



BABBB

EVERYONE IS A BANK

BANK ACCOUNT BASED BLOCKCHAIN

BABBB WHITEPAPER

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Authors

Rushd Averroës, Adam Haeems,
Jorge Pereira, Dean Refaat

Contributors

Ricardo Abreu, Annabel Mellor

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Please consult the full disclaimer at the end of this document.

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ABSTRACT

The microeconomy is fundamentally underserved by the incumbent banking system. Emerging technologies provide the opportunity to create an alternative that addresses perennial problems of the banking system in new ways, including systemic risk, data privacy, financial exclusion and sluggish competition.

Distributed ledger technologies, biometrics and machine learning provide us with the tools to create a new kind of bank, global and decentralised, which can service and empower individuals and businesses around the world in ways that traditional banks simply cannot. Built to operate independently of legacy systems, this new decentralised bank will serve, stimulate and galvanise the microeconomy, while operating in full compliance with regulations around the globe as well as Fair Banking principles .

BABB is the decentralised bank for the microeconomy, providing individuals and businesses with a UK bank account, powered by blockchain technology. The account is managed via a smartphone app and provides access to a decentralised payment card. In addition, partnerships with central banks allow for the integration and issuance of other digital currencies around the world, further stimulating local micro-economies and expanding the reach of the BABB solution and its underlying BAX token.

BABB is already an FCA Authorised Payment Institution (API) and will be applying for a Banking licence in early 2018.

INTRODUCTION

The financial services industry is - still - ripe for radical disruption. The existing banking system is built on an outdated infrastructure which no longer serves the interest of its retail customers or the microeconomy as a whole. Based on decades-old technology, mainstream banking completely excludes a third of the global population and is very expensive for the other two thirds.

Many energetic startup companies with bright ideas and ambitious plans have sought to better serve a segment of the unbanked, the underbanked or the underserved people of this world. For the most part, they've attempted this using existing structures, templates, infrastructure and technologies. The progress made so far, by the fintech industry and financial inclusion initiatives, has been promising but limited.

BABB's approach is different. BABB will redesign the economy from the ground up, transforming it from a rigidly hierarchical and exclusionary system into a decentralised and inclusive one. By combining blockchain technology, biometrics and artificial intelligence, we are creating the future of banking, radically different from what the world has seen before.

The World Bank serves the macroeconomy, whereas BABB is the World Bank for the microeconomy. Our ambition is a relatively simple one: everyone in the world should be able to open a UK bank account. The implications of a fully banked global society, however, are huge. This will be a global society of people using smart contracts to make deals, leveraging their social connectivity to make better use of their money.

This whitepaper outlines the problems as we see them, the BABB solution and our plan to implement it. We aim to communicate both the full range of our ambition, a broad level of technical detail, and information on how we comply with regulatory requirements.

THE PROBLEMS

The existing banking system is built on an outdated infrastructure which no longer serves the interest of its retail customers or the microeconomy as a whole. Individuals, freelancers and Small and Medium-sized Enterprises (SMEs) have always struggled to obtain affordable funding from these banking giants and often been excluded completely. This problem has been exacerbated recently by the banks' reckless behaviour in the run-up to the financial crisis, which has further increased the public's discontent towards these traditional banking institutions.

BABB has identified key problems with the existing banking system, which we seek to address.

Banking Systemic Risk

As a society and individuals, we have become increasingly reliant on banks over time. We depend upon banks for daily tasks such as paying for our groceries with a debit or credit card, obtaining loans/mortgages to buy a house, or opening a savings account to put money away for the family holiday.

Banking services have become ingrained in our day-to-day life, and this over-reliance has resulted in banks having a worrying amount of control over both our money and personal data.

This loss of privacy and control has far-reaching effects, effectively exposing us to the systemic risks from the banking industry, as seen in the global financial crisis in 2008. For a more thorough analysis on the systemic banking risks we are inherently exposed to, please refer to *Appendix I*.

Financial Exclusion

It is easy to take financial services for granted. Currently, 2 billion - or 40% of the global adult population - have no bank account or mobile money services¹. These individuals have very limited access to savings, credit, mortgage and insurance products that are common in developed marketplaces, meaning consumers cannot fulfil their financial needs effectively and firms miss opportunities to utilise untapped financial resources.

¹ The Global Findex Database 2014 - Measuring Financial Inclusion around the World

The consequences of financial exclusion go beyond the greater risk and higher cost to consumers of relying on cash and informal financial markets. Forcing people to rely on these methods also undermines government’s ability to collect tax and monitor expenditures.

The following chart² illustrates this reality:



Many existing financial products are attempting to improve financial inclusion by providing better prices for consumers. Green Dot Bank offers prepaid debit cards to serve millions of low and moderate income families; Bank of America offers ‘Safe Balance’ account targeting those traditionally unbanked who cannot meet minimum balance requirements.

However, affordable financial services for the unbanked are not yet offered at large scale, as financial institutions struggle to match the high risk, high volatility nature of these customers and the products they need. The root of the problem is threefold:

1. Difficult physical access to branches/technological access to online banking
2. Over-reliance on cash, particularly in emerging markets
3. Customers do not have enough savings or cash flow to benefit from an account

²Capgemini - The World Payments Report

Underserved Microeconomy

The efficient distribution of resources between businesses and individuals is of paramount importance to our quality of life and sense of well-being. The obvious conclusion, as we look to communities around the world, is that the current distribution is inefficient.

Individuals, freelancers and SME's are often excluded completely from the system. In the UK - one of the wealthiest economies in the world - there are still 1.5m people who are unbanked³. In addition, many of the people and businesses who do have access to banking, only have access to a very limited number of services, with their financial needs often not met due to circumstances outside of their control (e.g. their risk profile does not fit within strict risk parameters set by their bank).

Inefficiency in the economy can be exacerbated when traditional and modern banking systems reduce access to banking services to individuals, freelancers and SME's, reducing innovation, entrepreneurship and ultimately our quality of life.

Inadequate Systems and Unfair practices

There has been an abundance of innovation within the banking and payments space in the last few years, which seek to make money management and transfer more convenient and accessible. We've seen an explosion in the offering of e-wallets, mobile money, new currency & credits and digital currencies.

However, each of these innovations has its own limitations, or has not yet been leveraged to provide a comprehensive and global solution to the problems we find. For a more detailed analysis on these innovations please refer to *Appendix II*.

As we take stock of the current state of things, we conclude that existing systems are not designed to support the local or global microeconomy nor do they encourage financial inclusion, primarily due to the following reasons:

1. Based on Asymmetric information

When one party has more information than another, there is an imbalance of power between them when transacting. This increases the costs and delays of transactions, requires third party intermediaries and leads to major issues such as adverse selection, moral hazard, and information monopoly.

³ University of Birmingham - Financial Inclusion Annual Monitoring Report 2015

2. Use Customer data to the detriment of their Privacy

Data is not always used appropriately and is often sold to third parties for profit or unrelated purposes. Traditional banking systems will be adversely affected by the upcoming GDPR regulation in the E.U., and will have to completely redesign how they collect, use, and store customer data.

3. Exclusive or non-inclusive

The existing financial system is not incentivised to bank the unbanked or underbanked global population due to the costs incurred in onboarding them as customers considering the small balances they may have. Legacy systems are in themselves a barrier to financial inclusion. Integration with third parties and adding intermediaries is not a solution, and is not economically viable to reach the remaining unbanked population. Costs must be reduced from the ground up to include these people in the financial system.

4. Competition

Banking is often considered an oligopoly, where a small number of firms have a large market share. This can lead to collusion on pricing to the detriment of consumers. By contrast, a decentralised system takes advantage of the network effect, whereby banking becomes more effective when more people use it, and people can seek services from each other, providing more choice.

5. Centralised

The centralised nature of these institutions creates an inefficient distribution of power, and puts customers data and money at risk.

We connected the dots between these shortcomings of the incumbent banking system, the economic realities, and studied the successes and mistakes of the latest innovations. Our research, coupled with our knowledge of regulatory compliance, financial services and emerging technologies, has allowed us to devise an effective banking solution for the global microeconomy.

Our global, diversified and highly creative team has designed a blueprint for a global decentralised bank, which offers a sophisticated solution to the challenges faced by the microeconomy.

OUR SOLUTION

BABB leverages blockchain, biometrics and machine learning to offer revolutionary decentralised banking services for people across the globe. Regardless of background, location or income, BABB will offer a UK bank account to anyone in the world, helping increase financial inclusion and social integration, while also empowering local economies to generate wealth for themselves.

We will connect people and businesses to a frictionless new global financial system which revolutionises the existing micro-economic ecosystem through advanced technological, social, economical and regulatory capabilities.

By combining social connectivity with accessible banking (social banking), we are building a global banking network fostering international collaboration and inter-community engagement.

In essence, BABB is building a decentralized bank powered by the blockchain, operating a full reserve and integrating digital currencies all around the world.

UK Regulated, Global Bank Account Based on Blockchain

BABB will offer a bank account on the BABB platform, compliant with UK regulations, available to any eligible person or business in the world, instantly, without the need for a UK address or credit history.

To open a UK bank account with BABB all you need is a valid ID document such as a Passport or National ID card. Access to basic account services will also be available to those without identity documentation by merely using biometric authentication and peer-verification from someone fully identified.

We leverage blockchain technology to facilitate the movement of fiat currencies anywhere in the world instantly, cheaply and securely. Through tokenization, BABB can host any fiat currency on its platform, as well as our own native cryptocurrency, BAX.

We rely on technology and innovation to provide a bank account which is orders of magnitude cheaper, easy to use, secure and most importantly - accessible to all.

SEPA & UK Faster Payments

With your UK BABB account, you will experience seamless transition between legacy banking and your blockchain-based bank account. In addition to the usual cryptographic address, BABB Accounts are issued an IBAN for European and international bank wires, as well as an Account Number and Sort Code for UK national transactions.

This will allow funds to be onboarded and off-boarded directly into the banking infrastructure, to maximize the usefulness of your BABB account. This is the primary bridge through which we'll connect BABB to the existing financial systems, allowing for onboarding and offboarding of funds, particularly larger volumes.

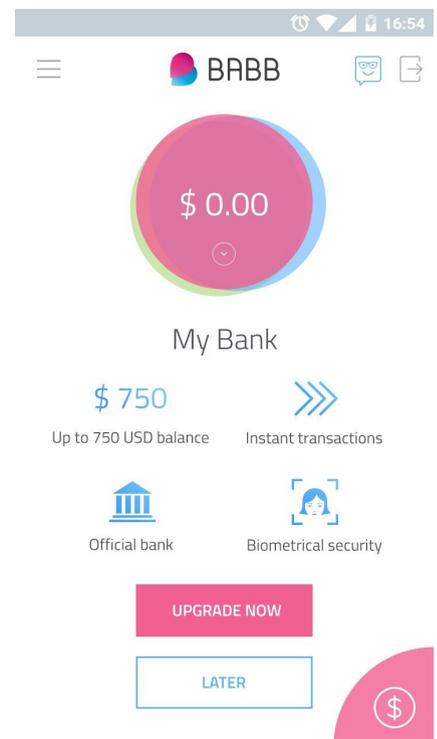
Mobile Application

Via the BABB Mobile Application, anyone can quickly create a bank account as easily as “taking a selfie and humming a tune”, with no ID document required to open a basic wallet. Upload one form of ID or get referred by someone who is fully verified in the system to get access to your own basic bank account.

BABB allows businesses and individuals to control their money anywhere, as long as they have an internet connection.

BABB supports traditional banking functions such as transfers, payments, cash in/out, as well as other peer-to-peer transactions using smart contracts.

In addition, users can generate income from their own money, by providing peer-to-peer services such as currency exchange and loans and earning a fee, just like banks do.



Black Card

The BABB Black Card is a secure payment card that links directly with your BABB bank account via a QR code or NFC. It allows both a debit-like functionality, or it can be issued as a pre-paid card for your friends and family. This approach allowed us to design a simple yet elegant card with no need for a chip and pin.

With the BABB Black Card you will be able to spend your funds within your BABB bank account in shops and in-person (peer-to-peer). Retailers can accept payment using the BABB card by simply downloading the BABB app and scanning the QR code or via NFC. Payment is made instantly into the retailer's bank account and the funds can be used immediately.



The BABB Black Card is the first card of its kind, containing no personal information on the card itself, which greatly improves card security.

If the card is lost, it can be easily unlinked from your bank account, preventing anyone else from using it. Should you find your card again, simply scan the QR code on the card via your BABB app and it will link to your BABB bank account once again. If the card is lost permanently, new cards will be available very cheaply from certain major online retailers with next day delivery. Alternatively, you can pick up a spare from a friend, or even print a less durable - but equally functional - paper version of the card.

Why have we decided not to use traditional card systems and create a new decentralised card with no chip?

- Opportunity
According to World Bank statistics, only 2% of people in developing economies have a credit card and only 15% have access to a debit card⁴. This presents a huge

⁴ www.worldbank.org/curated/en/187761468179367706/pdf/WPS7255.pdf

opportunity to introduce a simple, cheap and more efficient payment card with increased security and accessibility for the underbanked.

- **Access to Card Processing services**
Millions of SME's across the world struggle to get card machines from the banks, as it can often be hard for them to qualify for a card payment facility. This forces them to operate in cash, which introduces significant personal risk from holding large amounts of cash.
- **Smartphone penetration**
Over half the world now have a smartphone. Downloading the BABB app to process card payments with our Black card using the QR code is cheaper, faster and more convenient than integrating with traditional card payment solutions such as Visa or Mastercard.
- **ATM's are being phased out**
With the introduction of NFC technology and the trend towards a cashless economy, there is less need for a card with a chip to access cash from ATMs.
- **Cost**
The costs associated with facilitating traditional card payment services can be prohibitively expensive for SME's. Card processing rates can be up to 5%-6% of the transaction and this cost prevents millions of retailers across the world from integrating with traditional card payment services.
- **Access to funds**
Retailers who accept payment with the BABB Black Card can receive the funds in their BABB bank account instantly.

Traditional card issuers have a very low penetration rate across developing countries (see graphic below) due to the above reasons. This presents a great opportunity for the BABB Black Card introducing the following key benefits over traditional card issuers:

1. Easy to distribute (eg, via large retailers)
2. No barriers to entry
3. Affordable
4. Secure
5. Available

Essentially, with the Black Card we create a new universal physical payment system.

BABB

Economic Potential of BABB Card

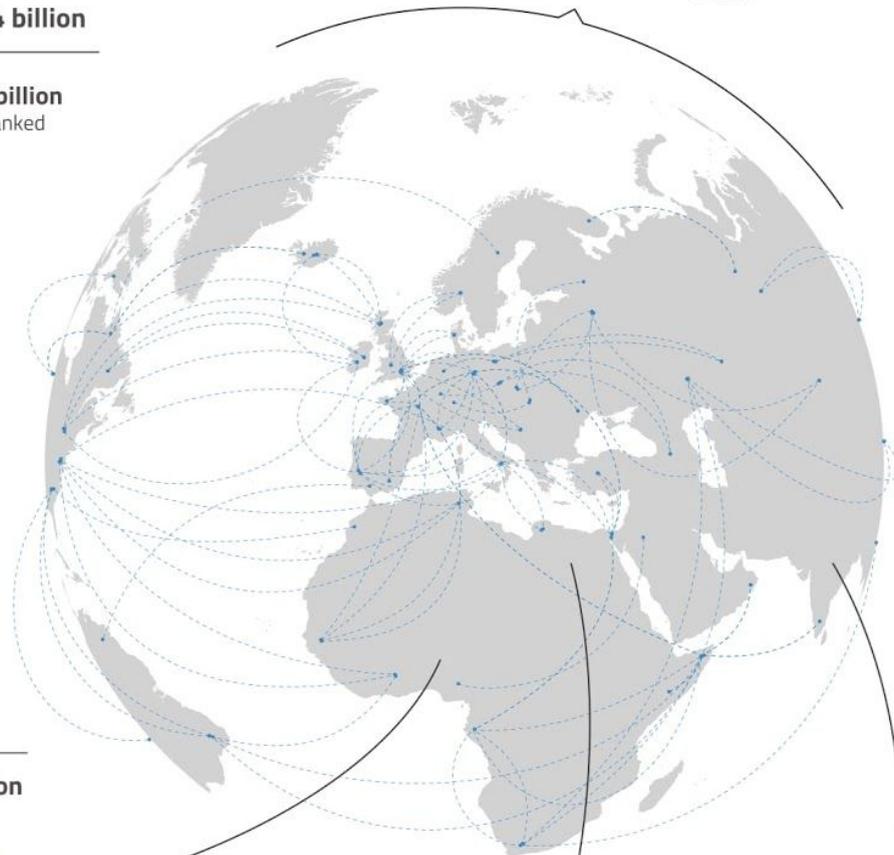
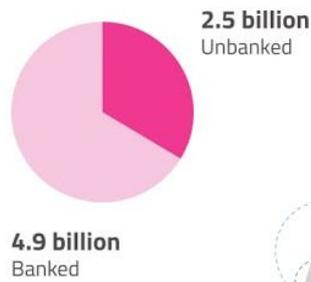
Transactions



Traditional card issuers with low penetration rate in poor countries

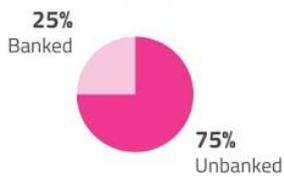
- **BABB Card**
- easy to distribute
 - no scheme
 - affordable
 - secure

World Population 7.4 billion



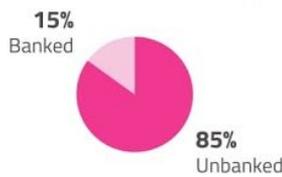
Africa

Population **1.2 billion**



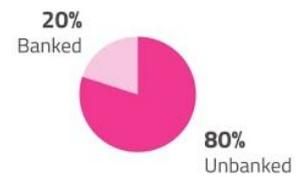
MENA

Population **381 million**



Indian Subcontinent

Population **381 million**



Central Bank Digital Currencies

At BABB, we believe it is inevitable that Central Bank Digital Currency (CBDC) will be adopted by Central Banks (CB) over the next decade. This opinion was initially formed in 2015 based on our assessment of the overall social benefits for the microeconomy - you can read our full analysis in *Appendix III*.

In the second half of 2017, we have seen further validation of this thesis, with a slew of announcements by Central Banks all around the world, each considering launching their own digital currency. For instance, the Reserve Bank of India's research institute has recently argued that blockchain technology could provide the necessary basis for the digitization of the Indian rupee.

We believe CBDCs are essential in establishing improved payment networks at a local level, thereby stimulating micro-economies. Our focus on working with central banks and supporting additional digital currencies is in alignment with our goal of deep financial, economic and social inclusion, and will help us support grassroots initiatives and stimulate micro-economies, while at the same time improving cross-border and foreign exchange of these currencies via the BAX token.

BABB will look to work with Central banks in primarily two ways:

1. Integration with existing CBDCs

Central banks that have already launched their digital currency could benefit from BABB's inter-blockchain approach and provide for a natural extension of BABB, allowing us to quickly onboard those currencies.

This may be executed by entering agreements directly with such central banks, or by establishing partnerships with local banks, which would provide regulatory coverage for their jurisdiction and associated currency.

2. Issuance of new CBDCs

Central banks looking to launch their own digital currency can leverage BABB's technology, and host and operate domestically a portion of the federated network. This takes into consideration local jurisdictions and the complexity of the existing fiscal and monetary policies. This sub-network essentially becomes a part of BABB's global platform, allowing central banks to ensure security, regulations and economic control, while at the same time providing their citizens with the opportunity to transact not just locally on the central bank's local system, but also internationally on any currency supported by BABB.

In essence, we can provide central banks with the mechanisms and infrastructure to integrate or issue their digital currencies, as well as the products for their customer population to interact with this currency in multiple ways. Finally, data collected by central banks from our platform will provide the insight needed to manage and regulate such a system efficiently and effectively.

Example Use Cases

The BABB App is designed to solve defined problems and address specific use cases which guide our product and design processes.

Peer-to-Peer Cash

BABB enables users to withdraw and deposit cash from their account by engaging with other users or agents. Also, the app makes it easy to exchange and withdraw a currency that is different from the one currently held in a BABB account.

BABB users do not need to depend on proximity to an ATM, whether it is functioning, or whether it's on their card network (a reality in many countries). They also don't need to adjust to a bank's working hours and fees. All they will need to do is choose the local person or business they would prefer to deal with.

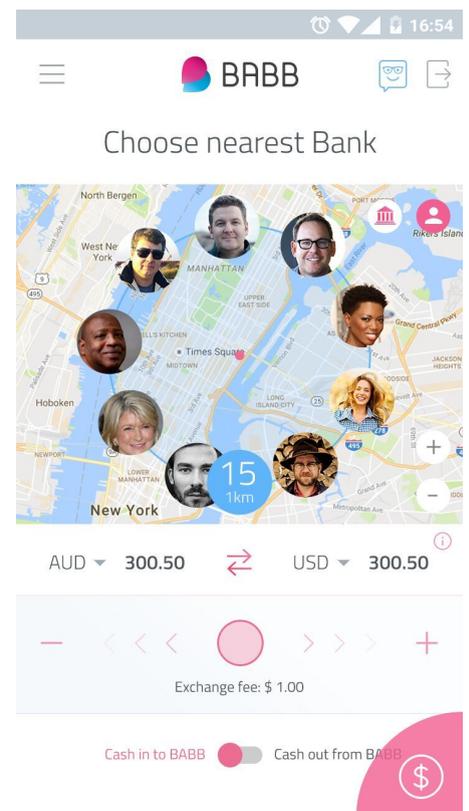
Example:

Eden lives in Ethiopia where her family owns a crop farm. She earns a very small wage from the farm and employs five workers.

As Eden often struggles financially, she receives £300 per month in her BABB account from her son who works in a small coffee shop in London.

Eden is expected to pay her staff in cash and opens her BABB app to find a local BABB user who can help.

She finds a vegetable stand in her local village, who is willing to exchange an electronic payment for physical cash, in turn receiving a small fee. They agree to meet at the store to complete the transaction and Eden receives the Ethiopian Birr in cash.



Peer-to-Peer Borrowing

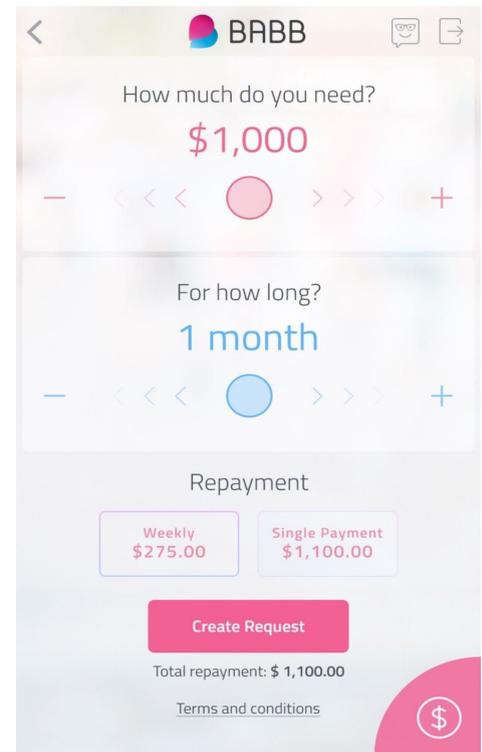
Through the BABB app, users can lend to and borrow from one another. Payment terms and rates are clearly defined, agreed on, and fast to conclude.

Example:

Pablo runs a fruit stand at a local market in São Paulo, Brazil. It has been a difficult month for his business; the increased rain has resulted in a drop in customer numbers. He is looking for a small loan to help restock his stand for the following weeks, and so he sets up a loan request in the app.

Pablo requests R\$1000 (2) for one month (3), and sends his request only to his friends and family. The app automatically calculates the payments (4) and sets up the smart contracts.

Luiz (his cousin living in Curitiba) receives the loan request in his BABB app. Having had his own business himself, he sympathises and decides to cover the full loan. The funds are transferred instantly into Pablo's account and he can now restock the stand.



Peer-to-Peer Fundraising

BABB will provide tools for international and local fundraising, where anyone can raise funds using 3 types of mechanisms: *Private* is only by invitation; *Personal* is broadcasted to friends and family; and *Public* is for anyone to start a global fundraising campaign, particularly for purposes like disaster relief and community infrastructure projects, but also for personal projects and causes.

A few advantages of BABB fundraising:

- Fundraising can use BAX, which makes it easy for people across the world to participate in fundraising without worrying about currency conversion
- Fundraising using BAX can support small amounts, less than \$1 per participation
- Funds are delivered to those in need, bypassing middlemen such as banks
- Participants have access to the fundraising history in the BABB blockchain
- Funds can be raised privately within a certain group of people, or publicly
- Public fundraisers can request to be verified, in which case they must get approval in the platform to start a campaign, so that participant money is protected

Example:

Batopilas is a small city in the state of Chihuahua, Mexico. Its water infrastructure decimated by recent earthquakes, and the population needs \$50,000 to purchase a new water silo to provide potable water to the city.

Alejandra lives in Batopilas and runs a small local charity which provides emergency water infrastructure to communities hit by natural disasters. She launches a fundraising initiative through the BABB app and contacts local people to ask for donations.

Alejandra's brother Juan lives in the US and he decides to help. He shares the fundraising initiative with his friends via the BABB app. With donations rolling in from Batopilas residents and their families and friends, Alejandra's charity soon meets their fundraising target. Alejandra shares the news with all donors and keeps them updated as the silo is quickly completed.

Payments & Payroll

BABB banking platform can be used to create a more direct payment flow that connects payers and payees – across borders or domestically – without intermediaries, at ultra-low fees and almost instant speed.

As an example, companies can easily automate payroll processing, instantly disbursing funds from their BABB bank account to their employees BABB bank account.

Example:

Maruf is the Managing Director of a small factory in Dhaka, Bangladesh. He has previously outsourced payroll processing to an external provider. This was not ideal, as it was expensive and meant he didn't have control over changes to his employees' salary and bonus payments. Maruf now uses BABB to pay his 24 employees, thereby incurring one less expense and retaining greater control.

With a few taps, he sets up the recurring payment in the BABB app. Each month, Maruf reviews and authorizes employees payments, who now receive their wages directly into their BABB bank account.

As our App improves, we plan to tackle more detailed use cases and encode them into smart contracts - for instance deductions such as pension, income tax and other contributions could also be automated.

TECHNOLOGY

Blockchain

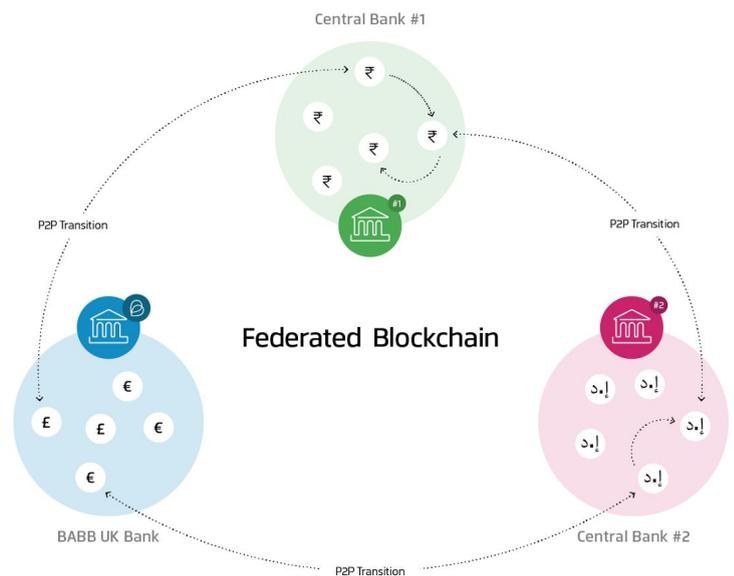
The Blockchain is a secure transaction ledger database that is shared by all entities participating in an established, distributed network of computers. It records and stores transactions - transfers of information between entities within the network - essentially eliminating the need for "trusted" and centralized third parties. This information can be digital currency, identity data, or any other type of structured data.

BABB relies on a blockchain for many of its core services, which makes it a fundamental piece of technology. It serves multiple purposes, not just recording transactions, but also notarizing identity data and serving as a secure channel for sharing data across different participants in the network.

Federation

Validation of blockchain activity using standard blockchain consensus schemes, with a federated blockchain of validating nodes⁵.

Participation in the network and initial nodes are managed by the BABB Platform, with major participants also running their own nodes, including Central Banks and regulators in specific jurisdictions. This ensures collective oversight and transparency, while at the same time allowing for multi-jurisdictional activity to take place.



⁵ While not exactly at the core of our solution, some relevant points are presented in this article: <http://jonathanpatrick.me/blog/federated-ethereum-blockchains>

Smart Contracts and Regulations

The rules for operating BABBB accounts will be encoded into Smart Contracts: transfer of funds, management of data privacy, etc. In addition, we will also comply with the rules defined by Central banks for the funds they control, which will also be encoded into smart contracts on the blockchain for their specific currency.

In this manner, the necessary regulations become embedded into the transactional activity, which ensures a transparent, straightforward, verifiable and predictable operation, with few surprises to its participants.

Tokenization of FIAT Funds

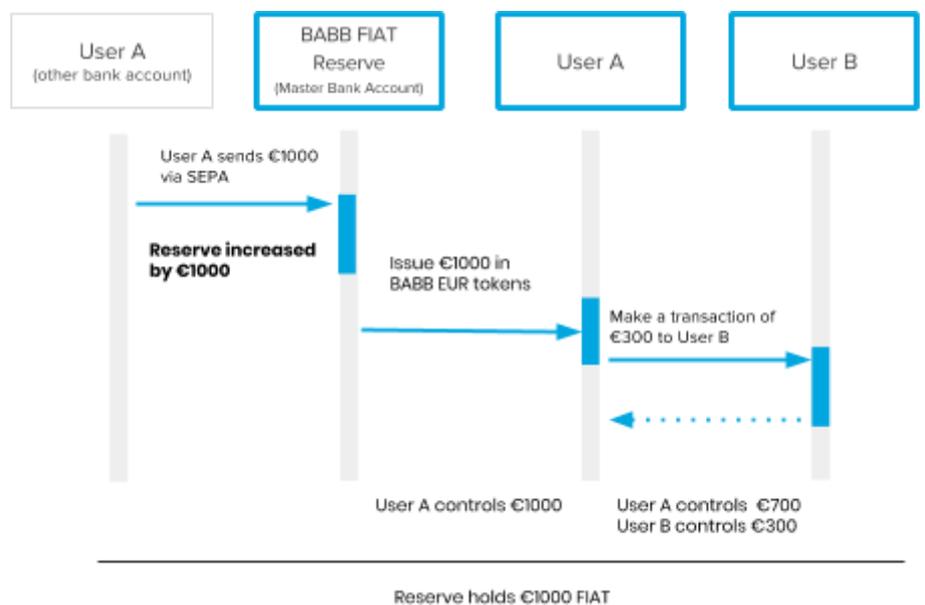
One of the primary uses of the blockchain at BABBB is to store the ledger containing the bank account balances and related transactions.

For this purpose, any FIAT funds that exist in the legacy banking system are represented as a token in the blockchain. Once funds are tokenized, users can transact without the involvement of any intermediary.

Follow a few examples of how this plays out:

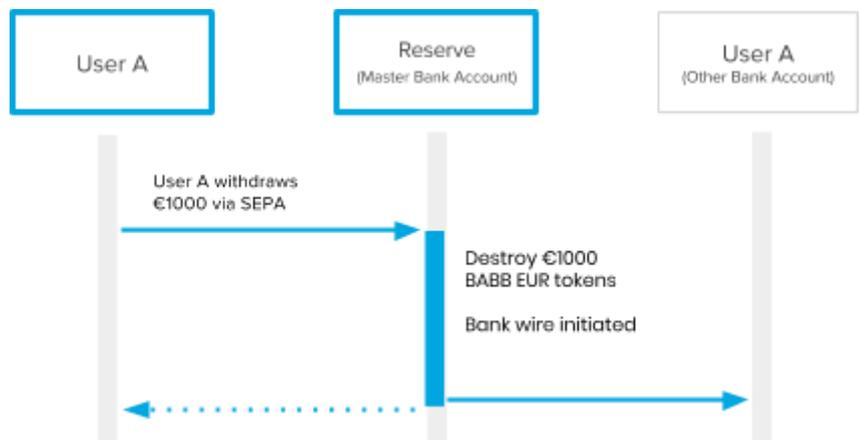
1. Deposit EUR via SEPA, followed by internal transfer

Let's consider a scenario where User A deposits €1000 via SEPA into their own BABBB account. Once the deposit is processed on the banking network, BABBB will issue €1000 in the blockchain, and keep the FIAT €1000 in the bank's reserve. User A can then send €300 to User B.



2. Withdraw EUR via SEPA

In this example, let's assume User A has €1000 in their BABB Account, and wants to withdraw €500 to a bank account at another bank. As a result of this operation, a SEPA transaction of €500 will be initiated, and €500 destroyed from the BABB blockchain.



Control & Self-Determination

Account holders in BABB are in control of their own funds on the blockchain, and users can transact on the BABB blockchain without the explicit approval of any intermediary or central entity.

In other words, only account-holders have access to the necessary private keys, and so as long as they meet the rules set into the smart contracts that manage the network, any account-holder can transact their own funds.

Privacy

Transactions and access to private data such as User identity require a private key that is in the sole possession of the user, on their device.

Under no circumstances will third party services gain access to any user private keys, nor will they be able to act on behalf of a user, nor access user data unless explicitly authorized by the user.

In addition, we are aware of the challenges of ensuring privacy on a blockchain, and will leverage privacy preserving features such as data encryption, zero-knowledge proof and cryptographic hashing to accomplish our goals. In cases where sharing of user private data is required, an explicit authorization is requested from the user, and only the user is capable of authorizing such access with its private key.

Recovery & Succession

To ensure that only the user can access their funds, any private keys must be kept only on their device, which implies that if the device is lost or compromised, access to funds would be potentially at risk. To maintain user-friendliness of the service and avoid loss of funds, additional mechanisms must be implemented for Recovery and Succession.

In addition to traditional recovery approaches like having a mnemonic printed or written down, one of the key approaches for this are Schnorr Signatures, 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.

Via this approach, a group of designated parties would essentially keep a portion of the key encrypted on their devices, and would attest to the identity of a person when necessary. This role can be undertaken by closely related parties like family and friends, but could also be taken by local parties such as governmental entities or businesses. In the event of a BABB account that was created via Social KYC, the person that originally extended the invitation would likely default to be one of the designated parties.

In short, in a Recovery scenario where a private key was lost, a subset of the designated parties would allow for a new private key to be associated with the identity, therefore allowing the person to regain access to their account. In case of a succession event, the designated parties would attest that such an event has taken place, and would allow for disbursing funds to designated heirs, which will also lead to smart contracts triggering any regulatory reporting obligations according to the jurisdiction of the bank account.

We're still researching these options in conjunction with a thorough regulatory analysis, but regardless of the combination of mechanisms, it is fundamental that we maintain the decentralised nature of the system, and that recovery actions can be undertaken without the person having to cede control to a central or intermediary entity.

Cloud Hybrid

One of the key goals of BABB is to build a decentralized ecosystem which can survive the collapse of its participants, and where multiple participants engage with different roles and permissions.

We are however aware of the limitations of existing technology, particularly when looking to process large volumes of data in a secure manner, connect with legacy systems or handle the intersection between new technologies, existing regulations and legacy technologies.

One such example is capturing and processing of biometric data, where current limitations imply that some of these items will be subject to some form of centralised processing before going into the blockchain. Another example is the gateway to sending and receiving funds using traditional banking rails like SEPA and UK Faster Payments.

Therefore, at this stage there are edge aspects of our solution that will be distributed in a traditional cloud based manner, making BABB a hybrid of cloud technology with the best that blockchains have to offer. We will however continue to pursue our goal of a fully decentralized system that can survive the passing of time and the rise and fall of organisations.

Identity & Data

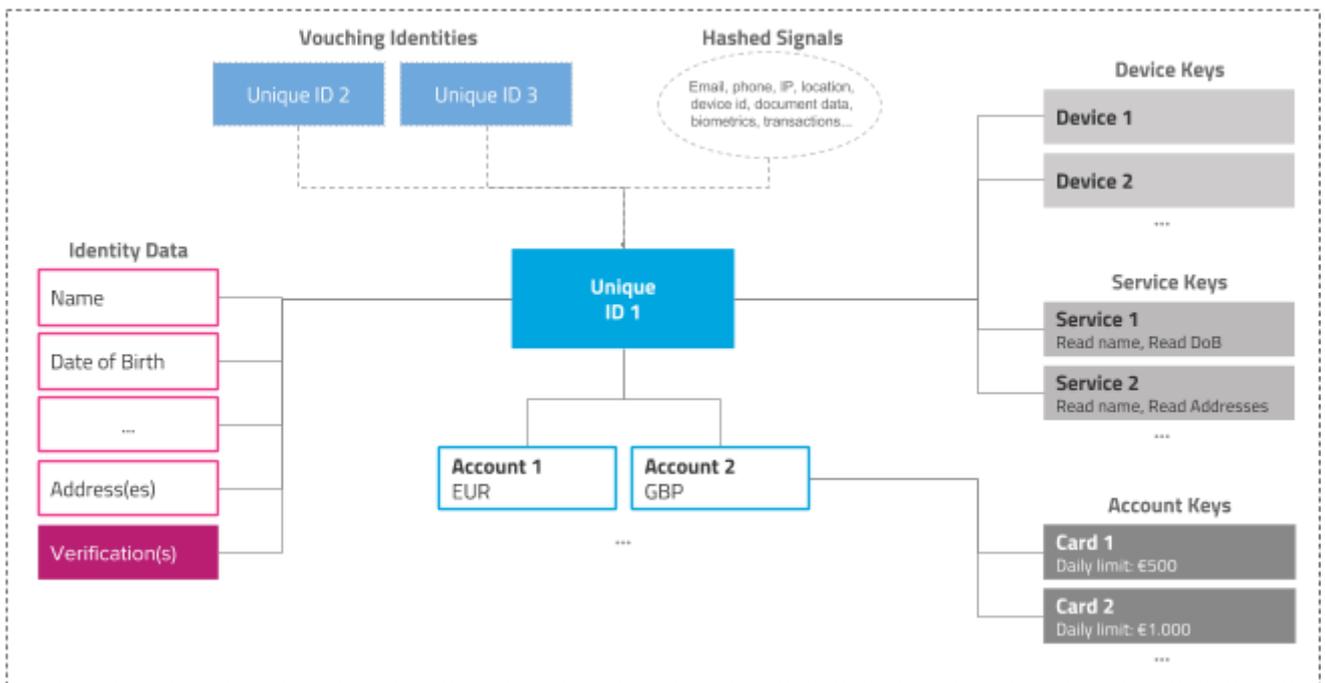
A key aspect of BABB is how it handles the identity and data of individuals, how it evolves over time for an individual, and how an increased degree of certainty allows for additional services to be used and restrictions reduced.

Data Architecture

A unique digital ID is created and stored on the federated blockchain environment, in representation of an identity. The user is issued a keypair, with the private key stored on their device. The user can associate additional devices, for which separate keypairs will be generated.

Identity data and identity verifications are stored in smart contracts in the federated blockchain environment, associated with the ID. This data is encrypted and accessible solely to the owner of the identity, as identified by one their private keys. Users can also choose to selectively grant access to specific elements, essentially creating a permissioned access to their identity data and accounts.

Data on Federated Blockchain



Device private keys are held in User devices, whereas **Service** private keys are held by 3rd party services the User has approved.
Account keys are used for transaction initiation, whether via the app, Black Cards, or even by 3rd party services the Owner has approved.

Smart contracts then ensure that every transaction is formed with the accompanying identities, with different information accessible to the different participants in the transaction, without compromising privacy.

Biometrics

The primary approach to assert a Digital ID is the capture and processing of biometric data, primarily facial recognition with liveness detection and multivariate voice analysis. These allow us to provision a new account to any individual, so they can start using basic services without requiring a long winded registration process.

Given current technology, face and voice recognition are not enough to guarantee a 100% unique match. They are then complemented via fuzzy matching of additional signals and other forms of identity validation.

Peer-to-Peer Identity Validation

Within BABB, users help validate the identity of other users. Every user who has gone through the whole identity validation process can vouch for other users in the platform, thus helping validate their identity. Whenever available and authorised by users, additional validation is also performed by analysing social graph information.

This allows new users to obtain services up to a certain transaction threshold, and helps extend BABB to millions of people, while ensuring we capture the networks of trust that exist in real life.

Extended Identity Verification

In addition to biometrics and 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 participants in the BABB platform also have means of verifying the identity of the people they bring aboard, which can be used to enhance BABB's level of trust in any given identity. In addition, we also expect to cooperate with other projects currently building blockchain-based digital identity solutions.

All of these solutions together work to form the digital ID of the BABB account holders, and ensure they are legitimate.

SECURITY & RISK

A set of practices guide our Security Plan, with roots in modern established security standards and a particular attention to the decentralized portions of our infrastructure and operations. This allows us to adhere to guidelines like OWASP, PCI/DSS, PSD2 and other relevant security guidelines⁶.

We follow a multi-layer security pattern, where multiple solutions provide for different functionality and different capabilities, which in some cases also overlap, in order to obtain feedback from different sources.

Human Resources

We have a strict hiring process and require background checks for staff. Staff accounts on various systems are access setup to require multiple factors, hardware tokens and authentication via PKI (Public Key Infrastructure) is used wherever possible, and authorizations granted with clearly defined privileged access and segregation of duties.

We make efforts to maintain all our staff constantly trained in Security and Information Management, ensuring they know how to handle themselves in the face of both internal and external threats. We also ensure that policies and guidelines are clearly communicated and openly discussed, so that the reasoning behind them is fully understood and encourage adherence.

Last but not the least, our ideal that people come first also has an impact on how we build our team. We are a diverse bunch, and look to maintain an environment where people can express themselves freely, with the understanding that making mistakes is human and solving problems together takes precedence over assigning blame. We design our processes in an holistic manner where people are naturally supported by their peers. This approach allows issues to be exposed sooner, transparently and without fear of repercussion.

⁶ For instance, the [6] SANS Institute Security Assessment Guidelines for Financial Institutions: <https://www.sans.org/reading-room/whitepapers/auditing/security-assessment-guidelines-financial-institutions-993>

Risk Assessment

We follow a risk-based approach to our decisions, and maintain a cross-functional Risk Register that covers not just our information systems and infrastructure, but also our financial operations, regulatory compliance, staff, contractors, partners and 3rd party service providers.

By allowing risk management strategies to permeate all our activity, we are able to clearly identify complex threats in advance, and react swiftly when new threats are detected.

In addition, we plan to use up to date machine learning models to leverage information contained in relationship and transactional networks of people and businesses, greatly improving the accuracy and reliability of credit scores.

Business Continuity

We maintain a Business Continuity Plan, planned and tested, including crisis communications, both in terms of information systems, operations and support services. The decentralized nature of some of our technology provides us with a natural advantage in this context, and our state of the art architecture and careful planning provides for the rest.

Control Activities

Control activities are the policies, procedures, guidelines, techniques, and mechanisms that help ensure that the processes to deal with the risks identified during the risk assessment are actually carried out.

In other words, control activities are actions taken to minimize risk. When the assessment identifies a significant risk to the achievement of an objective, a corresponding control activity or activities is determined and implemented.

Preventive controls are designed to discourage or pre-empt errors or irregularities from occurring. There are many ways to interpret Prevention principles, which is why we believe it's best to clarify ours.

Note that these apply not just to information technology, but also to processes and operations all across the board:

Correctness

Security by Correctness aims to ensure that any bugs or malicious code are weeded out during the software production stages, and never go live.

This strategy has been the focus of various aspects of computer science, including better developer training and improved development tools such as safe and stricter languages that by force of structure and strictness try and avoid common mistakes. Last but not the least, we have code verification tools with heuristics and patterns that look to identify common issues, and code lifecycle management tools.

In addition to this, there continue to be changes in the programming paradigms themselves, with a shift to functional programming and formal methods, which are increasingly more pervasive, particularly in mission-critical environments.

In spite of all these approaches, issues still happen by force of poorly defined use cases, resource constraints, compromises, interaction between different components and non-linear system growth. Additionally, purposefully malicious code is often perfectly valid, and seeing as existing tools cannot be programmed with the ability to assess code from a deontological or ethical perspective, Correctness can only take us so far.

Simplicity

The Systems Engineering discipline explains that its essence, a system is defined by its Components and how they interact through a set of Relations. Just by looking around, it's easy to understand how a system can have complex components (eg, a person) and how complex relations can be (eg, family ties).

From a software development perspective, it's a known fact that complexity is the enemy of a properly functioning system, and a number of axioms have evolved around this notion, not the least of which is Occam's Razor.

It's not just that components can grow to become complex, it's also that the Relations in between different Components grow exponentially. In fact, most bugs in software development are a result of interaction between different components, and therefore we look to carefully design the Components of our systems, ensuring they are easier to understand and operate with fewer Relations, thus keeping complexity at bay.

In short, a simple System is easier to understand, manage and secure than one that is complex, so striving for simplicity is a major factor in security.

Isolation

We look to break elements of the system into small units 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.

Simple as it may sound, this approach is actually quite hard to pull off. Designing a system which is partitioned into meaningful pieces and setting permissions and relations for each piece is an extremely complex task. In other words, individual complexity is removed from the system, but on the other hand it becomes much harder to design said system, and relational complexity increases.

Examples of this strategy abound. For instance, development teams are segregated from operational teams, which means that bug reports observed in production often are harder to debug due to the development team having only limited access to the environment and data the issue occurred in. On another example, processes running in modern operating systems cannot access memory from other processes, which means that for processes to communicate they need to follow slightly more structured approaches than just sharing pointers to data.

This scenario has changed with the popularization of virtualization technology. Previous strategies of process separation and isolation have been rendered mostly useless in the last few years, which has given rise to the notion of "Infrastructure as Code", where we program the infrastructure to launch components into their isolated containers, and very carefully define the relations between said containers.

Obscurity

No matter how hard we work to reduce and remove bugs, we know there's always the possibility that one will make it through. A Prevention strategy should therefore make sure any bugs that do occur are very hard to find and exploit.

We use a number of techniques that rely on obfuscation, encryption and randomization, in order raise the bar on obscurity.

Internal Controls

Internal Controls essentially provide oversight to ensure that the techniques and processes that have been designed are in fact being followed, therefore preventing situations of potential fraud or abuse, ensuring things work as intended and any

inconsistencies - purposeful or accidental - are detected and resolved before they have a chance to cause a negative impact. Absence of such controls can lead to a set of procedures that look great on paper, but which are not effectively followed throughout the company and its infrastructure.

BABB relies not just on continuous analysis and automated indicators 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, and where peer-review and peer-support are actively encouraged. This ensures that internal controls are not merely tolerated, but actively supported as means to protect both our staff, our users and their data.

Information Management

In order to protect the information resources and depositaries of protected information that are placed under BABB custody, it is necessary to have clear attributions of responsibilities and access levels.

In order to facilitate this, the 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.

Applicational Security

In addition to our own internal procedures, there are a number of techniques and signals we use to validate and/or increase verification for user activity, particularly:

- Allow multiple factors for authentication, such as:
 - something they know, like a password and User ID
 - something they have, like a one-time-password (OTP) token or a device ID
 - something they are, like a fingerprint, voice or facial pattern
 - something they do, like a behaviour or gesture

- Historical activity, including:
 - Transaction size and relation to overall balance
 - Transaction history of contacts
 - Device and browser usage
 - Geographical history
- User Interface and Experience, including:
 - Consistent visual language
 - Consistent written language
 - Consistent confirmation prompts
 - Preview for critical actions
 - Various other approaches to reduce errors and conscious mistakes

COMPLIANCE & REGULATIONS

Fair Banking

On the organization's website⁷ the vision for *fair banking* is laid out as follows:

"To create banking developments that encourage individuals and families to manage their money better and thus improve their well-being. To share in an open and inclusive way the selected products and approaches, so as to promote the maximum well-being benefit.

In particular, to enable developments to extend to the less advantaged in society including those less affluent and younger. To adopt specific measures of satisfaction which go beyond improving the consumer's economic circumstances.

This concept speaks to the very core of BABB. As such, although there are yet no specific regulation around Fair Banking, our Compliance department is tasked with observing the Ethical norms set forth in the Fair Banking vision. We seek to integrate this approach with or observance of the applicable Regulation across the various jurisdictions in which we operate.

GDPR

BABB has a unique way of implementing privacy in our Bank. We believe that users should have control of their own data. With BABB, the users are the data controllers. We are building a new banking platform incorporating privacy by design. BABB's native data privacy and risk management capabilities leverage blockchain and smart contract technologies. We aim to go a step beyond GDPR, by incorporating all the requirements directly into our operations.

BABB's solution will start by implementing three categories of data protection. Each category has a different level of security and restrictions, with multi-jurisdictional and multi-language capabilities.

We plan for three broad categories of data protection:

⁷ <http://fairbanking.org.uk/>

1. **Private.** This is highly regulated and highly personal data to be used, stored and controlled only by the user with their private key, which may only be shared with regulated and accredited institutions following explicit consent of the user.
2. **Personal.** This is light personal data. Users will only allow third party access to their personal profile if they have previously consented to this communication . For example, cross selling of services, insurance, mortgages, etc. Users maintain the ability to suspend previous permission given to a 3rd party.
3. **Public.** Data which can be used publicly. This can also be a way of interacting publically, such as for BAX fundraising and payments.

The above privacy tiers are implemented through various means of data storage and encryption, and are presented in clear and obvious UI, optimized to ensure privacy by default. Our vision is to implement a global General Data Protection Regulation (GDPR) as a standard that can be leveraged by all other data controllers.

KYC & AML

As a regulated entity, BABB will follow all the mandatory requirements for Know Your Customer (KYC) and Anti-Money Laundering (AML) regulation, with the relevant programs in place to detect, report and prevent suspicious activity.

As part of the onboarding process, background and compliance checks are executed on all new users, with additional checks required to access certain higher levels of BABB services.

The KYC (Know Your Customer) process - including checking the PEP and Sanctions registries - is of course a key part of the process for identifying users who require further investigations, and for ultimately providing evidence to enable BABB to approve/deny new users. The KYC process includes validating the identity of users involving company and personal ID verification checks for all users.

A successful KYC process must also comply with local regulations, without altering the customer experience. BABB will harmonise KYC processes and procedures across our future locations to have a global set of KYC rules, complemented with specific rules to address local regulatory requirements.

Social KYC

BABB has a unique method to achieve economic and financial integration while keeping human relations at the heart of the matter. To create a trustless platform, BABB creates accounts with digital identities integrated for all its users and verifies them via a compound KYC process. This validates user identities and gives them access to services as per jurisdictional regulations.

To remove barriers to banking, users will not need to provide documentation to sign up on the app. Using various forms of biometrics technology, users can create their Digital ID in a straightforward manner. This will allow everyone across the world to participate in the BABB eco-system and be included in the global financial system. For the first time, technology has provided us with the means to achieve a goal which many have failed to attain in the past.

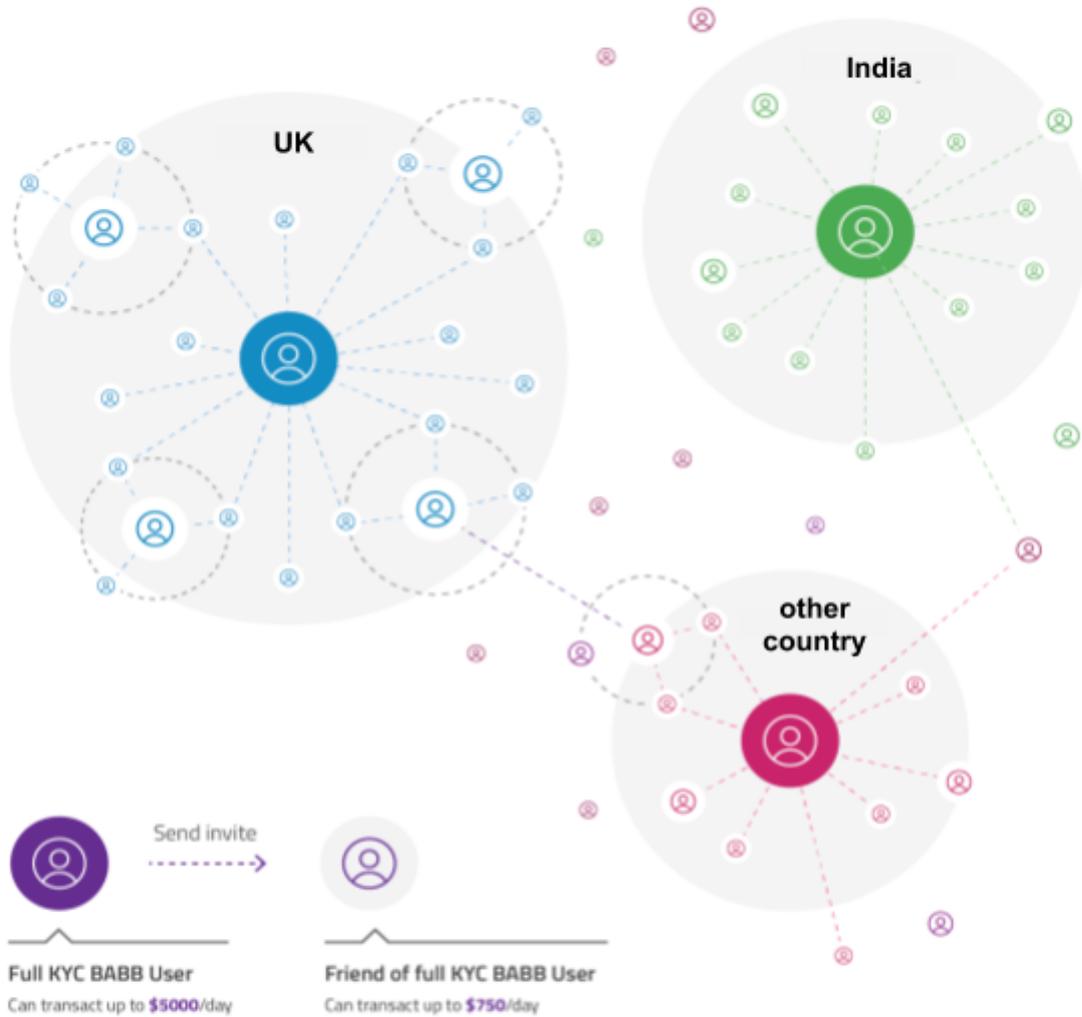
For those who want to make more out of their accounts, simple steps can be taken to finalise the KYC process, such as providing a photo of their passport or other form of identification, broadening the scope of services they can access.

Furthermore, we are introducing our innovative 'social KYC' process, which allows fully KYC-ed users, with validated documentation, to open a basic account for others. This will give the invitee access to the basic level of functionality without the need to provide ID documentation. We believe there is huge potential for rapid expansion of the network thanks to this 'social KYC' mechanism to promote exponential growth of our user base. This is particularly useful for onboarding the unbanked in emerging markets, seeing as one of the main barriers they face is lack of documentation. That is, we are fighting financial exclusion by integrating people such as low-income employees and refugees/asylum seekers.

Social KYC will include those who cannot provide relevant documentation. BABB does this by requiring a fully KYC-ed user who personally knows the prospective undocumented friend/family member to confirm his identity and details. That is, it will become a Human to Machine KYC process which reduces cost, fraud and internet hacks.



Dynamic and P2P Social KYC



(these are indicative only, may not necessarily represent the actual parameters)



BABB User with full KYC

- Passport
- Proof of address
- OFAC
- Worldcheck
- Geo location
- HMT
- Biometrics



BABB User invited by full KYC BABB User

- Phone numbers
- School / Workplace
- Social Media
- Geo Location
- Emails
- Time stamp transaction analytics
- Intelligence ID expire notification
- Behavior analytics

PSD2

PSD2 is an European Union directive, which introduces a set of regulatory changes that are poised to shake the payments and banking industry, breaking the monopoly banks have on accessing user data and transacting their funds.

Under PSD2, banks must provide ways for users to share their bank data with authorized AISP (Account Information Service Provider), and also allow users to authorize PISP (Payment Initiation Service Provider) service providers to initiate a payment on their behalf, opening up the path for innovative services like P2P transfer and bill payment.

As you can imagine, this desire for interoperability is a natural fit for BABB: any account on our platform will meet the PSD2 directive.

Also, PSD2 was initially devised with the goal of providing more transparency on the costs of international payments, seeing as banks currently hide their fees in sub-market exchange rates that hide additional fees.

Interestingly, we've seen this happen in other markets - for instance a few years back it was common to see airlines present a price that was never achievable, with additional fees creeping up in the process.

It is unclear how the requirements for transparency will actually pan out into regulations. For instance, the UK government response to the last public consultation⁸, seemed to indicate a relatively mild approach to the issue of hidden fees.

In line with its ethos of fair banking, BABB is committed not just to Privacy, but also to Transparency, and will make all efforts to ensure the full and real costs of any transaction are displayed in a comprehensive and comprehensible manner.

⁸ Implementation of the revised EU Payment Services Directive II: response to the consultation, point 2.9 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/629988/Implementation_of_the_revised_EU_Payment_Services_Directive_II_response.pdf

Local Regulations

As soon as BABB become fully authorised as a UK bank, BABB will provide a global bank account for anyone who passes KYC.

Central Banks and Banks that license BABB solution will operate a node on the BABB network and become a nexus for local activity, and for all users on the BABB global network that need services in that country or geographical area. Their users will immediately be able to open a local digital currency account with tokenized fiat, and will be able to interact with users from different countries via the BABB App.

BABB provides the technological capacity for all banking operations including KYC, along with regulatory guidance and support. This guidance is intended to enable implementation and compliance to take place at the local level. Each jurisdiction has unique local regulations and it would be ineffective and inappropriate for BABB to set out compliance for each bank and Central Bank. A process of decentralised decision making will ensure that BABB is implemented as a tailored solution in each jurisdiction.

BUSINESS

BABBB is currently licensed as a UK financial institution (Authorised Payment Institution) by the Financial Conduct Authority, and it is in the process of applying for a UK banking licence.

It should be noted that although BABBB is applying for a UK Banking licence, it is not a necessary requirement to enable us to achieve the goals laid out in this whitepaper. Having a UK Banking licence will enable us to hold customer deposits, however, as we are already an FCA Authorised Payment Institution (API) we can already integrate with partner banks to hold our customer deposits and access the wider payment network.

Company Structure

BABBB will be properly structured to ensure separation of concerns and liabilities, and regulatory compliance. Additional research is underway to ensure this structure meets the regulatory compliance requirements across multiple jurisdictions, and changes may yet occur.

BABBB Platform

BABBB Platform will issue the native token BAX and raise funds through the BAX token sale. These funds will be used for the development of the platform and mobile app, and also to cover costs running the infrastructure, both cloud and initial federated blockchain.

BABBB Platform will retain copyrights to issue licenses to third parties who wish to access BABBB technology.

We are still researching whether the BABBB Platform will be incorporated as a Foundation or as a Limited company.

BABBB App: The Bank

BABBB App is the Bank, a completely separate and ring-fenced entity. The bank will raise funds separately through traditional means, and will be granted an indefinite license from BABBB Platform LTD to operate on its technology platform.

The bank will focus on UK banking, providing the regulatory coverage for the bank accounts, and developing relationships with other banks and regulated entities. Once

authorised by the FCA as a bank, BABB APP will be able to offer customers protection under the Financial Services Compensation Scheme (FSCS)⁹.

BABB Labs LTD: Software Development

BABB LTD will use the funds raised from the token sale to develop the platform and BABB mobile application. It offers product and technology development for BABB Platform LTD, BABB App and other parties who wish to use the technology.

This company will also offer integration, custom development and technology consulting for partners that wish to leverage BABB technology and products.

⁹Details of the FSCS can be founds here: <https://www.fscs.org.uk/what-we-cover/compensation-limits/>

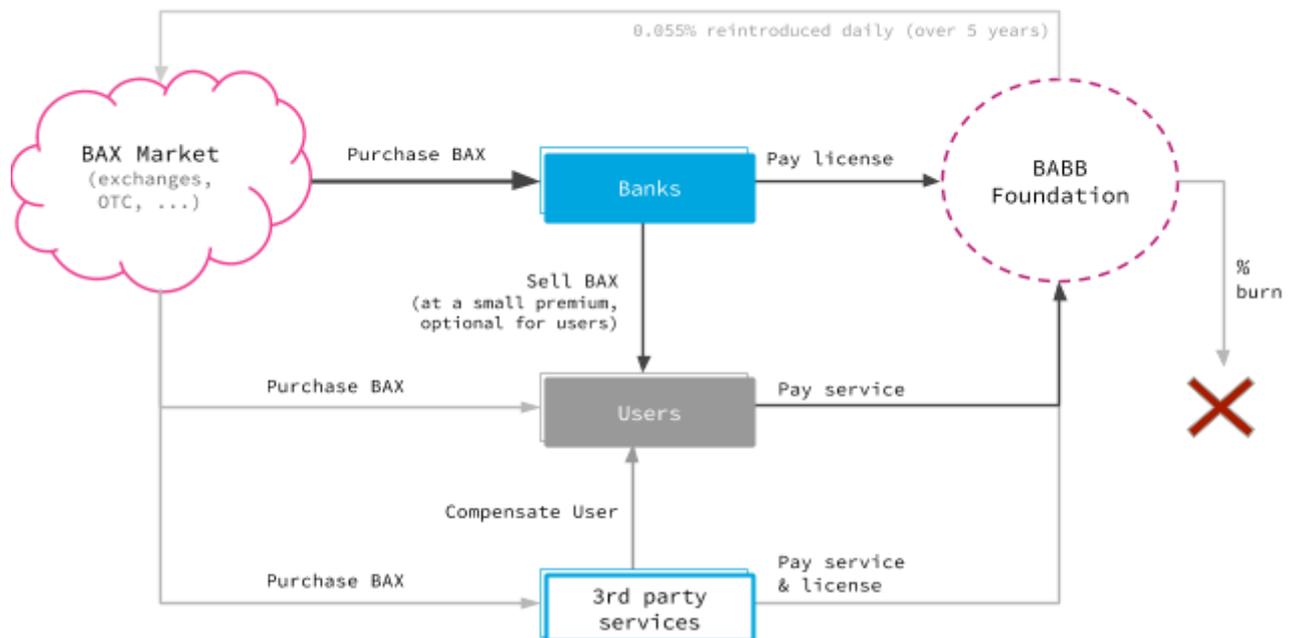
The BAX Token

BABBB is launching a distributed application platform where FIAT funds are tokenized. These tokenized funds will be used by the BABBB APP Bank, partner services, banks worldwide, as well as central banks in developing countries.

The BAX token is used under the hood to operate the services of the platform across all the geographies and jurisdictions served by the platform. A summary of the token details can be found on the table in *Appendix IV*.

BAX will be implemented on the public Ethereum blockchain as an EIP20/ERC20 token. The Ethereum blockchain is currently the industry standard for issuing custom digital assets and smart contracts, and is compatible with the existing infrastructure of the Ethereum ecosystem, such as development tools, wallets, and exchanges. This active ecosystem and technology make Ethereum a natural fit for BAX.

Here's an overview of the flow of BAX over the whole ecosystem:



The strategies described below aim to create an active market for BAX, with a long-term bias towards token appreciation, which we expect should lead to Banks, Central Banks and service providers to form reserves of BAX in order to maintain their operations, sell BAX to their customers, and cover licensing costs.

Initial Token Sale

BABBB will create 50 billion tokens, allocated as follows:



- **Public (60%)**
BABBB will be selling 60% of the tokens to the public in our token sale. This will be split over two phases:
 - 40% sold in phase one, with a pre-sale and main sale in early 2018
 - 20% sold in phase two in 2019 at the earliest, once the app is live and BAX in use on the platform
 - Any unsold tokens will be burned.
- **Team (20%)**
The team includes the immediate BABBB team, advisers, early contributors and partners. The team tokens are:
 - locked for 1 year
 - 25% are made available at six month intervals
- **Platform Reserve (18%)**
A portion of the issued BAX tokens will be held by BABBB Platform in reserve. This Initial Reserve will enable the platform to maintain liquidity in its BAX operations. See the *Reserve Management* section below for more details.
- **Bounty (2%)**
BABBB is incentivising our community via a BAX bounty campaign. Details of our bounty campaign will be available on our website in due course.

Token Utility

The BAX token is the lifeblood of the platform. All services, fees and licensing of the BABB platform use BAX under-the-hood.

If a user doesn't hold any BAX to operate on the platform, they can easily purchase the necessary amount from banks in the BABB platform, and also from other users, online exchanges and other 3rd party services.

For instance, the BABB Bank app allows for BAX to be purchased a single step, without impacting user experience and without the need for the user to take extra actions. The BABB Platform adjusts the amount in BAX required for its services depending on the average token price in open markets, which provides a stable price experience for the end user.

It is only natural and healthy that banks may add a small premium over any BAX they sell, which covers their own costs of service. This paves the way for a fair and healthy banking industry, where people pay only for the services they use and remain in control of their own funds and data.

While we are still deciding on the exact structure of costs, we expect platform fees will be tiny (equivalent to cents of a dollar), for actions such as:

- Open a new BABB account (the bank covers this fee)
- Send/receive a transaction
- Exchange currency

For banks and 3rd Party Services operating on the BABB platform, fees also include:

- Licensing fees (eg, monthly cost paid by a bank to operate on BABB)
- Specialized services such as initiating a fundraising campaign
- Request access to a user's Identity information (a part of which paid to the user)

This last item is vital, it introduces friction to services that require access to user's information, and provides the user with compensation for sharing some of their details.

Other uses of the BAX Token

In addition to its intrinsic utility within BABBB's platform, BAX may also be used for a number of other purposes

Onboarding/offboarding

Any service that adds support for BAX can therefore interface with the BABBB platform, and send/receive funds directly to/from user bank accounts. We will look to have BAX token listed on cryptocurrency exchanges in various geographies, therefore allowing it to be used as a way to onboard value into and out of the BABBB platform, and a gateway to cryptocurrencies.

Foreign exchange liquidity

BAX may be used as an intermediary when converting tokenized FIAT currencies between BABBB accounts, which facilitates rate discovery, improves liquidity and eases conversion across local currencies.

International Payments

We expect that in many circumstances - particularly with illiquid currencies of smaller countries - it will be more practical to send funds in BAX and let the recipient convert to their currency of choice at their own pace.

Fundraising

To facilitate international collaboration, funds raised via BABBB's fundraising features may be collected in BAX, which entails additional advantages for participants:

- Funds can be sent by anyone in the world, not just BABBB users
- Anyone around the world can enter the fundraising without worrying about currency conversion
- Fundraising using BAX can support small amounts, less than \$1 per participation, which allows for micro-participations

The redemption of such funds for local currency will be done in accordance with clear payout schedules that promote reasonable use of the funds.

Reserve Management

BABBB Platform has strict restrictions on how it manages both its initial reserve and the tokens received as part of its revenue generating operations.

For transparency and to encourage public scrutiny, the BABBB Platform will publish the addresses of its reserves, and will also look to encode these rules into smart-contracts.

Burn of received tokens

Tokens paid to operate the platform are handled in two separate manners:

- 50% are burned, effectively taken out of circulation forever. This will happen until the total amount of tokens in circulation hits 20% of the issued total.
- The remaining are frozen into the Platform Reserve, so they do not affect market price for years to come, allowing BAX price to appreciate as the platform grows, without compromising its future usefulness.

Reserve Liquidation

BABBB Platform has strict restrictions on liquidating any portion of the funds in its Reserve during the first 5 years following issuance of the token, including any funds captured through its revenue activity:

- Every day, a daily fraction of no more than 0.055% of the Initial Reserve¹⁰ can be made available for liquidation, therefore effectively limiting any potential impact on the market price

Funds released in this manner will be liquidated with preference for mechanisms that minimize the impact on the market price, particularly:

- Rewards directly to users, to incentivize network growth. This has the advantage that a sizable portion of tokens released this way will be held by individuals for their later use, rather than sold on the market. This has far less impact than the alternative, which would be to sell the tokens for funds to invest into marketing.
- Sell a portion directly to users. This would be done at a premium over the average market price. This effectively allows the Platform to liquidate these small daily amounts without depressing market price.

¹⁰ The daily fraction that can be liquidated is calculated as $1/(5*365)$

CONCLUSION

BABB's unique vision for the future of banking is both radical and feasible. BABB will empower each individual and business within the microeconomy, by creating a decentralised and inclusive financial system. BABB intends to usher in a new paradigm of Fair Banking, by embracing emerging technologies and applying a 'people first' approach.

The BABB platform has huge potential for growth, through the three main touch points of the BABB app, the Black Card and Social KYC. By maintaining a physical and digital presence and implementing a natural viral growth mechanism, we expect to see exponential uptake throughout our target markets. The BABB proposition is infinitely better than the current offering across many different use cases. The world is ready for BABB, and now we need to make sure BABB is ready for the world.

The token sale will raise the funds necessary to develop and distribute the BABB solution. By purchasing the BAX token, you are taking part in the future we have outlined here. The BAX token is instrumental in BABB's functionality, and will be integrated into the operations of the platform worldwide. There is enormous untapped potential in the global microeconomy, and BABB (with BAX) has a plan to unlock it.

Join us to help build a World Bank for the microeconomy which is fair, inclusive and connected.

APPENDICES

The following documents provide additional background information on a few of the topics we approach in this document.

Appendix I: Banking Systemic Risk

As we saw in the global financial crisis of 2008, the nature of the systemic risk ingrained in the existing global banking network poses a significant threat to our deposits and savings in these traditional banking institutions. In addition, the centralised nature of banks also poses a threat to our personal data (HSBC in 2009¹¹) and wealth (Tesco Bank in 2016¹²) should they be victim of a successful cyber attack .

The existing banking system is dependent on fractional reserve banking; the system in which banks are required to back only a fraction of bank deposits in cash should they be needed for customer withdrawals (usually 10%). Banks lend out the remaining capital from customers deposits and earn interest on the loans they create. This process presents significant risks to the bank, and customers deposits, should a large number of customers choose to withdraw their cash at the same time, or should the number of loan defaults go out of proportion.

For instance, in September 2007, the UK Bank Northern Rock experienced the largest bank run in 150 years as customers worried that their deposits were not safe after hearing news that the bank had no option but to approach the Bank of England for an emergency loan facility.

Innovation in financial markets led to innovative new products (e.g. Mortgage-backed securities) which increased the interconnectedness of the banking systems, thereby increasing systemic risk. With yields at record lows, banks continue to create innovative risky new products in search of higher yield products. Banks across the world continue to take on risk with customers deposits through both their investment banking and retail arms.

¹¹

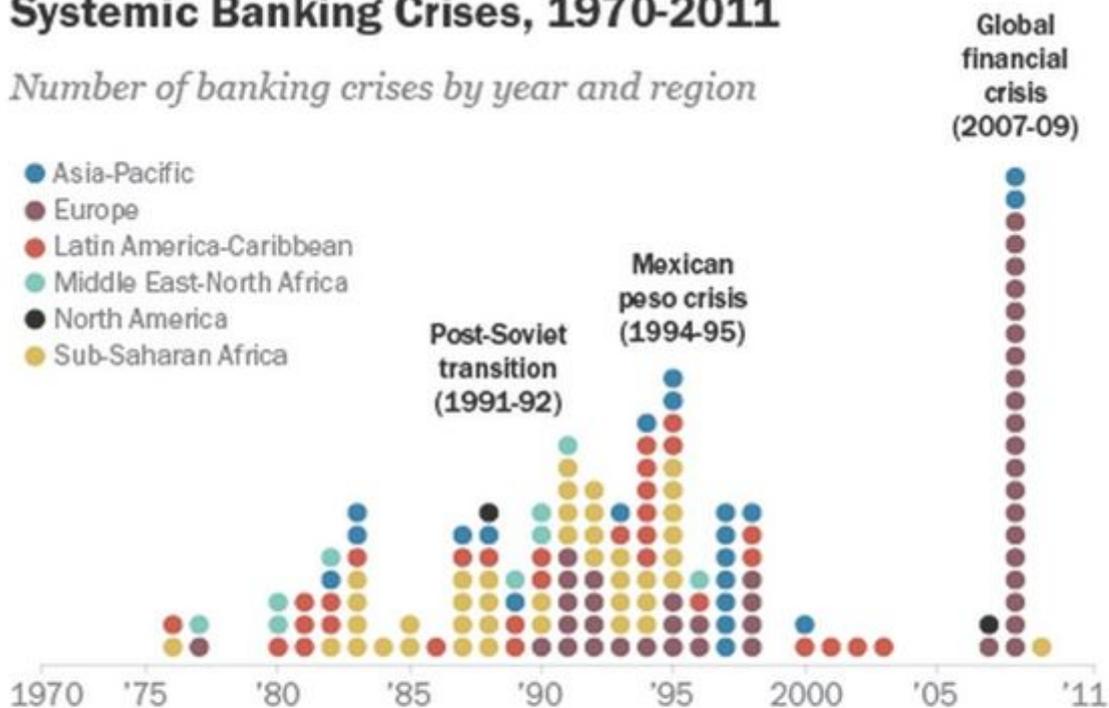
<http://www.telegraph.co.uk/finance/newsbysector/banksandfinance/5886419/HSBC-fined-3.2m-for-losing-customers-details.html>

¹² <https://www.theguardian.com/business/2016/nov/08/tesco-bank-cyber-thieves-25m>

The banking system's recent history provides a wealth of evidence that it is unfit to support or stimulate the microeconomy. The last few centuries have been characterised by continual financial crises, though few have been comparable in scale and impact to that of 2007-08. In many instances, a collapse of the banking system has been the root cause, or at least one of several contributing factors which has led to a severe economic recession. These recessions weigh mostly on small businesses and those workers on low-middle incomes who face redundancies, a reduction in social welfare support and sometimes even the loss of their home.

Systemic Banking Crises, 1970-2011

Number of banking crises by year and region

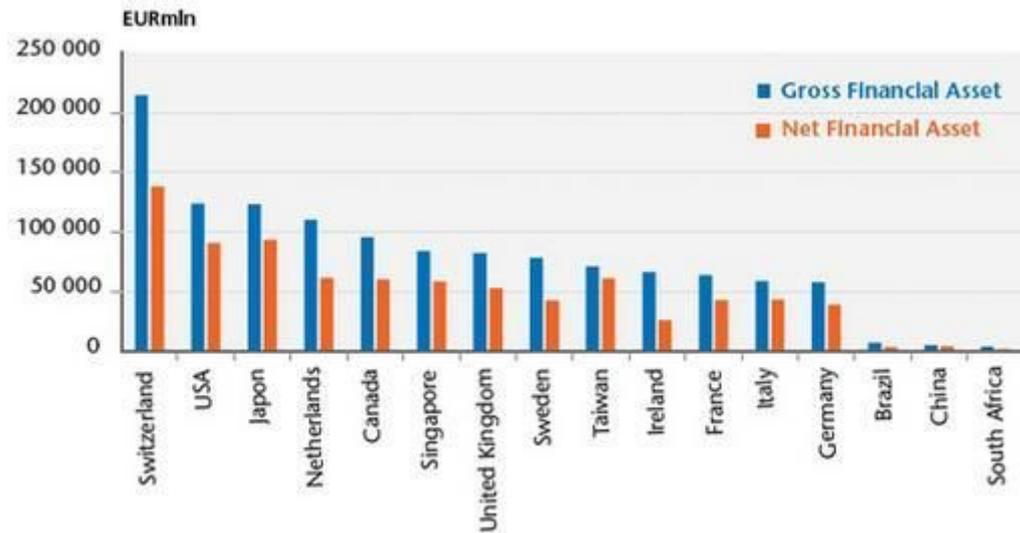


Note: Subsequent banking crises in Cyprus (2013) and Greece (2015) not shown.

Source: "Systemic Banking Crises Database: An Update," by Luc Laeven and Fabian Valencia. IMF Working Paper WP/12/163

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Systemic failures are often complex, and each one is different. That said, there are common themes of events which can be observed in many different cases. For instance, discoveries of fraudulent or negligent management of assets by retail banks are all too common. Retail banks in particular have struggled with asset transformation, and failed to leverage their resources effectively. External pressures from foreign trade and commercial risk have also played a role.



The Bank of England announced in July 2017 that it is extending direct access to its real-time gross settlement (RTGS) service to non-bank payment service providers[1], so they can compete with existing banks to provide current accounts. The purpose of this change is to create a more diverse payment arrangement with fewer points of failure.

This demonstrated that the UK central bank is recognising and embracing the fintech firms' potential to deliver a greater unbundling of banking into its core functions of settling payments, performing maturity transformation, sharing risk and allocating capital¹³.

¹³ Roland Berger ' The rise of Cryptocurrency

Appendix II - Recent Innovations

In the last few years, we've seen a number of innovations tackling issues within the banking and payments space. Many address meaningful and real problems within certain contexts, but have yet to be leveraged in a manner that can address the challenges faced by the microeconomy in a global manner.

These innovations can be grouped primarily in four areas:

1. E-Wallets

The first E-Wallets solved a very clear problem: payments. These were initially developed by non-banking institutions, to make an entry and achieve market share.

Examples of such E-Wallet includes Paypal and Google Wallet, which are built on the existing infrastructure of payment systems, by linking the email addresses and mobile phones of users to their bank accounts and/or credit cards.

While these solutions improve the user experience of the payments process, they still fundamentally rely on the banking infrastructure.

2. Mobile Money

Mobile money schemes place mobile operators in the position to offer payment services, where cash is accessed via a cell phone, not necessarily smartphone.

For example, M-Pesa in Kenya granted exceptional access to limited budget services, including payments made for school fees or utility bills. In areas with limited access to bank branches and unreliable internet connectivity, this type of service offers a practical approach to cashless payments.

On the downside, it is not universally versatile and is controlled by the telecommunications companies, each with their own non-interoperable service.

3. New Currency & Credits

These currencies allow communities to develop their own independent economy, unhindered by a world of compliance and regulations. Normally, they are valid only within a specific region, or within a company private platform or multiple yet specific platforms.

Real-life examples include the Brixton Pound in the UK or BerkShares in USA. On the digital side, we can find examples such as Facebook Credits or Linden Dollars in the

2nd Life virtual world. Credits are frequently used in mobile games and often function as in-game currency.

Given their restrictions, these approaches are unlikely to result in a global solution.

4. Digital Currency

Digital currency is a digital unit of value and performs three distinctive economic roles similar to physical currency:

1. A medium of exchange (an intermediary instrument used to facilitate the trade of goods and services between parties, which circumvents the problems of barter exchange);
2. A unit of account (as an example, if you spend British Pounds at a British store, the price tags will be denoted in numbers of British Pounds, as opposed to, say, number of apples); and
3. A store of value (polymer banknotes are more long lasting than paper banknotes)

Several types of money coexist under this broad definition – cash, commercial bank money, central bank reserves, virtual currencies and cryptocurrencies - each with their own set of strengths and weaknesses when fulfilling their roles.

While cash remains the world's quintessential means of payment, nearly all money has already been digitised. In the United Kingdom, for example, the physical form of money in public circulation represented only 4% of broad money balances in 2016 (BOE M4 measurement). On top of the declining popularity, cash has many drawbacks: it is the main instrument for tax evasion, money laundering and the financing of illegal activities; it is prone to devaluation in high inflation countries.

In the last few years, we've seen a new form of digital currency appear: cryptocurrencies. These combine a new currency unit with decentralised payment systems that validate transactions and maintain consensus. These mechanisms use a publicly visible ledger which is shared across a computing network, enabling users to reach a consensus that a transaction is valid.

Appendix III: Central Bank Digital Currencies

To understand why a Central Bank would issue its own digital currency, it's useful to take a step back and consider the evolution of technology and global economy.

Why are Central banks interested in issuing digital currency?

Distributed ledgers Technology (DLT), a generalization of the Blockchain technology popularised by Bitcoin and Ethereum, offers the technological breakthrough to digitise cash while potentially withholding its main features: universality, P2P exchangeability, anonymity and a constant nominal value. With this technology, people are able to hold assets directly, just like banknotes and coins are held in a wallet today.

Central banks around the world are actively exploring the idea of issuing Central-Bank-Issued Digital Currencies¹⁴ (CBDC) based on distributed ledgers that allow members of the public and business to hold digital deposit accounts at the central banks directly to make online payment and P2P payments, without the need for bank agents.

Similar to a cash transaction between two parties, when value is transacted with a CBDC, the bearer instrument changes possession directly in real time. There are two main advantages, one is that it eliminates the need for clearing or settlement between the parties transacting; it also gives central banks the ability to track CBDC transactions based on near real-time big data analysis through Blockchain. As a result, central banks can significantly cut costs relating to securing, distributing and processing physical notes and coins

While the use of distributed ledgers is not strictly required for such operation, it allows remote P2P exchange of electronic value in the absence of trust between the parties, and without the need for intermediaries, while it also helps to manage the development of digital data without boundaries in a secure manner. This improves efficiency, resilience, cost and reliability.

At Babb, we think it is inevitable that a CBDC will be adopted by at least some Central Banks over the next decade. This opinion is based on the following two assessments in which the overall social benefits for the micro-economy will likely exceed the social costs.

¹⁴ Including the Bank of England, the Bank of Canada, the Monetary Authority of Singapore, the Central Bank of Denmark, Swiss National Bank, Sweden's Riksbank, the People's Bank of China and the Central Bank of Russia

Why should a Central Bank issue its own digital currency?

1: Unregulated cryptocurrencies vs CBDC

There are a small number of privately created digital currencies (known as cryptocurrencies) today, such as Bitcoin. If these cryptocurrencies improve social efficiency to the extent that CBDC could, then there would be no reason for a CBDC issuance. Also, CBDC has the backup of monetary tools and regulations, whereas unregulated private cryptocurrencies can be a threat to the economy due to its speculative nature and a lack of economical structure.

However, at present:

- i. Cryptocurrencies cannot completely fulfil the economic roles associated with money¹⁵ (see table 1). For example, despite the rapid growth of bitcoin-based payment, bitcoin has a small daily transaction of about US\$ 316 million, which is marginal compared to the large global credit card providers. The small size and limited acceptance network restrict its use as a medium of exchange.
- ii: Volatility of privately created digital currencies is generally much higher than for national currencies, which makes it an unreliable store of money. To avoid the complexity of the existing monetary and fiscal policy Central Banks could start implementing DC for the local Microeconomy and maintain the stability of its digital currency by committing to a fixed exchange rate between its digital currency and the legal tender (physical notes).
- iii: Cryptocurrencies are not yet used as an independent unit of account, as they are often quoted in terms of fiat currencies.

In essence, cryptocurrencies constitute a new category of asset in themselves, and most aren't yet widely used as a unit of account and medium of exchange. CBDCs on the other side, remain legal tender with all the properties of fiat money, plus the flexibility and ease of local and international transfer associated with cryptocurrencies.

2: Too big to fail & risks

If privately created digital currencies become broadly adopted for making retail payments, it imposes a systemic risk to the financial system where a failure of a major private digital currency scheme could result in significant financial losses or even

¹⁵ See Yermack (2013); Lo and Wang (2014); and Ali, Barrdear, Clews and Southgate (2014).

adverse economic effects. To effectively address these concerns, central banks may wish to establish its own presence in the digital currency market by issuing DC to formulate oversight framework and ensure systemic risk can be accounted for (the idea is that the provision of DC cannot be entirely left to the market).

3: Cost and efficiency

a) Barriers to compete in payment system markets:

In the UK currently only a few banks and building societies (sponsor banks) are able to hold reserves accounts directly with the Bank of England, this give them direct access to payment systems such as CHAPS.

This means that challenger banks or banking fintech start-ups who wish to compete with more established banks must first gain indirect access from the sponsor banks to be connected to the systems. This puts start-ups on an unequal footing with banks.

In the future, by issuing CBDC that is available to all citizens, the central banks would create a level playing field that enables new entrants to offer payment accounts and payment services which were not dependent on access to the balance sheet of commercial banks.

b) Foregone transactions and micro-payment

Foregone transactions are those that are economically beneficial to both buyer and sellers, but did not occur due to existing market frictions. One example would be online transactions fees, which could be too expensive for relatively small-value transactions (assessing per-click online articles). Even though consumers may be willing to pay a small fee to access such items, the seller may not be willing to.

c) Shadow economic activities, Tax evasion and illegal economic activities

Cash transactions are historically associated with Tax evasions and illegal economic activities due to its anonymity and the difficulty to trace. CBDC can help to address tax evasion and even increase the tax base.

Appendix IV: Token Sale Summary

BAX TOKEN SALE SUMMARY	
Project Description	Babb is building the first World Bank for the microeconomy
BAX Description	BAX is the native token of the BABB Platform, used to pay for all fees and licensing, and as a medium for on/off boarding, exchange and fundraising.
Ticker Symbol	BAX
Token Background	BAX is an ERC20 token on the Ethereum blockchain
Start Date	Public Pre-sale in January 2018 (TBA) Public Sale in February 2018 (TBA)
End Date	February 2018
BAX token price	TBA after pre-sale
Total number of BAX token issued	50 billion BAX token
Percentage Public Sale	60%
Percentage for community initiatives	2% Bounty program
Percentage for long-term alignment of interests (BABB Team)	20%
Percentage locked in Reserve (for internal liquidity)	18%
Limit per ethereum wallet address	TBA after pre-sale
Handling of unsold tokens	Unsold tokens from the Public Sale will be burned
Escrow of funds	Multi-signature Escrow wallet, 3 out of 5 signatories
Accepted cryptocurrencies for BAX token sale	Ethereum only

DISCLAIMER

This document is currently considered a draft, and while we make every effort to ensure that any material herein is accurate and up to date, it may not be exhaustive. It contains forward-looking statements and is likely subject to further changes without notice.

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A more thorough disclaimer will be published in a later version of this document, but if in doubt, please seek professional legal advice.