

Potential Disrupting Effects of Blockchain Technology on Airport Finance

(December 18, 2017 by Dafang Wu; [PDF Version](#))

I was writing this article on Friday when I felt obliged to stop and write another article for friends first: [Cryptocurrency Speculation and Blockchain Stocks](#).

As the airport industry struggles to regulate Transportation Network Companies (TNCs) and evaluate TNCs' impact on airport finance, blockchain technology will have potential disrupting effects on airport operations, which may even make TNCs obsolete in the coming years.

Blockchain Technology

There are three issues we must understand about blockchain technology: cryptocurrency, decentralized network, and smart contracts.

Cryptocurrency

Cryptocurrency (the Coin) is digital cash issued without a central entity, unlike normal (fiat) currencies backed by a country's central government or organizations. As of December 18, 2017, [Coinmarketcap](#) is tracking 1,364 Coins, with the largest, Bitcoin, claiming a market capitalization of more than \$300 billion.

After both the Chicago Board Options Exchange and the Chicago Mercantile Exchange began trading Bitcoin future contracts, Bitcoin became mainstream. Although Bitcoin and other Coins are not yet accepted at all locations, many places accept Coins as a form of payment. Overstock.com has accepted major Coins since 2014, and plans to issue its own token today. Several financial institutions issue debit cards based on Coins, such as [TENX](#) (PAY) and [Bitpay](#) (BAY). Many financial institutions are testing Coins as settlement tools, including [Ripple](#) (XRP) and [Stellar Lumen](#) (XLM).

The widespread adoption of Coins is at least partially attributable to the appreciation of Coins' value. With the market being impressed by Bitcoin's increase from 1,000 per coin in January 2017 to 20,000 per coin in December 2017, many Coins have seen an appreciation in value of 100 times; for example, Ripple rose in value from less than one cent to approximately 70 cents. As retail investors become attracted to Coins due to their fear of missing out on major opportunities, Coins may appreciate further and become more widely accepted by business operations.

Decentralized Network

Coins are surprisingly only side products of blockchain, which has the true potential to disrupt many industries. Blockchain is a ledger of transactions or records kept by thousands or millions of individual computers (nodes) simultaneously. Coins are tokens to use on the blockchain platform; they incentivize nodes to continue supporting the blockchain platform. Every few minutes, all transactions within the interval are validated by a majority of the nodes, and are sealed into a consecutively numbered block, which forms a chain of blocks. Under a so-called proof-of-work approach, the individual computer that can most quickly solve a mathematical puzzle ("mining") and seal the block is rewarded with Coins. For Bitcoin, this implies \$250,000 every 10 minutes. Gigantic mining pools have been set up to mine the Coins. Unless someone can overpower the network, the records on the blockchain cannot be revised or lost.

A decentralized network appears to be a waste of resources because the same records are kept millions of times and enormous energy is consumed in mining the Coins. According to [Digieconomist](#), the energy consumed to mine Bitcoins is enough to power three million households, and it increased 22% in the last 30 days. However, a decentralized network has many advantages:

1. No single entity can control the blockchain unless it amasses half the network's computing power.
2. There is no single point of failure. A blockchain network cannot be attacked by denial-of-service attack
3. All records are transparent, yet encrypted by private keys.
4. All records are permanent and cannot be revised.

Smart Contract

The utility of blockchain technology goes far beyond the decentralized network. In addition to keeping transactions on the platform, blockchain technology has smart contracts, which are coded to execute when certain conditions are met.

This creates unlimited opportunities for the application of blockchain technology. TNCs have not been affected so far because TNCs constitute a tiny industry compared to how blockchain technology can be applied:

- Bitcoin does not have a smart contract, but has the potential to replace some countries' currencies.
- A set of blockchain platforms such as [Ethereum](#) (ETH), [Stellar Lumen](#) (XLM), and [NEM](#) (XEM) enable developers to develop further applications in all industries. Any of the platforms can be used to develop a decentralized ridesharing network
- A group of coins are designed to be non-traceable, such as [Monero](#) (XMR) or [ZCASH](#) (ZEC).
- [Ripple](#) (XRP) wants to be the tool for global financial settlement.
- [Populous](#) (PPT) wants to provide invoice financing for all trades.
- [TRON](#) (TRX) wants to disrupt the entertainment industry.
- [WAVES](#) (WAVES) already offers a decentralized Coin exchange, with several other Coins aiming to become a stock exchange.
- [STEEM](#) (STEEM), [Status](#) (SNT), and several other Coins want to revolutionize social media.
- [Syscoin](#) (SYS) wants to replace eBay, and several other sites, such as [Openbazaar](#), are already running on blockchain.
- Many other projects are set up for application to legal services, identity verification, cloud storage, and super computers, among others

Even some small blockchain developers with market capitalization near \$10 million are discussing applications for ridesharing.

Implication for Airport Finance

The evolution of blockchain technology has already created two major issues for the airport industry: payment and management.

Payment

Several debit cards backed by Coins are already in use. However, there is an increasing possibility that more businesses may directly accept Coins as a form of payment. The airport industry collects much nonairline revenue based on a percentage of the concessionaires' gross receipts, such as those from rental car companies. When all central governments are expected to continue rejecting Coins as currencies, it remains uncertain whether the airport industry can collect a percentage of the Coins.

When the concessionaires immediately sell the Coins into U.S. dollars, the airport industry may have grounds to argue that the proceeds should be included in gross receipts. However, some companies, such as Overstock.com, actually hold a portion of Coins. This raises a further issue regarding how the

Coins should be evaluated. Because the Coins are still in the development stage, their values could fluctuate by more than 10% daily.

Even if the concessionaires are willing to pay a percentage of Coins to the airports, many airports may not have the technology to set up their Coin wallet.

Management

When the airport industry can manage and negotiate the TNCs, the decentralized network is designed to eliminate a central entity that has control of the network. Unless all the thousands or millions of individual computers are removed from the internet, the decentralized network will function without external management.

Take rental cars, for example. Dozens of blockchain projects can design a framework as follows:

1. Issue Coins through an initial Coin offering to fund the operations.
2. Develop a wallet to hold and exchange Coins.
3. Establish a decentralized network with a minimum of thousands of users.
4. Reward users for supporting the network by automatically issuing Coins.
5. Incorporate identify management.
6. Allow any user with Coins to request car rental on the network.
7. Allow any user with cars to accept the request.
8. Payments are made in Coins.

Such a potential platform would enable anyone with a car to offer that car for rental. If the network is not set up to require a background check, insurance check, or car maintenance check, it would be nearly impossible to impose further regulations. A decentralized network can continue running indefinitely without the original developer, as fully tested in the case of Bitcoin. When an airport may issue a cease-and-desist letter to a TNC, where would we send the letter to a decentralized network?

Any organization must overcome significant hurdles to remove TNCs or Airbnb. However, financial incentives exist to encourage such efforts:

- The initial Coin offering is heavily chased, providing initial funding.
- The ongoing mechanism ensures the foundation is funded.
- A small transaction fee may be implemented for development; this would be one-tenth of what “traditional” companies such as Uber are charging.

Conclusion

Blockchain technology has the potential to disrupt many industries. Because adequate financial incentives exist, it is only a matter of time before blockchain technology affects airport operations. Advance planning and coordination with the IT department will be the keys to managing future operations. In addition, when an airport establishes additional long-term airline agreements, the airport should carefully consider a residual ratemaking methodology or residual protection. Someday, when we wake up, parking and rental car revenues may no longer be at their current levels.