BLUEPRINT 2025: THE EMERGING GLOBAL DIGITAL FINANCIAL SYSTEM

FOREWORD BY

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ABSTRACT

Facebook's introduction of Libra represents a reality check about our digital futures, and our economic prospects as a whole. For the aware and the ready, it is wide open field of opportunity, particularly as cryptocurrencies are adopted into the mainstream. For the unaware and the unready, it could be a death knell for personal rights and financial freedoms. We see emerging a careful balancing act brought about by responsible businesses and civic consortiums, enabled by blockchain and DLT innovations.

Let's discover what happens when a new financial internet reduces friction to zero for transactions of any complexity.

"Great is truth, but still greater, from a practical point of view, is silence about truth. By simply not mentioning certain subjects... totalitarian propagandists have influenced opinion much more effectively than they could have by the most eloquent denunciations."

Aldous Huxley

FOREWORD

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When Milton Friedman predicted the rise of a digital currency in the late 90s, Keynesian and Austrian School economists alike started to see a monetary system that would begin to choke on its own debt fumes, so to speak. Luminaries like Bernard Lietaer, a former central banker and co-architect of the Euro, would conduct over 196 complementary currency experiments around the world that challenged the notion of debt-based currencies, just as Hyman Minsky would challenge the notion of debt altogether.

We've known about technology's inevitabilities to disrupt industries, create new markets, and shift sociocultural paradigms. What we haven't known about, or more specifically seen, are the effects on large segments of the population when money itself is reconstituted as an instrument that is not exclusively debt and inflation-oriented. This is both the challenge and opportunity of a new global digital financial system.

This isn't really about Bitcoin, or the blockchain, distributed ledgers, or cryptocurrencies as we've come to understand them. This is about an alternative set of systems stretching across the domains of technology, finance, education and the environment which comprise a clarion call for building a better, more equitable world.

What does that world actually look like or how would it operate?

To glimpse into that future let's start from the reality of where we are now: In the current financial system, amid western sovereign states, we can no longer spend our way out of debt. Perhaps this is the hardest thing to accept for political and institutional leaders who approach improvement timidly, from outdated perspectives meant to preserve and further strengthen the status quo, rather than leap into the true potential for innovation that current scientific and technological and socio-ecological advances offer us.

So goes the great promise of a new, alternative system, one with all the digital bells and whistles societies and nation-states can muster: Money-over-IP, stablecoins, tokens, cryptofiat, new asset classes, and a general willingness to push boundaries previously unseen. The possibilities of this emerging global digital financial system abound, from taking care of the unbanked, the underprivileged, and a wide swath of people who need access to vital resources, not to mention mechanisms for managing their own data and their own personal financial assets. In the grand scheme of things, this opens up unprecedented possibilities to financial innovations that can

regenerate economies, while preserving natural resources and reversing the perilous trajectory on which we've deluged the planet with predatory practices.

While time is of the essence, now the question becomes one of willingness, alignment and synchronicity at a global scale. **Are we ready to transition out of a zero-sum mindset and to play a win-win regenerative game with each other and with nature?** The seminal vision in Blueprint 2025 points to the hard truth: While we have at our fingertips the technology and science to embark on a regenerative trajectory by tapping into the potential available now - zero to negative interest rates, net zero remittance capability, and a frictionless payment rail ecosystem - our mindsets need a radical shift to be able to make all these advances come to fruition.

Blueprint 2025 fuels such a shift. It is pragmatic, applied and precise.

The responsibilities required to make this a reality fall not only on the shoulders of powerful leaders, but on every individual, since all of us have to ride this wave of change in our lives, families, communities, organizations. It's time for an adaptive approach to implement the much needed changes to better our lives by keeping the blue dot blue for the future generations.

Here's to what is possible!

Introduction: The Economics of Sound Financial Logic

At the time of this writing (Wednesday, September 18, 2019), the United States Federal Reserve, historically one of the most powerful central banks in the world, executed a $53 billion dollar 'borrower bailout', with plans to repurchase another $75 billion in debt instruments such as treasuries. Meanwhile, the federal deficit has reached a whopping $1 trillion this fiscal year.

According to a Federal Reserve representative: "The goal is to pump money into the system to keep borrowing costs from creeping above the Fed's target range."

"No one knows why this is happening," Jim Bianco CEO of Bianco Research, said on Twitter. "If it persists more than another day or two, it will be a problem."

Sound familiar?

An 'overnight adjustment' of interest rates allows banks to quickly and cheaply borrow money, for short periods of time, often to buy bonds like treasuries. And as we know now, the treasury market broke down during the 2008 financial crisis. Analysts like to draw a distinction between the current 'period of stress' and what happened during the crisis. Back then, as it is conjectured, investors were deeply worried about the financial health of banks. Today, banks are hauling in record profits and balance sheets look sturdy… Or so it seems (not really; look at what's happened already to European banks).

Here is the core problem: You can't target flationary conditions in which you can't spend your way out of debt. **In other words, inflation targeting is useless**.

Buying back treasuries and other securities is also pointless if purchasing power isn't accelerated for investing into real assets to support the real economy. Quantitative easing - issuing more dollars into the economy in order to increase spending activity - won't do it, certainly not on its own.

Then we have to think about debt and purchasing power parity across nations. Beyond trade wars, tariffing, and Brexit negotiations - all marked signals of fiscal dynamics, no less - we live in a global economy. Global debt-to-GDP hovers around 318%, or $247 trillion. On average, the world's **debt** now exceeds $86,000 in per capita terms, which is more than 2½ times the average income per-capita. The most indebted economies in the world are also the 'richer' ones. Funny too, that China is subsumed in its own debt and has a closed capital account (meaning you can put a dollar in, but probably won't get a dollar out), while western countries like the U.S. have escalating debt and considerable investment in China. If inverse yields in bonds are any indication of how extending the debt doesn't and can't work in any sustained way, it's time we faced the music, so to speak. Only this time, it can't be a Swan Song.

Of course, it also seems oxymoronic that indebted countries are the richer ones.

Right now, in most western economies, we are experiencing low to negative inflationary rate adjustments with respect to monetary policy, while we are experiencing pockets of *hyperinflationary conditions*, whereby the prices of goods and services can rise by more than 50% a month in certain areas, due to an overall lag in purchasing power. This means that some people might have more money to spend, but they are getting far less 'bang for their buck'. In other cases, many more people are jobless or underemployed as a result of the relatively high pricing of products and services. We are seeing this play out in parts of Europe, the U.S. and in more glaring ways, South America and Africa — especially in areas where resource economics are seriously challenged by geopolitical agendas.

Paul Craig Roberts has summarized it well: *"When the debt can't be serviced, it can't grow. Moreover, debt service drains income into interest and fee charges, further reducing consumer purchasing power. Thus, the offshoring of jobs has limited the expansion of aggregate consumer demand. As corporations are buying back their stock instead of investing, there is nothing to drive the economy. The economic growth figures we have been seeing are illusions produced by the understatement of inflation."*

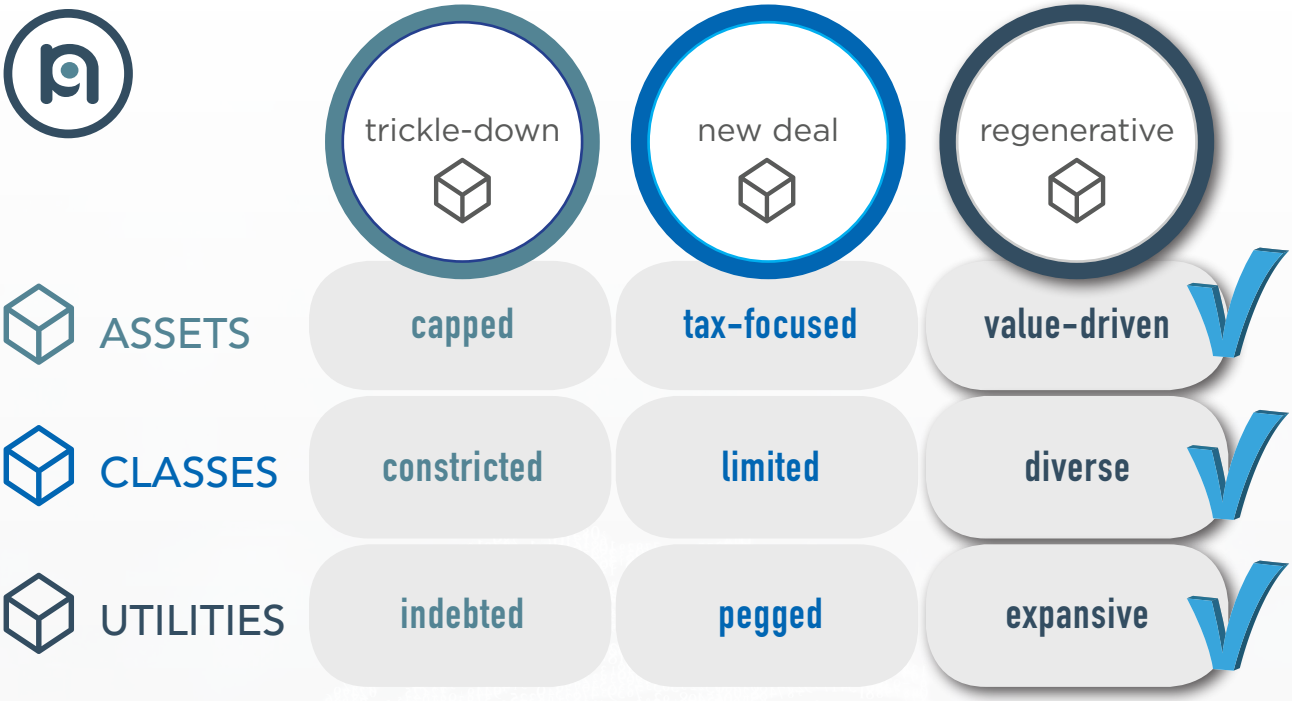
Not to despair, fundamental economics - sans failed theories and unfounded assumptions - tell us something far more practical about the real risk and opportunity in developing a healthy economy.

+ **Real assets hedge against flationary risk**; regenerating assets like land, food, energy, water and the data representing them are an even greater hedge against that risk, since there is a constant demand for the resources people need to live and to work.

+ **Those assets steward jobs, increasing labor force participation**; as more resources are made available - facilitated by emerging technologies like the blockchain - structured assets necessitate management and redistribution, in turn creating new skill sets, new vocations and job opportunities, at scale.

+ **These reduce deficit spending against tax receipts, in part by generating tax revenues on products and services**; as products and services proliferate back into the real economy as real utilities (things people can actually use that have real value), unwieldy taxation on citizens is mitigated by real, managed taxation on those utilities.

Progressive taxation, new deal economics, green new deal ideologies, and the general shortsales of the public trust get wiped away when we ground ourselves in these pragmatics.



Now consider the real promise of blockchains, distributed ledgers, cryptocurrencies and related digital instruments: Low to net zero remittances without middlemen remove the friction to buy, purchase and redistribute assets, largely without debt and flationary risk.

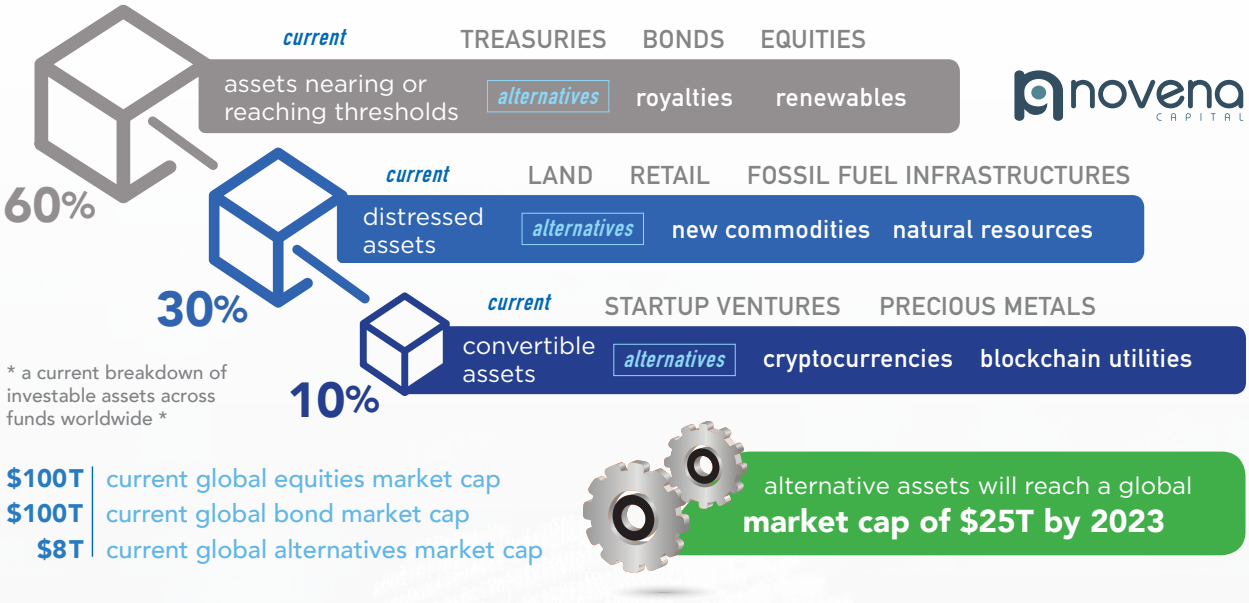
In other words, we can create and redistribute new assets, and create new asset classes, such that more people can live and work on their own terms.

Hard to believe?

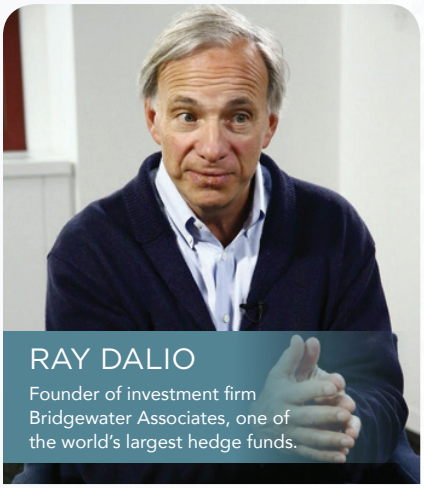
What if you were told that a mind-bending $68 trillion in sidelined capital **is waiting to be reinvested back into the real economy**, with more or less 'no place to go' as of right now. Yes, it is true. And to boot, less than 5% is being allocated to investments that have real social and environmental impact. Remember what we just established about regenerating assets as being the greatest hedge against flationary risk?

As such, another critical factor arises: *Risk isn't what we think it is.* It used to be that investing too much in the 'wrong things' was too risky. **It is investing too little, in the right things, that is the real risk we face.**

Let's look at the current breakdown of investable traditional asset classes with alternative assets across funds worldwide, where we can see the gaps and opportunities of this unprecedented moment in history.

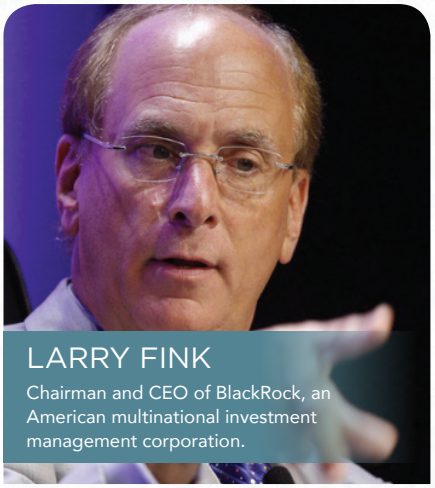


What this shows us, in sum, is that the majority of traditional asset classes are reaching their thresholds in terms of return on investment, while alternative asset classes are emerging to become their 'default replacements'. To be clear, this is not some clarion call for a 'green movement' per se, but to make implicit that investable assets are already heading in the direction of alternatives. And this is already being corroborated by the biggest financial players in the world.



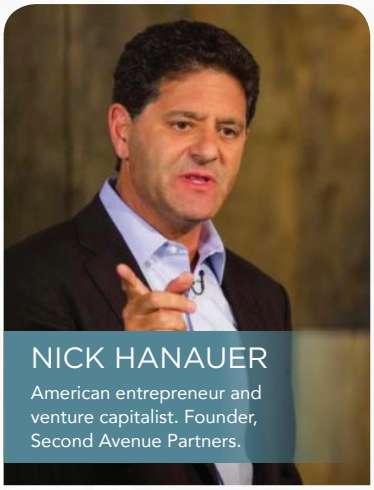
RAY DALIO
Founder of investment firm Bridgewater Associates, one of the world's largest hedge funds.

"If you're holding cash, you're going to feel pretty stupid."



LARRY FINK
Chairman and CEO of BlackRock, an American multinational investment management corporation.

"To prosper over time, every company must not only deliver financial performance, but also show how it makes a positive contribution to society."



NICK HANAUER
American entrepreneur and venture capitalist. Founder, Second Avenue Partners.

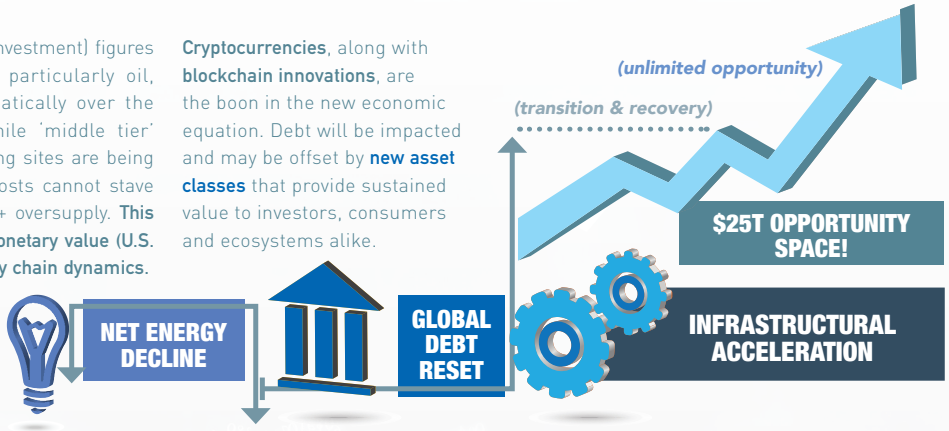
"A thriving middle class is the source of growth and prosperity in capitalist economies."

Cynics will say that the likes of Dalio, Fink and Hanauer are paying lip service to hedge their own bets on asset offerings that will continue to fatten their portfolios. This may very well be the case. However, we also know that in this new financial paradigm, the mechanics point to a system far better than a zero sum game.

Capitalizing on the big shift.

EROI (Energy Return on Investment) figures show that fossil fuels, particularly oil, are downtrending dramatically over the next 24-36 months. While 'middle tier' infrastructures like drilling sites are being built, lower production costs cannot stave off less overall demand + oversupply. **This affects everything from monetary value (U.S. petrodollar, Euro) to supply chain dynamics.**

Cryptocurrencies, along with **blockchain innovations**, are the boon in the new economic equation. Debt will be impacted and may be offset by **new asset classes** that provide sustained value to investors, consumers and ecosystems alike.



As the biggest fund managers and market analysts have stated, there is a ton of cash 'sitting on the sidelines'. This means there is an inordinate amount of liquidity not being allocated towards durable investments, especially those which could have substantial, immediate impacts on the economy. Across impact funds worldwide, a very small percentage of capital is currently being deployed. When more is invested it will put **a major dent in the debt-to-GDP** ratios of the two largest industrialized nations. Current global debt is at $247T.

Returns on normative or speculative assets (equities, fossil fuels, etc.) overall will continue to wane and reach thresholds, while currencies adjust to changing market conditions and overcorrections. Low returns will encourage investors to move away from debt markets, while private banks and institutions pivot toward the support of new asset classes, as well as (re)investment in **alternative infrastructures.**

The more we build right now, in decentralized and distributed capacities, the more value is created, and the more **valuable** organizations and markets dedicated to building alternatives become. This includes corporations, all way down to non-profits, small businesses and, of course, **startups**.

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In short, **net energy decline** - which is the decline in speculative value associated with the USD and other western fiats, in which service center demand can't match oversupply of crude oil - is forcing the hand of a global debt reset. That global debt reset can only happen by way of investment into alternative infrastructure. It is an inevitability. And it is happening right now.

TAKEAWAY:

WE CAN'T SPEND OUR WAY OUT OF DEBT. WE HAVE TO REPLACE IT WITH REAL ASSETS WITH REAL UTILITY IN THE REAL WORLD.

Now let's dive into the mechanics of what the emerging system looks like, how it actually works, and what the possibilities are for a prosperous future.

Roadmap

Part 1: Network Structures: An overview of how the current financial system works with a focus on how individual end users interface with the system.

Onboarding Capital: How end users are currently onboarding into the financial system with a focus on the friction created to onboard marginalized groups, and the promise of distributed ledgers to reduce this friction towards zero.

Commodification of the Financial System: The implications of a near zero friction future, and how open source public ledger protocols are uniquely positioned to accrue value as the platforms with the lowest barrier to entry.

Bottom-up Liquidity: How DLT (*distributed ledger technology*) can provide the lowest friction platform for hosting end user driven identity management and credit history.

Custody: Issues uniquely facing the DLT space as a function of ledgers being based on cryptography that causes ownership to function as a bearer bond-type instrument.

Part 2: Regenerative Retail: How DLT-driven retail can fundamentally reshape retail supply chains and equity structures by reducing the barriers between investors, manufacturers, and consumers.

Retail Data Chain: Linking retail data together at the most granular level possible will greatly expand economic prosperity by reducing information asymmetry between buyer and seller.

Retail Equity: At the retailer to end user level, chaining together transaction data (especially for IOT enabled devices) will drastically improve the utility lifecycle of retail goods. More importantly, it will allow end users and companies to share true equity with each other through direct ownership in the underlying corporations that make the products.

Supply Chain Provenance: At the raw material to distributor level, this same chaining technology will drastically improve the efficiency of supply chains, reducing cost and increasing transparency.

Mutual Credit Manufacturing: A culmination of the regenerative retail concept where we explore what an end user driven corporate collective can accomplish using DLT.

Roadmap (cont'd)

Part 3: Token Continuum: Switching from macro narrative to practical execution, there are three main levels of distributed ledger based ownership tokens that will work together to create a new financial internet.

Value Token Layer: The first level is the medium of exchange layer which can function similarly to how currencies are used today for value storage and liquidity, though can also be tied directly to the performance of the utility and security token baskets.

Utility Token Layer: The next layer represents ownership of goods and services that exist natively on distributed ledger infrastructure. More radically, the utility token layer can be viewed as the full expression of business logic needed to run enterprises of any complexity from making car tires, to selling insurance products.

Security Token Layer: The final layer represents legal debt, equity, and commodity like ownership of the entities that are building the utility token layer. This layer can be tied directly to the value and utility layers as fluidly as regulations allow for.

Exchange Layer: To feed the new financial internet, a new breed of custodial and exchange offerings are emerging that allow the existing financial world to communicate with the new distributed ledger based financial world.

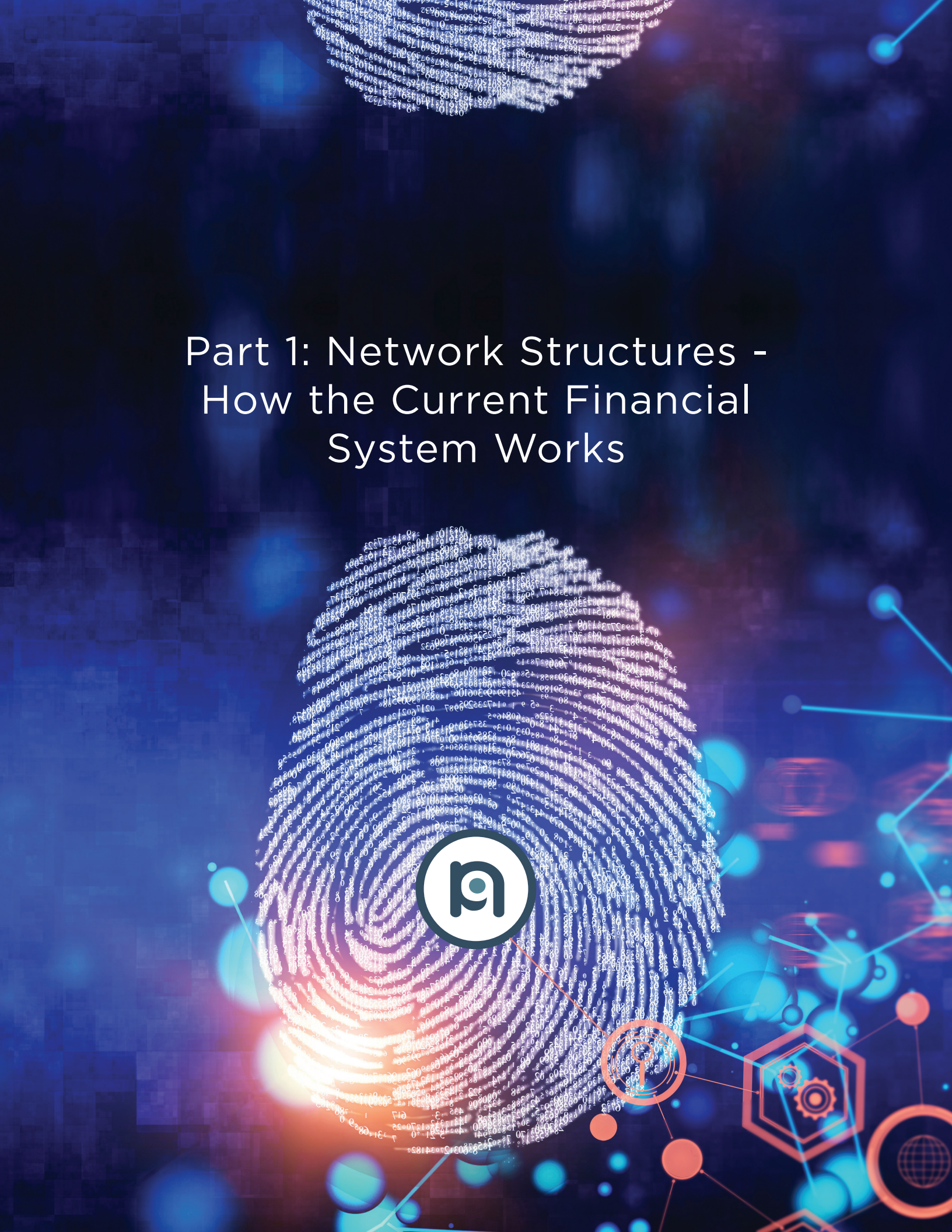
Shared Architectural Pattern: An emerging technical structure is being perfected to allow the new financial internet to operate securely and at massive scale.

Part 4: The New Financial Internet: Our conclusion contains policy recommendations on how individuals, corporations, and sovereigns can act to place themselves at the forefront of this coming tidal wave of change.

Progressive Capital Gains: If regulators begin to understand the difference between value, utility, and equity token layers of this new ecosystem, sovereigns can benefit immensely from automated tax revenue while keeping innovators from fleeing to more progressive jurisdictions.

Tax Offset Markets: DLT-based tracking offers the opportunity for the first time to accurately price externalities into capitalist markets.

Part 1: Network Structures - How the Current Financial System Works



Network Structures — How the Current Financial System Works

Defining a blueprint for the future of the financial system is an ambitious goal. To frame such an audacious task, it is critical that we first understand how the current system works. From there, extrapolating to a distributed ledger-based future state becomes more achievable.

In this section, we will explore concepts including:

- How money is actually created and propagated through the legacy financial system
- How financial products are engineered to produce short-term gains with intrinsic diminishing returns
- What is possible when financial products trend towards being frictionless

Often opaque, some would say by design, the financial system is nothing more than the plumbing infrastructure through which "capital" flows. The essence of finance involves planning for the future by coordinating with others to create value. Thus "capital" is a powerful social invention that allows us to abstract value into an easily exchangeable (liquid) form of value.

Using liquid value rather than real resources like food staples (which expire) or mineral ore (which is heavy and often toxic) is vastly more efficient. Unlike many raw materials, liquid value can be stored like a battery, released into value accretive projects, and facilitate price discovery more easily through trade.

Caveat emptor, all of this coordination comes at a cost.

Whether it is pressing reeds into cuneiform tablets, pen to paper, or 1s and 0s into computers, *something* needs to happen to keep track of all of this value. Fortunately, this is where computers shine. If a single ingenious program is written once, it can be executed an endless number of times, nearly for free. With billions of people making billions of direct transactions per day, and infinitely more via computer programs that set prices for everything from airline tickets to sports books, record-keeping is not as easy as it appears at first blush.

The goal for this paper is to show a path towards a new monetary system where all value becomes liquid and derived from real underlying assets. To accomplish such a feat, we will need both next-generation smart logic we can trust, and a backbone of shared ledgers secured by mathematics to ensure there is a transparent connection between the physical world and the digital financial world.

Onboarding Capital

WHILE FINANCIAL LOGIC IS FAILING, CAPITAL INTEROPERABILITY IS EMERGING

The most pressing issue facing the current financial system is not the computer programs themselves, but the friction created when interacting manually with the financial system. This friction can be defined abstractly as the **difficulty required to perform a given set of financial logic**.

Let's start with the simplest logic to execute: the "transaction". To make a transaction, one person or entity wants to send something of value to another person or entity.

- At a traditional bank, the friction to perform a simple transaction approaches zero once capital is onboarded, assuming both parties to the transaction are inside of the same walled garden. (example: Chase customer A sends 100 dollars to Chase customer B.))
- In a system like Bitcoin, friction to send transactions from Bitcoin wallet A to Bitcoin wallet B also approaches zero assuming both parties are onboarded into Bitcoin (and are willing to accept the inherent price volatility - more on that later).

In both cases, there is still a large amount of friction required to onboard and offboard capital from one system to another system. (examples: Chase Bank to a Bitcoin Wallet, or Venezuelan Bolivars to Chicago Mercantile Exchange wheat futures)

The difference with something like Bitcoin versus a traditional bank, is that Bitcoin has **no custodial overhead costs**. For good or ill, Bitcoin does not care who customer A and customer B are. In less than 1000 lines of C++ code, all Bitcoin does is calculate if each account has the required amount of Bitcoin for the transaction by checking a shared set of identical ledgers hosted by computers around the world.

Layers of complexity like verifying the identities of each counterparty is simply not part of the Bitcoin protocol. They can, however, be a part of the on- and off-ramps to and from Bitcoin to the wider financial world.

Custodial services like Coinbase, or traditional financial institutions like Fidelity or eTrade will hold your Bitcoin for you just like a regular bank. They will also exchange non-ledgered currencies such as U.S. dollars into ledgered digital assets like Bitcoin on your behalf assuming you have properly complied with all KYC (know your customer) and AML (anti-money laundering) laws.

While this can have benefits at the institutional level (cross-border settlement within seconds between financial institutions) the real power is created when assets are kept within the ledger

ecosystem instead of being off-loaded back into the fiat system. Onboarding local fiat currency into a ledgered system current happens in three main ways:

- **cash-based ATM machines** (Customer inserts cash and receives a Bitcoin private key with a certain amount of Bitcoin loaded into it)
- **online custodial services** (Customer sends funds from a bank to a custody service that holds private keys on your behalf, of which you have legal claims on a certain amount)
- **app-based P2P services** (Customer sends funds to a specific individual or entity and receives a Bitcoin private key loaded with the correct amount of Bitcoin)

Additional complexity such as verifying customers, and preventing abuse can be as lax or stringent as the requirements placed on the system. Logic such as whitelisting and blacklisting certain Bitcoin addresses to flag illicit funds can be created in the same way as more advanced logic to underwrite mortgages, or create insurance products.

The net-net of onboarding capital into a distributed ledger based system is that all parties can communicate programmatically through a secure shared commons. The result of this change, it would seem, is incredibly stark for the financial industry. That is, if the financial industry refuses to see what is coming.

TAKEAWAY:

ALL FINANCIAL PRODUCTS WILL BECOME COMMODITIES ONCE ONBOARDED INTO CRYPTO LEDGER ACCOUNTING SYSTEMS

Commodification of the Financial System

FINANCE GORGING ON THE FREE LUNCH BUFFET

The trend towards the commodification of the financial system is nothing new. With free and open competition, fees for most financial products have steadily trended towards zero in areas such as index-based robo investing, "free" checking accounts, and low to no origination fee mortgages.

This trend, however, does not hold true in marginalized communities where access to financial products is more difficult. In many insidious ways, the less financially well-off bare the brunt of the most predatory practices in consumer finance. By not qualifying for lucrative rewards credit cards, cash and debit card consumers indirectly pay for the lavish perks higher credit consumers enjoy. This trend of preying on the financial least well off continues to the higher rates paid on loans of all types, to paying exorbitant fees for sending small dollar value remittances abroad.

Of course, any finance professional knows why this happens. "Riskier" borrowers pay higher rates, as this is the very bedrock of traditional finance.

If we can decouple the notion of real risk premium from friction induced risk premium, we will get at the heart of the commodification of the financial system.

In theory, the marginal cost of onboarding each new banking customer should approach zero, but in actuality it is far from it. Compliance costs, SG&A overhead, and earnings-per-share profit motives, down to air-conditioned bank branch offices and transporting physical cash all costs a considerable amount.

Conversely, shared digital ledgers existing purely on silicon have none of these sunken costs. A basic non-custodial, non-KYC transaction on the raw Bitcoin ledger costs around 1 USD in mining fees. On a network like Stellar, Ripple, or Bitcoin's own Lightning Network, this can cost as little as 1/10000 of a penny.

As disruptive innovation goes, distributed ledger technologies are still in their infancy. They facilitate mostly simple payment transactions without a robust custodial network to act as an automated intermediary in case funds are lost, stolen, or disputed. **Our research posits that eventually all logic will run on a distributed ledger fabric, as transparent and open logic is cheaper to scale than the cost to protect centralized walled gardens from cyber threats.**

Business is Information

As a thought exercise, what is the core intellectual property of an insurance company? Better actuaries calculating risk premiums more profitably? Investing insurance premiums in a way that creates alpha beyond average market returns? Lower SG&A costs than the competition by existing purely online & automating sales agents?

Each of these elements is surely a critical piece of the overall puzzle, but does not capture the entire story behind what makes an insurer successful. **The full story is in the interaction of various logic subsystems to create a cohesive profit machine**.

We call these profit machines companies, which form a whole greater than the sum of the individual parts by having some kind of competitive edge in the marketplace. As the outsourcing and "as-a-service" trends have shown, if a business function is not core to the key value proposition, it is likely better served by an outside vendor. HR, Accounting, IT, and myriad commodity-like departments face constant pressure from outside vendors offering standardized feature sets at lower prices than full-time internal employees.

The next wave of open source business logic running on immutable databases has the potential to further disrupt the very notion of what a business (specifically a financial business) is. It is straightforward to understand that Michelin makes tires, Airbus makes planes, and insurance companies make contracts that insure customers including Michelin and Airbus from risks in exchange for insurance premiums.

The critical difference is that for financial firms, the logic is the business.

At an abstract level, the complete set of logic required to make car tires or airplanes can also be expressed entirely in terms of 1s and 0s, as state-sponsored industrial espionage to the tune of 320 billion USD per year can attest. Copying wholesale industrial processes, however, is a much more daunting task than copying financial logic. Reverse engineering payments, insurance, or even more complex financial products like derivatives pales in comparison to the cost of reverse engineering the physical world.

The competitive moat formed by the massive CAPEX required to enter physical industries is simply much higher than any moat enjoyed by the financial industry. When the logic needed to create, execute, and service financial transactions exists in an open source framework available to anyone, the only logical conclusion becomes the commodification of finance.

TAKEAWAY:

THE NEW PREMIUM ON RISK IS SHARED AND DISTRIBUTED

Bottom-Up Liquidity

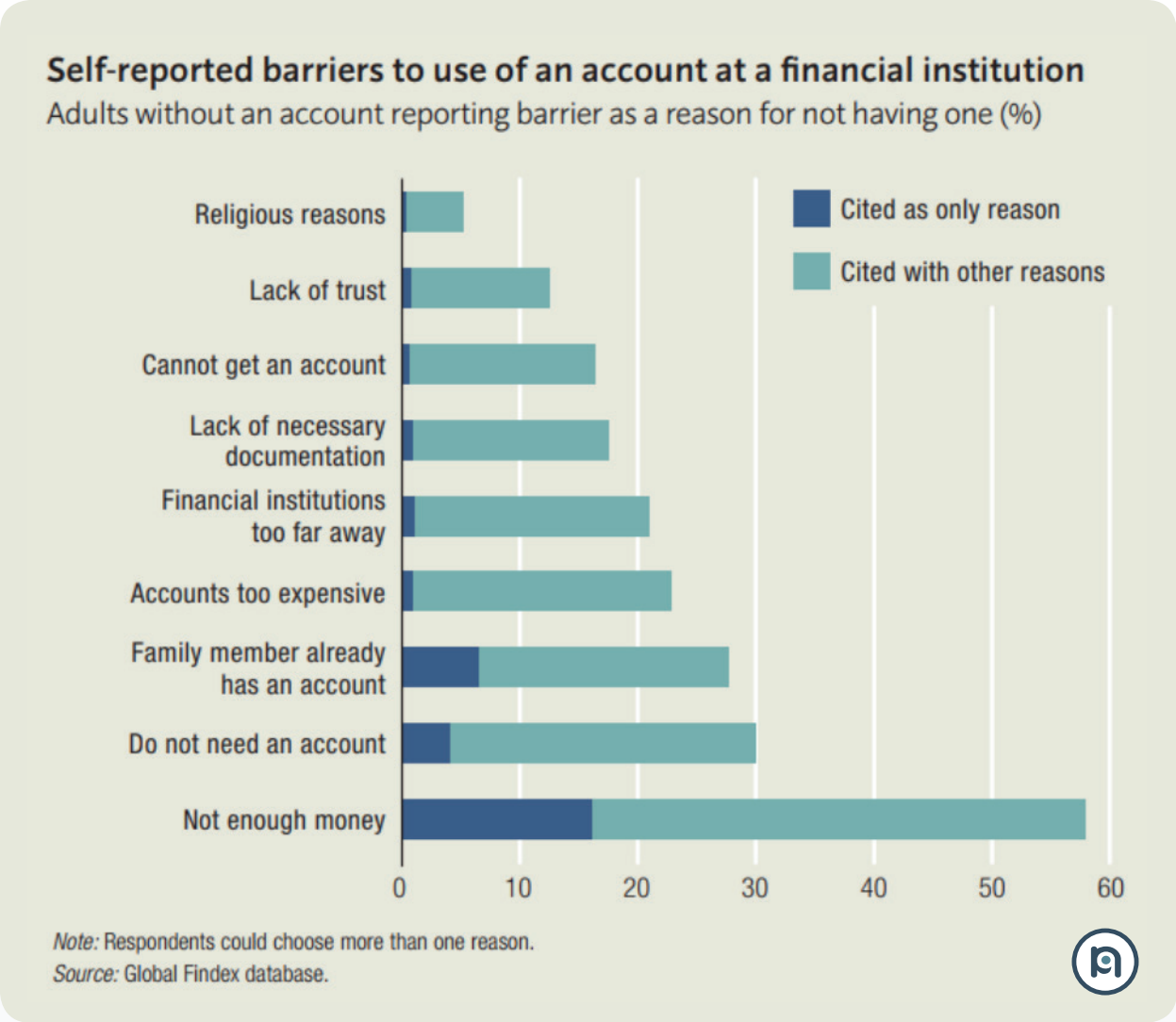
SMART LOGIC AT THE LOW PRICE OF COMPUTING COSTS

The fate of all financial institutions over a long enough timescale is the same. Piece by piece, logic will be converted into computerized, infinitely scalable logic submodules that interact together without the need for onerous middlemen at each point of friction. The real winners in this transition will be the creators of these automated smart logic systems, and the end users interacting with these new low-friction financial services.

To begin defining what "bottom-up liquidity" really entails, we must dissect the banked, underbanked, and unbanked continuum.

- At the fully banked level, the users identity is known, as well as a detailed track record of past financial performance including repayments on many types of debts such as car loans, student loans, and mortgages.
- The underbanked have basic identity data, but lack a detailed financial record. This population suffers from a lack of financial data, and thus pays higher rates of interest or it is denied outright from receiving credit.
- Finally, for the truly unbanked there is no access to financial services and no established financial identity. Instead, they rely either on barter or cash to perform financial transactions, and are thus the most vulnerable to victimization through predatory interest rates and poor custodial offerings.

It is of particular importance to further understand the actual 'barriers to account', not having enough money being the biggest factor.



As we can see, the higher up the continuum you go, the more data there is about an individual. **Thus, the common denominator separating the un(der)banked from fair and transparent access to the financial system revolves ultimately around solving a data problem.**

To solve this problem in a meaningful way, a lower friction financial system needs to evolve where traditional barriers to entry are drastically lowered. Here we find the two key components required to become "banked": Identity & Credit History.

- **Identity** is primarily the domain of sovereigns such as state and federal governments to issue a unique identifier to each citizen. At the state level, this could be a driver's license, and at the federal level this can be a passport or social security number. Identities then interact with private corporations who match records of these governmental identifiers with their own proprietary systems.

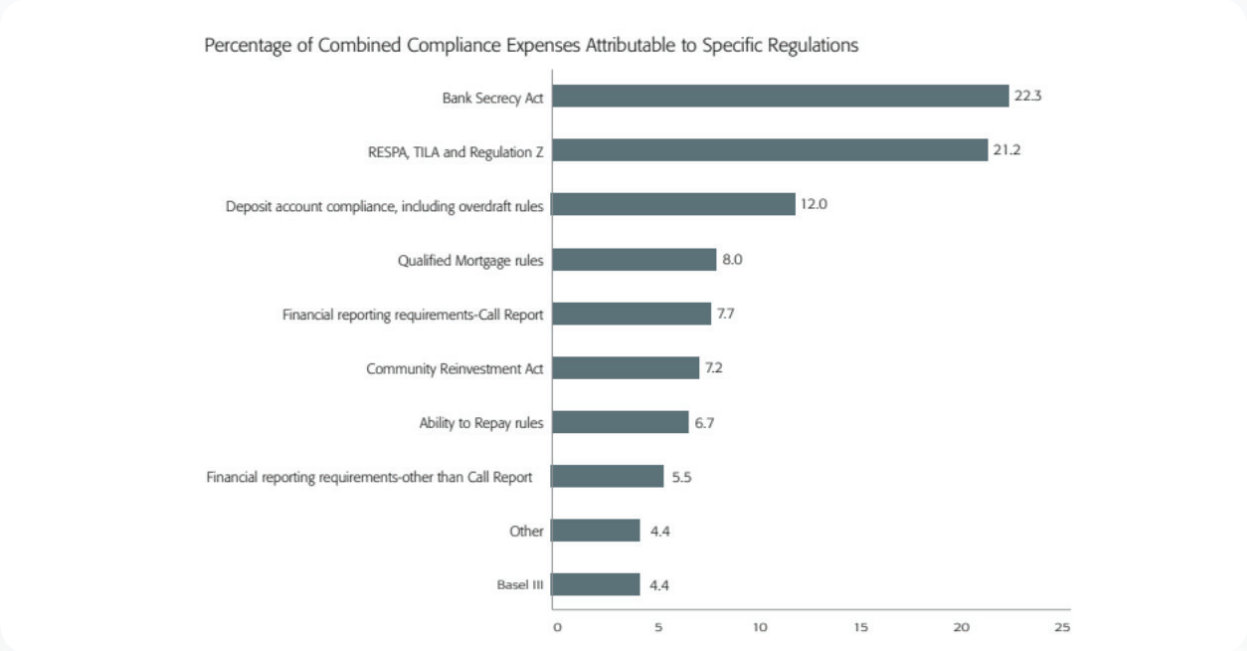
- **Credit history** then stems from the data trail created by each individual interaction with each private company. Aggregators such as credit reporting agencies exist that attempt to process and analyze data from disparate sources to calculate a final "credit score" that determines how expensive it is for individuals to access the financial system.

At every step of this current process, information can easily be replicated and stolen, as monolithic centralized entities control access to vast swathes of private financial information. The current revolution in finance will reverse this trend by replacing the opaque layers of middlemen with the aforementioned automated logic subsystems that individual end users can access directly.

The key point here is to understand that all companies with financial services capability, as well as resources in tow, will be competing over uses of data that at once lever their market positions, while giving customers/user more unfettered access, management and utility over their own data.

Not having enough money to access the legacy financial system plays out not just in free markets where banks intentionally turn down less lucrative business lines, but in fact, has an insidious regulatory component to turning down the un(der)banked. Compliance costs imposed by onerous regulation (specifically in the United States) can account for up to 17% of small regional bank operating expenses, with international remittance regulation from the Bank Secrecy Act and RESPA making up over 40% of compliance spend.

With regulatory costs amortized over a larger user base, megabanks gain an unfair advantage in the market with the help of the very regulators trying to rein them in. With costs approaching $200 USD per user per year to meet not just regulatory costs, but all costs associated with the legacy banking system, a wholesale rewrite of banking logic is needed to drastically reduce the costs and thus friction of accessing banking services.



Mini Case Study: Tala

Successful startups like Tala (https://tala.co/) have proven that the most vulnerable unbanked groups can be served profitability by leveraging technology to build better data signals around identity and credit history. At a high level, Tala works by analyzing as much data as possible about an individual based on information provided by their smartphone.

- From social web information about who the individual is friends with
- To more esoteric data points such as how reliability they keep their phone charged

All of these data signals are fed into an algorithmic model that approximates an initial credit worthiness. Tala then extends the user a small initial loan to establish a credit history of successful payback, before issuing more substantive loans over time as the user develops a credit history.

What Tala does not solve, however, is how to share such data securely via a distributed trust network. Rather than being end user driven, a centralized model is employed where Tala serves as the intermediary between liquidity providers and liquidity requestors, just in a more data-centric way than a traditional bank.

TAKEAWAY:

BEING BANKED WILL BECOME A MATTER OF REPUTATION, NOT TRADITIONAL CREDIT WORTHINESS

Shared Automated Logic

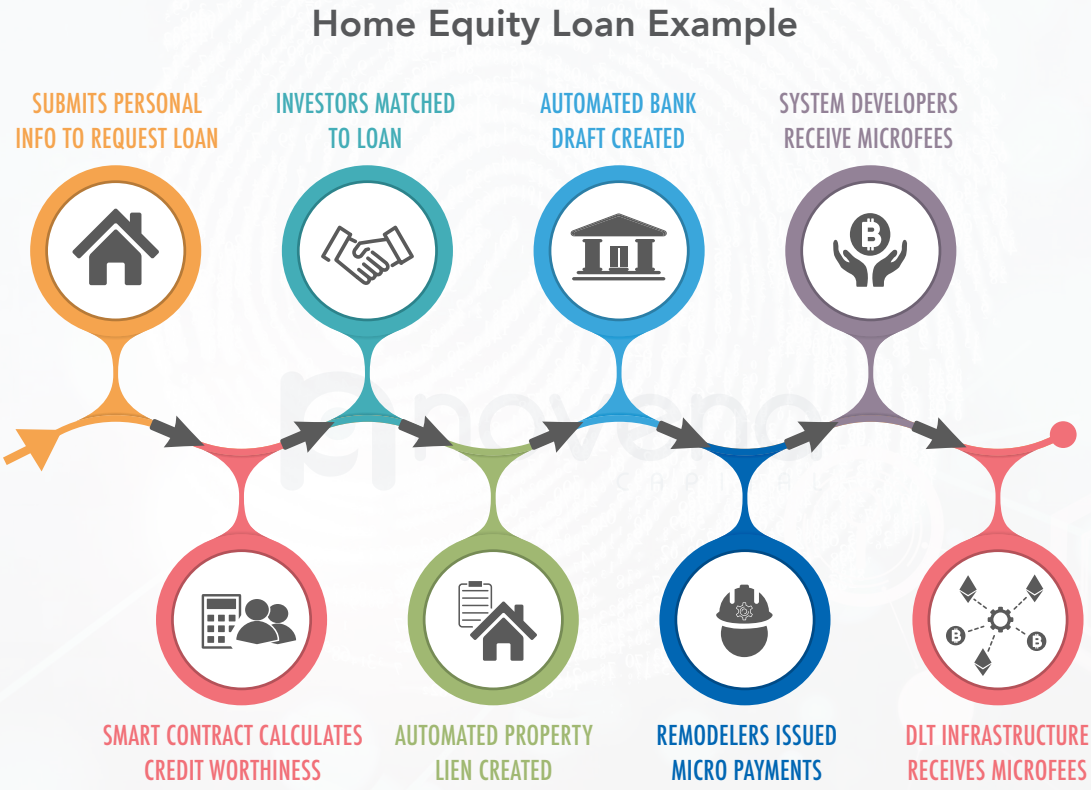
SOCIAL CREDIT ISN'T WHAT YOU THINK IT IS

The future of the global financial system in many ways resembles the work being spearheaded by startups like Tala. By more effectively sorting and filtering an ever-increasing dataset of financial transactions, friction can be reduced when connecting raw capital to effective uses of capital.

However, if financial data remains in the hands of a select group of data aggregators like banks to determine credit worthiness, or social media services like Facebook for identity, there will be an upper limit to change. Truly disruptive change will occur only when it becomes easy enough for end users to bypass the existing gatekeeper-based system entirely.

Imagine a banking and insurance company run entirely on a blockchain by end users. The users funding the distributed bank want a **commensurate return on their capital for risk taken**, and the users purchasing financial products like mortgages and insurance want the **lowest cost and highest security** finance service available.

Enter the automated logic subsystem. After being published to an open source shared commons, any end user is free to purchase the product directly. Some of this process resembles a Tala-like approach where data is analyzed to determine credit worthiness. However, rather than siloed inside of a walled garden, whereby data is exchanged peer-to-peer directly on a blockchain or distributed ledger, data takes on new reputational attributes that extend across networks.



Home Equity Loan Explanation

In practice, a distributed banking system would resemble the following, using a home equity line of credit as an example:

1. End user Alice requests a financial product (home equity loan) via a GUI-based application at looks remarkably similar to Lending Club or any other current peer-to-peer lending platform. She submits her address & amount requested as well as her encrypted personal credit history. **SUBMITS PERSONAL INFO TO REQUEST LOAN**
2. Her request triggers a "smart contract" e.g. a logical system that determines the credit worthiness of the borrower and makes an offer. Unlike Tala, Alice has complete ownership of her own financial profile data which she selectively shares with the home equity loan smart contract. If she has no history to import, the application can create a history for her using available data on her phone. **SMART CONTRACT CALCULATES CREDIT WORTHINESS**
3. Behind the scenes, other end users review the incoming offer in a manner very similar to existing peer-to-peer lending platforms. Rather than a manual process, this could happen in a number of different ways. **INVESTORS MATCHED TO LOAN**
    a. A matching engine pairs Alice's home loan request with either a pool of shared investor capital ala a debt REIT or other similar structure
    b. Or individual investors that want 100% of the home equity loan come together based on predefined risk profiles
    c. Additional logic can easily be created to auto-loan funds that meet a set risk/return criteria, again very similar to existing peer-to-peer lending apps
4. Once the terms are agreed to, a lien is automatically placed on Alice's property in a lien position behind ad valorem taxes, and the first lien mortgage on the property. **AUTOMATED PROPERTY LIEN CREATED**
5. An automatic draft is also set up with Alice's bank to debit per the smart contract specifications each month until the loan is paid off. **AUTOMATED BANK DRAFT CREATED**
6. In a home equity loan for remodeling case, additional logic such as distributing funds directly to sub contractors only as building materials need to be purchased can also be established. **REMODELERS ISSUED MICRO PAYMENTS**
7. At each step along the automated smart contracting process, micro transactions are paid to the developers that build and maintain the logic codebase. **SYSTEM DEVELOPERS RECEIVE MICROFEES**
8. At the most base level of the ledger, fees are paid to post transactions to the underlying DLT. Then when each logical subsystem is queried, additional micro transaction fees are paid. **DLT INFRASTRUCTURE RECEIVES MICROFEES**

As we can see, the end state of a distributed ledger based financial system looks remarkably similar to the financial system of today. **Logic** to purchase a home, extend home equity credit, issue credit cards, insurance, or any other conceivable financial product **is exactly the same**.

The difference is the future of finance is a distributed peer-to-peer system with open and transparent automated logic connecting people together, rather than the opaque and fallible centralized institutions we rely on currently.

TAKEAWAY:

FISCAL RESPONSIBILITY IS EQUALLY OWNED BY LENDERS AND BORROWERS

Custody

BUSTING DOWN THE GREAT WALLED GARDEN

Custodial issues stand in stark contrast to the trustless nature of distributed ledgers where end users by default have the ability to self-custody their assets. As crypto assets are ultimately expressed as bearer bond-type instruments, custodial providers in a distributed financial system take on even more responsibility than in centralized systems, as the penalty for misplacing or misappropriating user funds is their complete destruction.

In the current financial system, if a fraudulent transaction takes place, the bank can quickly reverse such an activity as they can modify and delete entries to their banking ledgers. In the DLT world, databases are read-and-write only, as any modifications to the ledger requires consensus between nodes (individuals or parties within the ledger that agree to transactions based on mutual consent). For private banking consortiums that use technologies such as Hyperledger or other walled garden approaches, transactions can be reversed assuming the consortium agrees on the reversal.

- This **private blockchain infrastructure** approach, in effect, recreates the existing banking system as modify-and-delete privileges are granted to administration nodes who have asymmetric access to what transactions are posted to the ledger.
- Conversely, **public blockchain infrastructure** such as Bitcoin has no information asymmetry, as all parties have equal access to interact with the system. Each transaction sent gives the possessor of the private key address complete and total control of all value sent to the associated public key. Reversals, errors, and other mistakes made using the raw public infrastructure are thus irreversible.

For public networks to function at a practical level, robust custodial solutions are needed to ensure value contained within a user's private key is fully insured and secure from being stolen or lost. This creates an additional layer on top of the raw peer-to-peer transaction system at the core of DLT technology, which is needed to insure end users are protected from the risk associated with self-custody.

A hybrid middle ground is possible where instead of electing banks or other centralized consortiums to manage keys entirely on their behalf, users can elect an "emergency contact" approach to custody their DLT assets. In this process, any user account from personal to multinational corporation can be given a portion of the master key to unlock the account. In the event the key is lost, the user can send a request out to each friend/ company in an automated manner to return access to the account.

Understanding the intersection of automated smart contracting logic and custodial key management is crucial to build a macro narrative about the future of the global financial system. The continuum from full self-sovereignty to full custody is a wide open area for development, and will be the front lines of a global battle for who controls the future of finance.

TAKEAWAY:

THE PROTECTION OF FINANCIAL ASSETS IS BECOMING THE MOST IMPORTANT COMPETITIVE DIFFERENTIATOR

Part 2: Regenerative Retail

Regenerative Retail

THE AMAZON EMPEROR WITH NO CLOTHES

With the macro narrative in mind from the previous section, we can apply **our thesis that smart contract automation, combined with a secure shared storage layer**, will empower end users to transact goods and services directly with each other as the friction created by middlemen approaches zero.

Money serves as the ultimate intermediary as a liquid, fungible store of value that can be easily exchanged for goods and services. Rather than attempt to trade an entire cow for forty chickens, money greases the wheels of the economy to make trade vastly more efficient. From this vantage point, we can see that the only real purpose of money is as a shared storage layer for value. The ultimate goal of money is thus not the money itself (unless you need to burn German Reichsmarks to stay warm) but to exchange said money for something valuable.

Enter into this picture two well-documented economic phenomena:

- **The coincidence of wants:** This phenomena states that bartering for goods directly between individuals is inefficient, as it is improbable that two parties have exactly the right **goods**, for exactly the right **relative value**, in exactly the right **place**, at exactly the right **time**.
- **The market for lemons:** This phenomena states the value of used goods is lower than an optimal value as there is **information asymmetry** between buyer and seller. As the buyer presumably knows more about the product than the seller, a risk premium discount is needed to account for potential dishonesty in the condition of the item being sold.

The grand vision of distributed ledger-based trust systems is to fundamentally reshape the retail environment by matching the coincidence of wants, and remove the information asymmetry between buyer and seller that creates an excessive risk premium for goods and services.

Retail Data Chain

YOU'RE ONLY AS GOOD AS YOUR PROVENANCE

Solving for the coincidence of wants and the market for lemons is possible due to the "chain" portion of the blockchain. Whenever a new transaction is posted to a distributed ledger, multiple hosts agree on updates to the shared database, and importantly save a fingerprint called a "hash" which forever links past data to present data in a mathematically irrefutable manner.

Refrigerator Purchase Use Case

Refrigerator Purchase Use Case

In action, such a system could function as follows in a retail environment:

1. Alice buys a durable good (a refrigerator) from an online retailer. **ALICE BUYS REFRIGERATOR**

2. Starting long before Alice makes her purchase, each component of the refrigerator from:
    a. the freon
    b. to each injection molded plastic panel
    c. to trace amounts of rare earth metals in the compressor

    has a hash linked record going from raw material origin to final retail sale.
    COMPONENTS CHECKED FOR INTEGRITY TO CONFIRM PURCHASE

3. When Alice buys the refrigerator, she inherits the hash chain of events appended with her unique buyer credentials to further the chain of provenance. **ALICE ADDED TO PROVENANCE CHAIN**

4. While some goods like jewelry or clothing do not lend themselves to internet-of-things level tracking short of simple ID tags, items like refrigerators (or any smart appliance with embedded computers like cars and robotic vacuum cleaners can provide a continuous stream of value data about the device.

   As the refrigerator is a smart internet-of-things device, it generates a data trail about itself for things like number of compressor hours, number of times filters are changed, etc. and posts this data to the shared ledger at regular intervals. **IOT DATA CONTINUOUSLY SENT TO LEDGER**

5. Imagine Alice wants to move to a new city across the country. Her landlord did not provide a refrigerator, so Alice happens to own the fridge she purchased brand new several years ago. In a distributed ledger based smart world, Alice has many interesting new options available for what she can do with the fridge. **NEW MONETIZATION OPTIONS UNLOCKED**

   a. She could post the refrigerator for sale in a manner very similar to a Craigslist posting of today. Unlike Craigslist where the market for lemons is abound, the buyer has near perfect information symmetry as she can share a mathematically secure chain of data with the buyer detailing the **exact performance history** of the item.

   b. She could also potentially barter directly for the fridge in a **barter swap market**. In such a marketplace, she can swap her item for whatever other item she might want on the other end of her move. If the prices don't match up directly, the barter system can offer cash credits directly within the system for future purchases.

   c. More exotic arrangements are also possible where she could effectively "lease" her refrigerator to the new tenants for a monthly fee. As the friction to do this would approach zero by utilizing smart contracts, she could have a **drip of a few dollars per month** automatically applied to her account until the refrigerator stops working. Less practical at the individual level, new companies like the scooter sharing apps of today might emerge to micro lease nearly every item in the home.

6. The supply chain would continue long after the useful life in the new and used markets. Upon recycling the refrigerator, a final payment can be made to the recycler and the amount of material saved versus scraped added to the final record in the entry. With smart enough tracking, the next generation of retail goods created from recycled materials could even reference the provenance of the previous item. **REFRIGERATOR TRACKED CRADLE-TO-GRAVE (RAW MATERIAL TO RECYCLING)**

This example illustrates the "regenerative" aspect of retail based on immutable shared ledger infrastructure. This simply means that parts can be reused, processes can be optimized to represent sustainable functions, and revenues can be redistributed. With more complete

accounting throughout the lifecycle of our products, we can more effectively utilize our scarce resources to extract value not just at the beginning of the product life cycle, but far into each product's useful life.

The incentives in the current system perversely benefit new purchases, at the expense of end users further down the value chain.

This is caused primarily by the inertia required to resell used goods being so high. Given a sufficiently cheap throwaway good, very few end users will go through the hassle of trying to sell their items after the initial purchase. By lowering friction to resell through smart tracking and automation, the new financial system will incentivize re-use by creating a viable mechanism for goods and services to become valuable assets that can be redistributed throughout their useful life.

Raw materials miners, to value add materials processors, through to factories, distributors, and end retailers benefit from the sale of new items disproportionately. With more complete accounting, many categories of goods (specifically those that generate data) can be made vastly more efficient, and distribute value further down the used market value chain.

As radical as rethinking the value lifecycle of retail goods is, distributed ledger systems can go much further to enable fluid relationships between goods creators and goods consumers at every level of financial interaction. Rather than a clear delineation between end consumer and producer like today, the future will be full of more nuanced relationships where there is a continuous feedback loop between the products people use, and the people creating said products.

There is also an interesting relationship to consider between the current Internet competitors like Amazon and Facebook. If, for example, Amazon owns supply chain infrastructure from A-Z, and Facebook owns user data primarily through a social graph, it is not unlikely that new partnerships would unfold concerning customer lifecycles where both Amazon and Facebook would make more money through sharing data.

This FAANG model (Facebook, Amazon, Apple, Netflix, Google) of course treats end users as data chattel, rather than a true end user model where individuals retain sovereignty over their economic lives through the complete automation of the data middleman.

TAKEAWAY:

THE TRADITIONAL SALES FUNNEL IS DEAD; LONG LIVE THE LONG TAIL

Retail Data Chain

THE PREMIUM ON REMOVING RISK AS THE ULTIMATE EQUITY OFFERING

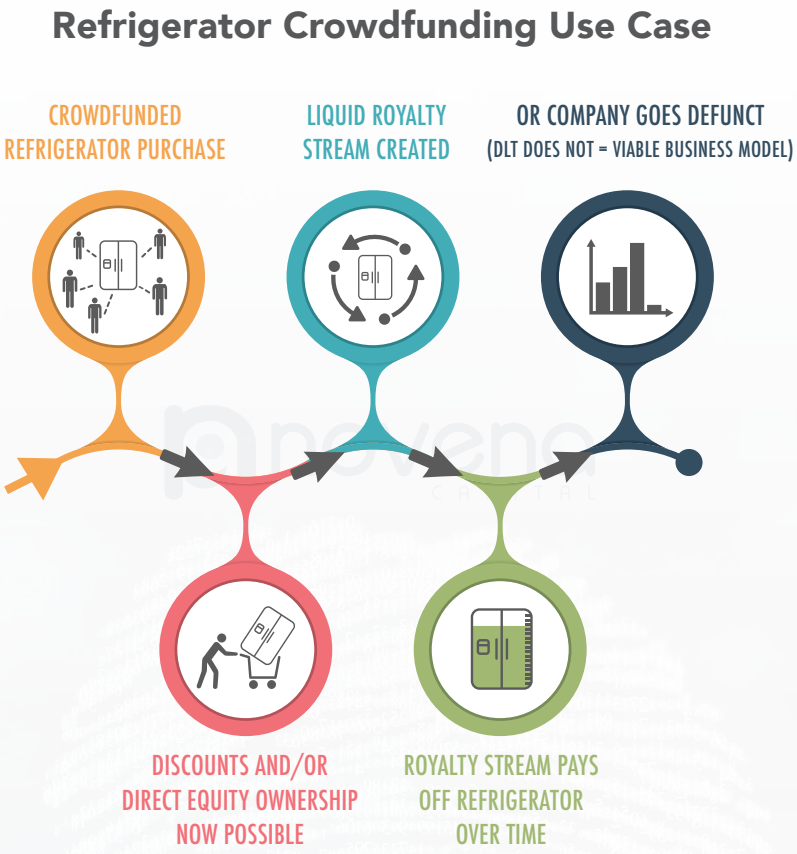
We express the value exchange relationship between goods creators and goods consumers as a concept called "**retail equity**".

The current state of retail equity is in its infancy and involves proto-crowdfunding type schemes where goods consumers can pre-order products from goods creators in exchange for intangible perks, or discounts off the eventual full retail price. Think Kickstarter, Indiegogo, or any other funding platform where a central intermediary distributes escrow funds collected by end users and send to goods creators.

The risk premium for being an early retail adopter is often mispriced, as creating an effective supply chain to turn product plans into a final retail goods is fraught with peril at every step. From the high CAPEX required to order parts in bulk, to the tooling, engineering, packaging, and certification requirements, getting a new retail product to market is an incredibly challenging feat. With distributed ledger technology, the gap between equity investor in a new or even existing product line can be bridged.

In the current state, Alice would use a centralized platform to pre-purchase a new good or service, then receive intangible perks and discounted access to the final product. If successful, the product would likely transition to traditional retail channels including online retailers like Amazon, or brick and mortar retailers if the product fits an in-person purchase experience.

While the future state looks quite similar at the end user application level (the consumer facing user interface will look nearly identical) the logic running in the background can be made much more fair, secure, and transparent by deploying to a secure DLT infrastructure.



Refrigerator Crowdfunding Use Case

1. Alice pre-purchases her good (let's continue with our smart refrigerator example) from a DLT-based crowdfunding platform. **CROWDFUNDED REFRIGERATOR PURCHASE**

2. While the user interface might look identical to a present-day crowdfunding site, she has new dropdown options at her disposal. **DISCOUNTS AND/OR DIRECT EQUITY OWNERSHIP NOW POSSIBLE**

    a. She can pre purchase the refrigerator for a **discount/perk** mimicking the logic of a traditional crowdfunding site identically.

    b. She can purchase **direct equity** in the company creating the refrigerator with micropayment royalty claims on each end unit sold.

    c. She can pre-purchase a **hybrid product** where she both gets the refrigerator, access to an equity like a royalty stream, and access to additional revenue streams for selling her IOT data back to the company.

3. Rather than staying coupled together, Alice has the option to sell her equity royalty stream at whatever price the market will bear. As there is no clear delineation between seed stage venture and full public equity as the product comes to market, the price people are willing to pay for future royalty streams changes. **LIQUID ROYALTY STREAM CREATED**

4. After Alice receives her refrigerator, the value of royalty stream on her company shares and value of the IOT data might eventually pay for her entire refrigerator. **ROYALTY STREAM PAYS OFF REFRIGERATOR OVER TIME**

5. Conversely, the company could go out of business making the royalty stream worth nothing. Such is the high risk nature of trying something new. **OR COMPANY GOES DEFUNCT (DLT DOES NOT = VIABLE BUSINESS MODEL)**

All of the above logic could be created using a traditional walled garden central database approach. The importance of deploying crowdfunding logic into a DLT vs a traditional centralized database is to create a secure shared commons where end users have complete information symmetry with goods creators. By deploying to a shared commons, the logic is also default shareable with other systems. This bottom-up method of using open technology to displace traditional centralized closed-logic systems will eventually have ripple effects that reach much further than specific finance or retail verticals.

TAKEAWAY:

EQUITY IS MERELY THE MECHANISM TO EXPRESS VALUE BETWEEN CREATORS AND CONSUMERS

Supply Chain Provenance

TRUST IS NOT A FOUR-LETTER WORD

Retail goods do not appear out of thin air. Whether it is securing enough coltan in southern Africa to make cell phone components, or enough halibut to keep the shelves stocked at the local supermarket, every item on earth has a provenance worth tracking.

Using our trusty refrigerator example, we will see how automated business logic run on a secured distributed infrastructure will reshape our global supply chains. From raw material to finished product, every step in the supply chain requires two critical components: trust, and contracts to enforce this trust.

- **Trust:** Is an intangible good built up over time by the successful execution of business logic? Example: the general contractor trusts that drywall used in the construction of a building will be the right amount, delivered on time, and of appropriate quality. Then the end home buyer trusts that the contractor will do the same delivering on time and at the quality expected.

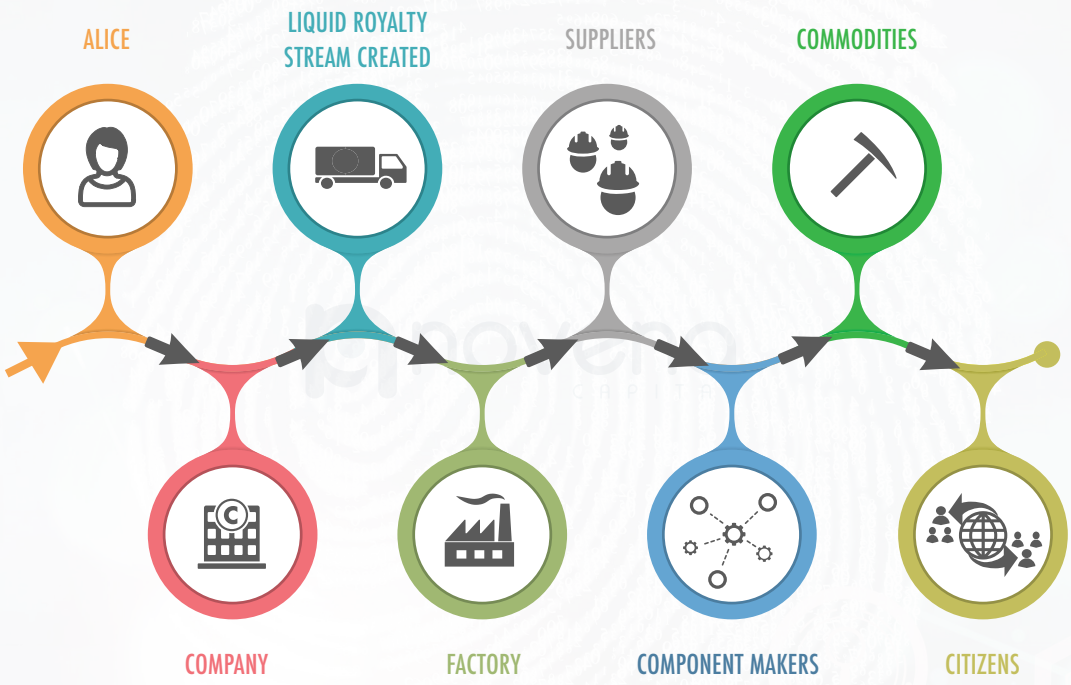
- **Contract:** Is the legal instrument expressing the business relationship between parties? In the case of Chinese drywall, contracts can be difficult to enforce as the supply chain has many potentially fallible middlemen through the process from raw material to final delivered good.

By utilizing DLT, provenance is tracked at each step of the supply chain with a tamper proof fingerprint (hash) showing both the exact time an event was logged, with corroborating evidence such as images and documents posted to the ledger. Today, documents are easy to fingerprint in a number of public blockchains from Bitcoin, Ethereum, to private implementations like Hyperledger. The natural extension of basic document provenance is to eventually convert each text-based legal contract to fully executable logic that runs natively in a shared supply chain commons.

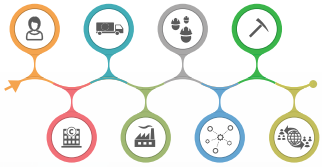
Working backwards from Alice's purchase of the Refrigerator from the crowdfunding platform, we have a web of many interconnected "smart" contracts governing the creation of the end product.

By no means an exhaustive list, we have:

Refrigerator Supply Chain Capital Flow



High-Level Supply Chain Example



1. The contract between **Alice** and the **company** to deliver the Refrigerator within a certain time window, for a set price, and with agreed upon specifications for size, features, efficiency, etc.
    a. Common in more complex business contracts, penalties for delivering late can be built in automatically making such protections available to crowdfunding end consumers.
2. The contract between the **company** and the **logistics provider** to move the fridge from factory to distribution warehouse, to consumer.
3. The contract between the **factory** and the **suppliers** making the assembly equipment, as well as the contracts with the factory workers for salary, overtime, and even a set share of the royalty stream from selling the final products.
4. The contract between the **suppliers** and the **individual components makers** that just like Alice, want components for a set price, delivered at a set time, and with a set quality.
5. The contracts between the **component makers** and the **commodity suppliers** again for a set price, time, and quality.
6. Finally at the very bottom of the supply chain, the contracts between the **commodity suppliers** and the **governments and ultimately citizens** who allow the commodity suppliers to use the earth for industrial purposes.

As we move further down the retail supply chain, the connection between the planet and the final end product becomes ever more abstract. Through automated royalty payments, we can create a closed loop sustainable system where value is transmitted more transparently and securely throughout the supply chain.

TAKEAWAY:

REPLACING, REGENERATING AND REDISTRIBUTING RESOURCES CREATE THE CONDITIONS FOR HIGHER QUALITY PRODUCTS AT LOWER COSTS

Mutual Credit Manufacturing

THE ONLY PLACE THAT WILL HAVE MARGIN IN THE FUTURE IS THE MANUFACTURER

So far we have expounded upon the benefits of reducing information asymmetry and friction to create more transparent retail markets. A larger issue that until now has only existed at the sovereign level is how Keynesian-style stimulus economics can be employed at the corporate and even end-user level to create new markets.

Let's consider what happens if Alice doesn't have the income to afford a refrigerator.

- One scenario involves using the material offsets of making the refrigerator as a means to subsidize Alice's purchase of the refrigerator. This essentially means that the refrigerator's marginal utility as an asset and Alice's potential purchasing power are combined to create a lower-risk way to put a needed asset in the hands of an underbanked customer.

Consider for a moment that credit essentially acts as a stimulus for all economic activity. To gain access to the needed capital to make something in the world, a bond is created between borrower and creditor that facilitates getting products out into the world, with riskier projects needing to yield higher rates of return to offset risk. It is important here to make a distinction between debt and credit; debt is an agreement (such as the form of a bond) to repay a loan at interest, while credit can be an agreement in which repayment happens at no interest or easily repaid low interest, provided that the asset accrues value, or has components of transferable value. More on this in a moment. The key here is to understand how mutual credit provides a self-funding instrument.

Through DLT, new markets can be created where corporations acts as open logic containers for investors, manufacturers, and end consumers to benefit from a virtuous cycle of closed end consumption and re use by **self-funding the principal** needed to create the goods and services in the first place.

Put another way, in our current paradigm a manufacturer makes X refrigerators in hopes they will sell, based on abstracted data of the number of potential customers in each market segment, and average annual replacement rates.

Instead, with a crowdfunding model they could pre-select paying customers that would each want to lease-to-own a new or used Refrigerator-as-a-Service for X dollars per month. With a final customer in place, the manufacturer can go direct to market knowing the exact demand for the product, rather than through fee-extracting distributor channels.

YieldCo Corollary

THE STRANGE NEW RELATIONSHIP BETWEEN PROFIT AND COST

Today, a similar process to the self-funding principal exists in the YieldCo industry. For the uninitiated, YieldCos are simply spin-off equity containers that utility companies create to place long-duration electricity generating assets like wind and solar farms into.

After floating a note to fund the creation of an electricity project, the project is then sold into a YieldCo container clearing the utility company of the debt when the project transfers to YieldCo ownership. This structure is mutually beneficial as endowments, pensions, insurance companies, and other long-term minded investors want access to a consistent revenue stream based on the electricity generated by the project over many years.

Traditionally, to access such a large amount of debt the YieldCo would need to use Wall Street as a liaison between central bank money printing to secure the debt note. However, in the new financial Internet, a series of smart contracts can be created that govern the execution of a "Refrigerator YieldCo".

There are three primary groups the Refrigerator YieldCo hopes to benefit:

- **Investors** wanting a consistent revenue stream based on the as-a-Service revenue model generated from consumers rent-to-owning a refrigerator.
- **Manufacturers** wanting to make money not just at the initial sale, but through the entire support, used market, and final recycling process potentially with uptime and reliability covenants built into their contracts like a GE or other large industrial device manufacturers.
- **Consumers** that have no discretionary income to pay for the upfront cost of a refrigerator, but can pay a small amount each month for the use of the refrigerator with the ability to eventually own the item outright.

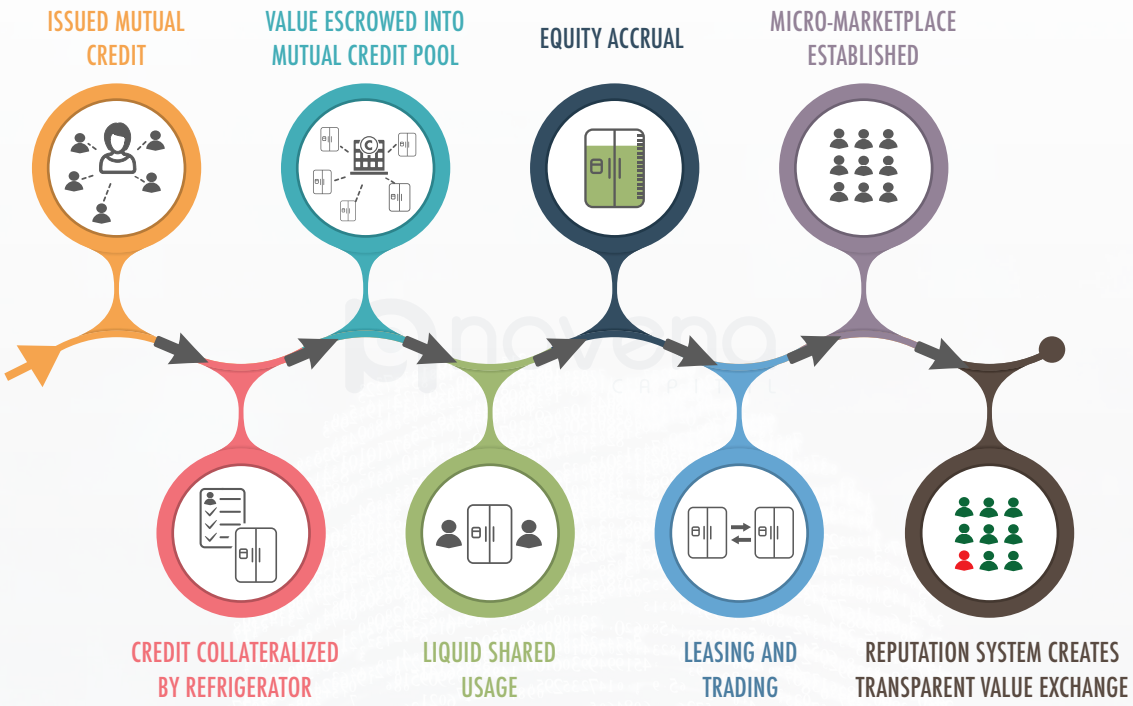
For a car manufacturer like Toyota, financing long-term durable assets too expensive for most people to pay cash for is essential to the financial health of the company. Finance for the sake of finance, however, is not the key value driver at Toyota.

Taking in raw materials worth billions of dollars and navigating them through an intensive web of supply chain contracts to create a value added final product is Toyota's business. In the same way, a refrigerator manufacturer will continue to make margin through the same value added process from raw material to finished good.

The key difference is with DLT-based tracking, information asymmetry approaches zero. This allows for finished goods to be fractionalized and intelligently reused without incurring additional costs to the consumer.

In practice, a Refrigerator YieldCo might work as follows:

Refrigerator YieldCo Example



1. Alice is issued a low- or no-interest credit vehicle (known as a 'mutual credit') from a pool of investors seeking yield in a deflationary environment. **ISSUED MUTUAL CREDIT**
2. The credit vehicle is backed or collateralized by the materials used to make the fleet of "as-a-service" smart refrigerators. **CREDIT COLLATERALIZED BY REFRIGERATOR**
3. The materials have a future stored value in their recycling and reuse as scrap value, which will be tracked throughout the product lifecycle. The stored future value is escrowed as shared equity in the mutual credit pool. **VALUE ESCROWED INTO MUTUAL CREDIT POOL**
4. Alice has the option of leasing the refrigerator to other people, fractionalizing its use, and/or trading on the commodity portion of its utility (similar to 'crowdshares' or dividends) **LIQUID SHARED USAGE**
5. As Alice builds up her own equity in the refrigerator as a reusable asset, she can purchase it outright, continue to lease it, and/or sell it. **EQUITY ACCRUAL**
6. Alice can transfer that purchase equity as more credit to buy, lease or trade on other goods. **LEASING AND TRADING**
7. Alice helps create a new 'micro-marketplace' for tradable goods, with parts/materials that can be tracked and measured for ongoing or regenerating value. In other words, parts can be reused and/or redistributed to make other products. **MICRO MARKETPLACE ESTABLISHED**
8. The transactional and reputational relationship between Alice and other cohorts in the micro marketplace bring about ways to exchange transparent value, with real utility (use) in the real world. **REPUTATION SYSTEM CREATES TRANSPARENT VALUE EXCHANGE**

Thanks to a mutual credit YieldCo structure, Alice is now a full participant in the refrigerator marketplace. As her reputation as an honest participant solidifies, she is extended new crypto credit facilities. She can also be rewarded for responsible behavior, such as receiving discounts for her refrigerator consuming electricity preferentially at off-peak times. These self-sustaining economic ecosystems around specific products such as refrigerators, or more broadly, any smart asset such as scooter shares, or locomotive engines, will bring liquidity, economies of scale, and most importantly, economic inclusion, back into the financial system.

To get to this noble end state, we must next look at the practical logic mechanisms that will allow for this future to exist. Namely, we need to dissect the differences between stable value tokens, utility tokens, and equity-like tokens that will allow something like a Refrigerator YieldCo to function within existing legal and business frameworks.

TAKEAWAY:

PRODUCTS AND SERVICES ARE NO LONGER VALUABLE JUST BECAUSE THEY ARE DIGITAL, BUT BECAUSE THEY HAVE MEASURABLE POSITIVE IMPACTS IN THE REAL WORLD

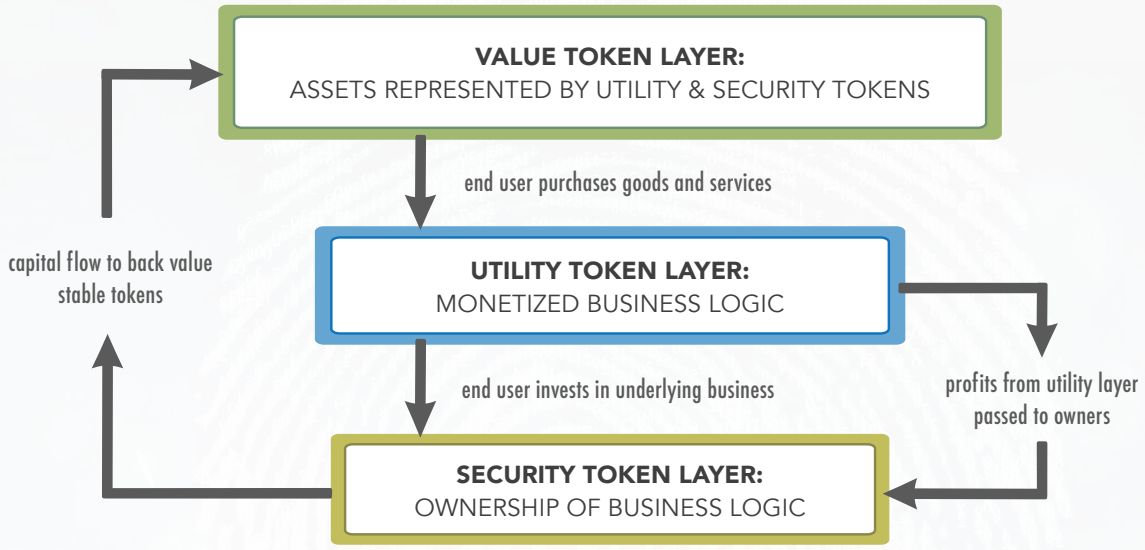
Part 3: Token Continuum

Token Continuum

THE NEW GAME OF TOKEN MONOPOLY

To make our regenerative retail section more practical in terms of executing such logic, we must build some schemas around the different categories of value that can be expressed via DLT.

- First, is the **value token** layer which creates a low cost entry from fiat currencies into natively digital currencies either through stable value tokens without excessive volatility risk, or through native a cryptocurrency such as Bitcoin.
- Next is the **utility token** layer which seamlessly exchanges stable value tokens for tokens that provide access to everyday goods and services.
- Finally, the **security token** layer drastically lowers barriers to entry to own the underlying equity that powers the utility token and stable value layers.



These three layers of value interact with each other to facilitate the execution of more complex business logic. This logic will enable Alice to earn a royalty stream on her refrigerator, just as easily as it will allow:

- a movie purchaser to share in the revenue stream with a movie creator
- or an investor to share in the rent generated from an apartment complex

The logic that runs crowdfunding sites, movie streaming platforms, publicly traded real estate trusts (REITS) or any other type of business will remain largely the same. The difference is the combination of value, utility, and equity tokens will eventually make every business process tamperproof, traceable, and with minimal barriers to entry.

Value Token Layer

VALUE GOES CURRENCY AGNOSTIC

The stable value layer acts as the on-boarding mechanism for the entire tokenized digital landscape. Market participants from consumers to enterprises must have some kind of trustworthy way to convert their existing fiat based currencies into natively digital currencies.

Motivations for consumers to make the switch to natively digital currencies include:

- **Near zero transaction fees for foreign remittances.** In the developed world, services like Venmo provide "free" transactions between users. However, the global cross-border remittance market averages 7%+ fees per transaction hurting the most vulnerable populations who can benefit the most from an increase in discretionary income.
- **Built-in zero friction option in popular social apps.** We will discuss the Facebook-led Libra payment network and Cailbra wallet in-depth in a future section. The net-net is the 2.4 billion+ combined users of the Facebook suite of social products (Facebook, WhatsApp, Messenger, Instagram) will gain automatic access to a stable value token directly inside of their apps with key custody handled automatically by the Calibra wallet.
- **Incentives to interact with the utility token and security token layers.** Users will need some form of stable fiat value or native cryptocurrency like Bitcoin to interact with this new ecosystem and have access to the immense opportunities utility tokens and security tokens will provide in the coming years.

Motivations for enterprises include:

- **Near zero transaction fees:** Unlike consumers who are largely shielded from transaction fees as they are obscured by credit card point schemes, business bears the brunt of the 1.5% to 4%+ transaction fees every time a customer uses their debit or credit card.
- **Better analytics = increased transparency & lower costs**: The inherent design of a token based ledger requires that the sender and receiver are verified by a network of validation computers that store multiple copies of the transaction. This creates default transparency and the ability to apply more granular analytics to transaction data.
- **Programmable money**: The ability to programmatically execute business logic cannot be overstated. In this future, contracts can be enforced using a rules-based system with arbitration logic built in to the core application.
- **Mitigating fiat risk with a low volatility currency basket**: Projects like Facebook's Libra are attempting to implement a global stable currency that provides a more stable currency than any one currency alone can attain. Rather than multinational enterprises needing to run large FOREX desks to mitigate exchange risk, a shared stable value currency can be used in its place lowering the cost of doing business globally.

Utility Token Layer

REAL USE IN THE REAL WORLD

The concept of a utility token precedes distributed ledger technology and cryptocurrencies by many years. Whenever you receive credit card points, airline loyalty points, or in-video game credits, you are already using a form of centralized utility token that most often does not have any real value outside of the original issuer's system.

The big idea behind utility tokens is to incentivize users to exchange their fiat-based or cryptocurrency-based value tokens for access to goods and services.

- Consumers can pre-purchase exclusive or discounted access to future product offerings.
- Enterprises can entice consumers to stay loyal to their platforms where they glean more analytics from consumer behavior, and build a recurring revenue relationship with the consumer.

The business models possible with this basic arrangement are endless, though some thought-provoking concepts currently being explored in the space include:

- **Disintermediating the 'sharing economy'**: Rather than a middleman-focused extractive model such as Uber, Airbnb, etc. fees generated by the platform are distributed back to the providers of services in the form of utility tokens.
- **Natively digital business logic products such as insurance, home loans, etc:** Disintermediated models where a programmable smart contract is written with predetermined logic to pay out claims and settle disputes through an arbitration process.
- **Legacy businesses going consumer crypto:** Similar to airline loyalty and credit card points, all consumer facing businesses (B2C) can create incentive models to deliver tangible and intangible value to consumers.
- **Legacy businesses going enterprise crypto:** B2B use cases are truly enormous from supply chain tracking, to GDPR compliance, fair use data integrations, identity management and streamlining of KYC/AML processes. A link between B2B and B2C systems is possible by selectively sharing information between systems based on access credentials.
- **Crowdfunding new businesses:** Through tokenization, not just hardware products can be funded natively via DLT as shown in the Regenerative Retail section, but also digital services such as streaming platforms, rideshares, etc. where early adopters are incentivized to join and promote the project in exchange for exclusive features and discounts.

An important caveat to utility tokens involves the "expectation of future return". This is the defining feature of an equity offering as decided in the 1946 United States Supreme court case resulting in the Howey test. Utility tokens must be value stable and not have an expectation of future return, or will instead be classified as a security token.

Utility Token Layer

SECURITY AS THE ULTIMATE FORM OF VALUE

The most controversial logic from a regulatory standpoint to convert to a transparent and programmable token-based system is how to treat risk-of-loss financial products like equities and bonds. Imagine a future where consumers are empowered to own equity in their favorite goods and services not in the abstract via the existing paradigm of publicly traded equities, but through **real direct ownership**. There is a natural funnel from value tokens, to utility tokens, and finally to real equity ownership via security tokens.

With a progressive regulatory framework in place, end users will be able to participate in companies not only at the public market stage where most of the appreciation has already occurred, but from the very beginning. This phenomenon is already blurring the lines between venture stage seed investing, follow-on private equity, and public markets, as evidenced by the ICO craze starting in 2017.

Exposing retail investors to the inherent risks of unproven business models is a significant challenge. The goal of securities laws is first and foremost to protect consumers from fraud, though this has the perverse externality of preventing all but the richest citizens from participating in the upside of scalable new business ventures.

With a transparent flow from value -> to utility -> to finally security, many interesting new phenomena will occur in the financial systems including:

- **Unbundling of corporate assets.** Imagine owning a piece of individual intellectual property such as a movie, TV show, podcast, or book without owning the parent company.
- **Earlier price discovery for new ideas:** With liquid trading markets available earlier in the development of companies, investors can achieve liquidity quicker. This also brings the risk of insiders dumping on unsuspecting investors, hence logic such as lock-up periods that can be programmatically added to smart equity contracts.
- **Increased corporate governance:** By programming governance rules such as board votes, hurdles rates, treasury management, etc. where parties can vote directly or delegate their votes to a trusted representative.
- **Rise of alternative asset classes:** With the ability to tokenize any commodity, good, or service along the value chain comes the potential to create a portfolio of many more types of assets than are currently available. Early experiments into tokenizing artwork and other collectibles such as classic cars, to the massive 250+ trillion dollar global real estate market show a vast amount of untapped liquidity that can be unlocked through tokenization.

Value Onboarding Layer

EXCHANGES CHALLENGING THE CLASS SYSTEM

The goal of any company in the value onboarding layer is first to make revenue from transaction volume, but more importantly, to become a trusted custodial source with the next generation to help them preserve and grow their wealth.

With an estimated 30 trillion USD equivalent in value expected to transfer from the Baby Boomer generation to the Millennial generation in the coming decades, companies positioning themselves at the forefront of the transition to token-based value stand to benefit immensely.

Within the onboarding space, there are many different strategies to capture market share in this emerging space including consumer-facing strategies such as:

- **Native digital currency exchanges such as Coinbase, Gemini, and Binance.** They primarily serve the nascent fiat currency to cryptocurrency market. Their core user base consists of tech savvy retail investors who wish to convert fiat currency not for a fiat equivalent digital currency, but for hard-limited supply cryptocurrency.
- **Stable value tokens projects such as Libra.** These are aimed at increasing the velocity of spend on social networking platforms by lowering the barrier to entry to send money globally. Introducing billions of users to cryptocurrency via an easy to use interface integrated directly with products already being used can have impacts far beyond just increasing ad spend. **With programmable money, services like Facebook can begin to offer financial identity management, insurance and investment management services.**

And enterprise-facing strategies such as:

- **Legacy banking institutions:** experimenting with the replacement of their back office remittance network with a permissioned blockchain network. This setup is not consumer-facing, but rather a way for banks to transfer fiat-based value more quickly using shared infrastructure with administrators that can reverse, modify, and delete transactions.
- **Legacy investment institutions:** are primarily focused in the institutional and high net worth classes to provide custodial services for hard limited supply cryptocurrency. This allows institutions such as hedge funds to legally hold cryptocurrencies without self- dealing legality risks of managing the private keys directly.

Shared Architectural Pattern

WHILE HAVING POWERFUL BACKERS, LIBRA IS NOT UNIQUE

The three-layer token system presented above is only possible if such a system can scale to accommodate potentially millions of transactions processed per day. Fortunately, a robust architectural pattern has emerged in recent years that offers a path towards achieving such a lofty goal. For many, the entry of Facebook into the DLT marketplace with its project Libra is a sign that the industry is beginning to mature. Digging into the technical documentation, we can see that the architectural pattern chosen by Facebook's Libra protocol looks remarkably similar to existing projects in the space mimicking designs employed by the Stellar, Ripple and NEO platforms, among others. Basically, the system works like this:

1. Transactions are posted to a network of "validator" full nodes which keep a full universal copy of network activity in an ever increasing hashed chain of transactions.
2. Validators take turns as a "block leader" winning the chance to submit new transactions to the ledger, which other validators then agree to if consensus rules are met.
3. The consensus mechanism used to prevent malicious nodes from co-opting the system are variations of delegated byzantine fault tolerance. This consensus protocol is able to converge on honest transactions by allowing honest information to preferentially propagate through the network even if a large percentage of nodes act dishonestly.

This architectural pattern has drawn criticism from many in the distributed ledger community, as the process to become a validator often takes place behind closed doors in an opaque and power-centralizing process.

Case in point: **Libra**, in its current design, requires a contribution of 10 million USD to an industry consortium based in Switzerland to run a full node, then distributes profits on interest generated from fiat-backed currency sitting in reserves to validators. This reserve is what is known as a "handbasket" - a grouping of fiat currencies which are selectively drawn based on market conditions, such that the interest they generate works like a money market fund. As such, as a so-called stabilizing mechanism, this interest is not redistributed to end users, but rather the members of the governance structure.

Conversely, validators on open systems like Stellar and NEO do not have such constraints on membership. Of note, NEO began with complete internal control over node validation to ensure the network performed properly during initial beta usage, before transitioning to a more open model where any organization can apply to run a node.

While not an exhaustive list of validator-based systems with byzantine fault tolerant consensus, Stellar, Ripple and NEO are the largest market capitalization projects that employ architecture nearly identical to what Libra is proposing.

By including a scripting and smart contracting language (MOVE) Libra hopes to serve as not just a value token payment rail, but to eventually offer more complex financial services such as insurance, banking, and potentially even exotic financial vehicles such as derivatives contracts. This makes NEO and Stellar closer competitors in functionality than Ripple, while Ripple has confined its use case scope to interbank transfers and remittances.

With thousands of completing public and private ledger projects fighting for market share in an industry destined to replace the totality of traditional finance, diligence into the technical and business acumen of each project must be considered before deploying critical business logic to a ledger network.

Market forces will eventually find a winner, or a handful of winners with the ability to process trillions of global transactions in a provably secure way. The processing of all business logic will create a "financial Internet" where any system can seamlessly communicate with any other system with the appropriate credentials.

TAKEAWAY:

TOKENS MUST REPRESENT REAL ASSETS WITH REAL UTILITY VALUE

Part 4: The New Financial Internet

The New Financial Internet

END OF THE PYRAMID SCHEME?

The case this paper presents is a world where friction to execute any business logic approaches zero. The infrastructure to share this business logic securely with other parties without needing to rely on fallible middlemen can only be done with distributed ledgers. While the technology to host massive amounts of data in secure digital databases has existed for decades, no prior system architecture shares data securely between non-trusted parties in an immutable format.

We need secure timestamped fingerprints of every transaction shared with a global network of ledgers to ensure a near frictionless resolution to any financial problem. When problems can be tracked to their source using automated shared logic, the ability to find and correct friction inducing issues becomes drastically easier. By tweaking the parameters of the system, certain data categories such as personal transactions can be done in a manner that does not reveal personal information using technologies outside of the scope of this paper including ZK-SNARKs based lightning channels, and provably deleting historical data from permissioned blockchains.

This decentralized, autonomous, and traceable financial world is coming whether we like it or not. Those who embrace this change will thrive, while those who do not will have their power eroded by the coming hegemon. Or, they will contribute to the building of alternative infrastructure, such as the efforts advanced by the likes of Radix, Holo, dWeb, Verses and many others.

At a public policy level, governments should be doing everything in their power to outcompete other sovereigns for a piece of the new financial Internet. From a regulatory and compliance standpoint, it should be obvious that a system with inherent traceability is superior to our current system of leaky tax havens and Panama Papers.

Progressive Capital Gains

THE END OF PERSONAL INCOME TAXATION?

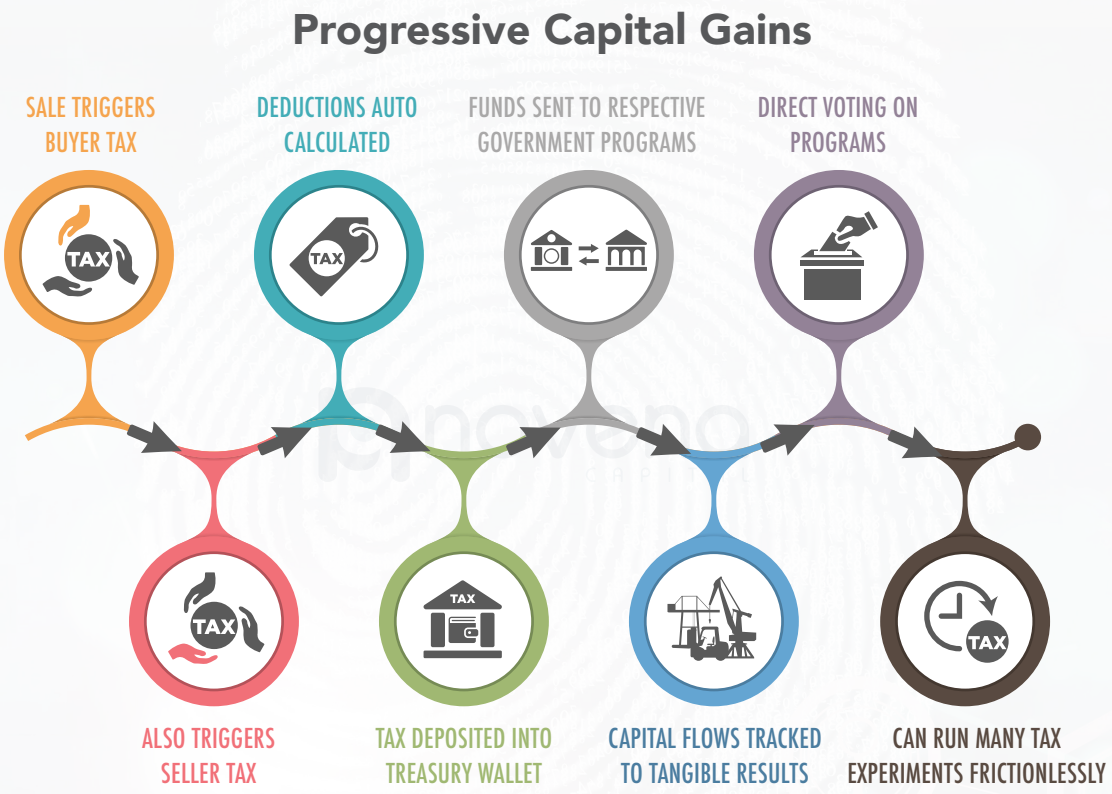
In our current system, every sale of a digital crypto asset is considered a capital gain in certain jurisdictions, and thus taxed at the short-term rate if held less than 12 months, and the long-term rate if held for more than 12 months. This design is fundamentally incompatible with the entire value token and utility token layer of distributed ledgers. Taxes are not levied everytime we click to watch a Netflix video, or pay for daily needs in cash or credit, so why are all crypto assets universally treated as the same asset class?

The solution: In the short term, exempt value stable and utility tokens from capital gains taxation through an automated application process where crypto companies can follow set guidelines to prove they are not in violation of the Howey Test. Granted, the Howey Test is no true litmus for regulating digital dynamics in an emerging financial system that requires adaptive frameworks for proper governance.

The reality is that new market players must develop proactive relationships with regulators to balance the needs of investor protections with innovation.

Over the long term, we can create a graduated taxation system at the individual transaction level that increases fees with transaction size and volume. Such a system will not create onerous compliance issues for SMEs as compliance will be built in at the protocol level, making compliance automated rather than a manual after-the-fact reconciliation process.

Countries like France have recently embraced a taxing model that only targets crypto-to-fiat transactions, while not taxing crypto-to-crypto transactions. This forward-thinking approach creates a tax environment conducive to innovation, rather than penalizing usage of crypto technologies through regressive taxation and onerous reporting requirements.



Example:

1. Alice purchases a refrigerator and submits her delivery address. Just like in the current system, the delivery address triggers state and local sales taxes.
   SALE TRIGGERS BUYER TAX

2. Unlike the current system, the transaction also triggers a taxable sale event for the company that sold the refrigerator. **ALSO TRIGGERS SELLER TAX**

3. In an automated accounting system, the sale is credited against the applicable deductions to calculate the amount of corporate taxes owed in real-time. **DEDUCTIONS AUTO CALCULATED**

4. When the transaction is processed, the amount of tax owed gets automatically deposited into a tax treasury account where funds into it and out of it can be tracked in real-time by anyone in the public. **TAX DEPOSITED INTO TREASURY WALLET**

5. Similar to certain sales tax jurisdictions where different items are coded in different taxation categories, items like cigarettes and lottery tickets can go into their respective tax wallets and other in the government do not have access credentials to spend. **FUNDS SENT TO RESPECTIVE GOVERNMENT PROGRAMS**

6. Tracking the flow of capital back to individual school supplies, park ranger salaries, etc. is also possible making government wastage much easier to spot. A complete record of public expenditures available in a unified format will make performing big data analysis much easier and help spot developing patterns in expenditures early before problems escalate. **CAPITAL FLOWS TRACKED TO TANGIBLE RESULTS**

7. Instead of waiting for after the fact reconciliation, citizens in a fully ledgered tax system could vote for or against expenditures over a certain amount directly, as they would also have a unique identity preventing vote fraud. At the representative level, votes could be balanced with the direct votes of the citizenry as further checks and balances against wastage. **DIRECT VOTING ON PROGRAMS**

8. With the ability to tweak incentive levers in real time, minimum viable experiments could be performed at the local to determine what an optimal tax rate is to balance the needs of the few with the needs of the many. For example, transitions below a nominal value of 10,000 USD equivalent per year of cryptocurrency expenditures could be tax free before an escalating VAT type tax is incurred. **CAN RUN MANY TAX EXPERIMENTS FRICTIONLESSLY**

TAKEAWAY:

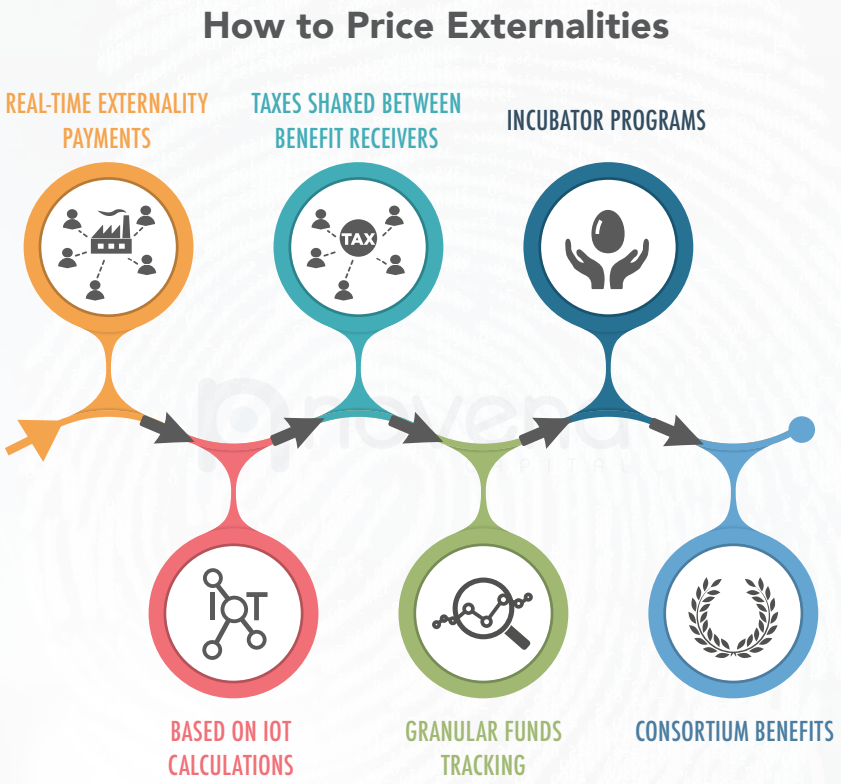
CAPITAL FLOWS FROM TAXATION THROUGH SPENDING (SALES TAX) ARE MADE VASTLY MORE EFFICIENT WHEN EXPENDITURES MATCH PRODUCTION CYCLES

Tax Offset Markets: How to Price Externalities

TRANSITIONING CAPITAL FROM PREDATOR TO PROGENITOR

Tax offset markets are a grand vision of what is uniquely possible using distributed ledgers that goes far beyond merely tracking and quantifying expenditures at the per transaction level. Tax offset markets would allow for the proper pricing of externalities (Pigovian taxes) that classical capitalism does not factor in. Classical capitalism also does not account for natural capital, which is becoming increasingly more important as externalities are offset in the manufacturing process and across consumption domains.

In classical capitalism, there is no pricing mechanism for the positive or negative externalities created by industry (unpriced spillover effects on the wider world). Common examples include the use of non-renewable raw materials and pollution, but more abstractly, can also include externalities created from the free use of user data to build private profiles of individuals targeted at inducing certain consumer or political behaviors.



1. As with any rules-based system, enforcement is key. DLT combined with IOT uniquely allows for the real-time payment of externality-causing behavior. **REAL-TIME EXTERNALITY PAYMENTS**
2. If the refrigerator Alice purchases comes preloaded with 5 pounds of ozone depleting freon gas, a cost of what her individual burden of depleting the ozone layer can be calculated. **BASED ON IOT CALCULATIONS**

3. This microcost is automatically siphoned from both the company producing the refrigerator, and Alice at a ratio that prevents the manufacturer from moving to a jurisdiction that does not have such a tax. **TAXES SHARED BETWEEN BENEFIT RECEIVERS**

4. The ozone depletion wallet can only be accessed for projects that directly impact ozone mitigation efforts. **GRANULAR FUNDS TRACKING**
5. Within the ozone fund, a profit motive can be established where an incubator type system distributes the funds following rigorous guidelines to promising ozone mitigation efforts including the development of low cost environmentally friendly alternatives to freon. **INCUBATOR PROGRAMS**
6. As DLT acts in a consortium type fashion, additional manufacturers can be incentivized to join the same funding pool across legal jurisdictions. **CONSORTIUM BENEFITS**

If these use cases sound like science fiction, it is due to a cynicism around the ability for many game theoretic actors, with often conflicting motivations, coming together for the greater good.

Be that as it may, these explorations are based on economic and monetary fundamentals, in conjunction with the interdependencies technological code and its resultant financial logic provide.

The Future of Margin

PROFITS WHICH DO NOT INCUR COSTS TO THE CONSUMER

In open conclusion, we have established several basic frameworks throughout the paper that can serve as a reference guide for investors, entrepreneurs, corporations, and sovereigns wanting to prepare for the coming shared ledger-based automation and asset creation revolution.

Each discussion in the paper in some way references "margin" either directly or indirectly. Margin is the heart of the "profit motive", which is the primary concept at the heart of capitalism. By extrapolating current trends towards automation of business processes via secure smart logic, we get to a world very quickly where almost all value add is turned into a race-to-the-bottom commodity.

Not to despair, this process will create much more than it destroys, as individuals for the first time will be able to **directly own the engines of margin creation**. Regardless of the amount of automation employed, finished goods will always have more value than raw materials. The same is true of finished software products in relation to raw coding materials such as packet switchers and compilers.

The goal of the distributed ledger revolution is to expose the logic that runs all business processes to the rigor of programmatic execution, and more importantly, have that logic owned directly by the people who benefit from it.

This disintermediation of the middleman will drive economic growth as economic activity does not get hoarded by a small group of superusers with asymmetric access to information, but is instead shared symmetrically with all users of the system.

This in no way dilutes risk premium for being an early adopter in these new systems; it simply means that in the future, value will be created one automated microtransaction at a time, with transparent competition among all providers of value.

And what a world that will be.

> "We are not going to be able to operate our Spaceship Earth successfully nor for much longer unless we see it as a whole spaceship and our fate as common. It has to be everybody or nobody."
>
> **R. Buckminster Fuller**

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Our vision for the next economy boils down to 3 fundamental things:

1. **Alternative asset expansion** to create new assets & new asset classes in the form of vital resources (food, land, energy, water, money, etc.)
2. Rapid development of said resources into **viable civic + commercial utilities** (regenerative energy units, reformation of distressed land bases, microgrid variations, etc.)
3. **The scalable (re)distribution of utilities** at the local level, then horizontally scaling outward to regional, national and global integrations. This creates many more jobs, new vocational skills & healthier, more stable and highly investible markets

… all of which is distributed ledger-enabled.

Relevant projects from Novena Capital transforming global finance:

+ a global carbon credit and investment reallocation exchange
+ a mineral rights easement/sequestration platform
+ a microgrid off-peak energy platform
+ a global mutual credit platform
+ a distressed land asset conversion platform
+ a supply chain externalities assessment platform
+ a learning institute and impact investment vehicle

Industry sector suggestions:

+ MANUFACTURING - mutual credit facilities
+ INSURANCE - collateralized risk pools
+ FINANCE - cryptocredit instruments
+ RETAIL - fractional equity lines
+ ENERGY - off-peak redistribution grids
+ AGRICULTURE - zero-interest subsidies
+ HEALTHCARE - fair use data exchanges

About Novena Capital

Novena Capital is a strategic advisory firm that focuses on alternative asset development. We use whole systems approaches to designing, implementing and capitalizing economic solutions with the highest possible **social + environmental impact**. We also build our own technologies, and have a resource development platform (Next Block Group) through which we forge critical partnerships. The **blockchain and distributed ledger technologies** play a critical role in these partnerships, as we transform sectors such as healthcare, insurance, energy, agriculture, finance and real estate.

We foresee alternative asset classes expanding from $8 trillion to $25 trillion in market capitalization by 2023.

The group is an exceptional blend of seasoned emerging technologists, whole systems designers, award-winning strategists and venture capital/capital markets veterans who see an entirely new world unfolding which focuses on true social and environmental impact investments and private-public efforts. The group's founders, Ed Prado and Gunther Sonnenfeld, count among their fintech achievements the development of the world's first online bond trading platform (tradebonds.com), and the world's first Bitcoin point-of-sale platform (Coin of Sale).

The group works with a small portfolio of companies completely disrupting healthcare, sustainable real estate, regenerative agriculture, renewable energy, and responsible carbon investments, as well as next generation Internet infrastructure and decentralized government systems. It counts among its unique, proprietary approaches socioeconomic frameworks such as *Smart Ecologies*, used to provide whole systems solutions for local land development projects, and a holistic vetting tool called *The Block Evaluator*, which factors in 'A-Z' organizational components such as leadership and communications styles, as well as nuanced technology audits, all in a comprehensive 100-point evaluation process. Next Block Group also has a suite of proprietary technologies and hApps in development, including the content creation and distributed digital rights management platform, RAIR.

The group's two upcoming books on the unique global impacts of blockchain and distributed technologies, ***The Distributed Application Revolution*** and ***Emerging Frontiers***, will be published on RAIR, Q4 of 2019 and Q1 of 2020, respectively. The group's **Core Thesis Paper**, recent **Blockchain Industry Outlook Report** and **Exploration of Crypto's Non-Flationary Value** can be accessed here.

"Given all the infrastructure and resource needs around the world, this is a pivotal economic moment. Startups, mid-stage companies and global organizations alike have an unprecedented opportunity to develop real ecosystems with real value. The blockchain, and myriad next generation approaches, are facilitating an evolution in social, ecological and governance reform. All of us can seize upon inclusive, collaborative and highly profitable market models that give more and more people the ability to live + work on their own terms. Novena Capital looks forward to working with you to achieve this."

Gunther Sonnenfeld

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