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# Implications of Next Step Blockchain Applications for Accounting and Legal Practitioners: A Case Study

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## **Abstract**

Perceived price volatility of cryptocurrencies may distract practitioners from further developments in the blockchain space that may generate audit and other implications. As next step applications and developments are built on top of existing blockchain programming, the potential implications for both accounting and legal practitioners may be substantive. Especially as different blockchain tools and platforms become more robust and conducive for business and transactional use, the importance of being able to attest and report on this information will move closer toward the mainstream. This article discusses the rise of blockchain applications in a manner applicable for both practitioners and academics, as well as the implications these applications will have on attestation and compliance reporting.

## **Keywords**

Blockchain, accounting, cryptocurrency, reporting, innovation.



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## Abstract

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*JEL classification:* M40.

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## **Introduction**

Blockchain, arguably, is one of the most widely discussed technology options and tools in the accounting, financial, and legal professions of the last several decades. Obtaining a fundamental knowledge of how blockchain functions, the various iterations of blockchain in the marketplace, and some use cases of this technology is useful for practitioners. That said, this research does not focus on blockchain fundamentals, different classes or types of blockchain, or use cases at this preliminary level of technical understanding. Rather, this piece focuses on several next step applications and developments in the blockchain space, and specifically focuses on what practitioners in the legal and financial sectors should be aware of moving forward.

The layout of this article follows, and should be of interest and assistance to readers regardless of industry or sector affiliation. Emerging topics are discussed and explained, and following this initial analysis, an explanation or takeaway point is presented to highlight implementation considerations.

An important point to reference and identify prior to drilling down into the technical specifics of blockchain itself, as well as emerging areas connected to blockchain, is that this research and analysis is not focused on bitcoin or other cryptocurrencies. Especially with the price volatility that has accompanied the broader cryptocurrency marketplace since it has attracted mainstream investment attention, that does not appear to be as disruptive for accounting practitioners as the underlying blockchain technology itself. Instead, applications and functionality that are built on blockchain platforms, including those linked to cryptocurrencies are analyzed with implications for the financial practitioner landscape.

The applications and case studies for accounting and financial services have, up until this point at least, remained primarily in the realm of pilot tests and beta level initiatives. While blockchain might be arguably the hottest topic to hit the profession in the last several decades, actually using it to conduct business and record financial information has remained in preliminary stages as of this research. Recent developments and investments, however, appear positioned to make blockchain more applicable and realistically useable for accounting and financial purposes. What this research attempts to do is document, analyze, and interpret the changes implicated by blockchain technology on the broader accounting profession. Specifically, there are several areas that are developing within the broader blockchain space that are driving change, disruption, and the impetus for change across financial services sub sectors. These concepts and change vectors are not meant to represent an all inclusive overview of cryptocurrencies nor an authoritative one, but rather to provide a foundation from which users of this research can both expand on the analysis within and be used for practitioner oriented purposes.

## **Literature Review**

Prior to drilling down in the specific implications of next step applications of blockchain technology on the broader accounting and financial services industry it appears logical to prepare and communicate working definitions and terminology regarding blockchain. Many articles, books, and media events have been focused around the topic of blockchain education and training, but that very variety has also led to some conflicts regarding just which definitions and terminologies are important. What remains almost undebated, however, is the innovation and disruption that blockchain will potentially cause throughout the financial

landscape (Lewis, McPartland, & Ranjan, 2017). Taking into account that different industries are going to be more interested and focused on different potential applications and use cases of blockchain technology, there are several core traits, themes, and characteristics that need to be understood and integrated prior to the potential utilization of any further applications (Drew, 2017). Additionally, and as enterprise ready blockchain applications become accepted into the financial services mainstream it does appear logical to begin analyses of how this technology tool will change and drive innovation within the accounting profession (Alarcon, 2018). An appropriate place to begin said analysis of core terminology and components of blockchain is the underlying technology itself that differentiates blockchain from existing technology tools and options in the marketplace.

Blockchain, at the core of the idea, represents a decentralized and distributed data base that allows network members to share, store, and transmit information in a nearly continuous manner. Building on these initial characteristics, this information is also encrypted in such a way that – if the SHA-256 bit encryption protocol is utilized as it is with the bitcoin blockchain – this information is shared, stored, and communicated in a manner than has been extremely resistant to hacking attempts as of this writing. This nearly continuous transmission and sharing of data between network members is also amplified by the distributed nature of the information itself, which is contrary to virtually every other data storage and management system utilized in financial services sectors. Taking a step back from what can quickly become a technical analysis focused on the computer science angle of this field a logical conclusion is that a previous trend, big data, is becoming coupled and augmented with blockchain. Specifically, the creation and storage of increasing amounts of information also raises the specter of centralized platforms falling victims to hacks and breaches, which is an area in which blockchain can improve the data analysis process (Drew). Even if copies of data in a centralized format are copied and stored on different servers and by network members, these different copies are often batched and backed up relying on a single source of truth. In a distributed model of data storage and transmission every network member has an up to date copy and record of the most current information that has been recorded on the blockchain itself.

Terminology is consistently an important part of any academic or practitioner analysis, and it appears logical to include said definitions as they pertain to accounting and financial professionals.

1. Decentralized and distributed networks form the basis for blockchain technology, and can be summarized as follows. Such a network protocol and construct allows the network itself to survive data hacks, breaches, and other potentially malicious attacks, which is not an abstract concern in the current business environment. According to an in numerous industry reports, total damages related to cybersecurity breaches and other unethical activity will total millions, if not billions of dollars in 2018.
2. Consensus based data approval, if the decentralized and distributed nature of the blockchain itself forms the basis of blockchain technology, is the fundamental game change associated with the technology itself. In a situation where consensus based approval is utilized by a blockchain network, in essence, that means that for any block of information be added to the blockchain, other members of the network must validate and approve the block. The specific nature of just how the consensus based protocol functions will vary from blockchain to blockchain , but the underlying implications of group based data will decrease the likelihood of any one specific

unethical actor having the ability to contaminate the ecosystem with erroneous or fraudulent data.

3. Immutability is an idea and concept often associated with the different iterations and applications of blockchain technology, but it is important to analyze and understand just what exactly this means from an implementation perspective. Just because the phrase immutability is used does not mean that no data changes are ever possible with regards to blockchain information. In fact, additional future blocks can indeed be added to the chain to help adjust, tweak, or net out previously information that may have been uploaded in error. That being said, these future or modifying blocks will be equipped with unique hash identifiers, which in addition to the data and time stamp functionality incorporate into the platform itself, results in a virtually ready made audit trail.
4. Speaking of unique hash identifiers, but without delving too deeply into the computer science and technical specifications, the creation of a unique hash ID for each block of information is a byproduct of both the encryption protocol itself, as well as serving as an additional control over the validity and accuracy of uploaded information. Put simply, each and every block of data, as it uploaded and added to the blockchain, has a unique hash ID that is generated and assigned to that block. Not only is that hash ID unique to that specific block, but it is hashed – or derived from – the transactional information contained within that block. In other words, even if an individual was able to crack the encryption itself, any attempt to edit or change the information contained within that block would generate an error since the new information in the block would not sync with the previously generated hash ID.

### *Institutional interest*

Driving a substantial percentage of the investment, development, and change in the broader blockchain space is the increased interest of institutional players and allocation of institutional capital to the blockchain and cryptocurrency arena (Wieczner, 2018). Fidelity, in the latter end of 2018, launched the first U.S. based cryptocurrency platform that was open to institutional investors to purchase and allocate funds to cryptocurrency assets, generating substantial ways of interest and investment in the space. While a headline generating news event it was not the only instance of various institutions becoming increasingly interested into directing funds toward the area. Coinbase, for example, had applied for and received a custodial banking license, which also was connected to the broader interest at Coinbase to launch and offer asset management services beginning toward the end of 2018. Adding to the institutional interest and investment, particularly in 2018 and 2019, was the development, issuance, and proposed settlement of the first bond running on a blockchain platform (Cohen & Smith, 2018). In order for a technology, no matter how innovative or potentially disruptive, to truly enter the mainstream, especially in regulated fields such as accounting and finance, incumbent organizations will have to adopt the technology.

In addition to these developments and announcements, it also seems that larger and more systemic players in the financial services space are increasing interest and investment in both blockchain and cryptocurrency options (Tully, 2018). Goldman Sachs launched a cryptocurrency desk and trading program in 2017, and was followed by other larger financial institutions in 2018 even as the market capitalization of the cryptocurrency market declined significantly. An interesting development from the perspective of cryptocurrency possible developing into a viable alternative to traditional financial services players and services is the

continued integration of the Ripple blockchain and associated XRP cryptocurrency into the banking sector. Following an initial pilot phase, Ripple has continued to improve upon its initial platform and develop services that both work with and also improve the speed and efficiency with which financial transactions are processed. Interestingly enough, XRP appears to filling a role – in reducing the fees and processing time associated with international remittances and payments – initially envisioned for bitcoin (Huo, 2017). Other institutional players and sector interest include the insurance space, food safety arena, and various aspects of the healthcare sectors, many of which are still in pilot or beta stages as of this research.

## **The Lightning Network**

Built on the bitcoin blockchain, one of the oldest, largest, and most well established blockchains in existence, the lightning network addresses one of the most common complaints and associated shortcomings of the bitcoin blockchain. Under current operating protocols, the bitcoin blockchain can only process between 3.3 – 7 transactions per second, which is much slower than most traditional payment alternatives. Additionally, the process by which blocks are added to the blockchain means that, on average, blocks are only added every 10 minutes, which further limits the speed with which data be processed. Last, but arguably most important, is the sheer amount of electricity and computing power required to mine, hash, and encrypt the blockchain as it is currently constituted under the proof of work consensus model. All of these forces limit the scalability and broader use cases of this technology, but the continued work and development of the lightning network offers a potential solution.

In essence, and avoiding unnecessary jargon at this stage, the following working definition can be established. In essence, a lightning network allows certain transactions to take place off of the primary blockchain, and only utilize the bitcoin blockchain for the opening and closing out of the transactions themselves (Morris, 2018). The bitcoin blockchain will only be used, to use an analogy that is not too technical, as an anchor point at the beginning and at the end of transactions that are taking place. A core aspect of how this is possible is the creation of a next step blockchain application called a payment channel, which facilitates the transmission and exchange of bitcoins without having to record every individual transaction on the bitcoin blockchain itself.

### *Implications of the lightning network*

Perhaps one of the most interesting implications of the lightning network becoming more mainstream and integrated throughout the financial services landscape is that this will increasingly enable financial institutions to store, transmit, and serve as custodians for cryptocurrencies and other cryptoassets. Additionally, the tax considerations that have, until recently, remained the concern of only retail or individual investors, are increasingly becoming part of the institutional reporting and compliance conversation as a result of this increased institutional interest (Schwanke, 2017). These iterations and evolutions are possible because, in addition to reducing the friction and transaction time associated with bitcoin – and potentially other cryptocurrency transactions in the future – transactions, this also enables the development and implementation of payment channels. Alongside these advances, however, there are several key considerations practitioners should take into account.

1. Even with the increased speed and efficiency of the lightning network, regulatory uncertainty as to the treatment and reporting of cryptocurrencies and other cryptoassets may curtail adoption.
  - a. In addition to the uncertainty on an intra-country basis with regards to how different cryptoassets are reported, this uncertainty is compounded when dealing with international transactions.
2. Legally speaking, which institution is responsible for the maintenance of the lightning network, especially since this network is an outgrowth of the (public) bitcoin blockchain? Especially if transactions, facilitated via the lightning network, are executed or at least started based off of a smart contract platform, ensuring proper controls and review over the initial rules and frameworks will be important.
  - a. Even in a technologically integrated workplace, the importance of fundamental controls over the inputs and outputs of information as it is generated will only continue to increase. A sophisticated system, regardless of how automated and efficient those processes are, will only perform and analyze the data that it is given.
  - b. Specifically, as the speed with which immutable and encrypted transactions can be completed increases, the need for robust internal controls will only increase. This may seem contradictory as the combination of automation and speed may reduce some of the need for manual review, but the flow of information into the system must be properly monitored and controlled.
3. From an attestation perspective, how is it possible to audit and attest to the amounts that are stored, transferred, and transacted with on the lightning network, again since this initial iteration is built on the public bitcoin blockchain versus a private blockchain. While this will almost assuredly change, this initial development and application will establish the foundation for future conversations.
  - a. Again the lightning network is constructed upon the bitcoin blockchain, which is one of the largest public blockchains on the marketplace. Even with the encryption and immutability of the bitcoin blockchain, the fact that all transactions are visible and available to network members might remain an obstacle to future adoption of this specific iteration.
  - b. Even if the blocks themselves are indeed able to be audited and examined, the reality of the current audit process means that even if the block headers are identifiable and able to be reviewed, the transactional information within those blocks may remain unavailable. Numerous firms are working on these issues, but at the current time it remains uncertain as to what will be the ultimate result.

Additionally, and taking a step back to remove the analysis from strictly an accounting perspective and to instead focus on broader market implications, the implementation of the lightning network can, and in some cases already is, enabling the development of custodial and fiduciary business models around bitcoin itself. Even the cryptocurrency exchange and trading platform, Coinbase, recently received approval from the New York Department of Financial Services, to launch custodial banking services in the state, which is considered amongst the most difficult to obtain approval from. Established players, notably Fidelity, late in 2018 began to launch institutionally oriented investing and trading platforms for bitcoin and other cryptocurrencies, which would not have occurred, or at least not as quickly, without the development and improvement surrounding the lightning network platform. The increased



speed with which data can be processed and reviewed on the lightning network, specifically the increased speed with which cryptocurrencies can be traded, is a driver of the institutional interest. Additionally, because the underlying infrastructure surrounding bitcoin and other cryptocurrencies continues to mature, it is increasingly possible for financial institutions to migrate some existing business practices and models to the cryptocurrency space.

Even with the increased speed, decreased latency per transaction, and increases in efficiency possible via the lightning network, it seems appropriate to acknowledge that this lightning network protocol is constructed via a public blockchain model (Odell, 2016). For the majority of organizations, a public network – regardless of how fast or efficient it is – will not be appropriate for business transactions. In addition to the legal and regulatory issues identified previously, the fact that all of the blocks of data are indeed publicly viewable and visible to network members will serve as a detracting factor to broader adoption.

## Payment Channels

The core of the payment channel idea is not something that is entirely unrelated to the name of this technical aspect of blockchain technology. Put simply, a payment channel is an off-chain network that runs parallel to the blockchain itself. In other words, these transactions and the associated information linked to these transactions are not directly stored on the blockchain at every single instant. Such an arrangement addresses some of the current shortcomings associated with this technology, including the lag in processing speed and the amount of time that is spent processing certain transactions. Using smart contracts (remember those are automated agreements that have been embedded into the blockchain chain), this allows two or more connected parties to perform transactions without having to broadcast every transactions to the network (Derose, 2016). Conversely, during the lifetime of the payment channel – which again can range from days to years – the individual transactions are stored off-chain. When the chain is closed, the in final balance is mined and added to the blockchain itself.

Payment channels may seem to, when introduced and implemented in conjunction with the concept of the lightning network, or an equivalent to the lightning network, seem to present a solution addressing the speed and scalability of various blockchains. Put simply, if every single transaction must be posted onto the blockchain itself, this 1) delays the speed with which information can be stored, and 2) limits the scalability of blockchain for financial transactions and other business purposes. That said, when considering whether or not a payment channel is an appropriate solution or tool, considerations that should be discussed and analyzed include the following.

- 1) In the case of a custodial relationship, how is the ownership of different cryptocurrencies held on account verified. Is there a trusted third party used to verify and attest to the ownership of private keys? Does there have to be a track record or other paperwork demonstrating a connection between transactions and the associated cryptocurrencies?
- 2) Since payment channels enable off-chain transactions and transfers of information, how are these individual transactions verified or confirmed? It is true that at the current level of implementation the majority of transfers are micropayments, but it is logical to conclude this will evolve alongside the technology itself. How can financial

professionals verify, attest to, and report on these payments communicated via payment channels?

- 3) Lastly, and specific to those same transactions that are taking place off-chain, what are the controls and policies put into place to maintain the integrity and security of information transmitted between the involved counterparties? Both from a legal and accounting perspective, ensuring that this information is secured is a fiduciary responsibility as well as having business implications.

Clearly there do appear to several audit and attestation issues that remain unresolved with regards to the broader implementation of payment channels as a mainstream financial channel through which transactions can be conducted, but simultaneously there are equally as far ranging initiatives underway seeking to address this issue. One of the most consistent complaints and issues that have an impact on the cryptocurrency space, and especially as they seek to be treated and utilized as currency alternatives, is the price volatility embedded in many of the coins and tokens. As next stage blockchain developments and applications become increasingly entrenched within the financial conversation, accounting guidelines and frameworks will have to evolve and keep pace with market trends. Reflecting the increased interest and investment, both by financial institutions and accounting organizations, blockchain advisory and accounting services will continue to develop moving forward (Jun & Vasarhelyi, 2017). While in late 2018 the volatility among many of the larger and more well established cryptocurrencies, including bitcoin, had declined versus prior price movements, the connotation and implications of past volatility still appeared to be having an impact on mass market adoption. Put simply, and logically enough, consumers, investors, and institutional players are less likely to adopt and use a currency option prone to double digit percentage swings in value. This next topical area seeks to remedy both the implied and actual volatility associated with native cryptocurrencies

### **Stablecoins**

Cryptocurrencies, especially Bitcoin, have attracted billions in investment dollars, and hundreds organizations have deployed thousands of individual in this area, but the cryptocurrency landscape continues to change and evolve at a rapid pace. This includes the development of stablecoins, but a working definition assists with any further analysis. First, a working definition of a stablecoin is a cryptocurrency that is pegged to another stable asset, such as the dollar, commodities, or gold reserves. So even though the underlying cryptocurrency technology may still be in play and be used by this asset, the resulting has lower volatility due to the fact that it is linked to some other tangible asset. This actually allows for the practical usage of this cryptocurrency for things like paying for items, and using a cryptocurrency as medium of exchange versus simply as an investment tool. The stability of price, versus the dramatic price swings that have characterized the bitcoin market as of the writing of this research, is important for two financial reasons. Price stability in the short term allows for these items to actually be used for transactions – merchants are more likely to accept a method of payment that does not have a connotation or previous track record of price volatility. Viewed in the long term, price stability allows stablecoins to become a viable alternative investment choice for a broader range of market participants. Broader adoption and integration within portfolios will also help maintain the stability of price, which alongside the institutional investment and interest via lightning networks and

payment channels, appears to be driving the conversation regarding regulation and standardization toward the proverbial front burner.

For financial and legal practitioners, and in addition to technical issues that will inevitably arise in this space, several additional considerations – including those listed herein – must be part of the implementation conversation.

1. What is the stabilizer in the stablecoin conversation? Just because there is a new class of cryptocurrencies with the same label does not mean that all of these stablecoins utilize the same sort of stabilizing function. Some are backed by fiat currencies, others are backed by commodities, and yet others are supported by an additional cryptocurrency that, in turn, is supported by some other type of asset.
2. How is this stability achieved? For both legal and financial reporting purposes it is important for practitioners to understand just how this price stability – a primary attraction of stablecoins – is achieved. In terms of both any contracts, rights, and obligations that are built using these stablecoins, as well as the taxation and reporting of assets to the marketplace, understanding how this stability is achieved is an important part of the conversation.
  - a. For example, if the stability is driven by smart contracts, which party is actually in charge of constructing these smart contracts, and is that same party also in charge of maintaining the smart contract coding.
3. Is it possible to audit the valuation and existence of these stablecoins? Particularly with the breaking of the buck that has occurred with some of the most prominent USD linked stable coins in 2018, the valuation question raises both financial accuracy concerns as well as legal liability issues. If said stablecoins as used as collateral for a loan or purchase of other assets, the valuation, existence, and accuracy of these coins can quickly become a major issue with several associated implications.

In addition to the issues raised above with regards to stable coin issues, it also important for practitioners to understand just what type of stablecoin, and what type of stabilizing protocol, are being used to generate the required reduced price volatility, including the process by which these coins or tokens are actually issued (Cohen, 2017). Many of the most prominent stablecoins that have been implemented and introduced into the marketplace in the United States have been connected, in one way or another to the U.S. dollar, but there are also several instances of coins that are supported by a physical commodity, which often happens to be gold. Drilling into these differences more specifically, there are several topical areas that should form the basis for how accounting and financial professionals assess, record, and contend the issues that arise as stablecoins enter the market place and become more mainstream.

First, how is the stablecoin itself actually connected to the underlying asset? Such linkage can take many forms, and even more variations if the stablecoin happens to be linked or connected to an underlying currency. The idea of pegging one currency to another is not a new or innovative concept at all, emerging market economies have linked domestic currencies to the U.S. dollar for decades. In the case of stablecoins, which are supposed to increase the stability associated with cryptocurrencies, however, it is important know what exactly this pegging represents. A direct, or 1:1 peg, between the cryptocurrency and the U.S.

dollar is an approach that has been adopted by some market actors, but also generates the same types of issues and potential problems that occur when a country seeks to link currency to another currency. Costs associated with shoring up the stablecoin may, given how market conditions change, result in an unsustainable business model for the issuing organization. Conversely, crawling peg or flexible beg, in which the stablecoin itself is allowed to fluctuate in value versus the underlying currency within a pre-established range, may appear to be more appropriate given the early stage in which the market currently finds itself. As of this date, the SEC is beginning to issue guidance and opinion papers with regards to token classification, but the field itself remain ambiguous as of this research (Crabb, 2017).

If, contrasting versus a fiat based current peg, the stablecoin itself is linked, connected, or pegged to a commodity, the implications are going to shift and be different than for stablecoins connected to a fiat currency. Specifically, the issues from an accounting and legalistic perspective can be distilled into two broad categories. If a stablecoin is indeed connected to an underlying commodity such as gold or oil, does the stablecoin holder actually have a physical claim on that underlying commodity? In the case of stablecoins that are simply backed or pegged to a commodity the answer to that question may not be as clear or evidence as might initially be thought. Connected to both client reporting and the actual valuation of the associated stablecoins, obtaining an accurate definition of how the stablecoin is actually related to the underlying asset is fiduciary duty of any financial professional. Individuals or institutions who mistakenly believe that the stablecoins linked or pegged to gold or oil, for example, provides access to the underlying commodity should be cautioned against this assumption. Collateralized coins, to the contrary, are usually directly supported and underpinning by the commodity itself, but in addition will usually have a legal claim to access or use the underlying asset in the event of market uncertainty.

### **Implications of Blockchain on Audit and Attestation**

As has been documented throughout this research paper as well as numerous other articles, podcasts, and periodicals, the implementation and integration of blockchain technology does appear to be having several disruptive effects on the profession at large. Specifically, the implementation of GDPR on both an E.U. and international basis, contending with that as well as other regulatory changes will increasingly occupy a larger percentage of practitioner time and effort (Herian, 2018). In addition to these documented changes, including but not limited to the augmentation or eventual elimination of the audit function and many lower level tasks associated with entry level employees, next step applications will also have an impact on the broader accounting and financial services landscape. Stablecoins, payment channels, and the lightning network protocol that utilizes said payment channels are positioned to have an arguably larger impact on the profession than bitcoin and other cryptocurrencies initially had on the business landscape. While the technological implications and ramifications of these technology tools do appear to be becoming increasingly evident, these tools will also require that accounting practitioners evolve and develop alongside the broader business landscape.

Specifically, as larger components and pieces of the data processing and analysis currently performed by individuals and financial services professionals are instead performed via software programs, practitioners will need to evolve in order to keep pace. Data management and analysis will continue to shift from an ancillary service to a core component of the services performed by accounting and financial professionals. As this occurs, and taking into account the automation already impacting financial services, it does appear

reasonable to attempt to forecast and estimate the ultimate impact these forces will have on accounting (Borthick & Pennington, 2017). For example, remaining simply a subject matter expert in a specific technical area will no longer be enough as larger amounts of data and information are able to be processed with automated or computerized means. Even centralized banking authorities, i.e. central banks, are increasingly expressing interest in developing and implementing cryptocurrencies or other blockchain based solutions to both keep pace with changes and experiment with specific implementation tactics (Berentsen & Schar, 2018). In addition to the need for practitioners to be more well rounded in terms of technical expertise and knowledge, practitioners will also need to develop more interdisciplinary skills and abilities to work with a broader coalition of internal stakeholders. Additionally, and on top of the reality that accounting and other financial practitioners will need to work and consult with other technical experts, this also demonstrates the need for practitioners to evolve into a role more akin to that of strategic partner.

Transitioning to a position as strategic partner or trusted advisor is an oft-cited goal and aspiration of many accounting and finance professionals, but has remained a difficult transition for the majority of practitioners. Such difficulty can be boiled to two primary drivers – the lack of technical tools to augment and automate accounting processes, and the mindset of profession itself. Underpinning the broader cryptocurrency and blockchain ecosystem is the reality that, after several decades of iterations and false starts, the technology itself has been proven as functioning and able to be utilized. That said, and even taking into account the development and efficiencies delivered by emerging tools and technologies, it is worth taking into the reality that regulation will have an impact on how fast and how thoroughly these tools and adopted across financial services (Posadas, 2018). Whether it is the public blockchain, epitomized via the bitcoin blockchain, RPA organizations and providers, or AI tools such as those represented by the work underway at IBM as IBM Watson, the technology itself has developed to a level that is functioning for commercial use.

Second, and arguably the more important point from the perspective of accounting and financial professionals is the pressure coming to bear on the profession from external forces. Whether it comes in the form of data analytics and data scientists handling the advanced analytics and reporting, practitioners will need to keep pace both the technology tools themselves as well as the implications these tools will have on the work performed by practitioners. Regardless of individual or firm opinion, the underlying reality is that the technology landscape is changing and evolving at an accelerating pace, and that other members of the professional services landscape are evolving to meet stakeholder expectations. This transition and evolution of the profession will be comprised of two distinct, yet related tracks. First, practitioners and professionals will need to embrace the idea of continuous learning and education in order to keep pace with the reality that, from virtually every perspective and angle, that the needs and expectations of practitioners is changing. Second, and building on this requirement for education, the need and expectation of information and education represent a potential new service line and revenue opportunity for the profession. Drilling down, the conversation around additional service lines connected to the changing nature of the technology landscape is an important aspect to consider. Taking a look at these possible opportunities, the following conversation becomes, for all intents and purposes, a requirement of the professional dialogue and landscape.

*Additional service opportunities*

While much of the conversation related to emerging technologies tends to focus on the job loss and job automation impacts of these technologies, these very same forces also have the potential to create new opportunities and possibilities for motivated and forward looking professionals. Even for the practitioners and organizations who are not able or interested in staffing out the necessary expertise to tackle these areas of growing importance for clients and customers, there are additional options and venues in the marketplace for firms to leverage and develop moving forward. A simple, yet powerful, example is already underway in the case of Singapore using different forms of distributed ledger technologies to tackle money laundering a fraud, with direct implications for attest and assurance services (Lai, 2018). Drilling down specifically to some of the direct action steps and service lines that can be generated as a result of this technological emergence and integration include, but are not limited, to the following.

First, offering advisory services related to dealing with different types and classes of cryptocurrencies, including cryptocurrencies, tokens, and stablecoins is positioned to become a fast growing and lucrative service lines moving forward. Whether it is recommending different accounting treatments for different assets, advising as to whether or not the client organization should take or receive different cryptoassets as a form of payment, and what the potential implications of cryptoassets may be on the organization are important questions every firm must grapple with. Second, serving a role of expert advisor or technology consultant also provides a possible path forward for practitioners and firms, as with any fast moving space there is bound to be confusion, a lack of quality information, and misinterpretation on the side of potential customers and clients. Offering such advice may seem to be removed from current product and service offerings in the marketplace, but upon a more in-depth review it is not as abstract or distinct as might have been initially believed.

**Concluding Thoughts**

The intersection of blockchain technology, cryptocurrencies, and the legal implications that arise from having to deal with do not appear to be a fad or a passing trend. With the 10-year anniversary of Bitcoin implementation quickly receding into the rear view mirror, it is clear that while the initial goal of Bitcoin – the creation of an alternative financial system and structure outside that of fiat currency – may not have been realized, that the introduction of this asset has spurred the creation of an entire new industry. While it is true that billions have been invested into the blockchain ecosystem and cryptocurrency space, and dozens of leading organizations are doing this investing, the broader ecosystem still remains in flux. What can be stated without any doubt, however, is that there do appear to be next level types of applications and developments that continue to change both the blockchain ecosystem, and how this ecosystem intersects with the financial services landscape. From an accounting, attest, or legalistic perspective it is imperative that practitioners have both a firm understanding of these emerging trends as well as key considerations from an implementation perspective. Completely accurate answers and guidance may still be out of reach at this point, but asking the correct questions and understanding what factors should be taken into account represent definitive first steps that can be taken regardless of industry affiliation. The time is now to remain aware of changes occurring in the broader blockchain space, and develop frameworks to accurately assess and engage with these technologies moving forward.

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