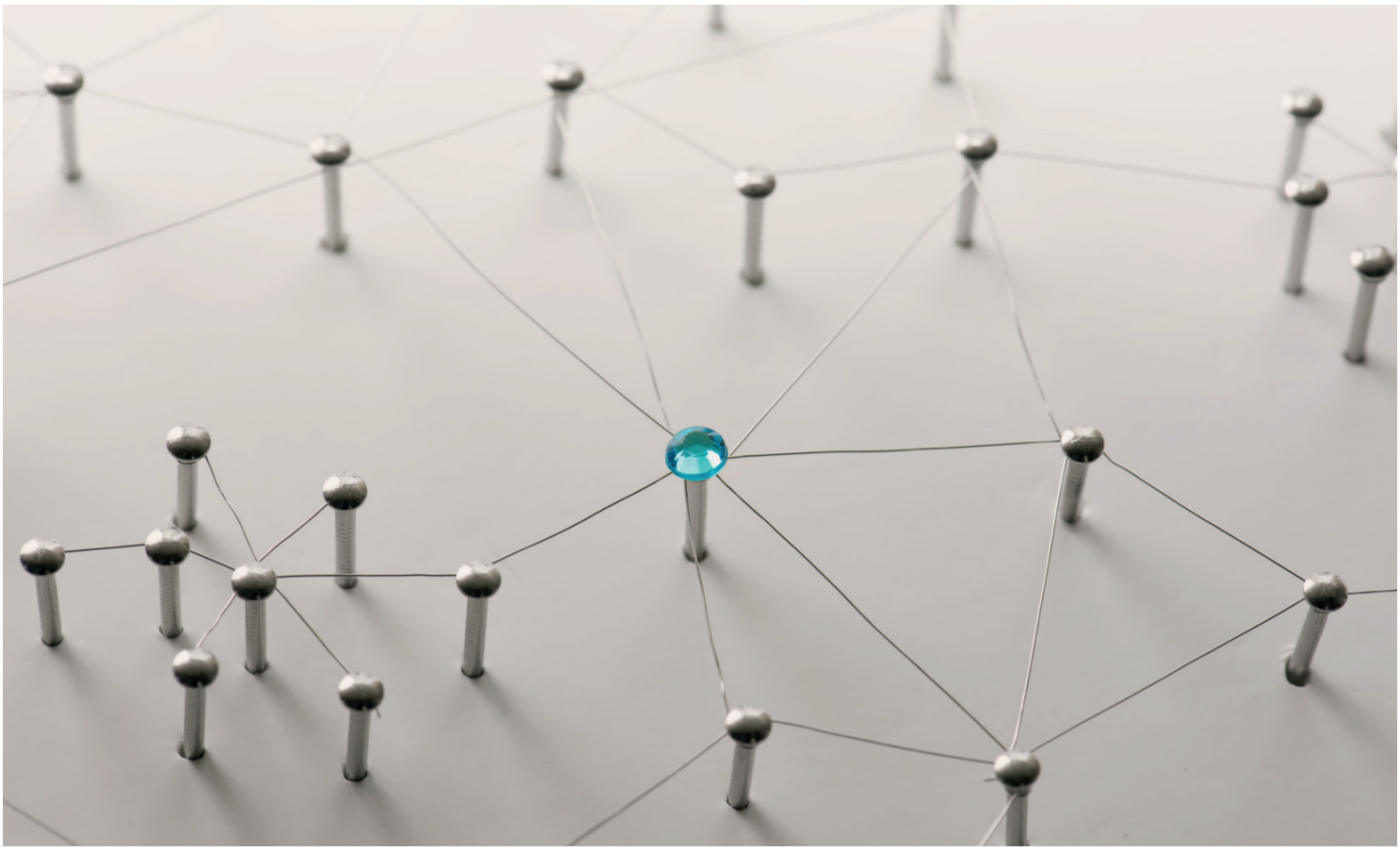

BLOCKCHAIN TECHNOLOGY: WHY LAW & FINANCE WON'T LOOK THE SAME IN FIVE YEARS

By Josias N. Dewey

Distributed ledger technology — more commonly known as blockchain technology — is moving from theory and white papers to the prototyping stage, and in limited cases, real-world implementation.

This transition from discussion to implementation is occurring at a much faster pace than most expected — including this author. Its adoption is being driven in large part by the prospect of greater efficiency and cost savings, which at scale can potentially be game-changing for several industries, including legal.

Beyond just its value proposition, however, the blockchain development community has grown from largely a collection of hobbyists and academics to some of the world's largest technology companies, including IBM®, Microsoft® and Intel — all of whom are devoting significant resources to advancing blockchain technology. In addition to those developing the technology, the list of industry players deeply committed to adopting the technology has grown exponentially over the last couple of years, and now includes Banco Santander, Barclays and Nasdaq, just to name a few. This synergy of development resources and innovative financial giants has created the perfect environment for blockchain to reach mainstream use rather quickly.

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If you avoid being distracted by its granular technicalities, the technology itself is rather straightforward. As with operating systems for computers (e.g., Windows®, macOS™ and Linux), there are different variants of blockchains under active development, including Bitcoin, Ethereum and Hyperledger Fabric, again just to name a few.

The purpose of a blockchain is to maintain a ledger of information. In the case of Bitcoin, probably the best-known example, its ledger is used to keep track of every Bitcoin transaction that has ever occurred.

However, Ethereum's ledger is more robust than Bitcoin's. While Ethereum can also be used to keep track of its native cryptocurrency (known as Ether), its ledger also doubles as a virtual computer that can run computer code to manipulate information stored in its ledger. Think of Ethereum as Excel® on steroids. While capable of being implemented as a private ledger, both Bitcoin and Ethereum saw their technology developed as public blockchains.

Many other protocols under development today are targeting what are known as "permissioned ledger" use cases, where participants that have access to the ledger must be authorized. These permissioned ledgers are the predominant focus of the finance industry due to privacy and data security concerns.

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WHAT MAKES BLOCKCHAIN SO ATTRACTIVE?

Regardless of the protocol, however, all blockchains share at least two fundamental characteristics. First, they are decentralized in design. Rather than rely on a central ledger that is maintained by a trusted party (e.g., your bank, the U.S. Federal Reserve, the Social Security Administration), a copy of the ledger exists on every participant's computer (referred to as a node) and each copy of the ledger is updated simultaneously as and when information changes.

This decentralized architecture is often referred to as being a peer-to-peer network since individual nodes all have peer nodes with whom each communicates, but not all nodes share the same peers. An important benefit of this architecture is that there is no single point of failure. The disconnection of any one node has no material impact on the network as a whole because the remaining nodes will continue to operate uninterrupted.

In addition to a decentralized architecture, all blockchains have a means for achieving what is referred to as "consensus." Consensus answers the question that you may already be asking yourself: Without a sort of central "clearinghouse," how does every participant know that its ledger looks the same as everyone else's ledger and that this shared ledger is accurate? At the heart of each protocol is a solution to this problem, which is referred to as its consensus algorithm or mechanism.

For example, both of the better-known cryptocurrencies that use blockchain technology — Bitcoin and Ethereum — use a technique known as "proof of work" to ensure that malicious nodes are unable to tamper with the ledger. Proof-of-work is based on the simple economic principle of scarce resources. More specifically, the nodes that are responsible for ordering transactions into sequential blocks (known as "miners") are all engaged in a game of sorts. The protocol is programmed such that only one miner can win the game and have its block added to the chain — and in exchange, be rewarded with a fixed amount of Bitcoin or Ether, as the case may be.

The "game" each miner is trying to solve requires a large expenditure of electricity and computing power. So much so, that the cost to tamper with the ledger would in theory far exceed the gain achieved by such a malicious act. Proof-of-work is not an optimal solution, however, because it does require such a massive amount of electricity and computing power to maintain the integrity of the ledger.

There are several other alternative consensus algorithms that are also available. Proof-of-stake (which Ethereum ultimately intends to implement in place of its current proof-of-work model) requires that the validating nodes have an economic stake in the underlying ledger (through ownership of its underlying cryptocurrency).

The amount of each validator's stake is proportionate to its influence on the ordering of transactions and creation of new blocks. Again, the idea is rooted in basic economics inasmuch as validators have the incentive to be honest or otherwise lose the value of their stake in the protocol. Within permissioned ledgers, the most common consensus algorithms being developed are based on Byzantine fault tolerance (BFT) algorithms, which are essentially mathematical models which determine what percentage of consensus among the total number of validating nodes must be achieved in order to ensure the integrity of the ledger. Permissioned protocols under active development include those used by Hyperledger Fabric, Chain's Core and several other protocols and are all capable of relying on BFT-like algorithms.

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THE FUTURE IMPACT OF BLOCKCHAIN

While blockchain technology is not appropriate for every use case, promising use cases have been identified in banking, capital markets, insurance, supply chains (including trade finance), government, energy, real estate and many more industries.

In addition to the more obvious benefits, such as the elimination of trusted intermediaries and the reduction in transaction costs, there are even more fundamental benefits. These arise from the digital and distributed nature of blockchains, which allow for the application of at least two other revolutionary technologies — the Internet of Things (IoT) and Artificial Intelligence (AI) — to the business logic implemented on blockchains.

IoT shows particular promise in trade finance where, when paired with blockchain technology, virtually any good or commodity can be tracked from origin to destination while eliminating risks associated with counterfeiting, tax evasion and violation of law (e.g., blood diamonds). Indeed, traditional paper letters of credit will soon be a vestige of the past. And AI shows tremendous promise in the finance world by being able to apply intelligent systems like IBM Watson to a transaction's business logic, or potentially to an entire portfolio of transactions (e.g., permitting a regulating agency to use AI to spot systemic risks in financial systems before human examinations would be capable of doing so).

It is no coincidence that cloud providers, including Microsoft, IBM, Amazon® Web Services (AWS) and Google® are all battling for a share of the blockchain business. When you consider the potential benefits that can be achieved by the above technologies — all made possible by blockchain — it should become apparent that many industries, especially finance, are in for a major transformation over the next few years.

As a result, the law firms that counsel in these areas will likewise need to understand the unique issues raised by the implementation of blockchains and the digital contracts implemented on those digital ledgers. While it's impossible to predict the future, it is not too far-fetched to assume that the most sought-after deal lawyers will be those capable of writing deal documents not only in human language prose, but in code as well; or at a minimum, have enough technological knowledge to interface with those that do.

No matter how the details play out, however, given the widespread and significant nature of these advances, the way financial institutions and their lawyers operate in five years is likely to look very different than it does today.

ABOUT THE AUTHOR:

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Josias "Joe" N. Dewey is a partner at Holland & Knight in its Miami office where he represents a diverse portfolio of clients in the banking and finance, real estate, technology and gaming industries.

In addition to his legal practice, Joe spends his time developing a smart contract platform called "contractCode." A self-taught coder from a young age, Joe's intrigue with the brilliance of blockchain technology and its logical intersection with law and business propelled him to be one of the legal industry's leading experts on the topic.

Joe regularly publishes articles on blockchain technology and has been a guest speaker and panelist on the matter at conferences around the world. Joe received both his B.A. and J.D. from the University of Florida.

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