Chapter 15
Summary and Conclusions

Blockchain technology is revolutionary. It will make life simpler and safer, changing the way personal information is stored and how transactions for good and services are made. Blockchain technology creates a permanent and immutable record of every transaction. This impenetrable digital ledger makes fraud, hacking, data theft, and information loss impossible. The technology will affect every industry in the world, including manufacturing, retail, transportation, healthcare, and real estate Companies as Google, IBM, Microsoft, American Express, Walmart, Nestle, Chase, Intel, Hitachi, and Dole are all working to become early adopters of blockchain. Nearly $400 trillion across various industries is set to be transformed by blockchain.

Blockchain technology provides verification efficiencies, including operational, regulatory, enhanced visibility, and traceability. This technology is also a powerful database that could easily be combined with big data. Blockchain solutions can help cut costs and make many services more competitive. While blockchain technology has reshaped and decentralized financial institutions, its application possibilities are far more robust. Currently, it is being actively considered by the food and beverage, automotive, electronics, aerospace, and defense industries to secure quality, safety, batch and lot, and traceability information along the supply chains. Companies like IBM and Microsoft are providing blockchain solutions to a number of enterprises (Velasco-Castillo 2016).

The positive effects, however, are conditional. We have found a set of potential cohesive effects of blockchain technology on several industries, and have highlighted successful implementations of blockchain solutions in the manufacturing and service sectors of the economy. Furthermore, this book reviews new business applications of blockchain and argues that blockchain's digital democratization is anticipated to foster emerging economies and markets, such as the personal data marketplace, neighborhood micro grids, machine-to-machine transactions, and smart cities.

Blockchain technology is in a very early stage of its development. The hype around blockchain is high, and best practices are hard to come by. Much of the technology remains immature and untested. According to Gartner, only 10% of organizations will achieve any radical transformation with the use of blockchain technologies through 2020. Very few examples of the technology have been implemented, and therefore effects are often anecdotal and, notably, not fully tested. In our literature search, we found few papers published in peer reviewed academic journals or as academic working papers exploring advantages and limitations of firms implementing blockchain technology.

This book presented an important early academic contribution to a field dominated by narratives and promises made by consultants. We urge future research to test the enabling and constraining effects of blockchain and search for more empirical evidence of its successful implementations in different industries.

Future Directions

As discussed in this book, the core technology to build cryptocurrencies is blockchain. Bitcoin has brought attention to this underlying technology, and the increased use of cryptocurrencies will help blockchain grow. The number of merchants accepting digital currencies such as bitcoin has only increased at a modest annual rate. Mass adoption of bitcoin has not happened yet because in its current form, bitcoin is not capable of fulfilling the role of money. The existing bitcoin network can only process 4–6 transactions per second. That means most bitcoin transactions take 10 min to be approved. In contrast, credit card networks can process 2000 transactions per second making credit card approval less than 10 s. Merchants will need to see improvement of storage methods and processing capability of blockchain currencies for the exponential growth needed for mass adoption. By improving the main disadvantages of bitcoin, a big breakthrough could finally be here soon.

In June 2019, Facebook revealed the details of its cryptocurrency called Libra, with a public launch set for 2020 (Libra Association 2019). Libra allows users to buy items or send money to individuals with nearly zero fees. The Libra Association is an independent entity of founding members tasked with governing the coin. It is a nonprofit organization that will be responsible for recruiting additional members to act as validator nodes for the blockchain. Each founding member of the Libra Association has invested at least $ten million into the project's operations. More than a dozen companies back Libra, including Visa, MasterCard, PayPal, Western Union, Uber, eBay, Spotify, and Vodafone. This is the first major operation by a large, multinational platform to develop its own digital cryptocurrency. The association will promote the open-sourced Libra blockchain and sign up businesses to accept Libra for payment. It will also provide customer discounts and rewards. Facebook defines Libra's mission as "to enable a simple global currency and financial infrastructure that empowers billions of people." (Libra Association 2019).

Libra payments are permanently written into the Libra blockchain, which is a cryptographically authenticated database that acts as a public online ledger that is operated and constantly verified by founding members of the Libra Association.

Existing cryptocurrencies like Bitcoin and Ethereum are susceptible to huge and unpredictable price swings, making it tough for merchants to accept them as payment. The Libra blockchain is built to handle 1000 transactions per second—much faster than Bitcoin's 7 transactions per second or Ethereum's fifteen. Facebook is hoping Libra will become simpler to set up, more ubiquitous as a payment method, more efficient with fewer fees, more accessible to the unbanked, and more flexible. Libra holds the promise of disrupting how things are bought and sold by eliminating transaction fees common with credit cards; however, Libra's transactions are not entirely free. They incur a tiny fraction of a cent fee to cover the cost of processing the transfer of funds, similar to fees charge by Ethereum. This small fee is much less expensive than the 7% average remittance services charged for sending money internationally (Constine 2019). Additionally, Libra can offer the 1.7 billion people who lack bank accounts a financial services alternative by being their online identity provider. Libra's growth will elevate the "crypto" acceptance in both public and private organizations, and will have a potential long-term economic significance. It will be interesting to see how regulators and users respond.

Blockchain requires industry collaboration. To be successful with blockchain technology, it is important to work together. Blockchain, by its nature, requires organizations to collaborate with industry partners, customers, and even competitors. Only through decentralized collaboration with stakeholders, do the benefits of blockchain become truly visible. One example of this type of collaboration is the new initiative by the EU's European blockchain partnership called International Association for Trusted Blockchain Applications (INATBA). It is the result of close collaboration of 26 EU countries. The international association will act as a linking organization for blockchain startups, large firms, non-profit organizations, policy-makers, and regulators. The main objectives are to understand and support blockchain, to provide the developers and users a global forum to interact with regulators and policy makers, and to take blockchain technology to the next stage (Rijmenam 2018).

According to an article in the Harvard Business Review, widespread blockchain-led transformation of business and government is still many years away. That is because blockchain is considered a *foundational* technology that has the potential to create new foundations for our economic and social systems. It will take decades for blockchain to reach its full potential and be fully adopted into our economic and social infrastructure. (Iansiti and Lakhani 2017). The addition of technologies like AI and ML could offer a boost in blockchain applications. Combining multiple smart contracts with AI and analytics has the potential to automate decision-making capabilities and result in a new organizational design that is completely run by computer code. Blockchain combined with other technologies will become a game changer.

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