

One of the main issues of a public blockchain is the inability to control and stop its functioning. In case of a private blockchain, the lack of control of the functioning of the platform does not apply, but whether or not this would be sufficient to trigger the liability of the company managing the platform has not yet been tested. Therefore, the allocation and attribution of risk and liability in relation to a malfunctioning blockchain must be considered carefully, and not just at the vendor-customer level.

D. Intellectual Property

There is inevitable value in the blockchain and ownership of the IP as it will likely form an important consideration notwithstanding limitations on the patentability of software and business processes. Blockchain vendors will have to determine their IP strategy as vendors and they will likely want to capitalize on any other commercial benefits to be generated from the blockchain, including commercialization of the underlying data, and it will need to be a carefully negotiated area.

Also, a customer may insist on ownership of IP developments or may be willing to 'merely' license them for the agreement term (or perpetually if usable with other networks) or vendor restrictions on use may be acceptable. No matter the approach, there appears to be a realization that technology will have to be shared in order for value to be gained.

E. Data Privacy

Blockchain's immutability characteristics raise serious implications for data privacy, especially where the relevant data is personal data or metadata sufficient to reveal personal information. The transparency of transactions on the blockchain is not easily compatible with privacy needs. Technology-based solutions will need to be found to design privacy-protecting blockchains. This might include limiting who can join the blockchain network to "trusted" nodes and encrypting the data on the blockchain, although this is not without its challenges especially in an environment in which transparency is prized.

In addition, data privacy implications were further complicated when the General Data Protection Regulation ("GDPR") became effective on May 25, 2018.[84] Although enacted by the European Union ("EU"), GDPR has an extraterritorial effect and the regulations apply to all companies who process EU residents' and citizens' data, regardless of where the company is located.[85] Some of the GDPR threats to blockchain implementation are the right of access, right to consent, right to be transported, right to minimize data, and the right to be forgotten.[86] Specifically, the right to be forgotten or the "erasure right" is implicated due to the immutability of the blockchain.[87] Therefore, clarification from the GDPR on what "erasure of data" means is needed to help advise clients on how to best comply with the GDPR regulations.[88]

F. Decentralized Autonomous Organizations (DAOs)

DAOs are essentially online, digital entities that operate through pre-coded rules. These entities often need minimal input and are used to execute smart contracts, recording activity on the blockchain. Modern legal systems are designed for participation by actual people (e.g., people have the power to enter into legal contracts, to sue, and to be sued). But the legal status of a DAO makes that difficult to assess since the DAOs "management" is conducted automatically. Courts and regulators are unlikely to allow the wholesale adoption of technology which bypasses established oversight, so much more work needs to done to have a DAO environment in which people have confidence.

Although many users were scared away when coding and security errors in the Original DAO allowed a user to take $55 million worth of Ether, DAO developers have learned from the Original DAO experience and have created more secure and sophisticated structures.[89] For example, DAOstack was launched in spring 2018 and is a step toward DAO adoption. However, due to the recentness of the launch, time will tell whether DAOstack is the future of DAOs and what legal implications there may be.[90]

G. The Enforceability of Smart Contracts

Blockchain makes possible the use of so-called "smart contracts". Smart contracts are blockchain-based contracts which are automatically executed upon certain specified criteria coded into the contract being met. Execution in a blockchain network eliminates the need for intermediary parties to confirm the transaction, leading to self-executing contractual provisions. This also raises significant legal questions in relation to applicable regulation and, therefore, the legal enforceability of smart contracts.

Since smart contracts are prewritten computer codes, how their use works with the traditional "contract" definition and laws of contracts is an open question. This is particularly true where smart contracts are built on permission-less blockchains, allowing for no central controlling authority. Since the point of permission-less blockchains is to decentralize authority, they might not provide for an arbitrator to resolve any disputes that arise over a contract that is executed automatically. It also remains unclear whether basic contract legal elements, such as capacity and apparent or ostensible authority, would apply. Also at issue is how concepts of offer and acceptance, certainty and consideration work in this environment. There are advances in many countries regarding the level of acceptability of electronic contracts so this may end up applying to smart contracts. Meanwhile, customers will need to ensure that smart contracts include a dispute resolution provision to reduce uncertainty and provide for a mechanism in the event of a dispute.

However, states are taking steps toward expanding the enforceability of smart contracts. For example, in March 2018, Tennessee enacted a new law that recognizes smart contracts and blockchain signatures as legally binding.[91] Senate Bill 1662 acknowledged a signature secured through a blockchain as an electronic signature.[92] It also acknowledged contracts secured through a blockchain as an electronic record.[93] As a result, the electronic signatures and contracts secured through a blockchain have the same legal standing as a traditional contract and signature.[94] Senate Bill 1662 also states "no contract relating to a transaction shall be denied legal effect, validity, or enforceability solely because that contract contains a smart contract term".[96] Tennessee now joins Colorado, Florida, Nebraska, New York, Wyoming,[96] Arizona, Delaware, Nevada and Vermont in expanding the enforceability of smart contracts.[97]

Moreover, it is likely a smart contract would pass a Statute of Frauds inquiry because smart contracts require parties to use their private keys to authenticate the transaction and private keys verify a party's identity.[98] Therefore, it is likely using private keys to authenticate satisfies the Statute of Fraud's signature requirements.[99] Nevertheless, as more states and potentially other countries adopt smart contract statutes and regulations, the enforceability of smart contracts will continue to expand and consequently, the applicability of current legal standards to smart contracts will need to be revisited.

H. Compliance With Financial Services Regulation

Many sourcing arrangements, including the use of certain technology solutions, require regulated entities to include in the relevant contracts a series of provisions enabling them to exert control, and seek to achieve operational continuity in relation to the services to which the contracts relate. With blockchain this may well be more of a challenge.

I. Exit

The need for exit assistance will be determined in large part by the specific solution and the extent to which the blockchain vendor holds the customer's data. If the customer does not have its own copy of the data, it will require data migration assistance to ensure the vendor is obliged to hand over all such data on expiration or earlier termination of the agreement and a complete record of all transactions stored on the blockchain.

J. Due Diligence on Blockchain

Public and private investors have already begun to make significant capital investments in blockchain technology startups. This trend is likely to increase as more use of blockchain technology commercially is made. Transactional lawyers who are tasked with performing due diligence on the buy and/or sell side in connection with these or other business investments utilizing blockchain technology will need to adapt more traditional due diligence approaches. This applies, for example, with respect to ownership of data residing on decentralized ledgers and IP ownership of blockchain-as-a-service offerings operating on open source blockchain technology platforms. The assessment will also impact the business value proposition of any investment.

VIII. Conclusion

Blockchain is now recognized as the notorious "disrupter" of commercial contracting, on the verge of revolutionizing the nature of commercial contracting in any context but particularly for supply networks where trust and verification are key relationship benchmarks also found in transportation, banking, finance, government, healthcare and energy transactions. Claims about blockchain technology range from praise, as efficient, cost-reducing and disciplined, to dismissive, as over-hyped. It is no doubt evolving and maturing, as are its users and customers. Its key benefits of use – existence, ownership, tracking and storage, particularly for food, apparel, and other goods have improved the ability of supply chains to facilitate payment, trace and track. At this point it seems likely that use of blockchain technology will expand into other industries continuing to drive improvements in quality, cost, service, and customer satisfaction. Determining whether blockchain technology is right for any company will require a keen assessment of business needs, available structure and flexibility, vendor engagement and appetite for risk leading to potential building and testing of the technology. In the supply chain context the drive to try and test should prove as irresistible as the drive to remain competitive. The next edition of this article will hopefully focus on the progress made on the important issues such as privacy, confidentiality, protection of intellectual property, jurisdiction and claims enforcement only now being identified and debated so new users of blockchain technology can benefit from practical and improved solutions.

IX. Endnotes

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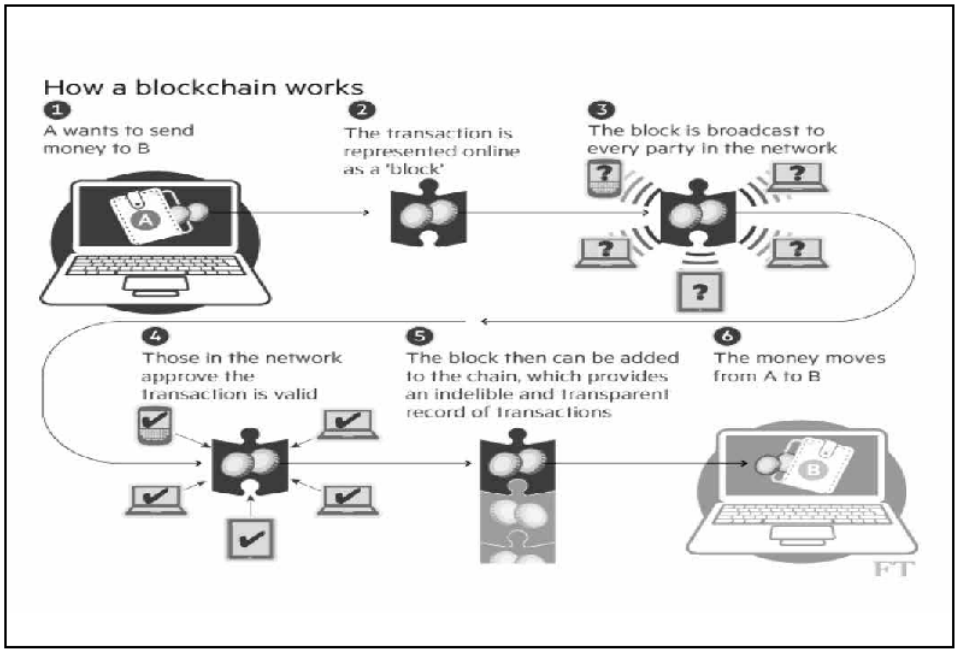

Figure 1

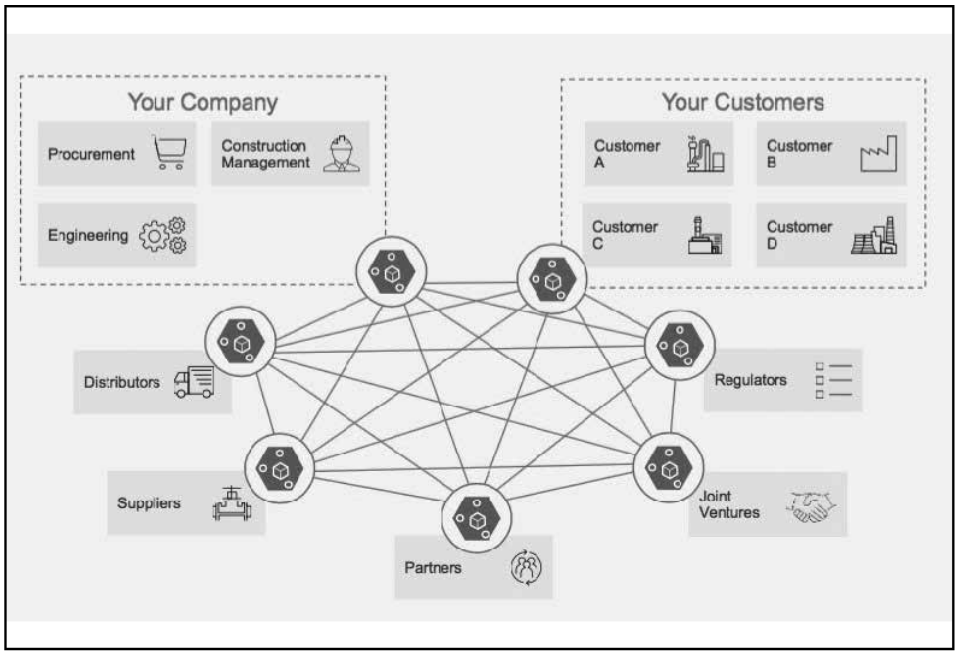

Figure 2

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