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Legal implications of expanded use of blockchain technology

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The use of digital currencies, like Bitcoin, is becoming widespread. To date, much of the focus on digital currencies has been directed at their potential to substitute for or complement fiat currencies, but the true innovation lies in their underlying infrastructure – the decentralised ledger of transactions called the ‘blockchain’, which could have extensive effects in myriad applications.

By way of background, Bitcoin’s system is decentralised – no central authority tracks, approves or secures transactions on the Bitcoin network. To achieve security and usability, Bitcoin’s database (the Bitcoin blockchain) utilises cryptography. The Bitcoin blockchain is a publicly viewable ledger that records all transactions, with each network user retaining a copy of the ledger. When a transaction is initiated, it is grouped with other transactions; these groupings (blocks) are added to the ledger. Blocks are distributed to users, and a block’s veracity is confirmed by users’ distributed computing power. Approved transactions are irreversible and only the sender’s authorisation is needed to initiate the process.



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Although regulators have focused on digital currencies in financial transactions, the expanded use of the blockchain's distributed ledger technology could complicate the legal landscape in many emerging areas. Below we discuss some of these areas as well as some of the apparent and potential legal impediments that may need to be overcome prior to wide-scale implementation.

Financial transfers

Digital currencies are already being used as speculative investments and mediums of exchange. The blockchain technology can also be used to rapidly and cheaply transfer currencies globally. These capabilities may find application to, among other things, global remittances, settlement and clearing, cross-border currency exchanges and interbank transfers. In fact, as of September 2016, over 50 global financial institutions have joined the R3CEV blockchain consortium to explore the uses of distributed ledger technology. Further, other financial institutions have collaborated to develop the idea of permissioned blockchains such that participants can be identified or restricted.

It may not be possible to shoehorn the use of blockchain technology into existing financial laws and regulations. As

a result, changes to laws or regulations, no-action relief or interpretive guidance may be necessary.

Multi-signature transactions

Blockchain technology can accomplish escrow by using multi-signature transactions, which involve depositing funds to a virtual currency address to initiate a transaction between three parties – two contracting parties and a third-party 'escrow'. Completing or refunding the transaction requires two of the three parties to sign the transaction.

Laws regulating escrow agents who assume physical control over assets are not designed to accommodate this type of transaction. For example, California defines escrow using language such as 'delivers' and 'to be held'. Such laws may be incongruous with transactions where nothing is physically delivered to or held in escrow.

Merchant-issued digital currencies and 'coloured coins'

Advances such as 'coloured coins' or merchant-issued cryptographic currencies blur regulatory lines; for example, the New York State Department of Financial Services' 'BitLicense' exempts 'gift cards', defined in part as payment devices that are useable at merchants or service providers, "issued for a specified

amount", and "purchased... on a prepaid basis for the future purchase or delivery of goods or services". A fixed-value digital currency created and accepted by merchants would operate similarly to existing gift card systems.

'Coloured coins' are tags representing assets overlaid on digital currency. The resulting digital products can be distributed as gift cards, discount coupons or other vouchers. For example, a merchant could tag a bitcoin transaction such that one bitcoin represents a voucher redeemable for \$1000 of merchandise. However, the bitcoin retains its own value, so the resulting product combines digital currency and asset vouchers.

Property registers and intellectual property

Blockchain technology could also be used to supplement or replace ownership recordation systems. Property titles could be stored and verified via a blockchain, and title transfers could be effected and verified without a centralised third party. Intellectual property (IP) ownership could be similarly recorded via decentralised ledger. Tokens representing individual sticks from the bundle of property rights could be individually transferred. For example, the right to perform a copyrighted work could be sold



as a token without affecting other rights. Regulators may be reluctant to decentralise official registries, but adopting new technology may produce blockchain advantages such as higher security, reduced fraud opportunities and decreased transfer cost.

Blockchain technology in this context requires doctrinal and legislative shifts. Current IP licensing law focuses on contractual relationships, not transferrable in rem property rights that could be sold downstream. However, blockchain systems could change IP law as applied to digital products, such as the doctrine of first sale. Under this doctrine, a purchaser of a copy of work may resell that copy. This is problematic with digital files, because it is impossible to know if the original purchaser has resold the original file or a second copy. Blockchain technology allows digital copies to be individually identified such that sellers could verifiably and fully transfer copies, allowing application of the doctrine.

Storage and data transfer

Other information could also be transferred or stored via blockchain. For instance, a blockchain's decentralised verification could provide for secure digital signatures. Identity information could be stored and verified via a blockchain ledger, and resulting verified

identities (remaining pseudonymous) could reduce fraud on peer-rating sites or provide trust ratings for peer-to-peer marketplaces or lending services.

Yet, such identity verifications raise privacy concerns, including whether a right to privacy would exist in such applications. Further, creating massive information repositories raises data breach concerns. Although cryptographic ledgers are widely seen as secure, if personally identifiable data from elsewhere were exposed and correlated to blockchain data, or if blockchain data were aggregated and analysed, transactions could be tracked and compared even with a pseudonymous ledger.

Smart contracts

'Smart contracts' are self-executing computer programs that automatically fulfil programmed arrangements. Basic smart contracts would exist entirely online; a user could make a donation to a blog, with the donation automatically transferring after a defined number of articles are posted. Smart contracts could also facilitate the sale of digital goods, with activation codes being sent via a blockchain only after payment is received and recorded in the ledger. With the move toward the Internet of Things, transactions involving physical objects could be digitally verified and

secured.

Smart contracts raise legal issues. First, their automatically enforcing nature obscures the application of classic contract doctrines. These 'contracts' might not be voidable or cancellable even if coerced or unconscionable. Smart contracts might also be programmed to be impossible to breach, efficiently or otherwise. Second, these interactions carry the same blockchain privacy concerns. Contracts between parties would be publicly viewable in the ledger, and third parties could potentially track an individual's contracts. Finally, smart contracts could lead to legal industry changes, as lawyers are tasked with crafting or adjudicating auto-executing arrangements.

Decentralised organisations

Blockchain technology could be used to distribute rights that mirror those of traditional organisations, such as voting or divided rights. Company actions could be taken automatically by smart contracts, such as automatic dividend distributions after authorisation by an organisation's members.

Decentralised organisations raise liability issues as ultimate responsibility may be difficult to define. Because the organisation's 'management' is conducted automatically, legal systems



would have to decide who is responsible if laws are broken. Similarly, the legal status of such organisations will be in question.

Securities and financial products

Most notably, Overstock.com has been working on its own blockchain platform to issue public securities using blockchain technology. In this regard, the Securities and Exchange Commission has declared Overstock's S-3 filing effective to provide it the ability to issue blockchain shares in a public offering.

Other companies have raised funding through the sale of their own native tokens while asserting that these sales are not securities but rather pre-sales of technology access. Whether tokens are securities will be highly fact-dependent; the answer may vary between multiple uses of identical technology. Additionally, financial products can be created and executed using smart contracts, such as ownership tokens for companies that automatically distribute portions of profits to holders. Regulators and exchanges could write rules into

these contracts requiring compliance to be met before the contracts can be executed.

Conclusion

Blockchain technology will likely continue generating new possibilities for the way we interact and exchange information. These possibilities provoke challenging and complex legal issues and push the boundaries of existing laws. It is to be expected that legal frameworks will need to be adapted or modified to accommodate this rapid innovation. ■