



IMPACT OF CRYPTOCURRENCY ON DEVELOPING COUNTRIES

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Abstract

Cryptocurrencies have long been discussed and debated as an application and economic tool has become more prevalent with consideration as a solution to support developing countries. Developing countries are repeatedly put through economic, political, financial and technological difficulties which are a result of a variety of influences. Therefore important aspects including infrastructure, institutions/governance, politics, price stability are fundamentals to cryptocurrency adoption.

Most certainly each developing country has different challenges but factors associated to this disposition are similar and interconnected. In an era of technological advancement the capacity for improvement for these specific countries that subsequently remain underdeveloped is becoming more practical and realistic.

This paper examines the impact of cryptocurrency with regards to developing countries. Additionally, it presents a framework proposing the pre-quisites and potential circumstances for implementation of cryptocurrency into developing countries. This paper is the outcome of examining a study on the opinions and awareness of individuals from developing countries relating to, cryptocurrency and financial inclusion.

Main findings with this study included the impact of cryptocurrencies in developing countries by reduction of time and transaction fees involving remittances has potential for improvement; which is directly beneficial to promotion of trade of goods/services (locally and internationally) simultaneously promoting microfinancing mechanisms. The foundational technology of the blockchain supports anti-corruption through transparency of digital monetary accountability. Technological development and innovation incorporating individuals, institutions and government can help provide financial inclusion. Cryptocurrencies can act as a combative tool for inflation as long as supply remains fixed.

Keywords: developing countries, cryptocurrencies, financial inclusion, digital economy

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Chapter 1 Introduction

1.1 Motivation

Traveling through Zimbabwe during a currency crisis some years ago sparked the current interest and personal motivation of this dissertation.While at a supermarket and the line to purchase food had 50 people and was extremely slow, when it was finally my turn to pay the time that exceeded what a normal supermarket expects. The question is why it took so long. To my discovery it took a reasonably large amount of time to finalize everything because Zimbabwe was in an economic crisis with hyperinflation affecting their currency which in turn required absurd amounts of cash to pay for anything. Zimbabwe had implemented an e-payment system that connected an individual's phone number that was then attached to each bank account. Therefore when a person would go to purchase something they would not pay with physical cash in hand but a pathway to pay digitally. As a result, is the idea of cryptocurrency as an alternative to this system?

1.2 Scope of work

This paper will examine the role of cryptocurrency in developing countries' economies and the possibility for it to serve as an economic instrument in the financial system for benefit and improvement. The outcome is to examine the awareness of the role of cryptocurrency application in developing countries' economies and its impact on society. The key purpose of this paper is to get a better understanding of the problems developing countries face and would improve cryptocurrency adoption and boost the conditions.

1.3 Background

> *"The history of the mankind demonstrates that the money is continuously developing. In historical perspective the evolution of money forms and types can be conventionally represented as a gradual transition from commodity money to electronic money." (Panova, 2015)*

The world has had a range of measures aimed at the stabilization of money circulation in order to fully or partially transform society and whether it be the use of sea shells as a currency to a digital block being sent over the internet the idea of value in the form of monetary association.Being that we now exist a technologically advanced society there ultimately the result is innovation and sometimes disruptive.

As a unit of account, money was used to measure value, historically the use of copper, silver, gold was adopted as a standardized unit. Furthermore, the invention of paper banknotes and various currencies were implemented such as digital savings or checking accounts came into play as time went on. Eventually the introduction of a cashless world was spawned due to technological advancement and in this process cryptocurrency was invented. The human will to improve technology has essentially transformed every aspect of society but cryptocurrency and all its advancement can be perceived by advanced economies as highly speculative and uncertain due to high volatility and without regards for any regulation. Yet the developing world may utilize this idea of cryptocurrency in a different perspective, especially countries with a historical financial instability regarding inflation or deflation and where access to traditional financial systems such as a simple bank account may be harder to access; this is where cryptocurrency has become opportunistic and a feasible point of interest for developing countries. Anticipating an in depth discovery involving the elements impacting cryptocurrency in developing countries it is compelling to elicit the interest, motivation and objectives involved within this dissertation.

Therefore the growth and improvement of third world countries gives the opportunity to construct a model to explain and add to the base of knowledge of cryptocurrency in developing countries, to validate the model in this field of interest and to model a scenario that can be used as a construct for cryptocurrency implementation.

The structure of the document will be as follows:

1. Section One: include an introduction of Cryptocurrency & simple description of the blockchain technology relating to application of developing countries and it will also include research motivations.

2. Section Two: gives a brief history behind blockchain technology and cryptocurrency including concepts of previous publications in the form of a literature review. At this stage of the thesis it will establish the literature review as a table and critical analysis of perspectives presented, including the knowledge gap.
3. Section Three: gives a structure to the research design including the research question, presenting a strategy of conducting the research using the design science research approach.
4. Section Four: presents the proposed model and conceptual framework including the explanation and descriptive associated to the nature of the framework
5. Section Five: will incorporate the data collection and describe the process involved, sample descriptions, analysis approach, limitations as well as the discussion and data analysis and associated summaries.
6. Section Six: gives the overall conclusion of the study and potential further research

Chapter 2 Literature Review

2.1 Research Introduction

With regards to the foundation of previous knowledge it is necessary to involve research regarding the academic analysis of past literature as it is helpful in order to articulate this thesis in a logical manner. In the process of gathering information for the purpose of this dissertation the involvement of *scopus.com* and *wos.com* were utilized to acquire adequate publications regarding cryptocurrency in developing countries. Within the development of these two sources the combination of keywords were applied to the keyword-based research which selected articles, were read, analyzed, and graded regarding the purpose and application of the research approach. Regarding the articles, the literature and publications of most relevance were reviewed and will be discussed in this section. The logic of the literature review will include and focus on the elements below in order to understand principal works that have been consequential in the scope of cryptocurrency, developing countries and financial inclusion.

2.2 Synthesis

This concept intends to describe the application of cryptocurrency from the point of view of its importance for third world development and the widely considered instrument of cryptocurrency and the impact on individuals and business within these developing countries.

In order to locate publications from reputable sources the following table (Table 1) is considered regarding keywords and search combinations throughout the process of searching for reliable information. The research in the table below was sourced through World of Science and SCOPUS.

Research done in SCOPUS and WOS (open access)				
Keywords	Total Papers	Papers Kept	Date	Source
TITLE-ABS-KEY (bitcoin)	133	2	27/11	WOS
TITLE-ABS-KEY (bitcoin developing countries)	50	11	27/11	WOS
TITLE-ABS-KEY (bitcoin digital currency)	508	3	27/11	WOS
TITLE-ABS-KEY (bitcoin poverty)	4	1	27/11	WOS
TITLE-ABS-KEY (bitcoin world bank)	54	0	27/11	WOS
TITLE-ABS-KEY (blockchain developing countries)	226	4	27/11	WOS
TITLE-ABS-KEY (evolution money)	1,685	1	27/11	WOS
TITLE-ABS-KEY (digital currency developing countries)	44	1	27/11	WOS
(TITLE-ABS-KEY (developing AND countries)) AND (developing AND countries AND cryptography) AND (LIMIT-TO (EXACTKEYWORD , "Developing Countries") OR LIMIT-TO (EXACTKEYWORD , "Cryptography") OR LIMIT-TO (EXACTKEYWORD , "Blockchain"))	144	1	2/12	SCOPUS
TITLE-ABS-KEY (bitcoin AND digital AND currencies AND developing AND countries)	4	2	2/12	SCOPUS
(TITLE-ABS-KEY (developing AND countries AND economy)) AND (bitcoin AND developing AND countries AND economy) AND (LIMIT-TO (EXACTKEYWORD , "Developing Countries"))	13	2	4/12	SCOPUS
TITLE-ABS-KEY (developing AND countries AND economy AND bitcoin)	8	1	4/12	SCOPUS
(TITLE-ABS-KEY (developing AND countries)) AND (developing AND countries AND cryptography)	122	0	4/12	SCOPUS
TITLE-ABS-KEY (developing AND countries AND economy) AND (LIMIT-TO (EXACTSRCTITLE , "World Development")) AND (LIMIT-TO (SUBJAREA , "ECON")) AND (LIMIT-TO (EXACTKEYWORD , "Developing Country"))	576	4	4/12	SCOPUS

Table 1. Summary of search and combination of keywords (WOS and SCOPUS)
Source: Own Illustration

Although this keyword combination included only 11 combinations the constructed opportunity was sufficient in the results regarding total papers and relevant papers for the tentative literature review. Following this keyword research the PRISMA Flow Diagram provided below (Figure 1) was used as a filter to correspondingly select the correct papers according to relevancy. The important criteria determined for the outcome of this dissertation was to use a process of elimination by screening the publications excluding, no relevant study design, no relevant outcomes, not evaluating the connection between cryptocurrency and third world countries. Through the process of eligibility an important aspect was utilizing texts which provided full text as well.

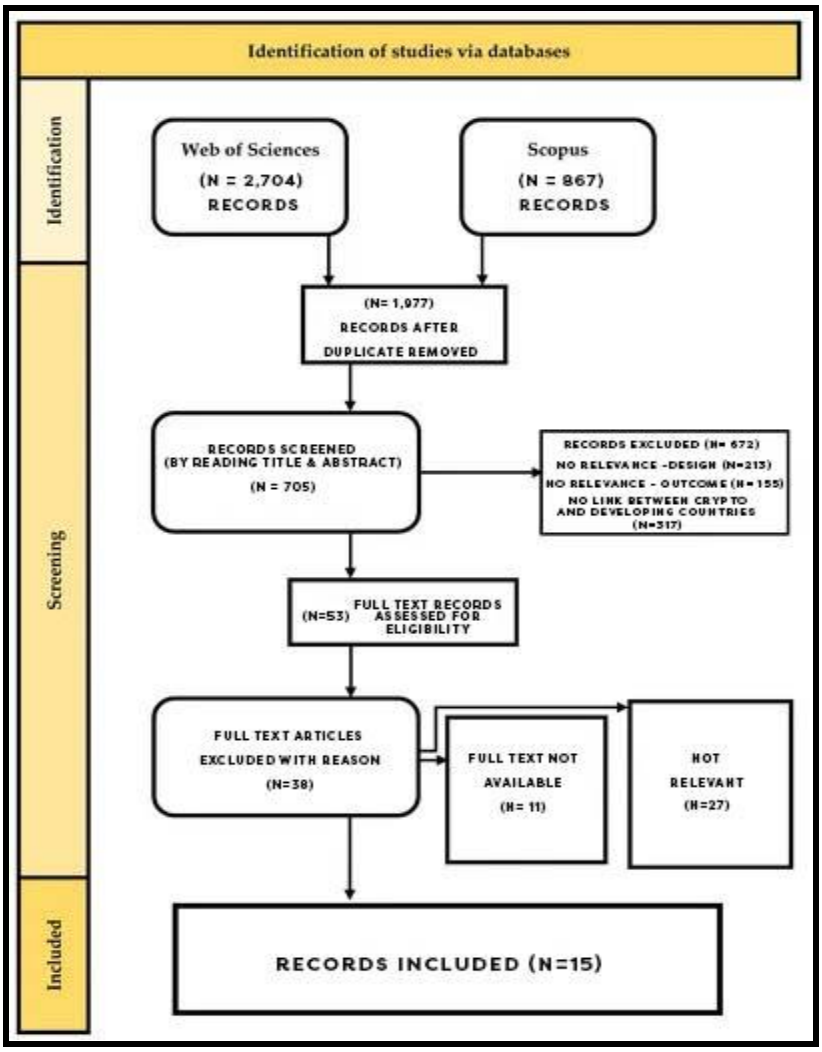


Figure 1: Prisma Flow Diagram

Following the acquisition of the articles and relevant publications in figure one the following table (Table 2) presents the set records that help highlight the potential map of the current concept.

In the following table (Table 2), will provide the publications selected for the application of the literature review ordered by the date of publication (from oldest to most recent). As the selective process was constructed the relevance was directly related to the concepts and combinations of bitcoin, developing countries economies, digital currency, cryptocurrency, blockchain, etc.

Table 2. List of Selected Papers

Author	Summary	Future research and limitations
Nakamoto (2008)	Keywords: bitcoin, blockchain, peer-to-peer, electronic cash system Concepts: proof of work, timestamp server, hash rates, electronic coin, digital signatures, blockchain, network, simplified payment verification, privacy, trust	N/A
Dwyer (2014)	Keywords: Bitcoin, emoney, private currency, cryptocurrency, blockchain Concepts: transfer private digital currency without intervention, currency issues,	N/A
Böhme, Christian, Edelman and Moore (2015)	Keywords: bitcoin, virtual currency, electronic payments, decentralization, cryptocurrency Concepts: centralization vs decentralization, bitcoin ecosystem, blockchain	N/A
Maupin (2017)	Keywords: economic resilience, financial inclusion, digital economy Concepts: international frameworks, regulatory frameworks, fragmenting global economy, public trust, economic institutions, socially beneficial properties, new industrial revolution, public oversight, economic resilience, central bank blockchain consortium, industrial revolution action plan	N/A
Parino, Beiro and Gauvin (2018)	Key words: bitcoin blockchain, transaction network, bitcoin adoption Concepts: Peer to peer payment system, independent banking, low transaction fees, blockchain, decentralized currency, socioeconomic driver, internet penetration, augment nodes, country adoption, social impact	Blockchain adoption regarding challenges in developing countries

Author	Summary	Future research and limitations
Kumar, Kumar, Tahir, Memon, Mahmood and Zia (2018)	Keywords: blockchain, blockchain challenges, blockchain adoption Concepts: usability, energy waste, latency, scalability, adoption obstacles, budgets, awareness, education and integration transition	Large issues foreseeably for handling integration of important adoption practices, education and infrastructure
Nguyen and Dang (2018)	Keywords: blockchain, digital technology, distributed diary, industrial revolution 4.0 Concepts: digitized ledger, future globalization, functioning financial systems, bitometics, blockchain contracts, domestic money transfers, market efficiency, transaction security, economic growth, disadvantages of cryptocurrencies, network potential, human error, security flaws	N/A
Holtmeier, M., & Sandner, P. (2019)	Keywords: cryptocurrency, world bank, developing countries, financial services Concepts: opportunities for crypto currencies in developing countries, internet access, internet penetration rate, economic equality, lack of education, poverty, advantages and disadvantages	New technologies and innovations are the key to the catchup process of developing countries highlighting the internet penetration as a crucial aspect for developing countries
Vincent and Evans (2019)	Keywords: cryptocurrency; mobile phones; internet; financial inclusion; financial sector development; emerging markets Concepts : linkage between cryptocurrency, internet and financial inclusion; necessity of mobile phone subscriptions in developing countries, financial inclusion dependency on certain elements would be conclusive for developing countries for financial sector development; macroeconomic and institutional factors environment Frameworks: frameworks for policy regulations, governance, and infrastructure	Highlights the importance of cryptocurrency, mobile phones, and the internet being the link between the financial sector regarding development of emerging markets
Omane-Adjepong and Alagidede (2020)	Keywords: cryptocurrency; emerging assets, RWWC, diversifier, hedge, safe haven Concepts: background of bitcoin, linkages between cryptocurrencies and emerging financial assets, multifaceted economic benefit.	Broadness of the publication with a specific topic regarding investors and potential interests but adheres to certain

Author	Summary	Future research and limitations
		values regarding emerging markets capacity
Mavilia and Pisani (2020)	Keywords: blockchain, catching-up, developing countries, Africa, financial inclusion, innovation management Concepts: blockchain technology, socio economic advantages, catching up developing countries, policy regulation, governance, developmental capacity, financial trust, cost reduction mechanism, supply chain revolution, anti-corruption, e-governance	Blockchain being the catchup mechanism for financial inclusion in developing countries
Balvers and Mcdonald (2020)	Keywords: global currencies, digital currencies, cryptocurrencies, currency design, bitcoin Concepts: currency design, price stability (key feature), stable currency mechanics, blockchain based design mechanism Framework: stable blockchain currency and model for stable global currency, developmental capacity	Descriptive statistically may provide too many equations but useful with application to frameworks and mechanism for a blockchain stabilized currency
Pathiranage, Xiao and Li (2020)	Keywords: bitcoin, cryptocurrency, blockchain, mining, monetary policy Concepts: inefficiencies of bitcoin regarding developing countries, technical problems, volatility, government skepticism, political instability, synchronized regulatory frameworks	N/A
Xu, Chen, Fan, Shah, Gao, Diallo, Carranco and Shi (2020)	Keywords: blockchain, cryptocurrency, mobile payment, smart devices, developing countries, Concepts: mobile payment systems, smart device ownership, poor infrastructure, low penetration rate of financial services, KYC (know your customer) Framework: payment protocol with centralized bank and without	Delegation protocol and transaction protocol with low latency and transaction cost reduction
Cunha, Melo and Sebastião (2021)	Keywords: central bank digital currency (CBDC), bitcoin, cryptocurrencies, digital money	N/A

Author	Summary	Future research and limitations
	Concepts: Decentralization of money, advantages and risk of CBDCs, experiments, proof of concepts, pilots, economics finance, fintech, positive macroeconomic impact, inclusion of unbanked and underbanked, difficulty of money laundering, black economy and tax evasion; risk to commercial banks business model Frameworks: Approaches for introduction, institutions and governance, infrastructure	
Ajwani-Ramchandani, Figueira, Torres de Oliveira and Jha (2021)	Keywords: circular economy, modified linear economy, blockchain, distributed ledger technology, developing economies Concepts: Policy implications, economic growth, emerging economies environmental pollution, earth's resources, circular economy performance Framework: conceptual model for distributed ledger principles in order to facilitate blockchain model to an actual system	Limitations relating to settings and how research is based on eco-sensitive communities regarding the waste management value chain
Khestri (2021)	Keywords: blockchain, developing countries, ethical dilemmas, institutions, smart contract, supply chain, sustainability, traceability Concepts: Blockchain promoting supply chain sustainability, decentralization, immutability, cryptography-based authentication, micrometering, rapid diffusion of IoT devices, cell phone penetration rates	N/A
Levulyte and Šapkauskienė (2021)	Keywords: cryptocurrencies, currency functions, medium of exchange, unit of account, store of value, bitcoin Concepts: cryptocurrency and market participants, asset correlation, lower transaction costs, financial benefits gained, cryptocurrency as a value preservation tool	N/A

Throughout the literature review the opportunity to construct and understand the views at hand have been provided by the publications listed in table 2. The contribution of conceptualizing the implications of a cryptocurrency being implemented, can best be understood through extraction

of literature review publications which identify the opportunity for cryptocurrency in developing countries.

Many of the articles that were read have opposing views in relation to the use of cryptocurrency in developing countries. The relevance of the literature review was categorized and thematically divided in order to create a substantial platform and structure to formulate a better understanding of the topic at hand being divided into primary and secondary themes due to their representation in the combined literature reviews.. The following table represents the division:

	Primary							Secondary	
Articles	Infrastructure	Development Capacity	Politcal Backing	Price Stability	Widespread Adoption	Microfinancing	Corruption	Remittances	Financial Inclusion
A Peer-to-Peer Electronic Cash System (2008)	X	-	-	X	X	-	-	-	-
The economics of Bitcoin and similar private digital currencies (2014)	X	X	X	X	X	-	-	X	X
Bitcoin: Economics, Technology and Governance (2015)	X	X	X	X	X	-	X	-	-
Blockchains and the G20: Building an Inclusive, Transparent and Accountable Digital Economy (2017)	X	X	X	-	-	-	X	X	-
Analysis of the Bitcoin blockchain:sci-economic factors behind the adoption (2018)	X	X	X	X	-	X	-	X	X
Challenges of Adoption of blockchain in developing countries (2019)	-	-	-	X	X	-	-	X	-
Blockchain Technology for the advancement of the future (2018)	X	X	X	X	X	-	-	-	X
The possibilities of cryptocurrency in the global economy (2019)	X	-	X	X	-	-	X	-	-
Can cryptocurrency, mobile phones, and internet herald sustainable financial sector development in emerging markets? (2019)	X	X	-	X	-	-	X	X	X
Dynamic Linkages and Economic Role of Leading Cryptocurrencies in an Emerging Market (2020)	X	-	-	X	X	-	-	X	-
Blockchain and catching-up in developing countries: The case of financial inclusion in Africa (2020)	X	X	X	X	X	X	X	X	X
Designing a global digital currency (2020)	-	X	-	X	-	-	-	X	X
The inefficiencis of bitcoin in developing countries (2020)	X	X	X	X	-	-	X	-	-
Supporting Blockchain-Based cryptocurrency mobile payment with smart devices (2020)	X	-	-	-	X	-	-	X	X
From bitcoin to central bank digital currencies (2021)	X	X	X	X	X	X	-	X	-
Sustainability in multinationals: enabling circular economy, organizations social practices, and corporate purpose (2021)	-	X	-	X	-	X	-	-	X
Blockchain and supply chain management (2021)	X	X	-	X	-	-	-	-	-
Cryptocurrency in context of fiat money functions (2021)	X	X	X	X	X	X	-	X	X

Table 3: Categorically divided themes of literature review

Source: Own Illustration

2.3 Critical Analysis

2.3.1 Developing Countries and Poverty

The following part will provide a definition of developing countries, as they are one of the research's focal points.

Although there is no legal categorization or agreement that qualifies a country as developing, the United Nations has established a set of criteria for comparing and contrasting the differences between developing and developed countries. A developing country is one that is deemed to have a lesser level of economic and social development than other countries, as a result of which it has a less developed base and produces lower economic output. A country's classification as a developing sovereign nation is based on a number of factors that are shared by

other countries that meet the same criteria. There are similarities in the Human Development Index (HDI) such as food insecurity, educational opportunities, access to health care, infant mortality rate, low life expectancy, and low per capita income, all of which are related to employment rates in developing countries (O'Sullivan & Sheffrin, 2003).

There has been much debate about where to classify different categories based on various aspects of their economies, but there is no fine line between some countries because some countries have aspects and features that fully meet a criteria while others may not be entirely in a category due to characteristics that would create too many variables. As a result, the United Nations has formed groupings that identify all countries that meet the precise requirements linked with the country's geographical region in Appendix A.

Because restricted or no access to financial services is a key cause of poverty, the concept of financial inclusion has remained a major concern in terms of a country's development. When undeveloped countries have greater access to financial services, the risks to all parties involved in that nation are reduced and one step closer to being considered an industrialized country (Holtmeier & Sandner, 2019).

Many problems exist in the financial space for developing countries which is a direct correlation to poverty. When the standard of living is low there is a higher possibility for lower levels of social trust. In order to increase social trust and to remediate this problem the improvement of an economic complex facilitating the improvement of standard of living develops and grows the trust within society. As a result trust is fundamental even with regards to the government organizations. In many situations corrupt parties exist within the institutions and this can be detrimental to the people because they suffer at the cost of this malpractice (Vincent and Evans, 2019). In any event there are solutions or proposed tools to mitigate poverty, increase financial inclusion and develop a space to improve all aspects of life and in order for this to happen the economy needs to have structure, balance and stimulus. The currency needs to work for the people who make up the developing county. Which brings the next topic in this review regarding the idea of cryptocurrency as a unit of value for developing countries.

2.3.2 Introduction of Cryptocurrency

In order to highlight a structured and all encompassing view of the influence that cryptocurrencies may have in developing countries, it would be helpful to understand the basic elements associated.

Money is essentially a tangible form or an electronically distinguished unit that can be accepted in a universal sense such as a medium of payment for services and goods for a particular environment economically. In the traditional standard money was created to facilitate trade in its most basic form. Fiat currencies which are money like the US dollar, British Pound or the Euro are issued by a banking system that is nationalized and/or centralized. The idea of cryptocurrency is a digital currency in the form of an electronic coinage that is decentralized involving the platform technology of implementing the underlying technology of the blockchain. The technological advancement of blockchain and bitcoin which was created in 2009 intrinsically became the world's first privatized digital cryptocurrency that essentially enables users a peer-to-peer network over the internet which uses a series of concepts and technologies forming the basis of what is a digital monetary ecosystem (Nakamoto, 2008).

Through these means it allows it to be entirely virtual and digital, resulting in a substantial shift of standardized systems to traditional centralized currencies. (Balgobin & Seam, 2020) A peer-to-peer network operates distinctively in a different formation compared to that of a government’s fiat money. A government’s fiat money is created to be used by a single issuer, which is certified by the issuer and used by many (Dwyer, 2014).

As it may be cryptocurrency can be classified as electronic money and Bitcoin being the most popular cryptocurrency, provided below the figure demonstrates the differences between Bitcoin and Fiat Money.

Feature	Bitcoin	Fiat Money
Issuance	Decentralized, regulated by underlying algorithm	Centralized, regulated by central bank mandates
Supply	Capped at 21 million units	No hard cap
Liability	Not the liability of anyone	Liability of the central bank or commercial banks
Liquidity	Not guaranteed	Absolute
Stability	Volatile	Stable, except in face of hyperinflation
Acceptability as medium of payment	Limited	Universal in a given economy
Privacy of user identity	Pseudonymous, no link between addresses and natural persons	Anonymous if cash is used, Know Your Customer (KYC) enforced for accounts in commercial banks
Confidentiality of transactions	Ledger is public	Restricted to parties, visible to financial institutions, accessible to law enforcement
Geographical scope	Global	Limited

Figure 2. Comparison of Bitcoin (cryptocurrency) and Fiat Money

Source: (Cunha, Melo & Sebastião, 2021)

The blockchain and associated with bitcoin became the first initial transfer of digital goods that enabled payments without an intermediary. This associated technology was instant through a distribution network, completely transparent and decentralized while storing this information in the block network simultaneously it is final, irreversible and efficient (Amous, 2015). Essentially for the first time one person using the internet can transfer a unique digital property to another internet user, allowing the transfer to be guaranteed safe, secure, and publicly everyone can acknowledge the transaction has taken place while no one can challenge the legitimacy of this transfer without the need for a government or controlling entity. (Böhme, Christin, Edelman, & Moore, 2015). Historically speaking the role of governments regarding modern history play a large role in the distribution and regulation of money, as a result now moving from nationalism and moving into globalism (Balvers and Mcdonald 2020).

Bitcoin and cryptocurrency as a whole has the potential of entering into the competitive market regarding central banking systems and governmental regulatory practices for its ability to facilitate cross border payments capacities remaining decentralized, high degree of anonymity, and low transaction fees can be regarded as an opportunity and key factors for both developed and developing countries.

Bitcoin in its developmental capacity over the past 10 years has become the most popular and widespread digital currency being implemented as an alternative to the banking system and digital fiat money. Besides the fact that it does offer a payment mechanism without any centralized control (i.e. by institutions, governments, or banks), it has also paved the way for a completely revolutionary concept of the blockchain which is the foundational technological concept of the technology. (Parino et al., 2018).

Blockchain technology was created as a tool to implement bitcoins, which has become of increased particular interest in the traditional sectors of economy for its widespread potential of applications regarding various avenues of use that outreach it's initial development plan and now in this opportunity it can provide an inclusive, transparent, and responsible digital economy (Maupin, 2017). Within transparency and the idea of full trustworthiness the ability to manipulate cryptocurrency is minimized since it is not centralized, and based on the notion of decentralization this offers certain advantages because this can ultimately avoid concentrations of power that could let a single person or organization take control and cause manipulation.

Before blockchain was introduced, it was seemingly difficult to process and manage a person's transactions over the internet without implementing a centralized control mechanism to confirm that data would be non-recitative. As there was no trust mechanism between the individuals carrying out specific business transactions and thus the need to secure the idea that not a single person could manipulate data to their advantage without the consent of other incorporated individuals. The implementation and introduction of the blockchain provided a probabilistic solution to the continuous problem of trust and this ongoing problem of financial independence (Böhme et al., 2015).

2.3.3 Monetary Policy

Aside from cryptocurrency implementation when a country executes a monetary policy on an efficient capacity including the government conducting a systematic approach there can be much benefit when executed efficiently. Money circulates in an economy in the form of a legal tender either fiat (often printed tangible paper) most often referred to as cash or money that circulates in the form of electronic realm which consists of electronic records that represent deposits in the banking system. In this monetary system the fiat money supports the deposits which are made electronically in order to provide for the public to exchange. Fiat is tangible and

supports the movement of currency within an economy. Providing credit to an economy, the monetary policy and banking system use the reserves which were established by cash which were deposited into the central banking mechanism in order to support new deposits (Cunha, Melo & Sebastião, 2021).

Within this cycle the government can control the mechanisms involved in the representation of money as a store of value, medium of exchange, unit of account and form of standardization for balancing the economy. When a government has a functioning monetary policy, there ability to control the exchange rate, inflation, build reserves, build internally, trade externally which can support the maximization of employment, create stability in prices, and facilitate an equilibrium with interest rates (Omane-Adjepong & Alagidede**,** 2020).

In this cycle of government influence and monetary policies the historical pattern is that money over time has been slowly dematerializing with the increased detachment of the intrinsic value of the currency. It can be argued that all money in an economy is fiat money, especially a developed country. As technology advances, the development of processing money is turning towards a cashless society. Electronic money is accelerating the global landscape which is sustaining the attention of an alternative to fiat money (Cunha, Melo & Sebastião, 2021).

Traditionally countries have succeeded economically through precise monetary policies utilizing fiat currencies and now futuristically the emerging application of additional monetary policy tools such as Central Banking Digital Currencies (CBDC) which carry benefits as well as risks. CBDCs is a digital form of a currency and rather than printing money the issuing bank electronically produces the coin. CBDCs provide central banking with more accuracy and transparency but in turn to do this there is a large requirement for an architectural, economic and technological advancement in order to facilitate this monetary policy (Cunha, Melo & Sebastião, 2021). Current pilot programs have highlighted the benefits of CBD's with more efficient and safer payment systems, anti-corruption mechanics, financial inclusion of unbanked and underbanked, as well as positive macroeconomic impact CBDCs are characteristically similar to cryptocurrencies but giving the government centralized control over the currency and applying a monetary policy is highlighted as a major difference being that cryptocurrency is completely decentralized. Bitcoin and current cryptocurrencies have provided a space for the adoption, the technology, goals and challenges related to CBDCs to find a parallel approach for central banks (Cunha, Melo & Sebastião, 2021).

2.3.4 General Advantages and Disadvantages of cryptocurrency

Developing countries are constantly subject to financial, economical, and technological problems that are influenced by a variety of internal and external influences but to be more specific, each country has different problems to overcome within their own economy and sovereign nation. As it may be, developing countries must be connected with the world economy, and implementing this positive change can be seen as extremely beneficial through the advancement of technology and overcoming financial and economic difficulties.

A major advantage of cryptocurrency is that the underlying properties which are desired in most developing countries is that of the promotion of trust, the visibility and transparency of the network which essentially harbors the mechanism for developed trust between multiple parties involved. In the sense of central banks and how it relates to the currencies that are issued, the central banks enable other parties such as intermediaries to take fiat currency and facilitate a transaction. These transactions that take place using the fiat currency can be sent overseas completing transactions in the exchange from one party to another. A disadvantage to this system in particular is the velocity at which it takes to process this exchange and the costs involved can be tremendous (Ammous, 2015). Cryptocurrencies can transact without limitation to time as these payments are seemingly instantaneous across the world connecting any advice that has an internet connection.

A potential benefit implementing the application of decentralization of the cryptocurrency network is that a government in power cannot control or manage it. The supply is limited because that is how it was designed and there is no ability to continuously print fiat currency which can be a direct result of inflation. More so, since there is no restriction on cryptocurrencies regarding the network and access to where it can reach, there is world-wide geographic application to the regions and distances it can reach as long as a satellite or internet is promoting the connection. Since it can be accessed anywhere and the government cannot control it this means that there is a capacity for a widespread financial transfer system rather than having to use a fiat currency, intermediary influenced through some government central banking mechanism.

On a side note, having unlimited transfer distance can be beneficial to an extent where the dynamics of the purpose of transfer exists in the realm of black money, corruption, illegal activities and even terrorist related activities. Being that the transfer of the money has no bounds the financing of these unwelcomed activities can be easier since their government is not involved in the intermediary process. From these understanding of cryptocurrency and bitcoin we can thus understand there is no central bank to cryptocurrency (Ammous, 2015).

2.3.5 Cryptocurrency Opportunities in Developing Countries

Considering motivation and participation, a personal smart device such as a smartphone is the perfect tool to receive a payment and make a payment considering it a highly attractive resource in underdeveloped areas where the only presence of the internet is through the phone. For those who cannot obtain a bank account or be involved in a financial institution creates benefits with cryptocurrency (Xu et al., 2020). Through using bitcoin money with blockchain operations: the M-Pesa mobile payment system in Tanzania and Kenya was able to assist poor farmers by providing a framework for them to send as well as receive domestic currency payments at affordable prices while simultaneously having extremely low transaction costs (Nguyen & Dang, 2018).

This payment system was utilized through a mobile payment plan which is a likely tool to be used in most developing countries constructing a platform for blockchain technology to be applied allowing for interconnectedness and a seen solution for infrastructure related issues for developing countries (Vincent and Evans, 2019). Through the possibility of financial inclusion ultimately giving opportunity for the unbanked and underbanked, is an important motivation for an electronic payment system for developing countries providing a provision for basic accounts and as a result provide significant advancements especially to those in most need during a crisis (Cunha et al., 2021).

Traditional banking systems require what is called a process formally known as "Know Your Customer" (KYC), where the individual who is considered the owner of the account is correctly identified. Majority of exchanges that facilitate the movement of cryptocurrencies have begun to implement KYC processes in order to fulfill their moral and ethical responsibilities, while there are other networks that do not require this process (Parino, Beiro and Gauvin, 2018). This removes the centralization of a customer identification process and enables the

decentralization where the user is essentially free to transact on the network without identification.

In a stage to enable trust cryptocurrency regarding the block chain has levels of transparency and accountability to the extent wallet addresses can be reviewed within transactions which is an advantage because it can create trust between two parties and the interaction associated. The basis of the underlying technology of the blockchain implements a hash function which is the mechanism for both the private and public encryption of each individual transaction which essentially does not require the two parties to have to trust that the transaction will not take place once submitted.

With the idea of decentralization in mind the supply is not controlled by a centralized or monetary framework that is normally implemented by a central banking system is removed from the situation and as a result there is volatility in the market. Without this important figure involved it is difficult to be used in the form of money for the exact value can fluctuate on such a high level resulting in an uncontrollable supply schedule. As a result this element can provide benefit to a variety of uses in the monetary space for select users but regarding the fundamentals is not preferred as a store of value which is the purpose of fiat money to stay as close to strable at the most basic levels. However, there is no type of money that has always remained safe and regarded as a reliable asset because in reality most fiat currencies are subjected to inflation and in some cases hyperinflation. Yet the desirable aspect of a currency is to remain stable, pairing well with the idea as a store of value, a unit of account, and a reasonably efficient medium of exchange (Balvers and Mcdonald, 2020).

In the case of disadvantages regarding a crisis in the sense of financial terms may occur where a developing country does not have sufficient resources in order to stimulate and drive the economy to protect their socially vulnerable population to a similar extent, that of industrialized and more developed countries which can recuperate and rehabilitate their economies more effectively. The benefits of the majority of currencies are not particularly great, but rather changing a larger amount of currency could be significant and motivate the individuals in the market considering them participants to use cryptocurrency more widely. (Levulyte and Šapkauskienė, 2021)

The need for developing countries to have increased technological advancement and implementation through corroboration of government and society regarding a digital currency is

futile to the improvement and futuristic development of the world economy. A reduction of all barriers that impede the achievement of an inclusive financial system would be useful to reduce the level of financial exclusion, providing to the development of industrial enterprises and, more generally, to economic development (Mavilia & Pisani, 2020).

2.4 Summary of Literature Review

Summarizing the literature review, the possibility of looking deeper into the concepts involved, there are other influencing aspects that should be understood to realize the impact of blockchain in developing countries regarding these four core elements:

- (1) Infrastructure: majority of people do not have access to internet as well as data protection/security not being guaranteed;
- (2) Institutions and governance: institutional capacity can be useful to expand the distribution and establish long-term sustainability of blockchain solutions including the use by low-skilled individuals
- (3) Price Stability: a stable price is essential to the acceptance and adoption levels which is a prerequisite for trust in cryptocurrencies
- (4) Political backing: these measures can aid or obstruct the deployment of blockchain intention and applications;
  (Mavilia & Pisani, 2020).

As a basis for the research the factors contributing to the success of a cryptocurrency are dependent on a four factors, Infrastructure, institutions/governance, price Stability, political backing and institutions/governance referred to the division of elements necessary to understand the important aspects involved for potential requirements that would be used for implementing a cryptocurrency into a developing country.

Furthermore once these 5 core elements are in place it can lead to the beneficial impact and remove the developmental barriers by providing a space for the following:

- (1) Financial Inclusion
- (2) Cross border payment efficiency

- (3) Micro Financing Promotion
- (4) Market access: sell goods and services
- (5) Reduction of corruption/Promote Transparency

As a platform for the researcher the topics in this summary that have been extracted will be utilized and familiarized in the finalization of the research process.

2.5 Research Gap

Cryptocurrency is a new representative in the market of digital currencies and as it is relatively new and with the outcomes of specific applications being limited regarding use case and actionable data regarding the capacity for expansion into developing countries with regard to past research studies. As it may be a gap exists because of the limited amount of information available and preceding research conducted of cryptocurrency relating to developing countries has not had enough headway and/or progres yet. As a result of this research, the impacts and effects of cryptocurrency on developing countries will be analyzed and examined accordingly.

Firstly, The foundation of cryptocurrency being the blockchain technology offers an opportunity to provide a space for digital trade that has the capacity to track specificity in valuables on the internet. With regards to this the traditional use was to have explicitly safe and secure transactions so it is due that further research be concluded and not neglected that other areas of interest be explored. With this in mind the limited information regarding the technology is not readily available in the case of current technological development.

Secondly, currently the only country that has fulfilled this objective is El Salvador. Being as there are 195 countries in the world the use case of cryptocurrency on national levels is limited therefore the gap of understanding the real world applications and the associated challenges. A new framework for international standards is necessary as well as current practices to transform and improve pre-existing regulatory frameworks in order to apply it to developing countries (Maupin, 2017)

Lastly, there is an overall and general feeling of the disruptive nature of blockchain technology and its application to financial systems and the perceived barriers involved. The high volatility rate of many cryptocurrencies would worry any individual and that this virtual commodity that is backed by nothing has the possibility to gain everything regarding money.

Because of this there may be inefficiencies and as a result would be considered disadvantages to developing countries (Pathiranage et al., 2020).

In summary, cryptocurrencies are newly designed and as such the result of research conducted is from numerous perspectives and limited in quantity. Therefore this research will cover the areas involved in the research topic and may be limited regarding the technological applications and development of third world countries. As such further research shall be conducted and information will be gathered to study the impacts of cryptocurrency in order to provide fresh insight into the dynamic link between cryptocurrency and developing countries.

2.6 Research Question

The overall objective of this paper is to understand and explain how cryptocurrency could affect developing world countries. This aim is proposed to be fulfilled through the follow objectives:

1. To develop an understanding of what people from different developing countries with knowledge of cryptocurrency think about this issue.
2. To understand what kind of impacts cryptocurrency would have on improving developing countries economies.

With regard to the issues provided above, the author of this paper will use the following research question:

How does cryptocurrency impact developing countries?

Chapter 3 Methodology

3.1. Introduction

The proceeding elements in this section present the methodology that will be performed in the research process which as the following will be the research philosophy, research approach to theory development, research design and lastly the research strategy. Provided the figure below will be the framework used in order to fulfill the theoretical research design model:

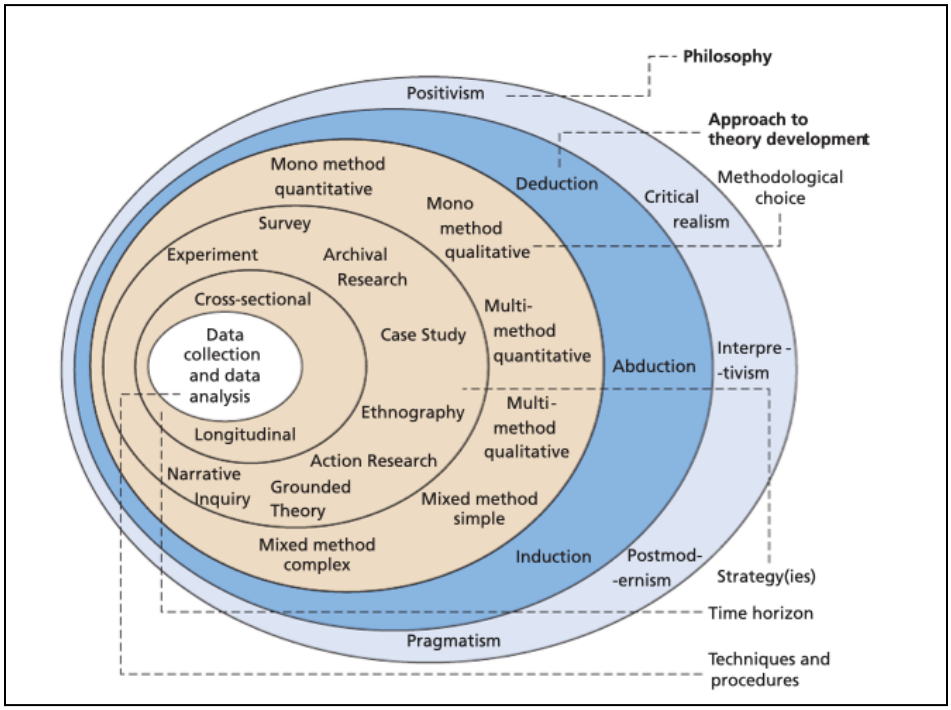


Figure 2: Research Onion (Saunders et al.,.2018 p.130)

3.2 Research Philosophy

Regarding the context of the philosophy, the beliefs and assumptions of the research will ultimately have an impact on the evolution and development of knowledge. Therefore with the context of the research philosophy in mind the reality of important concepts and the aspects behind it will differentiate in opinion and the direct relation to axiological, epistemology and ontology. As there is difference and disagreements between these three philosophical approaches.

Ontology refers to the assumptions regarding what constitutes the nature of reality. This can be individualistic based on how an individual sees the world around themselves such as the example of defining what research and criteria is best for the individual (Saunders, et al., 2018 p. 133). Within ontology there is objectivism and subjectivism. Objectivism highlights the social interactions and the connection to the social actors in an independent sense. Whereas subjectivism in ontology is socially constructed and has multiple realities. (Saunders, et al., 2018 p. 135)

Axiology directly refers to the roles of ethics and values. Whereas an individual, especially the researcher incorporates their own values and ethics for a guide of reasoning and must identify in the research process to reflect on these topics in order to articulate values and judgements correctly (Saunders, et al., 2018 p. 134). Axiology regards objectivism and subjectivism loosely in the sense of objectively speaking is value-free or detached and the subjectivism is the nature of value-bound or seeking of integrated or reflexive nature (Saunders, et al., 2018 p. 133).

Epistemology being what constitutes what is acceptable knowledge. And refers to the assumptions about knowledge through what is acceptable, valid and equally legitimate results in the communication to others. While involving the aspects of acceptability and legitimacy of the data presented may seem more obvious and relevant compared to ontology because epistemology includes structured knowledge such as numbers and visual representations. (Saunders, et al., 2018 p. 133). Within the space of epistemology the idea draws the difference between the case of objectivism and subjectivism through sets of differences. Objectivism can be adopted through assumptions, can be observed and include facts or even numbers. Where the subjectivism behind epistemology includes the aspects of opinions whether they are written or spoken being that specifics are attributed to an individual for meaning (Saunders, et al., 2018 p. 135). With this in mind the researcher is interested in the real and actual outcomes with regards to practicality rather than creating an abstraction.

Within the space above regarding various philosophies the researcher's intent of study is to answer the research question at hand in order to understand the different explanations and remain open minded to the variety of answers regarding how cryptocurrency can affect developing countries. As it may be this document will be utilized and approached from the perspective with an interpretive measure to understand the view of reality and the associated

opinions. Following these philosophic clarifications the researchers will use the ideas, perspectives and opinions of other individuals for interpretation and in doing so that data that will be collected with opinions for the use of subjective clarification.

3.3 Research Approach

The design and approach for the theoretical process of research, will be divided into two distinct approaches: inductive and deductive. The theory regarding the deductive studies tests against reality and the inductive studies forms theories based on studies of a phenomenon (Saunders, et al., 2018).

Regarding the deductive approach the process of developing the framework theoretically involves the development of the theory which is then subjected to rigorous tests through a variety of propositions. The deductive approach is regarded as a highly structured method as the theoretical foundations are prepared initially and then the data collection begins where the organizational approach is followed. Collecting data with a deductive approach requires the manner obtained to be statically set against one another. The basis of this approach supplies the possibility of analyzing the relationships between different variables (Saunders, et al., 2018). With the inductive approach being as it is the exact opposite of a deductive approach, this begins with the researcher processing data collection openly for generation purposes with this approach being associated with the interpretation-based research philosophy (Saunders, et al., 2018).

The abductive approach exploring phenomenon, by identifying themes and subsequent patterns (likely descriptions and occurrences) can be regarded as the process of continual analytic processing and as a result includes both deduction and induction (Saunders, et al., 2018).

This study being as it will be based on the inductive approach, highlights the importance of exploring the opinions collected from data and then followed with the association of the relative theory and to build upon what already exists. Being as it may, the result of an inductive analysis would be the formulation of a theory, which would be expressed as a conceptual framework (Saunders, et al., 2018).

3.4 Research Design

In order to facilitate the specific design approach the approach available for the research design mechanism will include research questions which will be differentiated between quantitative, qualitative and a mix of both (Saunders, et al., 2018). The researchers' design approach will be categorically interpreted as an avenue of involvement regarding the qualitative measure in order to understand the meaning of the problem and explore it to a deeper level. This at hand will incorporate the inductive process which will take data from various themes and categories to form and organize a meaning (Saunders, et al., 2018). The explanations of the data's interpretations will be assigned meaning according to the arrangement that the researcher seems fit to which will be constituted as acceptable knowledge.

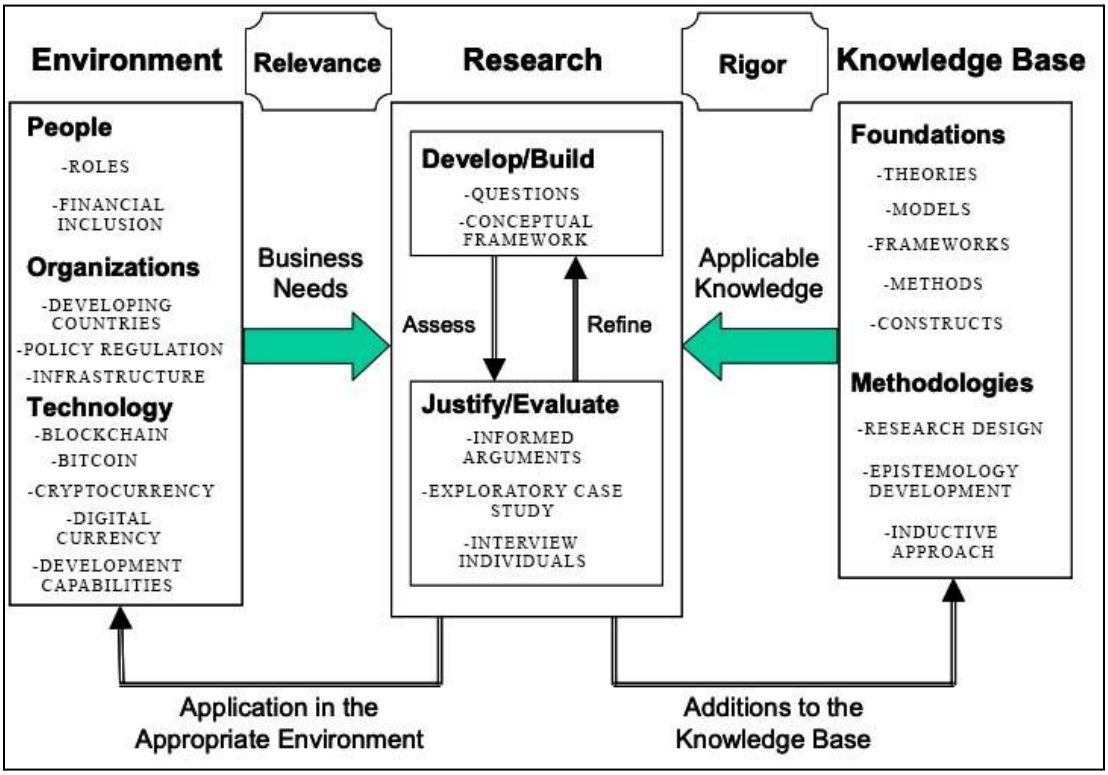
On the contrary of a quantitative design approach where the collection of data will be tested and how the varying elements relate in a statistical nature. The ultimate perspective of this approach is the amount of data from a hypothesis will result in the relationship between a set of variables that can correspondingly provide an analysis in a statistical value.

In order to answer the researchers question the path of qualitative research will be fulfilled. In order to do this the researcher believes that the best route to achieve an understanding of the research problem and question. The purpose of utilizing a qualitative research design approach is to deeply understand the information observed and collected from the individuals questioned (Saunders, et al., 2018).

3.5 Research Design Science Approach

In order to fulfill the aspects required to conceptualize the included knowledge base, environment and the research necessary the diagram below acts as a visual representation of the current research model including the foundations, methodologies, the development and building aspects while justifying and evaluating the process. The environment being relevant to the topic of question regarding the inclusion of people, organizations and technology. In order to facilitate the necessary new studies and understand the perspectives at hand the following approach was used to Design Science Approach (pictured in Figure 3) (Hevner et al., 2004). *"Design science addresses research through the building and evaluation of artifacts designed to meet the*

identified business need" (p. 79-80). Facilitating the support of this model the following framework is presented.



Source: Adapted from Hevner et al. (2004, pg. 80)

Figure 3: Model for research of behavioral science and design science paradigms

The design science elements regarding the process and flow of the inherent aspects included with the methodology create structure therefore regarding the complexity of setting form the important dichotomy of a set of activities (interview, questions and case study) and an artifact (conceptual framework) to be assessed and refined to ultimately solve the problem solving paradigm of the world and its complex problems (Hevner 2004).

3.6 Exploratory Case Study

At this stage in the research design process the execution of procedure of how the data will be gathered and interpreted. In the context of this stage a research design can be explanatory, descriptive or exploratory based on the foundational research question of the researcher and the affixed field (Saunders, et al., 2018). Regarding the limitations of a research topic and overall

limitations of a research process, an exploratory design can be highlighted as beneficial and for the purpose of studying the topic into more meaningful insight being as that the design is reasonable in the event of some prior knowledge or information of the topic (Saunders, et al., 2018).

At this point the research design approach within the exploratorative nature as it was considered the most appropriate approach given the circumstances will effectively be applied to the overall design method. This is due to procedurally distinguishing and identifying the problem to the fullest extent through the actualization of individual interviews to the best availability.

For this particular research study; the final stage of the methodology will be interpreting the data and analyzing everything collected from the procedural process highlighted in the previous design elements regarding the research design methodology and formalizing it with the conceptual framework.

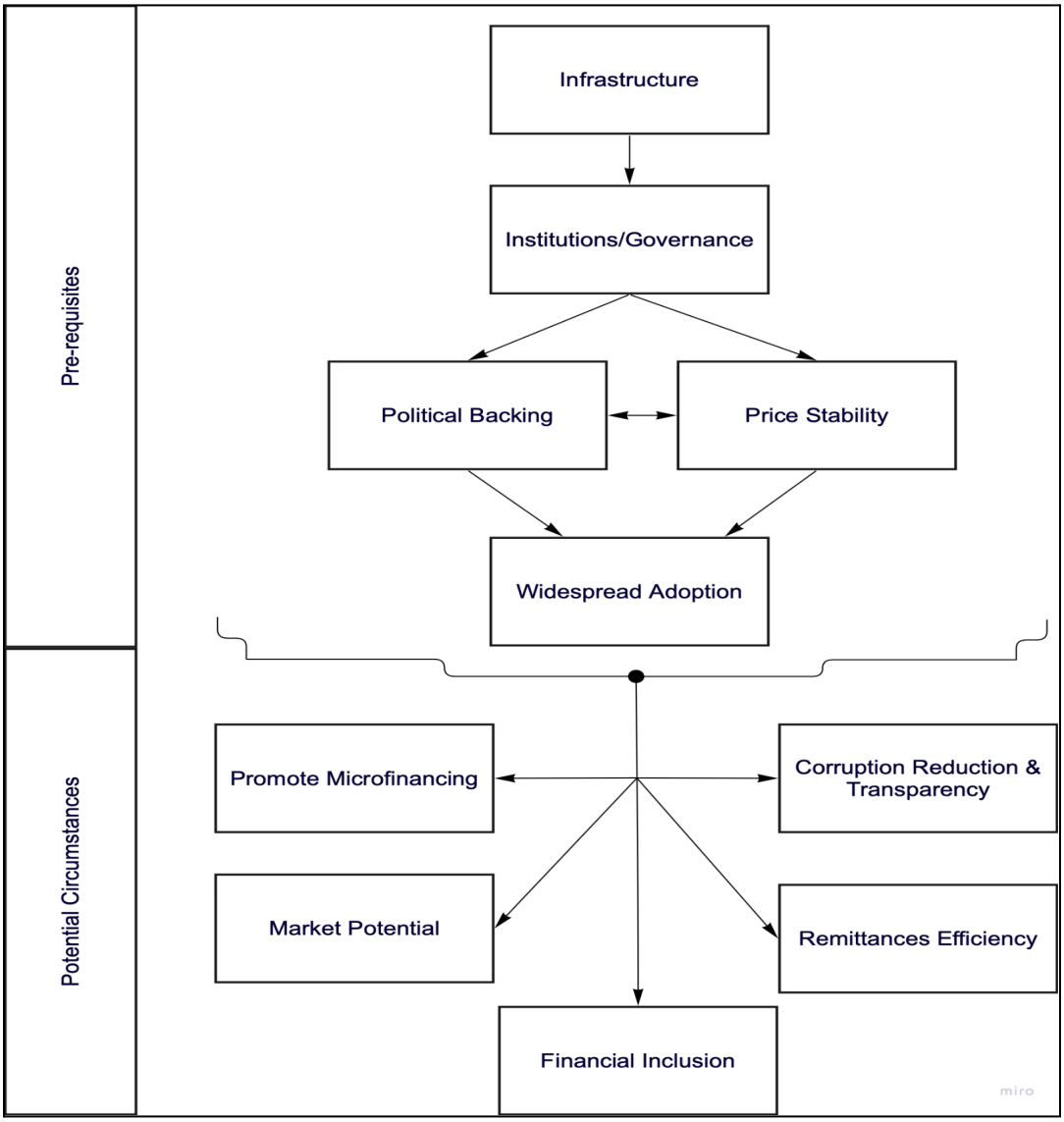
Chapter 4 Proposal of framework

4.1 Introduction

This chapter aims to present the framework and elicit the capacity to understand the possibility of a model to represent requirements for developing countries to adopt in order to implement a successful working mechanism of cryptocurrencies into their respective system. The proposed model is illustrated in Figure 4 with 5 components of main elements labeled that designate the framework process: 1) The “Requirements” being considered in this proposal as prior knowledge collected from the literature review which as subsequently impact; 2) “Potential Circumstances” which is directly correlated to the developmental process of cryptocurrency as an impact for developing countries.

The details of this framework will be outlined in two sequential parts. The first describes the requirements and how these prerequisites provide space for the potential circumstances of the framework to enable opportunities for developing countries as a result of the process.

4.2 Proposed Conceptual Framework



Source: Own Illustration

Figure 4: Conceptual framework for impact cryptocurrencies in developing countries

4.3 Understanding the framework: the requirements

Figure 4 displays the summarized requirements that would be essential for the developmental opportunities for crypto currencies in developing countries according to the researcher. Each element is as follows:

- **Infrastructure**: Cryptocurrency does not require physical infrastructure to a full extent other than cellular towers to transmit data and electricity to maintain this capacity. What is most important and has to be readily available is the software based infrastructure for users to utilize the internet in order to fulfill the prerequisite of the basic platform of cryptocurrency applications regarding cryptocurrency. Being that the penetration rate for cellular networks and users is increasing in developing countries the necessity of basic physical infrastructure has simple requirements whereas internet access is the key favor in the overall impact. Within the software infrastructure applications must be developed to maintain confluent data protection/security and integration on a community and possibly a state level.
- **Institutions/Governance**: Connecting the infrastructure in the sense of institutions creating a developmental capacity once people have access to the internet, the necessity to develop in this space in a software sense needs to pave the way for the new technologies and innovations that provide the solutions on a local level in order to integrate and maintain. Blockchain applications and tools need to facilitate the use by low-skilled individuals and there are necessary steps required in order to reach this level of integration. Institutional capacity can be useful to expand the distribution and establish long-term sustainability of blockchain solutions required to be able to reach what is considered a level of price stability or sufficient centralization.
- **Price Stability**: The ability to create a stable price is necessary in the sense that many currencies in developing countries have inflation issues and in order for the acceptance and adoption levels to increase there has to be capacity for stability. In this within each platform most cryptocurrencies can be converted into alternative currencies such as the US dollar or the Euro which allows for individuals in a platform to purchase their cryptocurrency with their native currency and either leave it in the cryptocurrency or convert it into a different currency whether it be in cash.
- **Political backing**: Political support will allow for many measures to occur in order to aid the deployment of blockchain intention and applications. This will only happen in the event of government influence or central banking mechanism supporting this otherwise the obstructions created cannot foster an environment for mass adoption on a level that is

required for a developing country to stimulate the possibility of momentum needed on a statewide level.

4.4 Understanding the framework: potential circumstances

The possibility and potential of cryptocurrencies must meet these requirements in order to provide a platform for financial inclusion to take place which would in turn make cross-border payments cheaper and faster, enable microlending, expand access for business and increase social trust and decrease corruption.

- **Financial Inclusion:** Globally many people do not have access to financial services which means they do not have a place to save money and get credit. Creating opportunities for individuals can be a big contribution for an economy with regards to increasing the quality of lives, ability to earn and save for the future. In turn this capacity can be the promotion of job creation which many developing countries lack. Having the ability to store value in a place that does not require a lot of documentation, advanced infrastructure or regulatory frameworks allows for financial inclusion for individuals that have the most barriers in front of them to integrate at a basic level.
- **Remittance efficiency:** The remittance market is essentially the transfer of money from one country's market to another. Many individuals sending money using traditional money transferring services experience high commission fees and prolonged transaction times depending on the destination country and the type of services used. For people in developing countries they can rely on these funds and in order to improve efficiency the importance of finding cheaper and faster ways to remit the funds. In essence cryptocurrency can facilitate a lower transaction fee and transfers are seemingly instantaneous.
- **Promote Microfinancing:** A tool to promote and empower entrepreneurs and small businesses most importantly which in turn helps members of each collective community become more financially independent. Associated with micro financing the skills involved for communities can be increased understanding of basic numeracy, bookkeeping, business plans, marketing and overall strategies. Ultimately, many people struggling do not have bank accounts based or required documents to open on.

Cryptocurrency can be used to expand this effort of financial literacy through encouraging microfinancing

- **Market Potential: selling of goods and services:** Developing a greater coherence and approach to the development of a market and the goods and services that are involved. The integration of foreign and global markets offers a great potential to remove developmental barriers through the connection of new opportunities. Market access prompts rapid economic growth utilizing cryptocurrency to reduce market access barriers. Connecting industrialized countries with developing countries regarding trade can be a great relief for imports/exports opportunities.
- **Reduction of corruption/Promote transparency:** Cryptocurrency can help fight countries rife with corruption which in turn can create a more sustainable and attractive environment especially regarding the investment of foreign parties which can then highlight the reducing elements of high unemployment rate which is one step closer in to making a developing country more developed. With cryptocurrency funds can be monitored and tracked and especially who is spending the funds through the trackability of monetization efforts including bribery and black money efforts. Enhancement of transparency is key to reducing malpractice and cryptocurrency provides an innovative space to clamp down on corruption.

Chapter 5 Data Collection

5.1 Introduction

The data for this exploratory case study was conducted through semi-structured interviews and extensive literature review. Being as it may, one of the main characteristics of qualitative research is to comprehend the meaning of the application involving the participants' perspective. For the purpose of this research to be fulfilled the interviewees included cryptocurrency enthusiasts, a student, a store owner, software developer, and a fintech expert. The variety of different influential stakeholders were identified and found through a questionnaire presented in a private discord group to which included 5,000+ people with at least a basic understanding of cryptocurrency and its associated applications. These participants were decided upon their relevant knowledge and subsequent involvement therefore chosen for the conduction of an interview.

5.2 Recruitment Process

In the range of 86 emails were sent out to different participants. Emails were sent more than once in order to ensure correspondence. These participants were chosen based on their country of origin being a developing country, relation to cryptocurrency and understanding of cryptocurrency. Many of the interviewees involved were cold contacts without any relation or previous connection except aside from a 3 who were of previous association to the researcher. The individual interviews were semi-structured, in this specific case in the event of the interviewees providing additional information or perspectives that they would have liked to offer in this study. In the terms of semi-structured interviews, an interview guide was developed with premeditated questions. Additionally there was extra time and space for conversation and questions to take place during the interview. The interviews took place in April and May of 2022 via phone due to accessibility and coronavirus restrictions. Conveniently this was also done within the preferences of the participants. Each interview took 30-50 minutes to which a time was most convenient to the interviewee. Each interviewee was picked based on their attributed knowledge and each interviewee in this sector. The interviews were conducted in English.

5.3 Participants and Sampling

For the purpose of this study a total of 12 participants were interviewed. Out of the emails sent, only 20 responded and 9 completed the interview process. The participants involved are associated with developing countries and cryptocurrency. It took 1 month to hear from the respondents.

5.4 General Interviewee Criteria

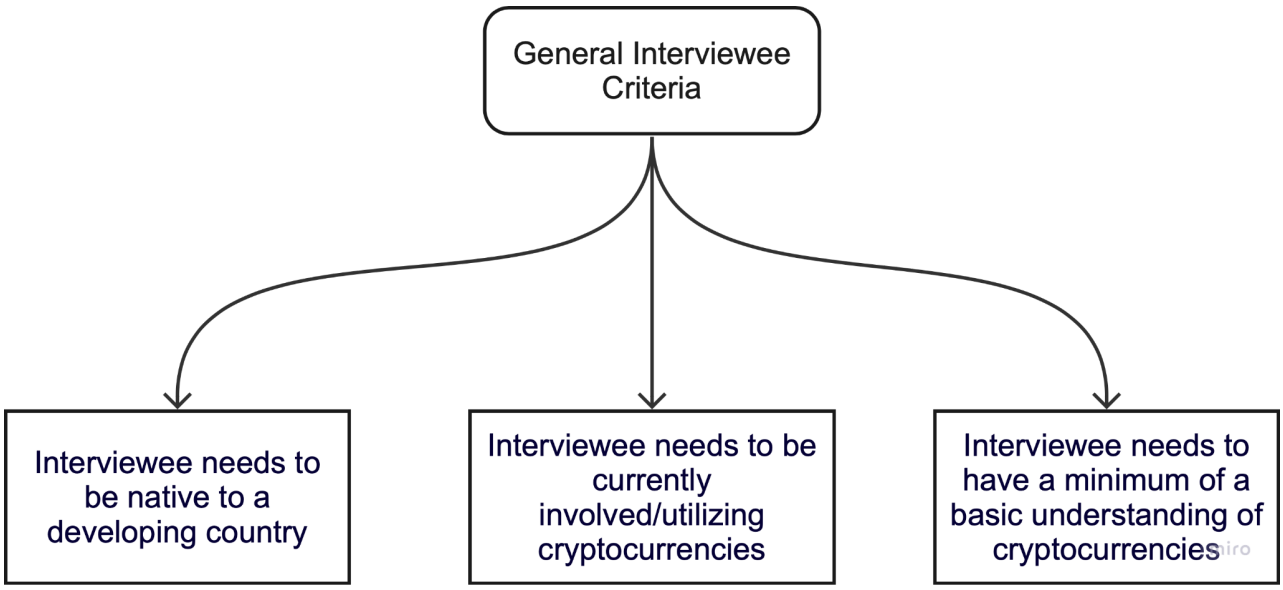


Figure 5: Criteria for interviewee in interview Process
Source: Own illustration

Connecting the interviewee criteria was made through an online process. Without the ability to travel to the individual and certain countries having COVID-19 restrictions made it difficult to meet the participants in person. All the participants involved in the study have been kept anonymous and personal information regarded with respect to the individuals involved.

The sample table of participants and their supporting characteristics have been provided. As the table below demonstrates each interviewee and supporting characteristics. These characteristics included their country of origin, relation to crypto currencies, level of understanding of cryptocurrency as well as current country of residence.

The interview guide including the criteria elements is provided and can be viewed in Appendix B.

Table 3: Final Sample Description

Interviewee No.	Developing country of origin	Relation to cryptocurrencies	Understanding of cryptocurrencies	Current country of residence
1	El Salvador	Tech support for Chivo wallet, receives payments in Bitcoin, cryptocurrency promoter	Intermediate	El Salvador
2	Nepal	Works for a fintech company that implements blockchain payment systems utilizing cryptocurrencies	Advanced	United States
3	Rwanda	Student, uses cryptocurrency to receive payments for tuition, remittances, cryptocurrency enthusiast	Basic	Rwanda
4	India	Cryptocurrency influencer, passionate about technology. Has worked in various crypto currency projects, admin in a 10,000+ subscriber cryptocurrency forum	Intermediate	United Kingdom
5	Venezuela	Store owner, entrepreneur, cryptocurrency investor	Basic	Venezuela
6	Zimbabwe	Reporter, editor, covering social media & venture capital startups related to fintech, author of blog for promotion of cryptocurrencies	Intermediate	South Africa
7	Guatemala	Youtuber, maintains a blog on crypto currencies, public speaker, bitcoin enthusiast	Intermediate	Guatemala
8	Argentina	Software developer, develops blockchain solutions constructing and designing smart contracts for blockchain platforms	Advanced	Argentina
9	Sri Lanka	Blockchain support engineer, consults with blockchain and cryptocurrency	Advanced	Australia

		projects, cryptocurrency day trader		
10	India	Works for a consulting firm with cryptocurrency projects, fintech and startups regarding developing countries	Advanced	Canada
11	Philippines	Customer support for a cryptocurrency exchange	Basic	Philippines
12	South Africa	Economist, Cryptocurrency investor since 2016, pro cryptocurrency	Intermediate	United Kingdom

5.5 Data Analysis Approach

As it may be regarding data analysis there are different techniques to break down the content into different categories. In particular for this study, the application of a qualitative analysis based on individuals from developing countries and relative interviews. Individuals were found through a private discord group of 5,000+ members who are involved in the cryptocurrency community. The individuals who participated varied accordingly from a student, store owner, fintech employee, youtuber and software developer. The individuals differ in their country of origin. A relation of the interviewees involved can be found in Appendix A.

For this study a thematic analysis was foundational to the approach and development of the qualitative analysis and methods applied. Many of the words used by the interviewees were used to be categorized into themes in order to identify patterns and qualitative data (Saunders, et al., 2018). In relation to the topic of the research being relatively new the thematic process allowed for an organizing of essential ideas to be grouped into order to fulfill the understanding of the research question. In order to correlate the themes this was done by transcribing the interviews. The application that enabled this process was called Sonix.ai which helps organize audio files for each interview. In accordance with the process of analysis and coding the process was implemented by manually going through and coding the interviews by similar themes and codes. The process of coding was deductive coding approach which is useful in the relevance of relationships between variables in deduces a theory or model framework (Saunders, et al., 2018). Deductive reasoning was the main approach in this study due to the foreseen and preconceived ideas from the literature analysis and as a result into data collection. The process of inductive reasoning came to present itself where there was the presentation of major patterns or concepts

that were of interest. It would be of importance to state that from the coding there were 17 codes that were formulated from the results, which was more or less than was expected. But thematically representing the connection to the literature review in order to connect what previous studies have shown and connecting to the current results from this one. Provided below is the division of results represented by the interviewees:

Interviewee	Infrastructure	Development Capacity	Politcal Backing	Price Stability	Widespread Adoption	Microfinancing	Corruption	Remittances	Financial Inclusion	Market Potential
1	X	-	-	X	X	-	-	-	-	X
2	-	X	X	X	-	X	-	X	-	-
3	X	X	-	X	X	-	X	-	X	X
4	-	X	X	-	-	X	X	X	-	X
5	X	X	X	X	-	X	-	X	X	-
6	X	-	-	X	X	-	-	X	-	-
7	X	X	X	-	X	X	X	-	X	X
8	X	-	X	X	-	X	X	-	-	-
9	X	X	-	X	-	-	X	X	X	X

Table 5: Categorically divided themes of individual interviews

Source: Own Illustration

5.6 Ethical Considerations

The participants involved in the study needed to be informed via email about the purpose of the study and provided with the set of potential objectives of the research intent. The potential participants were provided with the overall objective and a small description included in the research objective in order to create mutual interest of both parties. The emails were designed and formatted based on the potential group sample, particularly including the reasoning of the target individuals. Requests sent through emails were enacted and the resulting interviewees accepted.

An important aspect was providing consent to the individuals involved in and receiving the corresponding consent from each individual interviewee that was signed and provided to the researcher. The consent and information that was provided to the researcher will be kept confidential in order to protect the interviewee. Each interviewee was decided to be kept anonymous and the participants involved were identified with a pseudonym of numbers (1-12). The interviews were recorded and stored in a private location.

5.7 Limitations

In almost every study there are limitations that are included whether it be outside influences or simply the methodological approach. Some of the incurred limitations regarding this study were predicted while there were elements that were unpredicted. As it may be there were a total of 12 interviewees in different countries around the world. Because of this the data was less specialized in the sense that it was generalized due to the fact of decentralization. Each country has different issues and based on the current location of the individual creates opinions and influence based on geographical influences.

5.7.1 Predicted Limitations

The most established limitation was that the interview was done in English and the majority of the individuals involved were communicating in English as non-native speakers. This meant that important information or miscommunication could have taken place as a limitation for data interpretation for the researcher. Words can be misused, misunderstood or unknown for the purpose of a description or articulating information that was attempted to be conveyed. All of these were limitations but as it may be the researcher predicted them and appropriate measures were taken such as simple English questions, and translation platforms including google translate.

5.7.2 Unpredicted Limitations

Many possible interviewees did not respond, and as a result it took longer to find and locate potential individuals that fulfilled the stakeholder criteria. Many potential interviewees did respond, but in due course they either did not follow up after the initial response or they informed the researcher that they could not be a part of the study due to inconveniences. The last interview was completed on May 20th which was partially completed due to technological issues the interview was rescheduled and organizing of both parties to reconvene took longer than expected.

5.8 Discussion and Data Analysis

I get paid in Bitcoin and it has changed my life. If I receive money in paper money I will spend it right away. When I have it in cryptocurrency I spend what I need and save the rest. I know a lot of people living in shacks, on dirt floors and doing transactions on their phones and it's been very helpful to transform their lives (Interviewee 1, 2020).

The objective of this chapter was set with the intention to formulate the results and findings including the thematic process. For each element involved with the theme there was great value in the process. The researcher wanted to understand how the application of cryptocurrency impacts developing countries. The following contributions included the relevant questions regarding infrastructure, institutions/governance, political backing, price stability and widespread adoption following the potential circumstances of promotion micro financing, market potential, corruption reduction, remittances efficiencies and finally financial inclusion. While in a general sense the ideas of developing countries, financial inclusion and cryptocurrencies were omnipresent.

Please note that these themes were viewed in an exploratory stance and in general context demonstrate an overall umbrella of the overall results found. Discussions that were from the literature review will be incorporated into the results in order to support the overall impression and research of the entire study.

I think if we have a currency that is not controlled by the government everyone would be equal (Interviewee 3, 2022).

5.8.1 Cryptocurrencies in developing countries

One of the main topics that my interviewees highlighted regarding the concept and theme of infrastructure was the need for cell phones and the internet. This was a focal point for 7 of my 9 participants, and examples of their responses included:

For unconnected people who do not have internet access. Cell phones are getting cheaper, especially smartphones with better internet access and applications connected to them (Interviewee 8, 2022).

Many people have phones to make phone calls, play music but to use it to transfer cryptocurrency makes so much sense (Interviewee 3, 2022).

Normally it would take me 1 hour on the bus, 1 hour waiting in line to make my electrical payment and then 1 hour returning, now I can take a photo of the bill with my phone, send it ot the username of the company and the money will transfer into their account and it will be paid for (Interviewee 1, 2022).

The reoccurring focus by participants on the need for cell phones and internet is essentially the most basic level and platform that is required for the ability of access and utilize cryptocurrency as an integration mechanism and representing foundational platform. Yet progressing past the simple stage of a phone and internet the element of a continually development process is the need for education on a simple level regarding the technology in order to build trust. For example 4 of my 9 interviews mentioned a need to inform the people of the benefits and advantages of crypto currency and examples of the responses include:

Lots of people think it is a scam but there are scams in a lot of areas. The issue people think is that they are not actually getting money because they cannot see it by sending it to their wallet. So many people do not understand how it could work when they are used to seeing real money or bartering for something (Interviewee 7, 2022).

Financial literacy to those who need it the most is so important, educating people on why cryptocurrencies can help change the way they think about money and how it works for them (Interviewee 4, 2022).

As people become more educated, innovation and technological advancement can take place in the space directly related to the developing communities and countries and applications related to cryptocurrency. Organizations can be formed, groups of individuals combine to build into larger resources for promotion. For cryptocurrency to create high potential of financial inclusion it must get past the basic infrastructure phase and incorporate a level of development capacity regarding institutions and the role of governance. Another main topic that 3 of the 9

interviewees mentioned the need to incorporate low-skilled people into the process in order for it to be maintained and developed for example their responses included:

> *I accept payment at my store, all payments are welcome including crypto coins and cash. When people buy my product they use the DASH digital app, scan my QR code and I get the money then the customer can take the product. If the application was not accepted here in Venezuela I would not have a secure way to protect my income (Interviewee 1, 2022).*

The main theme presented is the use of an application that was created for the ease of payment, convenience and trust with the use of cryptocurrencies. Specifically the addition to a simple infrastructure in the process requires the capacity for the developmental barriers to be removed and growth potential in the applications implicated.

> *The features of cryptocurrency have more impact in poor people's lives than in rich persons lives because they don't have any other options (Interviewee 12, 2022).*

Relating to this idea of developmental capacity and theme that was mentioned by (Interviewee 2, 2022), was that the current status of cryptocurrency and essentially its impact on developing countries still remains in the beginning stages because the associated technologies are still being developed. In any regard the government plays a role in the process of widespread adoption therefore it seems fitting to transition into this theme.

5.8.2 Government Involvement

Another one of the main topics that my interviewees highlighted regarding the concept and theme of government involvement and political backing of cryptocurrency. This was a focal point for 6 of my 9 participants, in a variety of different associative remarks and examples of their responses included:

> *The government and institutions need to support the effort to reach high adoption levels, they will play a key role in helping find the balance (Interviewee 9, 2022).*

Together all of the parties involved create the support efforts needed in order to get one step closer to the acceptance on multiple levels of a country's economy and working system.

> *So many people in developing countries do not have basic banking and when the country begins to access digital payments using cryptocurrency it can be revolutionary. When the political side helps rather than creates barriers it can create more internal trust (Interviewee 4, 2022).*

In the regards for the government and political backing and support a theme that was brought to attention during the interviewees was the idea of sanctions and inflation which is a result of the government party and their influence over the economic and international trade relations. This theme was presented by 4 of the 9 interviewees and became a focal point and a few examples of their comments were:

> *Growing up in Zimbabwe the inflation was so high it was survival of the strongest. There was no cash and we could take no money out of the bank. People quit their jobs because they could not pay for the bus ride there (Interviewee 6, 2022).*

> *I remember when we had lines for getting money because the government controlled the amount of money that you are able to take out of the bank. Inflation increased so much and everyone became poor. The solution was to print more and more money. There was a social collapse with a huge increase of poverty and no product on the shelves (Interviewee 5, 2022).*

In a country's environment reaching the level of having imposed sanctions and limitations on a level international can be devastating to the economy especially in the sense of attempting to create financial inclusion when it actually prompts the opposite reaction. Financial exclusion occurs because people no longer exist in a functional market when the support of the currency is not enabling the economic stimulus.

Cryptocurrency can be a cure for inflation because it is like digital gold, it encourages digital spending and removes the need for fiat money (Interviewee, 11, 2022).

5.8.3 Financial Services

Involvement and collaboration from the government including regulatory frameworks is an important theme which was highlighted by 4 of the 9 interviewees as the focal can be seen in the following remarks:

The regulation of cryptocurrencies is essential for the acceptance and development because the level of freedom that it can keep relies heavily on how strong the restrictions are in a financial setting. If there are too many restrictions, political support can limit the benefits. The framework needs to be supportive or else it prevents the usability and does not work (Interviewee, 7, 2022).

Generally speaking, the adoption of cryptocurrencies is usually not politically supported because there is the fear of the government losing control of their monetary policies. Also they would not be able to have regulatory mechanisms in place for the supply of money. The only real solution for financial inclusion is for a developing country to have a central bank-issued digital currency (Interviewee 4, 2022).

From the interviews it can be noted that cryptocurrencies may not be a complete and substitutive for currency because it is a difficult process to have the use case of a cryptocurrency on the blockchain where is completely decentralized from the government yet in order to have a political support the government and centralized system would need to be characterized with sovereign capacities which removes the benefits of cryptocurrencies. There is a conflicting measure related to government monetary control and decentralized currencies (Interviewee 2, 2020).

5.8.4 Banks

One of the main topics that my interviewees highlighted regarding the concept of banking and theme of their involvement was the need for overcoming the issue of less advantaged

individuals having access to simple banking mechanics. This was a focal point for 6 of my 12 participants, and examples of their responses included:

> *I grew up in a rural area and had a job in a small village which was rare. I had limited options of what I could do with my money and to open a bank account in Nepal you need a letter from the employer, birth certificate, citizen proof and so on…this can be very difficult to do (Interview 2, 2022).*

> *Banking in India is expensive. People actually have to pay to the bank. To open an account you must pay money to open a bank account. Since living in the UK the bank wanted to pay me to open an account (Interview 4, 2022).*

> *If we put our money in the bank it's a promise that IOU but it does not guarantee we get our money when we need (Interviewee 9, 2022),*

Integration of bank accounts or simple financial services are less accessible in developing countries and ultimately, cryptocurrency could provide for much greater financial inclusion through the accessibility of these simple financial tools that are seemingly lacking in many underdeveloped communities.

5.8.5 Cross border payments

One of the main topics that my interviewees highlighted and became a focal point of a supporting pillar in the proposed conceptual framework was the idea of remittances. This meant that the transfer of currencies through cross border tools was lacking not providing a sufficient process that was suitable to developing countries potential circumstances as mentioned by 7 of the 9 interviewees:

> *I live in the United States and my family lives in a small village in southern Nepal, an app on my phone allows for money to be sent right away. No matter how far people are, the*

money arrives instantly. Before cryptocurrency I spent so much money in fees (Interviewee, 9).

To send money abroad there is always currency conversion markup and the price is not cheap so when an alternative appears of course people will choose the fastest and cheapest route (Interviewee 4, 2022; Interviewee 7, 2022),

My sister lives in Canada and she sends me help to pay for my schooling here in Kigali, Rwanda. She sends me cryptocurrency and I find someone here who wants it, I send it to their wallet and they give me cash. Sending money between countries using the bank is normally 10-20% fees and cryptocurrencies offer lower fees and faster payments (Interviewee 3).

With so many Venezuelans living abroad sending money from other places is common to support relatives by sending money home (Interviewee 5, 2022).

Cryptocurrency having an influence and seemingly promising use case for efficiency in cross border payments can help the processing of the transactions much faster and reduction of costs comparatively to bank transfers. Many countries create mutually exclusive partnerships with banks to only allow specific banks to pay out remittances including exclusivity agreements between the money transfer companies and banks are also common practice (Dilip, 2013). This includes removing all the transactions that use the broker or intermediaries to the extent of the accessibility of a cell phone which involves a mobile carrier and the internet's processing speed. The use of cryptocurrency for remittances is substantial in the improvement of speed and reduction of cost.

5.8.6 Price Stability

One of the main topics that my interviewees highlighted was the concept and theme of volatility regarding cryptocurrency because the value of money must be stable enough and reduce price fluctuations to promote growth rather than hinder it. This was a focal point for 5 of my 9 participants, and examples of their responses included:

The biggest issue is that people don't believe in cryptocurrency because it goes up then it goes down (Interviewee 7, 2020; Interviewee 6, 2022).

The volatility is often the biggest problem with the majority of cryptocurrencies (Interviewee 4, 2022).

Price volatility can only be reduced when the element of centralization and policy regulations in place which would mean cryptocurrencies would not be totally decentralized but on the other hand the introduction of a centralized system with government control would be an influencing factor in the developmental opportunities for the underdeveloped countries (Interviewee 12, 2022).

For price stability the government needs to have control to a certain extent which means that cryptocurrency would not be a 100% replacement for the fiat currencies of the country. The balancing act is to utilize the concepts of the blockchain while allowing for the political backing to take place for the protective and regulatory framework applications to be in place for the successful evolution of cryptocurrency. This leads to the idea of a cryptocurrency being used as a digital asset rather than being fully utilized as a currency replacing a fiat.

5.8.7 Enhanced Trade

One of the main topics that my interviewees highlighted and became a focal point of supporting the idea of creating access to the world market or greater access locally. This meant that cryptocurrency was expanding the way businesses can operate involving selling of goods/services which was mentioned by 6 of the 9 interviewees:

Being a software developer in Argentina and using cryptocurrency I am able to receive my payments in Bitcoin which gives me access to work in an international market (Interviewee 8, 2022)

Buying products in Colombia to be shipped to my store here in Venezuela has never been easier, we use cryptocurrency to transfer the money and the other company sends me what I need, very helpful (Interviewee 5, 2022).

The involvement of international trade and increasing the capacity for this development is a key element in the process towards financial inclusion. When trade is being promoted the ability to enhance developmental capacities is an opportunity for the economy to progress one step closer to financial inclusion. Cryptocurrency can enhance the effectiveness of cross-border trade and promote various areas of technological advancement. The supply chain backing itself on cryptocurrency can provide small-scale products opportunities simultaneously reducing trade costs.

5.8.8 Corruption

Throughout the interviews involving the idea and theme of corruption were presented by the interviewees as a focal point considering developing countries may have more corruption or the corruption is more present than other industrialized and developed countries, as a topic of interest for 8 out of the 9 interviewees provided examples of this idea:

Black money has many sources which are corrupted, that is we cannot confirm where they got that money from. The features of cryptocurrency can trace where the money came from (Interviewee, 2, 2022).

The blockchain essentially improves the visibility of the transfers or procurement processes as each transaction is visible to the network but can be used to circumnavigate out of a realm of control by governments. It is a double edged sword. In other words crypto can still be used for illegal transactions but it can be public knowledge whereas fiat currency is even more difficult to trace than crypto currency. Cryptocurrency brings us one step closer to transparency within a financial network (Interviewee 4, 2022).

> *Corruption began long before the introduction of cryptocurrencies but it can be very helpful in connectivity for digital literacy to prevent corrupt measures in the future when blockchain is utilized in certain public sectors like transparency of digital assets regarding public servants and governmental accountability which plagues developing countries (Interviewee 7, 2022).*

The idea of using the blockchain and cryptocurrency for an anti-corruption tool in a bigger context is seemingly presented as transparency and creating immutable registries of transactions creating security and a representation of digital accountability. Many developing countries can fail in the context of corruption and the underlying institutions are to blame and cryptocurrency is not a cure but more so a tool for inadequate systems to provide a potential for transparency and more accountability. Interviewee, 8 (2020) mentioned that cryptocurrency is just another way around moving money and larger amounts of it; faster and more efficiently and that it is just fueling more corruption and even the use of cryptocurrency can be used a vehicle to promote terrorism.

5.9 Summary of Results and Discussion

The results have shown a variety of factors that influence the applications of cryptocurrency and how it impacts a developing country. As it may be the collection of data in conjunction with the literature researches suggests that this topic has deeper levels and that it is under researched because it is a very new idea and as a result it has not had a placeholder for a long enough time in order to see the actually mature impacts that are observed from long term applications and many levels of development. This complexity is due to the fact that each economy within a developing country has different needs and expectations in order to be fulfilled by the political environment and government in power that directly associates to the financial realm and the developmental barriers that need to be overcome.

5.10 Success of conceptual framework

The conceptual framework in turn provided much value as it was previously predicted. As it may be, the model that was designed included concepts that acted as a platform for success

for the researcher. The model and framework also aided in the collection of data, providing the researcher with a structural format. Each of the concepts elements of infrastructure, developmental capacity, price stability, political backing and institutions/governance support. The model also helped create the entire structure of the research ideas and develop concrete results through the analysis process. As a result financial inclusion, cross border payment efficiency, micro financing promotion, market access, and reduction of corruption/promote transparency were verified by the conceptual framework. These outcomes were mentioned and highlighted by many interviewees throughout the collection of the data.

Chapter 6 Conclusions

In conclusion, the impact of crypto currencies can have a major influence regarding the increase of financial inclusion and reduce this gap correlating to industrialized countries. The need for developing countries to have increased technological advancement and implementation through corroboration of government and society regarding a digital currency is essential to the improvement and futuristic development of the world economy. A reduction of all barriers that impede the achievement of an inclusive financial system would be useful to reduce the level of financial exclusion, providing to the development of industrial enterprises and, more generally, to economic development (Mavilia & Pisani, 2020).

Throughout the scope of the study and literature review we were able to conclude considerable perspectives relating to the implications of cryptocurrencies and monetary policy that were presented with relevance by the interviewees and the conceptual framework and evidence building which ultimately aided in the development of final research.

The research question has been answered as follows:

"How does cryptocurrency impact developing countries?"

1. By reduction of time and transaction fees involving remittances has potential for improvement; which is directly beneficial to promotion of trade of goods/services (locally and internationally) simultaneously promoting microfinancing mechanisms
2. The foundational technology of the blockchain supports anti-corruption through transparency of digital monetary accountability
3. Technological development and innovation incorporating individuals, institutions and government can help provide financial inclusion
4. Combative tool for inflation as long as supply remains fixed

Cryptocurrency Limitations:

a. Cryptocurrencies need to fulfill the simple functions of money in order to create the benefits necessary for success.

b. Foundational issue of market volatility. Centralization and back-up are lacking with cryptocurrencies which is not supportive to a stable price level (Ammous, 2015)
c. Achieved stability depends on political backing, monetary regulation of central banks and government involvement in order to control the supply of money which can reduce many of the advantages of cryptocurrency
d. Central Bank Digital Currencies being implemented as an alternative to cryptocurrency
e. Acceptance, oversight and implementation of corrupt activities

Overall, the impact of cryptocurrencies has potential possibilities to support the growth process of developing countries in many ways as long as the balance between monetary policies and regulations can be achieved providing the stability necessary and the prerequisites for widespread adoption. Futuristically, financial inclusion is the ultimate goal of developing countries and cryptocurrency can provide a pathway to remove development barriers but in limited ways.

6.1 Future Research

The major topic of future research would be the developing idea of Central Bank Digital Currencies which is essentially another monetary tool for centralized banking but incorporates elements of cryptocurrency. Future research could include interviews incorporating experts from more academic backgrounds which would increase the presence of value regarding insights into the impact of cryptocurrency with developing countries and a comparative of a currency that is similar by nature. Additionally more case studies can be implemented for the improvement of the concept as a whole.

Another use case of cryptocurrency would be the application of using the underlying technology of cryptocurrency which is the blockchain to attach governments to wallets which can be publicly identified from the transaction ids and from there the reduction of corruption and transparency of a political system can be demonstrated. This purpose would track funds as it

would increase the credibility of government organizations and current systems cannot track these events in an efficient and reasonable manner. (Interviewee 8, 2022; Interviewee 6, 2022).

One other possibility would be for a country to nationalize cryptocurrency and provide each individual with a wallet address in conjunction with their birth certificate and/or phone number. This step would enable each individual in a country to have some access to the financial system as long as a phone and internet were connected. In this process it would promote financial inclusion, enable remittances, reduce corruption, and ultimately promote market trade potential. (Interviewee 4, 2020; Interviewee 7, 2020)

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Annexes:

Annex A

Africa		Asia	Latin America and the Caribbean
North Africa	**Southern Africa**	**East Asia[b]**	**Caribbean**
Algeria	Angola	Brunei Darussalam	Bahamas
Egypt	Botswana	Cambodia	Barbados
Libya	Eswatini	China	Belize
Mauritania	Lesotho	Democratic People's Republic of Korea	Guyana
Morocco	Malawi	Fiji	Jamaica
Sudan	Mauritius	Hong Kong SAR[c]	Suriname
Tunisia	Mozambique	Indonesia	Trinidad and Tobago
Central Africa	Namibia	Kiribati	**Mexico and Central America**
Cameroon	South Africa	Lao People's Democratic Republic	Costa Rica
Central African Republic	Zambia	Malaysia	Cuba
Chad	Zimbabwe	Mongolia	Dominican Republic
Congo	**West Africa**	Myanmar	El Salvador
Equatorial Guinea	Benin	Papua New Guinea	Guatemala
Gabon	Burkina Faso	Philippines	Haiti
Sao Tome and Prinicipe	Cabo Verde	Republic of Korea	Honduras
East Africa	Côte d'Ivoire	Samoa	Mexico
Burundi	Gambia	Singapore	Nicaragua
Comoros	Ghana	Solomon Islands	Panama
Democratic Republic of the Congo	Guinea	Taiwan Province of China	**South America**
Djibouti	Guinea-Bissau	Thailand	Argentina
Eritrea	Liberia	Timor-Leste	Bolivia (Plurinational State of)
Ethiopia	Mali	Vanuatu	Brazil
Kenya	Niger	Viet Nam	Chile
Madagascar	Nigeria	**South Asia**	Colombia
Rwanda	Senegal	Afghanistan	Ecuador
Somalia	Sierra Leone	Bangladesh	Paraguay
South Sudan	Togo	Bhutan	Peru
Uganda		India	Uruguay
United Republic of Tanzania		Iran (Islamic Republic of)	Venezuela (Bolivarian Republic of)
		Maldives	
		Nepal	
		Pakistan	
		Sri Lanka	
		Western Asia	
		Bahrain	
		Iraq	
		Israel	
		Jordan	
		Kuwait	
		Lebanon	
		Oman	
		Qatar	
		Saudi Arabia	
		State of Palestine	
		Syrian Arab Republic	
		Turkey	
		United Arab Emirates	
		Yemen	

Economies systematically monitored for the World Economic Situation andProspects report. These analytical groupings differ from the geographical aggregations defined according to M49. **b** Throughout the report the term 'East Asia' is used in reference to this set of developing countries, and excludes Japan. **c** Special Administrative Region of China. Source: United Nations, 2022

Annex B:

Interview Guide:

Name of interviewee:

Interview date:

Interviewee Country of Origin:

Interviewee Current Country of Residence:

Note to interviewee: This interview guide is intended for respondents who are from developing countries and have an understanding of cryptocurrency. Specific questions will be formulated based on the interviewee, thus questions for individuals will differ from no understanding of cryptocurrency to a more developed understanding.. This is implemented that way all participants can answer according to their experience and environment. Please make sure to sign the consent form, thank you.

Introduction:

Thank you very much and I appreciate you taking the time to talk with me today. My name is Lucas Johnson, currently I am researching how cryptocurrency can benefit developing countries. I will start by asking you some questions to help me understand the applications/benefits of cryptocurrency that may add to a developing country factors regarding the development focused capacity, infrastructure, policy/regulation, socioeconomics governance involved. For clarifications purposes, developing countries are distinguished by the United Nations country classification according to the world economics and prospects of 2022.

In order to get started, I just want to make you aware how this interview will look like today. To begin the interview will last about 30-45 minutes to 1 hour. Regarding the answers to the questions please try to answer the questions to the best of your abilities. Throughout the response and answer process, understand there is no right or wrong answer, and if you don’t know feel

free to ask me. Please feel free to ask me any questions that you may have, I will attempt my best to answer them accordingly. During the interview I will be making notes while we have our conversation and simultaneously I would also like to also record this conversation, so I do not forget anything. In order to proceed with the recordings do I have your consent to do so? (*If interviewee does not want to be recorded, but accepts the note option, make sure to tell them that the recorder turned off and confirm that it is completely understandable to decline being recorded. If the interviewee consents to being recorded, make sure to communicate to them the beginning and end of the recording, in order to keep them informed*.) The recording, transcripts and notes from the interview will not necessarily be anonymised. The explicit information that will be provided to me today will be securely stored, and that the data involving the interview and any contact information will be stored separately.

I would also like to let you know that our conversation is completely confidential and will only be used for my research purposes and possibly other researchers, for that purpose, please let me know if I am authorized to use your name, location, gender, and occupation? (*if they do not want their information in the research please note on interview and assure the interviewee that their name, location, gender or any other option will be kept anonymous.)* Please keep in mind that you can decide not to participate at any time. Now that we have completed this section, are you ready to start the interview? (*If not, ask if they have any more questions or ask what can be done to make them feel ready to start the interview*.)

- What options has the interviewee decided to keep anonymous?
    - Name, Gender, Age

Three main topics of discussion include:

- Developing Countries
- Cryptocurrency Applications
- Financial Inclusion

Respondent characteristics:

1. Interviewee country of origin
2. Relation to cryptocurrency
3. Level of understanding of cryptocurrency
4. Current country of residence

Interview Questions:

1. Are you familiar with Bitcoin?
2. Are you familiar with cryptocurrencies?
3. Do you know what a cryptocurrency is? If so, what is it to you?
4. What are some experiences you have had with cryptocurrencies?
5. What are the challenges that you find with cryptocurrencies?
6. What infrastructure is necessary to use cryptocurrencies?
7. Do you think a smartphone and internet is the only tool required to access cryptocurrency?
    a. What else needs to be developed or necessary?
8. Do you think Bitcoin or other forms of cryptocurrency is “real money”?
9. Tell me about your opinions on the stability and volatility of cryptocurrency?
10. What can you buy with cryptocurrency, and how?
    a. Take me through the process?
11. Could cryptocurrency be used to purchase things or pay bills? Any limitations?
12. Being more than a method for payment, what are other utilities of cryptocurrencies?
13. Tell me your position on using cryptocurrency as a money transferring system?

14. What do you think about countries adopting cryptocurrencies as a national currency?
    a. Would it be good for the economy?
        i. The people?
        ii. The businesses?
        iii. The government?
15. Why do you think the majority of developing countries have not adopted cryptocurrencies yet?
    a. What would make a government and the population adopt a cryptocurrency?
16. If cryptocurrency is accepted how is it maintained? What elements need to be involved?
17. What is the result of successful cryptocurrency adoption, what happens?
18. Do you think developing countries would be able to benefit more than industrialized countries with cryptocurrency?
19. Tell me what your position is on cryptocurrency reducing corruption?
20. Can cryptocurrency specifically help bank the unbanked?
21. Can cryptocurrency fix poverty?
    a. If so, can it promote micro-financing?
22. Do you feel cryptocurrencies can help advance financial inclusion?
23. In your opinion, what are the strengths and weaknesses of cryptocurrencies?
24. Tell me your position and what a disadvantage of cryptocurrencies, specifically with developing countries?

Closing:

Much appreciated for speaking with me today. I really appreciate the time and effort you have made to answer these questions. I feel I have a better understanding of your perspective regarding cryptocurrency in developing countries. Regarding your effort today it will help the

broader understanding of the benefits of using cryptocurrency in developing countries. Would you happen to have any more questions or comments for me at this time? If you have thought of anything that you may have forgotten to add to the interview please feel free to tell me now or if you remember something, feel free to write it down and send me an email at up20200031@fe.up.

Reflection/Comments:

This space is left for the interviewer to take extra notes of something that might not have been mentioned in the questions or information that was given by the interviewee that can be used in the analysis.