Chapter 1

Introduction

This issue of *Library Technology Reports* was originally proposed in 2018, when blockchain was still considered an exploratory technology. It stands to reason that in 2019, the year when this report is published, blockchain still is very much a technology with significant unexplored potential. To date, the main application of blockchain technology has been in the arena of cryptocurrency. Whether through the news, from excited computer-savvy friends, or over a family dinner, you may have heard of cryptocurrencies such as Bitcoin, Ethereum, Ripple, or many of the other thousands of coins that have been created in the last few years. Their rapid rise from speculative digital tokens (considered untraceable by regulators and with little intrinsic value) to tokens with quasi-currency status and an air of legitimacy was so fast that many considered this the twenty-first-century version of the tulip mania that swept the Netherlands in the seventeenth century.[1] The rise of Bitcoin has been well documented, starting from an obscure white paper in 2008 by the mysterious Satoshi Nakamoto to a valuation of USD$20,089 per unit at its peak in December 2017.[2] However, neither Bitcoin nor blockchain is a completely new phenomenon. Bitcoin is the first cryptocurrency that gained relatively widespread adoption, but as Narayanan and colleagues outlined, it was preceded by many other digital cryptographic currencies and by many attempts (which often failed) at distributed ledgers for digitally encrypted credit cards online in the 1990s.[3]

For various reasons, other cryptocurrencies did not gain the level of awareness and popularity that Bitcoin has reached. One of the reasons for Bitcoin's success is its ingenious use of the distributed ledger that underlies the Bitcoin blockchain (as outlined in Satoshi's white paper). Interestingly, this is where the first linkage to libraries can be made. The Bitcoin blockchain bears conceptual resemblance to distributed computing and to a concept that many in libraries are familiar with: LOCKSS. LOCKSS, which stands for Lots of Copies Keep Stuff Safe, is an initiative originally started by the Stanford Libraries in 1999. David Rosenthal, cofounder of the LOCKSS initiative, provided a history of how LOCKSS and other decentralized computing protocols are linked to our current understanding of blockchain technology on his blog.[4]

> *Stanford University: LOCKSS*
> https://www.lockss.org

Although blockchain is most commonly associated with cryptocurrencies, there is much more to this new technology than just cryptocurrency. Libraries, as organizations and as enterprises, will be impacted by this technology in numerous ways—from outside the library, where vendors will start deploying products and services based on blockchain, to libraries themselves leveraging blockchain to improve their systems and organizations. The ways in which blockchain will find its way into libraries are still uncharted. However, initiatives are under way, such as the work being done as part of an IMLS-funded grant at the iSchool at San José State University, and efforts such as this report.[5] The ideas for blockchain in libraries are still mostly at the conceptual level, and some possible use cases are presented in chapter 3. Whether these or completely different use cases will become successful implementations remains to be seen. How libraries implement blockchain will determine the impact of the technology and how it transforms the way we work with each other and our communities. This report will investigate the implications of blockchain technology for libraries from a variety of angles. First, we will introduce the ideas underlying this technology. Subsequent chapters will present thought starters for possible applications of blockchain technology in libraries, museums, and archives.[6] The report will wrap up with a discussion of barriers, challenges, and ethical considerations around the implementation of blockchain technology in our libraries. Ultimately, the goal for this report is to accessibly introduce the technology and to provide thought and conversation

starters to help libraries examine this complex topic and prepare themselves for the changes ahead.

Notes

1. True crypto enthusiasts will vehemently balk at the notion that crypto tokens are currency. Much of the cryptocurrency movement was founded in order to cut out the middlemen and free the exchange of value—i.e., traditional fiat currency—from government scrutiny and regulation. Blockchain's decentralized ledger with its built-in privacy protocols presented a perfect system until it grew too large to be ignored by governments. Blockchain enthusiasts and purists consider the notion of "currency" too close to the idea of fiat currency—i.e., currency issued and managed by governments.
2. Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System," white paper, Bitcoin.org, 2008, https://bitcoin.org/bitcoin.pdf; CoinMarketCap, Bitcoin Statistics, accessed September 7, 2019, https://coinmarketcap.com/currencies/bitcoin.
3. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Godlfeder, "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction," draft, February 9, 2016, https://d28rh4a8wq0iu5.cloudfront.net/bitcointech/readings/princeton_bitcoin_book.pdf.
4. David Rosenthal, "Blockchain: What's Not to Like?," DSHR's Blog, December 10, 2018, https://blog.dshr.org/2018/12/blockchain-whats-not-to-like.html.
5. "Blockchains for the Information Profession: A Project of the SJSU iSchool," San José State University, accessed September 8, 2019, https://ischoolblogs.sjsu.edu/blockchains.
6. In this report, I almost exclusively refer to libraries. Please note that in most cases, especially as it relates to the thought starters in chapter 3, museums and archives can often be substituted as allied terms.