

Accounting Research Opportunities for Cryptocurrencies

Nishani Edirisinghe Vincent

Stephan A. Davenport

The University of Tennessee at Chattanooga

ABSTRACT: During recent years, cryptocurrency has gained the attention of many large companies such as Facebook, Expedia, Apple, and Overstock to name a few. The acceptance and use of cryptocurrency in business transactions can have a major impact on a company's accounting system. However, accounting research exploring issues related to cryptocurrencies is sparse. Therefore, we identify research questions that the accounting profession should address concerning cryptocurrencies. We categorize these research questions using Rogers' theory of diffusion of innovation in an attempt to encourage and extend accounting research in cryptocurrencies to influence the design, development, adoption, implementation, and operation of the technology. We recommend that researchers take a more prescriptive approach to research, rather than a descriptive approach, given that cryptocurrency is in the infancy stage of development and adoption.

Keywords: bitcoin; cryptocurrency; accounting research; blockchain.

I. INTRODUCTION

Curiosity about cryptocurrencies among individuals and companies is ever-growing. Even though cryptocurrencies were first popularized and used among users of the dark web to carry out transactions that evade central governing authorities, large established companies, such as Overstock.com, are exploring opportunities to accept new forms of digital currencies as payments for legal transactions. In November 2013, blockchain.info recorded the largest bitcoin transaction, one type of cryptocurrency, amounting to US\$147 million (Southurst 2013). Further, in March 2019, CNBC reported on the development of cryptocurrency that will be available to use globally through Facebook's messenger application (Rooney 2019). Companies such as PayPal are making it easier to buy and sell cryptocurrencies using mobile applications such as Venmo (Cao 2020). Companies, regulators, and individuals are becoming more interested in using cryptocurrencies, given the ease of opening a cryptocurrency wallet and exchanging cryptocurrencies for goods and services. The latest cryptocurrency-related news reports that New York's financial regulator is taking steps to relax several regulatory hurdles that hinder the development of cryptocurrency to boost innovation (Finextra.com 2020).

As the popularity of cryptocurrency use increases, whether as a medium of exchange or as an investment, firms should consider how to capture, store, process, and organize data about cryptocurrencies in their accounting systems and consider the impact on enterprise and financial risk exposure. To help companies transition and manage transactions, accounting firms such as KPMG are introducing cryptocurrency management platforms (Helms 2020). Since cryptocurrency transactions can have a direct or indirect effect on the financial position of a firm, the accounting profession should take a proactive approach and address certain concerns to minimize any unintentional negative outcomes. Consequently, accounting researchers should consider the impact of cryptocurrency use on a firm's financial position, financial reporting, and regulatory compliance and guide the adoption of cryptocurrency in such a manner to reduce fraud and enterprise risk exposure. Given that the development and use of cryptocurrency are in the infancy stage, accounting research could influence and guide the development and address accounting concerns by extending existing accounting research to the cryptocurrency context.

Holub and Johnson (2018) conducted a literature review on one form of cryptocurrency, bitcoin, and found only eight academic articles. Even though research on cryptocurrency is emerging overall, accounting research on this topic seems to be lagging. Rather than asking and answering a specific research question, the objective of this paper is to encourage academic

researchers within various accounting specialties to collaborate and pursue research in the area of cryptocurrency. We use the diffusion of innovation theory as a guide to explore the diffusion of cryptocurrency and identify accounting concerns related to each stage of diffusion. Our potential directions for future research are by no means exhaustive, but we aim to fuel accounting research by discussing cryptocurrency and its implications for accounting.

II. LITERATURE REVIEW

In this section, we provide a brief overview of cryptocurrencies and discuss how a cryptocurrency transaction works, the similarities and differences between cryptocurrencies and fiat money, and the advantages and disadvantages of using cryptocurrencies. Further, we summarize the current literature on cryptocurrencies and some important research findings that may influence subsequent accounting research.

Overview of Cryptocurrencies

Cryptocurrency is digital or virtual currency that uses cryptography for security (<https://www.investopedia.com/terms/c/cryptocurrency.asp>). The Internal Revenue Service (IRS) mentions that “in some environments, virtual currency operates like “real” currency—i.e., the coin and paper money of the United States or of any other country that is designated as legal tender, circulates, and is customarily used and accepted as a medium of exchange in the country of issuance—but it does not have legal tender status in any jurisdiction” (IRS 2014b). Rosic (2020) explains that cryptocurrency can be considered to be limited entries in a database that no one can change without fulfilling specific conditions. As of January 2020, there are approximately 2,000 different cryptocurrencies in circulation with a known market capital ranging from \$100 to \$170 billion, and this number continues to grow (Coinmarketcap.com). The most popular cryptocurrency in circulation today, bitcoin,¹ has an approximate market capitalization of \$170 billion and Ethereum, the second leading cryptocurrency, has an approximate market capitalization of \$19 billion. The total market capital for all cryptocurrencies, according to Coinmarketcap.com, approximates US\$256 billion.

Several recent developments have helped position cryptocurrency in the mainstream marketplace. Worldline and Bitcoin Suisse announced a partnership to make cryptocurrency payment services available to Swiss merchants and consumers in both online and in-store purchases (Shome 2019). Further, the Swiss Financial Market Supervisory Authority announced in November of 2019 the issuance of licenses to two crypto banks (Mizrahi 2019). In January 2020, a leading Japanese consulting firm announced the development of a new cryptocurrency index that can be used by financial institutions to track the performance of cryptocurrencies in a global crypto market (Zmundzinski 2020b). Further, Amun AG, a leading Swiss cryptocurrency financial firm, launched a derivative on Six Swiss Exchange, the leading Swiss stock exchange (Zmundzinski 2020a). A survey conducted by Hartford Steam Boiler reports that one-third of U.S.-based small- to medium-sized enterprises accept cryptocurrency as a payment for their goods and services (Antonovici 2020). The study also finds that of the companies accepting cryptocurrency payments, 47 percent of businesses have been in business for five years or fewer. However, attacks to steal cryptocurrencies by groups, such as Lazarus, increase the threats associated with receiving and maintaining cryptocurrencies (Raza 2020).

Given the increasing interest in cryptocurrencies, companies need to consider the business impact of using/not using cryptocurrencies. Consequently, these business decisions regarding cryptocurrencies have a substantial direct impact on accounting and financial reporting functions within the company. Therefore, accounting researchers should identify, evaluate, and recommend best practices for cryptocurrency. Before we identify research opportunities, we discuss the use and function of a cryptocurrency.

Cryptocurrency Transaction

Investopedia defines cryptocurrency as “a digital or virtual currency that is secured by cryptography, which makes it nearly impossible to counterfeit or double-spend” (Frankenfield 2022). Most cryptocurrencies function on a decentralized network based on blockchain technology. The functioning of cryptocurrency, similar to fiat currency, depends on several components. First, cryptocurrencies need a payment network. Second, the network needs a valid ledger to include accounts, balances, and transactions. Third, the payment network needs a set of validation rules for consensus on the accounts, balances, and transactions. For example, currency is circulated through the banking system that keeps records of balances in individual accounts. Further, the banking system provides a central authority to clear transactions between accounts by assuring the payer has sufficient funds to make the payment.

¹ Bitcoin, when capitalized, refers to the entire network, whereas without capitalization, bitcoin refers to the cryptocurrency.

In cryptocurrency transactions, a decentralized peer-to-peer network makes up the network, which eliminates the need for a central authority. Instead of depositing a check received to a bank account and settling the account through the bank settlement system, cryptocurrency can be directly deposited into the payee's account. The ledger where all transactions are recorded is called the blockchain. One significant difference from the traditional record-keeping system is that the ledger maintained on the blockchain is distributed (every node on the network has access to the ledger unlike the bank account maintained at one specific bank) and is public (meaning anyone can access the ledger and read the transactions). Cryptocurrency transactions and issuance of currency are validated based on a set of rules called the consensus rules. Every cryptocurrency has a set of predefined rules on how to create currency, whether there is a limit to the currency in circulation, and how to validate the transactions to avoid the double-spend problem. Since there is no central authority to validate transactions, the decentralized network uses a set of mechanisms to arrive at a global consensus on the valid blockchain. Common consensus mechanisms used today are proof-of-work and proof-of-stake protocols. To process the transactions and add them to the public ledger, the distributed peer-to-peer network engages in a process called mining. Mining is the process of giving any one node in the peer-to-peer decentralized network the authority to add the transactions to the public ledger. When using a proof-of-work consensus algorithm, a node gains authority by winning a competition to find a solution to a mathematical problem. The winning node is compensated for mining a block on the blockchain (adding a set of transactions to the public ledger).

To transact using cryptocurrency, the first requirement is to download a cryptocurrency wallet. Based on the platform an application runs, wallets can be categorized as desktop, mobile, web, hardware, or paper wallets. Further, cryptocurrency wallets can also be categorized by their degree of autonomy and how they interact with the network into full-node, lightweight, and third-party application programming interface (API) clients. Full-node clients store a complete history of cryptocurrency transactions while managing the wallet and allowing users to initiate transactions directly on the network. A lightweight client, more suitable for a mobile device, needs to connect to a full-node client to access the complete transaction history. However, a lightweight client can interact directly with the blockchain network and independently create, validate, and transmit transactions. A third-party API uses an intermediary to connect to the blockchain network.

Similarities and Differences Between Cryptocurrency, Cash, Debit, and Credit Cards

According to Rosic (2020), similarities and differences of cryptocurrency can be discussed based on its transactional and monetary properties. Unlike transactions settled through a debit or credit card, cryptocurrency transactions are *irreversible*. Once a transaction is confirmed, it cannot be stopped or refunded. Contrary to cryptocurrency, a transaction made to the wrong payee by credit/debit card and/or check can be stopped after the transaction has been initiated. Further, most cryptocurrency transactions and/or wallets are not connected to actual identities, therefore they are *pseudonymous*. Unlike traditional transactions made by credit/debit cards or cash/checks that require a central authority to clear and settle the system, cryptocurrency transactions *do not need a settlement system* and are propagated in the network within approximately 10 minutes of initiation. Since popular cryptocurrencies do not need to be converted when engaging in foreign transactions, these transactions are *fast and global*. Moreover, the public/private key pairs used to authorize and receive funds using cryptocurrency provides *security* by allowing only the receiver with the private key access to the funds transmitted. Unlike creating a bank/credit card account in the banking system, cryptocurrency transactions do not need permission, hence they are *permissionless*. Using bitcoin, the most popular cryptocurrency, as an example, this means anyone can download a bitcoin wallet to receive and send bitcoins without obtaining permission from a central authority to create an account.

Rosic (2020) mentions two monetary properties of some cryptocurrencies, such as bitcoin, that are contrary to fiat money. First, some cryptocurrencies, such as bitcoin, have a *controlled supply*. The currency supply created during mining will decrease over time and reach its final number during a specified year. Due to the controlled supply, these cryptocurrencies will deflate rather than inflate.² Second, most cryptocurrencies are *not created by debt*. Unlike transactions shown in a bank account that represents debt (liability to the bank or IOUs), cryptocurrency is similar to having actual coins or gold.

Advantages and Disadvantages

Dumitrescu (2017) provides a detailed analysis of the advantages and disadvantages of bitcoin. Even though the analysis is for the most popular cryptocurrency, bitcoin, the advantages and disadvantages are common to all cryptocurrencies. One advantage of cryptocurrency is the separation of the private key from the public keys. Unlike using a bank account, where your account number needs to be shared with a third-party to receive money directly into your account, with cryptocurrencies the account holder can share the public key to transact while concealing the private key. Even though this feature in cryptocurrencies increases data protection, it does not eliminate hackers obtaining the private key using other means. Another

² Other cryptocurrencies, for example Ethereum, do not have an upper limit on its currency supply.

advantage of cryptocurrency transactions is lower transaction fees. For example on average, a \$100 transaction using a credit card costs \$3.37, whereas a bitcoin transaction fee for the same amount would only be approximately \$0.61 (Hayes 2017). As of January 2020, the average transaction cost for some popular cryptocurrencies such as bitcoin, ethereum, litecoin, ethereum classic, bitcoin cash, bitcoin sv, dash, and Zcash, range from 0.555 to 0.001 (<https://bitinfocharts.com/comparison/bitcoin-transactionfees.html#3y>). Even though transaction fees for cryptocurrencies are currently at a minimum, currencies with a cap on the amount of currency that is being circulated might experience higher transaction fees after the maximum amount is reached in order to compensate miners for the proof of work performed. Further, the speed of transfer can also protect merchants from chargeback fraud. Unlike credit card transactions where the funds are transferred several days after the transaction, a cryptocurrency payment can be confirmed within minutes.³ Therefore, the merchant can verify the fund transfer before the delivery of goods or services. Given the fixed supply of some cryptocurrencies in circulation, the inflation rate will decrease in the future.

Even though the decreasing inflation rate is an advantage compared to fiat money, some inflation risk remains. Watson (2018) discusses the issues of inflation risks as a result of lost cryptocurrencies. For example, Watson (2018) mentions that out of the 17 million bitcoins mined as of 2018, between 2.78 to 3.79 million bitcoins are lost due to various reasons, such as forgetting private keys, death, and losing/discarding hardware with bitcoins. Even though cryptocurrencies were created to provide anonymity by using public keys, cryptocurrency exchanges and wallet services are not entirely anonymous. Further, these currencies are also prone to scams such as high-yield investment schemes, mining investment scams, wallet scams, and exchange scams (Dumitrescu 2017). Other disadvantages include the decreasing market share of individual currencies as a result of the continuous introduction of alternative cryptocurrencies and overcoming psychological and sociological issues of trust.

The Current State of Research in Bitcoin/Cryptocurrency

To fully understand where accounting research compares with other disciplines, we conducted several searches for cryptocurrency articles. Using ABI/Inform, we searched for “cryptocurrency” alone, then added additional search terms for “business,” “accounting,” “economics,” “finance,” and “information systems.” We provide a summary of the results in Table 1.

The vast difference in the number of total articles (930,133) versus peer-reviewed articles (936) indicates a significant level of interest in the subject and the need for more peer-reviewed research. The results where both “cryptocurrency” and a specific discipline appear in the abstract reveal accounting has less than half the number of peer-reviewed articles than any other discipline.⁴

A search of bitcoin/cryptocurrency anywhere in an article on the American Accounting Association (AAA) website yielded 14 articles published in AAA publications.⁵ Out of the 14 articles, one article (Terando, Cataldi, and Mennecke 2017) discusses issues related to categorizing bitcoin or other cryptocurrencies for tax purposes. Vincent and Wilkins (2020) explore challenges when auditing cryptocurrencies. While several articles mention bitcoin as the basis to discuss the blockchain technology or the Bitcoin blockchain network (Dai and Vasarhelyi 2017; Kokina, Mancha, and Pachamanova 2017; Sheldon 2019; Dai, He, and Yu 2019; Liu, Wu, and Xu 2019; Rozario and Thomas 2019; L. Tang and Q. Tang 2019; Nehmer and Appelbaum 2020), the other articles use bitcoin as an example. Another article proposes a novel use of blockchain technology to share instances of practitioner misconduct across the country (Sheldon 2018). Coyne and McMickle (2017) show that blockchain is not a feasible secure alternative to the current financial system because of the existence of economic transactions outside of the accounting records. Main accounting issues related to cryptocurrency can be categorized into concerns on asset classification, revenue recognition, or disclosure requirements. Raiborn and Sivitanides (2015) provide a detailed discussion related to these issues. The issues on asset classification discuss whether cryptocurrency is cash, a cash equivalent, an intangible asset, or an investment. Although several accounting firms recommend reporting cryptocurrency as an intangible asset, there is still a lack of consensus as to how cryptocurrency should be classified in the balance sheet.

To identify more recent research dealing with cryptocurrency and accounting, we conducted a search on the Social Sciences Research Network (SSRN). Our search yielded 12 articles when we searched for “accounting” within the search for “cryptocurrency.”⁶ Of the 12 articles, ten relate to financial or capital market issues, one relates to financial accounting issues, and one was a literature review of existing cryptocurrency research. Additionally, four articles were posted in 2017, six articles

³ Yurina (2019) mentions the speed of processing cryptocurrencies transactions for various currencies; some of which are EOS—3000 transactions per second (TPS), Ripple—1700 TPS, GoChain—130000 TPS, and Dash—56 TPS.

⁴ Search conducted May 2020.

⁵ Search conducted November 2019 using both “bitcoin” and “cryptocurrency.”

⁶ These results are based on our initial search in May 2019. We conducted an additional search in November 2019 with similar results (14 total articles), so the current state of cryptocurrency research in accounting has not significantly changed.

TABLE 1
Search Results Using ABI/INFORM^a

Panel A: Search Terms Anywhere

Search Term(s)	Number of Items	
	Total	Peer-Reviewed
"Cryptocurrency"	930,133	936
"Cryptocurrency" and "business"	105,582	725
"Cryptocurrency" and "accounting"	7,384	241
"Cryptocurrency" and "economics"	5,004	484
"Cryptocurrency" and "finance"	20,259	515
"Cryptocurrency" and "information systems"	18,057	599

Panel B: Search Terms in Abstract

Search Term(s)	Number of Items	
	Total	Peer-Reviewed
"Cryptocurrency"	2,946	257
"Cryptocurrency" and "business"	383	25
"Cryptocurrency" and "accounting"	62	8
"Cryptocurrency" and "economics"	15	3
"Cryptocurrency" and "finance"	147	11
"Cryptocurrency" and "information systems"	57	9

Panel C: Search Terms in Subject

Search Term(s)	Number of Items	
	Total	Peer-Reviewed
"Cryptocurrency"	510	89
"Cryptocurrency" and "business"	15	3
"Cryptocurrency" and "accounting"	2	2
"Cryptocurrency" and "economics"	7	2
"Cryptocurrency" and "finance"	66	10
"Cryptocurrency" and "information systems"	5	4

^a Search conducted May 2020.

were posted in 2018, and only two articles were posted in 2019. While SSRN is not an exhaustive database of recent research activities, the lack of more articles related to accounting demonstrates the need for academics to ask and answer relevant questions to fill the void in the literature.

Finally, to further identify current research related to cryptocurrency, we conducted a search on Google Scholar of articles similar to those we had identified. We identified five additional articles that have been published or are pending publication since we conducted our original search. The *Australian Accounting Review* published three articles relating to Blockchain in its June 2019 issue (Tan and Low 2019; Karajovic, Kim, and Laskowski 2019; Schmitz and Leoni 2019). McCallig, Robb, and Rohde (2019) develop a system design that incorporates Blockchain to enhance the faithful representation of financial statements. Liu et al. (2019) analyze how blockchain could impact auditing. Each of these articles highlights the importance of understanding blockchain and its potential impact on accounting. Since blockchain is integral to cryptocurrency usage, this paper hopes to extend the research landscape and encourage additional research on cryptocurrency with the hope of influencing the development of blockchain technology.

III. RESEARCH OPPORTUNITIES IN ACCOUNTING

Given the increased interest in cryptocurrencies from the general population, the accounting profession should prepare to handle cryptocurrencies in audit engagements, tax planning, corporate accounting, and/or in accounting information systems

design. Therefore, the accounting profession should identify, evaluate, and address potential issues, concerns, and challenges not only to influence accounting and regulatory policies, but also to facilitate the development, adoption, and use of cryptocurrencies. To guide the discussion on cryptocurrency research opportunities in accounting, we turn to the theory of diffusion of innovation. Rogers (1995) explains that innovation generally diffuses over time through various channels, and the adoption and acceptance of innovation happens after going through various stages of diffusion such as understanding, persuasion, decision, implementation, and confirmation. The theory of diffusion of innovation has four key elements: innovation, communication channels, time, and social systems. We look to the theory of diffusion of innovation for guidance as we develop the discussion on research opportunities in the subsequent sections. In these sections, we discuss several research opportunities within accounting that may help or hinder the adoption and diffusion of cryptocurrencies. For further clarification, we use the predominant research streams found within accounting: capital market and financial accounting, auditing, tax, accounting information systems, and managerial accounting to organize the research opportunities.

Innovation

Rogers (1995) defines innovation as an idea, practice, or object that is perceived as new by an individual or other unit of adoption. In the context of this paper, cryptocurrency is the innovation. For a specific company, cryptocurrency innovation can be categorized into the following three categories:

1. Investment
2. Medium of exchange
3. Development of a new cryptocurrency/partnering with a cryptocurrency platform to transact with trading partners/stakeholders⁷

Rogers (1995) explains that the newness of an innovation may be expressed in terms of knowledge, persuasion, and/or a decision to adopt. Individuals generally ask two types of questions about innovations: (1) Questions about the functionality, such as “How does it work?” “What is the innovation?” “Why does it work?” and (2), questions about reducing uncertainty, such as “What are the innovation’s consequences, advantages, disadvantages?” Further, five characteristics influence the diffusion of an innovation: relative advantage, compatibility, complexity, trialability, and observability. Research about innovation in various contexts also examines differences between early adopters versus late adopters. Accounting research can also contribute to a greater understanding of various stakeholder perceptions. Table 2, Panel A provides a summary of research questions related to the innovation phase.

The diffusion of innovation takes place as market participants become aware of the innovation. *Capital markets financial accounting research* can explore aspects of cryptocurrency diffusion by observing market reactions. Event studies can be conducted to observe whether the market reaction to a company’s acceptance of cryptocurrency as an exchange medium, an announcement about developing its own currency (such as the Libra token by Facebook), or partnering with a platform (such as Walmart partnering with StormX) is positively or negatively received by the market. Findings from these studies may shed light on potential market trends, such as whether investors perceive one of the above options to be more restrictive to trading partners, customers, and other stakeholders. Comparing whether the market reaction is different when a company develops its own currency versus accepting an existing currency will fuel diffusion by informing other companies whether they should follow the early adopters. Accounting research could further examine the company characteristics of innovators, early adopters, and late adopters of firms engaging in cryptocurrency development, investment, and use. Findings from these studies could shed light on the determinants of success factors that will further fuel diffusion. Exploring whether a company’s announcements about cryptocurrencies affect novice versus expert investor perceptions positively or negatively will shed light on whether novice investors consider the risks associated with cryptocurrency, whether and how they factor risk into their investment decisions, and whether their perceptions change based on whether the company is developing, investing, and/or using cryptocurrency as an exchange medium. Findings from these studies may shed light on the level of knowledge about cryptocurrency among various market participants and help identify factors that persuade investors to adopt cryptocurrency. Further, such studies can help identify whether capital market participants perceive cryptocurrency to have a relative advantage, be more compatible with expectations, be less complex than existing fiat currency, be easily tried, and be observed. Consequently, findings from such research can enhance the development of the technology by introducing new features and/or

⁷ We exclude companies that develop cryptocurrencies for public use or offer the currencies in an initial coin offering (such as bitcoin and Ethereum) from the subsequent discussion. Since these companies issue currency, they act as a “federal reserve system/central bank” managing the money supply. We make a distinction between companies that develop their own cryptocurrency to transact with their trading partners (private use) and companies that develop a cryptocurrency for public use. Therefore, for parsimony we limit our discussion to companies that will engage in cryptocurrencies for the three categories mentioned above.

TABLE 2
Research Opportunities Categorized Using Rogers' Theory of Diffusion of Innovation

Panel A: Innovation

Category	Research Question	Methodology	Type ^a
Capital Markets	How does the market react to companies that announce cryptocurrency usage?	Event Study	1,2,3
Capital Markets	Is this reaction different for internally-developed versus existing cryptocurrency?	Archival	2,3
Capital Markets	What firm characteristics are common in companies who innovate in terms of cryptocurrency?	Archival	2,3
Capital Markets	Does investor knowledge impact reaction to cryptocurrency usage?	Event Study	1,2,3
Capital Markets	Does investor perception of cryptocurrency usage change over time?	Event Study/Archival	1,2,3
Audit, Managerial	Is the company ready for cryptocurrency adoption?	Survey; Field Study	2,3
Audit	What are the major risks involved in cryptocurrency adoption?	Survey; Field Study	2
Audit	What controls are necessary in order to adopt cryptocurrency?	Field Study; Survey	2
Audit	Are existing audit procedures adequate?	Field Study; Experimental	2
Audit	What types of fraud risk increase/decrease with use of cryptocurrency?	Field Study; Survey	2
AIS	What system design concerns does cryptocurrency introduce?	Field Study; Survey; Design Science	2,3
AIS, Audit, Financial Reporting, Tax	What reporting issues does cryptocurrency impact?	Field Study; Survey; Design Science	1,2,3
Tax	Do investors understand tax reporting requirements related to cryptocurrency?	Behavioral Experiment	1,2,3

Panel B: Communication Channels

Category	Research Question	Methodology	Type ^a
Capital Markets	Where should cryptocurrency be reported in financial statements?	Analytical; Archival; Survey	1,2,3
Capital Markets	Do cryptocurrency disclosures provide additional information content?	Analytical; Archival; Survey	1,2,3
Tax	Will recent focus on cryptocurrency by the IRS impact tax reporting?	Archival; Field Study	1,2,3
Tax	Could the IRS consider cryptocurrency to be foreign currency and assign penalties for failure to disclose?	Analytical; Legal	1,2,3

Panel C: Time

Category	Research Question	Methodology	Type ^a
Auditing	How do auditors develop competency related to cryptocurrency?	Event Study; Survey	1,2,3
Auditing, AIS, Tax, Managerial, Financial Reporting	How is the traditional role changing and what new skills are required?	Survey; Field Study	1,2,3
AIS	How does cryptocurrency adoption and use impact risk?	Analytical; Field Study	1,2,3
AIS	What internal controls should be implemented related to cryptocurrency?	Analytical; Survey	1,2,3

(continued on next page)

maintaining existing features and fuel subsequent research related to financial reporting, internal controls, auditing, etc. Given the novelty of the innovation, during the early stages, researchers could use research methodologies such as field studies, and event studies (with a limited sample) to obtain an in-depth understanding of the changing perceptions in market participants. As the innovation diffuses, researchers could use survey studies to solidify findings from the early stages. Research findings suggesting a positive initial reaction from innovators/early adopters can influence companies to consider altering their business strategies to stay competitive and regulators to consider the need for additional policy changes/requirements to maintain transparency and reduce information asymmetry.

TABLE 2 (continued)

Panel D: Social Systems

Category	Research Question	Methodology	Type ^a
Capital Markets	Can managers use cryptocurrency volatility to manipulate earnings?	Archival	1,2,3
Capital Markets	How does cryptocurrency influence revenue recognition?	Analytical	2,3
Audit	Does cryptocurrency impact audit risk?	Analytical; Archival; Survey	1,2,3
Audit	What audit procedures should be developed/changed related to cryptocurrency?	Analytical; Field Study; Survey	1,2,3
Audit	Does cryptocurrency influence professional skepticism? Are experienced auditors more or less influenced?	Experimental	1,2,3
Audit	What is the impact of the regulatory environment on cryptocurrency audit practices? What changes are necessary in the regulatory environment to address cryptocurrency audits?	Field Study; Survey; Experimental; Legal	1,2,3
AIS	What application and general controls should be established related to cryptocurrency at the firm and cryptocurrency exchange levels?	Analytical; Survey	1,2,3
Managerial	What are the costs and benefits of cryptocurrency?	Analytical	1,2,3
Managerial	How can a company use cryptocurrency to enhance its strategy?	Analytical; Field Study	1,2,3
Managerial	How does cryptocurrency impact planning?	Analytical; Survey	1,2,3
Tax	Can multinational corporations exploit different tax treatment of cryptocurrency across jurisdictions?	Analytical; Legal	1,2,3
Tax	What Alternative Minimum Tax (AMT) issues does cryptocurrency create for individual taxpayers?	Analytical; Legal	1,2,3
Tax	Should the IRS consider <i>de minimis</i> rules related to reporting cryptocurrency?	Analytical; Archival	1,2,3

^a Refers to the category of usage: 1 = Investment; 2 = Medium of Exchange; 3 = Development of new cryptocurrency.

The diffusion of cryptocurrency is facilitated by the company's readiness to adopt the innovation. *Auditing* research, particularly internal auditing, could help companies facilitate the adoption of cryptocurrency by examining company attributes that determine company readiness to adopt cryptocurrencies. If the company is considering using cryptocurrency as the medium of exchange, internal audit research could take a normative approach and discuss general and application-level controls companies should establish to assure the security of cryptocurrencies. Recommendations from this stream of research could help the diffusion of innovation by highlighting certain processes that need to be implemented before embracing cryptocurrency as payment. Further, recommendations can be formalized by updating existing controls/best practice frameworks to reflect the additional control requirements for cryptocurrency use as a payment method. Internal auditing research should also be able to inform the profession of challenges and best practices in risk assessment and independent review of the design of processes for cryptocurrency development and use. The observability of an innovation is important to the auditing practice. Therefore, audit and assurance research should also take a normative approach and explore whether existing methodologies used for gathering and analyzing audit evidence can be extended to cryptocurrency audits, whether auditors audit around a black box, and what new procedures should be implemented. Given the early stage of the innovation, researchers can employ field studies, case study research, and expert surveys to help identify specific audit procedures that need to be implemented when a company invests in cryptocurrency versus uses cryptocurrency as a payment method. Further, auditing research could also help explore fraud risk and fraud opportunities with cryptocurrencies and develop case studies for training and education by identifying what predominant factors influence cryptocurrency-related fraud and how to detect such fraud. Findings and recommendations from auditing research can shed light on areas where regulatory reforms are necessary and provide assurance of security, privacy, and confidentiality, which will help facilitate the diffusion of cryptocurrency.

The capability of existing information systems can either hinder or facilitate the adoption and diffusion of cryptocurrency. Therefore, *Accounting Information Systems* (AIS) research can explore the functionality, advantages/disadvantages, control mechanisms, and system design concerns that should be anticipated when using cryptocurrency as a payment method. Given that most companies are heavily reliant on multiple integrated systems, the privacy, security, and confidentiality of financial assets, customers, and vendors should be carefully considered when designing and incorporating cryptocurrencies as a payment method. Therefore, AIS research should explore issues related to system design implications of accepting cryptocurrencies, for example, if companies accept cryptocurrencies as a payment method, what changes should be made to the existing information system, the readiness of existing systems to keep track of transactions occurring in cryptocurrency wallets, the costs and

benefits of introducing cryptocurrency functionality to an existing system, design challenges with regard to maintaining cryptocurrency conversion rates in the existing systems, and additional cost requirements to modify the system to include customizations necessary to enable cryptocurrency integration, redesign managerial reports, and redesign various processes. Findings from research on design issues would inform whether companies need to consider changes to systems design concepts and provide best-practice guidance for companies to follow as the diffusion rate increases among companies. A related issue companies should consider is whether existing wallet applications could provide detailed information required for tax, financial reporting, and other compliance issues. If existing applications cannot provide needed information, AIS research should guide practice on what information needs will arise in the future and develop best practices for report design. AIS research could also compare and contrast the existing banking clearance process to cryptocurrencies and cryptocurrency exchanges to identify potential integration, clearance, and reporting issues. Further, research should guide and develop best practices to assure the security, privacy, and confidentiality of crypto wallets, interfaces with existing systems, and new application developments. The early-stage research in this area should take a normative approach and use field study methodologies to make recommendations grounded in theories from systems design, psychology, and management.

If the company is planning to develop its own currency, AIS research should guide the development and implementation by considering what the profession needs in order to provide assurance over financial statements. Therefore, AIS research should develop research artifacts, such as continuous auditing modules, into wallets/applications to monitor cryptocurrency transactions.

Unlike other categories of accounting research, *Tax Research* in the innovation phase is not normative, because the IRS has already issued guidance on how cryptocurrency, or virtual currency, should be reported. IRS Notice 2014-21 classifies cryptocurrency as a capital asset, similar to property. For taxpayers, this means they must track the basis and calculate gains and losses each time a cryptocurrency transaction takes place (IRS 2014a). This will require accounting information systems to carefully track purchases and sales of cryptocurrency to determine the proper basis for tax purposes, as well as any reportable gains or losses. Therefore, tax researchers should coordinate with other areas (particularly AIS) to ensure sufficient information is available for tax reporting. Experimental studies could be conducted in light of IRS Notice 2014-21 to see if individual or novice investors are aware of the complex rules, particularly capital gains and loss rules, related to cryptocurrency. Researchers could also test whether knowledge of these rules changes the perception of the value and riskiness of cryptocurrency and tie the findings into capital markets analysis.

Communication Channels

The theory of diffusion of innovation defines communication channels as “the process by which participants create and share information with one another in order to reach a mutual understanding” (Rogers 1995). Simply stated, communication channels are a means by which a message is sent from one individual to another. Therefore, communication channels can represent mass media, IT networks, the internet, supply chains, or financial statement disclosures that enable the transfer of information from one unit to another. Table 2, Panel B provides a summary of research questions related to the communication channels phase.

Capital markets rely on financial accounting to provide useful information. Extant research shows that where an item is presented on the financial statements has varying degrees of usefulness to the users (Maines and McDaniel 2000; Riedl and Srinivasan 2010). Consequently, financial statement users might weigh the information content of cryptocurrency differently based on whether and how these are reported on quarterly and annual statements. Further, fair presentation of cryptocurrency will need to consider the motivation of the company to carry cryptocurrencies. If information is misrepresented, it can have a negative impact on the company’s financial position and reputation in the long run. Another major communication channel companies use today is social media. Novice and individual investors are more likely to follow social media announcements of companies rather than the financial statements. Therefore, a company’s financial statements, announcements, and social media activities enable the diffusion of innovation by sharing information through these channels. For example, a company could use social media to publicize their plan to develop a cryptocurrency and raise funds using an initial coin offering or issue additional shares, and report their operational success in their financial statements, increasing investor confidence further. Consequently, to enable the diffusion of innovation, accounting research should address key questions such as: where should companies report cryptocurrency in the financial statements if the company is developing its own currency for private trading, using cryptocurrency as a payment method, or investing in cryptocurrency; should cryptocurrency be reported under the same classification if the company’s motivation for holding cryptocurrency is different; should cryptocurrencies be reported under a new classification; or should cryptocurrency be reported within an existing classification, and if the latter is true, where should companies report cryptocurrency. There are pros and cons to each alternative, so researchers should develop a consistent and comprehensive solution based on the conceptual framework to answer these questions using various research methodologies, such as experiments, surveys, and archival research.

The FASB has declined to address the issue of cryptocurrency reporting to this point. However, companies have requested they add the topic to their agenda, and CFO.com reported in October 2020 that the FASB would be adding it (Ryan 2020). However, FASB technical director and chair of the Emerging Issues Task Force, Hillary Salo, defended the decision to not include it in an address at the Financial Executives International conference on November 4, 2020. According to Salo, the FASB is monitoring the issue as an emerging trend, but does not consider it to be a pervasive issue (which involves both the number of companies impacted as well as the materiality of the issue) at this time (Lugo 2020). In light of this, accounting researchers need to be proactive so that when the FASB decides to include cryptocurrency on their agenda, we will have already wrestled through the related issues and be in a prime position to assist and influence the direction the FASB takes regarding financial reporting. Each of the Big 4 accounting firms has issued guidance on this topic, and generally conclude that cryptocurrency should be reported as an intangible asset (EY 2018; Fernandes, Fields, Ward, Werling, and Wildenborg 2018; Paul, Currie, and Ohl 2018; Uhl, Steele, O'Donnell, Zercoe, and Taylor 2018). This seems to be based on the current definitions we have in financial reporting and that cryptocurrency is, by definition, intangible. However, academics should thoroughly explore the implications of this decision to determine what classification provides the most useful information to the users of financial statements and explore the ethical implications of misrepresenting cryptocurrency. Now is the most opportune time for accounting researchers to be proactive and weigh in regarding financial reporting.

Since financial disclosures are an important component of financial reporting, research should investigate whether there is value in cryptocurrency disclosures. Hence, research could explore whether investors value and expect information about cryptocurrency transactions to be disclosed on the financial statements, as a note to the financial statements, or in a separate section of the annual report; whether and what type of information regarding cryptocurrency transactions should be disclosed in the financial statements; and the best balance sheet presentation of cryptocurrencies that add value to the market. Findings could significantly influence the development of new regulations and provide additional guidance to companies on how to enhance their financial disclosures. Findings from this stream of research can enhance financial reporting and reduce information asymmetry in the capital market in the future.

Tax research should address changes in the communication channels with the IRS. The recent *Coinbase* court decision requires exchanges to report cryptocurrency transactions over a certain threshold (*United States v. Coinbase, Inc.* 2017). Researchers could investigate whether exchanges are complying with this decision, and if so, are investors changing their behavior because of the additional IRS monitoring? The IRS invites outside researchers to submit proposals to be included in their Joint Statistical Research Program. Accounting researchers could submit a proposal to gain access to confidential IRS information to determine the extent to which taxpayers are correctly reporting cryptocurrency transactions.⁸

The IRS has recently issued several news releases related to virtual currency. IR-2018-71 reminds taxpayers of the reporting requirements for cryptocurrency transactions (IRS 2018). IR-2019-167 provides additional guidance for taxpayers who use virtual currency that supplements Notice 2014-21 and highlights that the IRS sent over 10,000 letters to taxpayers they think may have reported virtual currency incorrectly or not at all (IRS 2019). These notices could influence several research questions. Does this further increase tax reporting since investors know the IRS is now looking at these transactions? If the amount of reporting does increase, is the IRS equipped to handle the increased reporting volume, or does the potential vast number of reported transactions minimize its effectiveness? Since cryptocurrency is not backed by the United States (or any government), will the IRS consider bitcoin wallets as “foreign currency”? If so, will they impose penalties for failure to disclose bitcoin as foreign accounts? Each of these questions focuses directly on the communication channels between taxpayers and the IRS.

Time

The third element in the theory of diffusion is the time necessary for the adoption of the innovation. Rogers explains that the time dimension is involved in the diffusion of innovation in three ways, namely, the innovation-decision process (where an individual passes from learning about the innovation to adoption or rejection), the innovativeness of an individual (early or late adopter compared with other members of the social system), and an innovation's rate of adoption in a system (number of members of the system that adopt the innovation in a given period). Regarding cryptocurrencies, one aspect that influences the time it takes to diffuse is the availability of expertise to provide audit and assurance, guide development and implementation, and assess controls and compliance. Table 2, Panel C provides a summary of research questions related to the time phase.

In the *Auditing* context, an important concern for the profession is the level of expertise involved in auditing cryptocurrencies. Liu et al. (2019) recommend acquiring competency in blockchain technology. The breadth and depth of knowledge required to audit cryptocurrency may change depending on whether a company develops, uses, or invests in

⁸ For more information, visit <https://www.irs.gov/statistics/soi-tax-stats-joint-statistical-research-program>

cryptocurrency. The readiness of the auditing profession and the specific skill requirements to audit cryptocurrency transactions may vary depending on the client's use of cryptocurrencies. Therefore, audit firms should consider whether technical skills should be taught to auditors or whether technology experts should be employed to assist in cryptocurrency audits. Research should also examine the role of the auditor in a cryptocurrency/digital currency era and prescribe changes to the profession, education, and certifications. This is important not only in auditing, but also research in other areas of accounting, such as corporate accounting, management accounting, internal audit, AIS, and tax, should also consider what new skills and expertise are required when a firm decides to adopt and use cryptocurrencies. Addressing these issues and increasing the skill level of accountants and auditors will influence the rate of cryptocurrency adoption.

The time necessary to diffuse cryptocurrency may depend on the ability to integrate existing systems, ability access and implement risks and controls, and ability to onboard other stakeholders to adopt cryptocurrency. Unlike other technologies, the success of cryptocurrency does not depend on one company's adoption but on the adoption of all/many stakeholders. Therefore, AIS research should critically evaluate the impact of risks associated with cryptocurrency on IT risk because the level of IT risk may differ based on whether a company is developing, using, or investing in cryptocurrency. Consequently, companies will have to evaluate and develop a risk response that is appropriate to the level of IT risks facing the company. Companies will have to increase awareness, which can influence the decision process to help or hinder the adoption of cryptocurrency. Vulnerability in crypto wallets can negatively influence company information systems; on the other hand, legacy systems and security vulnerabilities in existing systems can make crypto wallets more susceptible to cyber-attacks. With the advent of online banking, companies have become more aware and have managed IT threats that impact online banking accounts. However, cryptocurrencies do not provide an additional protection system, unlike the traditional banking system, where a transaction is verified by the company and also by a bank. Therefore, research should explore and design internal controls appropriate for companies and address what governance mechanisms should be implemented to manage the risk exposure of accepting cryptocurrencies. [Sheldon \(2019\)](#) discusses general controls for a permissioned versus permissionless blockchain. This research stream should be extended to include appropriate controls/best practices under different contexts such as general and application-level controls/best practices that should be followed when developing a cryptocurrency, when using cryptocurrency as a payment method, and when holding cryptocurrency as an investment.

Social Systems

The last element, a social system, is defined as "a set of interrelated units that are engaged in joint problem solving to accomplish a common goal" ([Rogers 1995](#)). The interrelated units can be individuals, informal groups, organizations, governments, and/or subsystems. Further, the theory explains that diffusion within a social system takes place because of social structures, system norms, opinion leaders, and types of decisions and consequences of the innovation. Social structures related to accounting can be categorized into internal (management, internal stakeholders) and external (regulatory bodies, professional associations). Table 2, Panel D provides a summary of research questions related to social systems.

Executive management and the board of directors of a company set the tone at the top and form the culture of a company. Over the years, we have seen executive management, pressured by market expectations and individual pressures, engage in various fraudulent activities to meet earnings expectations, and manage investor/creditor perceptions. Cryptocurrency can provide an additional means for the management to manage the expectations of various stakeholders. Therefore, *Financial Accounting* research related to the social system can explore issues such as earnings management, revenue recognition, and fraud. Cryptocurrency can provide means by which managers manipulate earnings; therefore, financial researchers could investigate whether managers can manipulate earnings using cryptocurrency. Opportunities for earnings management vary depending on how cryptocurrency is classified on the balance sheet. For example, if companies report cryptocurrency as an intangible asset when a company uses it as an exchange medium, they could manage earnings downward in one period due to impairment and recognize a larger gain in a future period when the cryptocurrency was sold. Alternatively, if cryptocurrency is reported as an investment, companies could elect to report the current market value. Given the volatility and uncertainty surrounding the valuation of cryptocurrency, companies could manipulate earnings either upward or downward. Insight on what mechanisms are used in earnings management, and whether managers use classification or currency conversion as the means for earnings management could inform regulators on enforcing possible restrictions on crypto use for senior management. Further, research related to earnings management can also inform practice on what audit procedures should be performed to assure a company's reported value of cryptocurrency, particularly if it is reported as cash and cash equivalents.

Revenue recognition is another area of financial accounting research that may be influenced by the use of cryptocurrency. For example, if companies accept cryptocurrency as a medium of payment, various constituents within the social system should agree on the following issues: if a performance obligation has not been satisfied at the precise moment the cryptocurrency transaction clears, is the fluctuation in value treated as a gain or as revenue; should companies that accept cryptocurrency as a payment record the payment as a debit to the cash account immediately (similar to a cash transaction), or should they wait till

cryptocurrency is converted into cash to debit the cash account? Especially when it comes to smart contracts using cryptocurrencies, accounting research should provide guidance on whether these transactions should be treated the same as other contracts and recognize revenue when the performance obligations of the contract have been satisfied. In that case, research should address how the currency should be handled and whether it should go into an escrow account. When customers pay using cryptocurrencies, unlike current bank transactions requiring clearance, the payment is directly posted to the seller's account within a matter of minutes. Therefore, should payments made with cryptocurrencies be recorded first as an advance if performance obligations have not been satisfied? On the other hand, if cryptocurrencies are considered to be a commodity, then research should provide guidance on how financial statements should reflect the gains and losses from converting the commodity to cash.

Further, *Audit and Assurance* provide stability to the social system. Therefore, auditing researchers should explore several effects of cryptocurrencies on auditing practice such as whether the existence of cryptocurrency significantly affects audit risk and hence, audit fees. [Vincent and Wilkins \(2020\)](#) develop a model to assess the risk level of accepting and/or retaining a client with cryptocurrency based on the auditor's competence and resource requirements and the client's competence and alignment between cryptocurrency and business purpose. Further, they provide a list of additional issues auditors should consider for cryptocurrency.

Research on the classification of cryptocurrencies can provide stability to the social system by increasing/modifying audit efforts to incorporate the changes imposed by the innovation, thereby providing better audit and assurance services to the client and the public. Should companies that invest in cryptocurrencies versus companies that choose to use cryptocurrencies as a payment method classify cryptocurrencies the same way? Are current assertions applicable for cryptocurrencies, or are additional procedures necessary? How those assertions differ from current procedures for verifying both cash and cash equivalents, and inventory may have a significant impact on the audit risk, procedures, and audit fees. For example currently, to verify the balance in a bank account, auditors send confirmation letters; to verify the inventory on hand, auditors perform a physical count of inventory. However, these methods of verification may not apply to cryptocurrencies. Hence, auditing research should examine the existing assertions and whether these assertions can be applied to cryptocurrencies and prescribe changes to audit procedures and best practices. Further, how should companies that issue their own cryptocurrencies classify their coin offering? Auditing research should provide guidance and develop frameworks to help the auditing profession. Moreover, to increase stability to the public, auditing research could also explore how the existence of the client's cryptocurrency can influence audit quality and how the PCAOB perceives audit quality given the existence of cryptocurrency. Another related area is to examine whether and to what extent auditor liability will be impacted when a client has/issues/uses cryptocurrency.

Professional skepticism is an important characteristic of a good auditor. However, the novelty of cryptocurrency can influence professional skepticism. Therefore, research should explore whether and how novice versus experienced auditors exercise professional skepticism given the existence of cryptocurrencies in various forms (invests in, uses, and/or issues cryptocurrency). Research could explore the difference in auditor judgment based on the existence/nonexistence of cryptocurrencies at a client, and some factors that influence auditor judgment concerning cryptocurrencies. For example, does the auditor's perception change when a company carries multiple cryptocurrencies, company-specific cryptocurrency, uses an exchange, or converts to cash versus maintain as cryptocurrency? [Sheldon \(2019\)](#) discusses some general controls applicable to the blockchain environment. Research should investigate whether there are significant internal control weaknesses concerning cryptocurrencies, and the applicable controls for cryptocurrencies, maintenance, and security of public/private keys. Further, research should explore whether these controls will change based on whether a company invests, uses, and/or issues cryptocurrency and determine good practices under each situation. Auditing research could also explore and prescribe best practices for the maintenance of public/private key security given executive and management turnover. One aspect to consider is to examine whether and how current regulatory requirements, such as auditor rotation/partner rotation, have an impact on the security of private/public keys related to cryptocurrencies.

The social system depends on the company's AIS for reliable, accurate, and complete information. Consequently, the design, implementation, and integration of information systems should consider potential internal control issues and address application and general controls that companies should establish. [Sheldon \(2019\)](#) provides a good initial evaluation of what general controls companies should consider for blockchain technology that could potentially be extended and expanded upon to address controls for cryptocurrencies. Apart from general controls, AIS research should explore application controls required for crypto wallets and interfaces in companies. Traditionally, companies use a bank to provide an additional layer of security over cash. We assume that the bank has implemented adequate control mechanisms to provide security over cash; hence, companies do not require additional assurance over a bank's internal controls. This is not the case with cryptocurrencies. Cryptocurrency is developed with the premise that the system is trustless and the power is decentralized. Therefore, research should explore whether and how to provide assurance over internal controls over a cryptocurrency system and exchange; discuss whether cryptocurrency exchanges should perform service organization control (SOC) audits, and if so, on what aspects

should cryptocurrency exchanges focus; and identify how the audit may influence the financial audit of a company. Further, companies will need to consider whether cryptocurrency transactions at a third-party service provider (whether it is as an investment or use) will have an indirect impact on the company's financial statements. Therefore, research should explore whether current assurance services, such as SOC reports, address specific security, privacy, confidentiality, availability, and processing integrity controls; whether there are challenges and issues related to a SOC audit of a third-party engaged in cryptocurrency; whether and how third-party assurance reports impact financial audits given the existence of cryptocurrencies; and whether auditor judgment is impaired by relying on SOC reports on cryptocurrencies. Further, AIS research should identify what application controls should be assessed to provide reasonable assurance of financial audits and prescribe how these controls should be measured.

Managerial Accounting research could also influence the adoption and diffusion of cryptocurrencies. Managerial accounting research could assist AIS research by analyzing the costs and benefits of cryptocurrency adoption (invest in, use, and/or issue). Further, managerial research could enhance the adoption of cryptocurrencies by exploring whether companies can reach untapped markets, how the adoption of cryptocurrencies would influence the company's strategy and strategic position, if a company uses cryptocurrency as a payment method what products and services are susceptible to currency rate fluctuations, and how cryptocurrency exchange rates influence the company's profitability. Further, management accounting could also conduct impact studies to explore the extent to which investment/use/issue of multiple cryptocurrencies, exchange rates, and/or maintenance of multiple wallet applications influence company reputation, customer satisfaction, and social responsibility apart from company financial performance.

Given the current volatility of cryptocurrencies, management accounting research could also explore the impact cryptocurrencies may have on traditional planning techniques such as budgeting and variance analysis. Further, research should also explore whether management accounting approaches, such as cost allocations and standard costing mechanisms, would change if companies fully embrace cryptocurrencies as a method of payment.

Tax reporting is a key social system in the United States. There are numerous ways that the treatment of cryptocurrency can impact reporting. Since corporations do not receive preferential tax treatment for capital gains, what tax planning opportunities exist related to cryptocurrency? Can corporations use cryptocurrency to minimize transfer pricing issues? Are there jurisdictions outside the United States that provide different treatment of cryptocurrency that companies could exploit? Could corporations set up related-party pass-through entities to divert long-term capital gains to individuals? What economic substance requirements should be considered for corporations attempting to maximize this opportunity? For individual taxpayers, research should explore potential Alternative Minimum Tax (AMT) issues related to unrecognized gains for holding cryptocurrency. The IRS has already communicated to taxpayers the expectations they have for reporting cryptocurrency transactions, but researchers should investigate the costs and benefits of those expectations, and attempt to provide information to the IRS regarding *de minimis* transactions and simplified reporting in certain circumstances to improve the social system of fair tax reporting.

IV. CONCLUSION

Cryptocurrencies continue to increase in popularity. For example, companies such as Facebook are developing their own cryptocurrency (Rooney 2019). Experts forecast Facebook cryptocurrency to generate additional revenue of approximately \$19 billion by 2021. Even though they are not the primary form of transacting today, with the increase of e-commerce and the proliferation of internet offerings, we can expect widespread use of cryptocurrencies in the future. When virtually every human has a device that can communicate with anyone, the need to automate transactions, from ordering to payment disbursement, will create an additional need for cryptocurrencies. Consequently, individuals and companies will continue to embrace the use of cryptocurrencies into the future. Therefore, the accounting profession should be more proactive and explore whether the use of cryptocurrencies as a medium of exchange will impact the current system of accounting, and how these changes should be incorporated within the field of accounting. The Public Company Accounting Oversight Board (PCAOB) issued information in May 2020 that highlights the need for auditors to increase their focus on cryptocurrencies, and that recent inspections have uncovered financial statements where cryptocurrency was material (PCAOB 2020). This provides anecdotal evidence regarding the impact cryptocurrency already has, and the fact that its impact will likely continue to increase in the future. In anticipation of these changes, accounting researchers should explore potential problems, challenges, and opportunities and lay the groundwork for the necessary changes in the regulatory and reporting environment. The June 2019 issue of *Australian Accounting Review* highlights the importance of Blockchain in accounting. However, little academic research has taken the next step and examined cryptocurrency specifically.

Given the relative lack of research in this area, the objective of this paper is to start the conversation about issues related to cryptocurrencies and encourage research in different areas of accounting. The issues discussed in this paper do not represent an exhaustive list, but rather a starting point in the conversation. With a new generation of investors and customers and continuing

technological advancements, new issues and challenges will arise in the future. However, we have identified some preliminary issues we can address presently in preparation for the potential changes.

Business, environmental, regulatory, and technological changes directly and/or indirectly influence the accounting profession. To address changes and challenges arising from technology development, accounting researchers may need to take a more prescriptive approach to research instead of a descriptive approach. Thereby, accounting research could also lead and influence technology development, regulation, and professional practices. We look forward to research that addresses these, as well as other questions related to cryptocurrency.

REFERENCES

- Antonovici, A. 2020. *36% of U.S. SMEs now accept cryptocurrency payments*. Available at: <https://bitcoinist.com/36-of-u-s-smes-accept-cryptocurrency-payments/>
- Cao, S. 2020. *PayPal may start selling cryptocurrency directly, which would change everything*. Available at: <https://observer.com/2020/06/paypal-venmo-plan-bitcoin-cryptocurrency-service/>
- Coyne, J., and P. McMickle. 2017. Can blockchains serve an accounting purpose? *Journal of Emerging Technologies in Accounting* 14 (2): 101–111. <https://doi.org/10.2308/jeta-51910>
- Dai, J., and M. Vasarhelyi. 2017. Toward blockchain-based accounting and assurance. *Journal of Information Systems* 31 (3): 5–21. <https://doi.org/10.2308/isys-51804>
- Dai, J., N. He, and H. Yu. 2019. Utilizing blockchain and smart contracts to enable audit 4.0: From the perspective of accountability audit of air pollution control in China. *Journal of Emerging Technologies in Accounting* 16 (2): 23–41. <https://doi.org/10.2308/jeta-52482>
- Dumitrescu, G. C. 2017. Bitcoin—A brief analysis of the advantages and disadvantages. *Global Economic Observer* 5 (2): 63–71.
- EY. 2018. *IFRS: Accounting for crypto-assets*. Available at: <https://eyfinancialservicesthoughtgallery.ie/wp-content/uploads/2018/03/EY-IFRS-Accounting-for-crypto-assets.pdf>
- Fernandes, J., B. Fields, K. Ward, R. Werling, and I. Wildenborg. 2018. *Defining issues: Blockchain and digital currencies challenge traditional accounting and reporting models*. Available at: <https://frv.kpmg.us/content/dam/frv/en/pdfs/2018/defining-issues-18-13-blockchain.pdf>
- Finextra.com. 2020. *New York to relax cryptocurrency rules*. Available at: <https://www.finextra.com/newsarticle/36097/new-york-to-relax-cryptocurrency-rules>
- Frankenfield, J. 2022. *Cryptocurrency*. Available at: <https://www.investopedia.com/terms/c/cryptocurrency.asp>
- Hayes, A. 2017. Cryptocurrency value formation: An empirical study leading to a cost of production model for valuing bitcoin. *Telematics and Informatics* 34 (7): 1308–1321. <https://doi.org/10.1016/j.tele.2016.05.005>
- Helms, K. 2020. *KPMG introduces cryptocurrency management platform*. Available at: <https://news.bitcoin.com/kpmg-cryptocurrency-platform/>
- Holub, M., and J. Johnson. 2018. Bitcoin research across disciplines. *The Information Society* 34 (2): 114–126. <https://doi.org/10.1080/01972243.2017.1414094>
- Internal Revenue Service (IRS). 2014a. *Notice 2014-21*. Available at: <https://www.irs.gov/pub/irs-drop/n-14-21.pdf>
- Internal Revenue Service (IRS). 2014b. *IRS virtual currency guidance: Virtual currency is treated as property for U.S. federal tax purposes; General rules for property transactions apply. IR-2014-36*. Available at: <https://www.irs.gov/newsroom/irs-virtual-currency-guidance>
- Internal Revenue Service (IRS). 2018. *IRS reminds taxpayers to report virtual currency transactions*. Available at: <https://www.irs.gov/newsroom/irs-reminds-taxpayers-to-report-virtual-currency-transactions>
- Internal Revenue Service (IRS). 2019. *Virtual currency: IRS issues additional guidance on tax treatment and reminds taxpayers of reporting obligations. IR-2019-167*. Available at: <https://www.irs.gov/newsroom/virtual-currency-irs-issues-additional-guidance-on-tax-treatment-and-reminds-taxpayers-of-reporting-obligations>
- Karajovic, M., H. M. Kim, and M. Laskowski. 2019. Thinking outside the block: Projected phases of blockchain integration in the accounting industry. *Australian Accounting Review* 29 (2): 319–330. <https://doi.org/10.1111/auar.12280>
- Kokina, J., R. Mancha, and D. Pachamano. 2017. Blockchain: Emergent industry adoption and implications for accounting. *Journal of Emerging Technologies in Accounting* 14 (2): 91–100. <https://doi.org/10.2308/jeta-51911>
- Liu, M., K. Wu, and J. Xu. 2019. How will blockchain technology impact auditing and accounting: Permissionless vs. permissioned blockchain. *Current Issues in Auditing* 13 (2): A19–A29. <https://doi.org/10.2308/ciia-52540>
- Lugo, D. 2020. *Cryptocurrencies don't generate prevalent accounting issues, FASB technical director says*. Available at: <https://tax.thomsonreuters.com/en/checkpoint/news> (last accessed November 6, 2020).
- Maines, L. A., and L. S. McDaniel. 2000. Effects of comprehensive-income characteristics on nonprofessional investors' judgments: The role of financial-statement presentation format. *The Accounting Review* 75 (2): 179–207. <https://doi.org/10.2308/accr.2000.75.2.179>

- McCallig, J., A. Robb, and F. Rohde. 2019. Establishing the representational faithfulness of financial accounting information using multiparty security, network analysis and a blockchain. *International Journal of Accounting Information Systems* 33: 47–58. <https://doi.org/10.1016/j.accinf.2019.03.004>
- Mizrahi, A. 2019. *Switzerland approves Bitcoin banks—But with strict conditions attached*. Available at: <https://bggex.pro/article/1772>
- Nehmer, R., and D. Appelbaum. 2020. Auditing cloud-based blockchain accounting systems. *Journal of Information Systems* 34 (2): 5–21. <https://doi.org/10.2308/isy-52660>
- Paul, B., C. Currie, and A. Ohl. 2018. *Cryptocurrencies? Time to consider plan B*. Available at: www.pwc.com/us/en/cfodirect/assets/pdf/point-of-view/cryptocurrency-bitcoin-accounting.pdf
- Public Company Accounting Oversight Board (PCAOB). 2020. *Spotlight: Audits involving cryptoassets—Information for auditors and audit committees*. Available at: <https://pcaobus.org/Documents/Audits-Involving-Cryptoassets-Spotlight.pdf>
- Raiborn, C., and M. Sivitanides. 2015. Accounting issues related to Bitcoins. *Journal of Corporate Accounting & Finance* 26 (2): 25–34. <https://doi.org/10.1002/jcaf.22016>
- Raza, A. 2020. *Lazarus hacker group returns, steals crypto through telegram*. Available at: <https://bitcoinist.com/lazarus-hacker-group-returns-steals-cryptos-through-telegram/>
- Riedl, E. J., and S. Srinivasan. 2010. Signaling firm performance through financial statement presentation: An analysis using special items. *Contemporary Accounting Research* 27 (1): 289–332. <https://doi.org/10.1111/j.1911-3846.2010.01009.x>
- Rogers, E. M. 1995. *Diffusion of Innovations*. New York, NY: Free Press.
- Rooney, K. 2019. *Facebook's cryptocurrency could be a \$19 billion revenue opportunity, Barclays says*. Available at: <https://www.cnbc.com/2019/03/11/facebooks-cryptocurrency-could-be-a-19b-revenue-opportunity-barclays-says.html>
- Rosic, A. 2020. *What is cryptocurrency? [Everything you need to know!]* Available at: <https://blockgeeks.com/guides/what-is-cryptocurrency/>
- Rozario, A., and C. Thomas. 2019. Reengineering the audit with blockchain and smart contracts. *Journal of Emerging Technologies in Accounting* 16 (1): 21–35. <https://doi.org/10.2308/jeta-52432>
- Ryan, V. 2020. *FASB to take up digital currencies question*. Available at: <https://www.cfo.com/accounting/2020/10/fasb-to-take-up-digital-currencies-question/>
- Schmitz, J., and G. Leoni. 2019. Accounting and auditing at the time of blockchain technology: A research agenda. *Australian Accounting Review* 29 (2): 331–342. <https://doi.org/10.1111/auar.12286>
- Sheldon, M. 2018. Using blockchain to aggregate and share misconduct issues across the accounting profession. *Current Issues in Auditing* 12 (2): A27–A35. <https://doi.org/10.2308/ciia-52184>
- Sheldon, M. 2019. A primer for information technology general control considerations on a private and permissioned blockchain audit. *Current Issues in Auditing* 13 (1): 15–29. <https://doi.org/10.2308/ciia-52356>
- Shome, A. 2019. *Bitcoin Suisse, Worldline to bring crypto payments in Switzerland*. Available at: <https://www.financemagnates.com/cryptocurrency/news/bitcoin-suisse-worldline-to-bring-crypto-payments-in-switzerland/>
- Southurst, J. 2013. *194,993 BTC transaction worth \$147 million sparks mystery and speculation*. Available at: <https://www.coindesk.com/194993-btc-transaction-147m-mystery-and-speculation/>
- Tan, B. S., and K. Y. Low. 2019. Blockchain as the database engine in the accounting system. *Australian Accounting Review* 29 (2): 312–318. <https://doi.org/10.1111/auar.12278>
- Tang, L. M., and Q. Tang. 2019. Toward a distributed carbon ledger for carbon emissions trading and accounting for corporate carbon management. *Journal of Emerging Technologies in Accounting* 16 (1): 37–46. <https://doi.org/10.2308/jeta-52409>
- Terando, W., B. Cataldi, and B. Mennecke. 2017. Impact of the IRC Section 475 mark-to-market election on bitcoin taxation. *The ATA Journal of Legal Tax Research* 15 (1): 66–76. <https://doi.org/10.2308/jltr-52053>
- Uhl, R., A. Steele, I. O'Donnell, D. Zercoe, and P. Taylor. 2018. *Classification of cryptocurrency holdings*. Available at: www2.deloitte.com/us/en/pages/audit/articles/fra-classification-of-cryptocurrency-holdings.html
- United States v. *Coinbase, Inc.* 2017. U.S. Dist. LEXIS 111756, 120 A.F.T.R.2d (RIA) 2017-5239, 2017 WL 3035164 (United States District Court for the Northern District of California July 18, 2017, Filed). Available at: <https://advance-lexis-com.proxy.lib.utc.edu/api/document?collection=cases&id=urn:contentItem:5P25-H5X1-F04C-T3J0-00000-00&context=1516831>
- Vincent, N., and A. M. Wilkins. 2020. Challenges when auditing cryptocurrencies. *Current Issues in Auditing* 14 (1): A46–A58. <https://doi.org/10.2308/ciia-52675>
- Watson, P. 2018. *Why bitcoin has inflation risk*. Available at: <https://www.forbes.com/sites/patrickwwatson/2018/01/29/why-bitcoin-has-inflation-risk/#1fb7b20163c5>
- Yurina, V. 2019. *Cryptocurrency transaction speed as of 2019*. Available at: <https://u.today/guides/blockchain/cryptocurrency-transaction-speed-as-of-2019>
- Zmundzinski, A. 2020a. *Amun launched short bitcoin ETP on leading Swiss exchange six*. Available at: <https://cointelegraph.com/news/amun-launched-short-bitcoin-etp-on-leading-swiss-exchange-six>
- Zmundzinski, A. 2020b. *Largest Japanese consulting firm to launch new cryptocurrency index*. Available at: <https://cointelegraph.com/news/largest-japanese-consulting-firm-to-launch-new-cryptocurrency-index>

Copyright of Journal of Emerging Technologies in Accounting is the property of American Accounting Association and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.