

FIU DIPLOMACY LAB

DOWNSIDES OF CRYPTOCURRENCIES IN DEVELOPING COUNTRIES

**By Eitan Casaverde, Henry Allen, Kathleen Obrer,
Cesar Muir, & Nicolas Denis**

DECEMBER 2019

FIU

Jack D. Gordon Institute
for Public Policy

**DIPLOMACY
LAB**

Table of Contents

Appendix	1
Introduction	2
Background Information.....	2
Changes in Policy	3
Regulations	3
Taxation	4
Ideal Energy Infrastructure	6
Balancing Security Risks.....	7
Advancing the Economic Sector	8
Blockchain and Remittances.....	9
Supply Chain Transparency.....	10
Land Registration.....	10
Improvement for Public Welfare	11
Recommendations	14
Conclusions	15
Endnotes	17

Appendix

Cryptocurrency is a rapidly growing industry not just in the commercial trading sector, but also as a new system of a secure transaction through blockchain. Participants of cryptocurrency possess a “private key” that, when matched with the blockchain, allows the person to access their cryptocurrency and commit any desirable transaction. Transactions along the blockchain are made with a “public key”. Because cryptocurrency transactions are done on a public ledger, all forms of activities that occur within it are recorded and cannot be altered or reversed. Initially, this is meant to prevent double-spending or the transfer of the same cryptocurrency twice.¹ Furthermore, it allows consumers to place their trust in the system and invite more people to utilize it.

The operation of the blockchain technology in which cryptocurrency operates is not done by any central figure. Cryptocurrency relies on peer-to-peer analysis in which once a transaction is made, then participants of the ledger can verify the transaction. Anyone can become a participant on the peer-to-peer network and verify the data. A transaction on the blockchain is easy to identify because once it's made, the account number of the person making the transaction, the receiver's account, and the amounts sent become publicly available. When this information is presented, the people verifying the data also known as “Miners” begin to compute and verify its legitimacy to prevent any fraudulent activity through cryptographic hash functions. This system within the cryptography presents mathematical problems for “Miners” to solve and present the correct output of the transaction. These hash functions exist because since “Miners” could be working on the same transaction and delays between computers can occur, it is used to figure out the correct sequence at the correct time.

Prevention of fraudulent activity utilizes a virtual key system. Two types of ledger keys exist, a “private” and “public” type; these keys function as identifiers for members of transactions. Separate from the public domain, private keys exist as unique entities created to specify to each account. Functioning as signatures in these virtual transactions, the keys attempt to serve as insurance for digital transactions of these virtual currencies. Once the transaction is verified through cryptography, it becomes formally placed within a block of transactions that make a chain of previous and future transactions for everyone to see; the formation of these chains creates blockchains.

Introduction

The developing nation of Georgia, over the last few years, underwent a technological thrust that exponentially expanded the nation's cryptocurrency technologies. The small nation rose to the top of the global race to expand cryptocurrency, second only to China. Throughout the entirety of this paper, the information presented will assess the positive and negative aspects of cryptocurrency in regards to implementation to Georgia. Despite the risks to security, the adoption of cryptocurrency could benefit Georgia by facilitating further development in its socioeconomic sector and improving public welfare if the country implements the necessary policy changes to both its governmental mechanisms and energy institutions.

New technologies arise constantly, changing the way the world functions and revolutionizing the system that it replaces. A growing investment opportunity, cryptocurrency technologies stepped into public popularity in 2017 when Bitcoin hit an unexpected boom.³ Although the cryptocurrency market rose and fell following the spike in 2017, many currently wonder about the function of cryptocurrencies and their ability to provide benefits or hindrances for people.

This essay will first define the cryptocurrency technologies in question and then address how Georgia can adopt policies to maximize the benefits of cryptocurrency. Then, the paper will emphasize the opportunity found in the utilization of the current energy regulations as a mechanism for advancing cryptocurrencies. After, the paper will present a risk analysis in the security sector for Georgia, followed by the potential benefits both the socioeconomic and public welfare could undergo if the development of cryptocurrency becomes adopted by the Georgian government.

Background Information

Cryptocurrency functions as a decentralized digital currency; it operates on a public ledger known as a blockchain. Cryptocurrency bases itself on the genuine trust of the system itself, as well as the value of the virtual, intangible coin. To learn more about blockchain technologies, please refer to the Appendix included in this paper. The first attempts at developing cryptocurrency technologies, contrary to popular belief, dates back to 1998.⁴ A decade later, a paper was published online regarding a company called *Bitcoin*, a company that a year later released their cryptocurrency technologies for the public to access.⁵ These virtual coins remained unpopular, being used by the few who adopted the technology early on and making little headway for virtual currencies.⁶ Then, in 2017, Bitcoin suddenly broke all previous records of cryptocurrency technologies, expanding practically overnight and gaining recognition at a global level.⁷ Following the expansion of cryptocurrency technologies in 2017, the value for cryptocurrencies continues to fluctuate.

Today, these technologies undergo constant progress, changing and evolving rapidly. Due to the advancing nature of cryptocurrencies, foreseeable benefits serve as incentives to join the bandwagon. Many individuals theorize that the utilization of cryptocurrencies could help markets and economies prosper. For others, the doubt in the reliability poses the query of whether cryptocurrencies could prove more harmful than helpful. The ongoing shifts in cryptocurrency create certain risks for users and

adopters of these technologies.

The Eurasian nation of Georgia currently finds itself in an interesting position. As a developing nation, both their democratic form of government as well as their economy continues to progress. The sudden expansion of cryptocurrencies in the nation prompted the following question for this paper: Should Georgia Adopt or Oppose Cryptocurrency Technologies?

Changes in Policy

With a long history of monetary development, cryptocurrency exists as a relatively modern creation. As such, the currency presents new challenges to nations and their respective economic systems.⁸ These challenges seem to affect almost every aspect of a state, whether positively or negatively. More specifically, when a nation decides to incorporate any form of cryptocurrency into its economy, the state's policies and infrastructures must undergo specific alterations to accommodate.

Regulations

Before a nation can include cryptocurrency into its economy, various considerations should be made to determine whether the change or inclusion will harm or benefit the state. Cryptocurrency consists of fluctuations that make it rather volatile, possibly resulting in financial loss. Additionally, virtual currencies usually do not have a central authority which results in both the system being looked upon favorably by criminals and arising issues with customer complications. A large portion of virtual and cryptocurrency trading is conducted via digital wallets, exchange platforms, and amongst international nations. However, this presents an issue; there is a possibility that the users of this currency could face legal and financial risks as well as become victims of cyberattacks.⁹

With the creation of cryptocurrency, governments have been forced to create regulatory legislative acts.¹⁰ For nations like Georgia, this system can create major challenges to “central banks in terms of regulating monetary policies.”¹¹ Because Georgia does not have a highly developed regulatory framework, the nation is seen as a great place for cryptocurrency to develop and flourish. That being said, it is often difficult to form regulations on cryptocurrency since the concept itself is fairly new and not properly investigated, making it complicated to develop proper policies.¹² Georgia has taken caution against this form of currency. As of 2017, cryptocurrency remained a non-legal form of payment within the nation. Since cryptocurrency operates as a virtually unknown subject, the National Bank of Georgia warned its citizens about using any form of virtual currency.¹³

The ongoing development of the implementation of virtual currencies into national economies creates observable difficulties in forming proportionate regulations on the currency. Luxembourg does not have any regulatory legislation in place for cryptocurrency. Even so, the nation's financial regulator – the Commission de Surveillance du Secteur Financier (CSSF) – is always monitoring cryptocurrency platforms that were already active.¹⁴ Through the creation of informal regulations, other nations currently experiment with legislating cryptocurrencies. The Central Bank of Bahrain plans to launch a controlled environment in which the institution itself can observe the growth of these technologies with different regulations in place (a regulatory sandbox). This would allow for

blockchain and cryptocurrency companies to work within Bahrain on a trial base for nine months while the Bahraini government decides on which regulations to implement.¹⁵ Although regulations on cryptocurrencies prove difficult to create, the Republic of Malta set itself as a model for the rest of the international community when it comes to incorporating cryptocurrencies into a nation's economy.

The government of Malta formulated a set of legislative acts in July of 2018. This included the Malta Digital Innovation Authority Act (MDIA), the Innovative Technology Arrangements and Services Act (ITAS), and the Virtual Financial Assets Act (VFSA); collectively these were called the Digital Innovation Framework (DIF). The framework allows market participants in cryptocurrencies and blockchain companies to establish and function within Malta. Additionally, the DIF gives companies a “beneficial impact through enhanced trust, marketability, legal certainty and consumer adoption.”¹⁶ The DIF even sets ways in which cryptocurrency can be distributed (DLT Assets): Electronic money, financial instruments, virtual tokens or utility tokens, or virtual financial assets (VFAs). Under DIF and VFSA, the sale of virtual currencies can be regulated by security laws (regulations that manage the issuance of securities, a financial instrument designed for businesses to raise money from investors). If the DLT Asset of a cryptocurrency falls within the scope of currency security laws (since it can be categorized as a financial instrument) then the currency and those using it must abide by securities laws.¹⁷ Lack of regulation on cryptocurrency mining and border restrictions still leave room for improvement for the Maltese regulations. Still, Malta's DIF remains as one of the strongest regulations present today in the international community.

Taxation

Many consumers of cryptocurrency use the system to have anonymity from their respective governments as well as avoiding taxation on the currency. As such, national governments have found it difficult to install any taxation upon cryptocurrency. With the new introduction of taxation, consumers may become less willing to utilize cryptocurrencies. If the taxes on cryptocurrencies decrease its users, taxation might work as a prevention on cryptocurrency rather than a regulation. Even so, national governments feel some sort of obligation to install a tax on cryptocurrency to treat it like any other form of income to a household.

Some nations have tried to add a value-added tax (VAT) or goods and services tax (GST) on cryptocurrency. These taxes, similar to income tax, function by taxing according to the increase in the value of a service or product at every stage of production. However, unlike income tax, VAT and GST work as flat taxes, consisting of a constant marginal rate. In Georgia, the standard VAT rate currently rests at 18%; all imports and other taxable transactions fall under this tax.¹⁸ When it comes to cryptocurrency, the way a nation taxes the currency depends on the government's definition of cryptocurrency.

The European Commission, the European Parliament, and the European Court of Justice seem to “lean toward cryptocurrencies being interpreted as a ‘means of payment.’” In contrast, some national governments, such as the government of Luxembourg, see cryptocurrency as a “means of

exchange.”¹⁹ When countries identify cryptocurrency as a “means of payment,” then the currency can be treated similar to foreign currencies, exempt from VAT. However, if the country defines it as a “means of exchange,” then VAT rates could apply.²⁰

In Malta, there are currently no specific sets of taxation guidelines for cryptocurrency. Even so, the general rule of Maltese tax legislation applies to the taxation of cryptocurrency. This legislation does not recognize cryptocurrency as an asset that falls under income tax. According to the Maltese Income Tax Act, there is a difference between income receipts and capital receipts. Monetary transactions dealing with income automatically get taxed at a rate of 35% or a progressive rate that caps at 35%. The other transactions that deal with capital either fall under the 35% income tax or do not get taxed at all. The Income Tax Act utilizes different lists of forms of income that would be qualified for an income tax. However, cryptocurrencies failed to appear on this list, meaning that income taxes cannot be collected from cryptocurrency transactions. According to Malcolm Falzon and Alexia Valenzia, Malta will most likely follow the Court of Justice of the European Union’s opinion on the taxation of cryptocurrency: the exchange of bitcoin for traditional currency, and vice versa, would be seen as a supply of a service, yet exempt from VAT.²¹ Similar to the government of Luxembourg, Malta feels the need to first define how the nation wants to view cryptocurrency within their country to move onto how to tax and regulate it.

Nations have taken diverse approaches to the taxation of cryptocurrency. Currently, Japan holds a tax rate on cryptocurrency trading income. However, the Japan Association of New Economy asked the government to instill a progressive tax rather than the general tax of 55% found currently in place. With this progressive tax, it would reduce taxation of cryptocurrency to about 20% (the same rate that is applied to the stock market in Japan). Japan’s Financial Services Agency also asked for exemption of tax applications to transactions dealing with cryptocurrencies. Additionally, Venezuela also shares different views on the taxation of cryptocurrency. The nation instructed the National Superintendency of Crypto Assets and Related Activities (SUNACRIP) to handle the taxations. SUNACRIP established monthly limits and commissions on cryptocurrency payments for the nation.²²

If cryptocurrency became implemented into a nation, the government of said nation will most likely feel obligated to place a tax. The tax would allow the government itself to continuously gain revenue. For Georgia to fully incorporate any form of virtual currency into its economy, the government must first define how cryptocurrency will function in its society and economics. Then, the nation can pick the best form of taxation according to the official definition chosen. In their recommendations to Malta, Christopher Buttigieg and Christos Efthymiopoulos write in their article that “issuers and other operators in the field of crypto assets require clear guidelines from the national tax authorities...”. The authors claim that, without guidelines and principles, the process of setting regulatory action will become increasingly difficult. Additionally, Buttigieg and Efthymiopoulos say that the lack of guidelines and regulations will cause an increase in criminal activity and “tax evasion opportunities will arise.”²³

Ideal Energy Infrastructure

Cryptocurrency depends on energy. Energy powers server farms maintain blockchain and encryption systems and developed as a requirement to mine the currency itself. Globally, cryptocurrency mining is estimated to consume between 52 Terawatt-hour (TWh) and 111 Terawatt-hour (TWh) a year.²⁴ Furthermore, cryptocurrency miners (hashers) state that access to low-cost electricity supplies is the primary factor considered when determining where to set up operations.²⁵ The geographical footprint of cryptocurrency operations thus follows the distribution of energy, with the greatest centers found in China where excesses in hydroelectric power can be used in mining operations.²⁶

Georgian energy policy in its current state benefits the growth of cryptocurrency operations in the country. Behind China, Georgia is the second-highest user of energy for cryptocurrency mining.²⁷ Georgia relied on fossil fuel imports from the Soviet Union for the majority of its energy needs leading to energy shortages following the 1991 collapse. Beginning in 1995, policies to improve domestic energy production and energy security came with the establishment of the Georgian National Energy and Water Supply Regulatory Commission (GNERC). Under GNERC, the power industry was deregulated and became increasingly privatized, allowing for parties at all levels of production, distribution, consumption, and exportation to enter into direct contracts.²⁸ The freedom to approach energy producers and distributors directly remains attractive to cryptocurrency mining outfits. Furthermore, hydropower accounts for more than 80% of Georgia's generating capacity, with seventy operational hydropower stations installed as of 2015.²⁹ Hydropower is uniquely useful to cryptocurrency as it is relatively cheap renewable energy. Locating mining operations near the sites of hydroelectric dams also has the added benefit of making water-cooled mining equipment more efficient. Finally, cryptocurrency mining utilizes the excess capacity of hydroelectric facilities in the summer months when snowmelt and rainfall increase water flow.³⁰

The study provides a comprehensive overview of the state of the Crypto-asset industry in 2018, including a study of industry structure at all levels, the geography of the industry, the personnel involved, the usage and regulation of cryptocurrency, and the connections cryptocurrency formed with other industries within the global economy. The main notable findings include the use of renewable energy by the majority of cryptocurrency mining operations and an increase in self-regulation within the market. The report offers an estimate of the energy consumption of cryptocurrency mining by using a range between the greatest and least efficient market available hardware as opposed to finding an energy cost per transaction metric. The report also focuses on the energy mix used when determining the environmental impact of crypto asset mining, determining that renewable energy sources serve as favorable cheap sources of energy. Among these, hydropower makes up the majority of renewable energy used as it often includes excess capacities in energy production perfect for use by cryptocurrency miners. In terms of the change in regulatory practice, the report offers insight into the response of investors to the large drop in cryptocurrency prices in 2017 and finds that the distribution of service becomes restricted by varying policies of each country.³¹

The World Bank study offers insight into the approaches and strategies of low-income countries (LICs) can use to develop renewable energy sources using public and concessionary funds. The paper, aimed at policymakers in such countries and published as part of the Scaling Up Renewable Energy Program (SREP), offers monetary assistance in the implementation of renewable energy sources to incentivize or enable investment from the private sector. As such, the content focuses on the use of commercially viable technologies in solar, wind, geothermal, biomass, and small hydropower, as well as the financing strategies that serve most effectively in their implementation. The report identifies 33 case studies from the World Bank, the International Finance Corporation, and other regional banks, focusing on the different economic factors and policies that either led to the success or failure of renewable energy implementation. In this aspect, the report offers a comprehensive list of each financial instrument, its uses, in addition to pros and cons. The analysis of countries such as Honduras is particularly useful, as the energy crisis it experienced in 2007 showed how the lack of streamlined regulation and communication between government programs can lead to the favoring of diesel power despite the high potential for renewable energy in the country.³²

Balancing Security Risks

Cryptocurrency being introduced into the Republic of Georgia generates opportunities for both positive and negative outcomes, especially in the topic of security. Security, as discussed in this section, addresses the physical well-being of an individual as well as the safety of their assets and their online platforms. The implementation of cryptocurrencies into the Georgian system could potentially open up vast opportunities for technological advances and simplified financial interactions while simultaneously increasing the risk factor by simplifying illicit exchanges.

The anonymity involved in cryptocurrency allows great discretion utilized for the privacy of the general public as well as for the movement of money in the criminal sector. Because cryptocurrency technology works to simplify the process of money exchange, privacy becomes maximized for the users. Hypothetically, this level of anonymity in the realm of cryptocurrency could become a possible pull factor for the criminalization of cryptocurrency, allowing for the loss of accountability associated with illegal activities. Because of the levels of privacy cryptocurrencies bring to the table, the desirability for criminal individuals or organizations to utilize cryptocurrencies as a means of decreasing the footprints of their financial exchanges increases. The ability for people to have privatized financial information could be a challenge for the government in the aspect of monitoring the financial actions of their individuals.³³

The government of Georgia can utilize aspects of the United States policy on defense against cybersecurity. The US Department of Homeland Security discusses the idea of using local law enforcement to pursue and conduct criminal investigations on a broader scale and lessen the point of attack and its danger within the government.³⁴ The ease of the cryptocurrency systems combined with the anonymity of the process facilitates the process of certain criminal activities. The primary criminal uses of cryptocurrencies in crimes involve drug dealings, human trafficking, and the criminal

organization of money laundering.³⁵ The way that cryptocurrencies function produces a greater chance of these criminal activities to spread transnationally. The expansion of the cryptocurrencies and the blockchain technologies widens the size of the market vastly, reaching communities much further than the original physical boundaries. The current state of money laundering with cryptocurrency makes it far more discrete in that those laundering money can formulate their transactions by sending the money in multiple smaller transactions for their activities to become less noticeable.³⁶ The anonymity involved combined with the ability to split payments up makes it harder for law enforcement to track down the criminal activity that uses these technologies. Because of this, it would cost the government far more money, manpower, and technological abilities to track down all of these illicit activities.

The establishment of national security and money laundering departments could counteract the risks of the implementation of cryptocurrency in Georgia. Georgia can consider the European Union's Fifth Anti-Money Laundering Directive (AMLD5), which created a foundation for financial regulators to monitor cryptocurrency businesses and service providers, as a means of protecting against money laundering and other illegal activities.³⁷

The utility of discrete currencies and forms of payment could provide major benefits to the Georgian government. The Georgian government, with the use and anonymity of cryptocurrency, could potentially purchase different items at their leisure to facilitate international growth, information gathering, and any additional uses of currency. With this in mind, the anonymity is something that the Georgian government can seek to pursue with the intention of being able to propel their national economy into the forefront of the international stage as the nation develops and moves closer to a fully-developed state.

By gaining more control of cryptocurrencies, the government would be able to regulate and control the entire software. The government could potentially strip away certain aspects of anonymity to enhance their ability to track the financial movements of the citizens and reduce the ease that criminals would have to access the network for their illicit activities. The government is therefore tasked in making an executive decision to protect people and the government's privacy while also enabling the government to transparently see what activities are occurring that could be seen as illegal, such as the ones previously discussed.

Advancing the Economic Sector

The evolving nature of buying and selling products correlates to the increasing interest of consumers and financiers to seek out more beneficial and convenient modes of financial transactions.³⁸ In our technology-oriented system, cryptocurrency currently functions as a legitimate mode to complete digital financial transactions for developing countries.³⁹

Developing countries often find that their financial institutions, perceived as unreliable by investors and consumers, limit the nation to high transaction costs. The purpose of creating cryptocurrencies and blockchain technologies originated from the desire to enhance safe financial management and

circulation practices between individuals and corporations.⁴⁰ It does this by reducing the need for trust relating to the loss of confidence between transacting parties. The reduced necessity of trust between the parties involved in a transaction arises from the use of the blockchain network. Blockchain works as a decentralized database that decreases transaction costs while simultaneously increasing transparency. Blockchain technologies also maintain a record of all transactions to avoid any problems.⁴¹

Proponents of the system argue that through blockchain, a higher return on investment becomes more likely as opposed to other modes of trade. The idea that blockchain will provide trust for currencies while simultaneously transferring physical transactions to digital ones carried out through data mining. For developing countries, cryptocurrency can benefit them in the following three ways: remittances; supply chain transparency; and land registration.

Blockchain and Remittances

Across the world, primarily in fragile states, two billion people do not have access to financial services. This lack of access to services, combined with a lack of trust and high transaction fees, forced cryptocurrencies to grow as a popular choice of service for them. In 2017, over 400 million USD were sent to developing countries as remittances. Because developing nations lack stable financial institutions, remittances go through third-party services that apply high service fees.⁴² Service institutions, such as MoneyGram and Western Union, became popular for their remittance services. These companies usually charge up to 10% per transaction.⁴³ If the country of Georgia adopted cryptocurrencies, the blockchain technology would enable the transfer of funds worldwide at little-to-no cost. Since the technology relies on peer-to-peer network and cryptography for verification, remittance will no longer require the existing services.

Developing countries currently lack local or regional remittance networks that will properly allow the transfer of funds. Many local corporations and entities currently rely on fiat currencies for their day-to-day transactions and this will not change unless remittance networks are established. Furthermore, the lack of proven or scalable results with cryptocurrency has made it difficult for social entrepreneurs, researchers, and technologists alike to realize the full potential of cryptocurrency for a particular setting. Approximately two billion people currently utilize no formal banking organization and several companies have initiated projects to ease the transfer of funds and ensure proper allocation.

Over the past couple of years, several cryptocurrency startups emerged in South Asia intending to create a low-cost remittance service for workers overseas. Some of these startups have exclusively focused on the country of the Philippines, due to its unique situation of rapid growth and adoption of smart devices. Still, sustainable financial institutions continue to lack. Some companies, such as Toast, utilize the blockchain technology as a remittance service to allow overseas Filipino workers. Many of these individuals lack formal bank accounts to send money home to their families. Cryptocurrencies allow them to do so for a cost much lower than traditional services.⁴⁴ Other

companies, such as Coins.ph, also use the technology to create a mobile platform where users can pay bills. This helps overseas workers send money to their families. The company has been successful in attracting millions of users across the country and establishing a network of thousands of disbursements and collections.⁴⁵ While these companies have solely focused on Southeastern Asian markets, it is safe to assume that the Republic of Georgia may benefit in collaborating with comparable companies to open up similar opportunities.

Supply Chain Transparency

Supply chain transparency offers other benefits for developing countries regarding adopting cryptocurrencies. Currently, the financial sector pioneers the application of cryptocurrency technologies to enhance the robust shipping and transportation logistics.⁴⁶ With a lack of proper infrastructure in many developing countries, specifying the origin and destination of supplies becomes complicated. Likewise, finding the exact place where conflict or coercion took place in the supply chain also becomes rather difficult. This lack of certainty makes consumers reluctant to purchase products.⁴⁷ Cryptocurrency's blockchain technology can ease this by creating more transparency and traceability within the supply chain. This will allow companies and consumers to gain confidence in the materials purchased.

Cryptocurrency technology could work as a means to register the transfer of goods and services, being utilized as transactions. This would then identify the parties involved, as well as the price, the date, the location, the quality of the product, and any other information deemed necessary for managing the supply chain.⁴⁸ This would make it possible for corporations and consumers to trace back every product to its origins. *Provenance*, a company based in London, works on building trust across the supply chain, from the source to the consumer. The company currently pushes full transparency across the chain by utilizing cryptocurrency technologies to disclose where a product was made and with what raw materials. This ensures no exploitation during the production of goods.⁴⁹ As with all things, challenges exist with their mission goal. Bag tampering and false data entry still occur because cryptocurrency transactions continue to rely on local humans to input the data. Human nature leads to the question of deception, bribery or corruption.⁵⁰ Thus, as of now, the reliability of the data placed in the blockchain for this operation remains relatively questionable.

Land Registration

Land registration serves a vital interest in developing countries that adopt cryptocurrency. In many of these countries, land and housing are the most important assets for the poor, yet ownership often falls under disputes. It is common for key documents and archives to end up stolen, misplaced, destroyed, or tampered with. This, in turn, creates a dilemma for ownership rights and registration. Cryptocurrency transaction can potentially solve these problems by placing land and housing registration documents into the network so that the data remains permanent and accessible for all to see.⁵¹

In the past, Georgia conceived plans for land registry to fall under blockchain jurisdiction. In 2016, Georgia and the blockchain service company *Bitfury Group* announced a blockchain land-titling project that plans to coexist with the country's National Agency of Public Registry (NAPR). This private permission-based blockchain works through a distributed digital timestamping service. This service allows NAPR to verify and sign documents containing a citizen's essential information and proof of ownership of property. This service can potentially secure billions of dollars in assets and allow for quick auditing while simultaneously reducing costs and waiting periods for registry and transfer of property.⁵² Success with the new system will see the cryptocurrency technology expand into smart contracts to streamline business operations. This can include the sale of property, transfer of ownership, and more.

Furthermore, Georgia and Bitfury Group signed a new Memorandum of Understanding to expand the cryptocurrency technology into other government departments to facilitate bureaucratic processes in other areas.⁵³

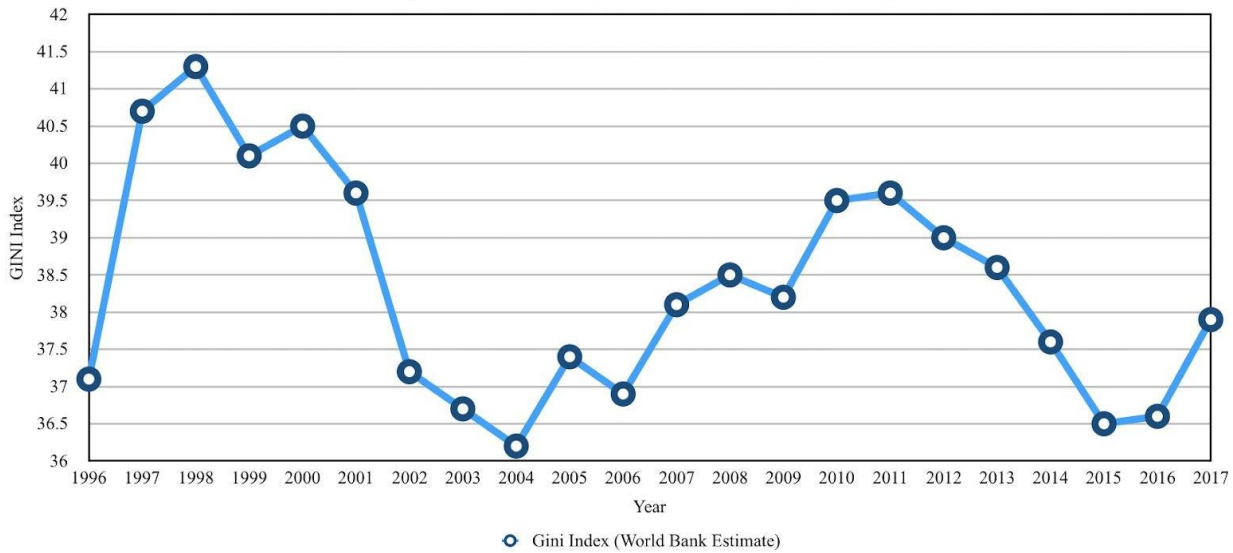
Improvement for Public Welfare

In Georgia, an estimated 16.8% of people live in poverty.⁵⁴ Economic disparities throughout the country enticed some into joining the mining of cryptocurrencies when the trend appeared.⁵⁵ When the huge wave of popularity of cryptocurrencies hit, especially with big brand names such as *Bitcoin*, many wanted to get their hands on a system to begin mining.⁵⁶ According to a source interviewed by the *New York Times*, the economic promise of cryptocurrencies led urban commoners to hop on the trend.⁵⁷ As typical with any investment, the market plummeted in cryptocurrency. Since then, irregular market patterns continue. Still, people seem to hold an interest in investing in cryptocurrencies.⁵⁸ Georgia's strong global standing as the second nation in terms of cryptocurrency, only behind China, exemplifies this.⁵⁹

Cryptocurrencies hold the potential of positively impacting societal differences in Georgia. The World Bank compiles information from different nations to create the Gini Index (or Gini Coefficient), a tool used to measure inequality around the world. With the use of the Gini index to measure inequality around the world, the World Bank can identify income inequality quantitatively.⁶⁰

The chart below shows the Gini Index for Georgia in the last three recorded years for the country (see Figure 1).⁶¹ Inequality in Georgia saw rises and falls from 1996 through 2017. Although the Gini Index started at 37.1 in 1996 and rose to a high of 41.3 in 1998, it reached a low of 36.2 in 2004 and eventually ended at 37.9 in 2017.⁶² Georgia's Gini Coefficient fluctuated over the last decade, a change that means that the inequality shows the differences in the economic lifestyles people endure. The Gini Index does not necessarily correlate to the development of the nation but rather to the differences between the social classes.⁶³ The variations in the Gini Index signifies unstable differences between the classes and their income.⁶⁴

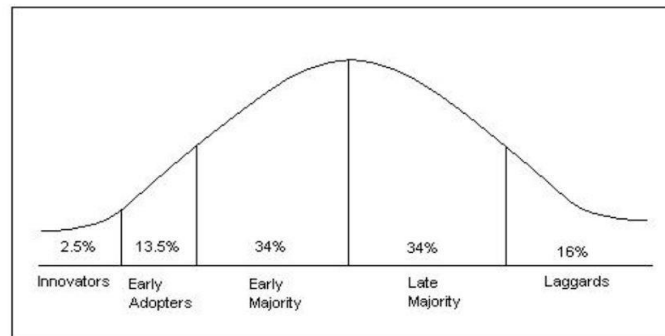
Figure 1. GINI index (World Bank Estimate) for Georgia



Source: World Bank. 2019. *GINI index (World Bank estimate) - Georgia*: World Bank.

The adoption, utilization, and development of cryptocurrency technologies could positively impact inequality reduction by generating equal financial opportunities for people and expanding the economic sector of Georgia. Blockchain and cryptocurrency will only continue to grow in Georgia.⁶⁵ The social Diffusion of Innovation Theory states that a small number of people will begin to use an innovation, followed by the general public who will join the innovation periodically, and after, by the “laggards”, or people who join the trend/innovation last (See figure 2).⁶⁶ Applying this social theory, one can begin to speculate the curve through which cryptocurrency will develop in Georgia.⁶⁷ According to this social theory, cryptocurrency will presumably continue to expand while more people throughout the country will continue to use it.⁶⁸

Figure 2. Diffusion of Innovation Distribution Chart

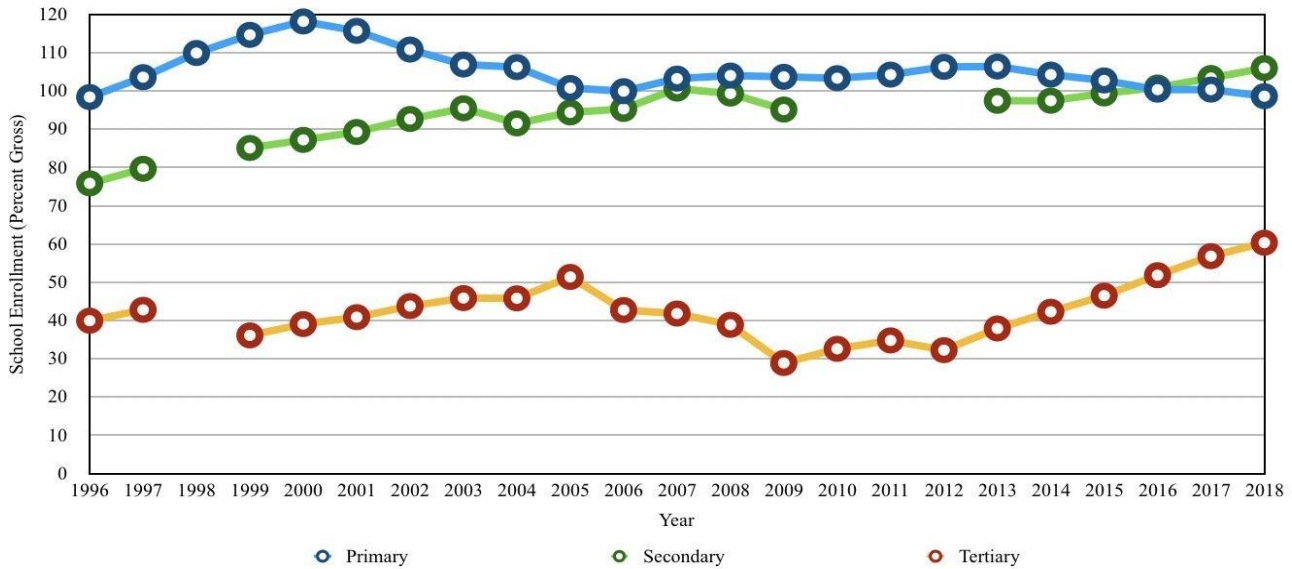


Source: Behavioral Change Models. 2019. *Diffusion of Innovation Theory*: Boston University School of Public Health.

The expanding use of cryptocurrencies throughout the country could lead to job growth, and therefore expansion of enticements to seek further education to fill these roles. Cryptocurrency mining utilizes a substantial amount of energy.⁶⁹ The education sector in Georgia needs improvement to effectively raise the enrollment of students in primary, secondary, and tertiary education (see Figure 3).⁷⁰ The development of a system that requires so much energy output means that Georgia will need to employ

trained individuals who can create, develop, and maintain these technologies. The demand for these positions can incentivize Georgians to attend technical programs or study for technologically-focused careers in college. With an increase in people receiving higher education, this can in turn help to reduce both inequality and poverty rates throughout the country in the upcoming years. Technology arguably acts as a strong incentive for people to go to, and succeed in, higher education.⁷¹

Figure 3. School Enrollment: Primary, Secondary, and Tertiary Percent Gross



Source: World Bank. 2019. *School enrollment, primary (% gross) - Georgia; School enrollment, secondary (% gross) - Georgia; School enrollment, tertiary (% gross) - Georgia*: World Bank.

The gap in public opinion polls regarding cryptocurrency technologies in Georgia needs action. The missing public opinion polls could hold value in assessing what the public thinks of cryptocurrencies today. Because the technology continues to grow in Georgia, the government of Georgia should seek to hold information on the public considerations of cryptocurrencies.⁷² The way that these polls function would most likely provide accurate data through the use of random sampling selection.

Recommendations

Listed below, this paper provides specific recommendations for the Georgian government based on the evidence provided throughout the research:

- The government of Georgia should consider setting up two distinct cryptocurrency servers, a private and a public one.
 - The private one would allow the government to maintain anonymity.
 - The government could utilize the private cryptocurrency market in security operations.
 - The private cryptocurrency server could serve as a means of monetary exchange for confidential development transactions.
 - The public server could allow citizens to use these technologies and expand their market.
 - The Georgian government can regulate and control this server, maintaining transparency with delegated monitoring services.
- Before Georgia can begin taking steps to incorporate cryptocurrency into its economy, the nation must agree on a definition for cryptocurrency and how it will apply to Georgia.
 - The government of Georgia should view cryptocurrency as a “means of exchange.”
 - With the definition set as “means of exchange”, value-added tax (VAT) rates of 18% can logically be applied.
 - To ensure no valid contestment on taxation, the government must include all forms of cryptocurrency into the Georgian taxation guidelines or form a new tax and regulatory legislation that is targeted towards virtual currencies.
 - For all operations and regulations on cryptocurrency to run smoothly, Georgia should create a governmental task force in charge of managing taxation, regulation, and all other assets of cryptocurrencies.
 - This would not only allow the government to enhance regulations of cryptocurrencies but also give consumers a central place to voice any concerns.
- The government should look to Malta’s DIF as a guideline or framework in which to build their regulatory system while also taking notes from Venezuela’s SUNACRIP as a group that manages cryptocurrency within a state.
- Evidence suggests that the government of Georgia would benefit greatly from conducting public opinion polls on its citizens regarding cryptocurrency and blockchain.
 - According to research, there was no recorded public poll information on the country of Georgia; this presents a gap in the available information.

- The government could use the current public opinions on cryptocurrency to strategically adopt the technologies in the country.
- The government of Georgia should construct and advertise the cryptocurrencies in the nation as incentives for people to receive a higher education and obtain jobs.
 - Technical facilities and higher education institutions should adopt programs to provide training in the field of cryptocurrencies.
- Assuming Georgia currently cannot develop regional remittance networks that will facilitate the transfer of funds through the platform, the government should call on the aid of businesses that specialize in adopting these technologies to implement in the country's most critical areas.
- Georgia should contract cryptocurrency and blockchain companies to develop secured supply-chain networks that will harbor consumer confidence and investment and employ the local population to maintain them. Enforcement and accountability of the local labor should be maintained to ensure no form of extortion or bribery takes place that can compromise the supply-chain networks.
- Georgia should expand cryptocurrency transactions from land registry to smart contracts that will facilitate the sale of a property, transfer of ownership, and more to secure billions of dollars in assets.

Conclusions

Following the research and analysis on the risks cryptocurrencies pose to security, the adoption of cryptocurrency in Georgia could lead to the advancement of the nation by facilitating further development in its socioeconomic sector and improving public welfare, given that the country implements the necessary policy changes to both its governmental mechanisms and energy institutions.

Currently, the energy sector produces more energy than what the nation uses, creating the ideal energy infrastructure for cryptocurrencies to grow without negatively affecting the population. For the government to effectively manage these rising technologies, the implementation of specific regulations will help to reduce associated risks and maximize efficiency. The government of Georgia needs to consider the security risks of utilizing cryptocurrency technologies, yet this should not deter them from reaping its benefits. The adoption of two separate servers will reduce the risks of organized crime related to cryptocurrencies. This is done through the process of providing a public domain for all civilians and private domain for official governmental use. Regarding public welfare, the implementation of cryptocurrency technology holds the potential to generate public reform in education and inequality, considering the implementation of the recommended legislative precautions. The socioeconomic sector of the country will experience a boom in its growth through the use of cryptocurrency if the recommendations are adopted to curtail the risks associated with its implementation.

The recommendations this paper concludes with allows for the Georgian government to institutionalize cryptocurrencies and absorb them as an official currency of the government. In doing so, the regulation of these technologies falls on the government, making them responsible for the safety of the people of Georgia in regards to cryptocurrencies, as well as allowing the government to implement taxes on the use of these technologies. Lack of action in Georgia could mean the government loses the advantages of cryptocurrencies. Regardless of whether or not the government adopts cryptocurrencies, this technology will continue to grow from here on out. The adoption of cryptocurrency technologies would grant Georgia legislative powers over the use of these technologies, as well as the opportunity to steer cryptocurrencies in a manner that would benefit development. Although this paper mentioned blockchain technologies, further research topics could include further useful applications of blockchain technologies for Georgia.

Endnotes

1. Chu, Dennis. "BROKER-DEALERS FOR VIRTUAL CURRENCY: REGULATING CRYPTOCURRENCY WALLETS AND EXCHANGES." *Columbia Law Review* 118, no. 8 (2018): 2323-360. www.jstor.org/stable/26542511.
2. SciShow. "Bitcoin: How Cryptocurrencies Work". Youtube. Published on December 21, 2016. www.youtube.com/watch?v=kubGCSj5y3k&t=382s.
3. Marr, Bernard. "A Short History of Bitcoin And Crypto Currency Everyone Should Read." Forbes. Forbes Magazine, December 6, 2017. www.forbes.com/sites/bernardmarr/2017/12/06/a-short-history-of-bitcoin-and-crypto-currency-everyone-should-read/#245091fe3f27.
4. Marr, Bernard. "A Short History of Bitcoin and Crypto Currency Everyone Should Read." Forbes. Forbes Magazine, December 6, 2017. www.forbes.com/sites/bernardmarr/2017/12/06/a-short-history-of-bitcoin-and-crypto-currency-everyone-should-read/#245091fe3f27.
5. Marr, Bernard. "A Short History of Bitcoin and Crypto Currency Everyone Should Read." Forbes. Forbes Magazine, December 6, 2017. www.forbes.com/sites/bernardmarr/2017/12/06/a-short-history-of-bitcoin-and-crypto-currency-everyone-should-read/#245091fe3f27.
6. Marr, Bernard. "A Short History of Bitcoin and Crypto Currency Everyone Should Read." Forbes. Forbes Magazine, December 6, 2017. www.forbes.com/sites/bernardmarr/2017/12/06/a-short-history-of-bitcoin-and-crypto-currency-everyone-should-read/#245091fe3f27.
7. Marr, Bernard. "A Short History of Bitcoin and Crypto Currency Everyone Should Read." Forbes. Forbes Magazine, December 6, 2017. www.forbes.com/sites/bernardmarr/2017/12/06/a-short-history-of-bitcoin-and-crypto-currency-everyone-should-read/#245091fe3f27.
8. Lekashvili, Eka, and Lela Mamaladze. "Monetary Policy's Crypto Currency Challenge: the Case of Georgia." *Borders without Borders: Systemic Frameworks and Their Applications for Sustainable Well-Being in the Global Era* 6 (2019): Ab.48. www.bslab-symposium.net/Pavia-2019/BSLAB-%20Book%20of%20Abstract-Pavia-2019.pdf.
9. "National Bank Warning." National Bank of Georgia, December 20, 2017. www.nbg.gov.ge/index.php?m=340&newsid=3247.
10. Lekashvili, Eka, and Lela Mamaladze. "Crypto Currency – A New Challenge For The Economy Of Georgia." *Copernican Journal of Finance & Accounting* 7, no. 4 (2018): 87–97. www.doi.org/10.12775/cjfa.2018.022.
11. Lekashvili, Eka, and Lela Mamaladze. "Monetary Policy's Crypto Currency Challenge: the Case of Georgia." *Borders without Borders: Systemic Frameworks and Their Applications for Sustainable Well-Being in the Global Era* 6 (2019): Ab.48.
12. Lekashvili, Eka, and Lela Mamaladze. "Crypto Currency – A New Challenge For The Economy Of Georgia." *Copernican Journal of Finance & Accounting* 7, no. 4 (2018): 87–97.
13. "National Bank Warning." National Bank of Georgia, December 20, 2017.
14. SILICON Luxembourg. "Cryptocurrencies in Luxembourg – Current Regulatory Approach." SILICON, 2018. www.siliconluxembourg.lu/cryptocurrencies-in-luxembourg-current-regulatory-approach.

15. Huillet, Marie. “Bahrain's Central Bank Launches Sandbox for Blockchain Companies: Report.” Cointelegraph. Cointelegraph, February 21, 2019. www.cointelegraph.com/news/bahrains-central-bank-launches-sandbox-for-blockchain-companies-report.
16. Falzon, Malcolm, and Alexia Valenzia. Global Legal Insights - Blockchain & Cryptocurrency Regulation 2019. Edited by Josias Dewey. First ed. Global Legal Group Ltd., 2018. www.acc.com/sites/default/files/resources/vl/membersonly/Article/1489775_1.pdf.
17. Falzon, Malcolm, and Alexia Valenzia. Global Legal Insights - Blockchain & Cryptocurrency Regulation 2019. Edited by Josias Dewey. First ed. Global Legal Group Ltd., 2018. www.acc.com/sites/default/files/resources/vl/membersonly/Article/1489775_1.pdf.
18. “Georgia: Corporate – Other Taxes.” PwC. PwC Network, 2019. www.taxsummaries.pwc.com/ID/Georgia-Corporate-Other-taxes.
19. SILICON Luxembourg. “Cryptocurrencies in Luxembourg – Current Regulatory Approach.” SILICON, 2018.
20. SILICON Luxembourg. “Cryptocurrencies in Luxembourg – Current Regulatory Approach.” SILICON, 2018.
21. Falzon, Malcolm, and Alexia Valenzia. Global Legal Insights - Blockchain & Cryptocurrency Regulation 2019. Edited by Josias Dewey. First ed. Global Legal Group Ltd., 2018.
22. Paradigm. “Crypto Regulation News: Wyoming Passes Friendly Regulations for Crypto Assets, Luxembourg to Give Blockchain Securities Legal Status, Thailand Green Lights STO, Iran to Launch Gold-Backed Cryptocurrency PayMon on Stellar Tech.” Medium, February 25, 2019. www.medium.com/paradigm-fund/crypto-regulation-news-wyoming-passes-friendly-regulations-for-crypto-assets-luxembourg-to-give-d8b4ce7ef0.
23. Buttigieg, Christopher P., and Christos Efthymiopoulos. “The Regulation of Crypto Assets in Malta: The Virtual Financial Assets Act and Beyond.” Law and Financial Markets Review 13, no. 1 (2019): 30–40. www.doi.org/10.1080/17521440.2018.1524687.
24. Rauchs, Michel, Apolline Blandin, Kristina Klein, Gina Pieters, Martino Recanatini, and Bryan Zhang. “PDF.” Cambridge, December 2018. www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/download_s/2018-12-ccaf-2nd-global-cryptoasset-benchmarking.pdf (81).
25. Rauchs, Michel, Apolline Blandin, Kristina Klein, Gina Pieters, Martino Recanatini, and Bryan Zhang. “PDF.” Cambridge, December 2018. www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/download_s/2018-12-ccaf-2nd-global-cryptoasset-benchmarking.pdf (77).
26. Rauchs, Michel, Apolline Blandin, Kristina Klein, Gina Pieters, Martino Recanatini, and Bryan Zhang. “PDF.” Cambridge, December 2018. www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/download_s/2018-12-ccaf-2nd-global-cryptoasset-benchmarking.pdf (78).
27. Rauchs, Michel, Apolline Blandin, Kristina Klein, Gina Pieters, Martino Recanatini, and Bryan Zhang. “PDF.” Cambridge, December 2018. www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/download_s/2018-12-ccaf-2nd-global-cryptoasset-benchmarking.pdf.
28. “Georgia.” Georgia | International Hydropower Association. International Hydropower Association, May 2016. www.hydropower.org/country-profiles/georgia.
29. “Annual Report 2018.” *Georgian National Energy and Water Supply Regulatory Commission Report on Activities of 2018 Tbilisi 2019*, 2019. www.doi.org/10.30875/8f945017-en.
30. Rauchs, Michel, Apolline Blandin, Kristina Klein, Gina Pieters, Martino Recanatini, and Bryan Zhang. “PDF.” Cambridge, December 2018. www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/download_s/2018-12-ccaf-2nd-global-cryptoasset-benchmarking.pdf.

[finance/download s/2018-12-ccaf-2nd-global-cryptoasset-benchmarking.pdf](#)

31. Rauchs, Michel, Apolline Blandin, Kristina Klein, Gina Pieters, Martino Recanatini, and Bryan Zhang. "PDF." Cambridge, December 2018. [www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/download s/2018-12-ccaf-2nd-global-cryptoasset-benchmarking.pdf](#).
32. Hussain, Mustafa Zakir. "*Financing renewable energy options for developing financing instruments using public funds (English)*." Washington DC : World Bank, 2013. [www.documents.worldbank.org/curated/en/196071468331818432/Financing-renewable-energy-options-for-developing-financing-instruments-using-public-funds](#).
33. Durrant, Sarah. "City University of New York (CUNY) CUNY Academic Works." City University of New York (CUNY) CUNY Academic Works. City University of New York, 6, 2018. [www.academicworks.cuny.edu/cgi/viewcontent.cgi?article=1070&context=jj_etds](#)
34. U.S. Department of Homeland Security. "Combating Cyber Crime." Department of Homeland Security, November 20, 2018. [www.dhs.gov/cisa/combating-cyber-crime](#).
35. Rauchs, Michel, Apolline Blandin, Kristina Klein, Gina Pieters, Martino Recanatini, and Bryan Zhang. "PDF." Cambridge, December 2018. [www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/download s/2018-12-ccaf-2nd-global-cryptoasset-benchmarking.pdf](#)
36. Durrant, Sarah. "City University of New York (CUNY) CUNY Academic Works." City University of New York (CUNY) CUNY Academic Works. City University of New York, 2018. [www.academicworks.cuny.edu/cgi/viewcontent.cgi?article=1070&context=jj_etds](#)
37. Paradigm. "Crypto Regulation News: Wyoming Passes Friendly Regulations for Crypto Assets, Luxembourg to Give Blockchain Securities Legal Status, Thailand Green Lights STO, Iran to Launch Gold-Backed Cryptocurrency PayMon on Stellar Tech." Medium, February 25, 2019.
38. Ashoor, Ahmed and Kamaljeet Sandhu. "Framework and Model for Cryptocurrency Innovation and its Impact on Economic Transformation," International Journal of Innovation in the Digital Economy (IJIDE) 10 (2019): 4, accessed (November 04, 2019), doi:10.4018/IJIDE.2019100103.
39. Alabbasi, Yousef and Kamaljeet Sandhu. "The Framework for Blockchain Innovation and the Impact on Digital Economic Transformation," International Journal of Innovation in the Digital Economy (IJIDE) 10 (2019): 4, accessed (September 30, 2019), doi:10.4018/IJIDE.2019100104.
40. Ashoor, Ahmed and Kamaljeet Sandhu. "Framework and Model for Cryptocurrency Innovation and its Impact on Economic Transformation," International Journal of Innovation in the Digital Economy (IJIDE) 10 (2019): 4, accessed (November 04, 2019), doi:10.4018/IJIDE.2019100103.
41. Thomason, Jane, Sonja Bernhardt, Tia Kansara and Nichola Cooper. "Blockchain Introduced." In Blockchain Technology for Global Social Change, 25-59 (2019), accessed September 22, 2019. doi:10.4018/978-1-5225-9578-6.ch002
42. Van Den Berg, Willem. Report. "Blockchain for fragile states: the good, the bad, and the ugly." Clingendael Institute, 2018. [www.jstor.org.ezproxy.fiu.edu/stable/resrep17341](#).
43. Van Den Berg, Willem. Report. Clingendael Institute, 2018. [www.jstor.org/stable/resrep17341](#).
44. Haynes, Casey (15 September 2017). "Meet The Cryptocurrency Startups Targeting the \$26 Billion Remittance Industry in the Philippines". [www.forbes.com/sites/chynes/2017/09/15/meet-the-cryptocurrency-startups-targeting-the-26-billion-remittance-industry-in-the-philippines/#4f3335fc5510](#)
45. Haynes, Casey (15 September 2017). "Meet The Cryptocurrency Startups Targeting the \$26 Billion Remittance Industry in the Philippines". [www.forbes.com/sites/chynes/2017/09/15/meet-the-cryptocurrency-startups-targeting](#)

46. Alabbasi, Yousef and Kamaljeet Sandhu. "The Framework for Blockchain Innovation and the Impact on Digital Economic Transformation," *International Journal of Innovation in the Digital Economy (IJIDE)* 10 (2019): 4, accessed (September 30, 2019), doi:10.4018/IJIDE.2019100104
47. Van Den Berg, Willem. Report. Clingendael Institute, 2018. www.jstor.org/stable/resrep17341.
48. Dickson, Ben. (24 November, 2016). "Blockchain has the potential to revolutionize the supply train". Techcrunch. www.techcrunch.com/2016/11/24/blockchain-has-the-potential-to-revolutionize-the-supply-chain/
49. Dickson, Ben. (24 November, 2016). "Blockchain has the potential to revolutionize the supply train". www.techcrunch.com/2016/11/24/blockchain-has-the-potential-to-revolutionize-the-supply-chain/
50. Van Den Berg, Willem. Report. Clingendael Institute, 2018. www.jstor.org/stable/resrep17341.
51. Van Den Berg, Willem. Report. Clingendael Institute, 2018. www.jstor.org/stable/resrep17341.
52. Pipan, Rachel (7 February 2016). "The Bitfury Group and Government of Republic of Georgia Expand Historic Blockchain Land-Tilting Project". www.bitfury.com/content/downloads/the_bitfury_group_republic_of_georgia_expand_blockchain_pilot_2_7_16.pdf
53. Pipan, Rachel (7 February 2016). "The Bitfury Group and Government of Republic of Georgia Expand Historic Blockchain Land-Tilting Project". www.bitfury.com/content/downloads/the_bitfury_group_republic_of_georgia_expand_blockchain_pilot_2_7_16.pdf
54. United Nations Development Programme. "Human Development Reports." | Human Development Reports. Accessed November 21, 2019. www.hdr.undp.org/en/countries/profiles/GEO.
55. Alderman, Liz. "Despite Bitcoin's Dive, a Former Soviet Republic Is Still Betting Big on It." *The New York Times*. The New York Times, January 22, 2019. www.nytimes.com/2019/01/22/business/georgia-bitcoin-blockchain-bitfury.html.
56. Alderman, Liz. "Despite Bitcoin's Dive, a Former Soviet Republic Is Still Betting Big on It." *The New York Times*. The New York Times, January 22, 2019. www.nytimes.com/2019/01/22/business/georgia-bitcoin-blockchain-bitfury.html.
57. Alderman, Liz. "Despite Bitcoin's Dive, a Former Soviet Republic Is Still Betting Big on It." *The New York Times*. The New York Times, January 22, 2019. www.nytimes.com/2019/01/22/business/georgia-bitcoin-blockchain-bitfury.html.
58. Bambrough, Billy. "Bitcoin Market Falls Sharply As Litecoin Suddenly Crashes." *Forbes*. *Forbes Magazine*, September 24, 2019. www.forbes.com/sites/billybambrough/2019/09/23/bitcoin-market-falls-sharply-as-litecoin-suddenly-crashes/#197e446e2afb.
59. North, Andrew. "How The Tiny Nation Of Georgia Became A Bitcoin Behemoth." *NPR*. *NPR*, April 23, 2018. www.npr.org/sections/parallels/2018/04/23/597780405/how-the-tiny-nation-of-georgia-became-a-bitcoin-behemoth.
60. BBC News. "Who, What, Why: What Is the Gini Coefficient?" *BBC News*. *BBC*, March 12, 2015. www.bbc.com/news/blogs-magazine-monitor-31847943.
61. BBC News. "Who, What, Why: What Is the Gini Coefficient?" *BBC News*. *BBC*, March 12, 2015. www.bbc.com/news/blogs-magazine-monitor-31847943.

- 62 The World Bank. "GINI Index (World Bank Estimate) - Georgia." Data. Accessed October 26, 2019. www.data.worldbank.org/indicator/SI.POV.GINI?end=2017&locations=GE&start=1996&view=chart.
- 63 The World Bank. "GINI Index (World Bank Estimate) - Georgia." Data. Accessed October 26, 2019. www.data.worldbank.org/indicator/SI.POV.GINI?end=2017&locations=GE&start=1996&view=chart.
- 64 "Who, What, Why: What Is the Gini Coefficient?" BBC News, March 12, 2015. www.bbc.com/news/blogs-magazine-monitor-31847943.
- 65 Alderman, Liz. "Despite Bitcoin's Dive, a Former Soviet Republic Is Still Betting Big on It." The New York Times. The New York Times, January 22, 2019. www.nytimes.com/2019/01/22/business/georgia-bitcoin-blockchain-bitfury.html.
- 66 LaMorte, Wayne W. "Behavioral Change Models." Diffusion of Innovation Theory. Accessed November 19, 2019. www.sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories4.html.
- 67 LaMorte, Wayne W. "Behavioral Change Models." Diffusion of Innovation Theory. Accessed November 19, 2019. www.sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories4.html.
- 68 LaMorte, Wayne W. "Behavioral Change Models." Diffusion of Innovation Theory. Accessed November 19, 2019. www.sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories4.html.
- 69 G.F. "Why Bitcoin Uses so Much Energy." The Economist. The Economist Newspaper, July 9, 2018. www.economist.com/the-economist-explains/2018/07/09/why-bitcoin-uses-so-much-energy.
- 70 The World Bank. "School Enrollment, Primary (% Gross) - Georgia." Data. Accessed December 13, 2019. www.data.worldbank.org/indicator/SE.PRM.ENRR?end=2018&locations=GE&start=1996; The World Bank. "School Enrollment, Secondary (% Gross) - Georgia." Data. Accessed December 13, 2019. www.data.worldbank.org/indicator/SE.SEC.ENRR?end=2018&locations=GE&start=1996; The World Bank. "School Enrollment, Tertiary (% Gross) - Georgia." Data. Accessed December 13, 2019. www.data.worldbank.org/indicator/SE.TER.ENRR?end=2018&locations=GE&start=1996.
- 71 Martinez Aleman, Ana M, Heather Rowan-Kenyon, and Mandy Savitz-Romer. "Opinion: Technology Crucial in Supporting First-Gen Students." THE FEED, October 18, 2018. www.feed.georgetown.edu/access-affordability/opinion-technology-crucial-in-supporting-first-gen-students/.
- 72 Dionne, E.J., and Thomas E. Mann. "Polling & Public Opinion: The Good, the Bad, and the Ugly." Brookings. Brookings, July 28, 2016. www.brookings.edu/articles/polling-public-opinion-the-good-the-bad-and-the-ugly/.