Foreword by Ryan Taylor, CEO, Dash Core Group

DIGITAL IS THE CASH

UNDERSTANDING THE PAST, PRESENT & FUTURE OF FINANCE IN ONE READ

NATHANIEL LUZ

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Nathaniel Luz

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18, Awofeso Street, Palmgrove, Lagos.
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Dedicated to all in pursuit of decentralisation, the separation of money and state.

PRAISE FOR DIGITAL IS THE CASH

This book is a must read for everybody that is interested in the history, present and most importantly the future of money. It walks the reader through the evolution of money throughout history and shows many opportunities how to benefit from coming changes in our money and financial systems. The book is completed with an in depth dive into Dash, an innovative blockchain based currency. You might miss out on significant opportunities if you don't read this book!

Quansen

For people new to monetary history of the world, and interested to learn more about Dash Digital Cash--this is your book.

Tele Heights

In this book, we will explore more about the benefits of cryptocurrencies, as well as some of their drawbacks and possible mitigations for these. By the end of this book you should be up to speed on the financial history of the modern world as well as its bright new future with cryptocurrencies.

James L.

The book "Digital is the Cash" is a must get for every individual, especially entrepreneurs who have a keen interest in investment and are passionate about the Future of Money. I strongly recommend this book as it entails secrets to lucrative forms of capital management and investment with salient historical references.

(AMB) Dr. Sowemimo Abiodun.

CONTENTS

FOREWORD

Since money's invention millenia ago, it has played an increasingly critical role in civilization and our everyday lives. Many individual hopes and dreams center around having more of it or owing less of it. It lubricates commerce to enrich our economies. Indeed, empires rise or fall because of it. Today, money has an almost mythical status in society.

That mythical status is not surprising when you consider what the invention of money has enabled. Nearly every good or service in a modern economy would be impossible within a barter system. It is hard to imagine a world in which automobiles, rockets, or chemotherapy drugs could be invented and mass produced without the invention of money. The economic value that was unlocked when money was created is simply staggering.

For something that plays such a central role in our lives and civilization, most people spend shockingly little time thinking about what constitutes money, or considering whether the currency they use is high-quality. In most countries, citizens have little incentive to question what specific currency they should use. There are tremendous benefits to utilizing the same currency that is most common in local commerce, which is most often the local government issued currency or a major international currency such as the U.S. dollar.

This has not always been the case. In the past, many currencies would circulate in parallel to drive trade. The quality and value of these currencies would be constantly reassessed in the course of trade. This process still happens today on international markets, but is notably absent from day-to-day transactions of small merchants and individuals.

Digital currencies are the latest innovation in money, and they address quite a number of end-user shortcomings of the

government-issued currencies that dominate the market today. They are the first currencies that are natively digital in an increasingly digital world. They are counterfeit-proof, inflation resistant (or even deflationary), and low-cost compared with the high cash-handling costs of physical cash or card fees.

We are entering a period in which money innovation is accelerating for the first time in nearly a century. This innovation has the potential to unlock incredible value, just like money innovations before it. It is my belief that the benefits of digital currencies will cause tremendous positive disruption across the world in our financial systems. This transition will take time, but seems inevitable.

Given their potential, I encourage you, the reader, to learn about the innovations that are occurring and monitor the adoption of digital currencies. Evaluate whether they can be useful to you or your business. Make a conscious decision regarding the role they should play in your financial repertoire. We are living in a time of great change, and nothing is more fundamental to the success of the human race than money. It is especially exciting to be living in a moment when money itself is being improved in such fundamental ways.

Ryan Taylor, CEO, Dash Core Group

INTRODUCTION

The world of finance is fast changing. Ever since the financial crisis between 2007-2009, the global economy has seen the development of rapid changes sweep over it. Previously, stalwart and trusted institutions sank into bankruptcy and obscurity. “Bail-outs,” “bail-ins,” and all manners of quantitative easing and financial maneuvers have been used by world governments, central banking authorities and global financial institutions and it has turned the heretofore well-trusted financial service industry on its head and left it reeling from a global lack of confidence.

Seemingly held together by duct-tape, the proverbial sword of Damocles hangs over the head of today's financial leaders as they seek to maintain the (illusion of) control that central banking and fiat money printing have given us over the last couple centuries in various forms. The modern form that we see is merely a final evolution of the original banking system, which itself was based on the colonial exploits of European powers during the 1490s until the 1950s.

The history of the stock market and other banking institutions is mired in slavery, war-for-profit, conquest, genocide and money laundering. These behaviors take a toll on society as a whole, especially when they're being financed by the world's largest institutions and financial corporations. From the 1500s until now, the modern debt-based economy runs on war, destruction and death. From Yemen, to Vietnam, to World Wars I and II, the Napoleonic conquests, the siege and defeat of the French, British and Spanish in Haiti in 1804, wars in South Africa between the British, the Boers and the native South Africans, all of these conflicts can be traced back to the corrupt and decrepit financial system that funds these conflicts and encourages their excess.

“Permit me to issue and control the money of a nation and I care not who makes its laws!”

- Mayer Amschel Rothschild

With all of this context as a background, cryptocurrencies were introduced in 2009 as a response to these excesses. By completely disintermediating the issuance of money from centralized sources of control, cryptocurrencies allow for inflation, issuance rate and other properties of money to be decided in advance and democratically. Unlike the fiat federated reserve system where you are born into a country and have little recourse which currency you will use, cryptocurrencies are completely voluntary.

Furthermore, unlike fiat notes, cryptocurrencies are not just tokens or means of exchange, cryptocurrencies are actually decentralized, distributed assets. With the exception of USD, most currencies don't find much use if any at all outside of their issuing country of origin. Cryptocurrencies are global, decentralized, always on and always available. Which means they are tradable on the global markets wherever you are, whenever.

This gives you unprecedented financial freedom, never before seen. In this book, you will get an introduction and background to the history of the current financial system up till now and also be introduced to the wonderful solutions that have been gifted to us to combat the financial excesses that we have endured for so many generations.

Until Dash, a popular fork of Bitcoin which is also the subject of Chapter 5 of this course and then other privacy coins for example it was nearly impossible to have fungible cash. If you've ever seen the television series “Better Call Saul” or “Breaking Bad”, you will have the great lengths that individuals, banks, businesses and more unsavory individuals go to in order to have true financial privacy. Because the banking system doesn't afford this easily. Every bill and account is tracked with your name on it. Which makes financial auditors' jobs very easy, but financial privacy for the individual goes out the window.

This is just one of the many new possibilities that are opened up by cryptocurrencies. In this book, we will explore more about the benefits of cryptocurrencies, as well as some of their drawbacks and possible mitigations for these. By the end of this book you should be up to speed on the financial history of the modern world as well as its bright new future with cryptocurrencies.

James L. - Independent Blockchain Researcher

AUTHOR'S NOTE

I've attempted to simplify the past, present and future of money in one easy read. The extent of my success will ultimately be decided by you, the reader.

A blend of history, finance, and technology, an aim at getting more and more people to see the obvious, where the prevalent global financial system is headed and how they can prepare themselves.

With governments trying unsuccessfully to salvage the global economic situations, rate of inflation skyrocketing in Latin America and Africa, people trying to save their money in a currency that'll still be relevant in the next decades, there's not a time this book has been more needed!

Will there be another global recession? Will more people lose hope on fiat money? Will Digital Cash become the prevalent currency of the future? Is cryptocurrency really a bubble?

This book expounds on those and others.

This book contains no financial, investment or legal advice. It contains purely the thoughts of the author as translated into words. Always **D**o **Y**our **O**wn **R**esearch and bear full responsibility for your decisions.

Happy reading.

CHAPTER 1

MONEY, MONEY, MONEY

What is money?

Money is defined by economics as anything that is generally accepted, a means of exchange of value, easily divisible, a store of value, scarce, precious and difficult to get.

Money isn't in the same class of commodities like cars and so on that people want just for its own sake, but people want money because of what they can buy with it. The purpose of money, therefore, is not intrinsically defined but extrinsically. One question can be asked: if someone were to pay you a certain value for the work you've done, would you prefer they pay in bags of salt or with fiat? In this imagined scenario, every other worker has the option to pick from a variety of other commodities varying from sugar to bamboo sticks and bottles of honey. Nevertheless, you would likely prefer to be paid in money notes (fiat) rather than in bags of salt.

Remember that any medium you picked will be commensurate with the value of the work you do and you would be paid in that form for the next ten years. Why will the likely response be to opt for paper money? Certain reasons can be given for this: First, you will have more salt than you or your family can consume; second, you may find it difficult to exchange salt with someone for some other thing you prefer — a phenomenon called “double coincidence of wants” in the barter system. One other difficulty is measuring the balance in prices, that is, ascertaining what quantity of sugar would be equal to a certain amount of salt. If you were to exchange that salt with a horse, what quantity of salt would be equal to a horse, or what will be the equivalent value of one bag of salt when compared with the horse.

These problems would however not surface if you were paid in salt, every other worker was paid in salt, there were specific measures of salt in valuing the worth of other commodities and salt was generally acceptable across the members of the populace. You would simply exchange your salt for whatever other commodity you needed, not

need to find someone who specifically needs salt and has a specified value attached to it. The salt would not then be purchased because it is needed, but because it could get what is needed. A person who would never taste salt would still acquire it because it would help him acquire other things he needs. In this scenario, salt takes the place of money as we will come to understand.

Similarly, the money notes we carry around are useless in themselves, just as a bank notification reflecting ones account balance is. However, both are representation of value which can be exchanged for another good or service or as a gift, reward etc. by transferring the notes to another, or transferring the credit an account holder has with his debtor banker to another. They are only useful because they represent value. Money provides the holder a purchasing power and though a note would not depreciate on the surface, inflationary factors can cause its worth to fall.

Money is a medium of exchange, a unit of account, a store of value and a means of payment. Losing any of these qualities simply makes it revert to what it would have been in its ordinary form: a coin or a note. A US dollar note, though a unit of account, a means of payment and a form of storing wealth will remain a note as it won't be accepted in exchange for goods in a market in Estonia, for example, since it is not accepted as a general means of exchange there.

Origin of money

Money is anything that is generally acceptable as a means of exchange of goods and services. Note that the words “generally acceptable” in the definition give us a very strong idea about what money is. “Acceptance” is the word! It means anything that a group of people accepts as a means of exchange can be regarded as money – whether stones, feathers, paper, precious metals, or even words. Many have asked about how money came to be, or more properly, how old money is. The truth is that money can be dated to as far

back as when communication began, because even the earliest forms of communication actually featured money in their lingo. Safely, one can conclude that money started out as an idea that a group of people accepted.

In the primitive years, we saw money exist in the barter system, where people exchanged one item for another – this was also idealistic. Much later, we saw the use of objects like stones, cowries, feathers and so on, which have no inherent value but became means of exchange because of an acceptance of them by a group of people. As man began to develop over the years, precious metals were discovered, which had value inherent in them. These precious metals like gold, silver and so on, soon became a means of exchange. It's a long history until now that we mostly use paper money, which is powered, controlled and supported by the banking sector and the government.

Today, we have cryptocurrencies, a monetary system that is both virtual and decentralized, unlike the traditional monetary system which is the exact opposite. Cryptocurrencies promise a whole lot to the financial sector, but if they're to be accepted, they must be simple for people to adopt and use in their everyday lives.

Money, in the course of history, has undergone a tremendous transformation in the same way humans have undergone considerable advancement. From the use of barter to the use of generally accepted commodities, to paper money, to monetary value stored in digital formats down to the creation of cryptocurrencies, money has evolved in accordance with the growth of finance, expansion of economic needs and technological innovation. Money is one of the things which seem to defy matter, as it has changed from the heavy, hugely visible and massive space occupying commodity it was to some forms which are untouchable, weightless and only occupy digital memory.

Barter

The first types of value transaction was the exchange of whatever good or service you could offer for another. In the barter system, people who had goods in excess of what they could consume would seek for others who had the exact item they want in excess (double coincidence of wants). When they found them, they'll exchange the items and each will leave for his house happily. Barter is the first form of human transaction and basically remains the form of value transaction between animals. Barter is as old as human and it is found in other living things, as the symbiotic relationships between plants and animals is a form of exchange in itself.

If Alice, in an imagined scenario had a bag of potatoes she would love to exchange for a cloth, she'd have to find someone else, Bob, who has an interest in potatoes and is able to provide cloth in exchange for it. In a situation where Alice has potatoes and Bob has cloth both in excess of what they could consume, but Bob wants apples instead, barter between both of them would be impossible as both of them do not have corresponding needs. To solve this problem, Bob might have to hold the cloth and look for someone who desires it and also possesses apples. The complexity of diverse, non-corresponding needs pose numerous problems to trade by barter as there were endless quests for corresponding needs, which became further deepened by an expanding market of products. The barter system had problems of divisibility and value measurement — the questions of, for example, the number of bunches of bananas that would be equal to a tuber of potatoes, or the quantity of a cow that would be equivalent to an apple.

The problems barter exchange posed, particularly the need for a double coincidence of wants, led to the evolution of a better form of barter, the exchange of goods for generally accepted goods — this system of barter is still present today in some places in the world. Traders at the Esuk Mba market in Akpabuyo, Calabar, Southern Nigeria are bartering to combat growing inflation.

The ancient practice in the capital of Cross River State was started in 1956 and still operates on a barter trade system, where no money is exchanged for goods in the weekly market that starts from 7 a.m and ends at noon every Saturday. Traders say it has helped them over the years to save cost in view of the scarce financial resources. In environments that are mainly production focused, it is common to see products being exchanged as a form of trade. The Esuk Mba market operates in an environment dominated by agriculturists. Gift exchange is also a form of barter which has not been replaced with better alternatives yet.

Commodity money

Goods with intrinsic values acted as currencies. They included animal skins, salt, cutlery, cowries, gold, silver and weapons. Known as commodity money, these goods served as the medium of exchange and units of measurement, though the unit values were quite negotiable. However, commodity goods had the problem of storage, measurement and particularly, the transportation of the goods for exchange. They were also susceptible to positive and negative supply shocks, which cause price volatility and make them unstable for use as a store of value and unit of account.

Primitive Money

All forms of commodity money aside the use of precious metals make up primitive money. It was used before the invention and even far into the 17th century as can be seen with the use of tobacco as a legal tender in Virginia and manillas in West Africa as late as 1949. Shells, feathers, beads nuts are also forms of primitive commodity money.

Precious metals

Metal objects emerged as a form of money as far back as 5000BC. At first, it was traded in its natural state, then it started being

transformed into objects such as rings, bracelets and coins. All metals used for exchange had to be measured for purity and value in weight at every transaction; consequently, the metals, after taking more definite shapes had a measured value, form and weight, providing proper identification and a wider range of acceptance. Metals were more divisible, transportable and served as a great means of storing value. They gave way to coins, which were first recognized in China and, at one point or the other, have been used as a means of exchange globally.

Paper money

Paper money/fiat was created as an alternative to Gold. Fiat was backed by gold until the governments of the world took fiat money off the gold standard. Now money can be printed as much as the government and its allies want. It then employed the Central Bank to control the amount of money in circulation to prevent inflation.

According to Wikipedia, the first known banknote was first developed in China during the Tang and Song dynasties, starting in the 7th century. Its roots were in merchant receipts of deposit during the Tang dynasty (618–907), as merchants and wholesalers desired to avoid the heavy bulk of copper coinage in large commercial transactions. During the Yuan dynasty, banknotes were adopted by the Mongol Empire. In Europe, the concept of banknotes was first introduced during the 13th century by travelers such as Marco Polo, with European banknotes appearing in 1661 in Sweden.

Prior to the introduction of banknotes, precious or semi-precious metals minted into coins to certify their substance were widely used as a medium of exchange. The value that people attributed to coins was originally based upon the value of the metal, unless they were token issues or had been debased. Banknotes were originally a claim for the coins held by the bank, but due to the ease with which they could be transferred and the confidence that people had in the capacity of the bank to settle the notes in coin if presented, they

became a popular means of exchange in their own right. They now make up a very small proportion of the "money" that people think that they have as 'demand deposit bank accounts,' and electronic payments have negated the need to carry notes and coins.

Plastic money

In the 1950s, a fiat payment type, credit cards were introduced, these plastic cards were used to make payments, in Nigeria debit cards “ATM cards” are used to make payments at POS terminals and online channels. It's amazing how money evolved to this level but there is still a problem of centralization, where the banks and government controls money.

Network Money/ Cryptocurrency

Money has evolved and taken a new form based on the age of the internet we are in. They are called cryptocurrencies and they are built on the blockchain. Fully permissionless and true digital cash, cryptocurrencies are spendable like the dollars, naira and euros, only that they are not owned by any central authority such as the government. Being digital cash, you can send them anywhere, anytime, instantly and at a very minimal fee.

Satoshi Nakamoto invented and launched the first cryptocurrency, Bitcoin, on January 3, 2009, which started a revolution in finance as money could now be sent via a peer-to-peer, decentralized network, like sending an email. This also means that anyone can use them! There is no segregation or discrimination as human identities are not required as a prerequisite for dealing in cryptocurrencies. Anyone can send money to anywhere totally borderless and censorship-resistant.

Cryptocurrencies give total control to the owner. No one controls your crypto and you can't control that of others also. Unlike bank accounts, they cannot be frozen or seized.

CHAPTER 2

MONEY AROUND THE GLOBE

The Global Financial Sector

An effective finance sector is at the crux of global economic development, national prosperity and advancement in individual standards of living. A developed financial system helps promote economic development by facilitating capital accumulation, progress and increased utility of human and capital resources. It is instrumental to the efficient allocation of resources and high productivity. It leads to an expansion in utility creation, better risk assessment and management and convenient monetary transactions. A nation's financial sector cuts across insurance (which helps individuals and organizations cope with negative occurrences), investment (through the use of instruments that help gather resources and direct them to productive uses, erstwhile promoting saving, responsible consumption and financial sustainability), funding (providing capital for innovative and new enterprises) and banking (facilitating transactions, savings and numerous other functions). Financial sectors do not stand alone in individual countries however, there is an interconnectedness with a bigger financial setting; the global financial sector the sweeping waves of globalization.

Globalization is a dominant trend cutting across all facets of national and international relations; social, political and economic. It is most evident in the financial markets, mainly due to liberalization (a movement from national isolation to enhanced relationships across countries and regions of the world) and deregulation of economic processes, supported by the considerable scientific and technical advances in the area of information and communication technologies. Globalization is the integration of national economic systems into multilateral systems. This is facilitated by growth in international trade, investment and capital flows, financial integration, global labour fluidity, technological advancement and economic liberalism. Technological advancement has thinned out barriers and fostered integration in global economies and information and communication technology has helped establish

connections between national and global markets.

It is important to assess the history of the global financial sector plays, its roles and challenges, its components and instruments, its future and its impact on the African continent.

Brief History of the Global Financial Sector

The modern global financial system dates back to the 19th century, but the history of the financial system goes further back than that. The early 20th century experienced a series of integration, disintegration and reintegrations, although major industrial countries could not avoid interactions. Maurice Obstfeld of the University of California detailed these phases in the history of modern financial history. In 1860, financial globalization was increasing and accelerating and every industrial power fixed their currency against the value of gold, creating the avenue to exchange at favourable rates. This increased confidence among foreign investors to pursue international transactions.

The outbreak of World War I, however, led to the collapse of this integrated world financial system. Integration then struggled to rebound during the 1920s and further plummeted during the Second World War. After that war ended in 1945, integration, according to Obstfeld began a steady recovery; not coincidentally, this period of reintegration also followed the creation of the Bretton Woods international monetary regime a few years after the war. National currencies were once again linked to gold, though in affiliation with the dollar.

“The world economy became increasingly financially integrated in the 1980s and 1990s due to capital account liberalization and financial deregulation. A series of financial crises in Europe, Asia and Latin America followed with contagious effects due to greater exposure to volatile capital flows. The global financial crisis, which originated in the United States in 2007, quickly propagated among

other nations and is recognized as the catalyst for the worldwide Great Recession", according to Wikipedia.

Calomiris and Neal, however, give a brief history of the globalization of financial markets in their work, "History of Financial Globalization, an Overview", ranging it from the roles the Romans played to the Ottoman Empire, the Chinese and the Japanese. Generally, Italians cities like Genoa and Venice played key roles in the evolution of financial institutions and instruments.

Federal Reserve Bank

In 1913, president Woodrow Wilson, 28th President of the United States of America signed a bill creating the Federal Reserve Bank of the United States. It's surprising but this institution has nothing federal about it, it isn't controlled by the United States Government but by other banks and some wealthy individuals and it has no reserve whatsoever. They engage in introducing more money into the economy by printing it out of thin air even though they claim that they don't have the power to do so. Their defined purpose has been to maximize employment, stable prices and ensure moderate long-term interest rates. They find it hard to do their job shown by the multi-trillion-dollar deficit they have and to face the underlying problems by printing more and more money.

This shows very poor handling of the economy in a country by a single entity which has affected other countries that use the US dollar as a reserve currency. The total reliance on a single entity is prone to a lot of flaws which by far outweigh its benefits. This had led to falls in different monetary systems as these entities seem to do as they please or see fit in their sight.

The Great Depression

The Great Depression which began in 1929 and lasted until 1939 was the longest and most severe ever experienced. This was due to

the stock market crash and bank failures. It greatly devastated the economy as about half of all banks failed, unemployment rose, housing prices and international trade fell.

The Great Depression changed the world economy, and it hastened the end of the international gold standard.

In 1971, the dollar was taken off the Gold Standard and devalued to help the economic situation by United States President Richard Nixon. The removal of the dollar off the Gold Standard salvaged the situation but gave the Federal Reserve the ability to print money from thin air.

The Fall of Money systems

It is well enough that people of the nation do not understand our banking and monetary system, for if they did, I believe there would be a revolution before tomorrow morning - Henry Ford

National and regional currencies have been devalued and many more across the globe have the value plunging. America has faced deflation with the Great Depression and Southern Europe is also facing a modern form of the same issue due to the use of the Euro which acts almost like a Gold Standard. The German Mark, after the First World War experienced hyperinflation. Recently, inflation occurred in Venezuela, Zimbabwe and Argentina due to the inflated money supply.

Since November 2016, the Venezuelan Bolivar has suffered inflation rates as high as 1,698,488% printing unlimited money (because of falling oil prices, the major source of income of the country). The government decided to print more money to pay bills which ended up devaluing the currency even further. You can imagine what happened to those who deposited their life savings in venezuelan banks? Gone. All gone due to inflation.

Similarly, in Zimbabwe, the Zimbabwean dollar fell between the late 1990's and 2009. The Zimbabwean government participated in the second Congo war and had to service its financial needs especially with the increasing salary demands of their army. To meet up, they decided to print more money which, alongside a host of other minor factors like the institutional corruption prevalent in the country and the poor economic policies put in place by the government caused a serious dip in the value of the currency.

Governments have failed and there is no guarantee that there would be a breakthrough soon with the current recessions, inflations and various economic instabilities around the world.

In summary, governments have failed throughout history to properly regulate the money supply and the unbanked without access to proper financial services are mostly victims of these governmental failures. Little wonder three quarters of the world's poor are unbanked.

CHAPTER 3

TRANSITIONS: OF BANKING, UNBANKED, UNDERBANKED AND FINTECH

Who are the Unbanked?

Conventional banking methods have caused a large portion of the world's population to lack access to banking services. These group of people are known as the unbanked. From the Global Findex database there about 1.7 billion unbanked adults. China, India, Pakistan, Indonesia, Mexico, Bangladesh and Nigeria are home to almost half of the world's unbanked population.

Banks or banking?

People want banking services but they do not want to have dealings with the bank. This has given rise to several fintech companies filling in the gap. fintech companies have made it possible to pay bills, make transfers, request loans and a host of other financial services all without the conventional methods of visiting the bank and having to stay on long queues followed by long document processing which may not yield fruitful results. All this is now done online, although the banks have stepped up and have started making some of these services available on their mobile apps.

Children all over the world born today today may never even have a bank account. With the effective impact of cryptocurrencies on the life of today's youngsters, they may come to see owning a bank account as an unnecessary formality. Their children will also most likely follow in their footsteps and leapfrog the experience of ever owning a bank account.

Banking the unbanked can be most attained by driving financial inclusion through mobile phones, as their penetration is already deeper. From a Forbes report, only 55% of adults have a bank account but 80% of them have mobile phones. Fintech services like M-Pesa in Kenya have previously used the mobile phone penetration to provide financial services.

Banking is essential, even as banks lose relevance

Financial services are at the core of the economy. These services can be compared to the engines that propel the wheels of trade and industry. Just as money has changed over time, finance has also evolved. Banking transformed from mere exchange between individuals to the making of deposits as savings in the Babylonian, Greek and Roman temples. Over time, the deposit of money led to the advent of securities and interest as a reward for loans. The finance system adapted to the demands of international trade and globalization, expanding to a complex network of numerous systems and components. To date, the finance space keeps expanding to meet the booming needs of national and international transactions. On the other hand, it also narrows its focus on meeting the peculiarity of individual consumer needs. One question hangs menacingly over their attempts to serve the individual consumer's needs: have their attempts been successful or not?

The answer is two-fold, yes and no. Yes, because it has catered successfully to some extent, for the banking needs of some people, especially in advanced/urban environments. These set of users have access to the advancements in the delivery of banking services, like the credit card some years ago. Even children have special accounts that can be operated on their behalf.

On the other hand, the banks have left a large population of people unattended to. As at 2017, over 1.7 billion adults are unbanked, yet two-thirds of them own a mobile phone that could help them access financial services. The implication of not having a bank account means that there is restricted access to financial services. The unbanked population are financially excluded and therefore cut off from enjoying financial services. Beyond the unbanked adults, millions of businesses do not have access to financial services and that limits the possibilities of expansion.

Financial inclusion reflects positively in metrics of national growth

and economic development and financial exclusion, evident in countries like Bangladesh, Nigeria, Mozambique and the Philippines could contribute to economic frustration. The factors behind such unbanked population are poverty, the distance to financial institutions, the absence of vital documents and distrust in financial organizations.

According to Statista, the number of mobile phone users in the world is expected to pass the five billion mark by 2019. In 2016, an estimated 62.9 percent of the population worldwide already owned a mobile phone. The mobile phone penetration is forecasted to continue to grow, rounding up to 67 percent by 2019.

The number of smartphones and internet enabled devices means that financial services could be more accessible. It means that more people could do more because they are required to do less. It means that not only will banks be able to reach more people, but more people will be able to reach banking services without actual banks, but alternative sources.

For the first time, banks and other financial institutions will not merely have to adapt to and embrace emerging technologies, they will have to evolve and revolve with these changes that occur at an accelerating pace. It means that users will not have to walk a distance to get to their banks, but can move to any distance while their banks go with them right in their palms. Put simply, people will be enabled to have bank accounts more easily and also, they will be empowered to enjoy financial services without having a bank account. Although this has started happening, it promises to happen everywhere, to everyone and through a multiplicity of alternative channels.

On Fintech

Over the years, there has been a massive application of technology in banking and other financial services. In these cases, technology

has been used to improve banking operations and delivery of services to account holders. Technology is used in-house to handle processes and improve work. Financial organizations have also used technology to improve service delivery for users. For instance, banks are transitioning from using physical media (cheques, bank tellers, receipts, deposit slips) to the use of information and communication technology channels. Banks have adopted technology through Automated Teller Machines, credit cards, internet banking, USSD and many more. The realization that brick and mortar structures cannot serve all the needs of consumers has led to the adoption of technology in banking.

Internet Banking

Internet banking or electronic banking (e-banking) allows a user to perform banking activities over the internet. This enables anyone with a bank account to transact over the internet rather than through a branch. Internet banking is often done on a website or through an application and can allow for different activities such as transferring funds between registered accounts, making payments to third parties, requesting loans, making investments, checking account details, requesting for credit cards, viewing transactions, checking bank statements etc. Beyond banks enabling account owners to transact over the internet, there are also branchless banks that are fully established on the internet. These types of banks offer direct banking services over the internet without having to ever visit an actual branch. They often require uploading certain documents for the account to be created.

Internet banking has had a tremendous effect on banking. The provision of this method of transactions reduces the direct burden on human staff and also gives ease of access to users. Internet banking is very convenient and it enables users to make payments and purchases anywhere and at anytime. The services are most often available every moment of the day, removing the time restriction that brick and mortar banking creates. Internet banking

or mobile banking is also fast and efficient. Transactions can be made in minutes without having to queue, without having to go through filling long forms and without having to wait for authentication by a banker. Internet banking makes banking easy, fast and secure.

Internet banking is just one of the applications of banking with technology. The use of technology in banking can be summed up with the term “digital transformation” which entails modifying processes through digitalization, with the goal of optimization. There could be more and as shown in recent times, there is actually more -- digital disruption.

USSD Banking

Unstructured Supplementary Service Data (USSD) is a Global System for Mobile (GSM) technology. It aids communication by dialing short codes on a mobile phone and does not require an internet connection. Banks now use it to provide financial services for customers by simply dialing a short code. The short code is given by the bank and the customer must have an account with the said bank. It can only be done on a mobile phone which has the SIM card used in bank registration.

Unraveling Financial Technology

Technology has widely been applied in banking. The application of technology in banking simply means technology has been used to improve the delivery of banking and other financial services. Technology has extended beyond being applied in technology alone. Technology is now being combined with finance to deliver both simultaneously. The rate of innovation and digitalization has led to a massive shift in the finance sector. The partnership between finance and technology is synergistic and it birthed the term "fintech".

Financial technology is set to revolve the finance sector. It is

essential to understand fintech, how the financial industry can harness the advantages and address the threats that widespread digitalization poses and to see how this innovation can promote financial inclusion.

The word Fintech just started being used in the early 2010s. The coinage from finance and technology is a recent addition to both sectors, but it has had far reaching implications and it still boasts a whole world of possibilities ahead. With fintech, the number of people who have smartphones and access to the internet becomes more significant, as it shows the large extent it can help those who have no bank accounts to reap the benefits of financial inclusion. Fintech has emerged as a key sector of two industries and it is causing paradigm shifts in both industries.

Fintech is the delivery of financial services with technology. It involves innovating financial services through technological devices with the aims to increase accessibility and consumer satisfaction. Some definitions have adopted the term "disruption", meaning that fintech is the disruption of existing banking and other financial activities through the application of technology. Fintech is truly digital disruption, modifying existing systems and establishing new ones, leading to changing business models and a focus on customer experience and inclusion.

Financial technology comes with numerous possibilities. The case of M-pesa in Kenya is a great example. M-pesa has helped over 80% of Kenyans make financial transactions from their phones without even having a bank account. The proportion of Kenya's population with access to formal financial services rose to 83 percent from 75 percent in 2016, driven largely by mobile technology, a survey part-conducted by the central bank of Kenya in 2019.

Fintech has been extensively used to perform five services. These services are money transfer and payments, savings and investments, borrowing and lending, insurance and budgeting and financial planning. Fintech is also used for digital asset

management, retail trading platforms and the development of new payments infrastructure.

The use of fintech in performing these activities has increased the number of participants in the sector. Start-ups have sprouted, each posting a unique idea to improve the sector. Financial giants have also looked inwards and partnered with some of those start-ups to deliver more value. In recent times, big tech companies have also leapt into the fintech sector. All of these lead to the evolution of a keenly contested, global sector with giant players and budding companies too. The decentralization of the sector is novel, shifting it away from the former monopoly of access. Furthermore, the stringent regulation and restricting policies guiding financial activities has had to pave way or be more liberally modified to accommodate the number of players. Fintech adoption has led to a shift from the financial institutions to their consumers, making the need to balance profit making and customer satisfaction imperative, as well as adapting to increased competition and changing regulations.

As a result, huge sums of money have been invested in ensuring that companies can benefit from increasing financial inclusion to the huge number of unbanked people globally.

Why Fintech Matters

Fintech matters because it can deliver financial services to anyone, anywhere in the world and at any moment, insofar as that person has an internet enabled device. Fintech provides an ideal solution for a problem that has been at the core of many policy objectives - increasing accessibility to financial services. Technological advancement and increased possession of information and communication technology devices (over two-thirds of the unbanked population have mobile phones) could be used in facilitating financial transactions for all.

Mobile devices play a prominent role in financial accessibility. The example of M-pesa demonstrates how mobiles phones can be used by people without bank accounts to transact and save through a mobile device. Beyond mobile phones, internet access and increasing digital awareness can help contribute to reducing the number of underserved people.

Financial technology generally helps achieve numerous aims. Beyond helping those that are financially underserved have access to financial services, it helps participants improve their services to get the currently served better served. Financial technology creates channels for devising solutions to increasing demands and the need for improved use of financial services, enhancing their quality, speed and security. Financial technology can also help harness the spread of mobile phones ownership, wider network coverage and increasing technology awareness to improve accessibility. Furthermore, participants in the fintech sector can leverage on electric data to design customer-centric services, giving a feel of personalized services. Also, fintech and effective government regulations can help increase protection and security of transactions and customers.

Financial technology will improve access to financial services through circumventing, or augmenting the processes for becoming banked in traditions brick and mortar banks. The AFI Special Report, tilted "Fintech for financial inclusion: a framework for digital financial transformation", 2018 listed them thus:

1. Digital identity and electronic know your customer for identification and simplified account opening

2. Open electronic payment systems, infrastructure and an enabling regulatory and policy environment that facilitate the digital flow of funds from both traditional financial intermediaries and new market entrants

3. Account opening initiatives and electronic provision of

government services, providing vital tools to access services and save

4. Design of digital financial market infrastructure and systems that, in turn, support value-added financial services and products and deepen access, usage and stability.

Financial technology is therefore not solely a product of a nexus between finance and technology. Creating and implementing progressive regulations, is key to unlocking its potential.

On Blockchain and other technologies at the base of financial technology

Four emerging technologies are the foundation on which financial technology is built. These technologies are Application Programming Interfaces (API), Artificial Intelligence (AI), Distributed Ledger Technology and Biometrics. Companies based on these emerging technologies have been funded in the drive to promote improved access to financial services. Blockchain (distributed ledger technology) is one emerging technology that has significantly enhanced financial inclusion through its primary application or use case which is cryptocurrency. It has and will continue to, in collaboration with the other technologies (AI, APIs and Biometrics) propel financial technology forward. These technologies are also aided by cloud computing and data security. A brief overview of artificial intelligence, application programming interface and biometrics will be done. Blockchain, which is prominent among these technologies, will also be explained along with them.

APIs help with the aggregation of financial services providers. It helps create connectivity between banks and fintech service providers, opening the space for aggregation of resources and collaboration between financial institutes and fintech companies. Such collaborations remove the monopoly often associated with

banking and promote Open Banking. These collaborations increases competition and as a result improve customer experience. The aggregation of resources, ideas and insight can lead to better products and improved services. API creates an ecosystem that includes financial institutions, fintech platforms and big tech firms.

Artificial intelligence, particularly machine learning, is able to create dynamic user experiences. Fintech positions the customer as a king and players in the sector want to appeal to as many customers as possible. Artificial intelligence can be utilized to improve their users experience, make operations easier and faster and utilize the user's data through intuitive channels. AI can be used for chat bots, monitoring, fraud protection, identity amongst others. It can be used for biometrics, which will be discussed next.

Hundreds of millions of dollars are being invested in biometrics. The importance of identity collection and use in fintech makes biometrics a pivotal unit of fintech platforms and even traditional financial institutions. Biometrics are vital for authentication, identity and security, which in turn are also vital for establishing systems that foster financial inclusion.

Cryptocurrency is often the first word when blockchain and finance, or blockchain and business is mentioned. Cryptocurrency actually plays the biggest role at the moment, attracting regulations, government agencies and a lot of activities. Being the first application, it is still the most used application. Other applications are being tested, however. blockchain holds numerous potential for finance, ranging from smart contracts to data storage and record keeping, to digital asset management and many other innovations that can be built on the decentralized ledger technology.

Cryptocurrencies have been adopted by financial institutions and national governments. The Bank of England announced the RScoin in 2016. Many other banks have threaded that path too. Countries have also created national digital currencies, such as the e-dinar, a national digital currency issued by Tunisia in 2015, United Arab

Emirates blockchain-based encrypted digital currency called emCash, Venezuela's Petro and many others. Countries like Canada, Uruguay, Norway, New Zealand, Singapore, Saudi Arabia and many more are seemingly working on cryptocurrency projects.

Cryptocurrency can help facilitate swift, borderless payments. For places like Africa, it can help cut the shortages of over 8% of remittance charges. The removal of intermediaries will help create faster, secure and safer transactions with little or no costs.

Blockchain technology can help propagate access to financial services.

CHAPTER 4

BLOCKCHAIN

What is Blockchain?

The blockchain technology is undoubtedly one of the greatest technological happenings in the world today. Its entrance into the world was followed by a change in the financial sector. Although there are many other sectors in which the blockchain finds relevance like healthcare, agriculture and production sector, it promises to revolutionize the world's current financial system.

Ever since the creation of Bitcoin and one of its underlying technology, the blockchain, in 2008, there has been a shift towards the use of this digital form of money called cryptocurrencies. This became more evident in how the value of Bitcoin rose from a few cents to over 20,000 US dollars in December 2017. The blockchain technology promises a very bright future for the world we live in. It aims to make services that are offered to the public to become as transparent, decentralized, safe, secure and convenient as possible. One may wonder why there is so much emphasis on this important invention, but a good understanding of its structure would help us to understand the endless possibilities that it offers.

Benefits of the blockchain

- It allows for secure and transparent transactions. The transactions are secure since they are peer-to-peer (P2P) and are transparent since each transaction information is made public.

- Double-spending is not possible with transactions on the blockchain. Double-spending is a problem in which the same digital currency can be spent more than once.

- It eliminates the need for a middle man or third party to facilitate transactions between two individuals.

- It is immutable. Information entered into the blockchain cannot be altered by any known computational means.

Cryptocurrency

Cryptocurrencies are digital currencies that exist on the internet and can be sent from one person to another anywhere in the world, where several different people confirm that transactions without a central regulatory body like the government. How does that work you say? Let's dive further.

In 2008, a whitepaper was released about the first cryptocurrency called Bitcoin, a new monetary system; the internet of money. Bitcoin can be sent from person Alice to person Bob as long as they are both connected to the internet and unlike fiat currency, Bitcoin has a fixed supply of 21 million. That's all that will ever exist and they have to be “mined” i.e. new Bitcoins have to be produced until the maximum is reached. Who confirms the transaction between Alice and Bob? How are Bitcoins mined if everything exists digitally?

The blockchain technology is one of the four technologies behind Bitcoin and other cryptocurrencies, the others being P2P Network, Proof-of-Work and Cryptography. The Blockchain is an open, distributed and encrypted ledger/network that records data that everyone in the world can participate in.

The people who participate in this network and confirm transactions that take place in the network are called miners, they simply take a transaction and add it to the ledger/network that everyone is accessing and broadcast it to everyone in the network that a transaction between Alice and Bob took place. However, this process of confirmation doesn't come cheap as the computers of these miners are made to solve complex puzzles, whoever gets it first will confirm the transaction and get rewarded with new cryptocurrencies for their efforts. So miners equip themselves with powerful computers to stand a chance to earn rewards. This process of confirmation is called “proof of work” and the rewards given to participants in the network is what keeps the network running till date.

There are other ways of confirmations which includes proof-of-stake, delegated-proof-of-stake, proof of authority but more emphasis will be laid on proof of stake later on.

Since the inception of Bitcoin, different types of cryptocurrencies have been developed with different functionalities. Some were built to serve as currencies e.g. Dash, some as a computer for decentralized applications i.e. they serve as a means for other people to build and run applications on the blockchain like Ethereum. Some are built as reward systems, lending platforms, voting systems, distributed computation, identity platforms, distributed storage systems and advertising systems.

Basically, there are two main methods of reaching consensus on the blockchain which are the Proof of Work (PoW) and the Proof of Stake (PoS). Each of these aforementioned consensus methods are distinct in the mode with which they process transactions and come to agreement on the blockchain.

Proof of Work

Proof of Work shortened to PoW is a type of blockchain consensus algorithm that authorizes transactions through mining of blocks that are ultimately added to the blockchain. This is attained by the use of mining rigs. Mining rigs can be thought of as a group of computers that process data at a very high speed and find answers to certain puzzle-like tasks. The mining rig that gets the answers correctly is rewarded. Unfortunately, the use of PoW comes with a whole lot of challenges with “high consumption of energy” being the main challenge, hence the shift to PoS.

Proof of Stake

Proof of Stake abbreviated to PoS is a type of consensus algorithm where certain individuals who wish to take part in the consensus on the network provide a certain amount of coins called a stake which is

commonly in the base currency of the blockchain network. They are then allowed to take part in the consensus by verifying transactions, adding blocks and taking a vote in certain decisions. They stand a chance of losing part or all of their stake if they prove to be dishonest and they are rewarded if they show honesty. This serves as an incentive to drive honesty in the consensus process.

Wallets

Wallets are what allows you to interact with the blockchain, the app or software you interact with when attempting to initiate a transaction or access your information on the blockchain. The blockchain is a very sophisticated network with a massive number of lines of code which an average person cannot understand. Therefore, wallets are designed to have very understandable interfaces even grandmothers can easily use to send and receive cryptocurrencies, they basically hold your account information and your funds. The vast majority of wallets are light clients, which access only the most recent information on the blockchain that's relevant to your particular account at the time, rather than storing the entirety of the massive file that is the blockchain. This is because the blockchain grows longer and thus requires more space with every block, thus the need for light clients in the first place.

Blockchain “accounts” are comprised of two parts:

1. A public address, given out to others to tell them where to send you cryptocurrency.

2. A private key that's used to digitally sign transactions. This is akin to a password. If someone knows your private key, they can effectively send your crypto wherever they want to with no repercussions. Thus, keeping your private key safe is of utmost importance.

When you purchase cryptocurrency on an exchange, the exchange

generates and stores addresses and keys for you on their servers. This means that your assets are only as safe as the servers they're stored on and exchanges are targets for hacks. For this reason, it is generally recommended to move your crypto to a more secure wallet for long term storage.

Just as there are different types of accounts there are different types of wallets but unlike the accounts that are simply classified by the time required for storage of funds, wallets are also classified by their security. Security is a very important issue since you have total control of your funds and a little mistake could cost you your life savings.

Desktop and Mobile wallets

These work by storing your private keys on the hard drive of your device. They are safe and if you drop or lose your device, you will not lose your money (or rather, the ability to access your money, which is pretty much the same thing), as you can recover your funds from either the private keys or seed phrase.

Anyone can access your funds from another device if they reconstitute the wallet there. The possessor of the private keys/ seed phrase owns the funds!

Cold Storage wallets

Cold storage wallets are widely regarded as the best option for keeping your crypto assets as safe as possible while still allowing relative ease of access. A device about the size of a flash drive generates a new public and private key pair offline, encrypting them.

Cold storage wallets are great for a few reasons:

1. They are portable – you can take your crypto anywhere!
2. They are not susceptible to hacking.

3. Your information is not stored anywhere online.
4. Even if someone steals your actual device, they can't decrypt your private keys. It is Protected by a passcode and /or Two Factor Authentication which is a double layer security feature offered by google authenticator (You can download it on playstore).
6. If you lose the device, your information is recoverable with a seed phrase specific to you.

Addresses

The traditional method of sending money through banks is to ask for the recipient's account number and account name right? The bank acts as the trusted middleman to confirm the transaction. In cryptocurrency, it works a bit differently.

There are:

- Public address (this is related to your public key, so for this introductory primer, we will refer to them interchangeably)

- Private key

Think of your public address like your bank account number: anyone can send you money if they have your bank account number – it's public. To receive cryptocurrency, all you have to do is give the sender your public address. The address is a long, random string of numbers and letters.

An update is coming to Dash where you will no longer need random string of numbers and letters to send Dash but readable and easily recalled usernames dedicated to each wallet address.

On the other hand, if you want to send money to someone else through your mobile banking app, you must first enter your

password and log into your account. The password ensures that it's actually you sending money, instead of some hacker. In the same way, to send your crypto to someone else you must first enter your private key. A private key is what protects your account, so it should never be shared with anyone else.

Entering your private key to validate, or “sign” a transaction is like saying “Yep! This is me! Go ahead and send one Dash to Joe.” Two things to note:

1. If someone has your private key, they can send your crypto wherever they want and there's nothing you can do about it. Keeping your key safe is critical.

2. For each crypto you own, you will use a different public address and private key. Your public and private keys are collectively called your “key pair.”

In a simplified manner, an address can be compared to physical infrastructures, such as your residence for instance. Since your address is public, anyone interested in knowing where you live can request your address and even share the address of your house to another person. Anyone can know your address since it is public, but they cannot enter the premises just by knowing your address. A key (the private key) is what you use to enter your house and anyone can hardly do so without your private key. No one wants to lose that key or give duplicates of the keys to others, but you can share your address to a multitude when you want to throw a party.

Keeping your private key secure is very important; else it is like throwing your house open for everyone to act like an owner.

Owning Cryptocurrency

To possess cryptocurrency, you have to create a wallet. A wallet is a software program that is used to receive, store and spend

cryptocurrencies. A wallet helps you receive, store and spend cryptocurrency through your public and private keys. Wallets are therefore facilities to house cryptocurrency and can be compared once more to an actual house. The public key to the wallet helps you receive cryptocurrency while the private keys grant access to using them to transact.

Wallets act beyond just helping you to receive and spend cryptocurrency. They establish a connection between you and the platform and can help you know the current value of a cryptocurrency. They show your balance, your transaction history and help you select preferences, such as the amount of transfer fee you want to use based on your desired speed of sending cryptocurrency.

After creating a new empty digital wallet that can store, receive and send digital currency, but on some few instances, a bonus (small cryptocurrency value) load up for gas cost (gas refers to the pricing value required to successfully conduct a transaction or execute a contract on the Ethereum blockchain platform) and early usage of such digital currency, could have been assigned to newly created wallet to be able to initiate a transaction. This is not applicable to all wallets, but is available for some few digital wallet as a bonus fee to begin transaction with a particular low bonus fee. In general, a newly created cryptocurrency wallet is empty and you have to receive cryptocurrency into your wallet by either:

a) Receiving / Requesting Cryptocurrency

You can own cryptocurrency when someone sends it to you. Whether it is a payment for a good you sold, a service you ordered or a birthday gift, you can receive cryptocurrency direct into your wallet from another user. The sender must first be aware of the public address of your wallet, which the user can send to, or if using a mobile wallet, by scanning the QR code.

b) Buying cryptocurrency

You can buy cryptocurrency through an exchange. Exchanges enable users to buy and sell cryptocurrency for fiat currency known an OTC (over the counter) exchange or fiat exchange. You can also buy cryptocurrency with other cryptocurrencies or buy with gift cards. Some exchange platforms connect users, peering someone who wants to buy with another that wants to sell known as peer-to-peer exchange. Some others simply sell the requested amount to the buyer in exchange for fiat currency (OTC).

Exchanges create wallets for users to buy and sell. However, it is not completely safe to store your cryptocurrency on an exchange. Storing your cryptocurrency with an exchange is granting third party access to and control over your funds, exposing it to fraud. Asides, exchanges are victims of attacks and are often vulnerable to them.

It is advisable to move significant amounts of cryptocurrency from an exchange to a safer wallet.

CHAPTER 5

DASH

What is Dash?

Dash is Digital Cash, a user focused cryptocurrency, which you can spend anywhere, anytime and any amount for fees less than 1 cent. Users may decide to take advantage of the optional privacy Dash offers.

History of Dash

In January of 2014, Evan Duffield created XCoin, which then became DarkCoin and finally Dash. He created the cryptocurrency due to privacy concerns in the Bitcoin network. He wanted to create a supremely private cryptocurrency with faster confirmations.

Dash is completely decentralised, which means that it doesn't require a third party (such as a bank) to operate. A record, or ledger, of all transactions and account holdings are kept on thousands of individually owned computers around the world, which constantly check each other for corresponding activity. This effectively disintermediates (in this case, we mean that power is removed from a single authority – technologically) the network and ensures fair play.

The Dash network is distributed, transactions are verified by people who contribute their computer power towards keeping the whole system running. These people, called miners, are rewarded with newly created Dash for their work. The rate at which Dash is created decreases over time in a process known as disinflation. Although Dash has a constant inflation rate over a short period of time, due to the protocol, this rate decreases at a rate of roughly 7% every year. Eventually, this will mean that Dash has no inflation anymore, which is a monetary policy that is termed disinflationary.

Besides miners, the Dash network has a system of Masternodes, which are a group of users who run masternodes - they have a complete copy of the blockchain. Masternodes have put 1,000 Dash

into a wallet which acts as a form of collateral, although it can be moved at any time, doing so disqualifies the full node from being considered a Masternode. By facilitating network activities such as InstantSend, PrivateSend (more on these later), preventing 51% attacks (which means someone or a group of people controlling the network for selfish purposes), masternodes receive payments from the network (45% of newly created coins) and are allowed to vote on proposals.

Besides paying masternodes and miners, 10% of newly created coins go to the Dash treasury, a community fund that pays for continued development, marketing, employment and more. Only masternodes are allowed to vote on proposals. In this way, masternodes do hold a lot of power, but their collateral incentivizes them to act justly. The treasury system is only one of the things that makes Dash so special and anyone can apply!

Dash runs on two consensus systems (confirmation) - Proof of Work (blockchain) and Proof of Service (masternodes).

Proof of Work are by miners, while proof of service are by masternodes, where certain people are willing to stake a certain amount of Dash in the network to show their commitment to the network and run specific tasks.

What does Dash allow us do?

By utilizing a distributed protocol, we can send money cheaply and quickly anywhere in the world. As long as you have the internet, you can use Dash no matter which country you're in, what time it is and regardless of how much you want to send. The internet allows us to send information quickly, easily and ubiquitously (anywhere in the world); Dash allows us to send value quickly, easily and ubiquitously.

Cryptocurrencies like Dash have value not only because they are sending information, but they're also mathematically guaranteeing

that that information is correct, i.e. no double-spends.

Dash is a payment system that exists only digitally and works differently than the systems we are used to.

Dash is a global payment system. Are you trying to send money to Aunt Jane in Russia?

To an astronaut on the ISS? Don't sweat it, you can still use Dash. Sending money to your next door neighbour is the same as sending it halfway around the world.

Dash removes third parties (like banks and credit card companies) from transactions. No one but you can control your funds.

Dash was designed to have low transaction fees and quick transaction times.

The Dash network protects your identity. It does not use names to identify accounts – instead, they are identified by random strings of numbers and letters.

Features of Dash

Like many other cryptocurrencies, Dash uses a blockchain to record transactions over time. It has two features layered on top of that which are interesting to discuss.

InstantSend

In a retail situation, merchants and customers need hyperfast confirmations. Some cryptocurrencies have a confirmation time of over half an hour! That's just too long to be usable for merchants for instance.

With Dash, you can send money in only one second, powered by

InstantSend. A small group of randomly selected Masternodes expedites, confirms and sends your transaction immediately. This function is only performed by Masternodes and takes about 1 second to complete.

PrivateSend

If you tightly guard your privacy, PrivateSend is for you. Though no names are used on Dash's blockchain, consistent 'account numbers' (addresses) are used. That means when you send Dash somewhere, everyone can see where you sent it to. This is because, as mentioned previously, addresses are like public mailboxes whose contents are visible to all. Unless you use PrivateSend in Dash, or CashShuffle in BCH, or Wasabi wallet in BTC. This is another masternode feature for those who want their transactions to be private. Masternodes will take the Dash you want to send and mix it in a group of Dash from other people using PrivateSend. The masternodes then distribute the Dash to the final addresses. This way, the final destination of your transaction is concealed.

Fees

This is one of the best features about Dash, an average fee for a Dash transaction is just 12 kobo, yes I mean just 12 kobo #0.12, very much less than a cent. This is super cheap and it means you could do over 100 transactions a day with just #12 spent as transaction fee. You can send Money in Dash to your friends and family in far locations such as China, Russia, Zimbabwe etc. with the same transaction fee you'll use to send to your neighbour, this is freedom of money in the purest form.

Treasury system

Another unique feature of Dash is the treasury system. With most other cryptocurrencies, all newly mined coins go to the miners. In the Dash network, 45% goes to the Miners, 45% goes to the

Masternodes and 10% of the newly mined coins go to a communal treasury, which funds development of Dash.

Let's take a look at why this is so important. Most other cryptocurrencies had a large pot of their coin when the coin launched and have sold off their stores over time in order to continue development work. Dash, on the other hand, is one of the only projects with a sustainable revenue stream. The treasury is well funded and is able to support projects and hire contractors that benefit the network. Anyone is allowed to submit a proposal to the network for a fee, used to disincentivize spammers. Masternodes vote on proposals and reach a consensus to either approve or disapprove. Every expense in the Dash network is voted on in this way, even the salaries of contractors and employees!

Masternodes

A Masternode, a concept originally pioneered by Dash, is simply a full node or computer wallet which keeps the full copy of the blockchain in real time. Aimed at solving different issues which have left cryptocurrencies such as Bitcoin daunted.

Masternodes differ from other single nodes in functionality as they perform special functions such as: Instant Transactions, Private Sending and Decentralized Governance and Voting.

There are 3 types of nodes in blockchain: the ordinary node, the full node and the masternode. Each of these nodes has different responsibilities and functionalities.

Ordinary nodes for example are regarded as the backbone of any cryptocurrency. Their main function is to secure the blockchain and also prevent double spending.

Full nodes on the other hand differ from ordinary nodes in functionality as they hold an entire copy of the blockchain in real

time. They also can connect to the over 124 other nodes whereas other nodes can only connect to 8.

The Masternodes stand out in functionality and responsibility and as a result of this, they are becoming popular among crypto investors today. Masternodes as earlier mentioned provide special functions such as InstantSend, PrivateSend and storing the entire blockchain. Masternodes are also allowed the privilege of voting on governance and funding proposals, with each masternode receiving a vote on each proposal submitted to the system.

On May 25, 2014, Dash introduced Masternodes, making it the first cryptocurrency to adopt masternodes. Now a lot of cryptocurrencies have adopted masternodes on their blockchains. Some of these cryptocurrencies are ION, Bata, PIVX, Zcoin, Bitsend, Neutron, Amsterdam coin, ColossusCoinXT, Bulwark and so forth.

Masternodes are computers that enable processing of transactions within a blockchain and in return earn a reward from the blocks created, while miners confirm the transactions ultimately. As a bonded validator system, miners are series of servers that underpin a blockchain's network, while masternodes provide other services. Every service that miners' proof of work cannot accomplish is enabled by masternodes.

Apart from the mentioned benefits that come with running a masternode, it is also a good source of passive income.

There are several ways to make money with cryptocurrencies, the most common being trading on exchanges such as binance. However, running a masternode is also an interesting way to make money in the cryptosphere.

For example, running a masternode on Dash blockchain earns a reward of 45%, while miners get 45%, and 10% is for the treasury of the DAO. A Dash Masternode requires 1,000 DASH as collateral. However, the collateral isn't permanently locked in. It can ultimately

be withdrawn or sold whenever the investor wants. According to Dash's website, this translates to 2 Dash every week and ultimately 10% of the initial 1000 Dash invested at the end of 1 year.

Just like any other investment, investing in Masternode systems is also very risky. It is important to evaluate some key aspects of any masternode. These factors include but are not limited to:

- The reward system on the masternode
- The coin demand
- The minimum stake
- The usability and acceptability of the coin
- Probable block reward changes

Masternode innovation as a well thought out initiative has gained worldwide recognition and adoption. As mentioned earlier, some cryptocurrencies have enabled Masternodes on their blockchains.

Interestingly, African countries are not lagging behind in this move as well. African countries are making significant improvements lately in their acceptability of blockchain technology. Although, other continents like Asia and Europe are far ahead in the game, African countries like Nigeria, South Africa and Kenya are embracing the latest developments reasonably.

More on Dash's Special Features

Improved Transaction Privacy

A major improvement Dash has over Bitcoin is its interestingly subtle ability to secure the anonymity of transactions. As observed on the Bitcoin blockchain, all transactions are publicly logged on the ledger with each block revealing the sender address, receiver address and the amount transacted. This severely compromises users 'privacy and security as this openness exposes transactions to surveillance.

Since privacy is undoubtedly a factor nobody toys with, there have been issues on how Bitcoin, Ethereum and some other cryptocurrencies that run a public ledger of transactions without making provision for privacy. Issues such as hacking and stealing of funds from wallets are consequences of this insecurity.

In a bid to salvage the situation, Dash introduced the masternode to provide a PrivateSend function. This uses a decentralized coin mixing service which was mutated from Coinjoin. The aim is to shield transactions as much as possible by pooling multiple transactions into a joint payment thus masking the inputs and outputs of all individual transactions.

Although Coinjoin experienced some level of criticism over vulnerability of users transactions due to centralized servers, custody of funds and slow mixing time, among other things. Dash mutated the idea innovatively by taking it a step further. By leveraging on denominations, decentralization, chaining approach and passive ahead-of-time mixing to correct such vulnerabilities, Dash is able to put a smile on all crypto users faces again.

The PrivateSend transactions require at least 3 users and common denominations (0.01, 0.1, 1, 10, 100 Dash) to avoid exposing the input and output increments. Once a PrivateSend transaction is initiated by 3 or more users, their corresponding input, output and denominations are broadcasted to a randomly selected masternode which in turn mixes up the transactions. A chain approach is employed to further conceal transaction marks. This involves passing the transactions through multiple masternodes for up to 8 mixing rounds.

With the successful innovation of the PrivateSend function, masternode users can now choose to transact privately without the fear of being scrutinized as transactions can now be as private as they ever want it to.

Instant Transactions

It is no longer news that some cryptocurrencies such as Bitcoin take such a long time to confirm transactions. This has been a negative influence on the adoption of cryptocurrencies. Dash observed this seemingly less appealing situation and sought out a solution; Masternodes. Masternodes enable the Dash blockchain to function at a very high speed when it comes to verifying transactions. Masternodes improve speed by locking inputs and preventing them from being spent until they can be included in the block, they propagate this lock to the network instantly which alleviates transaction bottlenecks and allows for instant respendability, thanks to masternodes + chainlocks.

ChainLocks

Dash has implemented a new, unique network upgrade that will reportedly “eliminate” the threat of a 51% attack from the protocol.

ChainLocks enables transactions to be confirmed and secured as soon as the block has been processed, rather than waiting for six other blocks to be signed first. This makes it nearly impossible for miners to cause chain reorganizations. Blocks, or even chains, that are not published can be quickly invalidated by any block confirmed with a ChainLock signature (CLSIG). It was proposed by a member of the network's core team of developers.

Most Proof-of-Work (PoW) blockchains are vulnerable to 51%, or consensus attacks; when one miner has more than half of the network's hashing power. This allows them to take over the network, validating or invalidating any transaction they want. Previous 51% attacks have disrupted the network; some worry they might also be used as a form of industrial sabotage against a rival blockchain.

How Does ChainLocks Make Dash Secure?

ChainLocks works on the Masternode tier, through an application known as Long Living Masternode Quorums (LLMQs). Put simply this improves the network's voting mechanism by allowing decisions to be taken without individual nodes – nearly 4,900 currently active – having to propagate their signatures.

With ChainLocks, blocks are confirmed by a quorum; a majority of quorum members – the Masternodes – need to agree on which block was the first. Once more than 60% concur, a CLSIG is then sent out to the rest of the Masternode community, essentially confirming which block was first. The network then rejects other blocks. Secretly mined and processed blocks added to disorganize the network during a 51% attack, are quickly invalidated.

LLMQs are made up of randomly selected Masternodes, making them broadly representative of the total set. If 60% of one quorum agree on what the first block is, this should generally be a majority of the Dash community of validators. Because LLMQs are unique to the Dash network, Dash is reportedly the only network that can implement ChainLocks.

“Pure Proof of Work is only secure against 51% mining attacks if the base assumptions behind mining economics and rationality of participants hold,” said Alexander Block, the core developer for Dash Core Group, who developed ChainLocks. “Dash has a unique advantage here, as we can leverage our Sybil Attack resistant Masternode network and LLMQs to add more security on top of Proof of Work, which allows us to eliminate the risks of 51% mining attacks.”

Ryan Taylor, CEO of Dash Core Group, while discussing the prospects of the innovation stated: “This is an exciting upgrade for us as we continue to make progress on the launch of Dash Evolution. It will improve numerous key functions within the Dash network, including

both InstantSend and PrivateSend and accommodates new transaction types that lay the groundwork for many future uses of the Dash platform, such as the ability to build applications or attach metadata to transactions." This has made Dash the most secure digital currency and the most user-friendly blockchain-based payment system in the world. Dash Core Group will release DashPay, a consumer-oriented application to demonstrate the functionalities of Dash evolution.

Participation in Governance

Masternode users are highly regarded network users and as such are allowed a say in the future of the network. They are allowed the privilege of voting on certain motions where other participants cannot. One of the problems facing cryptocurrencies is governance. For example, Bitcoin which lacks governance suffers from non-scalability. This means that the blockchain runs in only a preprogrammed format and there is no room for improvement. However, with masternode enabled blockchain, consensus can be reached as users are given the privilege to vote in the decision making process.

The Bitcoin blocksize debate lasted for about 5 years and resulted in several forks off Bitcoin while Dash solved it easily by voting. A Bitcoin fork is a term used to portray another project set up by a gathering or person that takes the Bitcoin codebase and a copy of the Bitcoin blockchain. These new projects run on their own set of rules different from those that govern Bitcoin. Since they are gotten from the Bitcoin blockchain they can acknowledge holders of Bitcoin for new 'forked' coins on their new blockchain. Which means a Bitcoin holder will have both their unique Bitcoins and 'forked' coins.

Why Dash?

The word dash reminds one of speed, of pace and acceleration. For fans of comics, one might remember Dash, one of the characters in

The Incredibles known for his astonishing speed. This feature is one of the many reasons that Dash stands out as a cryptocurrency; the transaction speed is very fast. Speed is a vital element for transactions, satisfying our needs of immediacy. For traders, there is no better assurance of their trust in a buyer than receiving their money as soon as possible and in most cases immediately. That is why actual currency is preferred for daily transactions than a cheque because while one transfers the value immediately, the other has to be transformed.

In the drive for the adoption of cryptocurrency, speed must be integrated in a project. Dash stands out in this area, innovating ideas to meet the speed requirement for propagated adoption of the cryptocurrency in all areas. Unlike many other projects that take minutes or hours for a transfer of value to be completed, Dash does so in seconds. Bitcoin, for instance, requires a waiting time for transactions to be confirmed and this is unsuitable for point-of-sale payments. This is because participating nodes have to synchronize the latest block and wait for a particular time to confirm transactions in the blockchain.

However, the goal of Dash is to become a payment system for regular day-to-day activities. Dash devised ingenious ways, building upon and making modifications of the Bitcoin model to establish a decentralized, disintermediated, strongly anonymous cryptocurrency with immutable instant transactions at near zero charges. Dash is designed to facilitate speed, security, privacy and affordability.

Dash has a system of governance, decision making and budgeting that is run by the community. The active community does not have a central authority and every participant in the community has a say. Also, Dash operates a self-governing and self-funding model that enables the Dash network to pay individuals and businesses for work that adds value to the network. This decentralized governance and budgeting system makes it the pioneer of successful Decentralized Autonomous Organization (DAO).

Dash transaction fees are affordable, very much less than a cent no matter the amount been sent . The charges for the tremendous speed of transactions are negligible and this reiterates that it is the best solution for commerce and trade. The privacy feature that Instasend allows is also a great point for users, leaving no digital footprints of transactions, an innovation which is being integrated into some other cryptocurrencies.

The operation of Masternodes protects Dash from attacks, as an attacker will need to have at least 51% of the total network to attack it. A thousand Dash is required to become a Masternode and it makes it practically impossible to purchase the amount required to attack the system from other Masternodes running into thousands. Therefore, no single entity can determine the outcome of the network.

Therefore, if you want a cryptocurrency that desires give you the best of functionalities you can imagine with digital currency, or any currency at all, Dash does so and is constantly evolving to keep doing so. The project has brilliant developers and a thriving, vibrant community that is open to every interested person.

How Dash Bridges the Adoption and Use Gap

Dash offers instant, peer-to-peer payments with micro-fees and is accepted by thousands of merchants worldwide. Dash is fantastic, but the Dash community is not waiting for its uniqueness alone to propagate its awesomeness. The Dash community is pushing for adoption of Dash, particularly by merchants through a series of programs and its ongoing innovation. Across Africa, Asia, Europe and the rest of the world, Dash is being evangelized in a way that stimulates interest and motivates traders to embrace it.

Dash is accepted by many merchants globally. These merchants have adopted Dash as a means of payment mainly because of the fees required for a successful transfer.

Dash is utilizing the power of education and entertainment to push for its adoption. There are physical Dash communities, regular conferences, meetups, student organizations, trader-get-togethers and many more platforms for enlightenment and continued education. Education has proved to be very effective because it aids understanding of the blockchain technology and its merit, gives users a grasp of cryptocurrency, makes them appreciate the efficiency of Dash and teaches them how to use it. Through these, the community is dispelling negative perceptions of both people and regulatory authorities worldwide. The community combines the enlightening power of education with the attractive prospect of entertainment. Every Dash meeting has newbies that are fascinated and who begin to use it and spread the word. These activities are designed for two key players pivotal to its adoption; merchants and buyers.

So while increasing the prospects of usability and increased transactions, merchants are being taught to adopt Dash as an alternative payment system.

Dash is executing a superb project and what is more exciting is that they are constantly innovating and developing new ideas and strategies for its accelerated adoption and increased usability. When businesses factor in the benefits of Dash through its features, they get swayed by the tremendous value it adds to their businesses. They can see Dash as a medium to improve and scale their businesses when they consider the speed of transaction InstantSend offers, the affordability of the near-zero charges, the possibility of privacy through PrivateSend, the security of their transactions and the protection of their funds. Users are also excited to have a means to send value across the globe, to anyone at anywhere and at anytime at a blistering pace. The unifying global system gives you the assurance that financial help is always near, as you can instantly send money to a friend when he sights a beautiful suit but has no cash or cryptocurrency.

Similar ideas to this is the use of Dash Text, which is popular in Spain,

Venezuela, Colombia, the United States and other countries. Dash has been integrated for use with Telegram and has been adopted by adamant messaging app. Dash text allows the sending and receiving of Dash via text messaging and is available on feature/ low end phones. This makes inclusion possible for more people rather than a select few.

These ideas open adoption to anyone anywhere, with or without technical expertise and will increase financial inclusion.

Dash has an ambitious roadmap and proven history of delivery in its push for improving usability, increasing adoption, delivering value and expanding financial inclusion. Dash is not relenting in positioning itself in the cryptocurrency market and promoting cryptocurrency adoption. The community is notable for premiering brilliant ideas and implementing them. Another innovative push for adoption is Dash Evolution, which is discussed next.

Dash Evolution

The Dash team has been working on a project called Evolution, which will bring Dash to the mainstream. Dash Evolution is meant to allow the cryptocurrency to be integrated with the retail users and merchants. While the technical specifics are complex, Evolution will allow Dash to be used by many retailers around the world. Users will be able to send funds to each other with usernames as opposed to anonymous addresses, making the entire platform much more user friendly.

Dash Evolution is a decentralized payment platform built on Dash blockchain technology. The goal is to provide simple access to the unique features and benefits of Dash to assist in the creation of decentralized technology. Dash introduces a tiered network design, which allows users to do various jobs for the network, along with decentralized API access and a decentralized file system.

It is designed to make cryptocurrency easy for everyone to use, even when they are not tech savvy. The platform will elevate payments systems by enabling businesses and developers to build user friendly, Venmo like applications that allow people to create accounts with customized user names instead of cryptographic addresses for Dash transactions. Additionally, Evolution will enable developers to build decentralized applications without the need to run a full node, as such a development will be run on decentralized hosting. Evolution will aid more practical and convenient use of Dash by easing the process through the introduction of usernames in place of public addresses.

It will allow different accounts on each wallet to meet different payment needs.

CHAPTER 6

APPLICATIONS OF BLOCKCHAIN TECHNOLOGY

Blockchain Uses-Cases

Blockchain technology is multidimensional. It can be deployed in existing and emerging innovative paradigms. Blockchain technology is often deemed as cryptocurrency, but that is limiting it to only one application from a pool of functions it can be used to perform. It goes beyond cryptocurrency and financial services traversing into all forms of businesses and technologies and it can be deployed in many ways and some of them are:

Governance

Blockchain technology can transform the models of governance of national governments and corporations. International organizations can also have more efficient models of governance through the integration of technology into administration. Blockchain technology can improve governance by facilitating a new model of voting, keeping the identity of citizens and through recording transactions, decisions and asset ownership. It can further be deployed in budgeting and management of public funds.

Data storage

The identity and records of citizens, as well as its proper documentation is essential for administration, but existing systems are inefficient to manage these needs. Identity documentation is prone to forgery, loss and difficulty verifying. The identity and records of citizens can be stored on the blockchain. Aside from that, criminal records, court records and even private records of individuals (wills, for instance) can be stored on the blockchain. It is also secure as it can be encrypted and easily verified.

Nations and organizations can also deploy blockchain technology in voting (elections). Voting via blockchain reduces the chances of manipulation, as results cannot be tampered with.

Healthcare

The healthcare sector is reliant on the data of patients and the difficulty arising from the storage of a patient's data using traditional means (such as paper), or centralized digital forms are numerous. First, the data is inaccessible by anyone who does not have access to the central storage and patients will have to get essential details retaken. This wastes time and money. Storing a patient's data on the blockchain and allowing access by medical practitioners, patients, health insurance agencies and other necessary parties will help build tamper-proof data, ensure fast medical rendering service and appropriate recommendations by physicians and promote prompt payments by insurance companies.

Supply Chain Management

The movement of goods across borders is an important aspect of global trade. Supply chain management is aimed at improving trust in the delivery of goods and using the blockchain will make the process more transparent. Beyond the keeping of immutable records, the technology can help improve speed by reducing traditional friction points.

Blockchain can further be deployed in the supply of perishables (like food). The blockchain can be used to make the process of supply more transparent and traceable. It facilitates visibility and accountability of food supplies and it also makes details such as origin, storage and expiration date known to parties. IBM Food Trust does this, using blockchain. The solution connects participants such as farmers, processors, wholesalers, distributors, manufacturers, retailers, etc. through a permissioned, permanent and shared record of food origin details, processing data, shipping details and more.

Similarly, blockchain technology can be deployed in the shipping of goods. Over four trillion dollars worth of goods are shipped each

year and the amount of money spent on documentation is huge. Global trade can be improved through the use of blockchain technology for documentation and transparency. Using blockchain technology in the shipping of goods will help create accessibility to fast and secure end-to-end supply chain information. It will also help create verifiable and authentic data that cannot be tampered with. As a result, it reduces the burden, difficulty and slowness of paperwork as it improves stock management.

Real Estate

The real estate and property industry can be made more efficient by utilising blockchain technology. It is one area that can be tremendously improved through the application of the technology, from the keeping of records of ownership, documenting of transfers and management of estates.

First, blockchain technology can be used to keep accurate records and make required modifications. With land ownership for instance, the owner of a piece of land can be documented and securely stored on the ledger. The storage on the ledger means that records cannot be forged since the storage is decentralized. This ensures that the transfer of property can be done in a transparent manner and the ownership of land can be verified, even when it has been transferred.

Blockchain can also be used to automate transactions, not simply for the purposes of speed and efficiency, but for security. Digital ownership certificates, for instance, can be programmed in a smart contract to get transferred after the deposit of a sum provided in the agreement. Mortgage activities are better processed and the costs that come from the presence of numerous middlemen is eliminated.

Education and Issuance of Academic Certificates

The nexus of blockchain technology and education transcends

teaching about blockchain. The decentralization and disintermediation of the technology can help make certification more reliable and reputable. Many educational institutes now issue certificates on the blockchain.

Energy

Blockchain technology can have profound effects on the energy sector. It can aid the decentralization of the distribution, sale and transfer of energy. With this, energy can be sold and transferred between parties directly and without the need for third parties. The process of energy sales is made transparent as there is storage of the amount of energy generated and transferred by each party. Communities can also build an energy distribution system where households with excess energy (especially when generated through renewable means like solar) can transfer to others for a sum they desire and whenever they want.

Smart Contracts, Property and Financial Instruments

The practice of law is centralized and highly procedural, with laid down principles for every process. Furthermore, the practice of law is jurisdiction-based and the laws that apply and are enforced in different jurisdictions significantly vary. The enforcement of contracts is one area of law that is a daily requirement for human life, especially with trade. Blockchain technology has helped devise a way that contracts do not need to be jurisdiction-based and everyone can speak the same language in an automated contractual agreement that self-enforces itself without the need to resort to courts. IBM in their publication titled "Blockchain" defined a smart contract as 'an agreement or set of rules that govern a business transaction; it is stored on the blockchain and is executed automatically as part of a transaction'. It can also be referred to as smart agreements as they are contractual agreements that are implemented through the use of software. Smart contracts are

advantageous because they can assure parity between parties to the contract, help enforce the performance of obligations and eliminate the possibility of default by any party to the contract.

Smart property is a concept that is reliant on smart contracts. Smart property arises from cryptographically enforced ownership that can be sold or lent digitally. Such transfers are subject to the provisions of a smart contracts between the parties.

Financial contracts and Instruments can derive huge benefits from the application of blockchain technology. Financial instruments are often based on rules set by the issuer, though there might be checked by security and exchange authorities for compliance where the financial market is regulated. However, these regulatory authorities often go through tedious, expensive and time-consuming processes to assess such rules, paving the way for efficiency through the use of blockchain technology. Algorithms (known as programming protocols) can be used to select rules and enforce their application. They can be used in the stock, commodities, indices, bonds and derivatives markets.

Cryptocurrency and other financial applications

Bitcoin is regarded as the first application of the blockchain and it remains one of the most common uses of the technology. Beyond Bitcoin, countries and their central banks, financial Organizations, companies and even individuals have created and are creating a number of cryptocurrencies regularly. Some of these cryptocurrencies are targeted at countries, regions, sectors or at addressing a particular issue. It is safe to state that the financial sector has witnessed the most widespread adoption of blockchain technology.

Cryptocurrency can be described as digital currency built through cryptography. It is based on decentralized trust and cryptography. Cryptocurrency is digital asset and it is often used as a digital value

across many countries. Since the first Bitcoin transaction in 2009 and the opening of the first Bitcoin currency exchange site (Bitmarket) in 2010, many new cryptocurrencies, numerous transactions, pool of miners, exchange platforms and so on have come up. With a total market capitalization in billions of dollars, cryptocurrency is the most dominant use of blockchain technology. It is so popular that it is often mistaken to be the blockchain itself. Bitcoin, Ethereum, Stellar, Dash, Ripple etc. are popular cryptocurrencies.

There are four major sectors in cryptocurrency. They are exchanges (purchase, sale and trading of cryptocurrency), wallets (storage of cryptocurrency), payments (facilitating payments using cryptocurrency) and mining (ensuring the blockchain is secure through the computation of hashes and solving of algorithmic puzzles to find valuable blocks that will be added to the blockchain).

These four sectors make up majority of the cryptocurrency industry. The cryptocurrency ecosystem comprises of different participants who establish connections between blockchains, traditional existing financial institutions and the general public. The participants have embarked on projects that drive adoption by building applications that stimulate the use of cryptocurrency by public users. Cryptocurrency is being entrenched in the global economy as a vital component.

Beyond cryptocurrency, blockchain technology is used for other financial applications. For instance, blockchain ledgers are being used, even without cryptocurrency to facilitate monetary transactions across different currencies. Specially designed ledgers can ensure a seamless exchange between different national currencies. This important aspect of international trade, when placed on secure, permissioned blockchains will increase market liquidity and reduce transaction costs. Blockchain technology can be employed to increase funding for small and medium scale enterprises because of improved transparency and risk mitigation. Overall, these applications will create new revenue generating

platforms for small and medium scale enterprises, foster increased trading, increase cross-border transactions, increase access to capital and promote overall trade and economic growth.

An organization might therefore make an assessment of the technology to see if it can help meet an organizational need or if it will be appropriate solution to a problem. They will have to identify the problem blockchain technology can solve (or an aspect it can help improve) and set the goals its application will achieve, pick the best consensus system (eg proof of work, proof of stake or select the most suitable platform and construct the architecture (cloud, in-house or a hybrid model).

The adoption of blockchain by organizations will propel further adoption and more innovations. All of these applications and many more resulting from the collaboration of blockchain technology with other emerging ones such as artificial intelligence and machine learning, internet of things, smart cities and robotics, digital trade, etc will birth thriving ideas and facilitate an all inclusive adoption globally.

Blockchain Technology and Africa

Africa and the Middle East have one thing in common; they are home to a number of developing countries. These developing countries have suffered restrictions to the benefits of digitalization and globalization, ranging from poor access to outright exclusion. Blockchain technology is however encompassing and it has great potential for applications in different areas of private and public life. This becomes more promising when we consider that Africa has adequate human resources and can leverage on it's technological know-how to improve the continent. From the prospect of eradicating corruption and mismanagement in public sectors to improve the ease of doing businesses, blockchain technology is one that can help Africa actualize a transformation. The potential of the technology is one that can even make developing countries leapfrog

others in their development.

A direct implication of the technology is the financial inclusion it provides for the unbanked populace. Subsaharan Africa has a large number of unbanked people and according to the Global Findex report, over half of the adults in Nigeria and Ethiopia are unbanked, while about one-third of Kenyans are financially excluded. Of the 25 countries that host 73% of unbanked adults globally, almost half of those countries are from the African continent, with eleven countries namely; Côte d'Ivoire, Democratic Republic of Congo, Egypt, Ethiopia, Kenya, Morocco, Mozambique, Nigeria, Rwanda, South Africa,and Zambia, as reported by the Universal Financial Access 2020. People remain unbanked because of the costs, the need for extensive paperwork and documentation and the distance to traditional financial institutions; blockchain technology can be used to address these issues.

The technology can help integrate the continent internal currency exchange system. Internal trade between African countries is more difficult than transacting outside the continent at times, particularly because of the absence of effective currency exchange platforms for African trade. Blockchain technology can act as an enabler for improved African trade, while also positioning her better for the global economy through the ease the technology brings to global trade.

By facilitating a better means for intracontinental and intercontinental trade, the use of cryptocurrency can help curtail Africa's huge expenditure on remittances. The Migration and Development Brief stated that the global average cost of sending remittances has remained high, at 7.2 percent in 2018 Q3, a rate which is way above the Sustainable Development Goal target. of 3 percent by 2030. Remittance charges can rise to nine percent when money is transferred to sub-Saharan Africa regions, according to the University of Nicosia's material titled " Digital Currency and the Developing World".

This potential advancement in financial inclusion will improve access to credit for small and medium enterprises (SMEs). It will increase the ease of doing business in Africa and can accelerate Africa's industrial and infrastructural growth. Financial inclusion will help individuals generate wealth, will help countries expand and will devise ways to tackle inflation.

A Note to Regulators

Regulatory bodies should embrace this disruptive technology and find channels to incorporate this digital concept with existing systems. The governments of African countries must be open to innovation and rather than resist it because of a misunderstanding of the technology or fear of the extent to which it can cause shifts in governance, they must create regulatory frameworks for it. Such frameworks must be designed to harness the benefits of the technology without frustrating its growth. Therefore, beyond stipulations on compliance, there must be collaboration between the government and key private economy players.

Africa has a chance for groundbreaking implementations of blockchain technology, if it does not utilize it, it will end up being a spectator.

Common misconceptions about Dash and rebuttals

1. **Dash isn't decentralized because of its masternodes**

There are over 4,500 masternodes, which makes Dash relatively more decentralized than other coins. Bitcoin has over 8,800 full nodes, but has a larger market cap. Bitcoin would have to have over 170,000 full nodes to achieve an equivalent level of decentralization as Dash. Masternodes are numerous because they are financially incentivized to serve the network, while Bitcoin nodes are not.

2. **The government could just buy all the masternodes and control the network**

Running a masternode requires putting forward collateral of 1,000 Dash. With price at $100, this represents a stake of $100,000 per masternode, and at $500, $500,000 in masternodes.

To buy half the masternodes at this price would cost $1.8 billion dollars IF the price did not rise during the attack. However, trying to buy this much Dash in the face of limited supply could easily cause the price to increase in multiples, making this a VERY expensive attack. This would be similar in nature to a 51% attack on Bitcoin mining – theoretically possible, but difficult and expensive.

3. **Dash price is artificially elevated because so much is "locked up" in masternodes**

The collateral for each masternode is not locked up. The masternode can be taken offline and the Dash sold at any time. The ratio of the amount of Dash backing masternodes is probably similar to Bitcoin held in cold storage. The difference is that masternodes serve the network and get paid to do it!

4. **Privatesend isn't private because master- nodes could spy on the network**

Masternodes are selected randomly in a PrivateSend mixing transaction and each coin is mixed on different masternodes multiple times before it can be spent via PrivateSend. Even if an attacker controlled 25% of the masternodes, the odds of tracking a transaction through 8 rounds of mixing is less than 0.004%.

5. **Dash has poor privacy because privatesend transactions are not mandatory**

Dash is fungible because it has optional mixing through PrivateSend (which has never been broken). If a merchant didn't want to accept

mixed coins due to their unknown previous history, one could simply send them unmixed coins. Dash offers the best combination of privacy, instant transactions and a clear road map for on-chain scaling that is unrivalled by any other coin.

6. Dash is an instamine scam

There are often challenges when issuing a new coin. Dash had no premine and did not have an ICO. However, due to a problem with the mining difficulty adjustment, approximately 1.9 million Dash were mined in the first 24 hours – a “fastmine”. The community was asked if this should be corrected by hard fork, but it was decided to leave it as is.

A distribution analysis shows a large portion of the quickly mined coins were simply dumped by the miners. This is reflected in the very low price between February and April 2014. Again from April to December of 2015, Dash traded for around $2 so it's hard to argue that no one had a chance to get in while it was cheap. Evan Duffield, Dash creator and the purported beneficiary of the instamine, controls no more than 256,000 Dash and will give away 80% of that to fund Dash projects in support of the community. He is still working hard on the project today. Evan also controls no masternodes or governance votes. For more information see the wiki entry on this topic at www.dash.org.

7. It's a ponzi scheme because masternodes earn a return on their investment

Masternodes must reserve 1,000 Dash as collateral and serve the network by running robust full nodes. In return, they earn 45% of the block rewards paid out when new blocks are mined. This currently provides an annual return of approximately 8% to masternode owners. With most currencies, 100% of the block reward is paid to miners, who spend most of the block reward on electricity and mining hardware. The Dash block reward is split to support miners, masternode operators and developers, so that all

critical parts of the ecosystem are financially incentivized to thrive.

8. It's just a marketing gimmick

Dash is one of the fastest innovators in the cryptocurrency space. It boasts unique features such as InstantSend, PrivateSend, a masternode governance system and the world's first functioning DAO. It does fund promotional activities because very few people in the world are familiar with cryptocurrencies. We want everyone to have the opportunity to benefit from their many advantages over fiat currency.

Dash's unique block reward system reserves 10% of the block reward to support the development of the currency. Much of this is spent on the large number of full-time paid developers and a portion is also spent on promotional activities like conferences and marketing. This is an advantage that many newer currencies have copied from Dash.

Dash is a next generation cryptocurrency similar to Bitcoin, but with many improvements such as InstantSend, PrivateSend, financially incentivized masternodes and a decentralized self-funding governance system. (DashDude)

Thank You For Reading

Thanks for reading this book, I bet you enjoyed the journey I took you through. If you like this book, please take a minute to visit the book's page on Amazon and leave a review. This will help the book gain greater visibility in search rankings and reach more people.

Looking forward to meeting you in your various cities when we begin the book tour to distribute 100,000 copies of this book for free, in pursuit of spreading the knowledge of the decentralisation of money.

To get in touch with me, kindly use
digitalisthecashbook@gmail.com or engage me on twitter:
@nathaniel_luz.

DIGITAL IS THE CASH

This book is a must read for everybody that is interested in the history, present and most importantly the future of money. It walks the reader through the evolution of money throughout history and shows many opportunities how to benefit from coming changes in our money and financial systems. The book is completed with an in depth dive into Dash, an innovative blockchain based currency.You might miss out on significant opportunities if you don't read this book!
- Quansen

The book "Digital is the Cash" is a must get for every individual. especially entrepreneurs who have a keen interest in investment and are passionate about the Future of Money.
I strongly recommend this book as it entails secrets to lucrative forms of capital management and investment with salient historical references.
- (AMB) Dr. Sowemimo Abiodun.

For people new to monetary history of the world and interested to learn more about Dash Digital Cash--this is your book.
- Tele Heights

Nathaniel Luz, an award winning libertarian, is an author, speaker, educator, and one of Africa's foremost blockchain and digital currency experts.

He is known for promoting the adoption and use of digital cash in Africa, seeing the numerous opportunities provided by blockchain & digital currencies. His goal is to leapfrog Africa via them.

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