



## EVENT SUMMARY

# LEVERAGING BLOCKCHAIN FOR VALUE CHAIN INNOVATION

EXECUTIVE CONFERENCE  
MAY 9, 2019



# Event Highlights

On May 9, 2019, the Value Chain Innovation Initiative at Stanford Graduate School of Business hosted the executive conference, Leveraging Blockchain for Value Chain Innovation. More than 50 academics, entrepreneurs, and industry leaders attended the half-day event, exploring the state of blockchain development and adoption, the value the technology can provide, as well as possible hurdles to implementation.

Overall, speakers at the conference agreed that now that the hype over blockchain technology has subsided, it has become evident that the technology has real potential to provide business value. Blockchain can not only increase efficiencies in existing businesses, but also form the basis for new ventures. At the same time, speakers noted that many technical, financial, and regulatory hurdles in using blockchain solutions still remain.

The following summary highlights some of the ideas presented at the conference.

## Hosts



**Hau Lee**

Thoma Professor of Operations and Information Technology  
Co-Director, Value Chain Innovation Initiative, Stanford GSB



**Haim Mendelson**

Kleiner Perkins Caufield & Byers  
Professor of Electronic Business and Commerce, and Management  
Co-Director, Value Chain Innovation Initiative Stanford GSB



**Barchi Gillai**

Associate Director,  
Value Chain Innovation Initiative

# Permanent, Verifiable, and Transparent

Industry and academia agreed on the many advantages of blockchain, which according to Dan Boneh, Stanford professor of computer science and electrical engineering, is at its core “just a data structure, a way to store data.”

With its highly decentralized structure, one of the main properties of a blockchain is its permanency; once information is stored on the blockchain, it cannot be deleted or modified. Another important property of blockchain is that it brings transparency. All data and transactions recorded on a blockchain are verifiable, meaning that you don’t need to trust anybody and can verify everything by yourself. “I would view the verifiability as the beauty of it,” Boneh said.

Activity on a blockchain is governed by so-called smart contracts, also known as decentralized applications, or DAPPs. The source code for such programs is written into the blockchain, making them permanent, verifiable, and transparent as well, and eliminating the need for a single trusted administrator.

Doug Galen, Stanford GSB lecturer and co-founder and chief executive of RippleWorks, a company that matches social ventures with outside experts in business and technology, also identified blockchain’s potential to increase transparency as one of its main benefits. Currently, “if you’re sending global aid, \$150 billion a year is sent around the world, and \$50 billion of it is lost” to corruption or other theft, said Galen. “What if you could trace that money?”

According to Galen, other ways in which blockchain, with its special characteristics, could help bring positive social impact include supporting tamper-proof voting, lowering the cost of moving money, and providing the means for unbanked people to create a financial identity and gain access to formal banking.

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# But Still Full of Hurdles

Many rules for operating a blockchain remain uncertain. “The governance process is still a work in progress,” Boneh said. Additionally, many legal and regulatory questions need to be asked and answered, and individuals and companies alike will need to be educated about the technology. Building such a large public decentralized system also raises many technical issues.

For example, while in theory all data on a blockchain can be accessible to all network participants, sometimes a user might want to keep a particular piece of information, like an exact monetary amount, confidential. Researchers are seeking ways to use cryptography to create so-called zero-knowledge proofs, which would allow everyone to verify that a transaction is valid without actually seeing the details of the transaction.

One fundamental issue of using blockchain is confirming that information added to a blockchain is valid in the first place. “It’s all about the first piece of data you put on the blockchain,” said Galen. “How do you know that what you put up there is real? That is the great risk for blockchain to be effective... we need to solve the problem of getting the right data into the blockchain.”

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# Many Potential Applications

Speakers said that because blockchain is useful for the collection and distribution of virtual currency such as Bitcoin, Ether, or Ripple, it could help manage financial transactions from servicing mortgages to collecting royalties for music and movies. Blockchain could also be used to monitor any kind of contract, whether business agreements or personal-estate documents like wills. And if wages were paid only on a blockchain, workers couldn’t hide income, making them less likely to evade taxes.

## MOBILITY INDUSTRY

But as with most other technologies, one of the hard parts “is getting blockchain to scale” and persuading enough businesses and individuals to trust and adopt it so that it’s useful, according to Chris Ballinger, founder and chief executive of Mobility Open Blockchain Initiative (MOBI), a nonprofit promoting the technology in the transportation industry.

To achieve this goal, MOBI has formed working groups, each focused on exploring a particular blockchain use. Some of the use cases they currently examine include vehicle identity and history, usage-based insurance, integration of electric vehicles and the grid, and data exchange among autonomous vehicles. Eventually, they aim to create application layer standards for industry adoption.

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# Already In Development

## ENERGY INDUSTRY

In the energy industry, the landscape is rapidly changing to “a hodgepodge” of electric vehicles, batteries, wind turbines, solar-based systems, and other devices, all trying to work off the electricity grid, said Jesse Morris, chief commercial officer of the nonprofit Energy Web Foundation, which promotes blockchain technology in the energy field. Currently, though, “we do not have an architecture capable of supporting that infrastructure,” which is expected to expand to nine billion devices connected to the Internet by 2025, Morris added.

Energy Web Foundation is developing a blockchain platform that can be used for renewable energy certificates and trading, virtual power plants, and electric mobility. The system could, for instance, simplify electric vehicle charging. Currently, drivers often need to manage separate digital identities with each charging network. In contrast, a blockchain app could allow a driver to plug in to any charging station, with the payment occurring automatically between the vehicle and the station, thus avoiding the hassle of managing multiple accounts and payment setups. “We’d have true peer-to-peer electric vehicle charging,” Morris said.

Blockchain is also helping traditional energy companies, including British Petroleum, which created the VAKT consortium with other energy firms to develop a blockchain to manage post-trade processing, said Karen Scarbrough, senior technology associate at BP. Under old methods, post-trade processing is performed on paper or via email, with each transaction generating more than 500 emails. With the large amounts of documentation and data required for each transaction, the risk of error is high, and 30% of invoices are disputed, according to Scarbrough. Using blockchain, “we want to eliminate the disjointed process, taking out non-value-added time” in the reconciliation process, she said. The platform was launched in late 2018, and so far feedback has been positive, with three new participants joining the platform just a few months after the launch. For now, the platform focuses on oil trades in the North Sea, but plans are in place to expand it to other regions.

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# Pharma and Retail Uses

## PHARMACEUTICAL INDUSTRY

Under the 2013 federal Drug Supply Chain Security Act, the pharmaceutical industry must find a way to trace prescription medications at the individual item level, and track interactions electronically among manufacturers, wholesalers, and pharmacies. In response, major drug companies and distributors formed the MediLedger Project to develop a tracking system that uses blockchain.

So far, the project is showing promise. “We’re able to exchange information without exposing [sensitive] trade information,” said Pablo Medina, associate director of product lifecycle and protection at Genentech, one of the participants in MediLedger. Furthermore, with the new test system, smart contracts validate transactions and the flow of medications, requiring less manual intervention. The ultimate overall challenge, however, is for MediLedger to create an automated system across the entire U.S. distribution network that tracks billions of pills and tablets a year without disrupting patients’ access to medications.

## RETAIL INDUSTRY

In the retail industry, e-commerce company Mavatar Technologies is offering a solution that connects shoppers, marketers, and influencers, and streamlines the path from discovery to purchase over a single platform powered by blockchain. Mavatar’s software uses smart contracts to avoid middlemen. One of the main benefits of blockchain and cryptocurrencies for this platform is that they make the process of sending micro-payments to millions of influencers much more efficient and manageable, said Susan Akbarpour, Mavatar’s co-founder and chief executive. Under traditional systems, influencers in particular aren’t fairly compensated, she said, with too much money going to search engines and other middlemen. With blockchain, the retailer receives better sales data, marketplace operators receive their commissions, and influencers are fairly and fully paid, she added.

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# In Closing

Discussions at the conference highlighted blockchain's potential, not only as a more efficient alternative to existing solutions, but also as an enabler of new business models that would not be feasible otherwise.

Yet, launching a blockchain solution for the first time is likely to be harder than expected, and may require overcoming legal and regulatory issues, technical issues, and high implementation costs.

To make blockchain implementations more successful, companies should keep looking for new use cases to encourage adoption and bring the network up to scale. In parallel, scholars should focus on addressing the many technical and regulatory questions and other related matters surrounding blockchain technology.

Learn more about the Value Chain Innovation Initiative at [www.gsb.stanford.edu/vcii](http://www.gsb.stanford.edu/vcii)

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