CLIENT ALERT

Blockchains and Distributed Ledgers: Can New Technologies Enhance Risk Management in Import/Export Supply Chains?

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Blockchains and distributed ledger technologies (DLT) have the potential to provide significant tools to address import and export supply chain risk. Will these new technologies eliminate risk? Will they solve the legal challenges companies face in complying with the many obligations throughout the supply chain? Unfortunately, nothing can completely eliminate risk; however, these new tools may help reduce and manage it, thereby easing the compliance burden.

Blockchain technology is at its core an engine for processing and exchanging information and assets. The Bitcoin blockchain, although the most widely known, is just one example of the application of this technology. Financial firms are seeking to use it to track ownership of securities. Power companies are seeking to use it to track power consumption and production. And it also has the potential to be used to track items through a supply chain, for instance from a mine to a plant to a customer, or from a manufacturing operation through an exporter to the ultimate consignee.

A blockchain is composed of "blocks", which are groups of transactions – or exchanges of information – between entities on the network that are secured and bundled together by the system. These blocks are then organized into a sequence – or "chain" – where their order has meaning. When a block is "closed," the system wraps it with a unique mathematical wrapper based on its contents, its place in the chain, and the unique wrapper of the block before it (which was similarly based on its contents, place in the chain, *etc*.). This chain of blocks then serves as a record of the transactions or exchanges of information on the system. The mathematical wrappers, together with the fact that each block on the chain is connected to the prior block and layered on top of the transaction-level security, makes it very difficult to make changes to previous records. This gives it a degree of integrity that makes it very attractive for supply chain applications.

Although a blockchain can be maintained on just one server, typical blockchain systems work by distributing the blockchain ledger across a network of users, which is then maintained collectively – *i.e.*, updates to this distributed ledger are performed by all users and controlled by an agreed upon set of rules and using verifications that are built into the system itself rather than by any one entity or in a central location. These verifications are designed so that, in order to go back and change information, a bad actor would not only have to work through the entire chain of transactions, but would have to make changes in a majority of the instances on the distributed ledger, and do so before anyone else made any other changes. Distributed ledger networks are designed to constantly check the blockchain so that unauthorized changes can be quickly detected and kept out of the distributed ledger.

Additionally, a "distributed network" is very different from the "centralized" networks that are more typical today. Centralized networks are like hubs leading to (and dependent on) spokes; distributed networks look more like fishing nets. If a connection or line is cut, the rest of the net still keeps working. Information can still be exchanged, updated, and verified, and any entities cut off by that outage will have their copies of the blockchain updated when they reconnect.

Various software implementations of blockchain and DLT solutions are being offered for different supply chain challenges, including:

- IBM and Everledger tracking the provenance of diamonds.
- A start up named Provenance building transparency into the supply chain using Blockchain.
- A company named Skuchain offering a potential product similar to Provenance.
- Inventory tracking, especially for luxury goods and other high-value items, using an embedded RFID chip or other micro-device that, when scanned by a retailer, confirms the authenticity of the item - here is an example of this type of service.
- Inventory and invoice finance using "smart contracts" to make payments faster. One example uses tokenized invoices that connect to the traditional banking system but uses blockchain-based "tokens" to enable vendors that have financed their receivables to automatically allocate payments.
- Tracking shipments using embedded devices in items such as shipping containers or railway cars to broadcast its location.

Note that not all blockchain and DLT solutions are broadly open to public participation; many require some type of qualification or verification to participate. Deployments with such requirements are known as "permissioned" versus "permissionless" systems. For example, the Bitcoin blockchain is permissionless – so anyone with a computer can access it using publicly available instructions. By contrast, systems supporting large supply chains would be able to, and likely would, remain closed except to verified users with permission to participate.

Making it work for you. Some observers predict that blockchain and distributed ledger technologies will enable the supply chain of the future; others view it with some skepticism. Who's right? That is for each company to decide, and as you do, we would like to offer a few recommendations and observations from a trade law compliance standpoint.

1. Blockchain and distributed ledger technologies can create a record of the events in the import and export supply chains that has more integrity than other methods. How? Unique digital tags can be created at every meaningful point in the product lifecycle. Each actor along the way then "signs" the tag, creating a chain of custody that is reflected in the blockchain ledger. The record itself has integrity by virtue of the genius of blockchain design. However, the underlying events that are "tagged" or "signed" remain a risk. That risk will not be eliminated by blockchain and distributed ledger technologies. Ensuring that all actors in the supply chain accurately "sign" the tags remains a compliance challenge. The benefit comes in the record that the blockchain system creates; once created, it provides a new level of integrity.
2. There is no information to suggest that any of the trade agencies, whether in an import audit or export licensing context, have relied on or accepted blockchain or distributed ledger technologies in support of a finding of compliance. It may well be some time before we do, and in fact we may never hear of it. These technologies are methods of proving compliance, no more, no less. For now, expect that regulators, especially auditors, will not be familiar with them, and be prepared to demonstrate what they do and do not do.
3. Blockchain and distributed ledger technologies may be familiar to most banks and financial institutions who in turn understand their role in finance, particularly with respect to letters of credit or other instruments, but other third parties may not have the same familiarity and whether they are vendors, tolling providers, service providers, customers, or others, it will be important to educate them on the tool and its commercial and regulatory importance.

The promise of blockchain and distributed ledger technologies is significant; they have the potential to change the way some parts of import/export compliance are done. Many companies are already exploring how to take advantage of these technologies, including those with high value assets and items at risk for counterfeiting or tampering as they move through the supply chain.

Put in context, blockchain and distributed ledger technologies may be used to confirm compliance with direct shipment rules, verify country of origin claims, obtain duty free treatment under free trade agreements; or ensure compliance with the recently expanded laws prohibiting importation of goods produced using forced labor. For exporters, the ability to track shipments provides a means to authenticate end-users, reducing the chances of exports being diverted to prohibited parties and destinations.

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