chamapesa

The Distributed Table-Banking app for the Last Billion

By Ken Griffith, and Ian Grigg [1]

[1] Inventor Ricardian Contracts, co-inventor of Triple Entry Accounting, co-architect R3 Corda, co-architect block.one EOS, etc.

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Abstract

In Chamapesa, we propose a smartphone app and a new, open network for decentralized savings and lending. Our inspiration are traditional savings circles, as used by people around the world for centuries.

Chamapesa will create a blockchain-based 'last billion banking network' to support saving circles. Our experience with Kenyan saving circles (locally called Chamas) has helped us develop a model that enhances this tradition, without changing it in any way.

Growth and maintenance of Chamapesa's community will be funded through the issuance of Chamacoin tokens.

The Problem

We are completely dependant on the commercial banks. Someone has to borrow every dollar we have in circulation, cash or credit. If the banks create ample synthetic money we are prosperous; if not, we starve. We are absolutely without a permanent money system.... It is the most important subject intelligent persons can investigate and reflect upon. It is so important that our present civilization may collapse unless it becomes widely understood and the defects remedied very soon.

Robert H. Hamphill
Atlanta Federal Reserve Bank

Financial cryptography advocates have hoped of creating a financial system that will improve on, and eventually replace, a deeply flawed, centralized fiat banking system.

To date, Bitcoin, and other cryptocurrencies, have focused on basic problems of money and transactions. But if we're to replace banks with a better system, we must explore ways to decentralize savings and credit.

Prior Attempts at Peer to Peer Credit

Peer to peer lending evolved as an alternative financial system to banks. Ironically, it's now encountering the same problems as banks: how to evaluate a borrower's risk, especially online, and the practical difficulty of collecting bad debts.

Loan decisions were once made by bank managers who knew their customers well. Now, organisations rely on 'big data' over personal relationships. But machine learning is not an oracle: it can't create new information, and relies entirely on the quality of data supplied.

So lending platforms don't have the right information about prospective borrowers as they have no real relationships with them. P2P lending relied upon social media and machine learning algorithms to identify those most likely to default. However, as some discovered, this information can be gamed by identity theft.

So the question becomes: can we now use blockchain to create a robust identity model? One that can be applied to savings and credit - the next level on from payments.

> *I am excited, but very challenged. I keep wondering at night 'Will I have a bank the next morning?' or will some technology company be doing banking without needing a bank?*

Uday Kotak

Founder & Chairman
Kotak Mahindra Bank, India

An answer from history

An alternative financial system already exists, and it's also solved many of the problems faced by banks and P2P lending. In fact, it's been around for centuries.

Saving Circles are a global phenomena, found in almost every culture. They're called Hui in China, Tanda in Latin America, Chit funds in India, Mutuals and savings and credit associations in the West. In Kenya, saving circles are called Chamas.

The cultural and economic impact of saving circles is greater than many realise. They offer financial services to those who can't access a bank because of geography (rural locations), prohibitively high bank charges, or where the banking system itself is too corrupt to trust.

Saving circles are how people come together to save and invest for a common good. They stimulate entrepreneurship through funding business and infrastructure development. Here in the West, they were a key driver of the Industrial Revolution.

In Kenya, Chamas are found in every social strata. Lower and middle classes in particular distrust the country's banking system as it suffers from endemic corruption. So rather than trust their money to banks, they trust it to each other by organising Chamas as a more efficient way to access and manage their money.

Chamas' enduring success is due to their social structure. To join a Chama, a new member must be guaranteed by two existing members. People tend to make better, more informed decisions when their own money or wellbeing is placed at risk. It's what Nassim Taleb refers to as "skin in the game". If a new member defaults on a loan or misses their contribution, their Guarantors must cover the loss. It's effective at reducing risk, but it hasn't eliminated risk.

With Chamapesa, we propose an app to enhance this centuries-old tradition. It digitizes this social saving practice, gives it a private blockchain (to improve bookkeeping and transparency), and makes it globally available through a mobile app.

Chamapesa can extend far beyond Saving Circles: it could also offer a solution to the much larger problems of identity and the unreliable web of trust in the blockchain world.

The Chama Method

A Chama, like any saving circle, is a small group of people who trust each other, make a commitment to save money together, and meet weekly or monthly in pursuit of their goals.

There are two types of savings and credit associations: Rotating Saving and Credit Associations (ROSCA) and Investment-based savings and credit associations (Accumulating Savings and Credit Associations - ASCAs). [2] They contain between three and 30 members who pool their savings together and invest as a group. [3]
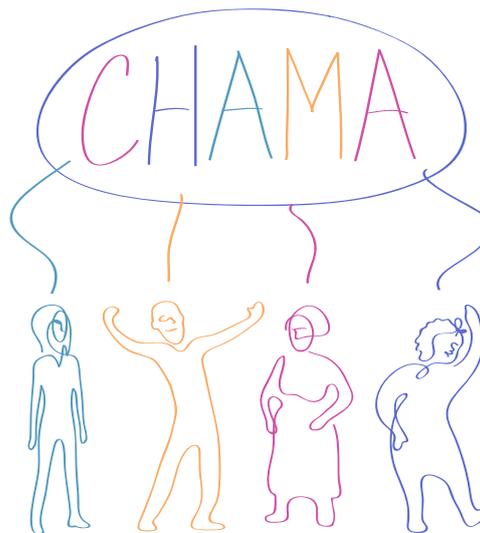
Rotating Chamas

These are the simplest and most popular form of saving circles around the world. In the US alone, rotating saving clubs formed by immigrant communities are a $30 billion market.

Rotating groups (ROSCA) provide members with regular cash sums. A group of friends agree to save a certain amount, either weekly or monthly. Each cycle, a different member takes home the funds paid in. For example, ten members save $100 per week. Each week, one member will take $1,000 home.

There's a risk that someone receiving a payout early in a rotation may default on payments before the rotation ends. The solution is to structure payouts: the most trusted members receive theirs first, and the least trusted (ie, newest) members receive them last. Additionally, Chamas require new members to be guaranteed by existing members.

Because of their simplicity, rotating Chamas are the most popular. In Kenya, there are three times more rotating clubs than investment clubs.

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[2] ASCA = Accumulating Savings and Credit Association
[3] http://www.startupacademy.co.ke/blog/chamas-and-table-banking-a-viable-source-of-funding/

Investment Chamas

Investment groups (ASCAs) are focused on general investment, but members expect to periodically borrow from the group to meet their cash flow needs. [4]

For example, Kenyan investment Chamas are often used to save money for tuition fees so children can attend private schools. Parents pay fees in installments two or three times a year, so need a way to save money safely. This is just one of dozens of needs for which people use savings groups.

Investment Chamas typically issue shares to members in exchange for savings contributions. Pooled savings may be invested in land, taxis, buses, or business ventures.

Investment Chamas effectively secure their loan and investment portfolios. As members buy shares, they enable the group to issue loans and investments. This allows members to profit from a wider portfolio rather than risking all on a few individual loans.

It's a savings and loan model with one important difference: *shares in the Chama are not demand deposits.*

Investment Chamas have higher bookkeeping costs because they're more involving. The Treasurer must keep track of savings, shares, group loans and investments. When money is lost in a savings group the main causes are either bookkeeping errors or a lack of governance and transparency when auditing the group's funds.

[4] Susan Johnson, Competing visions of financial inclusion in Kenya: The rift revealed by mobile money transfer
http://www.bath.ac.uk/cds/publications/bpd30.pdf
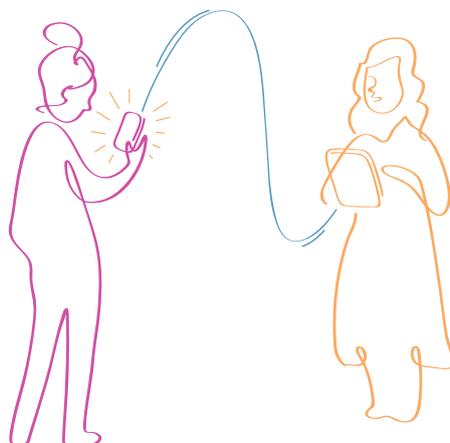
The annual failure rate of investment Chamas is around 6%. In Kenya alone, this is a $240 million dollar problem, while across the African continent, combined losses cost up to $6 billion each year. We see two major opportunities in the Chama model:

1   The solution to the problems faced by P2P lending in the West

2   A bookkeeping problem that can be solved by putting the group's transactions and guarantees on a blockchain.

The Need for Decentralized Fiat Currency Issuance

One of the major barriers to the adoption of cryptocurrencies is their lack of a tangible form.

Economies in all but six countries use a fiat currency issued by the Government as their money. The remaining six use fiat currencies issued by a more stable country.

Chamas save, account and borrow in their local currency. And while cryptocoin startups have announced their intent to bring financial inclusion to the world's two billion unbanked people, none has yet succeeded. They've struggled to decentralise the asset reserve, or to make it accessible locally[5]. You could call this "The Tether Problem".

Digital currencies backed by tangible assets such as cash and precious metals were initially successful. However, most failed due to attacks on the issuer or the reserve asset Trustee.

There is still a clear need for asset-backed digital money, and we believe there's a solution in the Chama savings method.

[5] Counterparty, HyperLedger, Bitshares, Colored Coins

The Chamapesa Solution

How do we create decentralised debt issuance that works reliably? By using Chamas like Kenyans do.

Our claim might seem counterintuitive. What can the developed world learn about finance from developing countries?

Kenya has some of the highest rates of fraud and corruption in the world. In just one incident, managers of Imperial Bank were alleged to have stolen more than 34 billion Kenyan Shillings from customer deposits. [6]

Chamas are how people in chaotic societies mitigate risk and meet their own financial needs. We saw the same in the early, lawless days of the American 'wild west', with people establishing 'friendly societies' or 'mutual aid societies'.

We developed the Chamapesa Identity Model in Kenya on the theory that if it works in one of the world's most chaotic and corrupt environments, it could be suited to work online.

Chamas use Guarantees to limit risk when new people join the group.

Alice: "I would like to invite my friend Bob to be a Member of our savings group."

Chama Chairman: "You may invite Bob into our Chama, but only if you personally guarantee him and co-sign his loans."

Alice: "Hmmm. Perhaps Bob is not the best fit for our group."

Managing risk really doesn't get any simpler or more effective!

Digital platforms that create a market between strangers will always struggle with fake profiles. Dating apps, auction sites, job references and cryptocurrency exchanges all suffer.

What if we create a decentralised ledger that lets people form savings groups with family or friends, and record Assurances and Guarantees made to other Members? Instead of relying on a government ID, we rely on someone's friends and family to confirm that they really are who they

[6] https://www.standardmedia.co.ke/article/2000193065/survey-kenya-ranked-third-most-corrupt-country-in-the-world

say they are.

Instead of relying on a centralised credit bureau, our users' identities will be based on their real world social network: friends, family, neighbours, business partners and so on. They'll have full control their own identity documents, and can choose who to share them with. This is the opposite of a credit bureau which sells reports to any institution willing to pay a fee.

However, information from someone's social network by itself isn't enough as people will happily give false information about friends if they believe there's no risk of repercussion. LinkedIn's 'endorsement' feature is an example of this: Members endorse friends, colleagues and even people they've never met, to gain goodwill. Some receive endorsement for skills they simply don't have.

If we ensure that endorsements come only from those with 'skin in the game' then we get accurate information. This is what we learned from Kenyan Chamas.

By combining endorsements with Guarantees and Arbitration, we can create an accurate picture of someone using the Chamapesa Identity Model. It's built on the following elements:

- Small groups who know each other (trust)

- Saving together (skin in the game)

- Recording Assurances (facts about Alice)

- And Guarantees (more skin in the game)

- Stored in a Persona (ID and credit record)

- That makes loans to Members (credit)

- Enforced by Arbitration (teeth)

Assurances

CA Cert pioneered one of the first 'webs of trust' by letting Members make assurances concerning each other.[7] An assurance is a statement of fact about another person. Alice gives her assurance that she has known Bob for ten years, and that this is an accurate photo of Bob. CA Cert may not have secured browser inclusion as trusted root certificates, but they created a successful trust model that reliably identifies Members. Their arbitration forum is still processing disputes today. [8]

Guarantees

A guarantee is a performance bond made against another Chama Member: a limited amount of money, for a limited amount of time.

For example, Alice might guarantee Bob for $100 for two years. If Bob defaults on a payment and loses an arbitration case, the Arbitrator calls in Alice's Guarantee. Alice has to pay $100 from her Chama savings. This also creates negative social feedback about Bob, and he may even find the cost of defaulting higher than the money he owes.

So now if Bob wants a loan, people first need to see what savings and guarantees he has. They become cautious, taking care not to lend Bob more money than the sum of his assets and Guarantees.

Putting it All Together

The Chamapesa app will let people create and manage savings groups on their phones.

The app will manage membership, bookkeeping, share issuance, payments, and loans between Members. It will integrate with local mobile money[9] rails, and an Ethereum-compatible wallet.

The Chamapesa app will create a micro-blockchain (Ricardian Litechain) for each Chama. Ricardian Litechains are a hybrid technology. They merge the functionality of Ian Grigg's Ricardo Transaction Suite with a blockchain. They're a major breakthrough: small enough to fit on Members' phones (and over 2G networks) without compromising blockchain's security benefits.

Each Member will hold a copy of their Chama's (Ricardian Litechain)[10] on their phone. It will record Ricardian contracts for the group's local currency accounts, shares and loans. (Ricardian Contracts, 'Riccys'[11] for short, allow the creation of redeemable blockchain tokens - backed by cash reserves, and distributed across numerous independent savings groups.)

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[7] Ian Grigg, LISA 08, "An Open Audit of an Open Certification Authority", De-horning the Dilemmas of Open Trust, 2008,
     http://www.iang.org/papers/open_audit_lisa.html#ap
[8] http://wiki.cacert.org/ArbitrationForum?action=show&redirect=Arbitration
[9] The app can be integrated with mobile money such as MPESA and Airtel Money as well as banking API's such as Equity Bank.
     https://developers.equitybankgroup.com/
[10] See appendix B - Ricardian Litechains
[11] See Appendix D: Chamacoin to Riccy Conversion

All Members can see how the Treasurer manages group assets, along with the performance of loans to individuals.

And each Member will receive a Persona. This is a record of a Member's identity details, performance history, Assurances and Guarantees. Personas could function like a credit record, to be shared with other Members, and financial institutions. There will also be an encrypted backup of each Persona for recovery in case a phone is lost or stolen.

Chamas move money around as part of their regular operations, so Chamapesa will be monetised through a small fee on each transaction rather than subscription. The market is accustomed to high transaction fees on mobile payments, so our proposed fee of ½% will be seen as very low. The app will also charge fees for sharing someone's Persona with other users, Chamas or financial institutions.

Chamapesa will support an ERC-20 token called Chamacoin. This will be used for collecting and distributing usage fees, and can be held as collateral for certain purposes, ensuring long-term economic demand for the token.

Taking It To the Next Level

Every group using Chamapesa will create strong Know Your Customer (KYC) records stored in Personas. These records will allow us to network Chamas together, enabling P2P lending across different groups. Arbitration locks it all together, and will give lenders a way to collect from those who default or abuse the system.

Once savings groups are using the Chamapesa app, we can create access to existing P2P platforms via an API. Members who need credit can issue a promissory note, backed by the guarantees of their Chama, and auction it to the highest bidder on a P2P lending market.

Creating a market will match qualified borrowers with reasonably priced capital. Chama Members will be able to access low-cost loans as the knowledge and guarantees of their Chama greatly reduce the risk to the lender. Both borrower and lender win. And all of this will be decentralised, with no central server or bank accounts.

Decentralised Fiat Currency Issuance

Without a local market between cash and digital currency, decentralised lending and saving could be shut down by banks or mobile money operators who simply refuse service. Banks call this 'de-risking' and it's a challenge for cryptocurrency exchanges and money transfer operators.

Chamapesa gives us the elements to create a decentralised fiat currency (or precious metal) issuance. It would be locally redeemable for cash, but free of a centralised store of value and with no need for a bank account. Here's how it could work:

- Member savings groups agree to a distributed Ricardian contract.

- They put forward collateral, or a performance bond, in the form of a token.

- They hold cash (or specie) locally as backing for a digital currency.

- The Group issues a receipt for their cash to a Smart Contract/Manager.

- Manager/Smart Contract then issues digital units back to the Group's Treasurer.

- The Treasurer then uses the digital units for the group's transactions.

- They can also spend these units to/from other Members/groups.

- A portion of transaction fees generated are paid back to the groups who put up the capital - thus generating a return for them.

Much of this will be automated, happening 'behind the scenes' so users can enjoy simple functions and actions. These steps allow Chamas to cooperate securely: as digital tokens are issued by a smart contract, there is no central issuer to attack.

That said, we're aware that Distributed Ricardian Contracts could let some groups issue digital receipts for cash they don't actually have. By asking Chamas to put forward collateral, we remove the economic incentive to cheat, and keep the system honest through arbitration.

If a Chama defaults on redemption, an arbitration dispute is filed. If the defaulting Chama does not comply with the ruling, their collateral is called in. The arbitrator can liquidate collateral held in the smart contract and unwind the defaulting group's issuance, preserving fiat currency issuance solvency.

Another potential problem is that of using a token with an independent market value as collateral for a currency. If token value drops relative to the fiat currency, the collateral may not cover the debt. This can be mitigated by setting the percentage of collateral needed relatively high.

As long as new savings groups join the network, the long-term effect of using Chamacoin as collateral to issue fiat tokens will be increased demand for, and scarcity of, Chamacoin.

We'll also need a way for Chamas to balance their accounts. For example, if one group has net withdrawals, and another has net deposits, the first has too much digital and the second too much cash. Chamas may trade digital for cash with each other using a secure discussion room to setup trades.

There are two markets for Chamapesa:

- Existing Savings Groups in the Developing World

- Western P2P lending and Consumer Credit Markets

In both instances, Chamapesa should be seen as a way to enhance these platforms, and not as a competitor.

Current Savings Group Market

In Kenya alone there are 300,000 registered ASCAs, and 900,000 unregistered ROSCAs. The investment Chama market grew from US $4 billion in 2012 to US $8 billion in 2016.,[12,13]

Across Africa, this market holds about $100 billion in assets, with an even larger transaction volume.

The potential fee base from African ASCAs is about $500M annually. In Kenya, reaching 10% of the Kenyan Chama market would mean Chamapesa could generate $2M a year in transaction fees, collected and distributed in the form of Chamacoin.

Rotating Chamas are harder to estimate, as many are unregistered. They will generate more fees than investment Chamas as money is constantly flowing in and out. The potential combined market for both kinds of Chamas is two to four times larger than the investment Chama segment alone.

In Kenya, the total savings volume is between $16 and $24 billion per year, with a potential fee base of $160 million to $240 million. These estimates are consistent with findings that cooperatives (savings and agriculture) account for 46% of Kenya's GDP of $70 billion.[14]

[12] http://www.capitalfm.co.ke/business/2012/11/first-handbook-to-guide-chamas-out/
[13] The $4 billion number is based on a 2013 study. According to the Kenya Association of Investment Groups a more recent study suggests that $8 billion is current value of assets under chama management in Kenya.
[14] Jeremiah M. Nyatichi, "Cooperatives and Employment Creation: The Kenyan Case", Ministry of Industrialization and Enterprise Development, Republic of Kenya, 2015, http://ccr.ica.coop/sites/ccr.ica.coop/files/attachments/5.4%20Nyatichi.pdf

Western Consumer Credit Market

Projections for the world's P2P lending market reveal that, despite difficulties, they're expected to grow by as much as 48.2% between 2016 - 2024. Much will be concentrated in the USA, UK and China. Transparency Market Research anticipates that "the global peer-to-peer market will be worth $897.85 billion by the year 2024".[15]

Morgan Stanley predicted that such marketplace lending would command $150 billion to $490 billion globally by 2020.

American P2P sites require a credit score above 640 before someone can take out a loan. This excludes the bottom 40% of America's market, the so-called 'subprime' borrowers.

Chamapesa can deliver a way to save, and to borrow against savings for this demographic, which has no competition from banking or P2P lending markets.

Business Model

Chamacoin will be the token associated with the Chamapesa app.

Chamapesa will be offered as a free app. By only charging fees on transactions, Chamapesa will quickly gain traction in a market where people prefer to "try before they buy".

A transaction fee of up to 50 basis points will be collected in whatever instrument is used (for example, shares of a savings group), automatically converted to Chamacoin on a market[16] before being distributed by Smart Contract in a way that incentivises both users and development team.

A decentralised market between Chamacoin and local currency will be available via the app. It will allow savings groups to buy and sell Chamacoins to cover their transaction fees and any requirements for collateral.

Users will need Chamacoins to cover transaction fees, even if this is invisible to users due to automatic conversion of fees through a market. This will give Chamacoin's early adopters a market where they can sell their tokens.

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[15] https://globenewswire.com/news-release/2016/08/31/868470/0/en/Increasing-Small-Business-Units-to-Act-as-Building-Blocks-for-Peer-to-Peer-Lending-Market.html

[16] Each Chama is its own market for its own shares. Members pay in via mobile money or cash each month to buy shares. When Chamapesa collects fees in the form of shares, those shares will be listed for sale in the Chama's own market (and pushed to the front of the line), so when Members pay in the following month, fee shares are converted to local fiat currency, which can then be automatically exchanged on a market for Chamacoin.

On average, each registered Kenyan Chama holds around $13,000. The flow of savings in and out tends to be a multiple of the actual money held. With a 50 basis point transaction fee, the average Chama can be expected to generate $133 per year in fees. If 80% of this is paid back to users as incentives, the annual revenue of each Chama retained by the publisher will be $26. Compared to a typical app that sells for $1 on the app market, Chamapesa will be lucrative, yet still cheaper to use than current models.

African Market

The biggest competitor we face is the paper ledger still used by most savings groups. Chamapesa has to meet the needs of existing savings groups which use tangible local currency. An abstract digital token will be a hard sell.

Though several Chama apps have been created and collected enough users to be profitable, none have really gained a significant share in this market. This is due to failures when accurately modelling how savings groups work and with incentivising groups to use the app.

The Chamapesa team began developing the app in Kenya, 2012. Our Head of Product, Toffene Kama, developed the most successful Chama app to date, called Tigopaare in Chad in 2015. We've focused on Kenya for our launch because of our relationships with both savings groups and financial regulators here.

Chamapesa Team

Ian Grigg

CTO

Best known for creating the Ricardian Contract in 1996, and his seminal paper on Triple Entry Accounting in 2005, Ian has worked as a consultant to R3 Corda, BlockOne EOS and Intuit.
www.financialcryptography.com is Ian's blog, which has been a trusted source of information on secure payments and webs of trust since the 90s. Ian's 'eureka moment' came when he realised Chamas are the ideal way to provide working governance to blockchain projects. In his latest e-book, Ian explores the potential of Chamas for creating a web of trust and identity models.

Ken Griffith

CEO

Ken's involvement with digital currencies goes back to 1996. In 2012, he persuaded Ian to visit Kenya to found a fin-tech project that evolved into Chamapesa. Ken managed the team who created the first Chamapesa app, then partnered with Chamas for its Alpha testing. In 2002, Ken oversaw the successful launch of a payments startup which gained 250,000 users and turned a profit in its first year. Ken also invented the Distributed Ricardian Contract as a way to offer decentralised asset-backed digital currency.

Hon. Marc Bean JP

CHAIRMAN

Marc has high level business and political contacts throughout Africa and the Caribbean. A Director of multiple companies, Marc operates several E-commerce businesses spanning online gaming and IPTV. Marc is interested in developing digital currencies and mobile payments for African and Latin American/Caribbean markets.

Eva Stöwe

GOVERNANCE ARCHITECT

Eva oversees Chamapesa's Governance Architecture, drawing on her extensive experience of governance with associations and communities, including the EOS community blockchain. She joined CAcert five years ago, quickly becoming its most active arbitrator. Before her involvement with Chamapesa, Eva worked as a Programmer in sectors including Transport, Banking, Insurance, Medical, and Energy. Her academic background is in Law and Computer Science.

Michael Kimani

USER RESEARCH AND MARKETING

Michael is a researcher with a background in Business Development and Derivatives trading. He's one of East Africa's leading cryptocurrency experts. Since 2014, Michael has helped increase Cryptocurrency use in Kenya through community engagement, education, training, and industry events. As a researcher in East Africa's informal economy, Michael has extensive experience of East African savings groups and has consulted for the digital currency startup BitPesa. Michael's experience and people-centred research background will help maximise Chamapesa's business development and customer experience.

Arthur Doohan

CFO

Arthur Doohan is an engineer by training, a banker by experience & an activist by choice. After graduating from Trinity, Dublin he immediately started in banking and soon found a niche in London trading all forms of credit, debt and their derivatives. Having left banking for more ethically coherent work, he soon made time to campaign for a debt reform proposal after the GFC on the basis that the answer to 'too much debt' cannot be 'more debt' and the asymmetries of fiat currency and bank created debt are unsustainable. He is currently CFO for a hardware startup, a blockchain consultancy, a social cohesion initiative as well as for Chamapesa.

Niti Bhan

ITERATIVE DESIGN

Niti adapts methods and tools from formal economies, applying them to the needs of informal economies. At Aalto University Design Factory, Finland, she developed a robust problem framing and solution finding methodology that integrates elements from business development, human-centred design and engineering. In 2008, she won a grant from the IDRC-supported iBoP Asia project which used design ethnography methods to understand household finance among low income and rural communities in the ASEAN, the foundation for the Prepaid Economy project, and EFL's body of knowledge-based practice.

Toffene Kama

HEAD OF PRODUCT

Toffene is focused on helping turn social savings groups into fully-fledged credit unions by leveraging their savings to drive entrepreneurship. As Head of Mobile Payments at Redknee he helped create the roadmap and scaling for M-Pesa. He founded Willstream Labs, a token-based remittance service that offers migrant workers a low-cost way to send money to local businesses in their native country. Toffene is also co-founder of Ay'Wa Markets, dedicated to improving Africa's mass transit systems using Blockchain technology. In his role as Head of Mobile Financial Services for Millicom, He created the Tigo Paaré mobile wallet, shortlisted as AfricaCom's Best Mobile Money service in 2015.

Simone Smith Bean

LEGAL COUNSEL

Simone was admitted to the Bar of England and Wales in July 2008. She obtained her Compliance Diploma and AML Certifications in 2010.

She is a former associate of Lockhart & Co. (formerly Lockhart & Munroe) resident in The Commonwealth of the Bahamas and Charter Chambers Bermuda Limited.

Simone is the owner and operator of Smith Bean and Company Limited, and SBC Corporate Services Limited, offering legal services related to Civil Litigation, Merger & Acquisitions.

Gabrielle Patrick

ADVISOR

Gabrielle is a Corporate Lawyer with over 18 years experience in both the UK and USA. As Chief Legal Officer for a global insurance company, she's responsible for over 30 territories. Since 2012, her focus has been on blockchain and distributed ledger technology (DLT). She was involved in the UK's FCA Regulatory Sandbox First Cohort, a testbed for new models, and runs her own DLT businesses, bringing the benefits of DLT to people. Gabrielle also leads the International Bar Association's dialogue on blockchain technology, and a multi-disciplinary committee that examines related legal issues.

Solidus Limited

ISSUER

Solidus (so-lee-doos) is a Bermuda Limited Company which has acquired the intellectual property of the ChamaPesa application and code base from the former project (Dinero Limited) which researched and developed the alpha version of the app and business model using about $250,000 of the founders' capital, and approximately $1.5 million worth of cumulative prior investment in the development of Ricardo since 1996. Solidus will issue and offer the ChamaCoin tokens, and will be responsible to carry out the objectives stated in this white paper.

Marketing Plan

We plan to develop and test Chamapesa in Kenya first, before introducing it into other markets using localised branding.

African Market

Traditional advertising methods are ineffective here which is more inclined to word of mouth, and 'eWord of mouth'[17] referrals.

We plan to hire and train full-time Chamapesa ambassadors in Kenya. They'll introduce the app to existing savings groups and teach them how to use it. It also makes sense to introduce Chamapesa to Graduates, a young audience who adopt mobile technology faster, and who may be inspired to start savings groups of their own.

Ambassadors will be paid on commission when they introduce new groups. We may need to pay base salaries during the training period. A one or two-level affiliate program may be built into the app to reward those users who introduce other savings groups to Chamapesa.

Once Chamapesa is running successfully in Kenya, we'll invite interested contacts in Ghana, Congo, Nigeria, Uganda, Somalia and South Africa. There are also plans to launch in the Caribbean, where we find similar group saving cultures on islands including Bermuda, the Bahamas, Jamaica, Haiti, and the Dominican Republic.

Because each country has a local name for their savings culture, we may need to release Chamapesa app under localised names (but use Chamacoin for fees and collateral).

Western P2P Lending Market

Given there's already a $30 billion ROSCA sector in America's immigrant communities, this becomes the inroad to Western markets. We can focus on immigrant communities, build a user base, then approach P2P lending platforms with an API that will let them grant access to our users.

Other Western markets include church-based debt reduction programs and Millennials - for whom the financial system isn't really working.

China presently has the largest P2P lending market. Due to its immense size and unique peculiarities, it makes sense to create a division of Chamapesa specifically to cater for the Chinese market.

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[17] M. Olmedilla, Identification of Influencers in eWord-of-Mouth communities using their Online Participation Features. First International Conference on Advanced Research Methods and Analytics, 2016, http://www.carmaconf.org/wp-content/uploads/pdfs/3642.pdf

Technical Innovation and Implementation

In addition to solving a practical real world problem (blockchain-based savings and credit), Chamapesa will bring three innovations to the broader blockchain community:

1 A group-based identity model. Users will be able to vouch for each other, and to put money on each other's performance. This may help people in developing countries to monetise their own credit reports, and may contribute to better web of trust within cryptocurrencies.

2 Ricardian Lightchains. These are lightweight blockchains, unique to each group and which live on members' mobile devices.

3 Distributed Ricardian Contracts. Also known as 'Riccys'[18], they allow creation of redeemable blockchain tokens which are backed by cash reserves and distributed across numerous independent savings groups.

Chamapesa is an existing app (code named 'Talisman') which is still in the alpha phase. It was originally created as the Android client for the Ricardo Transaction Suite. It currently supports the creation of Ricardian Contracts, holding accounts in Ricardian instruments with peer to peer transfer, and the creation and sharing of Personas. However, it still needs more features, such as recording assurances, guarantees and loans, before managing an actual Chama.

[18]   See Appendix D: Chamacoin to Riccy Conversion

Chamapesa uses the SOX (Secure Open Transactions) protocol to communicate securely over low quality (GSM Edge) data connections with minimal bandwidth. This gives better performance and uses far less bandwidth than SSL-based web connections. This is important in markets where users are sensitive to bandwidth costs.

The existing codebase, which is about 100 KLOC for all components is written in Java, and has clients for both Android and Java Virtual Machine (desktop UI is written in SWING). (The app itself currently uses only 20 KLOC.) We intend to upgrade to Java FX for all versions of the UI, making it easily portable to both Android and iOs devices, in addition to desktops.

Chamapesa's smart contracts will be developed for the smart contract platform which is yet to be determined due to the rapid changes happening on that front. But, given the large size of African and P2P lending markets, we anticipate transaction throughput to eventually reach thousands per second. To ensure our ability to scale, we intend to test smart contracts on several of the contending platforms to determine which is the best fit for our project.

Identity Model

The Chamapesa Identity Model (appendix A) was developed through our team's work with Chamas in the field, but is only partially implemented. For this token sale, the development team will implement features of The Chamapesa Identity model.

Ricardian Litechains

Led by Ian Grigg, the development team will create a new type of lightweight local blockchain called a Ricardian Litechain. (appendix B) While the issuance of national currency will be run by smart contracts on a global blockchain, the Chama's local accounting for Member Personas and accounts will be performed on Ricardian Litechains.

Secure Open Transactions Protocol

Secure Open Transactions (SOX) is a transaction protocol developed by Ian Grigg as part of the Ricardo Transaction Suite. SOX lets users open accounts and conduct transactions securely over a data connection, and specifically instruct transactions such as movements of value in Ricardian Contract issuances.[19]

In developing countries, most mobile users buy prepaid data bundles in small quantities (typically 100 - 500MB of data). This audience is sensitive to applications that are wasteful with bandwidth.

SOX uses very little bandwidth as it can work over UDP. In fact, the use of raw UDP allows SOX

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[19]   Gary Howland, "Development of an Open and Flexible Payment System", Systemics Ltd, http://www.systemics.com/docs/sox/overview.html

messages to be sent very efficiently, using only a fraction of the bandwidth required by HTTP over TLS. This is ideal for mobile transactions because SOX works quickly and reliably over a 2G network connection such as GSM EDGE.

The cryptographic code used in SOX is published here: https://github.com/iangfc/cryptix

Ricardian Contracts to Record Loans & Rotating Chamas

We will record loans and promissory notes as Ricardian contracts. Regular payments are made to a smart contract. This credits payment to the note's outstanding balance and releases funds to the note's holder.

The structure of a rotating Chama is very similar to a loan. A number of parties agree to the contract and make monthly payments, which are released to a different member each month. The same type of smart contract can be written to handle a loan or a merry-go-round.

Local Payments Integration

So that users can deposit and withdraw savings using mobile money, it makes sense to integrate Chamapesa with local money rails in each country. In Kenya, this means integrating MPESA, Equity Bank, and Airtel Money. Because several mobile money providers operate in multiple countries across Africa, the technical cost of adding new countries will be quite low. For the purposes of this token offering, at least one mobile payment rail in Kenya will be integrated with Chamapesa prior to public launch of the app.

We'd like each Chama to control their own mobile money account through the app. This way, they have the option of using a mobile money account as a custodial account for the group's funds. This would be controlled solely by the Chamapesa app on the Treasurer's phone. However, this is dependent on the available API and features of each mobile money platform, and may not be possible for some or all of them.

For Western markets that lack any established mobile payment rails, the app can be integrated with bank clearing systems such as ACH.

Integrated Markets

Ricardo Transaction Suite includes Ricardo Exchange, a component for creating order books between Ricardian instruments.[20] By building this into Chamapesa we give each Chama a mini-market where buy and sell orders for monthly savings and Chama shares are processed.

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[20]   Grigg, Ian, The Message is the Medium, https://steemit.com/eos/@iang/the-message-is-the-medium

Globally, national currencies will trade on markets for Chamacoin, with automatic conversions for transaction fees. Once markets are integrated, we can easily add new instruments, giving Chamas access to digital currencies such as Bitcoin, Ether, etc.

To create such a decentralised market, we will have to port Ricardo Exchange to a distributed model.

Iterative User Interface Design

We will work with Niti Bhan and Emerging Futures Lab to create an intuitive user interface that will guide people through creating a Persona, starting or joining a savings group, and saving with Chamapesa.

APPENDIX A - CHAMAPESA IDENTITY MODEL

The Chamapesa Identity Model uses Personas, Groups, Assurances, Guarantees, and Arbitration to create a reliable web of trust between users.

APPENDIX B - RICARDIAN LITECHAINS

Ricardian Contracts, invented by Ian Grigg in 1996, enable a contract to be converted into a financial instrument (money, bonds, shares, etc) and accounted for on a digitally signed transaction chain (triple entry accounting). [21]

If we merge blockchain with Ricardo, we create a 'Ricardian Litechain'. This is a Ricardian Contract Server for the savings group that sits on an encrypted blockchain and runs on 1-100 Member devices.[22,23] It efficiently and securely handles group identity records and transactions, recording information which is encrypted and stored away from the public eye. As there are multiple copies, account recovery becomes possible should a Member lose their device. Ricardo also works like a Telegram room, allowing conversations across a group.

APPENDIX C - DISTRIBUTED RICARDIAN CONTRACTS

To encourage wide-scale adoption of blockchain-based services, developers still need a way to issue digital units of local currency that can be redeemed or exchanged for cash.

By combining the Chamapesa Identity Model with a smart contract platform, we believe it possible to create distributed asset-backed tokens, where the asset backing the issuance is held in small quantities by tens, hundreds, or thousands of savings groups. By distributing the asset backing the token amongst the groups, it becomes asymmetrically expensive for corrupt elements to locate them and create pretexts for confiscating assets.

Through good governance, we can keep the system honest and protect against Member defaults.

[21] Grigg, Ian, The Ricardian Contract, http://iang.org/papers/ricardian_contract.html
[22] Grigg, Ian, "On the Intersection of Ricardian and Smart Contracts", 2015, http://iang.org/papers/intersection_ricardian_smart.html
[23] Grigg, Ian, "The Sum of All Chains: Let's Converge!", 2015, http://financialcryptography.com/mt/archives/001556.html

This will be done using Distributed Ricardian Contracts running on a global smart contract platform.

MPESA (Kenya's largest mobile money service) processed six billion transactions in 2016, averaging 189 txn per second. This number has been almost doubling annually. Ethereum is presently limited to 30 xn per second. As Africa wakes up to using Chamapesa, we expect to see our transaction volume approaching 1000 xn per second within ten years.

Between now and then, we must be prepared to shift to a smart contract platform with sufficient throughput to meet users' needs. Ethereum's dev team are addressing this issue. EOS also looks promising, but the future landscape may be different.

APPENDIX D: CHAMACOIN TO RICCY CONVERSION

Chamacoin ERC20 / Riccy Token Conversion Process

Chamacoin ERC20 token is an Ethereum token to be auctioned through a combined public-private sale.

Using the auction funds, Solidus will organise a Distributed Ricardian Contract (also known as a 'Chamacoin Riccy') to fund further development of the Chamapesa app.

How Chamas can issue Riccys
Any assured and guaranteed Savings Circle can apply to become a co-issuer of Chamacoin Riccys by following the steps outlined below. We envision a high degree of automation: the easier it is to convert, the more Chamas will join.

1. Install the Chamacoin Riccy Contract within the Chamapesa app.
2. Agree to the terms and create an account.
3. Put up collateral to set the issuance limit. (This is refunded should a Chama unwind its operations)
4. Purchase Chamacoin ERC20.
5. Record the address of the Chamacoin ERC20 as held in trust for the Chamacoin Riccy.
6. Receive Chamacoin Riccy tokens from the Mint Trustee account.

This process can be reversed by spending Chamacoin Riccy to the mint account, which essentially destroys it. The receipt can be used to withdraw ERC20 tokens of equal value from the trust address.

Retail Exchange
Conversion between the Chamacoin ERC20 token and the Chamacoin Riccy will be enabled at wholesale and retail (individual) levels.

Any member Chama may offer exchange services to other Chamas and Chama Members using the same model as an 'over-the-counter' Bitcoin exchange. This is done by holding balances in both the ERC20 and Riccy tokens, then charging for exchange services.