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Taking Stock of the Block: Blockchain, Corporate Stock Ledgers, and Delaware General Corporation Law—Part II

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Delaware recently amended the Delaware General Corporation Law to authorize Delaware corporations to replace their paper and electronic stock ledgers with a blockchain. Blockchain, also known as a distributed ledger, can promote efficient recordkeeping, but there are several legal and practical hurdles that corporations need to address before they can reap the full benefits of blockchain legalization. In the first part of this two-part article, which appeared in the May-June 2018 issue of The Journal of Robotics, Artificial Intelligence & Law, *the authors discussed blockchain and its applications. This second part of the article explains Delaware's legislation and blockchain's potential uses and hurdles.*

Delaware's Legislation

The Context of Legislative Adoption

The Modern Shareholding System is Outdated

Delaware enacted blockchain with a single goal in mind—simplifying stock ledger maintenance via distributed ledger technology. Delaware legalized blockchains under the Delaware General Corporation Law ("DGCL"), allowing corporations to improve the speed and accuracy of their corporate record systems. At its core, Delaware's blockchain legislation is an overhaul of the shareholding system in the United States.[105] To understand how these DGCL amendments change the foundations of the shareholding system, this section provides a brief overview of that system.

The modern shareholding infrastructure has not changed significantly since the Dutch East India Trading Company became the first publicly traded company in Amsterdam in 1602.[106] Like the Dutch East India Trading Company, companies today create an initial public offering to raise money for ventures, which many shareholders in turn sold on the secondary stock market.[107] In the

secondary market, a central registrar maintains the records of all trades and stock ownership.[108] As the market became larger and more regulated, exchanges, trading venues, clearinghouses, trade repositories, and securities depositories filled niches to expedite sales.[109] America adopted this system, and until the 1970s exchanged paper shares during transactions on the secondary market.[110]

An economic expansion in the 1960s, and a subsequent contraction a decade later, respectively caused and revealed major problems with how stock sales and purchases were executed. Stock exchanges through the 1960s saw available shares quadruple.[111] To compensate for the increase, the New York Stock Exchange closed one day a week and shortened trading hours to allow traders to complete backlogged paperwork.[112] Brokerage firms fell behind in their transactions and when the economy slowed in 1970, hundreds closed as firms defaulted on shares that brokers had lost or misplaced.[113] The Securities and Exchange Commission ("SEC"), reacted by limiting the physical movement of stock certificates to reduce paperwork and protect against lost shares.[114]

The SEC's solution was centralization. The SEC and Congress created what would become today's Depository Trust and Clearing Corporation ("DTCC"), which held and owned virtually every share traded in the United States.[115] Complete immobilization of shares solved the problem that became known as the Paper Crunch but created new ones. Since the DTCC technically owns every share, those who own shares are now "beneficial shareholders" who must engage with intermediaries to enforce their rights.[116] These intermediaries must approve a transaction or sale, leading to longer settlement times for transactions. Additionally, each intermediary charges a fee, leading to higher costs for transactions. The system's inefficiency came to a head in some recent Delaware cases.

Delaware Recently Experienced the Problems of the Modern Shareholder System

The DGCL amendments will allow corporations to maintain more accurate records. Prior to the amendments, there were several cases involving costly errors deriving from poor corporate record-keeping. Two opinions written by Vice Chancellor J. Travis Laster, a proponent of blockchain technology, highlighted the inefficiencies of prior paper and electronic stock ledgers.[117]

The first was *In the Matter of the Appraisal of Dell Inc.*[118] In that case, Dell approved a merger and submitted the merger agreement

to its shareholders for approval.[119] Some Dell shareholders ordered their voting intermediary, Institutional Shareholder Services Inc. ("ISS"), to vote against the merger.[120] Due to confusion arising from ISS's voting program, the shareholders accidentally voted in favor of the merger.[121] The shareholders sought appraisal of their shares, arguing that ISS voted against their wishes.[122] The Chancery Court decided "the mistake in this case did not arise at the [DTCC] level as a consequence of the federal policy of share immobilization."[123] Rather, it arose due to ISS's failures, not Dell's failures.[124] The court denied relief under Delaware law, because the shareholders assumed the risk by using ISS as an intermediary.[125] Without ISS's programing failure, there would be no need for the suit.

The other notable case is *In the Matter of Dole Food Co.*[126] There, Dole converted from a public to a private company, leading its 36,793,758 shareholders recorded in its stock ledger to receive payouts for their shares.[127] However, Dole actually had 49,164,415 outstanding shares at the time of the merger.[128] Due to its inability to track the short sale of shares during the three-day settlement period, Dole failed to record the additional 12,370,657 shares.[129] The court noted "the problems raised by short sales and trades during the three days before closing appear endemic to the depository system and hence likely infect every claims process. Nothing about either factor was unique to Dole. The only difference was the magnitude of the discrepancy, which made the issues visible."[130] The court noted that Dole's failure to maintain an accurate stock ledger is a common occurrence and the only difference between this case and others was the magnitude of the harm.

These cases highlighted two failures of the stock ledger system. First, the existence of more intermediaries increases the likelihood that intervening causes will derail a shareholder's voting rights. Second, paper or electronic ledgers are insufficient for maintaining corporate records when settlement requires several days. By legalizing blockchain, Delaware addresses these inefficiencies and enables corporations to experiment with the technology to ensure it was the right solution to the problem.

The Amendments to the DGCL

The Legislature's amendments made several changes to the DGCL that are worth mentioning. The Legislature's summation noted that the amendments "are intended to provide specific

statutory authority for Delaware corporations to use networks of electronic databases (examples of which are described currently as "distributed ledgers" or a "blockchain") for the creation and maintenance of corporate records, including the corporation's stock ledger."[131] These amendments therefore explicitly allow blockchain technology.[132] However, the Legislature also made several additional changes relevant to maintaining corporate records on blockchain, and provided several definitions and requirements.

Section 219(c): Defining a Stock Ledger

The Legislature also provided a precise definition for a stock ledger in its amendments. DGCL Section 219(c) now requires that a stock ledger (1) contain the names of all stockholders of record, (2) list the address and number of shares registered by each stockholder, and (3) track all issuances and transfers of stock.[133] That same section also notes that "[t]he stock ledger shall be the only evidence as to who are the stockholders entitled by this section to examine the list required by this section or to vote in person or by proxy at any meeting of stockholders."[134] Thus, the Legislature provides a broad definition of stock ledgers that encompasses paper, electronic and blockchain formats. Additionally, the stock ledger must meet the requirements set forth in Section 224.

Section 224: Requirements for a Stock Ledger

Section 224 of the DGCL was also amended and sets forth certain requirements for a stock ledger, blockchain, or otherwise.[135] A stock ledger now must (1) be printable, (2) be viewable, (3) record transferable stock, and (4) contain stock that provides rights to the owner.[136]

Printable Ledger

First, like previous versions of Section 224, electronic storage of corporate records is permissible only "provided that the records so kept can be converted into clearly legible paper form within a reasonable time."[137] These paper printouts of electronic blockchains are admissible as evidence in court.[138] While a printout of the entire blockchain is unwieldy, Delaware's court rules allow admission of electronic versions of corporate documents.[139] Courts should therefore accept electronic versions of the blockchain as evidence of the corporation's stock ledger.

Providing a List to Stockholders

Second, "it must enable the corporation to prepare the list of stockholders specified in Sections 219 and 220."[140] Section 219(a) still requires that the list is provided to shareholders ten days prior to a shareholder meeting.[141] Section 220, meanwhile, requires that corporations make copies of the stock ledger available to all shareholders upon request.[142] If a stock ledger is placed on a distributed ledger that shareholders can access, the corporation could potentially meet this requirement by simply directing the stockholder to the blockchain.

Title 6: Blockchain Shares Must be Transferable

Third, "[the stock ledger] must record transfers of stock as governed by Article 8 of subtitle I of Title 6 as required by Section 159."[143] Title 6, the investment securities article of the Delaware UCC, remains largely unchanged under these amendments.[144] The only notable change is in Section 202(b)(3), which entitles all outstanding stock (as opposed to shares) to vote, and clarifies when amendments to the articles of incorporation take effect.[145]

Because Title 6 remains largely unchanged, so do its requirements and allowances. These include (1) complying with other local, state, and federal law (such as the 1933 Securities Exchange Act), (2) restrictions to obtaining tax benefits under federal law, and (3) any other restriction lawfully imposed or agreed upon in the certificate of incorporation or that is not manifestly unreasonable, among other restrictions.[146] With smart contracts, corporations have the ability to encode these restrictions into their blockchain stock ledgers, automatically enforcing restrictions in the DGCL and the companies's articles of incorporation.

Blockchain Ledgers Can Only Hold Uncertificated Stock

Finally, "[the stock ledger] must record the information specified in Sections 156, 159, 217(a) and 218."[147] Section 156 requires that a certificated share state the amount paid for the share.[148] Because stock on a distributed ledger cannot have the original purchase price physically written on it, a share on a distributed ledger must be an uncertificated share under Delaware law. In addition to meeting the stock transfer requirements of Title 6 discussed above, blockchain stocks must also meet the requirements set forth by Section 159, which requires that both the transferor and transferee of stock agree to a transfer.[149]

The shares must also be alienable. Shares on a blockchain must have voting power because "[p]ersons holding stock in a fiduciary capacity shall be entitled to vote the shares so held" under section 217(a).[150] As the Legislature did not amend this section, the DGCL continues to sanction proxy voting. Section 218 allows a shareholder to enter into a voting trust agreement with another person as a trustee, allowing the trustee to exercise the shareholder's rights on the shareholder's behalf.[151] On the blockchain, both proxy voting and voting trust agreements could be conducted by smart contract. In this scenario, a shareholder contacts the program, and the smart contract takes the shareholder's private keys representing personal ownership of the shares. It then provides them to the proxy or trustee for the specified period and records the transaction on the distributed ledger.

Electronic Notice to Shareholders Explicitly Allowed

The Legislature has also amended the DGCL to allow electronic notices to adapt to blockchain technology. The amendment's legislative history states "[s]ections 151, 202 and 364 are also amended to clarify that the notices given to holders of uncertificated shares pursuant to those sections may be given by electronic transmission."[152] These sections were altered to require that notice be given, instead of sent.[153] Therefore, these electronic notices may be sent by distributed ledger to all shareholders with access to the ledger.[154]

Corporate Officer No Longer Maintains the Ledger

In addition to the changes mentioned above, the Legislature removed the requirement that an officer of the corporation must maintain a stock ledger, instead requiring the corporation generally to maintain its ledger.[155] However, the DGCL also specifies "[a]ny records maintained administered by a or *on behalf of the corporation* in the regular course of its business" must meet the above requirements, thus allowing another entity, such as a blockchain software company, to maintain the ledger on behalf of the corporation.[156]

Blockchain's Potential Uses and Hiccups

The recent amendments to the DGCL enable implementation of blockchain technology for corporate use. They do not address

how corporations may use a blockchain stock ledger or what issues may arise from that use. This section will briefly address some of the ways companies can use blockchain technology as well as the potential technical or legal hurdles preventing blockchain adoption.

Securities and Blockchain

Some blockchain advocates see the technology as a way to disrupt Wall Street and cut transactional costs of trading on a national stock exchange.[157] New companies can leapfrog older businesses by starting their corporate record maintenance on a blockchain, but established businesses will need to transition to a blockchain.[158] Overstock Inc., an online retailer, provides an example of blockchain's security trading ability and how a company can issue digitized and common stock simultaneously.

Overstock developed a blockchain securities trading platform called t0 (pronounced tee-oh), which was "named for its ability to use blockchain technology to reduce securities trade settlement times from trade date plus three days—termed T+3—to same-day settlement, or T+0."[159] This system was built upon Bitcoin's blockchain technology.[160] When two parties traded the digital securities, the blockchain company running the ledger recorded the transaction, transferring de minimus amount of bitcoin to itself, thus shifting transactional costs from the parties to the company maintaining the ledger.[161] A version of the ledger is published online for public perusal,[162] but redacts sensitive information, such as party names.[163] The ledger was programed, however, to allow agents "that [satisfy Overstock's] books and records obligations . . . to use the t0 software to access personal identifying information from the sole broker-dealer providing customer access . . . As a result, such agent[s] will have all information necessary to complete [Overstock's] books and records with respect to each digital securities transaction."[164]

Because Overstock used blockchain to trade securities, it was required to submit necessary documentation with the SEC.[165] Overstock submitted a prospectus, detailing the offering process.[166] It noted that the blockchain offering was an "unregistered private placement pursuant to Rule 506(c) of Regulation D and are restricted securities."[167] The company required "[a] person wishing to engage in transactions in our digital securities . . . to open an

online brokerage account with the sole broker-dealer licensed to provide access" to the t0 platform.[168] The companies maintaining the blockchain, Overstock, Pro Securities ATS, and DriveWealth, controlled the private cryptographic keys for each security and used the private keys to transfer de facto ownership between the various registered parties.[169]

Overstock's prospectus also noted potential risks associated with a blockchain platform.[170] For instance, it noted that hackers could steal personal information required to register with the platform, thus removing the anonymity from the system, or that the private keys for an individual stock could be hacked and stolen.[171] It lauded the quick settlement time, but Overstock acknowledged that the digital securities were traded on a separate, smaller market, thus allowing parties to manipulate the price, and allowing the stocks on the ledger to trade at different rates from common stock on established secondary markets.[172] Such drawbacks, Overstock recognized, could potentially dissuade investors from purchasing digital securities.[173]

Despite these risks and regulatory concerns about Bitcoin trading,[174] the SEC approved the use of blockchain for securities trading.[175] In its offering, Overstock provided Series A Preferred Shares, which traded on the blockchain, simultaneously with Series B Preferred shares, which traded on the open market.[176] As predicted, the stock settled nearly instantly.[177] From the offering on the t0 platform, Overstock raised $1.9 million.[178] During both initial offering and subsequent trading, Overstock was able to follow share ownership as the ledger updated instantaneously.[179] Blockchain can therefore solve the problems highlighted in *In re Dole Food Co.*,[180] by both reducing settlement periods and ensuring the company maintains an accurate stock ledger.

Shareholder Voting

Like trading securities directly on a blockchain, corporations can also use distributed ledgers as an electronic platform for shareholder voting.[181] Studies find that the current proxy voting system contains flaws that lead to inaccurate vote counts.[182] Blockchain can fix the system by distributing digital coins via a distributed ledger based on outstanding stock.[183] These tokens would be based upon the number of stock a person owns, not the value of the stock,

ensuring that stock volatility does not influence voting power.[184] Shareholders can then vote by transferring their coins to addresses on the blockchain, which will automatically count the votes.[185]

Specifically, blockchain can simplify the shareholder's annual general meeting.[186] Few shareholders involve themselves in such meetings due to voting complexity and lack of finality.[187] Blockchain lowers these perceived barriers, encouraging shareholder participation.[188] Distributed ledgers do this by allowing "(a) real-time transmission of the general meeting; (b) real-time, two-way communication enabling shareholders to address the general meeting from a remote location; [and] (c) a mechanism for casting votes" without the need of a proxy voter.[189] The anticipated results are high turnout, lower costs, and swift voting results.[190] As shown by *In re Appraisal of Dell Inc.*, the intermediary system currently in place can lead to confusion and mistakes.[191] With blockchain shareholder voting, companies can ensure accurate and cost-effective annual meetings that reduce the chance of litigation.

Evidentiary Issues

Delaware's amendments set some evidentiary guidelines by requiring the blockchain be legible in printout form, but there are several other unresolved evidentiary issues. Arizona has answered some issues question via statute.[192] Under the Arizona Electronic Transactions Act, transactions on a blockchain are considered electronic signatures.[193] This legislation "[r]ecognize[s] smart contracts in commerce and establishe[s] a contract may not be denied legal standing, validity or enforceability solely because it contains a smart contract term."[194] Arizona also identifies items on a public blockchain as privately owned and not available for public use.[195] These evidentiary issues are not settled under Delaware law, and Delaware must address these concerns to encourage transitions to blockchain technology.

Ledger Types: Which is the Best for Corporations?

Permissioned Ledger: Solving the Security Flaws?

Additionally, corporations wishing to adopt a blockchain stock ledger must weigh the benefits and drawbacks of the public, private,

and hybrid ledgers. Until now, fintech companies were the biggest proponents of private ledgers. There are several benefits to using a private blockchain. For one, since all nodes are controlled by a single or tightly knit group, owners can more easily "change the rules of a blockchain, revert transactions, modify balances" and update the system to accommodate feedback or advances in technology.[196] Transactions on the ledger are cheaper because fewer computers, likely with above average processing power, need to verify a transaction to add it to the blockchain.[197] With fewer nodes comes less overall power output and faster transaction times.[198] Private ledgers also require permission to join the network, thus increasing security and restricting those who can engage in transactions on the network.[199]

There are, however, security concerns that arise with a private blockchain. For instance, a 51 percent attack is easier to execute once a party obtains control of a node. If the nodes themselves are not adequately secure, hackers could make them priority targets. Because there are fewer nodes, to launch a 51 percent attack and alter a ledger, hackers need to seize fewer computers. Nevertheless, since a decentralized ledger has no single point of failure, a private ledger is harder to overwhelm than a centralized database, as DoS attacks require massive computing power to overwhelm a distributed ledger system.[200]

Public Ledger: Transparency Included

Transparency is the main issue with using public ledgers for corporate records. Corporations may want to reduce settlement times or increase accuracy in the system, but few would want to open their corporate records to competitors. When it comes to privacy, public blockchains are ill-equipped.[201] From a criminal procedure perspective, using public ledgers also means governments do not require warrants to see company documents.[202]

Overall costs increase when using a public ledger. Since there are more nodes on a public ledger, it takes more power and time to finalize transactions.[203] Fortunately, the electricity required is spread across other computers, reducing the company's cost.[204] Nevertheless, finalization of transactions will take longer because companies cannot assign computers with high processing power to the network.[205] Since modern Bitcoin consensus protocols are

spread over thousands of computers, Bitcoin transactions usually take more than two hours to finalize, rather than the near instant finalization on private networks.[206]

In addition, public blockchains are more likely to become subject to a hard fork. While parties controlling a permissioned ledger may alter the ledger themselves, consensus is harder to build when more parties are involved in maintaining the ledger. In the early days of a public ledger, when it is vulnerable to a 51 percent attack due to having relatively few users, outside parties could coordinate to capture a majority of processing power and alter the ledger. Given these concerns, corporations may wish to avoid using a public blockchain to store corporate records.

Hybrid Ledger: Best of Both Worlds?

A hybrid ledger, depending upon how it is coded, may balance transparency and security. For example, Overstock's hybrid ledger allows anonymous public viewing of the blockchain, but grants control to the company to hide or reveal traders. Given the customization of blockchain protocols and the potential public relations benefits from being perceived as an open company, hybrid ledgers may be the best option for certain corporations.

Conclusion

Corporations should consider both the benefits and costs of adopting a decentralized ledger. They must continue to adopt recent technological innovations to maintain or excel in their chosen market. This includes adopting blockchain to maintain corporate records. However, the technology is not infallible. As with any new technology, initial adoption of an untested system leads to technological and legal issues. These issues will likely be resolved over time as coders, regulators, and the courts fill in the gaps left by legislation and blockchain networks. Blockchain is unlikely to immediately change how corporations do business, but it could have significant long-term effects on businesses regardless of size or industry. While corporations should adopt a blockchain stock ledger, expectations cannot overshadow reality; progress will occur only when all parties—federal, state, and private—coordinate.

Notes *(continued from Part I)*

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