

CROWDBANK

WHITEPAPER

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Version 0.1

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Executive Summary

The world is evolving into a smart economy that is, there is a constant demand for the economy to upgrade. It is simplifying the way things to be done for convenience and faster speed of transaction at a lower cost. However, it is limited by the traditional methods of transactions which are available today.

We aspire to provide the various banking solutions to people worldwide in order to make the economy smarter. The banking solutions here refers to the centralized, hybrid and decentralized banking model for the people who prefer comfortable and fast banking services.

CrowdBank will take advantage of the fundamental concept of blockchain technology as the decentralised peer-to-peer banking system, by creating a transparent and decentralized medium of banking worldwide. Our entity will not only facilitate the cryptocurrencies but will also provide fiat banking at a global scale. Our strategy to design CrowdBank system will remove all the drawbacks of the current centralized banking system which stops growth, delays, transfers, and partiality.

CrowdBank's extraordinary vision for the imminent future of banking is to provide peer-to-peer banking products and services which incorporate a wallet, virtual debit card, loans, insurance policies and crypto to fiat and vice versa transactions. CrowdBank will empower each of its members through a decentralized and all-encompassing financial solution that has been created with great passion. We pride ourselves on being pioneers in this sector and we advocate the need of the current generation, in order to pave the way for the future. Here, a deposit of cryptocurrencies can earn an interest up to 6% per annum. Our wallet offers a negligible fee to store your cryptocurrencies.

We are the early players of unrecognized market potential. Your support will create the market more organized transparent & opportunistic for individuals.

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MISSION

At CrowdBank, our aim is to make the global banking system decentralized with no central holdings of banks and be a revolutionary online crypto bank.

VISION

We strive to enable our consumers with cryptocurrency in a modern and unique way so that they are able to store, spend, exchange and borrow practically any cryptocurrency in the same way as any other traditional currency, but in a quicker, more secure and economical manner than ever before.



1. INTRODUCTION

1.1. A Brand New Crypto-Economy

The world market is evolving and new choices are given to the current consumers. People are finding alternate ways to interact with money. Global demand for a cashless economy is continuing to rise at such a rate that the end of cash, as a mode of payment, is now a stark reality. In fact, the number of transactions done without cash worldwide were over 430 billion in 2015¹, and mobile payments are projected to surpass \$3.8 trillion by 2020.²

Cryptocurrency was first introduced 10 years ago, and since then it has rapidly gained popularity in the world's economy. Currently, there are between 60 million to 70 million users who actively use a crypto-wallet to send, receive and store currencies. There are over 1,500 digital currencies available in the market in which people can invest and this number has not stopped growing since the introduction of the first ever cryptocurrency in 2009.

The advantages of cryptocurrency over traditional fiat (legal tender) currency are numerous and it is impossible for the fiat currency to match up to the benefits of cryptocurrency. Today, a transaction between two people in different countries takes several days and costs both the parties (sender and receiver) a significant share of the money transferred (the average cross-border transaction fee is 7%), as each third party involved in the chain, (of which there are many) takes a small margin for their efforts. This entire process can now be completely avoided and the transaction can be done in seconds using cryptocurrency by eliminating the involvement of third parties. This method has significantly reduced the cost and has simultaneously made the entire transaction more secure than it was ever before.

But for many people, even those with a robust interest in new technology and in finding better ways of doing business, cryptocurrency is perceived as an instrument of investment. The single most important step in changing this perception is to enable people to use cryptocurrency in the same way as they use any other currency, i.e., by being able to access instant payment transactions through cryptocurrency, just like cash or money stored in their digital bank accounts.

Consequently, CrowdBank will be a revolutionary online crypto-bank, that will be a repository for the cryptocurrencies of the users. CrowdBank will also provide seamless solutions to all the problems faced by a traditional banking consumer. People will be able to save, pay, transfer and eventually borrow virtually any cryptocurrency in the same manner as any other fiat currency, but in a more rapid, inexpensive and secure environment than in any other traditional bank. To facilitate the users, we have introduced our two-coin concept in CrowdBank's ecosystem. Our first coin will be a

¹ Referenced from <https://blockgeeks.com/guides/what-is-blockchain->

² Referenced from <https://medium.com/@petehumiston/cryptocurrencys-next-massive-catalyst-an-eminant-stock-market-correction-the-search-for-yield-f1635ea9cb95>

variable NEP-5 coin called the CrowdBank Token (CBK) and the second coin will be a stable coin called the CrowdBank Stable Coin Euro (SCE).

Our crypto-bank will be a decentralized arm of the entire setup, which intertwines the constrained financial era that we live in presently, and instead, ushers in the era of a new crypto economy that has infinite and unbounded prospects.

1.2. Comparing the World’s Best Traditional Banks with A New Blockchain Bank

With the onset of any new technology that can change the market, the old-world order finds itself in a struggle to adapt to the new world realities. It will be no different for the current banking giants who, even today, cannot agree on whether or not cryptocurrency is the future or just a passing phase. While they decide, new dedicated blockchain based crypto-banks are poised to take their place in the crypto-economy.

The following table offers some instances of the benefits of a new blockchain bank when compared to any other top traditional bank.

	LEADING TRADITIONAL BANK	BLOCKCHAIN BANK
Countries of Operation	Limited capital and by Regulation	Unlimited, there are no boundaries for any country
Number of Clients	Limited by systems, countries of operations, etc.	Only technical limitations
Cost of Transactions	Up to 5% (Depending on intermediary cost) ³	As low as 0.5% fee
International Transfers	Restricted, slow and expensive	Unrestricted, fast and free
Scalability	Slow and expensive	Fast and relatively low-priced
Transfer Values	Restricted	Determined by the individual
Speed of Transaction	Potentially Several Days	Minutes/ virtually Immediate
Withdrawal of Funds	Potentially Several Days (depending on the amount)	Virtually immediate within crypto ecosystem but may take longer for conversion into fiat
Control	Centralized	Decentralized and Hybrid possible

³ Referenced from <https://www.investopedia.com/terms/t/transaction-fees.asp>

2. MARKET ANALYSIS

Today, the overall value of the cryptocurrency market is about US\$300 billion, down from a peak of US\$820 billion at the end of December 2017, but rising as we speak. There are over 2000 cryptocurrencies and over 200 exchanges in the market. However, this market is highly disorganized and volatile right now, and there is a huge need for an ecosystem like CrowdBank which can play a vital role in reducing the barriers to entry for people who wish to enter into the crypto markets, and friction between the various parts of the whole industry.

Our inspiration to start CrowdBank was the growth rate of bitcoins. We believe that it can replace future currency and therefore we want to give a systematic infrastructure to this ever-expanding market.

Case Study: Growth in value of bitcoins, promoted cryptocurrencies as the replacement of fiat currencies.

Let us study the growth of bitcoins and introduction of cryptocurrencies in market.

Assume that buyers' utility function is:

$$U(x) = \log(x + b) - \log b \text{ with } b \approx 0.$$

We will pick the following parameter's values for the benchmarking.

	Values	Target
β	0.999916553598325	period length = 1 day
B	6873428	max. no of average-sized transactions
μ	1.0003	money growth rate
σ	0.0178	velocity per block (block length = 10 mins)
τ	0.000088	transaction fee
α	1	normalization

The length of each trading session is 10 minutes (i.e. average block time) for an average day of 10 hours. We assume $\beta = 0.9999$ gives an annual discount factor of 0.97.

If we look at numbers then we can see average Bitcoin supply in 2015 was 14342502.95. So, the revenue's growth rate per day in 2015 is:

$$\mu = (1 + 25/14342502.95)^{6 \times 24} = 1.0003.$$

	Per day	Per block
Transaction fees (BTC)	22.45900183	0.15596529
Number of transactions	122129.7534	848.1232877
Estimated transaction volume (BTC)	254843.1781	1769.744292

We have set $\sigma = 0.0178$ to match the avg. fraction of Bitcoins transacted in spending per day, and setting $\tau = 0.15596529/1769.744292 = 0.000088129$ to match the transaction fees data. The average transaction size comes out to be:

$$\tau = 1769.744292 / 848.1232877 = 2.086659237$$

Therefore, we have set $B = 6873428.441$ which is the maximum number of average-sized transactions that the existing stock of Bitcoin can support.

After analysing case studies & comparing it with the current traditional fiat ecosystem, we came to the conclusion that the most robust & effective technology will be digital currencies. This fast & hi-tech market is at its initial stage which needs a system & infrastructure to grow. Therefore, our introduction of CrowdBank will fill the gap between tradition fiat & advanced crypto. The ecosystem that we are creating through CrowdBank and its infrastructure will facilitate global crypto banking & trading securely.

3. THE PROBLEMS

The current banking system is functioning on an obsolete infrastructure which is no longer up to date and is not serving the interest of its retail customers or the micro-economy as a whole. Individuals, freelancers and Small and Medium-sized Enterprises (SMEs) are struggling to obtain affordable funding and they are often neglected completely by the banking giants. This problem has been aggravated recently by the banks' reckless behavior during the financial crisis, which has further increased the public's dissatisfaction towards such banking institutions.

However, most banking systems were implemented decades ago and are hugely inefficient and incoming CEOs are unable or unwilling to migrate to new technologies and systems. This makes the entire banking and financial industry extremely inefficient and slow, with the large centralized institutions controlling trading and commanding high fees.

In addition, centralized institutions do not wish to relinquish their market dominant positions and have put up barriers to fintech and new digital currency and blockchain solutions in order to slow down or stop the advance of new systems and technologies, and the nascent blockchain and cryptocurrency system face huge barriers such as payments, bank account opening and maintenance, flows of fiat currencies in exchange for crypto-assets, etc.

CrowdBank has pinpointed the key issues with the prevailing banking system, which is what we seek to address and alter.

3.1. Government Intervention and Centralized Banking

We, as individuals or a society, have become increasingly reliant on banks. We are completely dependent on banks for our day to day activities such as paying for our groceries with a debit/credit card, obtaining loans to buy a house/car or opening a savings account to put money away for future needs.

Banking services have become an integral part of our day-to-day life, and this over-reliance has resulted in banks having a worrisome amount of control over our money and personal data. This loss of privacy and control has various ill effects which effectively expose us to the risks from the banking industry, as seen during the global financial crisis in 2008.

In this way, the government has the power (in most countries) to intervene and access the account of an individual, if any problem ever arises. The government may freeze or confiscate the account of a person and it is difficult for the individual to get the account back. Also, it may result in long and expensive judicial battles before the person can gain access to that account. Moreover, governments have the right to take away any allegedly unpaid tax money as well, and many governments practice

3.3. Underserved Micro-economy

The efficient and effective distribution of resources between businesses and individuals is of uttermost importance to our quality of life and sense of well-being. The problem currently, is that for societies around the world, the current distribution is ineffective and inefficient.

Most of the individuals, freelancers and SME's are often excluded completely from the system. For example, in the United Kingdom - one of the wealthiest economies in the world, there are still over 2 million people who are unbanked. But, for those who do have access to banking services, they have access to only a few services, with their financial needs often being neglected due to circumstances outside of their control (e.g. their risk profile does not fit within strict risk parameters set by their banks).

Problems in the economy and for the underbanked and unbanked can become intensified when traditional and modern banking systems decrease access to banking services to individuals, freelancers and SME's, reducing innovation, entrepreneurship and eventually our quality of life.

3.4. Inadequate Systems and Unfair practices

There have been numerous inventions within the banking and payment platforms in the last couple of years, due to which transferring and managing money has become more convenient and accessible. We've seen an ample number of e-wallets, mobile money, new fiat currencies, credits and digital currencies.

But, each of these inventions has its own limitations or has not yet been leveraged to provide a comprehensive and global solution to the problems we find.

Keeping in mind the present state of affairs, the current banking systems are not created to support local or global micro-economy, nor do they encourage financial inclusion, chiefly due to the following reasons:

- **Based on Asymmetric information**

When one party has more information than the other, there is an imbalance of power between them during a transaction. The cost is increased and transactions are delayed due to all this. It also requires third-party intermediaries which lead to major issues such as adverse selection, moral hazard and information monopoly.

- **Use Customer data to the detriment of their Privacy**

Sometimes, data is sold to third parties for profit or unrelated purposes. Traditional banking systems will be adversely affected by the new GDPR regulations implemented by the European Union. The current system will have to be completely redesigned in order to fit the functionality of how they collect, use, and store customer data.

- **Exclusive or non-inclusive**

The current banking system is not motivated or encouraged as the unbanked or underbanked adult global population involves high cost which is incurred due to initial registration procedure of such probable customers (considering the small balances they may have). Legacy systems are also a barrier to financial inclusion for such people. Integrating third parties or adding intermediaries is not a solution. It is not economically viable to reach the remaining unbanked population. The cost must be reduced initially in order to include these people in the financial system.

- **Competition**

Banking is often viewed as an oligopoly, where a few entities have a major market share. This can lead to collusion between such entities to fix prices at the expense of consumers. A decentralized system overtakes the networking platform even though banking systems are more efficient when a huge number of people use it and seek service from each other, leading to more choices.

- **Centralized**

The centralized nature of such institutions produces an ineffective supply of power and puts customers' data and money at risk. We have overcome the limitations of the existing banking systems and the economic certainty by studying the successes and mistakes of the latest inventions. The constant growth in our knowledge of regulatory compliance and conducting research on such matters with the help of financial services and emerging technologies, which has made us capable of devising effective and efficient banking solutions for the global micro-economy. To this effect, our highly skilled team has created a map for a decentralized banking system, which offers a solution to the limitations encountered by the micro-economy.

4. OUR SOLUTION

CrowdBank leverages blockchain, smart contract, and machine learning to offer revolutionary decentralized banking services for people across the globe. We will be able to link people and businesses to a new global financial system which completely changes the existing micro-economic ecosystem by applying and managing advanced technological, social, economic and regulatory functions. We are building a global banking network by combining social connectivity and banking, the result of which is fostering international collaboration and inter-community engagement.

In essence, CrowdBank is building a decentralized cryptocurrency bank powered by the community. The fundamental principle of CrowdBank is based on blockchain technologies and other technical and system advancements, in order to offer clients a choice of more secure, transparent, faster and cheaper centralized, hybrid, and peer-to-peer banking, thereby allowing clients greater freedom of choice of services as well as security and lower fees and faster transaction times than the current traditional systems in place around the world.

CrowdBank will be working with licensed fintech solutions that are already existing, and will acquire banks and banking licenses around the world in countries that require such licenses, and will also roll out solutions that may not require any banking or financial-related license, for example *Peer-to-Peer banking* which is an online system that allows individuals to undertake financial transactions with one another by using an auction style process, that let its members offer financial service for a specific amount and at a specific rate. It is an effective way of pooling resources within the community of CrowdBank and in effect the global crypto communities.

4.1. Mobile Application

We have developed a mobile application for CrowdBank through which anyone can quickly create their equivalent of a bank account easily, without involving in any cumbersome processes. CrowdBank will work with KYC and digital identity providers to enable quick, painless onboarding of clients to open a basic wallet with CrowdBank. A new member just has to upload one form of legal ID or get referred by someone who is fully verified in the system (social KYC and digital identity verification), in order to get access to their own basic bank account. CrowdBank allows businesses and individuals to control their crypto assets anywhere, as long as they have an internet connection.

CrowdBank also supports the functions of traditional banking such as money transfers, payment transactions, cash deposit/withdrawal and other peer-to-peer transactions through contracts.



4.2. Mobile Contactless Payments

As soon as a customer downloads the CrowdBank Mobile Banking App or uses its desktop web equivalent, customers will be able to make transactions in existing digital infrastructures such as credit cards and debit cards. Gone are the days when you need to apply for a debit card and wait for weeks for it to be delivered. Customers will be able to transact in certain major cryptocurrencies (such as BTC and ETH) or in ERC20 standard tokens for any product or services at any POS or POP terminals (Point of Sale (POS) or Point of Purchase (POP) is the time and place where a retail transaction is completed)⁴. There are already over 42 million terminals installed throughout the world, that are fitted with NFC (Near Field Communication), that can be accessed via the CrowdBank Mobile Banking App.

CrowdBank uses NFC HCE (host card emulation) protocols to tokenize the data on the virtual payment card and in turn, the POS terminal reads the connections as if it were a standard plastic card. Technically, these days, any NFC enabled payment service, such as Apple Pay, Samsung Pay, Google Pay or any other such provider, can be used to pay with cryptocurrency, and as far as the retailer or online store is concerned, they are being paid in the currency as per their payment order. This service will be extended to cash withdrawals and other banking activities as well.

4.3. Cryptocurrency Exchange

Users will be able to exchange a popular cryptocurrency into other cryptocurrencies. Traditionally, one of the basic function of a bank is to provide currency exchange services to the customers in order to convert one kind of currency into the customer's choice of currency, and the same function has now been incorporated in CrowdBank which provides cryptocurrency exchange services through their Mobile Banking App. Crypto-exchange services vary across the globe and are not standardized. Prices of currencies fluctuate across all the exchanges out there in the market. But, after the introduction of CrowdBank's crypto-exchange, we expect to remove such fluctuation and make the system transparent. CrowdBank is also seeking to partner with multiple crypto-exchanges from all over the world to onboard them as ecosystem partners, and having all the crypto assets liquidity in a shared ecosystem will allow users to enjoy less fees and greater access to all crypto-assets in the ecosystem.

4.4. CrowdBank's eWallet

CrowdBank is providing a highly secured Multisignon ewallet to its users. Users can keep their fiat and all types of cryptocurrencies here safely. It will make the transaction handy and quick for the users. Moreover, the ewallet provided by CrowdBank has all

⁴ Referenced from https://en.wikipedia.org/wiki/Point_of_sale

the safety features which generally other ewallets that are provided by exchanges lack.

4.5. CrowdBank's Interest Bearing Deposits

For the first time in the world, users can generate an income from the crypto-assets they have deposited into their accounts by providing peer-to-peer services such as currency exchange, lending and earning a fee, just as a traditional bank does. This will be the first of its kind where clients who are HODLing their crypto-assets can enjoy crypto returns on their assets whilst enjoying CrowdBank's custodial service partnerships, thereby achieving peace of mind and also increasing crypto asset holdings!

4.6. Peer-to-Peer Payments

The banking platform provided by CrowdBank can be used to create instant and direct payment flow that connects payers and payees internationally or domestically, at nominal fees without involving intermediaries.

For example, companies or peers can easily automate payroll processing, instantly disburse funds from their CrowdBank account to their employees or other peers' CrowdBank bank account. Another great example is international trade, where sellers can collect payment from buyers instantly, without any capital interference or capital control imposed by certain governments or financial institutions.

4.7. Peer-to-Peer Loan

Cryptobank users can lend and borrow from each other. All the terms regarding payments and rates are clearly mentioned, agreed upon and quick to implement. This is done in a transparent manner as secured smart contracts are deployed between the lender and borrower within each loan transaction.

4.8. Peer-to-Peer Insurance

Peer-to-Peer insurance alleviates the struggle that intrinsically rises between a traditional insurer and a policyholder when an insurer retains the premiums against the claims which does not lead to a payout. Through CrowdBank's app, users will be able to connect to other users who share the same interests.

These like-minded individuals can club their premiums together to protect themselves against a risk. The insurance pool comprised of friends, family members or individuals who collaborate to mitigate each other's losses. All the insurance policies and the cause will be transparent to users in CrowdBank's ecosystem.

4.9. Price-stable Capital Movement

CrowdBank's token has a smart contract feature that allows clients to peg the token against fiat currencies, such as USD, EURO or RMB. By doing so, the token is ascertained as a price-stable digital asset because it is backed by equal reserves in fiat currencies, allowing such assets to be bought and sold in the open market. Also, our customers can use price-stable cryptocurrencies offered by CrowdBank to protect from the volatility of the cryptocurrency market. CrowdBank allows users to exchange their cryptocurrencies into other cryptocurrencies available with CrowdBank's exchange.

4.10. Syndicate Loan Management

Through syndicate loan management system, if a corporate or an SME wants to have a loan, they can create a pool with the help of CrowdBank tokens. Here, multiple customers can participate in the pool and create a syndicate loan for the client who is seeking the loan. Each customer can offer different types of rates, which will be attached between the lenders' accounts and pooled account. Based on the accepted criteria, a syndicate loan will be created for a corporate customer. Repayment of the syndicate loan will be initiated based on the flexible smart contract created during the initiation of syndicate loan.

4.11. Crypto to Crypto to (Fiat) Lending

CrowdBank's customers can avail "crypto to crypto to fiat lending" on CrowdBank's platform. If any CrowdBank's customer wants to borrow on their assets, they may do so with the help of crypto or other accepted collateral. To protect the lender's lent assets, "crypto to crypto to fiat lending" will be linked with an added safety measure, i.e. with crypto collateral. For example, if an individual would like to lend his crypto assets and another person would like to have an urgent cash flow without selling his cryptocurrency (as he expects them to appreciate in value and does not want to release them as yet), then our platform will allow the two parties to use our smart contracts to input collateral (say, bitcoin) in return for our SCE (the lender buys SCE from our exchanges or eWallets and lends the SCE to the borrower) at a 50% LTV (loan to value) and an agreed "interest" rate of crypto assets. On repayment of the loaned crypto-assets, the borrower would get the same amount of cryptocurrency that was kept as collateral unlocked by the smart contract. This is a very significant advantage

for the users who want to have an urgent cash flow while keeping their cryptocurrency safe as collateral (and as HODLer's!). If the market value of the collateral goes below 55%, an alert will go to the customer to add more cryptocurrency as collateral; otherwise, the system can liquidate the collateral to avoid any losses to the lender.

4.12. Cross Cryptocurrency Transfer

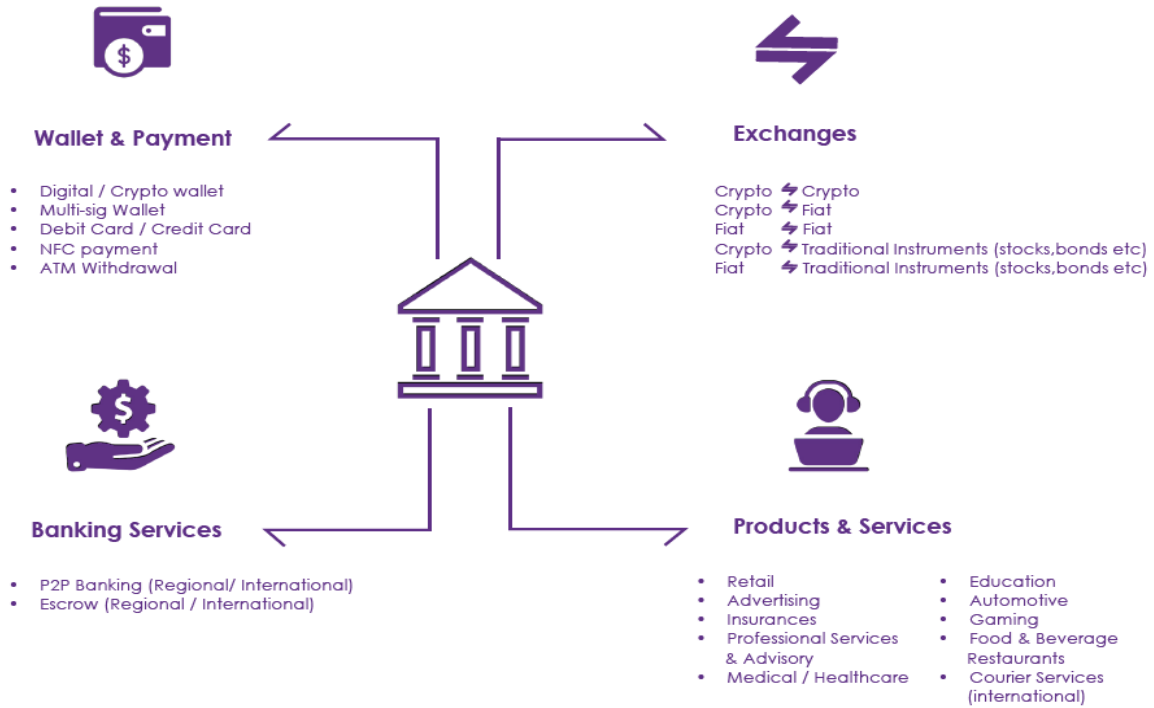
One of the major problems with cryptocurrency exchange is to have multiple stages while converting one cryptocurrency to another. Currently, there is no way a user can initiate a cross cryptocurrency transaction. With the help of CrowdBank's inbuilt functionality, a customer can purchase and sell different types of cryptocurrencies with the help of CrowdBank tokens, which will be invisible to customers.

4.13. CrowdBank's Customer Account Statement

At any point in time, all CrowdBank customers will have access to an ad-hoc consolidated customers' statement. A unique feature of the crypto customers' account statement is that it has full details of the transactions along with a transactions' narrations. With the help of this data, the inbuilt CrowdBank artificial intelligence (AI) system (bot) would generate the projection to target different types of the customer base, which helps in alerting any fraudulent transactions and satisfies the compliance requirement of the transaction details of the customer.

5. CROWDBANK'S SOLUTION AND PLANS

The below diagram gives an overview of the CrowdBank system and the description of the solution and products and services are described in detail below:



6.1.3 Control & Self-Determination

Account holders in CrowdBank are in control of their own funds on the blockchain, and users can transact on the CrowdBank blockchain without the explicit approval of any intermediary or central entity. That means, the authentic account-holders have access to the necessary private keys. Hence, as long as the rules which are embedded into the smart contracts are met, any account-holder can transact their funds using such private key.

6.1.4 Privacy

Access to private data requires a private key that is in the sole possession of the user. The same is required for transactions as well. Third-party services cannot gain access to any of the user's private keys, neither will they be able to act on behalf of the user nor access user data unless explicitly authorized by the user.

Furthermore, we are cognizant of the issues faced while ensuring privacy on a blockchain system, and hence we will leverage privacy conserving features such as zero-knowledge proof. In cryptography, a **zero-knowledge proof** or **zero-knowledge protocol** is a method by which one party (the *prover* Peggy) can prove to another party (the *verifier* Victor) that it knows a value x , without conveying any information apart from the fact that it knows the value x^6 , data encryption and cryptographic hashing (It is a mathematical algorithm that maps data of arbitrary size to a bit string of a fixed size (a hash) and is designed to be a one-way function, that is, a function which is infeasible to invert)⁷ to secure the privacy. But, where sharing of private data of the user is required, an explicit authorization is requested from the user and only the user having the private key will be able to authorize such access.

Also, CrowdBank makes use of the Tor software that has been included without any functional changes. It is not possible to connect to the CrowdBank network without using Tor, as all nodes are only reachable via their hidden service address. Original IP addresses cannot be revealed to any network participant except for their own and it is not feasible for an attacker to analyze the network structure or censor the network.

As stated earlier, CrowdBank has inbuilt support for OBFS4, an obfuscation protocol that hides the nature of the traffic that goes through it. By incorporating OBFS4, it is possible to use CrowdBank even in countries where access to the Tor network is censored. In short, the incorporation of OBFS4 efficiently 'wraps' the Tor traffic in an additional layer, making it appear as normal internet traffic.

⁶ Referenced from https://en.wikipedia.org/wiki/Zero-knowledge_proof

⁷ Referenced from https://en.wikipedia.org/wiki/Cryptographic_hash_function

6.1.5 Recovery and Succession

To confirm that only the user can access their funds, all private keys of the respective users must be kept within their devices when using the CrowdBank Peer-to-Peer system, which implies that if the device is compromised or lost, the accessibility to their respective funds in the Peer-to-Peer system would be potentially at risk. In order to comply with the user-friendliness of the banking services and to avoid loss of funds, additional security measures must be implemented for Recovery and Succession of the compromised or lost data.

One of the key approaches to Traditional Recovery Approach is Schnorr Signatures (In cryptography, a **Schnorr signature** is a digital signature produced by the **Schnorr signature algorithm**. Its security is based on the intractability of certain discrete alogarithm problems)⁸, which essentially allow a private key to be split into multiple pieces, and divided in a way that M out of N pieces are required in order to reconstruct the original.

Through this approach, a portion of the key encrypted would be kept within the devices of a group of designated parties, which would get attested to the identity of a concerned person whenever required. Such roles can be undertaken by family and friends (the closely related parties) but could also be taken by governmental entities or businesses (the local parties). In the event of creation of a CrowdBank account through KYC, the person that originally extends the invitation would likely be one of the designated parties on a default basis.

A Recovery scenario where a private key is lost, a portion of the Private Key with the designated parties would allow for a new private key to be associated with the identity of the concerned user, therefore allowing the user to regain access to their account. In case of a succession, the designated parties would attest to the fact that such an event has taken place. It would allow the system to disburse funds to designated heirs, which in return, will also lead to smart contracts, enabling regulatory reporting obligations as per the jurisdiction of the bank account.

We are still investigating these possibilities in combination with a systematic regulatory analysis, but regardless of the combination of mechanisms, it is essential that we preserve the decentralized nature of the system, and that recovery activities can be made to happen without the person having to cede control to a central or intermediary entity.

⁸ Referenced from https://en.wikipedia.org/wiki/Schnorr_signature

6.1.6 Cloud Hybrid

One of the important and key functions of CrowdBank is to build a decentralized ecosystem which can survive the collapse of its participants (even when there are multiple participants in engagement with different roles and permissions).

We are aware of the gap that could occur while communicating with legacy systems/technologies, such as, handling the intersection between new technologies and existing regulations/obligations or looking to process large volumes of data in a secure manner. For instance, processing of the captured biometric data, where current deficiencies explain that centralize processing of some of these items will be performed before going into the blockchain. Another such instance is the gateway which sends and receives fund using traditional banking systems.

Hence, at this point there are a few cutting-edge facets of our solution that will be disseminated in a traditional clouding manner, thereby making CrowdBank an amalgamation of cloud technology that carries the best functions that blockchain has to offer. We will, nevertheless, continue to chase our aim of a completely decentralized system that can endure the passage of time and the escalation of organizations.

6.2. Identity and Data

One of the key aspects of CrowdBank is handling the data and identity of individuals which evolves with time for an individual in an increasing degree of certainty, allowing additional services to be used and restrictions to be reduced.

6.2.1. Peer-to-Peer Identity Validation

Within CrowdBank, users help validate the identity of other users. Vouching of a user's identity can be done by any other user who has gone through the entire validation process on the platform, thereby validating their identity. Whenever available and authorized by users, additional validation is also performed by analyzing social graph information.

This allows new users to gain services up to a certain threshold limit governed by the transaction. It helps CrowdBank to flourish among millions of people, while ensuring that we create a network of trust that exists in real life.

6.2.2. Extended Identity verification

Apart from peer validation, to gain access to more services and remove restrictions, users will be required to offer multiple methods of proving their identity, such as by providing additional documentation or, where available, Electronic ID Verification mechanisms.

Some of the participants in the CrowdBank platform also have numerous ways of verifying the identity of the user they bring aboard, which can be used to enhance CrowdBank's level of trust in any given identity. Additionally, we are also expecting to cooperate with other projects which are currently building blockchain-based digital identity solutions. All of these solutions help us to validate the digital identity of our account holders and ensure that they are legitimate.

7. SECURITY AND RISK

A set of practices guide our Security Plan, based on modernized security standards and a particular attention to the decentralized portions of our infrastructure and operations. This allows us to comply with the guidelines, such as OWASP (the **Open Web Application Security Project**, an online community, produces freely-available articles, methodologies, documentation, tools, and technologies in the field of web application security)⁹, PCI DSS (the **Payment Card Industry Data Security Standard** is an information security standard for organizations that handle branded credit cards from the major card schemes)¹⁰, PSD2 (a revised Payment Service Directive administered by the European Commission (Directorate General Internal Market) to regulate payment services and payment service providers throughout the European Union and European Economic Area)¹¹ and other relevant security guidelines.

CrowdBank follows a multi-layer security pattern, where numerous solutions are provided for different types of functionalities and capabilities, which in some cases overlap, in order to obtain feedback from different sources.

7.1. Business Continuity

We maintain a Business Continuity Plan (a plan which will be molded based on future regulations and technology need), that has been planned and tested, including crisis communications, both in terms of information systems, operations and support services. The decentralized nature of our technology offers us a natural benefit in this milieu, and our state of the art architecture and careful development provides for the rest.

7.2. Control Activities

Blockchain implemented by CrowdBank will execute all the regulatory policies transparently on the blockchain via integration of DApps in the CrowdBank's system. These activities include policies, guidelines, techniques, procedures and mechanisms flow which ensures no risks to the system and users.

In other words, control activities taken forth by CrowdBank are the actions taken to minimize risk. When the assessment recognizes a major risk on account of the achievement of an objective, a corresponding control activity (or activities) is determined and implemented.

⁹ Referenced from <https://en.wikipedia.org/wiki/OWASP>

¹⁰ Referenced from https://en.wikipedia.org/wiki/Payment_Card_Industry_Data_Security_Standard

¹¹ Referenced from

[https://en.wikipedia.org/wiki/Payment_Services_Directive#Revised_Directive_on_Payment_Services_\(PSD2\)](https://en.wikipedia.org/wiki/Payment_Services_Directive#Revised_Directive_on_Payment_Services_(PSD2))

Prevention control techniques adopted by CrowdBank are designed to discourage pre-empt errors or irregularities from occurring. There are many ways to interpret such prevention principles.

Control Activity, features applied to CrowdBank's system are:

- **Security by Correctness Guarantees 100% Satisfaction to Our Users**

CrowdBank follows a system of Security by Correctness which directs to ensure that any malicious code or bugs in the system gets rid of during the software production stages, and never goes live. Therefore, we ensure 100% satisfaction to all our users who are using the CrowdBank's' system as their digital crypto-fiat bank.

While designing CrowdBank's ecosystem we have used number of techniques that rely on obfuscation, encryption and randomization, in order to raise the bar on obscurity.

- **Modularizing Elements to Keep Details of System in Check**

The workings of our CrowdBank system are very unique. We cannot afford to miss a single unfixed entity. Therefore, we break elements of the system into small units (subparts are designed in main compartments like insurance, balance management, trade, loan, savings, etc.) that are easy to describe, design, maintain, and operate in a more independent manner. This kind of compartmentalization means that if a part of the system misbehaves in any way, it can only affect other parts in a reduced and controlled manner.

Designing a system which is partitioned into meaningful pieces and setting permissions and relations for each piece is done by CrowdBank's team. In other words, individual complexity is removed from the system.

- **Obscurity & Trials in CrowdBank's System**

No matter how hard we work to reduce and remove bugs, we know that there are always possibilities that one will make it through and being a crypto-bank, we understand that we cannot afford it.

While designing CrowdBank's ecosystem we have used a number of techniques that rely on obfuscation, encryption and randomization, in order to raise the bar on obscurity.

- **Fraud Control system of CrowdBank**

CrowdBank relies on continuous analysis and automated indicators which are embedded into its technical infrastructure. At the same time, we look to foster an

environment where staff does not feel like they have to hide any mistakes they make. Here peer-reviews and support are actively encouraged within the team. This ensures that internal controls are not merely tolerated, but actively supported as means to protect both our staff, our users and their data.

7.3. Information management

In order to protect the information, resources and depositaries of protected information that are placed under CrowdBank custody, it is necessary to have clear attributions of responsibilities and access levels. CrowdBank's team is structured in a way that promotes segregation of responsibilities, with the operational teams functioning separately from development and business teams. Information classification is established in order to determine the relative sensitivity and criticality of assets, which provide the basis for protection efforts and access control. Data Warehousing is used effectively by our tech team to manage huge information and store them in a secured way. Reports are created by business analysts on this data using business intelligence technique. These reports help to keep track of all the information in graphical way on which higher management of CrowdBank keeps eye on.

7.4. Application Security

CrowdBank is maintaining several internal procedures within the systems. We also maintain number of signals and techniques which validate and/or increase verification of our user activities. We particularly use following methods:

- Allow multiple factors of authentication, such as:
 - A password and User ID (a password of 8-15 letters with at least 1 upper case, 1 lower case, 1 numeric value & 1 special character)
 - A One-Time-Password (OTP) or a device ID (OTP code will be generated on email or phone number)
 - A behavior or gesture (biometric gestures like finger print has to be uploaded)
- Historical activity, including:
 - Transactions' size and relations to overall balance (all type of transactions are managed in our data warehouse optimally)
 - Transactions' history of contacts (complete buy or sell history with profile of user details are maintained in our database)

- Device and browser's usage (IP address are maintained at our backend systems)
- Geographical history
- User Interface and Experience, including:
 - Consistent visual language to assist our customers with infographics
 - Consistent written language to assist global clients in different language
 - Consistent confirmation prompts to make sure our clients do not miss important information
 - Preview for critical actions so that mistakes are at bay
 - Various other approaches to reduce errors and conscious mistakes

7.5. Insurance Deposits

CrowdBank will go about facilitating its customers with insurance against loss of their assets. For example, both merchants and buyers deposit an insurance amount into the multi signature escrow address. The insurance deposit is a percentage of the sale price. Assuming the ratio is 100%, the concept can be easily explained using the following example.

Say a painting is listed for crypto equivalents of \$100, with an insurance ratio of 80%. The insurer would provide insurance of \$80 equivalent worth of crypto currencies, and the buyer would deposit assets of \$100 (crypto payment) and premiums offered by the insurer for \$80 (crypto insurance) equivalents. If both actors are have completed deal successfully and the sale went through, then both will get the release of their stakes (buyer releases \$100 equivalent, insurer gets his \$80 worth back and earns his premium from the buyer), and the merchant receives \$100 worth of crypto-assets as payment. The insurance put up by the merchant introduces a risk in closing the sale, and in this case the buyer pays, but this can also play out as the merchant paying. In any case, the insurer earns his premium for undertaking this risk and staking the transaction.

8. TOKEN ECONOMICS

8.1. Two Coin System

The CrowdBank Project will have a two-coin system. The 1st coin will be a variable coin called the CrowdBank Token (CBK) while the second coin will be a stable coin called the CrowdBank Stable Coin Euro (SCE).

8.1.1. CrowdBank Token (CBK)

The variable coin is based on NEP-5 and will be the coin issued to raise funds during the ICO. The CrowdBank token will be a utility token which allows users to access CrowdBank's platform. 20% of all the business profits from this CrowdBank token will be retained to ensure liquidity levels in the platform and for the security in the event of any fraudulent activity. As the coin is a utility token, it is expected that with the speedy (1000 transactions per block) flow of CBK coin in the system, we will achieve better market acceptability. This will create crunch in the market for CBK coin which will therefore increase the worth of coin. In terms of economics, it is the demand and supply crunch which is well planned by the team. The concept implemented here will make sure that the value of coin increases exponentially with time.

Following are the use cases of the token within the CrowdBank platform:

- Transaction fees in payments at CrowdBank's platform
- Transaction fees in loans at CrowdBank's platform
- Transaction fees in insurance at CrowdBank's platform
- Transaction fees in ewallet transfers at CrowdBank's platform
- Transaction fees in exchange fees, withdrawals and listings

Please note: CrowdBank's customers who use the Crowdbank Tokens for the above activities will get 50% discount on all of the transaction fees for the first year, 40% off from second year, 30% discount on the third year, and 25% discount from the fourth year of operation onwards.

20% of all business profits from the Crowdbank token will be retained to ensure liquidity levels in the platform, and for the security in the event of any fraudulent activity.

In the ICO event, 16,000,000,000 CrowdBank tokens will be created and 8,000,000,000 sold. In any event where all CBK tokens that are released for sale are not sold at a certain stage, the remaining unsold amounts (balance) will also be released for sale at the next stage. If the sale of all planned tokens is completed quickly w.r.t. to the time frame calculated, then its next stage starts automatically. Below table illustrates token-economics for Crowdbank's ICO token sale:

Name of Token	CrowdBank Token (CBK)
Type of Coin	Variable
Purpose of Token	Loyalty coin on Crowdbank Platform
Utility Token	Yes
Ticker Symbol	CBK
Number in Circulation	16 Billion total, 8 Billion sold
Token Technical Background	NEP-5 Token
Token Sale Start Date (Private Sale Starts)	12 th July 2018
Token Sale End Date (Public Sale End Date)	31 st October 2018
Token Price	1 Token = \$0.01 USD
Soft Cap	25 Million USD
Hard Cap	80 Million USD
Percentage of Total ICO monies raised for business expansion and operations	70%
Amount of money raised allocated for marketing and loyalty purposes	15%
Amount allocated to development	15%
Project Status	Private Sale Stage (at time of writing)
Safekeeping of Funds	Multi-sig Escrow Wallet Accounts, Custodial for Non-Hot Wallet Assets
Accepted currencies for the ICO	Bitcoin (BTC), Ethereum (ETH) & USD & EURO

8.1.2. CrowdBank Stable Coin Euro (SCE)

The stable coin will be used as the main currency within the CrowdBank system for conducting all peer to peer payments, loans, insurance premiums and so on.

The SCE will be tethered at a ratio of 1:1 to the EURO at €1 = 1 SCE.

The stable coin will not only be used by CrowdBank customers within the CrowdBank ecosystem but also for all other crypto banking products on other exchanges and wallets as well. This system will come with its own tokens for users to use in their transactions.

8.2. How to buy CrowdBank tokens?

To be able to buy CrowdBank tokens, the user first needs to register on the CrowdBank platform. Once all the verification process is approved after the registration, the user will need to fund their account. When the account is funded, the user can finally trade and buy tokens as they see fit.

9. INITIAL COIN OFFERING (ICO)

CrowdBank is offering unique benefits to contributors during ICO and to future token holders of the CrowdBank token. ICO contributors will be benefitted from an extensive range of offers in the form of products and services offered by CrowdBank, along with various opportunities to multiply their contribution, as tokens will surely be in high demand in secondary markets due its master economics design.

Tokens will be given in exchange for Ethereum (ETH) and Bitcoin (BTC).

The price of one token is 0.00002 ETH (at the time of writing, but may change as the value of ETH and the USD fluctuates).

Hard cap for ICO is 160,000 ETH and soft cap is 50,000 ETH (at the time of writing, and may fluctuate with the value of ETH and USD).

The total sum of tokens created will contain tokens sold during the three rounds of ICO, bonus tokens, tokens generated for founders, advisors and bounty campaigns.

9.1. Why ICO?

ICO is the finest and the quickest way to interest financing for stimulating projects, particularly those that are community driven and have the aim to advance vital infrastructure elements linked with cryptocurrencies. We are certain that an ICO can enhance innovation, by attracting funds via ICO procedure implies that companies do not have to go through conventional bureaucratic dealings. Furthermore, as an ICO is conducted via smart contracts and blockchain, the whole thing is transparent and project initiators get full credit for effective implementation of the idea.

An ICO also provides opportunities to people from various countries to share their digital assets into ventures and teams located in other nations. In conventional economies, there are numerous limitations and boundaries for people to contribute in such events and there are no opportunities for individuals to contribute a fairly low sum of funds into ventures that promise non-financial benefits.

CrowdBank provides only non-securitized and pure utility benefits to the contributors and future holders of CrowdBank tokens. Nevertheless, with time, we trust that due to these advantages, the value of tokens would go up, and our initial contributors will have the opportunity to sell them, if they are willing to do so.

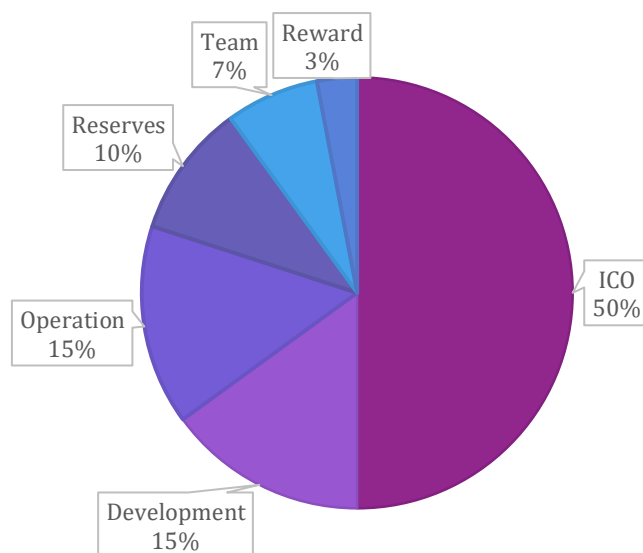
Our project is aimed at innovation in the financial industry and the crypto world, which is why we are giving crypto community the right to be the first ones in supporting our idea.

9.2. Escrow Arrangement

For the crypto community to feel sure that their assets are secure and will be disbursed only in the manner that is described in this document, we have developed multi-signature escrow wallet arrangement. This implies, that the funds that have been secured in the wallet would only be available for transfer from a multi signature escrow wallet, only if three out of four people approve the said transaction.

9.3. Distribution of Tokens

- 50%: Total ICO distribution sold to the CrowdBank community
- 15%: Tokens allocated for operations, marketing etc
- 15% Tokens reserved for development and technology
- 10% Tokens general reserves
- 7%: Reserved for the founders and management of the ICO and advisors
- 3%: Reserved for "bounty" campaign



The 15% of tokens that have been assigned for marketing and loyalty purposes will increasingly be released for operations where needed, and to expand the userbase and to accomplish Monthly Loyalty Program. CrowdBank believes that delivering those products that sustain mass scale adoption as rapidly and competently as possible would simultaneously deliver value to all CrowdBank token holders. 15% will be reserved for further technology developments and building CrowdBank's own protocol and blockchain if necessary, but running high security, enterprise level

software requires constant technical expenses that justify this reserve token allocation. 10% of tokens minted will be held in general treasury and reserves. The final 10% of tokens will be disseminated amongst the project team and advisors (7%), with a lock-up period of 2 years, and the partakers of the Crowdbank "bounty" campaign (3%). CrowdBank guarantees the presence of tokens in the eWallets of individuals who will procure tokens no later than 60 days upon the closing of ICO, once the individual has provided all the necessary account details. Distribution of tokens can be conducted upon closing, but tokens will be inactive for usage and transfers. All possible functionality of tokens will be activated on the 90th day after the ICO closes. Purchase of tokens via wire transfer will be stopped 10 days before the expected date of ICO completion. People who plan to use this method for transfer should deposit all funds prior to that date or use other means to conduct the transfer such as BTC, ETH, LTC and so on. "Bonus" tokens will be minted and distributed to buyers of CBK tokens and released over a lock-up period of 12 months.

9.4. 'Bounty' Structure

Support is essential for numerous marketing and expert discussions in forums such as bitcointalk, along with the involvement of leaders, banner ads and involvement in certain publications that focus on Cryptocurrency and blockchain. The exact dispersal of CrowdBank's tokens for marketing campaigns are looked after by the ICO controllers and adjusted frequently, but under no condition will it rise beyond 3% of the total dispensed CrowdBank tokens.

10. ROADMAP

On the following diagram, the roadmap outlining the key milestones of the CrowdBank project and launch date of the CrowdBank products and services is outlined below:



11. CONCLUSION

CrowdBank's exceptional vision for the future of banking is both revolutionary and achievable. CrowdBank will accredit each person and business within the microeconomy, through a decentralized and all-encompassing financial structure that we have created with passion.

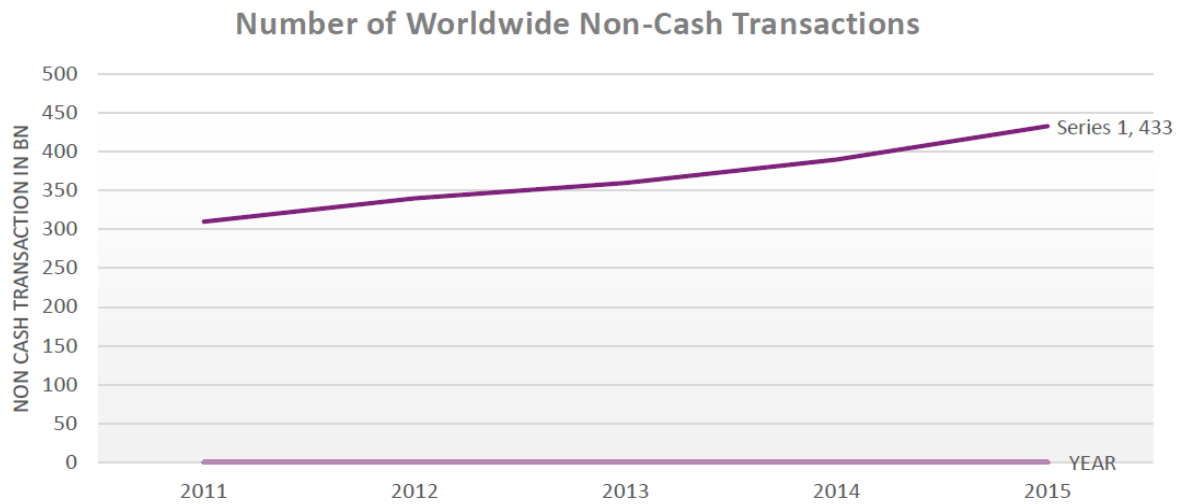
The CrowdBank platform has an amazing potential for development and growth, that is possible through the CrowdBank app. By having a corporeal and digital existence and by executing an organic viral growth mechanism, we anticipate an exponential progress of this technology all through our target markets. The CrowdBank proposition is far better than the current systems offered across by many different platforms. The world is ready for CrowdBank, and now we need to ensure CrowdBank is ready for the world.

The token sale will elevate the funds required to develop and disseminate the CrowdBank solution. Purchasing the CrowdBank token allows you to be a part of the future we have charted here. The CrowdBank token is a key component in CrowdBank's functionality and therefore it will be coalesced into the operations of the platform internationally. There is enormous untapped potential in the global microeconomy, and CrowdBank has a wonderful plan to unlock it.

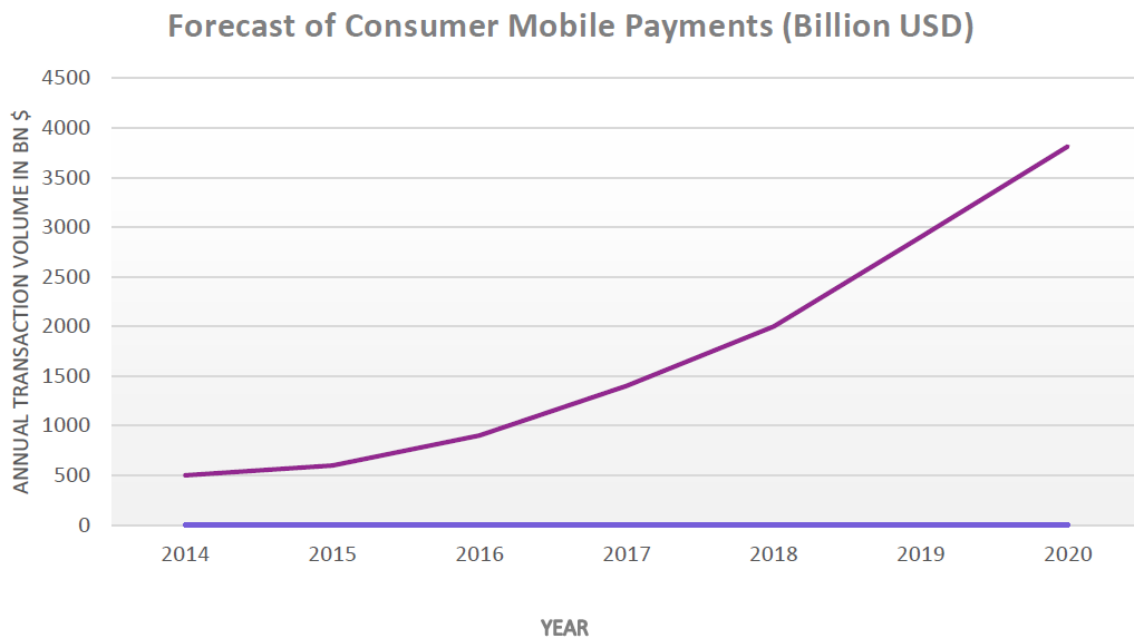
Come, join us in order to help create an impartial, inclusive and well-linked World Bank for the microeconomy.

12. APPENDIX

A.1. Number of Worldwide Non-Cash Transactions (Billions)¹²



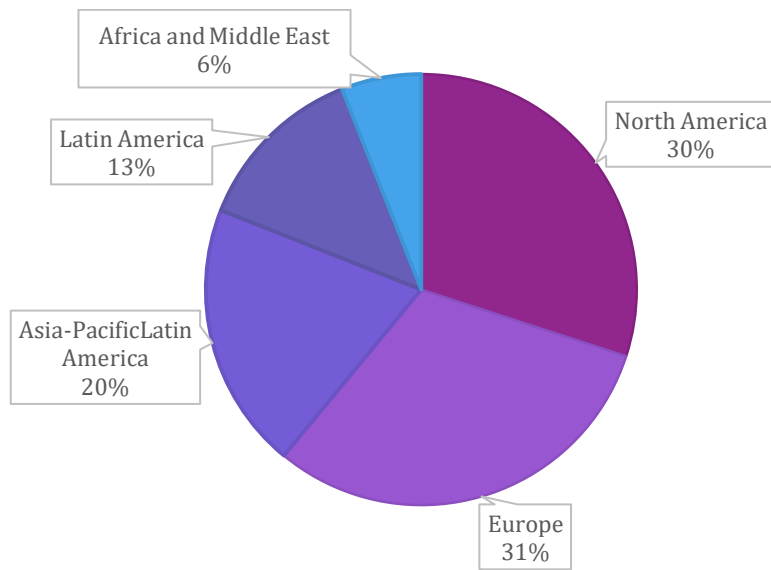
A.2. Forecast of Consumer Mobile Payments (Billion USD)¹³



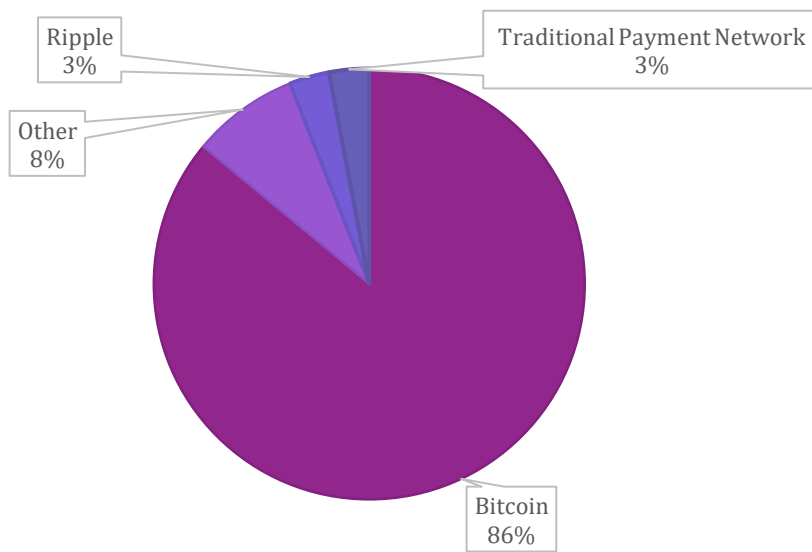
¹² Referenced from <https://www.worldpaymentsreport.com/reports/noncash>

¹³ Referenced from <https://www.statista.com/statistics/226530/mobile-payment-transaction-volume-forecast/>

A.3. The Number of eWallet Users¹⁴



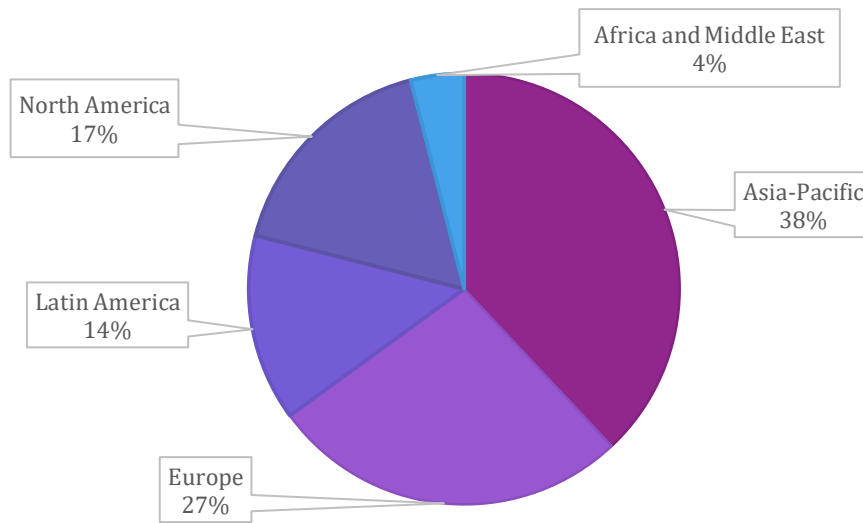
A.4. Use of Bitcoin for Cross Border Transaction¹⁵



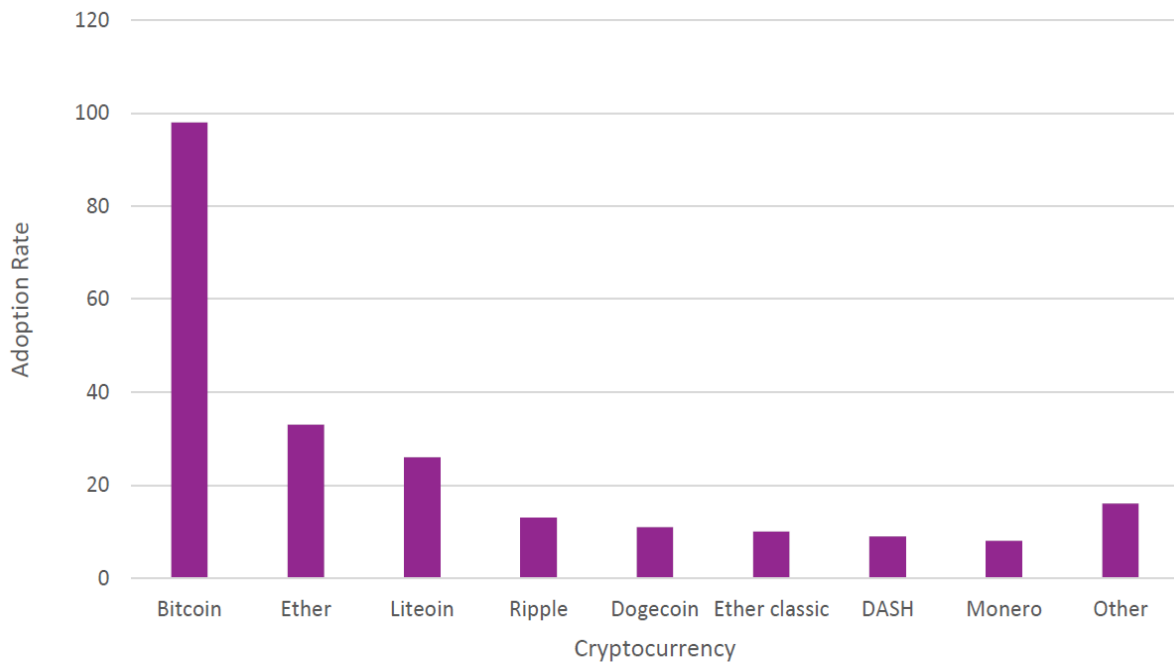
¹⁴ Referenced from <https://www.blockchain.com/charts>

¹⁵ Referenced from <https://www.zerohedge.com/news/2018-05-23/argentine-bank-use-bitcoin-cross-border-transactions>

A.5. Cryptocurrency user share by region¹⁶



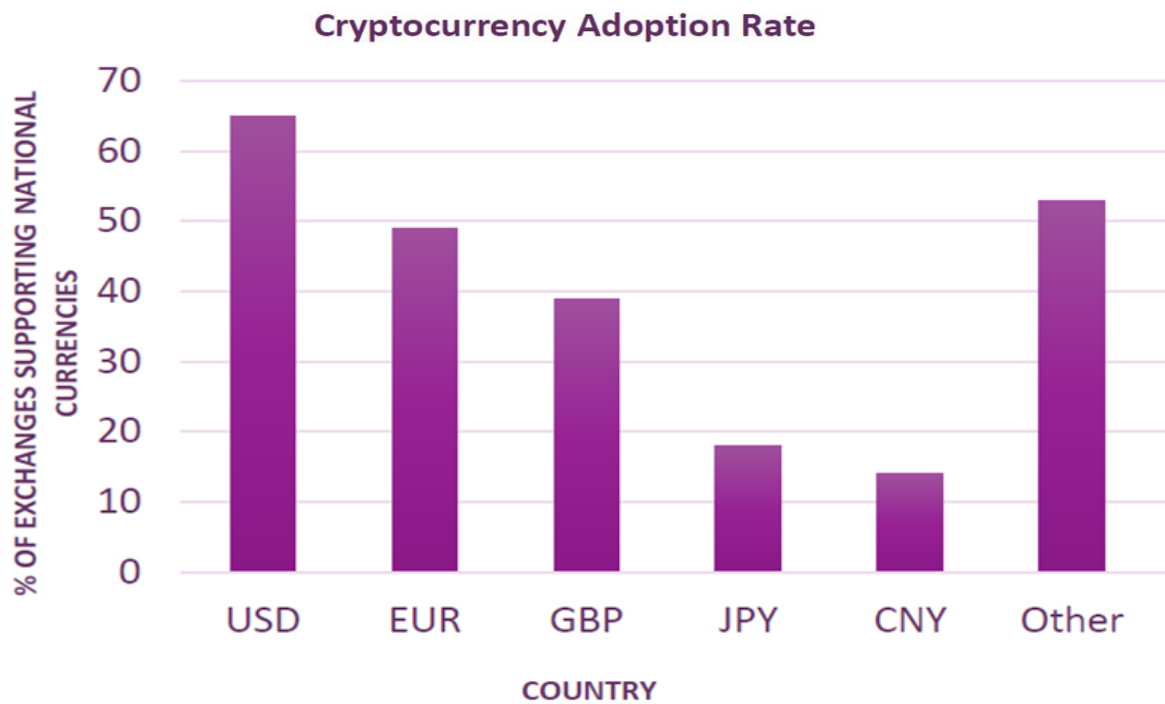
A.6. Cryptocurrency Adoption Rate¹⁷



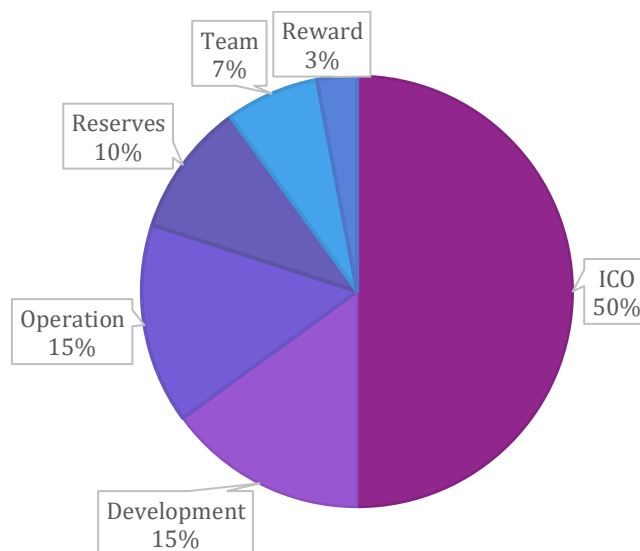
¹⁶ Referenced from <https://www.statista.com/statistics/731461/share-of-cryptocurrency-users-by-region/>

¹⁷ Referenced from <https://www.investing.com/news/forex-news/bitcoin-and-ethereum-lower-amid-fall-in-cryptocurrency-adoption-rate-505458>

A.7. % of Exchange Supporting National Currencies¹⁸



A.8. Distribution of Tokens



¹⁸ Referenced from <https://www.investopedia.com/terms/n/national-currency.asp>

A.9. Usage of Proceeds in CrowdBank Ecosystem

