THE COMPLETE GUIDE TO
UNDERSTANDING BLOCKCHAIN TECHNOLOGY

BLOCKCHAIN

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The Complete Guide To Understanding Blockchain Technology

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Table of Contents

Introduction

Transactions have had a long history dating back to biblical times. At first, they were nonfinancial, as money wasn't in circulation at the time. A credit system was employed where people could conduct transactions and exchange goods and services for a corresponding compensation that was expected immediately or in the future. This method of transaction was disadvantageous, however, as it required one party to absolutely trust the other party to keep their end of the bargain, especially in cases where future recompense was expected. As humans, trust is sometimes a challenge. Then came the common use of trade by barter, where debts were settled by a total exchange of something of corresponding value, such as precious stones, e.g., gold, silver, or diamonds. With the arrival of civilization, coins and other forms of money were introduced, allowing an individual to amass assets. These assets would not deteriorate with time, which was a disadvantage of accumulating goods. This newly introduced form of transaction and amassing wealth had the strong backing of the government or a regulatory body, which was responsible for setting values, adjusting these values, and then regulating circulation.

In the twentieth century, floating currencies gradually replaced the once common fixed currencies, making transactions easier, faster, and less stressful. Even the most complex transactions became easier, but even these transactions still depended on people for various protocols, such as verification, keeping records, and other functions. Tracking documentation, asset authentication, and other back-end functions were occasionally stalled since this transaction system still depended on people to function properly. Computers eventually made transactions easy, but the challenge of cyber theft was always present.

What if a better transaction system could be developed? What if a system could keep track of all transactions without the worry that some transaction records might go missing? What if the records could last forever? What if this transaction system could be applicable for all phases of human society? This book will enlighten you about blockchain technology. Take note of how the current transaction system is improved. Consider how it has been used, although by a minority of the earth's population, and how we all can harness

it. Pay attention to its application in various fields of human endeavor, and improve your transaction experience. Welcome to the new speed of economy —blockchain—but before we discuss this subject, I have this amazing welcome gift for you. It would be great if you could join my inner circle so that we can stay in touch and you can start receiving my new books at a discounted price. I want to give you an amazing reader experience. I have a special offer ready for you on the next page.

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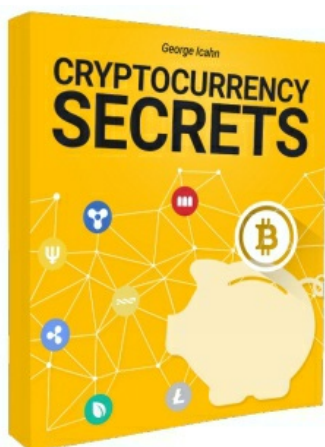
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Chapter 1: Getting Started With Blockchain

What is Blockchain?

Simply put, blockchain is a technology that simplifies our transactions. It is a numerical or digital (online) ledger that records transactions that are made in cryptocurrencies, sequentially and openly. It is different from the current way of banking, where all transactions are linked to a nonvisible, centralized network. Blockchain technology, however, is a decentralized database of the digital ledger that is made public for all to see. It makes it possible to monitor every transaction in detail. Even in the comfort of your own room, you can control all your transactions transparently. Each transaction is viewed as a single block, where subsequent transactions or blocks are added to make a digital, linear, chronological chain known as a blockchain. Each time a block is completed, a new block is automatically generated. The records of this digital ledger cannot be altered or erased without altering a previous transaction or block, and any attempt to do this will result in disruption of the whole network. Each computer connected to this network is called a node. When a new transaction is recorded, a copy of the blockchain is sent to each node as they join the network. This decentralized database of the digital ledger is replicated and harmonized through the Internet by anyone connected, rendering useless the use of a centralized administrator (such as banks). This digital ledger is incorruptible (no centralized information is available for alteration or hacking), and it records not only financial dealing but also anything of value (assets).

This ensures that each node or computer connected to this decentralized network has all the information about every transaction from the beginning to the most recently completed transaction. All other forms of transactions need a third party or an intermediary for them to work. Middlemen perform simple tasks, such as keeping records and authenticating the transaction processes, but with blockchain technology, you do not need a third party to conduct business. The money, property, and stocks are displayed on the computer as files. Re-creating such files is much easier, and you don't need a middleman in the whole process at all.

This technology allows people to trust each other, thereby extending the borders of the transaction. It is also safe, as hacking the system is

unfathomable. For example, if someone wants to hack into a single transaction or block, he will not just try to alter that block but also the previous block and then the previous block back to the very beginning of the transaction. What's worse is that he will then try to gain access to all the computers connected to that network, which could number in the millions. Accordingly, the possibility of someone hacking into the system is very low as opposed to the centralized systems we have today. There have been cases of banking systems being hacked, identities stolen, and bank records cleared. None of these are possible with blockchain technology.

We can further illustrate blockchain this way: Mr. A and Mr. B placed a bet of $10 each on whether or not it will rain the next day, where the winner pockets $20. They can decide to keep the $20 with a third party until the next day when the winner expects to get his reward. The third party can be influenced or swayed by sentiment if Mr. A wins, but he is close to Mr. B and vice versa. What if they eliminate the third party and drop the $20 into an automated machine that automatically credits the winner? Another example is comparing how information is shared through Microsoft Word documents. If Mr. A sends a Microsoft document to Mr. B to make an adjustment, Mr. A needs to wait until he receives a return copy from Mr. B before viewing the changes made to the document. It is as if the document is temporarily locked out of Mr. A's sight. But what if there were a platform, such as Google Docs or Spreadsheet, that grants Mr. A and Mr. B access to that same document at the same time? When one of them is making a correction, this same information is shared with the other, and both can view it simultaneously. It is like a shared digital ledger between them and will be available to others who connect to that network.

These two different examples are exactly what blockchain does. No third party—just plain transparency, instant access, and assured expectation. Vitali Buterin made the following comments about blockchain: "A blockchain is a magic computer that anyone can upload programs to and leave the programs to self-execute, where the current and all previous states of every program are always visible, and which carries a very strong crypto economically secured guarantee that programs running on the chain will continue to execute in exactly the way that the blockchain protocol specifies."

Want more? The relationship between blockchain technology and cryptocurrencies (e.g., bitcoin) has been likened to what the Internet is to

email. It will have a very great impact on the next generation. It gives all who are connected to the network equal access unlike banks and governments today. Eliminating intermediaries makes it possible to conduct transactions with more frequency and efficiency, contributing to foreseeable high traffic in local and international trades. It will allow more freedom as well, as many countries spend millions of dollars fighting corruption. With blockchain technology, though, protection against exploitation and corruption is guaranteed. Even the high number of people who lack exposure to the global economy will now be more familiar with payment and financial systems. Blockchain is no doubt the blueprint for all cryptocurrencies.

The History of Blockchain

When discussing the history of the blockchain, someone known as Satoshi Nakamoto must be mentioned. He was an anonymous scientist whose work, a 9-page white paper, was published almost a decade ago (2008 precisely). His work is almost an unbelievable postulation. He gave a rough draft in detail on how to make cryptocurrency that is powered by a complex mathematical formula and irrepressible distributed plan. Bitcoin will be discussed in detail later in this book, but we must mention it briefly at this point. In Santoshi's white paper, he explained how bitcoin can serve as a financial payment method between two willing parties, without a need for a third party regularizing the transaction. He postulated that each transaction will be stored in a digital ledger (the blockchain), with each recent block or transaction connected or added to a preceding block and the preceding block to another preceding block, in that order, to form a chain of blocks or transaction, using a digital signature. It is going to be built on trust and transparency because participants can authenticate the signatures by running various sophisticated algorithms. In this way, they can add blocks or transactions to the blockchain. In this system, two people who are not familiar with each other can exchange values through the network with full confidence that they will not be victims of any financial mishap.

Basically, blockchain technology was introduced when the bitcoin was invented in 2008, but implementation did not begin until 2009. Many argue that this theory of digital currency is new, but the concept of electronic money is not strange. We remember quite vividly the name David Chaum, who in the 1980s proposed a model of e-cash modus operandi. In the last ten years, however, a series of inventions have proved pivotal for achieving what

was once considered a dream.

- The first invention was the bitcoin. It started as a digital tryout, but as of mid-2017, the market capitalization of bitcoin is now $38,803,254,566 at the rate of $2,423.78 and a circulating supply of 16,421, 975 BTC and volume (24h) at $759,340,000. Amazing, isn't it? In just ten years of innovation? Who knows what the future holds. Millions of people across the globe use this medium of payment, making both large and growing remittances.
- The next invention is the blockchain, which is considered the blueprint, the technology that operated cryptocurrencies like the bitcoin. This innovation has been seen to be useful not just with the currency but also in other fields of human endeavor. Since its innovation, almost all financial organizations throughout the world have begun researching how they can harness this useful technology. According to IBM (International Business Machines Corporation), it is believed that blockchain will be used by 15% of the world's major banks worldwide by 2017, and the number is expected to rise to 65% by 2019.
- The next invention is the Smart Contract expressed by the creation of another kind of cryptocurrency called the Ethereum. It creates computer programs straight into blockchain, and this computer program provides a platform different from that of the bitcoin. The bitcoin represented cashlike tokens, but the ethereum allowed financial tools to be represented instead. Since its invention date, it has been graced by millions of people. Smart contracts boast a market capitalization of $25,266,094,727 at the rate of $271.82 with a circulating supply of 92,951224ETH with a volume (24h) of $1,071,180,000.
- The next invention is the "Proof of stake," which is considered the most recent modern stage of blockchain thinking. Currently, cryptocurrencies, like the bitcoin, are secured by "proof of work," which simply means that the group that makes the decisions is the group with the largest computing power. These groups that are responsible for the decision-making are known as the "miners." They provide security by operating vast data in exchange for cryptocurrency payments. The "Proof of stake" system, however,

does not make use of vast data centers; rather, it uses sophisticated financial tools for a higher degree of security. The proof-of-stake system is expected to go mainstream in 2017.

- The fifth invention is the blockchain scaling. Currently, all computers connected to the blockchain network work together to process every transaction. To be sincere, this is quite slow. What if there were a faster medium of processing transactions? A scaled blockchain provides the answer. It speeds up the process without jeopardizing security. It calculates how many computers are needed to execute a transaction and divides labor among the computers, so the overall output can be more efficient and also faster. It will no doubt be fast enough to go head-to-head with the current major middlemen in the financial world while powering the Internet as well.

As this progressive innovation hits the market, it is expected that rapid changes will take place. An example is for the transaction to go from taking days to execute to complete within hours, a few minutes, even immediately. The cost of processing each transaction is also expected to drop. In fact, we can't really predict its full impact because predictors often fall into underestimating long-term effects as well as overestimating how fast a change can affect the economy, but we are sure that it will surely improve the face of business.

Many government agencies are ready to start using it full time. For example, Dubai already has a blockchain strategy. They plan to start issuing all government documents on blockchain by at least 2020, and owing to its success, it is expected that many other government agencies will follow suit. It will start a global transformation in trading and partnership. In the book *The Entrepreneur State,* Mariana Mazzucato teaches that blockchain technology will be the leading edge of innovation, particularly in infrastructure, and it is often in the hands of the state, and that seems destined to be true in the blockchain space.

What You Need to Know About Cryptocurrency

As was discussed earlier in this chapter, cryptocurrency is a digital type of currency that makes use of encryption to carry out and verify/validate transactions. We remember that as each block or transaction is completed it is

automatically added to previously existing blocks to make a chain of blocks or transaction known as blockchain. We also note that cryptocurrency is supported by top governments, including the USA, and under consideration by some other notable governments, such as Argentina, Brazil, and Cyprus, as an alternative to fiat currencies.

What is a Cryptocurrency Address?

Just as a literal address helps others locate and confirm your ownership of a property so does the cryptocurrency address. It is unique for every customer. It is a public address that utilizes a number of unique characters to receive cryptocurrencies. It proves your ownership because each public address has a corresponding private address linked to it, and this private address is also linked to the digital ledger, the blockchain. It is just like a special mailbox through which you receive currency instead of emails.

Concept of a Digital Wallet

Everyone loves to own a wallet, which can be used to hold some cash maybe of different dominations for transactional purposes when needed. When dealing in cryptocurrencies, the digital type of currencies, you may start thinking of a central domain that stores your assets, but a digital wallet does more than hold cash.

A digital wallet is an electronic device that permits all forms of electronic transactions, be it purchasing items online or at a store. It can be used from a personal or shared computer or even from your smartphone. Even your bank account can be linked to your digital wallet. It can also be used to store digital coupons or loyalty card information. No more long queues and hours of delays you ask? Life made easy? Exactly! Conducting transactions, making and receiving payments, interaction with merchants worldwide, and liaisons with business partners will be a lot easier thanks to this wonderful innovation, but you must be careful with digital wallets because many different types are available. You can't just choose any particular one, as each person and the type of business they do differs. While your financial adviser or your banking service can be of help in determining which one is right for the type of business that you do, it is not their responsibility to make the final decision. Since it is your responsibility to protect your money, property, and other financial assets, it is your sole responsibility to make the final decision as to choosing the type of digital wallet that will best help you to adopt good

monetary practice.

Different Types of Cryptocurrencies

The bitcoin has become a household name since Satoshi Nakamoto created it, and when people hear about cryptocurrency, they automatically think of bitcoin. Actually, though, a cryptocurrency can be created at any time, and with the rate of growth that is now synonymous with cryptocurrency, it is expected to increase in the coming years. As of January 2015, more than five hundred different types of cryptocurrencies were present. As noted earlier, the largest and most successful cryptocurrency in the blockchain network is the bitcoin, but several others are worth mentioning. The bitcoin is followed closely by Ethereum, Ripple, and Litecoin respectively. Now some nine hundred types of cryptocurrencies are available, and the number is still growing. What follows is a discussion of the top ten types of cryptocurrencies and how they can benefit you, which should motivate you to think about trying this new innovation.

1. **Bitcoin**

   The bitcoin, which was created by the anonymous scientist Satoshi Nakamoto in 2008, is one of the pioneers of digital currency and can be used to purchase items over the Internet (electronically) and in some cases even locally. You really don't need to understand everything about the technicalities of the bitcoin before you can start using it as a means of exchange. Just install the bitcoin wallet on your electronic device—maybe a computer or a smartphone. It will automatically generate a bitcoin address for you once this is done, and then you can proceed to perform all types of real transactions with it. As your need for more transactions increases, you can generate more bitcoin addresses for yourself. For a full in-depth look into Bitcoin checkout my recent release "Bitcoin: The Complete Guide To Understanding Bitcoin" You can find it at http://cryptocurrencystudio.com/bitcoin

I constantly update all my books. With all the future updates I have planned to come soon I promise you'll love it! (All my crypto series)

2. Ethereum

This decentralized computing platform will foster trust even among strangers. You can do business with virtually anybody because with the ethereum all terms and conditions are clearly spelled out in a "smart contract," which is digitally registered on the blockchain network. This smart contract functionality offers the Eretheum Virtual Machine (EVM), a virtual machine that verifies and validates all contracts using a cryptocurrency known as "Ether." The embedded "smart contract" can be used several times for different transactions. No wonder its market capitalization as of 2017 is second on the cryptocurrency table, with only bitcoin ahead of it. For a full in-depth look into Ethereum please checkout "Ethereum: The Complete Guide To Understanding Ethereum" You can find it at: http://cryptocurrencystudio.com/ethereum
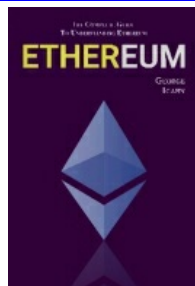
3. Ripple

It is also known as the Ripple Transaction Protocol (RTXP), and as expected it is built on an open source (decentralized) Internet protocol and currency known as Ripples (XRP). This Ripple protocol uses an agreed-upon process to facilitate all transactions, be

it an exchange, payments, or withdrawals. It is easy to understand and use, as it offers instant, cost-effective payments, both locally and internationally. It was launched in 2013.

4. Litecoin

Launched in 2011, this digital currency is almost identical to the bitcoin. Some even argue that its creation was inspired by the bitcoin. The transfer policy was built on an open source protocol as well. It is a peer-to-peer cryptocurrency that was released under the MIT (X11) software license.

5. Dash (formally known as Darkcoin)

This digital currency was launched by Evan Duffield in 2014. It is a more secretive form of bitcoin, as its formal name, Darkcoin, shows. Business dealings are almost untraceable, as it provides more added privacy. During its launch, two key features of this cryptocurrency that were emphasized were privacy and speed. It has since lived up to its expectations, and "dash" has an ever-growing fan base.

6. **Peercoin**
   This one-of-its-kind digital currency was created by Scott Nadal and Sunny King, two software developers, in 2012. Its most unique feature is its combination of "proof-of-work" and "proof-of-stake." It was formally known as PPcoin. The "proof-of-work" hashing process used in mining this coin was initially difficult, but to make up for this, users were rewarded with coins that used the "proof-of-stake" algorithm. The advantage of this remodeled coin is that it requires little energy to generate blocks or, in other words, complete a transaction.

7. **Dogecoin**
   This digital currency was launched in 2013 and uses a technology of scripts as a proof-of-work scheme. The makeup was based on the same protocol used in creating the bitcoin, although there were some modifications. There is no limit to the production of this digital currency, which is best suited for carrying out smaller transactions because it deals with coins that are of lesser value individually. The block time is approximately sixty seconds.

8. **Primecoin**

   In the summer of 2013, software developer Sunny King developed this digital currency. Its technicality, which is the proof-of-work, was based on prime numbers, which is completely different from the bitcoin framework. It works to find unique long chains of prime numbers, thereby providing greater mining ease and added network security.

9. **Chinacoin**

   This currency is based on the same framework as with the Litecoin. It uses the script key derivation function, which is password based. It is generated in a block of sixty seconds, with eighty-eight coins per block. Amazing!

10. **Ven**

    This digital currency was launched in 2007. It was created to reduce the risk of inflation. Its value in the financial market is determined from a list of currencies, commodities, and carbon features.

As these reviews show, cryptocurrency is not all about bitcoin. In fact, the well-known bitcoin has alternatives, such as the Auroracoin, Mastercoin, Freicoin, Quark, Sexcoin, and Namecoin. You can also choose from a host of other types of digital currencies. Based on CoinMarketCap.com, a website that regularly publishes the market capitalization of cryptocurrencies, about twenty types of digital currencies are available that sell for more than $1. For a full in-depth look into cryptocurrency please check out "Cryptocurrency: The Complete Guide To Understanding Cryptocurrency". You can find it at: http://www.cryptocurrencystudio.com/cryptocurrency
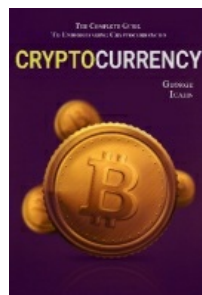
Chapter 2: Current World of Blockchain

Blockchain Mining and Investment

Blockchain Mining

In this article, we will use the bitcoin as a case study of digital currencies. As you read about bitcoin mining, remember that the bigger picture of this discussion is the blockchain and its mining. Basically, mining in this context refers to the addition of new block records (transactions) to the public ledger of blocks. We remember that these blocks make up a chain of transactions or blocks in that digital ledger known as the blockchain. Once these records are recorded, the blockchain makes it public to other connected networks or nodes of the completed block. The node connected to the blockchain makes use of this information in differentiating between legitimate and illegal bitcoin transactions and from attempts to respend coins that have already been spent. Since the bitcoin uses the "proof-of-work" function, each transaction or block must contain this hashcash "proof-of-work" for it to be considered authentic and acceptable. When the blockchain receives a new block, each node connected to the blockchain tries to verify this block's "proof-of-work" and then on completion of this verification, validates the block or transaction. It only takes a few seconds to complete this process. Upon validation, the new block is added. In this way, the number of blocks added each day is kept in check and remains steady. It is resource intensive and was specifically designed for this purpose. It allows each blockchain connected node to keep transactions secure and reach a tamper-resistant agreement.

But mining is also used to introduce new digital currency into the system. When new coins are created, miners are rewarded with transaction fees. These new coins are distributed in a decentralized manner, which builds confidence in the security of the entire system. Miners of cryptocurrencies assist in keeping the network secure by a consensus approval of transactions. Mining ensures fairness while keeping the network safe, secure, and stable.

How does the mining process work? Let us briefly take a look at the way hard currency or paper money is circulated as an example. The government decides and then approves when to print cash and how to

distribute it. In this respect, though, the bitcoin does not need a central government to approve its creation and circulation. It is a digital, decentralized currency that does not need a central government to be involved. Miners use specialized software programs and specially designed mining hardware to create or mine these currencies. They use the software programs to solve arithmetic problems and in exchange are issued a set number of digital currencies. It is a smart way to get the currencies and also encouraging to others who are interested in mining these digital currencies.

Blockchain Mining Hardware

Hardware for mining cryptocurrency is designed to generate "proof-of-work." There is much hardware to choose from, but your choice will be determined by a number of factors, including the type of coin you want, hashing algorithm, and the general acceptability of the hardware in terms of users' ratings. What exactly is the above-mentioned hashing algorithm or hashrate? It is the rate that controls how many attempts a miner makes in solving a cryptocurrency block per second. The more attempts at solving a cryptocurrency block, the greater the chances of solving the block and the better the mining hardware. The hashrate is measured in hash per second (H/s). We can have Kilohash (KH/s), Megahash (MH/s), Gigahash (GH/s), Tetrahash (TH/s), and Petahash (PH/s). Shown below is a table that provides details about hardware for the top three cryptocurrencies.

Harware name	Avalon 6	AntMiner S7	AntMiner S9
Hashrate	3.5 TH/s	4.73 TH/s	11.8 TH/s
Power usage	1050 watts	1350 watts	1350 watts
Power efficiency	0.29 Joules per GH	0.28 Joules per GH	0.1 Joules per GH
Controller	Separate	Built-in	Built-in
Noise	55 db	62 db	50 db
Chip process	28 nm	28 nm	16 nm
Breakeven point	7 years	2.6 Years	0.9 Years

You have a wide choice of hardware to choose from. If you think of mining, the ones above are the most recommended.

Blockchain Mining Software

The major work of creating a digital currency is done by the mining hardware, but mining software is also indispensable. It is needed to link the mining hardware to the blockchain network. Just as with the hardware, a number of factors must be considered in choosing which software program will be useful for you in your cryptocurrency mining process. These factors include the operating system and the type of cryptocurrency you plan to create. As discussed in the preceding chapter, upwards of nine hundred different types of digital currencies were available as of 2017, and each of these has specialized software for it, which means that if you are planning on creating Litecoin, for example, the software used in the creation of Dogecoin may not work for you. It must be noted, though, that some software can be used to create more than one type of cryptocurrency. Below are some examples of software programs from which you can choose.

Example:

- ZOTAC 750 T 1GB (5.35 MH/s for Lyra 2v2)
- XFX 7990 (21.8 MH/s for x11)
- XFX 7990 (28 MH/S for Quark)
- XFX R9 290x black edition (32 MH/s for Ethash)

Mining Difficulty

Simply stated, this is a measure of difficulty in finding a new block or how difficult it is to find a hash below a given target. The measure is periodically adjusted based on the hashing power that has been deployed by connected miners. There is a global block difficulty, so blocks that are considered valid must hash below this target. The difficulty is adjusted every 2,016 blocks, based on the time taken to find the previous 2,016 blocks. If one block is discovered every ten minutes, it will take two weeks to find 2,016 blocks. If the previous 2,016 blocks took longer than two weeks to find, the difficulty is reduced. Conversely, if it took less than two weeks to find 2,016 blocks, as expected the difficulty is increased.

Blockchain Investment

With all this information available, it is only logical to wonder how you can invest in this ever growing economy of the blockchain. You might want to ask such questions as What do I need to do to not lose money? What do I

need to know? When is the right time to invest, and how can I make the best possible profit?

You should invest in blockchain because it is the fastest-growing investment opportunity presently available. Every day the number of network users is steadily growing at an exponential rate, which, in turn, leads to positive growth of the investment. Let us consider Facebook. Currently, it is worth over $30 billion. It is growing every day. More than six billion people currently use it, and every insightful business owner wants to invest in it. Why? Only three steps are involved: invest, wait, and profit. The same is true of the blockchain technology. Consider these statistics:

In 2010, there were only about 10,000 users. In 2012, the number increased to 100,000. Two years later in 2014 the number of users jumped to 1,000,000, and last year a record 10,000,000 users were recorded. With this rate, in 2020, it is estimated that about 100,000,000 users will be actively using blockchain technology. As the number of network users grow, so will the investment. No doubt now is the time to think about investing your money and just wait for your profit to roll in. It is the best investment opportunity now, and some have called it the best investment opportunity since the Internet. Smart move!

Blockchain technology will eliminate financial deception in a number of ways. Banks can go bankrupt. Money can be lost even if it is kept in the bank, and if the bank's capital base is not large enough, all you will hear afterward is SORRY. Blockchain technology, however, is a mathematical guarantor of economic freedom.

Before you think of investing, take time to get at least a basic knowledge of the computer and how to operate it. If you don't and want to invest in blockchain technology, you may well lose your hard-earned money.

Know also that all accounts require a password. Create one that you will easily remember, or better still, write it down so that you can easily go back to check in case you forget. Also be sure to choose a password that others cannot easily guess. You don't want your money in the wrong hands.

Learn to back up your data. If you have disliked using antivirus programs, learn to love them and regularly update them. This will protect your computer as well as your accounts.

In essence, before thinking about investing in crypto-economy, try to improve your computer literacy.

The next step is to sit down and determine what percentage of your income you want to invest. Realize that there are risks, especially as a new investor, and to be on a safe side, try to start with an investment of between 1% and 10% of your income. This is important, as expectations may not be met immediately, although the possibility of this is very low as long as you are computer literate. As you become familiar with the system, gradually increase your stake or investment.

Also be sure to note that the blockchain investment opportunity is a long-term trust. It yields interests and profits over time. If you are someone who wants instant profits, it is not for you. Reasonably define the investment period from the start to within three to eight years because blockchain is still in its embryonic stage.

Study the market, observe the trend, know when the tide is high or low, and determine when is the best time to buy or sell.

Useful Tips From Experts for Cryptocurrency Miners and Users

Succeeding on the blockchain network requires careful study and calculation, but appreciate all the useful ideas and tips from those who have been successful in trading with cryptocurrencies. It is like planning a journey to a distant land you have never been to before. You may not know what to expect, but if someone who has been there before gives you firsthand information about the place, their culture, and living conditions, you will be more confident of going there. What may at first seem a dangerous quest will in no time turn into an interesting, mouthwatering adventure. In this article, we will take a look at what has made some hit the jackpot with cryptocurrency. We will also explain how you can make use of the tips therein.

Privacy Tips

One important point for all blockchain users is being able to surf the Internet and conduct dealings with a considerable standard of privacy. People trade every day in digital currencies amounting to millions of dollars. We know our personal business dealings is no one else's business, hence our need for

increased privacy. Since the digital ledger, the blockchain, is usually visible to all connected nodes, movement of funds is also well known to others. This can pose a threat to our public online dealings and can leave us susceptible to various malicious groups whose aim is to keep track of users and their online activities. Hackers also pose a risk, and how can we really differentiate between hackers and genuine business partners when we cannot meet on a personal level? We need to protect ourselves. Shown below are three things you can do to increase your online security.

- Connect to a proxy
- Browse on TOR
- Get a Virtual Privacy Network (VPN)

Each security strategy has its advantages and disadvantages, costs and limitations, strengths and weaknesses. Here is a brief discussion of three online security options. You should be able to make an informed decision afterward as to how you can increase your online privacy.

Proxy Security

We have known about proxies for quite some time. What is a proxy? It is a device that is set up in a location that Internet users can bounce their connection off of before the rest of the Net. Proxies are the first innovation of the Internet in setting up a remote connection, but how can they protect your online business dealings? They provide security or privacy by acting more like a firewall and prevent unauthorized intrusion, thereby hosting very meaningful security, but some have based routers that offer better security than the normal proxies. Many proxies are free, but in terms of Internet security, free is not always good. Free is not always secure or reliable. Free in the world of online privacy can mean less bandwidth and weak security. They can assume a different IP address for some procedures, but for resisting some more advanced tracking, they can be found wanting. If you are a user on a very tight budget, proxy security is for you, but do note that they offer limited security.

Browse on TOR

TOR means The Onion Router. It works to make your connection masked from close monitoring by running many different relays. Each of these connections makes it very hard to trace every action back to the IP address generating those actions. It is like a series of proxies working together. The

TOR browser is free to install and has an IOS version as well as an Android version. Some government agencies with a very high IT strength (for example, the CIA and the NSA) will still be able to track you because they can tell if you are using a TOR browser. Even though it is free, it still does a great job.

Virtual Private Network (VPN)

Of the three security options, the VPN is the best for enhancing your online privacy at any given time. This is because VPNs are encrypted, and if you are using an encrypted command, so is your online activity. VPN handles all Internet traffic with ease, and it is not attached to a specific application or browser. The TOR browser has a limited scope of activities, but with VPN, your entire Internet connection is protected, and you do not need to worry if you can or cannot engage in some particular activities. It is premium, though, which means you have to pay for it—but one thing is guaranteed. It offers the best online protection. To choose the best VPN, here are a number of factors to consider:

- Cost and speed
- Effectiveness of their customer service
- Do they keep logs?
- What devices are supported?

The location of the VPN host is another factor to consider, which is important because most of us like being incognito when we are online. Depending on the location of some VPN hosts, some governments might force certain hosts to submit a record of their tracking activities. Since you are paying for such services, you expect the best treatment, and you deserve the best. Choose a VPN host that guarantees a good customer care relationship. Good customer service is identified by the means of contact the VPN host supports. Ideally, a good customer service should support phone, email, and chat as basic means of contact. If the host you are considering offers anything less, consider changing your decision. Some VPN can work on the iOS platform, while others can work with Android devices. Another factor to consider is if the VPN host allows several connections. With a single subscription, you should be able to connect different devices. It will be less acceptable if you have to pay for a subscription with every device you use.

Other Useful Tips

1. Take advantage of all the resources that you can. Some people take the various Internet search engines for granted. What do you have to lose? Take time to walk yourself through the fundamentals by doing a quick search every now and then regarding questions you have about blockchain trading. You will be surprised to know how much you will learn. You will confidently and easily trade alongside pros in the business and will readily be on hand to provide help for those who need it.

2. Write down your wallet recovery phase, wallet ID, and password. Store them where you are sure they cannot be easily lost before attempting to send funds to your wallet. The wallet recovery phase helps to back up your data. Other tips might suggest how to protect your online activities from other people, but the wallet recovery phase is like protection against yourself. When you are setting up your wallet, you can always back up your wallet. Do not skip this section, as it could be very crucial to your success. Two types of keys are associated with your wallet: a public key and a private key. This wallet recovery phase will ensure that these keys are saved into your file. As long as the keys are saved, the blockchain network will be able to retrieve your balance with ease and at any time. You can store the keys in any external storage of your choice, be it portable, external hard drive, a flash drive, an optical disk, a mobile phone, or even on a piece of paper in written form. It can also be stored on a cloud-based system of backups like the icloud on iOS devices or Dropbox in Android and Windows devices, but the cloud storage system is not 100% reliable. It is recommended that you encrypt the data before uploading it to any cloud-based storage medium.

3. Always double-check your transaction details before hitting the "Enter" button and sending. It is all too common for us to double-check a bank statement before giving it to the cashier, even though a mistake can be reversed if it is noticed. If we can make such efforts with bank statements, it is all the more important to double-check online transactions in the blockchain

networks before sending them. The reason is simple. Once you hit the "Send" button, it can never be reversed. It is imperative to double-check the amount of digital currency you want to send so that you know you are sending the right amount. Also be sure to double-check the cryptocurrency address you intend to send to. You don't want to make a mistake.

4. Keep separate wallets. A person can create and keep as many digital wallets as they prefer, as there is no limit to the number of wallets you can create. If your entire digital currency holdings is in a single wallet, you may be vulnerable to all sorts of online abuse. Some experts and professionals keep separate digital wallets for different purposes. They have a separate wallet for making remittances and sending money, a separate wallet for receiving payments, and another for their savings. You can adopt this method that is sure to work for you too.

5. It will do you some good not to keep all your savings in a web wallet. A web wallet is certainly convenient to own and maintain, but it should be operated like a checking account (where we store only money we plan to use soon). Learn to handle your web wallet the same way. Some web wallets have been hacked. For your protection, only a limited amount of spending money should be kept in your web wallet. If your wallet is hacked, your loss will be limited. Always remember that if you lose money on the blockchain network, the money is simply gone. Even if you call the police and they try to help you by investigating, the chances of getting back your money are very low.

6. Do all you can to increase your online privacy. Do not get into the habit of sharing your passwords or keys with anyone. Your wallet address or your public key is like your bank account number, and your private key is like the PIN associated with your account, through which transactions with that account number are validated. Do not reveal your financial details to hackers. This information should always be kept to yourself. Always avoid being too familiar with strangers. Since blockchain technology is visible to all connected nodes, it is easy to trust business partners that we don't see. If you get too

familiar, though, chances are they will start investigating how much your holdings are worth. One thing you can do is try to conceal relations between your separate wallets (i.e., between your spending wallet and your saving wallet) by transferring funds between them using a mixing service or programs that protect your privacy and anonymity.

7. Even if you keep your digital currency holdings in a wallet stored in a device like a computer, it does not mean you are totally protected from attacks. Different viruses and malware can infect computers, like the Trojan horse. That is why you must get a good antivirus program. Also, try storing your wallet's private key in an offline medium, which is another measure of protection against attacks. It could be on a flash drive or USB key. You can also encrypt your private key so that in case it falls into the wrong hands it will be useless, as it cannot be used without decrypting it, and to do that, your password is needed. If you decide to encrypt your private key, do not forget your password, as even you can be barred from access to your digital wallet.

Latest News and Information Regarding Blockchain

Blockchain has made great strides within the last decade, and this industry is just getting started. The following articles will help you get the latest groundbreaking information about blockchain technology.

1. **Fox Business Foretells Bitcoin Price Could Reach $1 Billion (6/7/2017)**: Throughout the first two quarters of 2017, the price of bitcoin has risen to the extent that there is a redefined awareness in cryptocurrency from the media. Before now, the press has been quite negative about the financial prospects of investing in the blockchain, but a great many people understand that bitcoin and other forms of digital currency are an enduring financial and technological force. Recently, Jim Cramer, a CNBC personality, suggested that the bitcoin price could rise to $1 million as a result of ransomware attacks. Also, a Fox

business show asked whether the price of bitcoin could reach 1$ billion. On June 30, 2017, Charles Payne in his show *Making Money with Charles Payne* featured Naomi Brockwell (former New York Bitcoin Center Policy Director). Naomi attributed the recent increase in the price of bitcoin to the political ramifications of its decentralized nature. She said that people living in lands under very harsh regimes can use the bitcoin to purchase food and other products not available in their countries. She said, "The main people promoting this technology are those who understand that the government can be dangerous." Although no one directly said the price of bitcoin could rise to $1 billion, when she was asked if the bitcoin price could reach $1 billion, she agreed and said it could go "to the moon."

2. **22 Global Banks Will Test SWIFT's Cross-Border Payments Blockchain (6/7/2017):** The operator of the platform used by the global banking system SWIFT has included twenty-two new banks to its ongoing blockchain proof-of-concept. SWIFT has labeled this ongoing project as "the new standard for cross-border payments." In an announcement on July 6, 2017, SWIFT confirmed the addition of these new banks to this blockchain endeavor. The PoC blockchain movement was initially founded by six banks back in April. Hyperledger Fabric was chosen as the core technology of this trial. Why the trial? SWIFT announced in April that the purpose of the trial is to help banks reconcile with their international Nostro accounts in real time. These accounts help banking systems to remit money in designated Nostro accounts globally. These doctor accounts make possible international money transfers. Damien Vandervsken, head of R&D of SWIFTLab and user experience at SWIFT said: "If banks could manage their Nostro account liquidity in real time, it would allow them to accurately gauge how much money is required in each account at any given point, ultimately enabling them to free up significant funds for other investments." The twenty-two banks are major banks from Africa, Asia, Europe, and North America. These banks

will work together as a group to help validate the blockchain test application developed by the six original banks.

3. **India Becomes a Breeding Ground for Blockchain Engineers (6/7/2017):** India is emerging as a talent pool of blockchain engineers because of the rising global demand for blockchain technology. Students and professionals in India are quickly signing up for courses related to blockchain to help them develop or acquire the needed technical skills to start their research in this innovation and possibly adopt it. The *Times of India* (India's biggest English-language newspaper) of July 6, 2017, revealed that e-learning marketplace Udemy recorded a 978% enrollment for courses related to blockchain, and of these new enrollments, an average of 80% are from India. This has no doubt fueled their interest in cryptocurrency. With a margin of about 40%, India leads Australia as the largest pool of talent in the Asia-Pacific region.

4. **IOTA Partners Healthcare Providers for Blockchain Research in Norway (6/7/2017)**: For about a year now, the IOTA Foundation has been making a concerted effort in applying its Tangle distributed ledger network to the public, with a focus on eHealth. The foundation is presently partnering with top Norwegian healthcare providers, such as Oslo Medtech, the Norwegian Centre for eHealth Research, and the Oslo Cancer Cluster. The partnership is expected to form a Distributed Ledger Technology research network. Norway is known for its fast adoption of new policies, as it was one of the leading countries to start racing toward a fully cashless policy. With this move by IOTA, machine learning will be used to improve diagnostics and quick cancer detection; social media will be used to predict the spread of flu. No wonder many industries are exploring blockchain and distributed ledger technology as a means to continue developing. It is expected that other countries will follow suit.

5. **A New Pro-Bitcoin Ethereum Association Launches in the**

German Parliament (6/30/2017): There is a new blockchain and nationwide federal digital currency lobby group known as the "Bundesverband"—the Federal Blockchain Association in Germany. This official recognition, with just a number of attendees from the German members of Parliament, took place in Germany's parliament building. An official release from the group stated that "Blockchain will be the basic technology for the next innovation stage of the Internet, and Germany has a chance to put itself at the forefront of the world through pioneering regulation. The Federal Association is to help seize this opportunity."

6. **Delaware Passes Groundbreaking Blockchain Regulation Bill (7/7/2017)**: The state of Delaware has passed a bill that recognizes as law the trading of stocks on blockchain technology. In April it was reported that the Corporation Law Section of the Delaware State Bar Association (DSBA) had [approved Delaware Law Amendments](#) with the intention of delivering statutory authority for businesses in the state to use the blockchain to maintain corporate records. According to the recent passage of Senate Bill 69, it states: "Amendments to Sections 219, 224, and 232 and related provisions are intended to provide specific statutory authority for Delaware corporations to use networks of electronic databases (examples of which are described currently as 'distributed ledgers' or a 'blockchain') for the creation and maintenance of corporate records, including the corporation's stock ledger." Passing the House at the end of June, the blockchain bill only received one vote against it out of a total of forty-one votes. With the advancement of the bill, it means that middlemen between sellers and buyers of stock could, essentially, be cut out of the process, providing faster settlement times. Origination of the bill was brought about last May when Jack Markell, then governor, announced an initiative to [embrace the blockchain](#) and smart contract technology. It was also hoped that it would provide a legal and regulatory environment for the development of the technology in the state and also help attract blockchain

companies to Delaware.

7. **Blockchain Enables Indian Insurer Settle Motor, Travel Claims in Minutes (7/7/2017)**: In deploying blockchain-powered insurance products for travelers and vehicle owners, Indian insurer Bajaj Allianz General Insurance is hastening the claim settlement process from "days to minutes." Private insurance firm Bajaj Allianz is now deploying blockchain-based insurance products in the travel and motor sectors according to the [Hindu Business Line](#). This will result in a seamless process of an otherwise cumbersome procedure of an insurance claim for end users. With "Travel Ezee," Bajaj Allianz is using innovative decentralized technology to proactively inform overseas travel policyholders of their payout eligibility in the event of flight delays. The traditional process of a claim typically sees the user register a claim before submitting a certificate of delay from the airline. With blockchain technology, customers will be able to instantly receive their claims without needing to file any flight delay forms. Sourabh Chatterjee, head of IT at Bajaj Allianz, told the publication: "This is helping us to bring down the current settlement turnaround time for some plans from days to minutes."

Many other stories appear in newspapers every day that clearly show that blockchain technology is more than just a myth as some say. It is the next big thing happening.

Cryptocurrency Legalities, Taxes, and Regulations
Legal and Regulatory Issues Surrounding Blockchain Technology

The transparency and freedom associated with blockchain technology are the major attractive features of this new innovation, and many businesses, organizations, and individuals are getting ready to come on board. The decentralized order of events, however, does give rise to a number of questions concerning regulatory bodies and policymakers, both locally and internationally. It is true that many people are excited and optimistic about it, as they feel it will help improve customer compliance with regulations, tracking, and reporting, but other people and authorities are adopting a "let's

wait and see" attitude.

Blockchain technology and the entire concept of digital economy has had its own challenges, including Blockchain latency, scalability, lack of exclusive reliance on digital commerce by some sectors, lack of sufficient information giving rise to a lack of understanding of what Blockchain can offer by the masses, and overreliance on the current legacy system that would eventually need to be done away with should the distributed ledger become the new system in place, among some other challenges. From a regulatory and legal point of view, the move to adopt this growing innovation will be like trying to negotiate a large-scale IT development. A few other regulatory challenges should be mentioned:

- **Accountability and Responsibility**—Since the digital ledger is going to be distributed among all connected nodes, the question still remains: Who is responsible for controlling or regulating this digital ledger? Who will regulate the users and any other connected party? In this decentralized system, if there happens to be a problem, who should be held accountable? Who even knows what or whom to regulate?
- **Who Will Regulate**—The Blockchain network remains in a cross-border initiative as we all know, without a central government determining what would be done as it was or acting as a regulatory body. Without international agreed-upon regulatory principles and cooperation, it is still something many are wondering how this will bring about a measure of cohesion in the economy.
- **Competition and Antitrust**—If this distributed ledger is eventually implemented, there could be arguments of cartel activity. Others will also argue that there may be risks that an algorithm will be set up such that it will produce an anticompetitive result that cannot be easily detected.
- **Smart Contracts**—How will existing contract laws adapt to take into consideration the automated Smart contracts? Will they ever be considered valid and subsequently enforceable?
- **Privacy and Security**— Records will almost be impossible to decrypt, and the technology relies heavily on assumptions that it is very secure, but with the way computing has been developing in recent years that may not always be the case. This could raise

some legitimate security concerns. For example, party identity from completed transactions could be traced by another party that has permission to decrypt data.

The blockchain has been tipped by experts to have the potential to transform virtually all sectors, and a number of organizations are already considering adopting this in not just their businesses but also in their dealings in other fields. Does that mean that blockchain technology is infallible? No. The challenges discussed above are still cause for concern. With this on your mind, every organization will do well to deal with these raised issues as well as the regulatory challenges before proceeding to adopt it.

It also seems that most governments do not really understand how blockchain technology can help them. One typical example is with the Federation of Russia that announced in the first week of May 2017 that by 2019 they will have regulations guiding blockchain investment already in place, but they did not provide any further details regarding how these regulations will be implemented. It seems like good and interesting news, but that announcement in itself still highlights a measure of ignorance and a lack of the necessary understanding of the prospects that blockchain technology offers. While we are not faulting this move by this great nation, realistically speaking, an evolving technology like blockchain cannot be predicted, let alone give assurances of regulations within a set period of time. Such promises may never be kept.

Back in May, something happened at the European Parliament that was an entirely different approach. The gathering focused on the discovery of this technology rather than assurance of regulations. They focused more on what the technology can help us achieve and how it can be useful to the government. They later discussed ways in which they can help in developing it and concluded on ways to protect their customers. That sounded like a more realistic approach and shows the group really understands what blockchain technology can do. One problem still remains. Regulatory bodies that are set up will still have to think about what to regulate and whom to regulate.

Regulating software is very delicate because rules exist to regulate intended behavior. Another issue that can come up is deciding whether or not to let the market decide the regulatory parameters. A move promoting market rejection

can render the technology's craftsmanship utterly irrelevant, but when the blockchain is used to transfer assets, waiting for the market to decide can have its own systematic consequences. Accordingly, there is also a need to regulate security measures.

Defining Blockchain Use

Even though we have identified different areas where this technology can be applied, we still don't know how extensive its applications will be in the coming years. What we do know about its applications so far is just the tip of the iceberg regarding what blockchain will offer in the future. The unusual division of private and public networks also requires a very different approach. While it is possible to draft laws governing the development of the private network, it is a different ball game regulating the public network based on their uses. It is really not going to be easy, taking into consideration the cross-border nature of this distribution. Laws will not be easy to establish and apply for it because blockchain, as we know, has no visible founder, let alone establishing its legal base. With the foregoing, it is clear that prospective regulators will only have the choice of "letting the market decide" when setting up regulations.

Blockchain Taxation in the USA

The date June 5, 2017, will live long in the memory of blockchain users. The state of Nevada became the first state in the USA to approve a bill that will restrain local government entities from taxing blockchain transactions. A significant portion of Nevada's revenue comes from entertainment, as the state is home to Las Vegas, the city of casinos that never sleeps. Concerning money, the state of Nevada is a revenue hub. With this legislative move, the state is opening the way for the success of blockchain technology.

The journey started on March 30 when Republican Senator Ben Kiechefer introduced Senate Bill 398, which was intended to protect blockchain transactions under the already existing electronic transaction act. The bill is the exact representation of blockchain technology. The bill states that it is "An electronic record of transaction or data which is

1. Uniformly ordered
2. Redundantly maintained or processed by one or more companies or machines to generate the consistency or non-

repudiation of the recorded transaction data
3. Validation by using cryptography."

The bill was unanimously approved by the Senate in April, and when the Nevada Assembly moved in May, it was amended and sent back to the Senate to confirm its amendment. It was sent to Governor Brian Sandoval afterward and was finally approved. Senator Kiechefer later said, "The potential uses of blockchain are limitless, and I'm confident Nevada's entrepreneurs will find ways to use this technology to innovate and drive our economy forward. I can't wait to see what comes next."

On May 29, 2017, Arizona Governor Doug Ducey also signed a bill that recognized the loyalty of blockchain's signature and smart contracts. These examples provide just a glimpse of how large the influx of states and federation will be in eventually signing this technology into law and, most importantly, canceling government entities unnecessarily taxing blockchain transactions. A world centered on cryptocurrency is the future that we should look forward to. It is a doorway to more financial transparency and a better economy.

Chapter 3: Movement of the Future—Blockchain

Revolution of Banking and Marketing

Almost every international bank is trying out blockchain technology because of what it offers in terms of cost savings and operational efficiencies. These banks are experimenting with blockchain in a number of ways, such as building in-house solutions, partnering with fintechs, as well as membership in global consortia. Many banks are experimenting with using blockchain technology to modernize and simplify banking processes and reduce costs. Other reasons for wanting to try it include the ability to create fresh business models and the likelihood of competing with fintechs. They are also looking at how blockchain technology will help solve some problems they face on a daily basis in their businesses. Banking regulatory entities are also looking to use its framework for developing more efficient regulations. In fact, it will help speed up transactions and make them more secure.

The year 2015 was when major financial sectors started thinking about blockchain technology. It also stressed that financial organizations, such as banks, should use this technology to their advantage, teamwork, and partnership across the industry. It also highlighted that blockchain technology will help solve some key problems within the financial system, for example,

- Prevention of interference with an agreed-upon chain of transactions
- The issue of double spending
- Problems relating to trust
- Agreement on transaction history

Transparency is another feature of this technology that will benefit both the customers and the banking system. No one will be able to alter any record. In fact, it could save banks' infrastructure $20 billion a year by 2022.

Transactions today are often verified by a centralized system that keeps its own central ledger. This can slow down transactions, as it could take days to settle a deal. It can also take days for two or more banks to relate and agree with a particular customer's records. The blockchain initiative, however, will eliminate that waiting period, as each bank will have its own copy of the ledger immediately once the transactions are lodged. This will enable easy

communication among participants. Transactions will be validated within seconds, and significant costs will be reduced.

Marketing will also be transformed. Many marketing procedures today may involve the use of intermediaries, many handovers, and lengthy processes. Applying blockchain technology will eliminate these problems.

What is also worth highlighting is that blockchain allows the use of "smart contracts," which will create a transaction route such that some actions will be approved automatically provided dome conditions are met. One example is as long as certain codes are complete, remittances will be approved.

In a new report *Beyond the hype: Blockchain in capital markets,* McKinsey says that the mainstream of the technology will advance in about four stages, starting with internal purpose-built distributed ledgers that operate within enterprises. This would be followed by the adoption of blockchain by a small subset of banks as an upgrade to manual processes, starting with assets that are traded infrequently and manually over the counter. This would help participants agree on standards and protocols for booking and transfer with relatively little investment. Next would involve conversion of inter-dealer settlements, which would help solidify the standardization of products, followed by a large-scale adoption across buyers and sellers in public markets, which McKinsey says ". . . would be a great leap forward and would depend on the large-scale conversion of existing systems and adoption by a large-scale number of market participants."

McKinsey makes four major recommendations for prompt action:

- Assess the effect on your business and plan for the long term.
- Participate in consortia and work with regulators. The payoff for cooperation over competition may be industry utilities and a faster development cycle.
- Capture the internal ledger opportunity: this would give individuals and firms the opportunity to test new technology on systems already being revised and try to develop expertise without concern for network issues.
- Go after post-trade and manual processes. These can yield significant workflow benefits and be less disruptive to business models.

Considering the foregoing, it is clear that blockchain technology will improve banking services significantly, as these will mean great advantages to both regulators and customers, and marketing will be made very easy as well. Blockchain technology is the future of our current financial system. No wonder many refer to it as a needed revolution in marketing.

Securing Digital Identity

Whether the field of human endeavor involves work, business, leisure, politics, or healthcare, authorization of identities is directly connected to all of them, but the concept of identity authorization faces challenges perhaps because of inadequate common comprehension and the mostly unchecked cyberspace of personal information. Technology has advanced in recent times to pose a threat to digital identities, such as many more cases of hacked databases and account breaches. What blockchain does is use biometrics to provide solutions to these issues concerning digital identity such that identities can be authorized uniquely in a manner that is unalterable, undeniable, and safe.

How exactly will blockchain technology help secure digital identity? We need to first consider how digital identities are represented in the blockchain. When a user's identity is entered into the blockchain network, it is seen as a self-asserted block that contains the user's identity feature. The block also contains the user's private and public keys. Other information that the user's block contains is electricity providers or banks along with their public keys or PINs for validation.

The user's relationship with the electricity provider is established by signing in with the public keys. Other relationships are gradually established between the user and the associated providers, and as more of these relationships are established within the blockchain network, confidence in the accuracy of the user's identity grows organically. As more transactions are completed in the name of that user, the "reputation capital" of that user's identity grows consistently.

In case one or more relationships between the user and the entities change, the difference is noted within the blockchain as a separate block with a unique cryptographically signed timestamp. This creates a cryptographically secured sequence that allows the new verifier to reconcile both previous and current relationships.

Rebranding Healthcare

Earlier in this book we mentioned how people in general and even experts don't know the full applications of blockchain technology. Over the years, some noticeable improvements have been made in healthcare owing to advancements in modern technology, which has led to an influx of innovative ideas as well as medical equipment and facilities. In spite of these improvements, however, the healthcare sector still faces challenges. Questions have been raised as to the industry's fidelity, efficiency, and general effectiveness. One example is the case of a patient who receives a wrong prescription medicine just because the hospital or healthcare provider is not aware of the complete medical record(s) of the patient. There are also reported cases (although not too common) where patients were transferred from one facility to another, and the new medical facility did not receive the transferred medical records in time to start immediate administering of treatment. These developments surely need reform. The entire healthcare system can be progressively changed for the better only if blockchain technology can be adopted. Outlined below are some changes that blockchain technology will bring to the healthcare industry.

1. **Data Exchange or Access to Data**: Let us use the prescription of a patient's medication as an example to explain this point. Normally, when a patient's medications are prescribed, different entities can fill out the form from time to time. These entities may be hospitals, pharmacies, or other organizations that provide healthcare. Each one maintains its own "version" of medication for that same patient. There is a likely chance that each entity's prescription might differ slightly from that of other entities because each entity does not get to share their version of the medication. In some cases, this prescription medication may be electronic, but in cases of a duplicate paper prescription, these might be lost. Since blockchain technology is a system of a shared digital ledger, each medical entity, hospital, or pharmacy will see all the background information of that patient. When a pharmacy gets the prescription from a patient, they will now have all the information needed for that particular patient, his/her medical history and present

condition, and will in no way question the doctor's prescription. They could also view past prescriptions and relate these to the current prescription. It will bring about a special kind of cohesion to the healthcare system made possible only because of the system's fidelity and accuracy.

2. **Improved Data Security for Patients**: Medical records are very confidential, and doctors respect this fact. They even take an oath before joining the medical profession. Blockchain technology will help doctors and caregivers at large maintain their integrity in this regard. They will be able to keep information for as long as they want and at the same time protect the identity and information of every single patient.

3. **Accuracy**: Information about medical records, past and present diagnosis, and history of a particular patient's medical condition will all be readily available (stored on a digital ledger), and these records remain unalterable.

4. **Specialized Data Sharing**: We remember that blockchain technology uses the concept of "smart contracts," which makes automated execution of milestones possible. Not only will data elements be distributed from a patient to a healthcare giver or organizations, but instead of storing the actual data, it will also be encrypted, and only authorized personnel can decrypt it (provided with passwords) and access the information.

Relevance in Real Estate

Blockchain technology allows individuals or organizations to transfer information, money, or other types of assets quickly and without a need for intermediaries. It can also be used to easily transfer real estate. We will now examine three different ways blockchain technology will improve or totally transform real estate for the better.

- Prevention of Fraud
- Disintermediation
- Smart Contracts

Prevention of Fraud: In the world of transactions, fraud is a major problem.

Everybody wants to make quick money, and they try all sorts of means, ranging from forging different kinds of data and paperwork to misrepresentation of bank invoices and statements, deeds, drivers licenses, all in a bid to make more money. Real estate fraud is also common, and the rate at which this crime has been increasing in recent times is alarming. Even the world's largest and most secure banks still fall victim to such criminal acts once in a while, but how can blockchain technology prevent these criminal acts in real estate? This is what Don Oparah, CEO of a London-based IT firm, has to say about how blockchain will improve real estate transactions: "By offering a 100 percent incorruptible resource, whereby a sender and recipient of funds was logged, and where digital ownership of certificates for properties are saved, the blockchain could effectively make forged ownership of documents and false listings a thing of the past. The unique digital ownership of certificates would be almost impossible to replicate and would be directly linked to one property in the system, making selling or advertising properties you do not own impossible. So it is clear that frauds in real estate transactions will be reduced to its barest minimum by blockchain technology."

Disintermediation: Real estate transactions can be complicated at times due to the presence of and need for third parties or intermediaries to complete the transactions. These third parties may include escrow companies, stockbrokers, inspectors, appraisers, or even government agencies in some cases. These transactions will be stalled for many days until the intermediaries complete their tasks, and it can cost money and waste valuable time. It is similar to when we depend on them to complete the deals. Why are middlemen needed in transactions related to real estate? Why do we need them to validate our title deeds and other documents? It is because they have skills and licenses that we don't have, and they have access to some information that we cannot access, and these licenses and information are needed for these transactions to be completed. As we already know about blockchain technology, it is a digital ledger that is made public, and access to everyone connected is granted at the same time without needing any form of permission or without any information being withheld. It means that every property will be able to handle transactions themselves anytime without the need for any third party.

Let us take TITLE as an example. The title to a property is currently just a

piece of paper. The paper needs to be filled out correctly, signed with possibly a pen and the middleman, and a notary most likely puts a rubber stamp on it. It then goes to the county's recorder, who manually puts it in their database. Taking a look at the whole process, you will notice all the wasted time and money to record this information in the database. Blockchain technology can help make the process much simpler. It will replace a paper title, and a cryptocurrency (e.g., bitcoin) will be used to create a digital title. It can then be transferred easily over the Internet to the necessary agencies, nullifying the need for a third party and saving valuable time as well.

Smart Contracts: It seems that one of the best features of the blockchain is the smart contract. There will no longer be a case of a party fulfilling its obligations while the other party refuses. It is automated, as the contract will go on as long as certain mutually agreed-upon conditions are met. An example is that you will be paid as soon as you reach a certain number of the consumer base. There will be fewer court cases, as transparency will make fraud a thing of the past.

Application in Government Structure

Nearly all governments worldwide are faced with these three common challenges: transparency, corruption, and trust. This has made many governments start looking into exploring blockchain technology to help them improve their operations and at the same time tackle these challenges. A recent survey by IBM and EIU shows the following:

- Nine in ten governments wants to invest in blockchain so that they can better manage financial transactions.
- 14 percent of government structures are expected to implement blockchain in at least one arm of governance by the end of 2017.
- Seven in ten governments believe that blockchain's use in government will alter the field of contract management.

It is no surprise that various governments have been outspoken in canvassing support for this new innovation. Let us take a look at four different ways blockchain technology can benefit governments and help them improve their operations.

4 Ways That Blockchain Technology Can Help Governments

1. Transfer of Assets: Moving assets, be it money, property, or value from one place to another or from one person to another will be made easier. Bilateral trades between different governments will improve, and the process of direct payment of funds will speed up.
2. Ownership: Since the blockchain is known for its preservation of "chains" of events and records of physical assets, the ownership of property titles, lands (boundaries), and any other type of physical asset ownership issues will be done away with, thereby promoting good relations.
3. Identities: When e-identities are provided by the government to its citizens, using every other service will be easier, e.g., voting. The e-identity is quite similar to international passports, as an owner is eligible to participate in every other activity within the country. With the help of blockchain technology, this will be made possible.
4. Verification: Events, proof of records, transactions, and licenses will be adequately verified with the technology. Unscrupulous activities will be curtailed, and identity theft will be minimized.

It is expected that governments should start exploring blockchain technology through its proof of concept and other processes. It is totally harmless—doing more good with little or no harm. They should create more awareness for it and put people in charge of developing it. They should commit to making it better suited for their circumstances. They should also encourage citizens to embrace this innovation, as it gives more freedom and can both maximize strength and reduce costs.

Blockchain in Governments

The United Kingdom: The United Kingdom is exploring this new technology in the management of grants. Controlling the distribution of grants has often been subject to corruption. Since all involved parties connected to blockchain have the same information at the same time, the distribution of grants will be better managed.

Estonia: Estonia has used blockchain technology to create the concept of e-

residency. This program has allowed anyone anywhere in the world to be able to apply and become an e-resident of the country. This e-residency is not different from normal residency because an e-resident can use the same services available to a resident by birth. Estonia is also using this technology to improve its health sector, especially in managing medical records.

Ghana: This West African nation is looking to utilize this technology in managing property ownership because of corrupt individuals in positions of trust.

Sweden: This Scandinavian country wants to use blockchain technology in making real estate transactions more efficient. The feature of this innovation most useful to them is the elimination of intermediaries.

Singapore: The major reason this Asian nation is exploring blockchain is to curb the frequent cases of customers defrauding banks. Two years ago the country's standard chartered bank lost almost $200 million to fraud. Fraudsters in this country also occasionally duplicate bank invoices and get return money from banks.

Engineering Development in Poorer Countries

One thing that is synonymous with developing countries is a developing economy, and every developing economy wants to grow and achieve "developed" status. The blockchain network can help these developing countries facilitate the process of change from "developing" to "developed." The technology has been seen to have great potential for all who implement it. Developing nations are only making life harder for themselves, but with this technology, not only will they better their lot economically, but they will also find normal day-to-day operations easier. In developing nations, some rules govern transactions, but these rules are not implemented. So it happens that any service that depends on these types of rules does not take place. An instance is opening an account in most banks in Africa. These banks require prospective account holders to deposit a considerable minimum opening balance, which can be equivalent to a person's annual income, but here is how blockchain technology will help out in that regard: simple transaction rules are set that ensure authentication and not an opening balance. These rules will make banking both simple and affordable. That is just an example, as there are many other ways that blockchain technology will help bring about development in these poor lands.

1. **Sending Money Internationally**: Last year an estimated $442 billion was sent from individuals in developed lands to their families back home in poorer countries. We can't question this because they aim to make life better for them. All of us certainly want to help our families in need, but can you imagine the amount of money needed to transfer such a large amount of funds? We all know that money can be sent by MoneyGram, Western Union money transfer, and other such entities, and they charge for their services. Using digitalized blockchain technology for such transfers will result in bypassing bank charges and the common remittance protocols. More funds will be saved and sent home.
2. **Helping Small Businesses**: It can be very hard for some businesses in these developing lands to apply for a loan and be approved because access to loans in these countries greatly depends on middlemen. Not only have these loans been hard to get, but they also attract very high interest rates. Banks also refuse to grant loans in areas well known for corruption and fraud. Blockchain technology will help nullify the role of these middlemen and will promote transparency, which will reduce fraud. Small businesses will be able get loans and extend their borders.
3. **Humanitarian Aid**: Sometimes, nongovernmental organizations and foreign companies in richer countries send money, clothes, and other forms of relief to these poorer countries, especially when disaster strikes. In some cases, it turns out that this humanitarian assistance is not used for its intended purpose due to corruption and mismanagement. There is also the challenge of the cost of transporting relief material to these target countries. Blockchain can help in two major ways. It can reduce the cost of transportation and keep track of how this humanitarian aid is used. Donors can actually be confident that what they want done with their resources is respected and adhered to.
4. **Insurance**: Lack of access to basic amenities, such as healthcare and insurance in developing countries, is due to lack of income. The money required to have access to these

amenities is more than what they make. Insurers also tend to exploit these low-income earners by siphoning money from them. This technology will ensure that these processes will be restricted to an online mode, which will reduce the corrupt insurers' impact. It will also give customers the option of paying in smaller amounts.

Chapter 4: Future Use of Blockchain Technology

In the coming years, further applications of this technology may include:

- **Tracking Taxpayer Money**: Hancock, speaking at the Digital catapult headquarters in King's Cross said, "We are exploring the use of blockchain to manage the distribution of grants. Monitoring and controlling the use of grants is incredibly complex. A blockchain accessible to all parties involved might be a better way of solving the problem. Bitcoin proved that distributed ledger can be used to track currency at it is passed from one entity to another. Where else could we use that? Think about the student loan company tracking money all the way from the treasury to a student's bank account."
- **Online Voting**: Currently, no country has yet to adopt this process. Maybe they fear it might not be totally secure, but some have used blockchain technology to improve the electoral system due to its transparency. Remember that in 2014 the Liberal Alliance political party in Denmark became the first major party to conduct an internal voting process using blockchain technology. Their success has led many experts to consider this technology as the future of our electoral system.
- **Cloud Storage**: We can also expect blockchain to be applied as cloud storage systems of data because of its decentralized nature. This technology can distribute information across many connected servers all at the same time while still maintaining privacy, with absolutely no chance for program hackers and attackers.
- **Smartcard Payments**: By the end of this year through the start of 2018, payment cards that are entirely contactless and can process transactions almost immediately are expected to hit the market. Today, merchants and dealers can utilize this as an alternative to payment services.
- **Expanded Digital Identity**: Industries lose an estimated $18.5 billion annually on improving digital security. Taking a closer look at that figure shows that for every $3 spent $1 goes to protecting online identity. Blockchain's automatic tracking and

digital management will solve these problems, which will be useful in almost every facet of identification, such as passports, e-residency, birth and wedding certificates, citizenship, healthcare, and licenses.
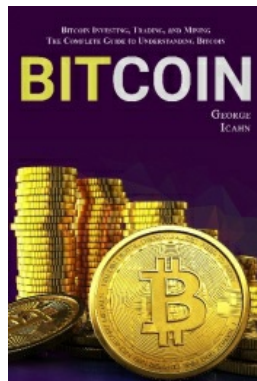
This technology can also be applied in many other ways. The legal system will improve as will land registration and every form of online payment and subscription. The list goes on. The bottom line is that blockchain is here to stay.
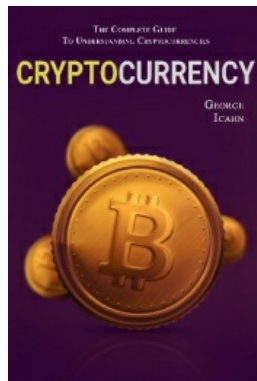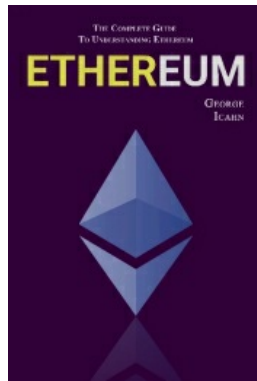
Conclusion

When we were children, we always depended on others for almost everything —support, food, and even simple tasks, such as sleeping. As we grow older, though, we learn to do some things on our own. In today's world, we can't expect to depend on people for everything, especially in the business world. This book has been expository regarding how blockchain can help you grow your business and other activities. The prospects are amazing. In ten years' time, I am sure that blockchain will be on the lips of everybody on this planet. It may even be taught in colleges. Many governments will have ministries dedicated to the development of blockchain technology. It will be in the news every hour, and every country will legalize it. Other fields will be affected as well. With its ever-growing possibilities, it might just be your ticket to hitting the jackpot. It is no longer a myth. It is reality and the new speed of economy. I hope to see you at the top.

    — George Icahn

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