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DEMYSTIFYING BLOCKCHAIN

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2018, ISSUE 3

CALIFORNIA GROCERS ASSOCIATION

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DEMYSTIFYING BLOCKCHAIN

BY LEN LEWIS

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HOW MANY OF YOU HAVE HEARD THE NAME SATOSHI NAKAMOTO?

Right now, even the geekiest techno-geek doesn't know if this is a person or a pseudonym for a group of people or whether he, she or they are, as the name implies, Japanese.

What the world does know is that Nakamoto was the creator of Bitcoin, the mysterious, misunderstood, loved and loathed cryptocurrency.

However, more critical to the business community, including supermarkets, is that Nakamoto invented the blockchain, technology initially designed as an accounting method for Bitcoin but shaping up to be a game changer for data collection, storage and transmission.

It is being touted as a way to achieve real and complete transparency in the supply chain, the solution for every issue in supply chain management and "the second generation of the Internet."

At its core, blockchains are a series of blocks or computers linked together that allow participants to keep track of digital orders and data transmission that are secured by cryptography.

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It is, in effect, a digital ledger or digital spreadsheet available to a network of computers. The information contained on it exists as a shared and continually updated database which is distributed publicly but cannot be copied.

The document sharing part of the equation is far from traditional. Instead of the ledger or document being passed from one party to another and running the risk of it being lost or not everyone seeing the same one, all information on the blockchain is shared simultaneously.

"This makes it easier to track a product throughout the supply chain and log data points about key safety and quality information at every stage," according to Peter Mehring, CEO of Zest Labs, which uses wireless sensors that can capture product information for blockchains.

The question Mehring and other observers have is whether blockchain, now in its infancy, is a true game changer or just another overhyped technology.

"You have to balance the two," he said. "Ever since the first fax machine, data between suppliers and retailers have been difficult. This is a great way to share data in a secure, reliable fashion that we haven't had at the commercial level. We need to look beyond the hype and how it can deliver real value."

"Hacking is difficult if a blockchain is created in the right way."

Mehring said there have been electronic data interfaces like EDI, GSI and Advanced Ship Notification (ASN) but companies have different formats and systems, making it difficult to connect data.

"Moreover, everyone's always suspicious when there's a single entity managing data," he added. "Blockchain gets away

from that with peer-to-peer transactions. If implemented properly – that's a game changer."

Christian Beckner, Senior Director of Retail Technology for the National Retail Federation, said it's still early in terms of use cases and applications for blockchain.

"Good traceability food safety initiatives are being done by Walmart and Kroger," Beckner said. "However, it's too early to tell how some broader applications might be adopted."

Beckner said that until blockchain is more visible from an applications standpoint, it's hard to explain to senior leadership. It must be built into applications without realizing that it's blockchain-enabled.

"It's the same as 20 years ago when building an e-commerce platform was a big hurdle," he said. "Eventually, it became a seamless process and the same thing will happen with blockchain technology."

Making it all possible are so-called "smart contracts." These are not contracts in the usual legal sense, but agreements that use a kind of digital fingerprint for authorized users to store information and boost transaction speed.

Also, since the blockchain database is decentralized rather than stored in one location, it can't be accessed or corrupted by a hacker. This means that you always know whom you're doing business with, according to knowledgeable observers.

While the technology is presently hack-resistant and incorruptible, this could change at some point if quantum computers become more readily available, according to observers. The theory is that the additional computing power could negate the blockchain's encryption, making it more vulnerable to tampering.

"Hacking is difficult if a blockchain is created in the right way and there's a governance structure with a closed group of responsible parties among manufacturers, distribution centers and growers there shouldn't be a security problem," said Beckner.

Concerns about hacking are not stopping retailers, financial institutions transportation companies and others from enthusiastically working on blockchain programs.

Walmart began running pilots with IBM two years ago to reduce waste, manage food safety and recalls. The goal is to improve overall business transparency – not just traceability – and the chain is encouraging suppliers and other stakeholders like growers and processors to join in. Overall, the system can trace a product's journey from the farm to retail in a matter of minutes instead of days, the company said.

The ability to identify fraudulent ingredients and trace the source of contaminations could, for example, be invaluable in the case of E. coli outbreaks in order to determine the region a produce item came from and who grew, supplied and distributed it.

At present, by law, each party in the supply chain must disclose a product's path to market one step forward and one step backward. Then government agencies and retailers can analyze the data to find the source of the problem, a process that can take days or weeks.

Frank Yiannas, Vice President of Food Safety and Health for Walmart, who partnered with IBM on a pilot, told the MIT Technology Review's Business of Blockchain conference recently that blockchain was able to cut the time it took to track produce from six days to two seconds.

Hilary Thesmar, Chief Food and Product Safety Officer for the Food Marketing Institute, believes the timeframe is feasible.

Paper purchase orders and bills of lading and centralized databases have become inefficient and cumbersome connecting the supply chain for a single item creates tremendous challenges due to overlaps between order, pricing, inventory, date and locality information," she said. "However, all of this data can be stored in the blockchain, making it easily accessible. Finding the lot number for a recalled product can indeed be reduced from days to minutes or seconds."

"Overall, the system can trace a product's journey from the farm to retail in a matter of minutes."

Mehring also believes this can be done because blockchain is a single database and cloud computing is very fast.

"But that's tracing back," he said. "If you run the same exercise from the source, I don't think results would be nearly as quick. If you're a supplier and you want to put all the mangos shipped on May 14 in quarantine it would take more than a few seconds."

He would also disagree with those that say blockchain is an industry cure-all.

"Some say blockchain on its own will solve the safety issue or waste issues," Mehring said. "But it's really about how you use the data you put into it. Some people like to think that by using blockchain for the food supply means we'll never have another E. coli outbreak in lettuce. I wish it were true. From a technical standpoint that's not what blockchain delivers."

However, the good news is that developments are happening quickly.

"Companies are being challenged to do better, and that fosters time and investment in solving the problem," said Mehring.

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Thesmar added: "We do know that the future success of blockchain and other emerging technologies to enhance traceability will still depend on the collaboration of supply chain partners to adopt harmonized, and interoperable systems that allow for the exchange of key data elements and critical tracking events that are the foundation of food product tracing."

What blockchain does deliver, according to NRF's Beckner, is total visibility from the point of origin.

"Think about the recent recall of romaine lettuce and the ability to trace it from the field to the initial processor to the warehouse to the grocery store and have a record of where everything was throughout the supply chain," he said.

Walmart, which first started testing blockchain technology with pork from China in 2017, has formed the Blockchain Food Safety Alliance to develop food standards and partnerships that will result in a food safety ecosystem and a standard method of collecting worldwide data about safety, authenticity and origin of food products.

The company is also experimenting with storing payment data on blockchain. This could be safer than traditional cloud storage and offer greater protection from data breaches and identity theft. Walmart has also filed two patent applications with the U.S. Patent and Trademark Office for a "vendor payment sharing system" that includes authentication protocols.

On another front, Fortune magazine has reported that Walmart is exploring blockchain for its drones to improve delivery to customers' homes.

Some observers do question whether blockchain technology will be limited to large companies.

EMBRACING BLOCKCHAIN

Blockchain technology, while still in its infancy, has become an international business imperative, with many companies developing applications specific to their own industries.

HELZBERG DIAMONDS

Two hundred stores will be able to use their phones to find out exactly where their jewelry came from.

Through an alliance called TrustChain, IBM, Helzberg and companies involved with mining and refining will be able to track gems and precious metals from their origins all the way to the mall, eliminating the marketing and sale of so-called blood, or conflict diamonds.

MAERSK LINE

The world's largest container shipping company is developing blockchain technology to track the movement of goods globally with greater efficiency. It has dozens of partners around the world which will enable Maersk to use one global system to track products and eliminate paper.

BATAVIA

Batavia is a blockchain-based financial platform developed by the Bank of Montreal, Commerzbank and others, which involves sending cars from Germany to Spain and textiles used in furniture production from Austria to Spain.

Companies including Airbnb, and Daimler AG have purchased blockchain startups. Others like JP Morgan, American Express and Visa have started researching it.

The financial industry is also a strong case for blockchains. One application would be for international remittances or money transfers, which the World Bank estimated was over \$430 billion in the U.S. alone in 2015. Some observers believe blockchains would also improve liquidity and free up capital in the financial markets.

FORTACAST

This Singapore software company is using blockchain technology to help companies automate finance and operations to achieve labor savings.

BANK OF AMERICA

Bank of America has filed with the U.S. Patent and Trademark Office outlining plans for a permissioned blockchain for personal and business data sharing. A user will authorize service providers to securely access their data, but only for the specific records they have access to. For example, a healthcare provider will only have access to relevant healthcare records.

On a more altruistic note, Microsoft is working with Accenture and the United Nations to prevent human trafficking by using blockchain to provide a legal form of identification for 1.1 billion people worldwide.

Observers are quick to emphasize that blockchains, still in their infancy, don't represent a magic formula for curing all the ills of the Internet. But as one expert pointed out: "blockchain is the answer to a question we've been asking since the dawn of the Internet Age - how can we collectively trust what happens online."

"Larger companies are the ones that will pilot it because they have the resources and technology," Beckner noted. "But once you have the platform in place it would be open to a broader set of small and medium-sized companies."

Mehring thinks the answer is to work with smaller partners.

"We want to encourage adoption of blockchain at the grower level and beyond that to small retailers and farmers that don't have IT departments," he said.

"We're just trying to democratize the use of blockchains."

As Thesmar noted: "Big or small, each participant in the supply chain would provide a block of data in the chain – including farms, pack houses, importers, processors, distributors, retailers and consumers. Having all this information accessible in seconds is a tremendous

benefit. For an independent operator, blockchain could offer a way to differentiate their business and supply customers with enhanced information about products."

The consumer part would be relatively easy because data in the blockchain can be segmented.

"This is called the enterprise blockchain," said Mehring. "This would let consumers see the provenance of a product – things like harvest data – not proprietary information like the wholesale price. You can develop an application for the cache of public data that's easily accessible."

He noted again that this is not allowing consumers full access, but access that's fully validated by the blockchain.

Due to the international nature of the food industry, blockchains can improve relationships with overseas suppliers, but it boils down to how data is gathered.

Currently, blockchains are, for the most part, run on barcodes.

"We're taking a different approach," Mehring said. "We gather our data from low-cost sensors that have a built-in ID. They don't require any labor to catch the data at every step in the supply chain, and you don't have to worry that someone in Ecuador decided they don't want to capture the data today. Sensors make international adoption more reliable, consistent and easier. Less training involved and it will make everything more trusted."

Mehring recommends that everyone should be involved.

"The best way to understand new technology is to test it, work with it, so you understand the benefits and overhead," he said. "It's hard to understand how it will affect your business by asking others." ■

The article can be found online [here](#), starting on page 38.