Chapter 23
A Maturity Model for Understanding and Evaluating Digital Money

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ABSTRACT

As the internet and e-commerce expands, individuals will seek ways to earn and spend currency in the digital economy. Furthermore, faith in the fiat money systems of some countries is eroding and investors are searching for alternative ways to invest and store their wealth. Digital currencies (DC) are filling the demand for an alternative to government-based currency. Currently there are over 1,500 DCs with a market capitalization of over 450 billion (in US dollars) that are traded in thousands of markets. This chapter reviews the literature and history of DCs. Then the authors explain the related risks and benefits. Next, they add to the literature by proposing a model for judging the maturity of a DC. The digital currency maturity model (DCMM) will help individuals and organizations evaluate the safety and reliability of DCs given the investor's risk tolerance. Finally, the authors summarize their findings and suggest future research.

INTRODUCTION

The purpose of this chapter is to help the reader assess the maturity and stability of digital currency (DC). The authors will not attempt to explain all of the technical aspects of DC since that would require a voluminous manuscript and is far beyond the scope of this chapter. That being said, the authors must cover some technical topics to communicate the basic operation of a DC.

Digital Currency (also called digital money, crypto currency, electronic money, virtual currency, or electronic currency) is a type of currency that is available in digital form, not in physical form such as

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paper bills and coins. Digital money is similar to physical currencies and allows for peer-to-peer transactions, as well as electronic transactions. A digital crypto currency is a currency in which encryption techniques are used to secure the units of currency and verify the transfer and transactions of funds. Many crypto currencies operate independently from a centralized or governmental bank, such as the US Federal Reserve Bank. Bitcoin, Ethereum, Ripple, and Litecoin are specific types or brands of DC.

Digital currency is an Internet-based medium of exchange that is comparable to physical currencies. Similar to government-based money, these currencies can be used to purchase goods and services. However, they could be restricted to certain communities. For example, use could be restricted to inside an on-line game or social network (closed currency with no connection to the real economy). Digital currencies, such as bitcoin are known as decentralized digital currencies since there is no central point of control over the currency supply (Lee, Long, McRae, Steiner, & Handler, 2015).

E-Commerce relies almost exclusively on financial institutions, such as credit card companies, PayPal, and banks, serving as trusted third parties to process electronic payments and electronic funds transfers. While the system works well for most transactions, it suffers from the weaknesses of requiring a trusted third party. DC creates a peer-to-peer version of electronic cash that allows online payments to be sent directly from one party to another without going through a financial institution. In other words, DC allows individuals to transact over the Internet as though they were using cash in a face-to-face situation. Hence, the transactions are private and final (cannot be reversed) just like using cash.

In 2012, the European Central Bank has described digital currency (DC) as "a type of unregulated, digital money, which is issued and usually controlled by its developers, and used and accepted among the members of a specific virtual community" (European Central Bank, 2012). The US Treasury Department has defined DC as "a medium of exchange that operates like a currency in some environments, but does not have all the attributes of real currency." This chapter covers open DC that flows in two directions. An example of one direction currency is a coupon; a DC that flows in two directions is like cash.

Because DC is transacted over the Internet, it is exposed to cyber risks from hackers and fraudsters. Cyber risk is the risk of financial loss due to a security or privacy failure of an information system. The damage to the reputation of an organization, security, currency, or investment from some sort of technology failure of its information systems can cause a precipitous loss of faith and value in the investment. Many DCs use cryptography to mitigate cyber risk. Public Key Cryptography is a security technology that uses asymmetric key algorithms, where a key used by one party to encrypt is not the same as the key used by the other party to decrypt. Therefore, the sender and receiver of the encrypted information have different keys—a public encryption key and a private decryption key. This type of security is very reliable.

Once again, the purpose of this chapter is to help the reader assess the maturity and stability of digital currency (DC). The authors support that objective by proposing a model for judging the maturity of a DC. The Digital Currency Maturity Model (DCMM) will help individuals and organizations evaluate the safety and reliability of DCs.

LITERATURE REVIEW

Background and History of Digital Currency and Bitcoin

Digital currency (DC) is a peer-to-peer (person-to-person) system. In other words, users can transact directly with each other without going through an intermediary such as PayPal. The conspicuous example

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