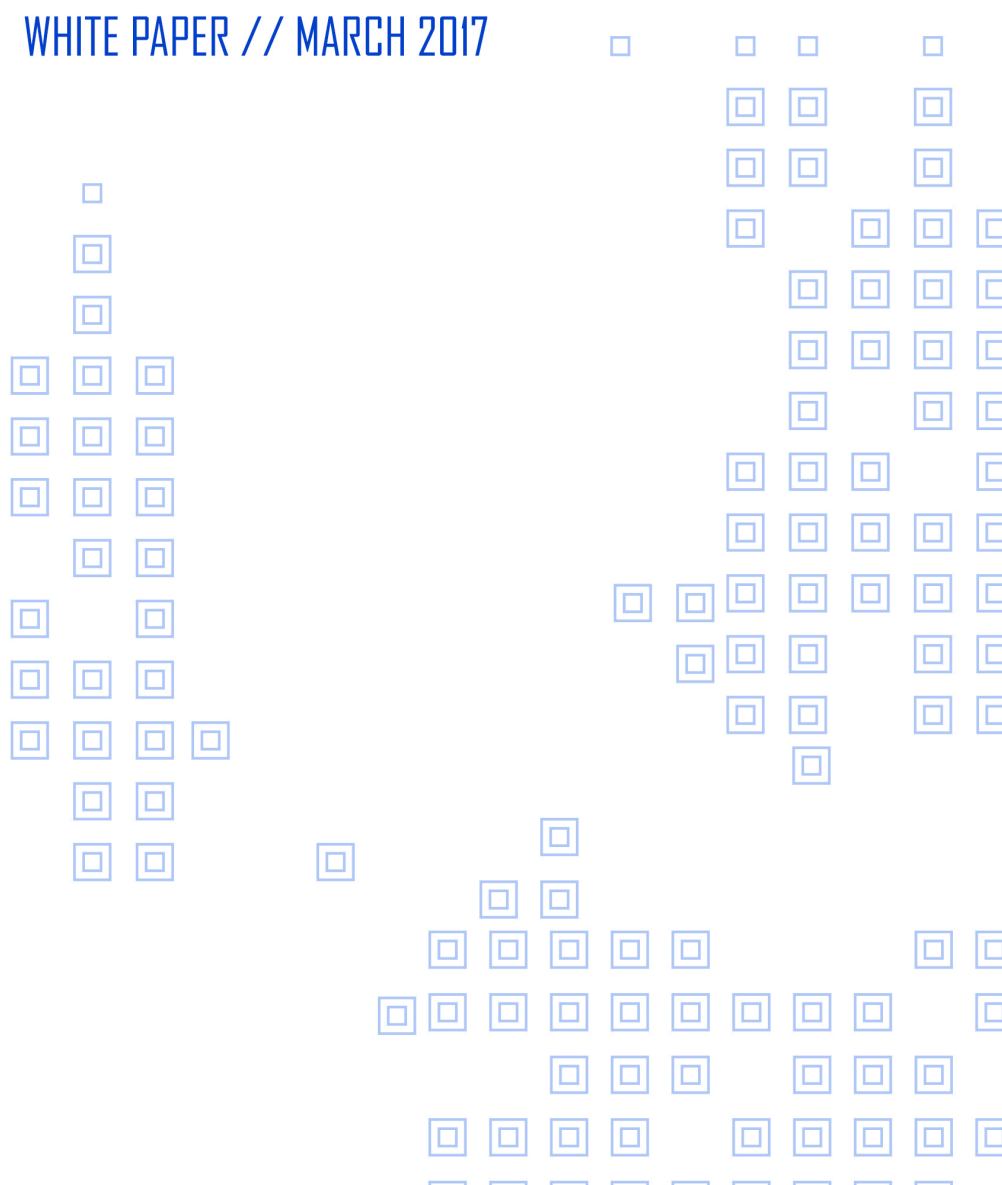
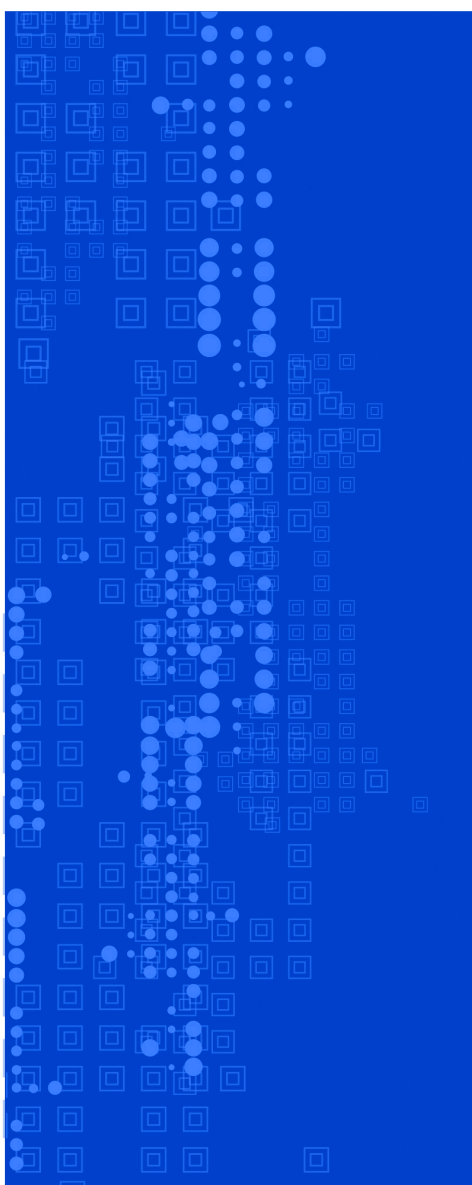


Blockchain and Financial Inclusion

The role blockchain technology can
play in accelerating financial inclusion

WHITE PAPER // MARCH 2017



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List of Abbreviations

AML	Anti-Money Laundering
API	Application Programming Interface
ATM	Automated Teller Machine
B2B	Business-to-Business
B2P	Business-to-Peer
BSP	Bangko Sentral ng Pilipinas
CTF	Counter Terrorism Financing
FCA	Financial Conduct Authority
FI	Financial Institution
FX	Foreign Exchange
IMF	International Monetary Fund
INR	Indian Rupee
KYC	Know Your Customer
MSB	Money Services Business
MNO	Money Network Operator
MTO	Money Transfer Organization
PoS	Point of Sale
RBI	Reserve Bank of India
SME	Small and Medium Enterprise
SWIFT	Society for Worldwide Interbank Financial Telecommunication
UFA	Universal Financial Access
UK	United Kingdom
USD	US dollar



Executive Summary

Financial inclusion refers to the delivery of affordable and usable financial access for unbanked and underbanked people. There are approximately 2 billion individuals who lack financial access and an additional 1.5 billion individuals who are underserved by the financial service industry. These groups of people have to pay significantly higher costs (e.g., opportunity cost, travel cost, monetary costs) in order to use basic financial services. In the last decade, global companies from various industries have implemented projects and campaigns to solve the issue. The Bill & Melinda Gates Foundation has set a goal to help the world's poorest regions improve their lives and build sustainable futures by connecting them to digitally-based financial services.¹ Although there has been some progress in this regard through the efforts of numerous organizations around the world as well as individuals who desire to see the problem eliminated, collective action from private sectors and government is required to provide innovative solutions within a supportive ecosystem.

Blockchain is an innovative technology that allows transfers of assets over the internet and has the potential to make the world a more transparent, efficient, and frictionless place. It has the ability to address some of the obstacles to providing affordable and usable financial access, such as account opening, account usability, and costs incurred to a financial institution. Despite these incentives to employ blockchain, the widespread adoption of this technology has been slow due to the perceived associated risks.

Our study focuses on how blockchain has played a role in accelerating financial inclusion by providing more access and improving the usability of financial services. We focus primarily on cross-border and internal payments. The aim of the study is to develop key insights for financial institutions and regulators in order to better understand the extent of its impact as they move forward in utilizing blockchain. The study provides a comparison of regulatory approaches of the technology (i.e., blockchain and virtual currencies), case studies of financial institutions using blockchain to increase the

delivery of financial services to the unbanked and underbanked, first-person interviews with relevant industry stakeholders, and extensive secondary research. The study examines three markets in particular: India, Kenya, and the Philippines.

Realizing the importance of blockchain and virtual currencies, most governments and regulators are proactive in searching for a way to regulate and facilitate the growth of the industry. However, because of the complex nature of the technology and risks associated with it, each regulator has different opinions and approaches for the issues identified as risks. While some central banks have chosen to be less responsive to the technology, others have been more direct in working with financial institutions to regulate the space. Despite dissimilar approaches, both financial institutions using blockchain and the current payment process must comply with anti-money laundering, know your customer (KYC), and consumer protection regulations. Our research shows that, when regulating blockchain and virtual currencies, it may be to the benefit of regulators to engage with financial institutions early and be part of the innovation process, tailor KYC to the risk profile of the unbanked to facilitate adoption, and apply principle-based approaches given blockchain's ever changing nature.

Blockchain can play a significant role in accelerating financial inclusion and thus empowering and transforming the lives of billions. Our research finds that using blockchain can lower costs, reduce risk, and enhance financial innovation. Blockchain technology allows financial innovators to provide specific solutions to the regional problems faced by the unbanked, allowing them to develop tailored solutions to a massive and complex global problem.

The Current Landscape of the Unbanked

Who Are the Unbanked and Underbanked?

In 2014, a World Bank report (Global Findex) estimated that there are about 2 billion individuals who do not have access to financial servicesⁱⁱ. These individuals are commonly referred to as the “unbanked,” and they live in a cash-based environment. The majority of the unbanked come from Africa, Asia, Latin America, and the Middle East, where forty percent live on less than USD\$5 a day.ⁱⁱⁱ In addition, there is a segment of adults who have limited or non-transactional access to financial services; these are the underbanked. When this group is added to the unbanked, the total number of individuals who need accessible financial services rises to 3.5 billion people worldwide, nearly half of the world’s population.^{iv} This alarming figure is one of the many indicators that poverty is rampant all over the globe, and the figure highlights the need for greater financial inclusion. According to the Global Financial Development Report, financial inclusion is defined as “the proportion of individuals and firms that use financial services.”

Financial inclusion is important because it is positively correlated with economic growth and enables the poor to improve their lives.^v The poor do not have access to many fundamental financial services most people take for granted, and they have a desperate need for these services. Without access to financial services, the unbanked and underbanked must find other semi-formal or informal means to facilitate their transactions, such as check-cashing or money-order stores that charge high transaction fees and take up the user’s time. For example, many billers refuse cash payments and require checks; however, without bank access, the poor must pay a fee to convert their cash to a check. The process leaves them with less money than the actual payment amounts. To make matters worse, financial service access not only costs more for the poor, but also takes more time. In areas like rural India, the commute to access a financial service can be as long as eight

hours.^{vi} The cost of poverty is real, and the extra fees and time make surmounting the barriers to financial empowerment unrealistic.

The World Bank has identified this issue as one of their priorities through the Universal Financial Access (UFA) by 2020 initiative. Below is a graph of the 25 countries that have been identified as a priority for the UFA.

The degree and detail of the problems vary country by country. This variety makes the problem more complicated and highlights that there is no universal solution. However, the common barriers that every region faces include lack of access to financial services or lack of ease of use of financial services.

A financial transaction that is highly valued by the unbanked and underbanked is money transfer, whether within a country (i.e., internal payments) or across national borders (i.e., cross-border payments). In a World Bank report, overall cross-border payment amount to developing countries in 2012 was estimated at USD\$401 billion. For money transfers within countries, the total would be several times this amount.^{vii} The available options for money transfers for the unbanked and underbanked come with three costs: relatively higher fees, long settlement times, and low usage. For example, the average cost to send remittances from a Money Transfer Organization (MTO) or a bank in Sub-Saharan Africa is 9.48 percent, which is the highest of all the regions measured by the World Bank.^{viii} Payment systems in that region are fragmented or inefficient, so most Sub-Saharan currencies lack liquidity. As a result, money transfers cost more.

It is clear that the poor of the world need assistance with cross-border and internal payments, and multiple successful initiatives (e.g., mobile money) have contributed to increased financial inclusion for this population. This is good news; however, we must not be complacent because there is still a long journey ahead to improve financial inclusion with the majority of the poorest communities in developing economies lacking

proper access. Furthermore, although these innovations are providing access, they are not necessarily being used. For example, in 2015, 411 million mobile money accounts were registered globally but only 32 percent of these accounts are active.^{ix} Active users are defined as those who have made a potentially chargeable transaction in the last 90 days. This gap highlights the limitations of mobile money. Because of its lack of interoperability, individuals are limited to transferring money to those who are using the same Mobile Network Operator (MNO) within a specific country. This limitation opens a window to develop a solution that is tailored to the needs and behavior of the unbanked and underbanked and will improve their lives.

One technology that financial innovators have used to maximize this window of opportunity is blockchain. The technology's unique characteristics allows financial institutions (FIs) to tailor their products and services to promote ease of use for the unbanked and

underbanked. A Philippine company, Coins.ph, offers a good example of blockchain's potential. Situated in the country ranked third in the world for receiving remittances (totaling about USD\$30 billion a year), Coins.ph provides Filipino users a mobile, blockchain-based platform to allow them to send money at a more affordable and faster rate. Blockchain allowed Coins.ph to build an application to facilitate fund transfers without reliance on existing bank infrastructures and to be more agile in their services at a more affordable price.

This is one of the many examples of FIs who have used blockchain to successfully reach the unbanked and underbanked segment and is an indication of the power of blockchain to not only provide financial services access, but also to improve the segment's current options by increasing usability.

Figure 1: Unbanked population of 25 countries in UFA^x



Source: World Bank Group

The Potential of Blockchain Technology

Blockchain Overview

Blockchain technology, or distributed ledger technology, refers to a protocol that allows peer-to-peer transfer of assets over the Internet. Today, trusted entities are responsible for verifying and validating transactions online. The disruptive component of blockchain technology is that its core functionality depends on the creation of an immutable ledger of all activity across peer-to-peer transactions. This has the potential to make the world a more transparent, efficient, and frictionless place.

The potential benefits of the technology have been recognized by global institutions and regulators. Many of the world's top companies have invested in blockchain as can be seen in Figure 2. IBM expects that “roughly 65 percent of banks are expecting to have blockchain solutions in production in the next three years.”^{xi}

The majority of blockchain usage so far has been as a platform to enable the transfer of bitcoin. The public blockchain is also known as the bitcoin blockchain. Since the initial blockchain developed for the transfer of bitcoin, there have been multiple blockchains created. These could be split into two main categories: “permissioned” and “permissionless.”^{xii}

The early use cases for blockchain were primarily concerned with payments. The cases that we have explored are primarily concerned with cross-border and internal payments.

How Blockchain Can Help with Financial Inclusion

There are a number of obstacles to providing financial access to the unbanked and increasing usage of financial services by the underbanked. We are going to explore three specific problems that FIs using blockchain technology are solving.

1. Opening an account

Problem: It is costly and challenging for those without a bank account to open one. There are travel and opportunity costs in going to a bank branch. Individuals also need to provide identification documents and an initial deposit.

Solution: Individuals do not need to travel to a financial institution to open an account or deposit cash. They are able to open an account on their phone thus avoiding the travel costs to set the account up. They are also able to deposit money into the account via a number of third party agents. This makes it easier to get money into the system.

2. Usability of an account

Problem: The challenge is not just in opening the account but in the everyday usability. Current obstacles for bank accounts are high transactional costs for making payments, minimum payment sizes, and settlement times. Making payments via the national payment system often takes a number of days, and there are fees involved. The recipient of a payment is not likely to release the services/goods until they are satisfied that they have received the funds. In order for digital methods of payment (i.e., non-cash) to be more widely adopted, the value has to transfer in real time or near real time.

Solution: One of the differences between the current payment infrastructure and blockchain is that blockchain can transfer value in a near instantaneous manner. (Transfer takes about 10 minutes, which is slow compared to the payment systems of developed economies but faster than those of developing economies.) Transfer fees are applied as a percentage of the transfer's value rather than a fixed rate, and the transfer requires no minimum payment amounts. Low rates, no minimums, and fast value transfers make blockchain useful for unbanked people to complete payment transactions.

3. Costs to the Financial Institution (FI) for providing financial services

Problem: All FIs will have some fixed and some variable costs. Many existing FIs have branches and are reliant on staff to interact with customers as well as perform back office functions such as compliance (KYC/AML). They also incur costs for using their country's national payment system and correspondent bank accounts for cross-border payments. The fees for using the existing payment system are often charged at a flat rate per individual transaction, thus a large number of small payments will be an increased cost for the financial institution.

Solution: Payments via a blockchain do not need to go through the national payment system, and there is no requirement for physical branches. FIs are able to offer more services digitally and thus will not require as many client-facing staff. Agent networks and alternative methods (i.e., cardless ATM services) can be used to add or withdraw funds. The cost to transfer funds via the blockchain is a percentage of the value transferred and thus makes smaller payments more feasible.

How Blockchain Is Being Used

As mentioned above, FIs have been using blockchain technology for cross-border and internal payments to overcome their customers' obstacles to financial access. They are doing this by utilizing bitcoin as a vehicle currency. Bitcoin has been around since 2009, and the volume traded has continued to grow. The average daily volume traded for the first two months of 2014 (when BitPesa and Coins were founded) was approximately USD\$68 million and has increased to approximately USD\$212 million for the first two months of 2017.^{xiii} The trading volume is important because trading improves bitcoin's liquidity, which is vital for FIs to be able to convert bitcoin into fiat currency.

Over the last year, there has been significant growth in transaction volume of cross-border payments using bitcoin (Figure 3). This growth

highlights the speed of adoption by customers. Individuals and SMEs have the option to add funds in fiat currency to the platform and pay out in fiat currency. This shifts the volatility risk of bitcoin from the consumer to the FI. FIs are using bitcoin as a vehicle currency. This is common practice in foreign exchange. Those who want to exchange one currency for another will not necessarily make the exchange directly. They may make the exchange by way of some third currency, which becomes a "vehicle" for the transaction.^{xiv} The dollar is the dominant vehicle currency, and it is used in 88 percent of all trades.^{xv} Using bitcoin as a vehicle currency and a blockchain as the payment rails is important because the sender and recipient do not hold bitcoin and thus are not exposed to the volatility of the virtual currency. This does not happen in all internal and cross-border transfers using a blockchain, and sometimes the individual or SME will have to purchase bitcoin to make the transfer.

Processing Payments via Blockchain Compared to the Current System

In order to evaluate the benefits of blockchain technology, we compared the current payment process for both cross-border and internal payments to the blockchain payment process (Tables 1 and 2).

Payment processes and their challenges can be separated into these three phases:

First Mile: This is how funds enter into the payment system. The funds can be cash, mobile money, or electronic payments. Funds at this level require FIs to perform KYC and AML activities.

Money Transfer: This is the process of transferring funds from the sender to the recipient. For cross-border payments, this involves a foreign exchange.

Last Mile: This is how the recipient receives the funds. The recipient can receive cash, mobile money, or electronic payments. FIs must perform KYC and AML activities.

Table 1: Cross Border Payments

	Current Payment Process	Blockchain Process
First Mile	Senders must go through a KYC process and pass AML screening.	Senders must go through a KYC process and pass AML screening
Money Transfer	<p>Payments from developed economies to developing economies: The majority of foreign exchange payments are sent using a vehicle currency (usually USD). Payments usually go through multiple banks, each adding its own fees, and the Society for Worldwide Interbank Financial Telecommunication (SWIFT), which also levies a fee. Payments can take a number of days.</p> <p>Inter-regional payments: The funds could be added via bank account or mobile money. The systems are not interoperable and might require an internal conversion into a currency that can be sent cross border.</p>	Funds are transferred using virtual currency as the vehicle currency.
Last Mile	Recipients must go through a KYC process and pass AML screening.	Recipients must go through a KYC process and pass AML screening.

Table 2: Internal Payments

	Current Payment Process	Blockchain Process
First Mile	Senders must go through a KYC process and pass AML screening.	Senders must go through a KYC process and pass AML screening.
Money Transfer	The funds could be added via bank account or mobile money. The systems are not interoperable and might require an internal conversion so they can be sent. There are fees for using the national payment system	Funds are transferred using virtual currency as the vehicle currency.
Last Mile	Recipients must go through a KYC process and pass AML screening.	Recipients must go through a KYC process and pass AML screening.

Key Takeaways from Using Blockchain

Cross-Border Payments

Cost Savings – The global average cost of remittance as of December 2016 is 7.4 percent. On average, FIs that use blockchain technology have lower costs for cross-border payments compared to traditional payment methods. For the FIs we interviewed, costs ranged from 1 to 3 percent.

The global average cost of remittance is calculated on sending USD 200 or its equivalent. It covers all the methods of remittance. FIs that use blockchain will not always be the cheapest but on average they are cheaper than the conventional financial institutions.

Reduced Risk – FIs using blockchain have comprehensive KYC and AML processes. All of the FIs have an MTO license and are required to perform screening and checks. They are required to have the same regulatory compliance as FIs that are not using blockchain so they should have the same money laundering and terrorist financing risks.

FIs using blockchain have a reduced settlement risk compared to traditional FIs because the foreign exchange can be processed in near real time. For FIs using SWIFT or correspondent bank networks, the foreign exchange transaction can take a number of days which increases the settlement risk. Goldman Sachs recognized blockchain's distributed ledger technology as a means to solve this risk and has filed a patent to use blockchain technology for foreign exchange settlement.^{xvi}

We would argue that the AML/KYC risk is the same as existing MTOs or banks, but the settlement risk is reduced, thus the overall risk is reduced.

Internal Payments

Versatility Helps Usability – FIs using blockchain technology are not constrained by their systems. Mobile money providers operate on a closed network which requires the existing payment network to transfer funds between mobile money operators. The versatility of blockchain's decentralized

network allows FIs to transfer funds across different centralized payment systems.

The FIs studied have all pivoted from their initial business models and adjusted their services to best suit their clients' needs. They would not have been able to pivot as easily if they had the fixed costs of a branch network and were reliant on a single centralized payment system.

The versatility of the technology allows FIs to adapt to customers' ever changing needs which has increased the usability of accounts.

Partnerships with All Players - To increase access to financial services and reach a broad customer base, all players must collaborate. FIs that use blockchain do not view banks as competitors. Instead, they look to collaborate with partners to serve customers. Building trust and cooperation with banks and MNOs is an essential part of that process. They position themselves as an additional financial channel to reach customers, not as a business out to disrupt the traditional financial system. Banks can benefit from these partnerships because they can increase their customer base and generate revenue on their existing infrastructure.

An example of a successful partnership is Coins.ph's partnership with a leading Philippine bank to provide a cardless ATM withdrawal service. Coins.ph created an option in their app to allow users to withdraw money from an ATM even if the user does not have an ATM card or a bank account. The app generates a code that the user inputs into the ATM to obtain the cash. According to Coins.ph CEO Ron Hose, "[Users] can get cash out right away. It's 24/7; it's the most convenient remittance you will find. This is rain or shine."^{xvii}

Building a wide network for last mile payment processing is also important to reach the unbanked and underbanked population segment. FIs using blockchain have partnered with banks, MNOs, pawnshops, department stores, and convenience stores. This allows them to provide a large network of low cost alternatives to bank branches.

Risks and Challenges

The FIs that we studied used blockchain and virtual currencies (mainly bitcoin), so we explored the risks of both. Virtual currencies have been volatile and there are no guarantees on the value. One company's user agreement explains to users that "the price or value of bitcoin can change rapidly, decrease, and potentially even fall to zero."^{xviii} The opaque nature of virtual currencies makes it difficult to gather information on the owners and to monitor their operation. There are concerns that the technology has not been tested on a significant scale. Efforts to increase volume could affect some of the security features of the technology.

Payment systems in developed economies are efficient and transfer of value can happen in real time. Transfer of value via a blockchain takes approximately 10 minutes, which would not work for retail payment in developed economies.

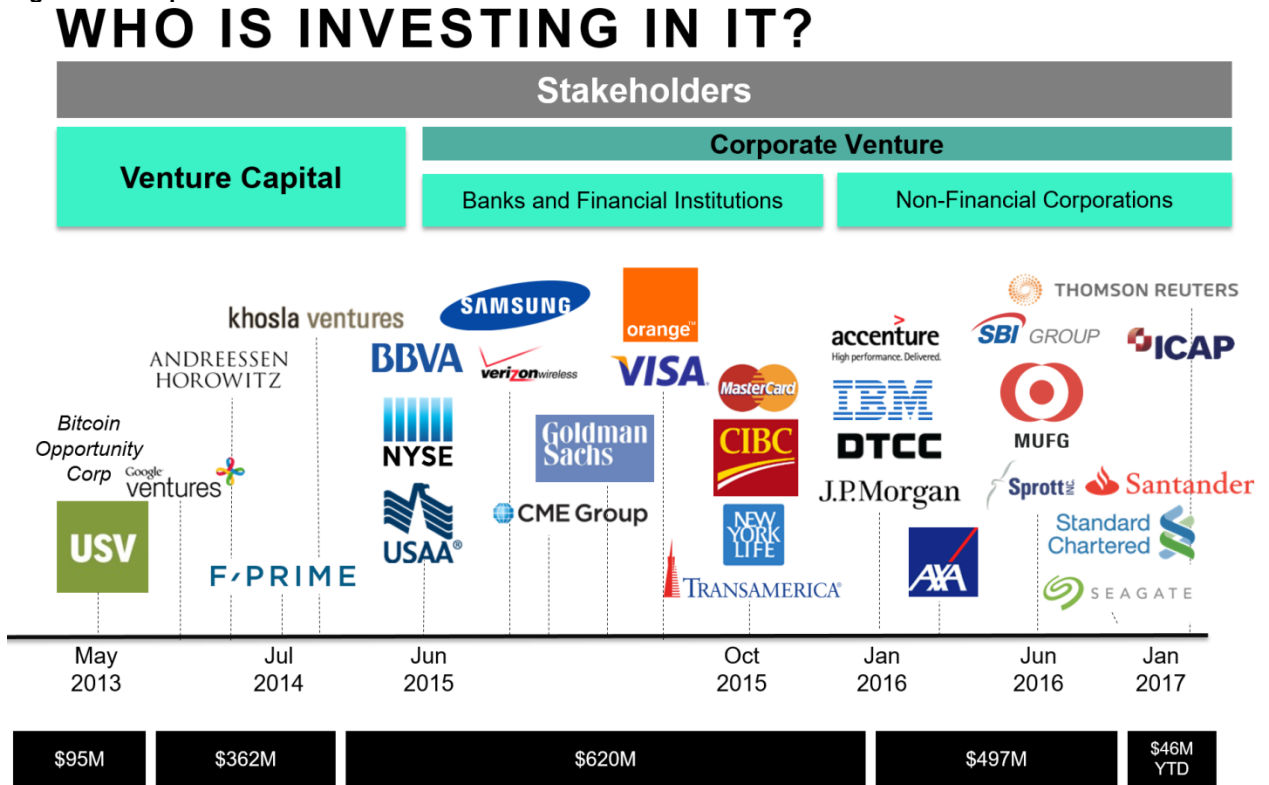
FIs using a blockchain must also convert virtual currencies into fiat currencies. The cost of doing this can offset the cost savings of using a blockchain as a payment rail.

Not all FIs have been successful in utilizing blockchain in their business model. A number of FIs have moved away from blockchain due to increased regulatory scrutiny and lack of liquidity in virtual currencies. In Singapore, Toast was a remittance startup that initially used blockchain technology. However, because virtual currencies are not as liquid in Singapore and the Philippines, Toast did not receive the cost advantages that blockchain implementation offers, so the company pivoted its business model away from blockchain use.

In light of these risks, the role of regulators is even more important to ensure transparency and protect consumers. As the adoption of blockchain technology increases globally, it will be a challenge for regulators to sort out how to maximize the benefits of blockchain while minimizing risks.

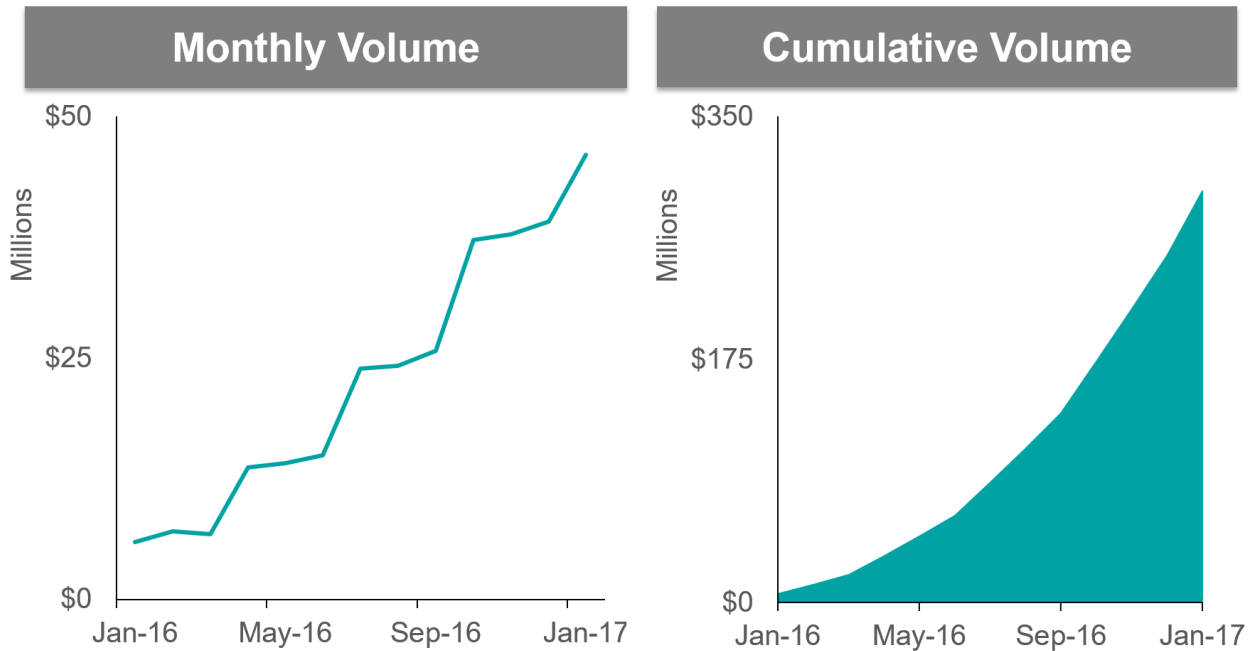


Figure 2: Companies that have invested in blockchain



Source: Digital Currency Group

Figure 3: Cross border payment using bitcoin



Source: Digital Currency Group Portfolio Company Analysis (Incl. Align Commerce, BitPesa, Korbit (Hyphen), Snapcard (MassPay))

Regulatory Environment

As blockchain has advantages and risks, financial regulators are committed to developing financial compliance standards to prevent money laundering, international crime financing, and customer fraud. Governments in various countries are looking at how to best regulate this technology. However, as the possible applications of blockchain increase, regulators are more focused on making policies on blockchain's applications (e.g., bitcoin) rather than the blockchain technology itself. These are current issues that are being considered by regulatory bodies across the globe.

Regulatory Concerns

Anti-Money Laundering and Counter Terrorism Financing - Similar to existing Money Services Businesses (MSB), FIs using blockchain to provide cross-border and internal payments are regulated under the Anti-Money Laundering (AML) and Counter Terrorism Financing (CTF) directives. There are fears that virtual currencies could be used to finance illicit activity due to their various levels of pseudonymity, or anonymity, and transnational reach. In 2014, a U.S. Senator sent a letter to federal regulators seeking a ban on bitcoin by highlighting these concerns.^{xix} The basis of the regulation is to control the 'gatekeepers' a place where fiat currency is converted into bitcoin. At the moment, the regulators' major concern is that when bitcoin is converted into fiat currency Regulators demand that businesses follow the traditional regime and report any suspicious transactions.

Consumer Protection - Existing centralized payment systems have measures in place to protect consumers, and any new system should exercise the same measures. Hacking is major concern that regulators have tried to address in past years. Many central banks and national regulators have issued a series of warnings to consumers to be cautious about any transaction they make on virtual currency platforms. Other regulators try to solve the issue by requiring businesses to meet certain criteria to gain a business license.

However, this approach might also create more burdens for startups and prevent them from launching a business.

Know-Your-Customers – To prevent the money laundering and terrorism financing activities, and to protect consumer from fraudulent transactions, regulators demand that bitcoin businesses follow the KYC approach . Businesses are required to ask for an identity of their customers before allowing those people to use their platforms.

Global Regulatory Approach

Each country has a different approach on how to regulate virtual currencies. The spectrum ranges from advising against transacting in virtual currencies to fully embracing and facilitating their growth. While governments in some countries, such as Bolivia, have decided to ban the technology, other countries, such as Russia and Thailand, have become more open and lifted the ban in 2016.

Many countries, such as India and South Africa, have a more neutral position on the issue. While these countries do not ban the technology, they do not regulate or support it explicitly. They may issue white papers or cautions, but do not present any further action.

The last group of countries are those that support the innovation. A common strategy is the regulatory sandbox approach, which allows companies to test new methods and retool old ones in a business environment that is free, within limits, from regulations. This approach means that companies can experiment without fear of reprisals. In the United Kingdom and the Philippines, regulators implemented the regulatory sandbox policy so startups and innovators can work in a controlled, but supportive environment. Other countries, such as the United States, have implemented some regulatory approaches to improve the business environment and to allow virtual currency adoption. BitLicense was implemented in New York as the first U.S. virtual currency business license.

However, many experts claim that, because of the complexity of the regulations and the increased compliance issues, the regulations have not succeeded in creating widespread virtual currency adoption among businesses.

Regulatory Case Studies

Philippines

Be part of the innovation process to learn early. Due to the large unbanked and underbanked population in the Philippines, the Bangko Sentral ng Pilipinas (BSP) has made it their priority to foster a financial environment that promotes innovation to improve financial access for these population segments. According to the G20 Global Partnership for Financial Inclusion, the country is one of the best examples “for using risk-based and proportionate assessments through their test-and-learn approach.”^{xx} In the test-and-learn approach, the Philippines’ central bank, the BSP, allows the virtual currency financial market to operate in a controlled environment and for businesses to work on pilot programs. This approach allows officials to better understand the business models, know the players, and identify the risks. All businesses are required to go through this model before they are allowed to scale. In 2009, when bitcoin was first launched, the BSP kept a watchful eye on its development. Since the usage and volume in the country was small, they saw the opportunity to use a test-and-learn approach. They took the time to understand the technology, businesses, market, participants, and risks. The BSP also created an internal technical working group and recognized the need to keep in touch with the stakeholders. This working group was tasked with liaising with the players in the market to understand their operations and business models. By working closely with the stakeholders, the BSP could stay current with the evolving technology and understand how to regulate it. Comprehension is crucial, but it is a difficult task.

Before regulating, understand first and then educate the public. Because virtual currencies were new, the BSP took the time to learn more, believing it was premature to put a regulatory framework in place. With more virtual currency usage in 2012 and 2013, the BSP’s first concern was consumer protection, so the entity took measures to educate the

public in lieu of enacting regulations. In March 2014, the BSP issued a circular that defined and explained the risks associated with virtual currencies. They warned readers that virtual currencies operate in an unregulated space that has no BSP protection, so the BSP cannot guarantee the currencies’ values. In February 2017, the BSP issued an additional virtual currency exchange guideline, Circular 994, which stated that the BSP would not endorse bitcoin as a currency. Circular 994 also requires businesses that use bitcoin to obtain a certificate of registration to operate.

Aligning regulatory requirements with the risk profile of the unbanked and underbanked. Blockchain transactions cannot be recalled once processed, which is a consumer protection and money laundering concern for the BSP. For consumer protection, all FIs using blockchain technology must be transparent and disclose their financial model to customers. For example, the disclosure must clearly state if the virtual currency does not guarantee the deposit amount. To prevent money laundering, limits are established for transactions. Since FIs are catering to the unbanked or underbanked, they expect that the low limits will not be an issue but rather be reflective of their lifestyles. While all FIs using blockchain technology have the same responsibilities as traditional financial institutions for KYC, customer due diligence, record retention, and training of personnel on AML, those that serve the unbanked and the underbanked are allowed to comply with reduced risk diligence. Since they are low risk accounts, the BSP agreed that they should not be held to the same standards.^{xxi}

India

Taking a neutral stance. In June 2013, India’s central bank, the Reserve Bank of India (RBI), who is responsible for regulating digital currency, issued the first notice on virtual currencies, including the legal, regulatory, and operational risks associated with them. The industry follows all the KYC and AML directives. While the industry is growing, the RBI is monitoring and deciding how to regulate the space.

Amid conservative regulation, self-regulation promotes more action. While the RBI has not taken significant action on regulation, leading virtual currency companies

have taken the lead by forming their own associations (the Virtual Currency Association and the Digital Asset and Blockchain Foundation of India) in hopes of changing RBI's neutral stance. One of their goals is to lobby the regulators to take action and legitimize blockchain as a legal payment rail. This is also in response to advice given by the RBI cautioning Indians against using virtual currencies in December 2013. Presently, the RBI has made it clear that they have no plans to regulate the industry. In addition to lobbying, the association plans to launch education initiatives on blockchain and virtual currencies. Their intention is to build credibility by working with the global community, investors, and regulators which will enable them to build a strong framework for the industry.^{xxii}

Despite demonetization, there is still a lack of certainty towards regulations. In 2016, The Indian government, led by Prime Minister Modi, announced the demonetization of all the 500 and 1,000 rupee notes in circulation. This event triggered a surge in bitcoin demand throughout the country. However, it is unclear if the government's view has changed towards virtual currencies. While significant evidence shows that the country is moving towards a cashless society, there is no sign that the RBI will regulate virtual currencies any time soon. In early February, the RBI posted on their website that they have not given any license or authorization to any virtual currency business and re-emphasized that consumers should use caution.^{xxiii} A few weeks later, the RBI explicitly announced that it will not include bitcoin or any digital currencies as a valid payment system under the Payments and Settlement System Act, the regulatory code for India's payment systems.^{xxiv}

Kenya

Lack of regulatory clarity may hamper businesses in virtual currencies. In December 2015, the Kenyan Central Bank issued a public notice identifying the risks of virtual currencies and advised the public to cease using bitcoin or other virtual currencies.^{xxv} Kenya does not recognize virtual currencies as legal tender, so these currencies fall outside of the legal "exchanging currency" definition. Companies offering remittance services using bitcoin do not have to register as an MTO in this country. This practice is inconsistent with other countries' virtual

currency regulations. This lack of regulatory clarity may hamper Kenya's virtual currency implementation and growth because businesses and customers cannot raise virtual currency funds or maintain virtual currency bank accounts.

Regulatory Key Takeaways

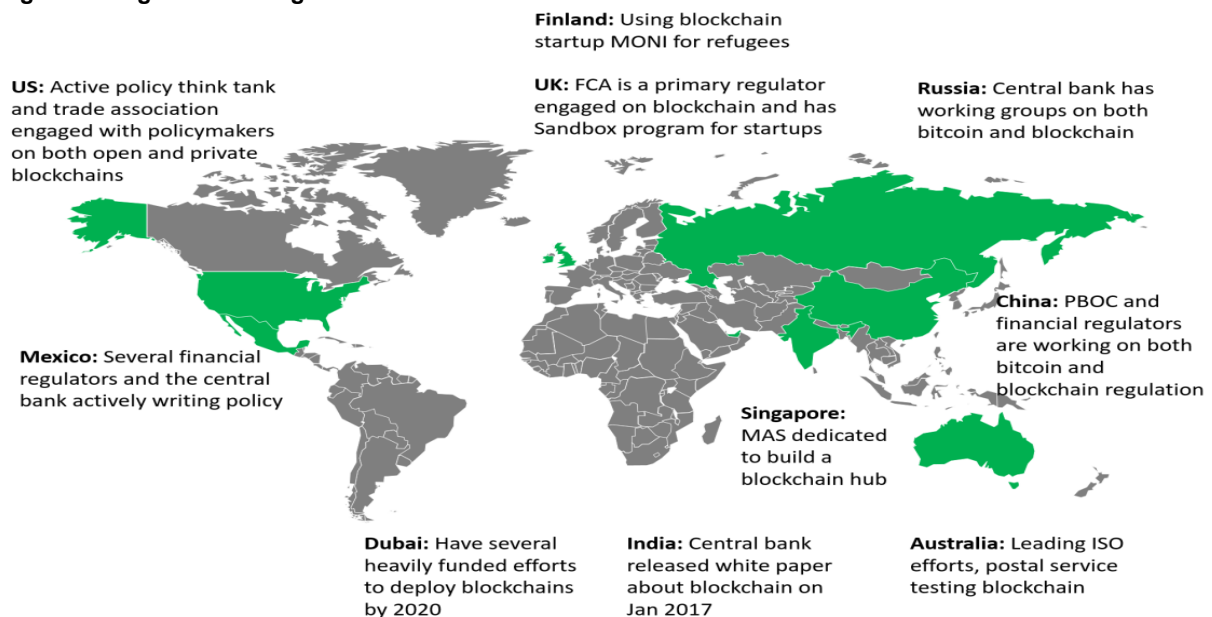
Engage early and be part of the innovation process. As with any new technology, it is challenging to understand how the technology works and the implementation implications. Regulators need this understanding to assess the innovation's risks, limitations, and the effects on financial systems and individuals. Through early engagement with the technology and its early adopters, regulators learn about the technology before it is widely used and can prevent problems ahead of widespread use.

In the Philippines, the central bank engaged with virtual currency technology early on to study financial transactions, educate people, and work with businesses. This proactive approach has helped regulators understand the virtual currency financial industry, bolstering their ability to apply the right strategy to push the industry in a positive direction. The BSP took a test-and-learn approach to virtual currency use. Companies worked closely with regulators, so the central bank not only learned from the private sectors, but also created a supportive regulatory relationship within the industry. As we will demonstrate below with the Coins.ph study, the supportive regulatory environment is one of the factors that helped the company grow and thrive. In the Philippines, the central bank created a technical group to work closely with the relevant players. Given regulatory agencies' limited resources, it may be advantageous to follow the Philippine model and employ a dedicated team tasked with understanding the virtual currency space. This is a contrasting approach to that of India's regulators. In India, the central bank decided to not regulate or facilitate the virtual financial space. Instead, the central bank announced its neutrality, which made it difficult for Indian startups to invest or manage their business using virtual currencies. The Indian regulators' hands-off approach created uncertainty within the industry, which created an inefficient business environment.

Tailor KYC requirements to match the unbanked population's lower risk. KYC requirements were put in place to protect the integrity of the financial system, especially against AML and CFT. However, standard KYC requirements create barriers to the adoption of financial services by the unbanked and the underbanked. The barriers include the population segment's lack of identification documentation and their difficulties in travelling to a branch office to conduct identify verification. Financial institutions are also reluctant to process these small transactions because meeting KYC requirements is too cumbersome for these small amounts. Adjusting the KYC requirements using a risk-based approach will encourage these segments to enter the financial system and make small transactions. This will help financial innovators utilizing blockchain to grow their customer base and accelerate financial inclusion. Gradually, as the average transaction size increases, regulators would be able to increase the due diligence requirements. Moreover, blockchain provides regulators an additional channel to monitor and understand money flow patterns in real-time and a secure place to store information. Thus, regulators should understand that blockchain helps people get access to financial services, increases their usage of financial services, and lowers risk, benefiting the system.

Given the ever-changing nature of blockchain, regulators should apply a principle-based approach to encourage industry growth. In the past, local regulators have been able to rely on global institutions for regulatory policy guidance. Blockchain's disruptive nature, however, complicates the development of blanket regulatory guidance since blockchain's effects vary country to country. Individual countries should perform a specific cost-benefit analysis that incorporates the impact of financial inclusion. Furthermore, regulatory uncertainty and various jurisdictions' regulatory approaches make it challenging for firms looking to use blockchain to improve marginalized populations' financial inclusion. Firms must navigate a complex regulatory environment, which makes planning difficult and may result in more compliance costs stemming from the approaches of different regional regulatory agencies. As shown above, these firms have great potential to reach the unbanked and thereby promote growth and prosperity. Regulators should explore flexible, principle-based approaches that keep pace with the ever-changing technology and give firms more certainty in their operations.

Figure 4: Regulation of Digital Currencies



Source: Coin Center & Digital Currency Group

Case Study: Coins.ph

Company Overview

Launched in 2014 in the Philippines by Ron Hose and Runar Petursson, Coins.ph is a mobile platform that uses blockchain to allow individuals to gain access to financial services through their mobile phone. Coins.ph was established with the intent to serve the unbanked or underbanked. With an estimated half a million users, it is ranked one of the world's best and well-rounded applications of bitcoin and blockchain.^{xxvi} When Hose and Petursson started, they approached the problem by first serving customers in the middle of the financial pyramid, those who have fewer hurdles, to ensure that the business was feasible. KYC was not an issue as this segment had the minimal requirements for customer identification. Upon launching Coins.ph, the first product offered was for remittances as this was the first need identified. Today, it is their largest service by volume.

Coins.ph was initially a self-funded company, but its founders have attracted multiple notable investors, such as Innovation Endeavors, Digital Currency Group, Rebright Partners, and Accion International. In the first two years of operation, they had a net loss; however, they have seen their revenue grow sixteen-fold from 2014 to 2015.^{xxvii} Today, Coins.ph is one of the most used financial apps in the Philippines, and it is the only non-bank in the top five list.

Problem

The traditional banking model does not work for emerging markets. While 31% of the Philippine population has bank accounts,^{xxviii} many are dormant, inactive, or maintained with another. Banks struggle to find a feasible way to reach the remainder of the population since they lose money serving this segment due to fixed costs and low volume or revenue generated. This leaves the unbanked with only costlier options to transfer money to conduct daily transactions. There is a clear gap.

Easier access to services is key in a country of high transaction costs. The Philippines is an archipelago so physical access is challenging. There is also a need for cross-

border and internal payment access. The Philippines ranked third as the largest recipients of remittances in 2015, receiving about USD\$30 billion a year.^{xxix}

Solution

By identifying the opportunity to reach more Filipinos amid the growing penetration rate of smart phones and apps like Facebook, Coins.ph provides an affordable bitcoin mobile wallet, allowing Filipinos who work abroad to send remittances more conveniently. This is the same population segment which banks are unable to serve.

How Coins.ph Uses Blockchain

Using blockchain helped Coins.ph build an app to facilitate fund transfer without relying on existing bank infrastructures. They used blockchain in a similar manner as how Skype or Whatsapp facilitates direct communication. Due to this lack of dependence on banks, they are more agile in their services and provide more efficient and affordable pricing.

Unlike Telco mobile money networks, blockchain is a global, open network, which means funds can be sent anywhere and be converted in almost any country and currency. Telco mobile wallets can only be used by those using the same Telco network within specific country. Blockchain helps Coins.ph facilitate remittances from any country, as long as the sender is able to purchase digital currency, even if no partnerships have been established.^{xxx}

Opening a Coins.ph account is easier than opening a bank account. Users simply input their phone number. There are no minimum cash-in amounts or monthly fees. Furthermore, when serving low-risk individuals, they can take advantage of reduced due diligence for those individuals.^{xxxi} For example, for KYC purposes, users can take a "selfie" on their phone while holding a government I.D..

Blockchain provides advantages for affordability by reducing fixed overhead costs that banks incur and removing the minimum capital requirements that banks comply with. Thus, Coins.ph avoids having to charge high fees and can charge a lower percentage than a usual remittance center. For example, people usually pay a fee of 7.5 percent per transaction, while

Coins.ph users pay a fee of 1 to 3 percent. When a user transfers money within the app, there are no processing fees. A charge, however, occurs when users make a cash withdrawal within the established partnership.

Furthermore, blockchain mitigates counterparty risk since transactions are settled almost instantaneously as there are no intermediaries. By using digital currency as their medium to conduct transactions, they aggregate demand to get the best forex rate and do not have to maintain multiple currency pairings. Users are not exposed to bitcoin price fluctuations since they convert or hold the funds in Philippine Pesos or any other currency instantaneously.^{xxxii} This is important since the unbanked are risk-averse. They will receive the exact amount of local currency.

Regulation and Compliance

Regulation

Coins.ph is regulated by the BSP. They share that a success factor has been BSP's open disposition to innovation and goal alignment towards financial inclusion. Since blockchain technology is relatively new, Coins.ph takes the initiative to explain and update BSP on their operations. There are limited regulations for Coins.ph to comply with due to the test-and-learn approach of BSP and the recently released circulars and advisories.^{xxxiii}

Compliance

Industry regulation was very uncertain when Coins.ph started. Since Coins.ph is serving a risk-averse market, they self-regulate and uphold themselves to the highest standard. They look at transactions as cash, and, depending on the kind of transfer, they apply the standard that was in practice for the most similar FIs. For example, they obtained licenses from the BSP as both a remittance and as a foreign exchange company.

Financial Inclusion

When Filipinos work abroad and send money to the Philippines, they lose an average of 7.5 percent of the remitted value to fees. This is roughly equivalent to losing one

month of wages for every year they work.^{xxxiv} By charging a fraction of the costs, this means a savings of up to 80 percent – an amount returned to families to potentially improve their lives and the country.^{xxxv}

Key Insights

Startups must work closely with the user to better tailor their services and make them usable. As Coins.ph grew, they constantly pivoted their business model and went to the market quickly to validate. They conducted regular workshops to gather feedback on how to provide better experiences for their customers. For example, Coins.ph reduced the app size so it did not use much data. Also, they hid the bitcoin wallet by default so users only see their transactions in cash. This eliminates the need for education on bitcoin for the unbanked and underbanked who view cash as king.

Strategic partnerships with all players especially FIs are key to success. Coins.ph does not view banks as competitors. To increase access to financial services, all players must work together and collaborate. The role of Coins.ph is to bring relevant partners together to serve customers, and building trust with banks is an essential part of that process. They position themselves as a company operating to not disrupt the existing financial system but to be another channel to reach customers. An incentive for banks is that Coins.ph increases market share and revenue on existing infrastructure.

A unique innovation they pioneered was the cardless ATM withdrawal. Partnering with a local bank, users can withdraw from an ATM even without a bank account or an ATM card. The app generates a code to be inputted in the ATM to obtain the cash.^{xxxvi}

Building a wide network for last mile delivery of services is also important to reach the unbanked. Coins.ph partners with establishments that are frequently visited and located nationwide, including banks, department stores, and convenience stores. By 2016, the network expanded to more than 17,000 locations throughout the Philippines, exceeding the number of bank offices and branches in the country.^{xxxvii}

Case Study: BitPesa

Company Overview

BitPesa is a pan-African platform that redefines how businesses make payments to and from Sub-Saharan Africa. The company initially focused on remittances, but pivoted to payments and B2B Foreign Exchange (FX) services. The service opens corridors for business payments and trade between Africa and the rest of the world. It also allows people who bank with small regional banks to send money to a local bank in Kenya, Nigeria, Tanzania, and Uganda without having to go through correspondent banks. This includes payments from popular mobile money services as well as delivery to an organization's national or international bank account on the same day.

The company was founded by Elizabeth Rossiello in 2014 with the purpose of creating more efficient foreign exchange payments into and out of frontier markets. BitPesa is a venture-backed company that has received over USD\$6.4 million in funding. BitFury Capital, Blockchain Capital, Colle Capital Partners, Digital Currency Group, Draper Associates, and Pantera Capital are all BitPesa funding partners.

Problem

The average cost to send remittances to Sub-Saharan Africa is 9.48 percent, which is the highest out of all the regions the World Bank measures.^{xxxviii} Sub-Saharan Africa's payment systems are the least developed globally. They are fragmented, the majority of banks are inefficient, and have little to no foreign exchange product innovations. Most Sub-Saharan currencies lack liquidity. (Liquidity is the ease with which foreign exchange can be bought or sold without having undue price impacts.)

Foreign companies have to deal with high transaction fees and long settlement times when making payments to Sub-Saharan Africa. Settlement times are not guaranteed and could take up to nine days. Companies must deal with many counterparties, including both local banks and banks abroad, as well as mobile money providers. Companies doing business in this region either go through multiple aggregators or spend time and money building custom integrations to handle payments. The traditional financial system causes companies to incur forex losses on transactions, so companies are forced to hire more staff and implement oversight measures to complete international and domestic payments.^{xxxix} Regional companies have many of the same issues. An additional challenge for them is often the payment size because some financial processors require minimum payments amounts.

Solution

BitPesa offers financial payment services with faster settlement times and at much lower cost than traditional banks. BitPesa's fast settlement times allow the company to provide certainty on exchange rates. The near real-time exchange reduces the settlement risk, which is the risk that one of the parties in the transaction will not fulfill its funding obligation. BitPesa does not operate in the first and last mile, but rather focuses on the money transfer process. Clients need to have an existing bank account, mobile money service, or digital currency account. They then get a quote to transfer funds from their origin currency to their destination currency via the BitPesa platform. BitPesa receives funds in the origin currency and pays out in the destination currency.

How BitPesa Uses Blockchain

BitPesa uses blockchain in the money transfer process. They receive funds in the origin currency, which they then transfer into digital currency. The digital currency is transferred via the blockchain in near real time to a digital wallet in the destination country. That digital currency can then be converted into local currency and paid out. Blockchain simplifies the money transfer process by reducing the number of counterparties from five to three and the settlement time from approximately two to seven days to near real time. The process of completing the foreign exchange transfer in two steps is similar to how the conventional transfer process works. The dollar is the dominant third or “vehicle” currency that makes up 88 percent of all trades.^{x1} The transfer in and out of the digital currency happens in near real time, thus reducing the risk of volatility in the digital currency and keeping transfer amounts consistent from the funding origin to its destination.

Regulation and Compliance

Regulation

BitPesa has experienced differing viewpoints from the countries it operates in.

- **Non-African countries** require the company to have a money transfer operator (MTO) or payment license. The company is a U.K. FCA-licensed entity which complies with all of the U.K.’s KYC requirements and laws.
- **African countries** do not want to grant MTO or payment licenses to BitPesa because they do not consider digital currencies as legal tender, thus digital currencies fall outside of the exchanging currency definition. There has been no specific requirement for digital currency transfer FIs to register as MTOs or MSBs as is the case in most of developed economies. Digital currencies are not regulated in the African markets; nevertheless, businesses that use these virtual currencies mimic the traditional financial regulatory requirements in expectation of future regulation. (M-Pesa operated for four years before being regulated.) The lack of regulatory clarity hampers businesses and impedes businesses’ ability to raise funds and maintain bank accounts.

Compliance

BitPesa requires Know Your Customer (KYC) information and documentation that is consistent with traditional FCA requirements. BitPesa performs both a manual and automatic check for high-risk clients. Their clients have often been through numerous sets of KYC processes which decrease the risk likelihood. This is in direct contrast to the lax process for sending funds via an MTO, for which a company has to provide KYC information once.

Financial Inclusion

BitPesa helps with financial inclusion both directly and indirectly.

- **Direct:** There is a study by Jack and Suri (2014) that examines the effects of mobile money’s lower transaction costs. By lowering transaction costs, households were better able to manage risk and withstand economic shocks. In a 2016 study, researchers found that mobile money enabled women to move out of agriculture and into business. Lowering transaction costs encourages employment and could increase the disposable income of locals employed by foreign institutions. It would also make it easier for locals to partake in the “gig” economy. This allows them to receive payments for services performed remotely.
- **Indirect:** A large percentage of the payments BitPesa processes from the U.S. and Europe to Sub-Saharan Africa are to foreign social workers. The reduced cost will allow for increased funds to be spent on further development .of these agencies and their work.

Key Insights

Partnerships are vital for performing first- or last-mile payment services. Since BitPesa focuses on the money transfer process, partnerships are vital to their business success to process their transactions. The company has partnered with mobile money services in most of the markets in which they operate.

In December 2015, one of BitPesa's mobile money partners suspended services to BitPesa, which could have sunk the business; but company officials managed to find new partners without much disruption. Had this partnership fallen apart at a later date, disruption in services might have a larger effect on the business.

Uncertain regulations mean increased business costs. A major challenge for BitPesa is the uncertain regulations in the Sub-Saharan markets. There is no consistent policy, which increases the business's regulatory costs. Regulators have not been

supportive of BitPesa's business model in the past. There is a lack of understanding of distributed ledger technology and digital currencies in Sub Saharan Africa, which slows virtual currency adoption. Regulators might take a long time to understand how the technology works and how beneficial it can be, so it is unclear how long it will take for regulatory implementation. This is in contrast to other nations' regulatory approaches that encourage experimentation with sandboxes and interaction with FIs adopting blockchain solutions.

Interoperability provide flexibility to meet their customer needs. BitPesa has managed to break into the financial industry. A number of FIs have tried and failed to use blockchain technology to provide remittance services to Sub-Saharan Africa. BitPesa pivoted their business model from focusing on individuals to focusing on SMEs, and the company has the flexibility to provide solutions to its customers' financial transaction problems.



Case Study: Unocoin

Company Overview

Unocoin is India's leading bitcoin company. Its vision is to enable Indians to buy, sell, store, use, and accept bitcoin. Unocoin gives its users a bitcoin wallet to manage their bitcoin. It also connects users to partner merchants in various industries, ranging from online bookstores, logistics, schools, and gift card vendors. Users are able to pay their bills or perform daily transactions through the Unocoin Point of Sale (PoS) platform. In addition to the basic bitcoin management feature, Unocoin provides a Systematic Investment Plan (SIP) to its users, which allows users to repeatedly buy bitcoin with the same amount of Indian Rupee (INR) according to a schedule set by the user, similar to the Dollar-Cost Averaging technique.

Unocoin entered the market in July 2013 in Tumakuru and Karnataka. It was the first mover in the virtual currency space in India. The company was founded when President Sunny Ray, who was excited about bitcoin, set up a Meet-Up group called IndiaBitcoin. Here the co-founders met and started the company. After the first seed investment of USD \$250,000 in 2014, the company raised USD \$2 million series A venture capital funding in September 2016

Problem

Similar to other developing countries, India's financial sectors are still inefficient in many ways, which creates an opportunity in the market for bitcoin-based business to operate. The three major problems that Unocoin and its partners solve are:

- **India is the world's largest remittance:** The remittance amount was at USD\$69 billion in 2015. This fact has motivated Indians who regularly send money to their families to find more efficient money transfer channels than what they currently use.
- **Getting credit card is not easy:** Credit card application approval in India can be challenging. Banks ask people for a lot of customer information and supporting documentation, and often cardholders must have a fixed deposit account or monthly

savings, or work with a credit card broker. To address this problem, Unocoin provides an easier online registration service by requiring less customer information and documents.

- **Credit card transaction fee is high:** While credit card companies charge a transaction fee of about two to four percent, bitcoin transactions perform the same services with a two percent fee. Bitcoin companies have a huge opportunity to enter the credit market and offer users lower transaction fees.
- **Government policy on demonetization:** In November 2016, the Indian government announced 500 and 1,000 INR banknotes would be removed from circulation. This policy created an economic instability which drove people to adopt more digital-based currency, including bitcoin.

Solution

Unocoin provides a bitcoin wallet with a PoS platform that allows customers to buy, sell, store, invest, and use virtual currencies on their mobile devices.

How Unocoin Uses Blockchain

As a bitcoin wallet that allows users to exchange INR for bitcoin, Unocoin provides services for users to store and transfer bitcoin currency as well as pay for products and services through partner merchants. To complete transactions, users must register for the Unocoin wallet by providing three forms of identification, including PANcard (a code that acts as an identification for Indian nationals, especially those who pay income tax),^{xii} photo I.D., and proof of home address. The verification process takes a few days, after which users can deposit funds, monitor their accounts, and complete transactions with other users and merchants.

Unocoin partners with several blockchain business providers to increase bitcoin use in India and improve some of its processes. One such partnership is with BTCJam, allowing Unocoin users to borrow or lend bitcoin to people in over 180 countries. The Purse partnership helps Unocoin translate Amazon

gift card balances to bitcoin and rupees. Unocoin also partners with Netki to improve its service by translating bitcoin addresses to human-readable names.

The unique feature of Unocoin is that the platform has a Systematic Investment Plan (SIP), so Unocoin users can set a schedule to buy bitcoin automatically. The system deducts INR from user-selected INR wallet-based applications.

Unocoin provides a dual-currency wallet for Indian users so they can complete transactions with the application in both INR and bitcoin currencies. Unocoin's services include:

- **Wallet:** Users may store their INR and bitcoin in the platform. After they open an account with Unocoin, they have to link their bank account to the platform in order to load money into their wallet.
- **Buy/sell (Investment):** The Systematic Investment Plan (SIP) is a service that allows users to buy bitcoin automatically, based on schedules of their choosing. The money is deducted directly from a user's wallet a few days after the order. For sales transactions, bitcoin is deducted and converted into INR, which are automatically added to a user's wallet.
- **Transfer:** Users have access to a peer-to-peer service to send bitcoin funds to other accounts. The process is similar to traditional mobile money peer-to-peer fund transfer services.
- **Payment:** Through partnerships with merchants, users can buy products and services with the bitcoin currency stored in their mobile wallet apps. Unocoin opens its API to third-party companies to integrate Unocoin's offerings with their platforms.

Compliance and Regulation

Regulation

As of February 2017, bitcoin currency in India is legal but not regulated by the government or other central regulators. While the Reserve Bank of India (RBI) has released several bitcoin announcements since 2013, including the one in early February 2017 warning of the risk of trading and investing in bitcoin,^{xlii} several players in the market, including Unocoin, self-regulate the virtual currency industry. A week after the RBI's February 2017

announcement, the Blockchain and Virtual Currency Association of India was formed.^{xliii}

The association will likely benefit businesses and continue to boost the growth of the virtual currency industry. Though the industry's regulatory situation is uncertain, and the RBI could impose industry regulations in a year or two, it is not possible to conclude whether India's self-regulatory system will help or hurt the virtual currency industry in the medium-to-long run.

Compliance

Although the industry is currently self-regulated, a company like Unocoin, which is considered a money transmission company, must comply with KYC and AML requirements because the only way to deposit funds into a bitcoin wallet is through a bank account. Cash deposits are not allowed.

Impact to the Unbanked

Given that India doesn't have a very well-structured financial system that covers the entire country, there is an opportunity for bitcoin-based businesses to improve the country's financial inclusion rates. However, this process will probably take some time because many traditional banking constraints and attitudes still exist, including unstable regulations, lack of education about the technology, and exchange rate instability. Moreover, given that the deposit process uses a bank account, the virtual currency system excludes the unbanked population. Future virtual currency technologies and supportive regulations will likely play an important role in providing access to the unbanked. With strong support from the government and a remarkable growth rate for both users and merchants in the financial ecosystem, bitcoin and blockchain technologies have the potential to impact lives in the same manner that mobile money and M-Pesa did in Africa.

Key Insight

Bitcoin merchant businesses in India are experiencing a high growth rate because the country's financial infrastructure is fundamentally ready for digital currencies to disrupt the system, and the country has the right environment for bitcoin to grow.

Under-Developed Financial Infrastructure

India is the world's largest remittance recipient

with remittances totaling USD\$69 billion in 2015.^{xliv} This has motivated Indians who regularly send money to their families to find more efficient money transfer channels than what they currently use. Bitcoin's money transfer fees are 2-3 percent lower than the traditional approach. Moreover, India is still a cash-based society where over 90 percent of transactions are in cash. Similar to mobile money, bitcoin has become a cash alternative that improves customers' safety at a lower cost to both consumers and businesses.

Supportive Ecosystem

India has the perfect business environment for bitcoin to grow. Its market has thousands of merchants who have embraced bitcoin as payment. Merchants have accepted virtual currency because PayPal's service is unstable and expensive in India. PayPal's transaction fees are relatively high compared to fees for similar virtual currency services, and these

fees are often frozen by the company.^{xlv} Like merchants, Indian people have become aware of virtual currency technology because it directly affects their daily lives. Moreover, Indian people have been educated about the technology and feel more comfortable with its use and implementation. There have been Meetup events and hackathons to foster continued blockchain innovation.

Finally, the demonetization policy of the government plays a big role in bitcoin adoption. Right after the announcement to cancel the 500 and 1,000 rupee banknotes in November 2016, the week's volume of bitcoin trading almost doubled over the trading volume from the week before.

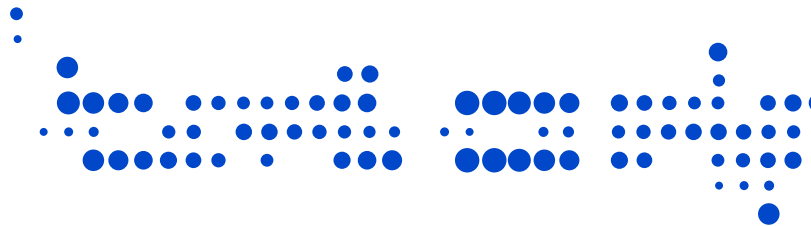
With all these factors at play, the Indian bitcoin market is one of the most interesting regions to watch at the moment.

Conclusion

As discussed in detail, blockchain technology can play a significant role in helping accelerate financial inclusion. The use of blockchain technology is still at an early stage and there are challenges to widespread adoption. Global institutions and regulators have recognized the potential benefits of the technology, and its use is increasing at a rapid rate. Given the importance of financial inclusion and the complex nature of the obstacles, collective action from private sectors and government is required to provide innovative solutions within a supportive ecosystem. Blockchain is not the only answer, but it can be part of the solution and requires partnerships with existing FIs.

FIs using blockchain for internal and cross-border payments can lower costs, shorten settlement time, and provide a better user experience. Consumers are voting with their wallets, and payment volume using blockchain is growing at a rapid rate. This is not something that regulators can ignore.

Regulators differ in their approach to blockchain technology, and this is creating a complex environment for FIs using a blockchain to provide services. Regulators should engage early and help shape the innovation. This will allow them to understand the technology, assess the risks, and enable tailored solutions to their specific obstacles.



Appendix

Foreign Exchange Overview

Foreign exchange is a large market with an average of USD\$5.1 trillion traded per day.^{xlvi} Approximately 33% of this volume is made up of spot transactions. Spot transactions are “single outright transactions involving the exchange of two currencies at a rate agreed on the date of the contract for value or delivery (cash settlement) within two business days.”^{xlvii}

People who want to exchange one currency for another will not necessarily make the exchange directly. They may make the exchange by way of some third currency, which becomes a "vehicle" for the transaction.^{xlviii} There have been numerous research reports on the reasons for vehicle currencies, but the main reasons for using them are lower transactions costs and liquidity. The dollar is the dominant vehicle currency and is involved in 88% of all trades.

Spot is performed mostly by market-making banks. The largest foreign exchange-dealing banks have agreements to provide quotes to each other on demand. Spot transactions are settled by physical delivery of the currency.

From a settlements perspective, what is actually traded in the foreign exchange market are bank deposits denominated in specific currencies. Settlements are made by electronic funds transfers. A settlement is the actual transfer of funds from payer to payee that discharges an obligation to make a payment. Before settlement can take place, payment instructions must be issued to a bank or to a payment system. These instructions are sent via the SWIFT messaging system.

Current FX Flow vs. Blockchain

We go through a comparison of the current FX process to FX via a blockchain below. The example we use is the sending of Euros to Kenya.

The trade would most likely be processed in

two steps with the dollar as the vehicle currency. Even if the trader sells the dollars for Kenyan shillings shortly after the first trade, the settlement will most likely not happen for a day, and thus that capital is tied up and is an opportunity cost to the bank.

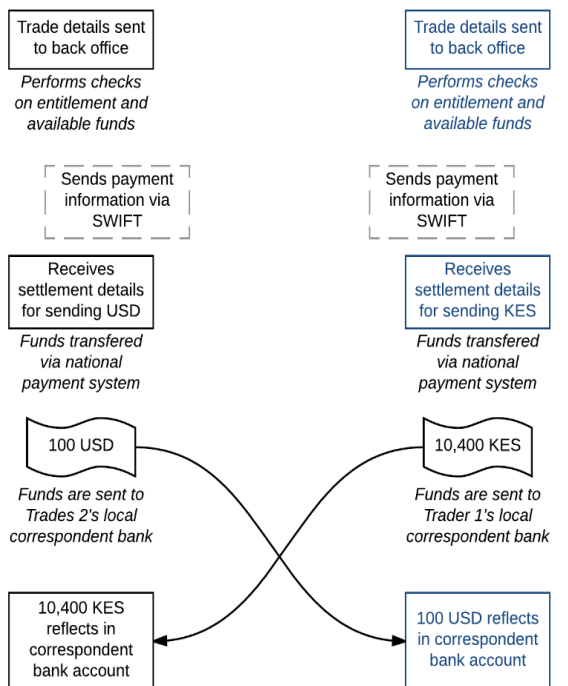
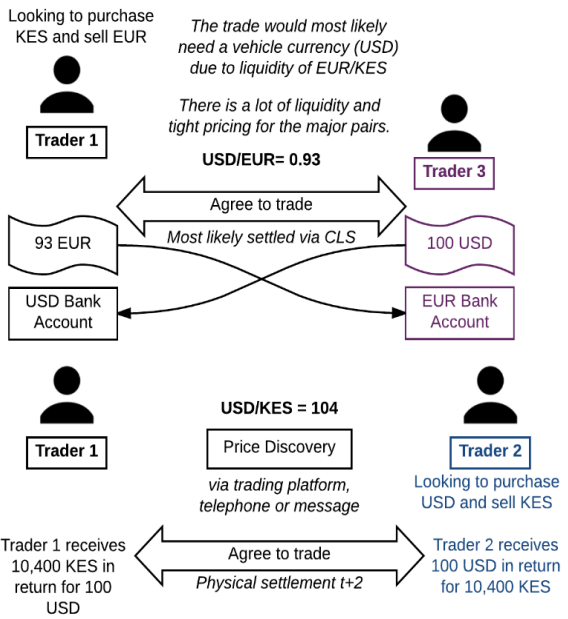
The second part of the trade would likely take 2 days to settle. So for a \$100,000 equivalent trade, the bank would have \$200,000 tied up for one day and \$100,000 for a second day until it receives the funds owed to it. There is a settlement risk which is amplified by the difference in time zones and varying processing times.

A blockchain transaction is processed in near real time and does not require as many counterparties. By processing the transaction in near real time, it greatly reduces the settlement risk. The funds are not tied up for a number of days, so there is very little opportunity cost.

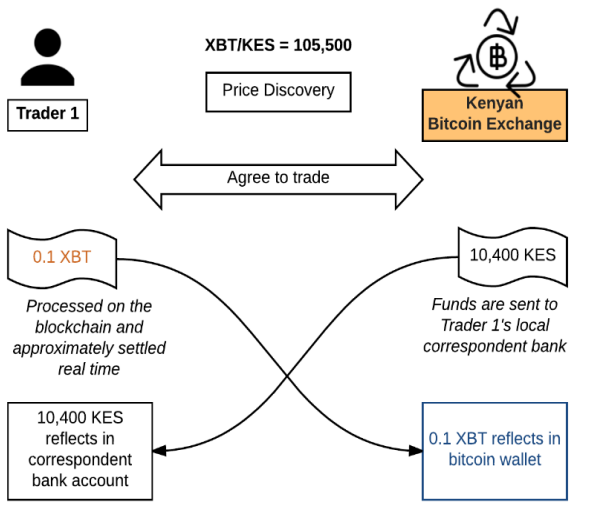
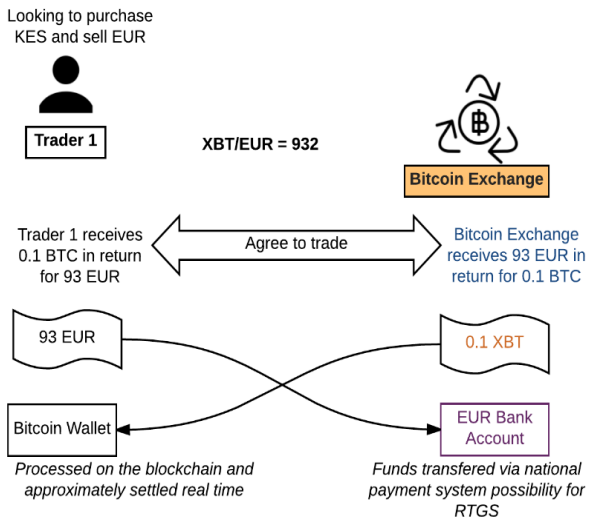
The transaction does rely on the liquidity of bitcoin to the origin and destination currency. This could affect the total cost of the transaction.

Both methods have different risks and costs. The costs via blockchain are lower for frontier markets as the currency spread is already wide and volatile (similar to bitcoin), but there is reduced settlement risk and transaction fees.

SWIFT has been hacked numerous times over the last two years and continues to be targeted. The security features of a blockchain make this case even more compelling.



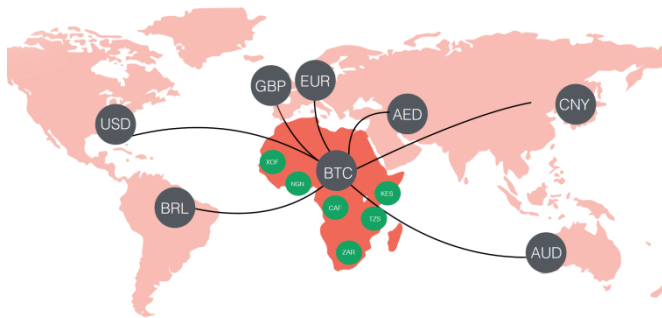
- Risks**
- **Settlement Risk** - Until both parties have received the funds there is risk that one of the parties may default on its obligation (Herstatt Risk)
- Costs**
- **Back office costs**
 - **Swift Costs**
 - **Cost of sending payment**
 - **Cost of Capital** - funds are tied up for 2 days and thus the company or financial institution will not be able to utilize them



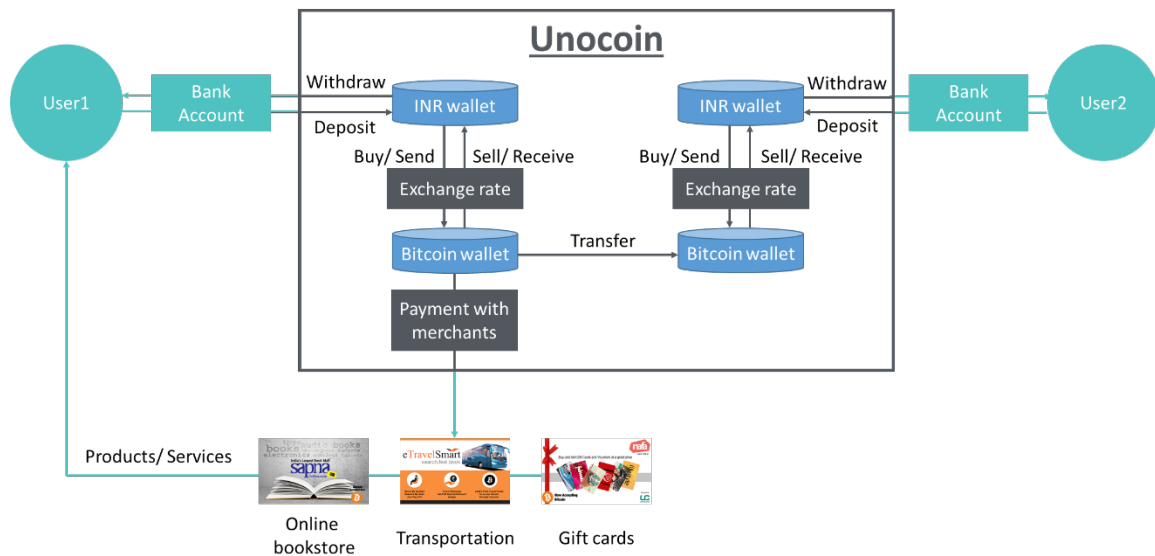
- Risks**
- **Settlement Risk** - Only the local payment to Trader 1's correspondent bank is subject to settlement risk.
- Costs**
- **Cost of sending payment**
 - **Cost of Exchanging Bitcoin** - Not as much liquidity

BitPesa

Bank Transfer	Western Union	PayPal	BitPesa
4-9 days	1-2 days	7-9 days	Instant
9% Cost	7% Cost	9% Cost	1-3% Cost
often blocked or returned	inconvenient pick-up	only available in a few countries	Transparent
bank	mobile money, cash	need USD bank account	Mobile Money Bank



Unocoin



Endnotes

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