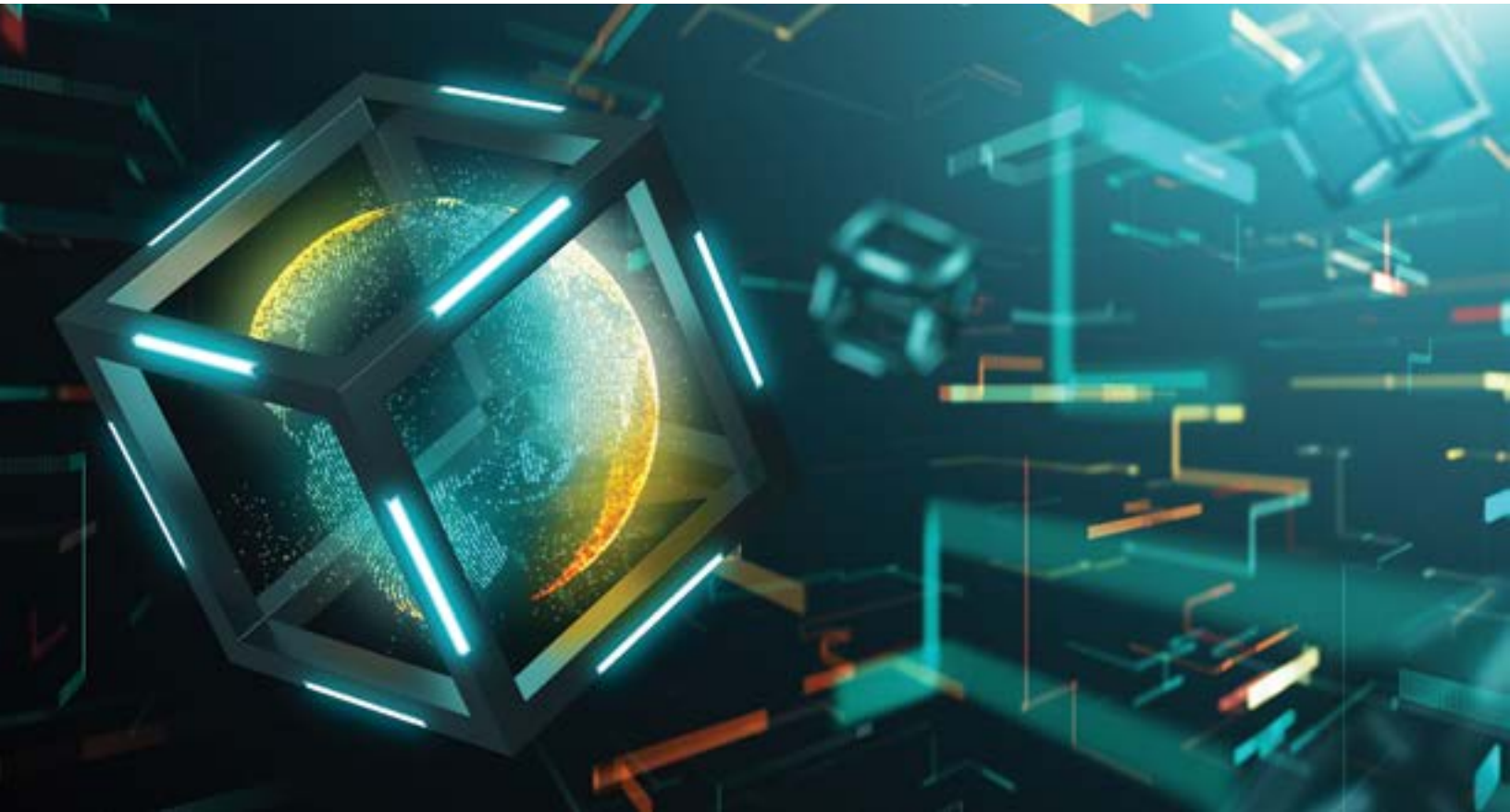


# BLOCKCHAIN AND THE FUTURE OF MANUFACTURING

The technology behind Bitcoin could be a valuable tool for manufacturers.



**I**n the years since this HV Mfg was launched we've aimed to include at least one article every issue spotlighting some burgeoning innovation that could change the industry. Few of them have had as unexpected an origin as this month's subject, Blockchain, which originates from Bitcoin. Yes, you read that right.

So, what is a "blockchain," exactly? And why is a technology developed as a part of Bitcoin—the so-called cryptocurrency — being touted in some corners as a game changer for established industries, including manufacturing?

Simply put, a blockchain is a digital public ledger. It originated as an accounting method for Bitcoin, as a means to verify transactions without relying on a third party. Each block records some or all of the recent transactions. Once completed, a block goes into the blockchain as a permanent database. When a block

gets completed, a new one is generated so there is a potentially infinite number of blocks in a blockchain, connected to each other in chronological order. Everyone connected to the blockchain's can view the most up-to-date transaction history whenever they wish. Every transaction is automatically recorded and cannot be deleted or copied, and nobody outside the network can access it.

Although the technology is primarily used to verify Bitcoin transactions, it is possible to digitize, code and insert practically any document into the blockchain. Doing so creates an indelible record that cannot be changed; furthermore, the record's authenticity can be verified by the entire community using the blockchain instead of a single centralized authority. In the manufacturing industry specifically, there have already been many suggested possibilities for this new technology.

## Supply Chain

When several high profile products from BMW and Pfizer suffered shortages late last spring, ordinary consumers were suddenly made aware of how important efficient, durable supply chains are to maintaining their standard of living. The global information technology services company Wipro has posited that this vast, interlocking network of producers, distributors, and their numerous partners is one area where blockchain can have a big impact.

As they exist today, supply chains are elaborate—and somewhat messy—threads of contracts, payments, labeling, sealing and logistics, as well as anti-counterfeit and anti-fraud processes that can span multiple countries around the globe. Such a complicated process often leads to high transactional costs, mismatches, paperwork errors, degradation and theft during transit, as well as contributing to bigger issues such as abusive or unsafe working conditions, environmental damage, illegal production processes, as well as forgery and imitation, all through poor supply chain management.

A blockchain infrastructure could potentially fix these issues by providing an easy way for the distant parties all along the supply chain to register, certify, and track the goods being transferred. All goods would be uniquely identified in the blockchain with a simple barcode, and each transaction would be verified and time-stamped by entering it via the same encrypted, transparent process that Bitcoin proponents use. Every transaction will be open to inspection by other parties on the chain, making it easier to detect problems in advance and pinpoint where and when any delays or other issues originated.

## Anti-Counterfeiting

There is currently no reliable way to validate that products and services in a supply chain are legitimate, a fact which has long been a boon to counterfeiters. While the percentage of global trade comprised of counterfeit or pirated goods is small, it can still be dangerous since these illegitimate goods can damage the reputation of genuine businesses linked to them, and pose health and safety risks that the more regulated authentic goods do not carry.



With an anti-counterfeiting blockchain, each product could be entered on the blockchain registry with a unique ID and key attributes. Each supply chain partner would update the status of the item as it traverses from point to point. Products would be validated at each point, from manufacture to sale, with their authenticity checked by matching the key attributes and tracking the ID.

This process would make it easier to spot when goods are stolen or diverted, and provide an easy way to identify the merchandise when it turns up. It would also make it easier to weed out imitation goods by establishing an easy way to check an item's authenticity. It also increases transparency in the supply chain by making it easy to track a good's progress. For example, with this, a manufacturer of engine parts could potentially see not only where their product



Owned and operated by the Esposito Family SINCE 1950

- Protective Packaging
- POP Displays Temporary & High End Permanent
- Thermoforming
- Specialty Die Cuts
- Product Packaging & Fulfillment & Shrink Wrapping
- Acrylic Fabrication
- Product Packing & Kitting
- RF & Heat Sealing
- Computer Design
- Cad Samples

1 Favoriti Avenue, PO Box 2295, Newburgh, NY 12550  
Phone: 845-562-0900 • Fax: 845-562-1020  
E-mail: michael@orangepkg.com



is shipped, but also what it is installed in—a car, a plane, etc.—and where that machine in turn is shipped to. This would make it easier for companies to track how their goods or services are being used, and to ensure they aren't associated with a potential PR controversy or running afoul of government sanctions.

### Airworthiness Certificates

In the aerospace industry, parts suppliers must obtain an airworthiness certificate to conform to the quality compliance mandated by authorities. These certificates and their related shipments must be tracked throughout the life of the airplane. Blockchain could be used to securely store the digital assets at every level of the supply chain. Currently such records can only be maintained separately across several different software programs, making it difficult to track and provide a definitive statement on the airworthiness certificate associated with each part of a plane.

In theory, all parties in the entire supply chain would form one private blockchain network where digital assets like FAA form 8130 would be updated and shared across the system. All airline parts could be tracked through the manufacturing lifecycle of the airplane, making it easier to predict and facilitate maintenance and repair of faulty parts. The blockchain would also provide an automatic audit trail, enabling anyone in the chain to track the state of an asset and trace their origins if they prove faulty.

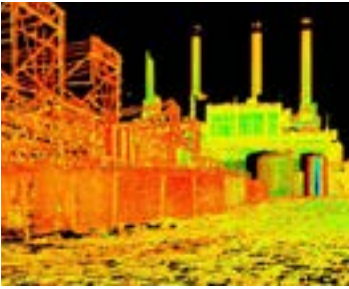
### 3D Printing

The increasing use of additive manufacturing across production industries requires 3D model files to be shared with 3D printing vendors and their 3D printing machines. Currently they are exchanged with conventional file-sharing methodologies, which means there is a high risk of IP theft. Additionally, tracking the use of the files per contracted quantity is typically done manually, which presents an additional challenge.

A blockchain system would ensure the 3D model files are shared with secure technology, it would also make it easier to identify and verify the 3D printing vendor and 3D printing machines. The blockchain would provide an automatic audit trail, allowing users to track and trace the state of an asset, which also helps prevent IP theft. Additionally, it would maintain easily accessible logs of 3D printing use per contracted quantity.

### Potential and Skepticism

The true potential of blockchain is still unknown, and more testing is needed before we can be sure of the technology's real-world potential (and surely its connection with Bitcoin is reason enough for skepticism). Questions have already been raised about storing such a massive amount of data, and skeptics have pointed out that many of blockchain's supposed uses can be done with traditional software. Still, the potential applications are seemingly endless, and it has clearly caught the tech world's imagination. So for better or for worse, it is clear that the technology won't be going away anytime soon. Whether it becomes the next iPhone or Google Glass though, is TBD.



chazencompanies.com • 888.539.9073

Hudson Valley • Capital District • North Country • Westchester  
Nashville, TN • Chattanooga, TN • Portland, OR

## Hand Hygiene Where You Need it

Healthy skin and productivity go hand in hand.



### PRO-LINK® Skin Care Products

- From mild cleansers  
to heavy duty scrubs



### PURELL ES™ Everywhere System

- Designed to fit your world



©2015. GOJO Industries, Inc. All rights reserved.

## Our People Are Your Best Insurance

**Marshall  
& Sterling**  
INSURANCE

[www.marshallsterling.com/kingston](http://www.marshallsterling.com/kingston)

[www.facebook.com/MarshallSterlingKingston](http://www.facebook.com/MarshallSterlingKingston)

Since 1864, the employee-owners of Marshall & Sterling, Inc. have provided affordable insurance choices for our clients, helping them protect their most valued assets. Our team works to exceed our client's expectations by providing exceptional coverage with outstanding service and support.

- ◆ Insurance for Business, Auto, Home, Life
- ◆ Group Benefits & HR Administration
- ◆ Bonds & Specialty Risks
- ◆ Wealth Management

**845-331-2255**

407 Hurley Avenue  
PO Box 3128  
Kingston, NY 12402