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CHRYSALIS
DIGITAL ASSET EXCHANGE

# Blockchain Technology, The Silver Bullet to End Corruption?

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## Introduction

Concerning anti-corruption, former Secretary-General of the Organization for Economic Cooperation and Development (OECD) Angel Gurría said “Integrity, transparency and the fight against corruption have to be part of the (member country) culture. They have to be thought of as fundamental values.”[1] Up until 2009, we had to rely upon humans to instill Gurría’s fundamental values. Now, a revolutionary technology call blockchain along with the applications it supports substitutes human oversight with computer code making fundamental values incorruptible by human interference.

## Background

In 2013, revelations concerning public sector corruption were publicized by the International Consortium of Investigative Journalists (ICIJ) when they launched the Offshore Leaks Database (OLD). OLD, combined with information revealed in subsequent leaks, divulged the hidden wealth of drug dealers, human traffickers, corrupt oligarchs, and world leaders. These leaks revealed the extent which corrupt officials and others will go to shield ill-gotten gains from the scrutiny of reporters, regulators, and law enforcement. The ICIJ consists of hundreds of reporters globally who conduct cross-border investigations; the OLD consists of contributors from 40 news organizations, representing 46 countries. In 2016, the ICIJ went public again, highlighting leaked documents under the title The Panama Papers, leaked from the Panamanian firm Mossack Fonseca. This was followed in 2017 by the Paradise Papers, comprised of documents leaked from Bermuda-based law firm Appleby and Singapore-based firm Asiaciti Trust. Finally, in 2021 the Pandora Papers provided details on 14 offshore service firms consulting with entities on how to shield assets from taxation in jurisdictions around the world. These revelations, along with information obtained via computer hacks by activist group Anonymous against the Russian Government in their response to the Russian invasion of Ukraine, shine a light on how those in possession of political and/or financial power stash ill-gotten gains (bribes, trading in influence, patronage, embezzlement, kickbacks, and other actions) away from reporting or surveillance.

US foreign aid programs began in 1948 with the Marshall Plan, which rebuilt Europe post World War II. The US formalized international assistance with the Foreign Assistance Act of 1961, which is still in effect to this day; funds are managed pre-distribution by the US Department of State and the United States Agency for International Development. According to the World Economic Forum corruption costs developing economies $1.26 trillion every year (Fleming, 2019), and according to the Transparency International, 140,000 child deaths annually can be linked to corruption (Mijatovic, 2021).

Transparency International’s Corruption Perception Index (CPI) measures corruption level in the public sector in 180 countries, designating 100 for very clean and 0 for highly corrupt. Of these countries, El Salvador is ranked 115 with a CPI of 34; Central African Republic (CAR) is 154 with a CPI of 24; Panama is 105 with a CPI of 36 (International, 2021). Why are these countries highlighted in this piece? El Salvador has made Bitcoin legal tender. The CAR recently passed a bill stating its intention to adopt cryptocurrencies and move away from their native fiat currency the CFA. Panama’s National Assembly recently passed legislation regulating the use of bitcoin and eight other cryptocurrencies when paying taxes and for private transactions.

**Transparency International**
**Corruption Perceptions Index 2021**

| Top Ten Corruption Free Countries | | | | Bottom Ten Corruption Free Countries | | | |
|---|---|---|---|---|---|---|---|
| 88 | Denmark | 1 | 19 | Turkmenistan | 169 | | |
| 88 | Finland | 1 | 17 | Equartorial Guinea | 172 | | |
| 88 | New Zealand | 1 | 17 | Libya | 172 | | |
| 85 | Norway | 4 | 16 | Afghanistan | 174 | | |
| 85 | Singapore | 4 | 16 | Korea, North | 174 | | |
| 85 | Sweden | 4 | 16 | Yeman | 174 | | |
| 84 | Switzerland | 7 | 14 | Venezuela | 177 | | |
| 82 | Netherlands | 8 | 13 | Somalia | 178 | | |
| 81 | Luxembourg | 9 | 13 | Syria | 178 | | |
| 80 | Germany | 10 | 11 | South Sudan | 180 | | |

(International, 2021)
Breakdown of developed economies versus emerging economies and their susceptibility to corruption



1 https://developingsuperleaders.wordpress.com/2018/08/28/integrity-transparency-and-the-fight-against-corruption-have-to-be-part-of-the-culture-they-have-to-be-thought-as-fundamental-values-angel-gurria/comment-page-1/

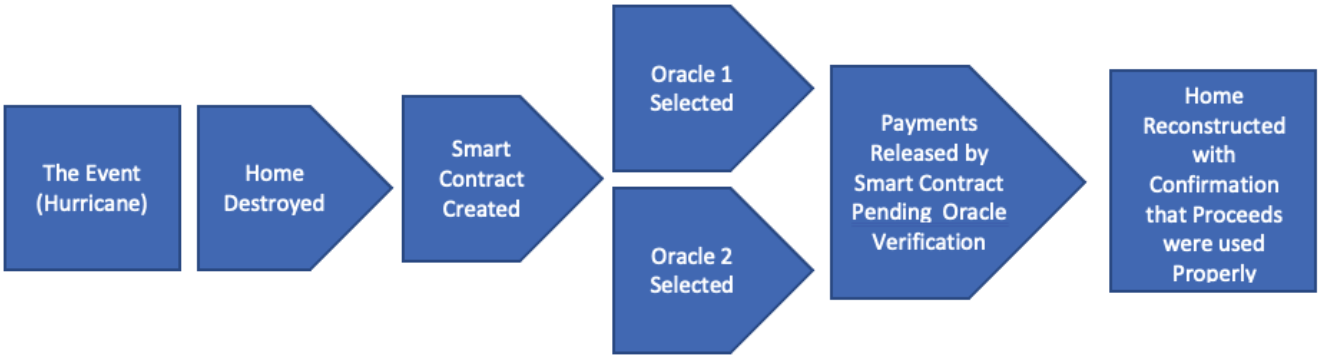
## The Solution

A solution to corruption is blockchain technology and, digital assets such as bitcoin. This idea runs counter to how the general media portrays digital assets. Harvard Law School professor Matthew Stephenson, compared digital assets to an "electronic suitcase" full of cash, and in terms of anticorruption, a "huge, huge problem".[2] Another critic is Massachusetts US Senator Elizabeth Warren who in a 2021 senate hearing called digital assets a "fourth-rate alternative to real currency" and a "haven for illegal activity".[3] These claims, and similar ones made by politicians, academics, legislators, and bureaucrats are based on a misunderstanding of how the technologies in question work.

The underlying technology allowing bitcoin to function is blockchain. Transactions recorded by blockchain are more transparent than fiat: Bitcoin transactions are recorded on a public ledger examined in real time by thousands of unaffiliated "nodes" 24/7/365. Instead of actual names, each transaction is associated with a pseudoanonymous "code." All transactions are tracked from when assets are mined through the life of the asset, extending theoretically immutably into eternity. Entities transacting in bitcoin can reveal their association with related transactions by publicly broadcasting their association with the "code" representing their transactions on the blockchain.

## Case Study: Financial Aid

It is precisely this transparency that makes digital assets like bitcoin perfect candidates for financial donations to areas in need of economic assistance. Created in 2008 by an anonymous entity/person called Satoshi Nakamoto, the bitcoin blockchain that allows bitcoin to function does not require a centralized administrative entity, but rather distributed control. The universal/borderless nature of bitcoin eliminates foreign exchange intermediaries. Tens of thousands of entities can view and confirm all blockchain transactions taking place on the same ledger viewable by all. Mathematics renders moot the need for trust between those participating in the blockchain's consensus verification. Another blockchain and digital asset, Ethereum, was created after the release of bitcoin and is more dynamic with greater functionality. Smart contracts native to Ethereum are based upon computer code residing on the Ethereum blockchain and can take the place of a human-directing entity deciding on where funds are to go. Once the sender and receiver of the proceeds decide on the details surrounding the distribution of financial aid, the program embedded within the smart contract functions as the distribution facility; no human intermediary is involved once the contract is activated. The money to be donated is stored within an escrow account and released according to the terms of the smart contract.




For example, if aid is being directed to a community impacted after hurricanes, impacted land parcel owners would apply for aid to rebuild. An "oracle" agreed to by both parties would be selected. An oracle acts as an agreed-to source of information relevant to the task at hand. For instance, a construction permit (archived electronically by the town hall of records jurisdictionally responsible for where rebuilding occurs) confirms that the victim is moving forward with rebuilding destroyed property utilizing the distributed funds they'll receive. The smart contract at the time of activation is programmed to automatically confirm with the hall of record's electronic files that indeed a permit has been filed, and this would trigger the release of the first wave of funds. Future fund releases would be dictated by construction milestones as observed by satellite real-time imagery provided by the oracle Earth Observing System (EOS).

2 https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwivwrjQ4bT4AhWChIkEHRRLB7EQFnoECAwQAQ&url=https%3A%2F%2Fwww.pressreader.com%2Fbotswana%2Fmmegi%2F20220422%2F281767042778074&usg=AOvVaw137uiNENkhu_pkk-X_CiHI

3 https://dailyhodl.com/2021/06/10/us-senator-elizabeth-warren-says-cryptocurrencies-are-a-fourth-rate-alternative-to-real-currency-heres-why/

Plumbing and electrical permits would be sourced also from the town hall of records to confirm the progress of the home's infrastructure. Humans would not be involved in this process, avoiding excessive "intermediary" fees, bribe payments and kickbacks.

A recent Triple A Survey found that three of the top five countries containing populations holding bitcoin are developing economies - India (100 million), Nigeria (13 million), and Vietnam (5.9 million) (A, 2021). The Corruption Perceptions Index reported that, between May 2020 and May 2021, Denmark, New Zealand, Finland, Singapore, and Norway are listed as the least corrupt nations. The most corrupt are Syria, Somalia, and South Sudan. This demonstrates a clear delineation between developed economies and emerging/struggling economies. The countries mentioned at the beginning of this paper (El Salvador, CAR, and Panama), also considered to be emerging economies, are utilizing digital assets creatively and like no other countries in the world. This illustrates not only how these historically corrupt emerging economies can avoid corruption moving forward, but also, how they see this technology as bringing their economies up-to-standards to compete in the global economy.

Blockchain and specifically cryptocurrency adoption is taking place at a rapid rate in developing economies. This mimics cell phone adoption trends: according to Vital Wave Consulting, since 2002, mobile phone penetration in emerging markets has grown 321% compared to 46% in developed countries (Anon., 2008). The reason for this is lack of a physical telecommunication infrastructure in developing markets and the virtual nature of cell phone infrastructure, allowing these countries to exploit the "infrastructure light" nature of cellular communication. Now digital economy participation requires just a smart phone and a Wi-Fi connection. This adoption is being accelerated because companies like SpaceX's Starlink and Amazon's Project Kuiper provide Wi-Fi to the most isolated regions of the world, and Jamaican-based Digicel facilitates distribution of free and low-cost smart phones to emerging markets. This represents a leap in technological advancement not previously possible, but now, thanks to advanced satellite communication, the reduction in materials and space required for personal computing, and blockchain technology, economic advantages can now (potentially) be shared by all.

Developing economies already creatively utilizing tools necessary for Decentralized Finance (DeFi) ecosystem participation show their willingness to join this powerful program not only to cut into illicit proceeds skimmed off vital economic aid, but to take advantage of the global economy and all it has to offer. Satoshi Nakamoto's white paper has created a third form of accounting, Triple Entry Bookkeeping. Since the advent of double-entry accounting in 1494, no other accounting innovation has had such a positive impact on society. As discussed, the blockchain records not only debits and credits via a consensus mechanism available to all, but also solidifies all of those transactions forever on an immutable ledger. Critics of this plan will point to the volatile nature of digital assets, but as I write, the idea of "stable coins" immune to market volatility are being perfected through trial and error. These tools available to all, regardless of location or economic status, will continue to evolve in the areas of supply chain management, digitized self-sovereign identity, and land title record keeping, among others, making the Satoshi Nakamoto white paper the most important development in favor of emerging economies in generations.

## The El Salvadorian Experiment

El Salvador was the first country to adopt bitcoin as legal tender (recognized by a government as a tool to settle public and private debt, including tax payments). This designation is usually reserved exclusively for national fiat currencies. El Salvador "retired" its former national currency, the colón, in 2003 when they adopted the US dollar.

Currently, over 12 countries outside the US use USD as their primary "domestic" currency, a process called dollarization. Countries that adopt the US dollar are dependent upon the US Federal Reserve (Fed) for their overall monetary policy, an entity that will always act in what it perceives to be in the best interest of the United States and not necessarily in the interest of countries outside of the US. A country undergoing dollarization has essentially “outsourced” it’s monetary policy to the US Fed, increasing and decreasing the monetary supply based on US economic conditions and not in reaction to the economic conditions experienced by those countries adopting the USD. For instance, suppose the Fed decides to raise interest rates in reaction to potential inflation. In that case, the move could act against the economic interests of countries outside of the US that may be experiencing deflation at that same time. To make decisions related to monetary policy, the Fed is made up of individuals comprising something like a board of directors. These individuals possess human traits such as emotion and national bias. On the other hand, the bitcoin monetary policy is universal, borderless, and based exclusively upon computer code. This has the potential to take geopolitical nation/state economic competition out of the decision-making process.

As described previously, bitcoin can significantly reduce instances of corruption. Suppose El Salvador’s transition to bitcoin as legal tender is successful in the long term; in that case, the country's ability to curb corruption could be even more significant by reducing the instances of illegal kickbacks, and excessive processing fees.

## Kickbacks

The monetary proceeds sent by US migrant laborers back to their countries of origin are remittance payments. The World Bank found in 2017 that immigrants sent $38 billion to their countries of origin in Africa alone (Bank, 2018). Collectively, remittance payments improve the economic conditions within the economy of the migrant laborers' home country. The parties involved in the remittance transaction have historically been exploited by asset transfer service providers such as Western Union and MoneyGram, who can charge over 12 percent for the "privilege" of sending money cross-border. The average fee in 2017 on remittances back to Africa was 9.4 percent. These fees are excessive and cut into the funds available to improve those local, at times struggling, economies; much of this cannot only be blamed upon the greed of the service providers but also the substandard TradFi "rails," which still have some antiquated conventions in place from the 1940’s. However, remittances denominated in bitcoin create a peer-to-peer transfer of assets, cutting out the middleman insisting on those fees for "services." A country like El Salvador using bitcoin as legal tender would be able to "mainstream" seamlessly financial aid to the entire country and down to the individual level. Essentially removing intermediaries that have historically benefitted from excessive fees through their monopolistic domination of TradFi international asset transmission rails.

According to GlobalEconomy.com, in 2020 remittance payments into El Salvador amounted to 24.09 percent of the country's Gross Domestic Product, up from 21.05 percent in 2019 (Globaleconomy.com, 2021). Not only do remittance payments improve local economies, but with 70 percent of El Salvadorians without a bank account (Bank, 2017) , peer-to-peer technologies like bitcoin can provide those without access to traditional bank accounts ways to participate in the broader global economy. In addition to the adoption of bitcoin itself, two recently developed technologies that are built upon the bitcoin network have further legitimized El Salvador's decision to make bitcoin the legal tender of the entire country.

Criticisms levied against El Salvador for adopting bitcoin as legal tender have continued eight months into the "experiment,” with one of the primary criticisms being that the ecosystem is too immature to power an entire country's monetary policy. However, technological developments over the past year and a half, establishing a 2nd layer on top of the bitcoin blockchain where payments can be made directly to those in need within El Salvador, have rendered several criticisms moot. The Lightning Network (Lightning) uses smart contracts to create "channels" for payments between entities for low transaction fees that settle much faster than on-chain transactions. A simplified illustration is a bar patron who opens a tab but pays for multiple rounds of drinks at the end of the evening versus every time a round is served. Blockchain forensic firms have developed the ability to monitor Lightning Network transactions for suspicious activity, revealing how the overall infrastructure grows around new technological developments.

In addition to Lightning, a FinTech app that has made significant headway into the El Salvadorian digital asset ecosystem is Strike. Strike leverages Lightning to dramatically reduce the fees and increase the speed of all domestic and international asset transfers. Strike does not overlap with the TradFi infrastructure at all and bases all transactions on bitcoin, even when bitcoin is not the intended output, thus bringing to reality what I have always called a "Netscape moment" in blockchain technology. The Netscape interface back in the 1990's allowed users to simplify their interaction with the internet versus searching conventions pre-Netscape, which demanded users search for information with Boolean Operators (and, or, not). With Strike I can transfer US dollars to a bitcoin skeptic without the skeptic having any idea that bitcoin was used to facilitate that USD transfer.

In conclusion, a monetary experiment the size of El Salvador's adoption of bitcoin as legal tender will have technical glitches, especially at the beginning. These issues can and will be resolved, from a shortage of bitcoin ATMs to bitcoin customer service lines being overwhelmed with calls. More significant issues such as bitcoin volatility will also eventually be resolved as the idea of stable coins matures. Finally, the criticism of excessive energy consumption when mining bitcoin can be quelled as El Salvador exploits the volcanic activity in-country by using environmentally friendly hydro-thermal energy. All of this is to say that countries in the developing world, through exercises such as the El Salvador experiment, will not only assist in dramatically reducing instances of corruption, but they'll also create a level playing field for all of those previously sidelined in global economic commerce.

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