

Impact Oxygen Token White Paper Draft

Version 3.2.4

A Utility Token for Decentralizing Social Development
and Social Finance Data Infrastructure

The Case for Inclusive Crypto Economics



Abstract

Impact Oxygen Token (iO₂) is a utility token that decentralizes social investment data infrastructure necessary to deploy social capital, and use proof of impact protocol to incentivize crowd validation of impact generation. iO₂ powers a Decentralized Autonomous NGO (iO₂ DANGO) that deploys a suite of decentralized social finance solutions such as pay-for-success crowdfunding and crowdsourced metrics, supported by social development data services including impact measurement, monitoring and evaluation, and impact data validation. These social finance solutions are important because they are the keys to deploying funds to social programs, however its current form lacks a cost-efficient and trustworthy mechanism of transparency needed for an unbroken flow of capital deployment to qualified programs. iO₂ Token solves this by decentralizing the transparency mechanisms which provides trust in a trustless environment, and gradually lowers costs by distributing the transparency economics with the increase of users and scale of projects over time.

The iO₂ Token is produced through the process of social finance crowdfunding on the iO₂ DANGO platform, at a volume commensurate to the size of funding, complexity of metrics, and number of milestones assigned to the project, in exchange for a minor fraction of crypto or fiat capital from the total transaction with a preset price by iO₂ DANGO from the onset. iO₂ DANGO is proposed to develop its own public chain, called *Impact Atmosphere* designed for grassroots community users and adapting to their user behaviors.

This whitepaper is a call to action for a global movement towards building a new Impact Atmosphere of inclusive crypto economy by participating in decentralized socially-driven capital markets, transforming anyone into a valuable stakeholder supporting positive social change through incremental actions that culminate into massive market-empowered forces for good. With the worldwide rise in social finance innovation to support social development, and the rising tide of decentralized networked technologies, we believe that the time for building an inclusive crypto economy is now.

In 2015, the UN set forth 17 Sustainable Development Goals (“SDG”s) for countries to adopt as part of a sustainable development agenda. It is estimated that in the period 2015-2030, there is an annual average of US\$3.9 trillion of investment needs to achieve the SDGs. However, largely due to a yet-to-be efficient infrastructure across the social capital value chain, only US\$ 1.4 trillion of annual investment globally are able to be deployed towards fulfilling the SDGs, leaving an investment gap of US\$2.5 trillion of capital need per year. Despite significant amounts of private and public sector capital available to fill this gap, the SDG investment infrastructure is fragmented and incomplete, with costs currently seeming to outweigh the benefits, resulting in large amount of capital unable to be deployed to areas and initiatives that desperately need those resources.

iO₂ addresses the SDG funding gap as a solution for investors on the verge of sustainable capital deployment, but are stopped because of the prohibitively high costs of transparency, and the complexity of data required to provide proof of impact to such a market and its stakeholders. We make it easier for them to take the next step, not only by decentralizing the infrastructural costs of the Social Development and Social Finance economy, but also by incentivizing all stakeholders to get onto the blockchain and do good by doing well through inclusive crypto-economics game theory, bringing online millions of users in developing communities that otherwise would not have proper incentive to participate, insuring that investors have the right base of data providers to make proper de-risked capital deployment decisions, and for those data providers to have sovereignty over their own data and be rewarded accordingly through voluntary and informed participation. To accomplish this, we are developing three key infrastructural components to enable such a decentralized and inclusive social finance ecosystem:

Impact Oxygen Decentralized Autonomous Non Government Organization (DANGO) – Decentralizes the process of identifying social development problems and solutions with crowd intelligence and crowdfunding. It is a platform that supports the authorship of consensus-based Pay-for-Success (P4S) smart contracts, where suggestions for impact metrics and milestones can be crowd-sourced by experts as well as beneficiary stakeholders, with game theory incentivizes for stakeholders to help create smart contracts that will achieve positive impact milestones.

DApps for Social Development (D4D) and SDKs – a special class of Decentralized Applications (and related software developer kits) designed specifically to collect, create, measure, validate, and manage social development and social impact data in developing communities, required to execute P4S smart contracts by validating their impact milestones. Game theory-driven incentivizes beneficiaries to increase participation in accurate data generation and social program engagement.

Beneficiary Oracle PoI Wallets and SDKs – in many developing countries or regions, off-grid beneficiaries need to be identified to participate in social development programs, and to collect their data to validate impacts and continued need for the program. The process is called Proof of Impact or PoI, using crowdsourcing mechanism to validate impact. Decentralized IDs solves this problem by following the World Bank's ID4D (Identification for Development) protocol, giving immutable proof of economic identification to vulnerable communities with uncertain political identification, empowering them to hold ownership of their data while maintaining the safety of their own interests, with incentives to share data with oracles & social programs, enabled by exchanges of data for goods and services where resources may be scarce, but data needs to grow.

Working in developing regions and financing such projects requires sensitivity to the needs of vulnerable communities and determination to forge streamlined alliances through social finance institutions. We at the Impact Oxygen Foundation are a team of experienced, passionate and innovative social development experts working intimately with beneficiaries at the frontline as well as working closely with social purpose organizations and financiers who fund them. We developed proven successful pilots of capacity building and data empowerment for social development programs and end-beneficiaries. We invite you to join the inclusive crypto economics movement, and to work with us to contribute to the development of an inclusive social finance infrastructure ecosystem. To learn more about the needs for social development, social finance, or inclusive crypto economics infrastructure, please see our forthcoming White Paper Report and other related publications.

Table of Contents

Abstract	1
Table of Contents	3
ONE. Decentralizing Social Capital Infrastructure	5
Impact Oxygen Foundation Goals by 2030	5
Impact Oxygen Foundation	6
Building Infrastructure of Social Capital	7
Exchange for Metrics Consensus: IL-X	7
DApps for Social Development: D4D	8
Beneficiary PoI Oracle Wallet: ID4D	8
iO2 Token Economics Overview	8
Crowdsourcing Metrics and Social Researchers	9
TWO. Consensus Metrics Crowdfunding Platform	11
Tapping into the power of Crowd Intelligence to solve social problems	11
Project Crowdfunding	11
Social Finance Crowdfunding	12
Consensus Metrics	13
Case Study of Consensus Metrics on IL-X Platform	13
The Estimation of Measurement Cost with IDRI Coefficient	14
Case Study of Measurement Cost Estimation and Token Value	16
THREE. Blockchain & DApps for Social Development	17
Oracle Strategies for Social Development and Social Finance	17
Intelligence Agents Become Grassroots Citizen-Oracles	19
Building Data Literacy	20
Grassroots Communities Providing Data Validation: Proof of Impact	21
Value Co-creation Model to Encourage Participation: Data Empowerment	22
Capacity Building Programs to Improve Impact Data Readiness	22
Automated Visual Recognition Survey and Analysis - Capacity Augmentation	22
FOUR. Beneficiary PoI Oracle Wallets & SDKs	24
From Centralized Data Profile to Decentralized ID	24
Beneficiaries PoI Oracle Wallet to Datafy Poverty: Social Development Incentives	25
M4P Partners: Commodity Incentives	26
Piloting Proposal to Brazil Ministry of Social Development and World Bank	26
FOUR. A Brief Overview of iO2 Blockchain Technology Specifications	28
FIVE. iO2 Token Economics Premises	30
Token Value Generation	30

Key Premises of Tokens Economics	31
Oxygen Tank	33
Proof of Impact for Staking of iO2 for Beneficiaries	34
Sharing and Exchanging iO2 Tokens Among End-beneficiaries and SPOs	34
Use of Extra ETH/Fiat from The Reserve	35
SIX. Terms and Disclaimers	36
Use of Proceed from Token Sale	36
Disclaimer	37
SEVEN. Executive Team and Supports	38
Core Team	38
Advisors	38
Piloting Partners	39

ONE / Decentralizing Social Capital Infrastructure

Impact Oxygen Foundation Goals by 2030

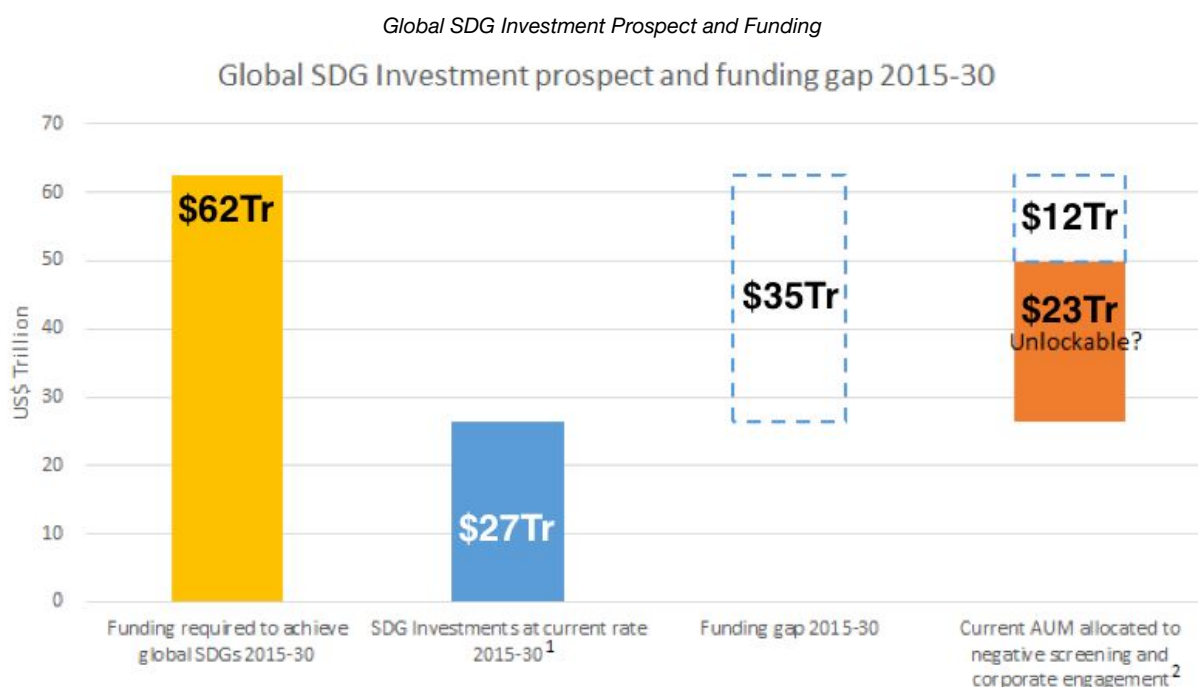


Figure 1. Gap (2015-2030)

Source: World Investment Report 2014, UNCTAD and Global Sustainable Investment Review 2016, GSIA

Note: (1) Current investment rate of US\$1.4 trillion with modest growth rate until 2030, (2) The sum of current AUM allocated to negative/exclusionary screening and corporate engagement/shareholding action have not been adjusted with potential double counting

Our main goal is to decentralize social-finance data-services platform, designed to enable socially impactful investments and projects towards the attainment of the United Nations' Sustainable Development Goals (SDG) – a market with a growing capital deployment need estimated to reach US\$62 trillion by 2030. Social Finance infrastructure required to support the SDG's is fractured, inefficient, and for most, inaccessible. By using decentralized technologies such as blockchain, smart contracts, and cloud computing for social development and inclusive social finance, we aim to build the de facto decentralized social finance infrastructure for managing social capital deployment. In parallel development with the SDGs, our goals are to build decentralized infrastructure lowering the barriers to Social Finance by 2030 in the following ways:

Social Finance Infrastructure Optimization - Targeting to serve US\$62Tr SDGs Social Capital Marketplace. There is neither a lack of identified social, economic, or environmental problems, nor any shortage of capital with congruent mandates to be deployed for solving those problems, but despite this apparent abundance, there is a dearth in suitable deal flow due to an inefficient social finance infrastructure, with very high barriers of cost and complexity that by default limits the deployment of capital to projects that need it. According to

the World Investment Report 2014 (UNCTAD), there is an estimated annual average of US\$ 3.9 trillion of investment needs in developing countries alone to achieve all the SDGs in 2015-2030, however, current investment levels of US\$1.4 trillion a year leaves a gap of US\$ 2.5 trillion annually, with a projection of US\$40 trillion in total after 15 years. Indeed, the problem is not for a lack of funds, but a lack of ability for the funds to find where it needs to go. The opportunity is to unlock the previously unlockable (US\$35Tr), mainly from 'negative screening capital', in order to close the SDG funding gap over the next decade - one of our most fundamental goals for this project.

Decentralize Impact Measurement Costs – Reduce average costs from 2% at day one of iO2 launching gradually to 0.5% of total budgetary capital outlay (currently at around 5%-8% of outlay through third party professional services). By focusing on decentralizing specialized components required to measure impacts, we are able to distribute costs across the system dynamically, incurring costs only where needed, and rewarding stakeholders for contributing accurate data relevant to smart contract requirements. In our inclusive crypto-economics model, all stakeholders, especially including end beneficiaries and field agents, are able to participate and gain incremental values from projects through validating impact and earn iO₂ tokens. With the capital raised through token presale, our ambition is to build a universal API for impact metrics frameworks, and SDK for the development of new metrics data collection automation (impact oracles) with capital raised in our token presale, then open-source all development to the world.

Make Impact Fungible – The next “SWIFT” for impact-value transactions, iO₂ is generated based on impact milestones achieved and validated. With iO₂ token as an universal currency attaching to all impact projects, 'impact' can become fungible internationally and between industries. For example, a social enterprise incubation organization in China uses credits to incentivize sharing resources among members. The credit system can access more facilities. iO2 tokens is the rewarding mechanism for everyone to contributing data when forming collaborations, and iO2 and such credit is fungible. There is another African organization, using cryptocurrency to incentivize participation of education program, also using iO2 to reward data collection. Therefore, iO2 tokens become a bridge to exchange resources between the members of the social enterprise incubator in China and the education organization in Africa.

Building Economic Identities for Grassroots Communities – In our token economics, all stakeholders are able to use iO₂ tokens to exchange values identified and useful within different scales of community, which we project to reach over 100 million users in around 4-5 years. These new mechanisms support general demand to reveal value of impact in capital markets, transforming value systems to perpetuate legacies of doing good.

Impact Oxygen Foundation

The Impact Oxygen Foundation (www.iO2.foundation) is a proposed Decentralized Autonomous Non Government Organization (DANGO), authored and founded by Chris Gee and Tat Lam, to create the governance, infrastructure, utilities, and community to facilitate the disbursement and management of Impact Oxygen Tokens (iO₂). iO₂ Foundation and all its future partners commits to perform what is set forth in this Whitepaper, to fulfill our vision of being open-source, transparent and non-commercial.

The Foundation invites everyone to become a *stakeholder of change*, including investors, trustees, foundations, financial institutions, entrepreneurs, social purpose organizations, governments, wholesalers, communities, leaders, beneficiaries, and interested individuals to participate in our crypto social finance platform by contributing tokens, cryptocurrency, fiat, expertise, and data, to join us for the next step for global action towards a more inclusive crypto economy.

To do this with us requires a slightly different approach than a typical technology startup mentality. For instance if adopting a typical Silicon Valley attitude, then working in vulnerable communities and developing regions employing a “Fail-Cheap-Fail-Fast” model could become devastating to communities where stakes are exponentially higher at the frontline and consequences could be irrecoverable without any accountability.

At iO₂ Foundation, we believe that an alternative, more sensitive, and patient approach is required to solve problems in developing communities and have thusly created the following four simple, yet crucial principles, to which we commit to strive for ourselves, our partners, and our beneficiaries:

Listen - *Development frequently doesn't reach the very poorest and most marginalized because they are less able to access to infrastructure, information, knowledge and opportunities. Sustainable development requires meaningful participation and local ownership. Therefore, listen to the voice and will of the poor, vulnerable, and disenfranchised. Engage in participatory social research to identify the most pressing yet hidden social problems and needs of development.*

Act Sustainably - *Be fully transparent and accountable for your positive and negative outcomes to society and environment. Disclose risks and social costs in your performance measurement, and trust that the potential negative outcomes can be fixed in the long view with a patient time period. Not only is it beneficial to report upward to your investors and donors, but also crucial to have "downward accountability" to local intermediaries, agents, and beneficiaries.*

Deploy capital on social problems that are crowd-identified - *Social Problems can include economic deprivation, well-being deprivation, and relational poverty that is associated to inequality and dis-empowerment. Rely not on yourself, but rather on the crowd to figure out what is worth investing and donating. Find the causes rather than symptoms of poverty. Deploy your money, small or large, to engage in shareholders/ donors/ lenders rights of security, control and polling.*

Listen Again - *Only measure what is material for your stakeholders. Follow the principles of stakeholder participation for effective social impact measurement practice and metrics. This will lead you towards the most accurate and useful data for social finance decision-making and cutting out redundant middlemen.*

Building Infrastructure of Social Capital

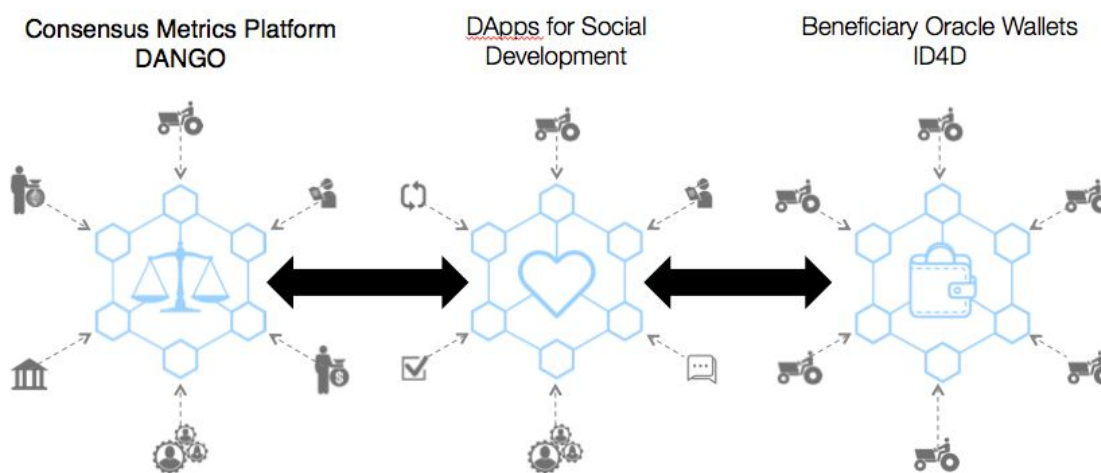


Figure 2. iO₂ Community solves impact measurement and builds inclusive cryptoeconomics

There are three important components of the new infrastructure of social capital, all driven by iO₂ blockchain technology and its token economics.

Exchange for Metrics Consensus: IL-X

iO₂ tokens launched by Impact Oxygen Foundation can be exchanged on *Impact Learning Exchange (IL-X)*, a marketplace to match social capital and social development and to create impact metrics consensus. IL-X

is driven by our pay-for-success smart contract protocol, a certain % of capital flow (either in cryptocurrencies or fiats) will be exchanged into iO₂ tokens, split between capital contributors and recipients to data flow from frontline of social development programs in developing regions to operation teams of social purpose organizations and social investors. Key functions and features of our token exchange are:

- Pay-for-success Smart Contract
- Investment mandate, social impact and feasibility assessment
- Impact Metrics Assignment Polling
- P4S Milestones Creation Polling
- Early Market Research to de-risks new ideas

DApps for Social Development: D4D

iO₂ token stakeholders are free to use all DApps for social development. This is a set of technologies and applications suitable to adapt different environments in developing regions, with limited data infrastructure and data literacy of users. Some key functions and features of the tools are,

- Frontline Data Literacy Indexing & Capacity Building
- Community Assessment, DD, & Poverty Indexing
- Two-Way Data-Flow Field Kits
- Impact Due Diligence and Monitoring & Evaluation Tools

Beneficiary Pol Oracle Wallet: ID4D

The concept of *oracle* in the blockchain ecosystem refers to a system of data validation that justifies the authenticity of digital signals required to trigger smart contract actions. In our inclusive crypto-economic model, all stakeholders gain value from impact generation and validation, including a huge amount of end-beneficiaries, who gain iO₂ tokens from providing **Proof of Impact (Pol)** data, a mining process through contributing data related to their life, environment, or program participation. This specific Pol digital wallet we are creating is able to handle a huge amount of users (100M+ in year 5), activating sensors on their mobile device to collect ambient data, while mining tokens. With iO₂ tokens, end-beneficiaries are able to access more social programs, as well as other data technologies, services and other kinds of sustainable commodities to alleviate poverty from our Market for Poverty (M4P) partners network. Some of the key functions and features of Beneficiary Oracle Wallet are,

- Universal decentralized ID (Identification for Development, ID4D)
- Collecting ambient data through mobile devices
- Ownership, Control, and Monetization of user Data
- Enables data in exchange for goods and services where money is scarce, but data needs to grow

iO₂ Token Economics Overview

The token economics of iO₂ is based on three value exchange loops between impact investors/donors, social purpose organizations, end-beneficiaries and M4P partners. The functionality of the ecosystem will not rely on exchange of iO₂ token with other cryptocurrencies or fiats. Moreover, the loops are designed to incentivize more impact data contribution and more social impact programs in three different levels.

The following is a list of usages for iO₂ tokens to exchange value within our token economic model:

Beneficiary Data: Social development SPO ↔ End-beneficiaries

- Social development SPO (Social Purpose Organization) gains iO₂ tokens when receiving impact investment or donation, 0.5%-2% of the fund will be exchanged to iO₂ tokens. Social development SPO joins the iO₂ community.
- End-beneficiaries gain iO₂ tokens from social development team with their Pol wallet by providing

- impact data. End-beneficiaries join iO2 community.
- Social development SPO gains iO₂ tokens from end-beneficiaries through providing social impact programs, in order to provide more tokens for end-beneficiaries to exchange for their data. So far and so on.
- In our token economic model, the frequency of exchange of tokens between Social development SPO and end-beneficiaries will increase, because iO2 Foundation supply of iO2 tokens is decreasing. It is around one exchange per month in year 1 and gradually increasing to once every 5-7 days in year 5.

Ambient Data: End-beneficiaries ↔ M4P Partners

- M4P partners gain iO₂ tokens from end-beneficiaries through providing data products or services (such as internet, electricity, agricultural supplies).
- End-beneficiaries receive subsidies when uploading data through automated iO2 token exchange with utility companies.
- End-beneficiaries gain iO₂ token through providing ambient data for developing region market intelligence.

Other Possible Usage of iO₂ Tokens

- Access database in the whole ecosystem for social problem, development market intelligence and project due diligence
- Tax redemptions or offsets with governments
- Digital payment currency development in developing regions

Crowdsourcing Metrics and Social Researchers

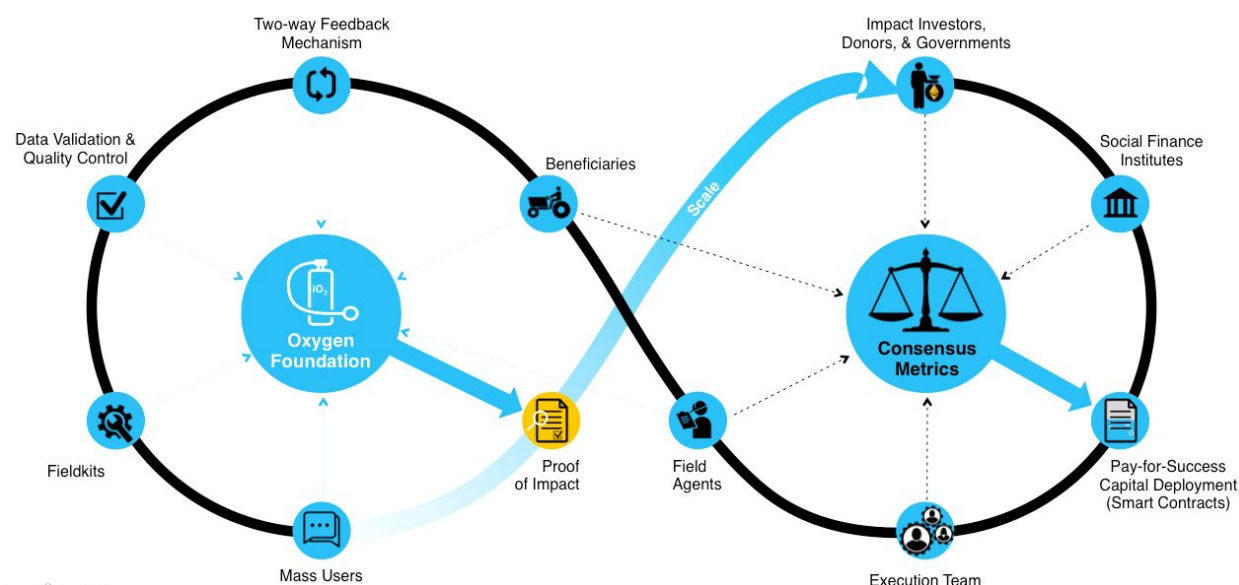


Figure 3. The overarching mechanism to automate capital flow and impact information flow to unlock social capital

We believe that the right decisions in social finance can only arise if *transparency* about what will count as social performance becomes a fundamental principle of stakeholder participation. This means that, the poor will not only participate in discussing what social change for which to strive, but also which social performance of the policies, programs or projects are worth focusing and measuring. This is related to the identification of social problems, which traditionally lies in the expertise of social researchers from different fields and disciplines.

This involves consideration of a management-context for collecting the data related to identifying social problems, which relates back to the question of downward accountability. On one hand, when an investor only wants to achieve the intended positive outcomes, there would be no need for stakeholder participation in identifying what to measure. However, this presents a low level of accountability. On the other hand, when an investor wants information on important positive and negative outcomes for all stakeholder groups, there is a need for a participatory decision-making process to determine which ones should be managed. Such participatory decision-making process shall include all stakeholders including investors, investees, agents and intermediaries, direct and indirect beneficiaries, as well as the the wider community: partner organizations, government, employees, and the society at large.

Crowdsourcing metrics is about the equal involvement of decision making. All stakeholders of iO₂ tokens, including beneficiaries, who earn the token from providing personal data, are able to use iO₂ tokens to preference, opinions, and sentiments for which metrics should be assigned. In this model, the aggregate of community intelligence has equal right to express desire of impacts as those of investor “mandates” and of entrepreneurs’ social missions, during the smart contract formation process. This process also raises awareness of outsiders as to what local communities need and desire.

Crowdsourcing social research is particularly crucial for situations where the uncertainty and ambiguity of the context requires complex measurement that cannot be accommodated through a predetermined logic model of outcomes and measures. The evaluation of social impact has to be constantly and rapidly changing in these situations, such as in post-conflict societies, in the face of rapid environmental deterioration, or in complicated political economies.

Allowing a bottom-up and incremental aggregation of social problem identification, impact reporting, and impact validation, Impact Oxygen Foundation aims to provide an intellectually robust and effective alternative to standardized impact measurement in complexity of developing communities. These situations are ones where those wishing to intervene are willing to accept but they do not yet understand enough (about the situation and what will ‘work’) to set out what their outcomes, targets, and impact should be. In practice, this approach may lead to a series of rapid learning cycles as social changes are undertaken as much to learn about what is effective to ameliorate a particular social problem. This method relies initially on immediate rather than longer term feedback. Such decentralized and incremental social research integrates action and measurement as a single, feedback-based, process of change.

Indeed, such depth of participation could easily become another unattainable ideal, however, we are excited to explore how this can be achieved by the distributed ledgers which may facilitate a decentralized platform for stakeholder participation in identifying social problems.

TWO / Consensus Metrics Crowdfunding Platform

Introducing iO₂ Consensus Metrics Platform (IL-X), our proprietary impact investment ‘terminal’ that utilizes blockchain technology to create consensus metrics for crowdfunded Pay-for-Success (P4S) smart contracts. IL-X is built as a decentralized application to lower the barriers in establishing and participating in social finance mechanisms, with the ability to use both iO₂ pay-for-success smart contract protocols as well as from established 3rd party smart contract providers such as IXO Foundation, onto which IL-X provides consensus metrics mechanism and exchange iO₂ from Foundation’s Oxygen Tank for impact measurement and validation. IL-X can also integrate with other platforms as an OEM whitelabel, to generate iO₂ to pay for impact metrics and impact validation oracles. IL-X will support both fiat and cryptocurrency contributions towards impact investment and donation smart contracts.

The platform aims to lower barriers to participate in social finance in the following ways:

- Easier to becoming a contributor - Translating *Desires to do good* into *Mandates* into *Metrics* that can help shape coordinated impact measurement efforts
- Qualifying for and Receiving Impact Investment - ready-made data infrastructure to help organizations at any stage to become social enterprises
- Problems Identification - Sending & receiving signals from where social programs are needed and how they may need to change and develop

Tapping into the power of Crowd Intelligence to solve social problems

iO₂ employs crowdsourcing strategies for users to network and focus on specific societal problems, social development needs, or other market gaps, towards which they can author smart contract-based financial mechanisms [ex. a pay-for-success (P4S) smart contract] to fund projects to address such issues, and then to solicit both local and outside expertise to provide inputs that will establish a crowdsourced framework of governance designed to be equitable for designated communities as well as the smart contract participants. This provides a means to dialogue across several interested parties and social development stakeholders for how to engage social impact projects and how the smart contract should best be executed before being set into contractual agreement with all parties.

Crowdfunding is the most direct means to determine if projects should advance into reality by contributing cryptocurrency, fiat, or iO₂ tokens towards what users deem as relevant and therefore worthy projects that should become real projects that engage with the world. In this sense, not only is the volume of tokens related to the worthiness of the project, but the popularity may also be taken into account by how many different users polled regardless of or in addition to token volume. Indeed, the types of users may also affect the surge of a network effect if for instance beneficiaries are also polling at scale with their own iO₂ tokens, regardless of total volume of token input.

Project Crowdfunding

There are three conditions by which crowdfunding smart contracts may be created for existing or proposed social development projects:

- **Metrics-Only Type** - (such as getting extra funding for measurement) where an existing project that already has its base operational costs covered only needs to fundraise for the cost of impact metrics and measurement over the course of a project.
- **Kick Start Type** - (such as projects in Kickstarter Website) where an entrepreneur can propose a socially impactful business model for crowdfunding both the operational startup costs as well as impact measurement costs.
- **Patient Capital Type** - (such as Social Impact Bond) where in addition to startup and metrics costs, the author can request to crowdfund a longer-term pay-for-success model as a means to help projects shoulder bigger risks to provide products and services that address market failure.

Social Finance Crowdfunding

There are four conditions by which crowdfunding may occur for the creation of social finance smart contracts:

- **Request for Proposal (RFP) Smart Contract** - (such as Ford Foundation) an individual or group of token contributors put together a smart contract that has already identified 1.) a problem to be solved, 2.) a set of metrics that need to be met, 3.) resources pooling requirements like tokens or fiat, and 4.) a process for an organization or organizations to apply with a proposal to fulfil these requirements (hence RFP). This smart contract can be semi or fully autonomous depending on the authors.
- **Co-Contribution Smart Contract** - (such as mainstream asset management companies) token contributors looking for fellow token contributors to startup a smart contract that pools funds to autonomously or semi-autonomously make contributions into other smart contracts that fulfill its own mandates. In the social finance sector, there exist different types or classes of contributors that have different risk and return plus social impact objectives. A government contributor may have strong social impact objectives, but be far more tolerant of lower returns, higher risk, or longer payback periods. While the terms 'finance first' and 'impact first' are somewhat dated, a 'finance first' contributor may be keen to participate, but be unwilling to sacrifice any risk adjusted returns that may be indifferent to social impact. On the other hand, 'impact first' contributors may be willing to consider a host of financial– social return trade-offs. The presence of one entity willing to guarantee all or even a portion of the investment's risk can bring in other players, much as 'cornerstoning' does in conventional finance. The actions of integrating risk appetite of different investors can also be automated through semi or fully autonomous smart contracts.
- **Community Request Smart Contract** - (such as commune or community trust) a grassroots community or consortium can put a call out for token or fiat contributors to create a locality-centric decentralized RFP smart contract that contributes towards other project-based smart contracts that fulfill its mandates. As with all other smart contracts in the iO₂ ecosystem, the mandates, milestones, and metrics can be crowdsourced and/or delegated, while giving final say to the original author(s). This is a means to help fringe communities to pool their resources together while giving channels to import outside resources to co-create social and financial innovations that align with community interests. If the fund does not receive the established minimum target funding, then all contributions are returned to the users.
- **Pay-for-Success (P4S) Smart Contract** - (such as social impact bond) an individual or group of individual token or fiat contributors establish a P4S smart contract, where impact milestones are set to disburse funds or execute actions as designated milestones are achieved. P4S smart contracts can be structured as a pay-for-success model with the potential to be in collaboration with a government or financial entity willing to back it with market rate interest returns, or to have a pool of

donors seeking to see certain milestone results accomplished before placing donations a means to pay back the initial risk-takers with interest.

Consensus Metrics

Crowd Metrics is another method by which all iO₂ stakeholders can join the poll for how projects should conduct their inner and outwardly governance, and how to measure their impacts as such. During the smart contract bidding process is a function where donors/token contributors may suggest or mandate metrics in addition to or to supplant metrics identified by the smart contract author. The author has the option to host hearings for discussions on proposed metrics and methodologies as a means to open a dialogue that may better inform the creation, negotiation, and finalization of the smart contract. The author also has the final authority to accept or veto any additional proposals which may also limit the types of mandate-specific contributors that participate.

When smart contract author making final decisions of the P4S smart contracts, he or she will have three important insights and analysis, in order to help him or her to make the best decision on which metrics to pick according to the consensus.

- Investment amount behind each metrics, in order to choose the right metrics
- Number of polling participant type behind each metrics (beneficiaries, investors or third party institutes), in order to understand opinions from the mass
- Cost behind each metrics when implementing on the frontline, in order to understand how many times of token exchanges between end-beneficiaries and himself or herself to keep the measurement continuous

Case Study of Consensus Metrics on IL-X Platform

For example, there is a social purpose organization (SPO) requesting \$50M to implement a 5 years long early childhood education programs in a developing region servicing 30,000 households. The average annual capital outlay to subsidy each household is around \$333.3. There are 4 funders interested in this program and willing to contribute major funding to it, 30 minor funders and 66 individuals from the community or other research institutes. All of them (100) are either investors or iO₂ stakeholders.

After conducting their own impact metrics research, the requesting SPO proposes Metrics 1 (M1), Metrics 2 (M2), Metrics 3 (M3) to becomes its impact performance indicator to set milestones to receive \$10M per years for 5 years from all the funders. The project is listed on IL-X platform. There are 50 funders interested in M1, 30 funders interested in M2, 2 funders interested in M3, 10 funders interested in M4 (not initial proposed by the SPO), and 8 funders interested in M5 (not initially proposed by the SPO).

Metrics	% of Funding Behind Votes*	# of Votes in Polling*	Decision
M1 (proposed)	35%	50	Accept Metrics
M2 (proposed)	25%	30	Accept Metrics
M3 (proposed)	5%	2	Cancel Proposed Metrics
M4 (not proposed)	30%	10	Accept Metrics
M5 (not proposed)	5%	8	Veto Metrics

Table 1. Polling result for metrics

* votes in this sense are defined as non-binding preferences for impact metrics assignment

The SPO decides to cancel M3, because the implementation cost for M3 is very high and the crowd-intelligence suggests it is potentially not a major issue to monitor. After understanding M4 and M5, the SPO believes M4 is actually contributing to the betterment of the program, but M5 is not as relevant. After considering the fund raised amount has exceeded what they need, the SPO decides to take on M4 as one of their metrics, but to decline funding from voters for M5. After the negotiation process is over, the smart contract is formulated, with milestones and 3 metrics allocated towards those milestones for future validation.

In the hard-coded part of the smart contract, the SPO needs to fulfil mandates from IL-X platform, such as developing decentralized ID (digital wallet) for all beneficiaries, and populate data for beneficiaries database. In the soft-coded part of the smart contract, all three agreed metrics has been included.

The Estimation of Measurement Cost with IDRI Coefficient

With iO₂ tokens (as simply as logging in or signing up at iO2 DApps to gain slight tokens), users can access all technological tools available in the Foundation. However, working on the frontline of development programs, programs need to also rely on local agents and grassroots community members to contribute and collect data. The Impact Data Readiness Index (IDRI), our proprietary metrics for understanding the readiness of a project for data technology-enhanced impact measurement solutions, aids project stakeholders to make decisions on metrics selection based on estimated measurement cost. This mechanism helps the consensus platform for P4S smart contract to be built among iO₂ stakeholders. Simply speaking, the higher the cost of impact data automation due to calculations from its IDRI coefficient, with the same among of iO₂ tokens, the development SPO needs to provide more incentivize to trigger a higher frequency of exchange of iO₂ token between them and the end-beneficiaries, i.e. more social services for them to gain tokens back for them to collect more data.

Before understanding the estimation of the cost of measurement, we need to understand the concept of impact data readiness. Impact data readiness is about how easy or difficult for a specific community to generate data digitally and automatically to interact with cloud computation. For example, an aging village with limited access to internet and lower willingness to participate is more costly to generate data, compared to a younger community in a big city with ubiquitous mobile devices and higher willingness to participate. The IDRI coefficient does not denote better or worse places or projects to consider impact investment, but only signifies the typology of data solutions needed to overcome such automated information gathering obstacles, which in place will ultimately help the program to thrive and scale what works. The automatic representation of IDRI index and estimation of measurement cost will create further awareness during the consensus metrics process (metrics polling) from all stakeholders of iO₂ tokens.

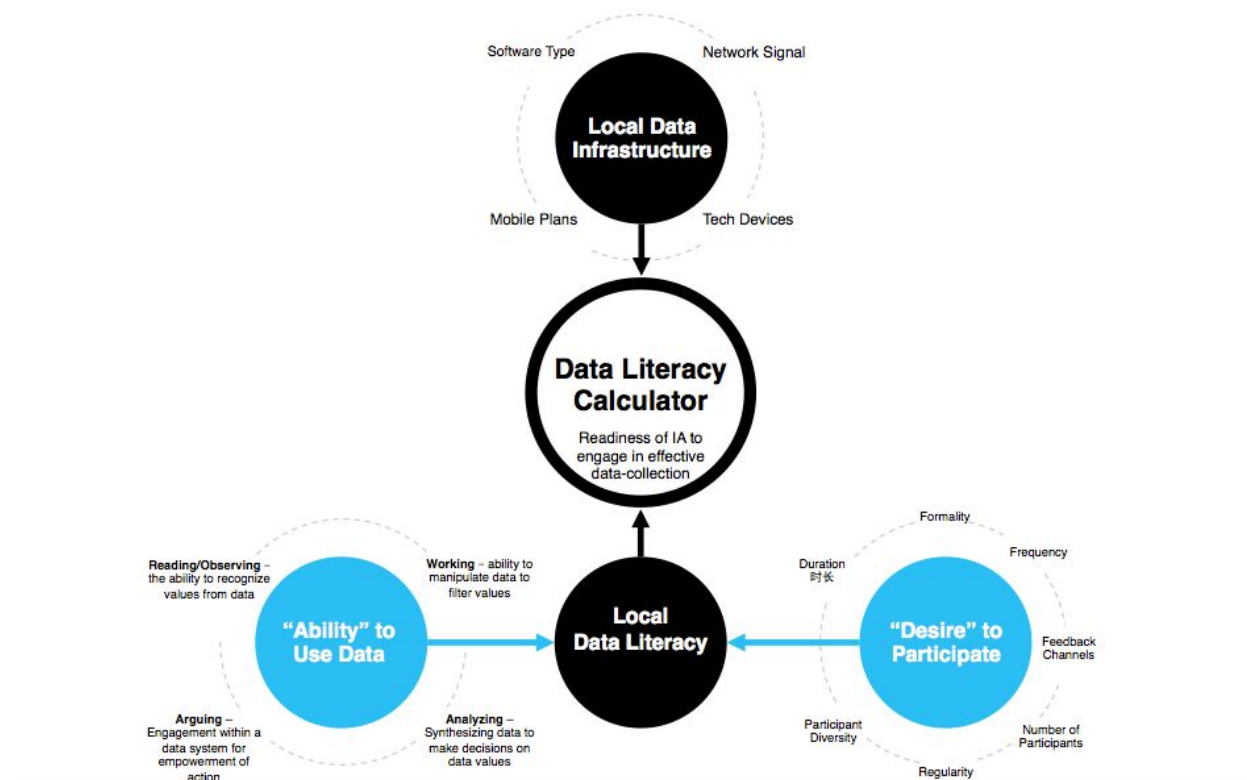


Figure 4. Conceptual framework for Impact Data Readiness Index (IDRI)

There are two dimensions of IDRI, namely local data infrastructure, local data literacy. The two dimensions create many typologies of oracle solutions for data technology implementation based on slightly different combination of artificial intelligence and “intelligence agents”. We define intelligence agents as the local providers of information, be it a frontline worker or an end beneficiary, the information “algorithms” are kept in their minds, culture, lifestyles, place, and sensibility, from which we rely on to gather relevant information augments our artificial intelligence in the cloud or is augmented by artificial intelligence on the ground.

In addition, local data infrastructure helps to define software and hardware solutions to adapt to the local condition of telecom infrastructure. Local data literacy is about the ability to use data by community members, and desire to participate in the data generation process. These two sub-dimensions are governed by a set of high level data, including education level, socio-economic development, and even proximity to major developed areas. The overall score, infrastructure score and data literacy score the become crucial considerations towards estimating costs of impact metrics data solutions. To further diversify the range of IDRI utility, we are developing the following indexing systems to more accurately understand feasibility.

- IDRI-X: Impact Data Readiness Index for External Environment of Programs
- IDRI-N: Impact Data Readiness Index for Internal Organizational Team of Programs
- IDRI-B: Impact Data Readiness Index for Beneficiaries Profile
- IDRI-R: Impact Data Readiness Index For Ranking Solutions and Social Problems of the Data Divide

To understand cost of oracle, the following is demonstrating how to use the formula. This formula will govern the generate of iO_2 tokens for projects.

$$\#B * \sum [M(x) * O(x) * \text{frequency}] * 1/\text{IDRI} = \text{estimated cost of oracle in USD}$$

- #B: number of beneficiaries defined in the case

- M(x): numbers of data points is needed per metrics
- O(x): oracle type in terms of cost per data point
- 1/IDRI: coefficient of how difficult for technology to automate data flow to save cost

Case Study of Measurement Cost Estimation and Token Value

Continued from the use case step 1, the SPO received \$50,000,000 commitment of fundings and set up smart contract with three metrics, M1, M2, M4 to become the project's pay-for-success milestones. IDRI overall score of the area is 4.0, according to our metrics means, severe barriers to implement data technology. Therefore, it will require more iO₂ tokens to develop intelligence agent programs for data collection, advocacy and education. The following calculation of the value represented by the iO₂ token economics for this project to bring local agents online and using blockchain ("oraclization" of local agents):

- M(1) requests 12 data points every 3 months, will be collected by O(1) costing USD 0.1 per data point. Annual cost of M(1) is $300,000 * (12 * 4 * 0.1) * \frac{1}{4} = \text{US\$}360,000$
- M(2) requests 90 data points every year, will be collected by O(2) costing USD 1 per data point. Annual cost of M(2) is $300,000 * (90 * 1 * 1) * \frac{1}{4} = \text{US\$}6,750,000$
- M(4) requests 1 data points every day, will be collected by O(3) costing USD 0.01 per data point. Annual cost of M(4) is $300,000 * (1 * 365 * 0.01) * \frac{1}{4} = \text{US\$}273,750$
- So in this project, local agents need to be paid at US\$7,383,750 in total, at around 14.7% of the total social development program, to provide all the data for impact measurement.

If this investment happens in year 4 after iO₂ platform launched, the following table is an assumption of the exchange mechanism for iO₂ token economics to solve the oracle problem.

Years after launched of the platform	Annual Transaction In Mn US\$	% of Fund to be exchanged for iO ₂ (End of each year)	Exchange rate of iO ₂ with US\$ (End of each year)
4	US\$4,947Mn	1.173%	US\$0.0162

Table 2. Assumed parametrics of iO2 launching from iO2 Foundation.

Therefore, there will be $\text{US\$}50,000,000 \times 1.173\% / 0.0162 = 36,203,703.7$ iO₂ tokens to be distributed to the SPO to engage with 300,000 end-beneficiaries to contribute data. Each beneficiary is able to gain on 1,206 iO₂ token in average (equals to US\$19.55).

The total value of all iO2 tokens for the measurement is US\$586,500. According to the calculation of IDRI, it is needed US\$7,383,750 in 5 years to fairly compensate all data contributors from the field. Therefore, in 5 years, there will be at least $\text{US\$}7,383,750 / \text{US\$}586,500 = 13$ times exchange between the SPO and the end-beneficiaries. The SPO is happy to organize extra social programs to keep the data collection process continuous.

THREE / Blockchain & DApps for Social Development

Blockchain & DApps for social development are a set of digital tools designed to work in frontline conditions for sending and receiving information to and from the real world to reveal the results of actions taken and impacts made with social finance investments in the crypto world, other than solving typical problems of transactions, capital source tracing and etc. The challenges facing the attainment of accurate and valid data for oracles serving developing communities include overcoming potentially massive digital gaps, illiteracy rates, and data literacy divides.

We research to bridge the above-mentioned deficiencies in social development space. Traditional “oracle” refers to the mechanism transferring external data to blockchain network (in our case Ethereum). We make use of the different *oracle* typologies with specially devised strategies for how to deploy technology and interact with the digital and analog communities and environments across the social development space.

The development of oracles is still in the early stages for blockchain and is currently well-documented in advancements made in the field. As such there are four generally accepted classifications of oracles, which may overlap with one another: software, hardware, inbound/outbound, and consensus.

- **Software Oracles** rely on data based on the internet or across networked systems. In developing communities, different types of communities will have different levels of data readily available, which may require different degrees of effort to procure reliable or effective data.
- **Hardware Oracles** take data from the real world, and bring it online. In the case of social development, the hardware must often match with the specificity of the technological and data-readiness of the community, in order to bring them online.
- **Inbound Oracles** send information to inform blockchain for decisions that need to be made
- **Outbound Oracles** receive information from the blockchain environment to enact actions into the digital or real world
- **Consensus Oracles** require more than one source of data validation for higher security and proof of impact.

Oracle Strategies for Social Development and Social Finance

The oracle represents one the biggest challenges for blockchain technology to bring external data (such as weather/traffic/flight takeoff times) to the blockchain network. From a technical perspective, it is a challenge of logic being solved by the mainstream blockchain market, however in social development, where acquiring data depends on engaging with grassroots communities that may have their own localized value systems and socio/cultural/digital behaviors that do not conform to the mainstream, it is an even greater challenge to

navigate such potential barriers to bringing external data sets concerning these communities onto the blockchain. A greater barrier yet, is not only gaining trustful methods of data collection, but in developing communities, the trust/distrust paradigm is flipped, where it is the communities (that are often vulnerable) that must be able to trust these mechanisms to share data with outside parties.

With Blockchain, we believe that the opportunity to overcome these problems of trust in trustless environments will be solved for the developing world by starting with the needs of grassroots communities first, where crypto-economics and immutable decentralized IDs can provide strategies that bring fringe communities online with sovereign digital identities, empowering them with control over their own data, and incentives to contribute data to the blockchain network. Our approach is to create a blockchain data validation infrastructure that can leverage end beneficiaries as data providers into an oracle system.

This is no longer a purely technological question, but also a social behavioral question that our team has been engaging for the past three years, solving local informational problems to incentivize grassroots community to get online, produce data that is needed by social finance stakeholders, and in return, receiving valuable data that helps them make better decisions in their lives. In this chapter, we will discuss how we can learn from our experience before, to contribute to the blockchain community about bringing a huge amount community members from developing regions onto the blockchain network, and making it meaningful to them.

Gathering data for social development projects demands a specific sensitivity to geo-political and socio-economic factors, and as such we have created additional dimensions for which we have an ongoing development of means to interface with different types of communities and different types of projects or fields. iO₂ has devised four dimensions for social development oracle strategies, of which there are no clear delineations, but rather a continuous spectrum, but for simplicity sake we have organized as the following:

- **Lean Data** - in developing regions, the option of accessing big data solutions may be limited to understanding the types of impacts for social programs. Simply said, for much of the developing world, there may not yet be any available data for a big data analysis, so to be more cost effective, Lean Data is a more precise approach for creating indicators and validating data.
- **Big Data** - where possible, big data solutions can be deployed to reference correlations in massive amounts of data. We are creating the crypto-economic framework for Lean Data providers to eventually amass and actuate channels for big data collection and analysis for social development in developing regions where quality data is scarce.
- **Event Based Data** - pre-defined physical events where data can be collected directly from target populations, creating periodic data streams
- **Ambient Data** - continuous data feed on a real time (RT) or near real time (NRT) basis

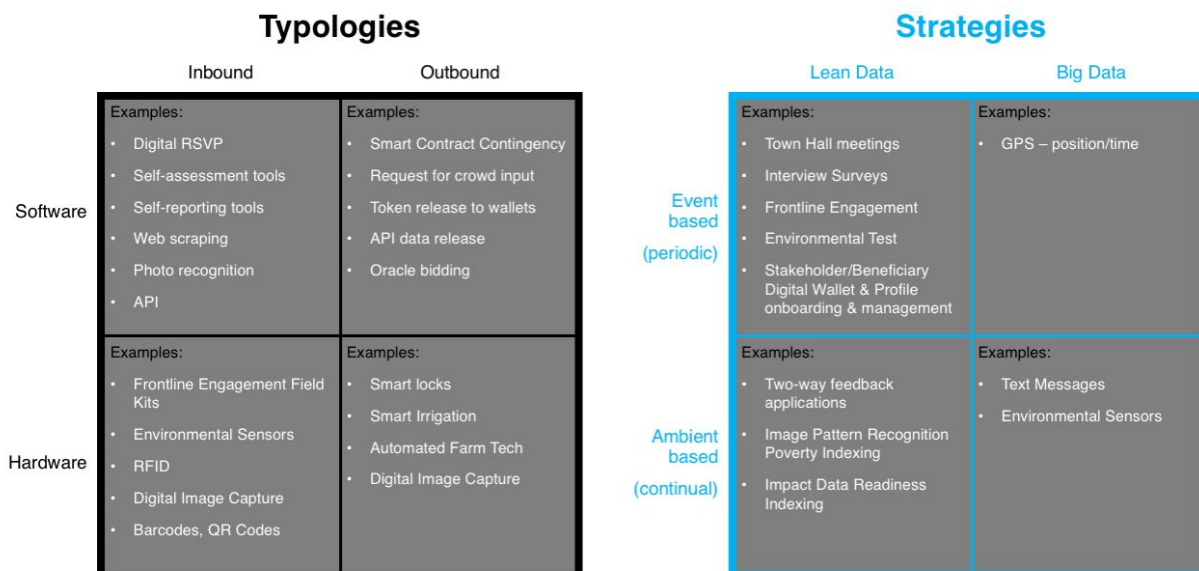


Figure 5. DApp typologies and strategies for impact measurement and smart contract oracles

Intelligence Agents Become Grassroots *Citizen-Oracles*

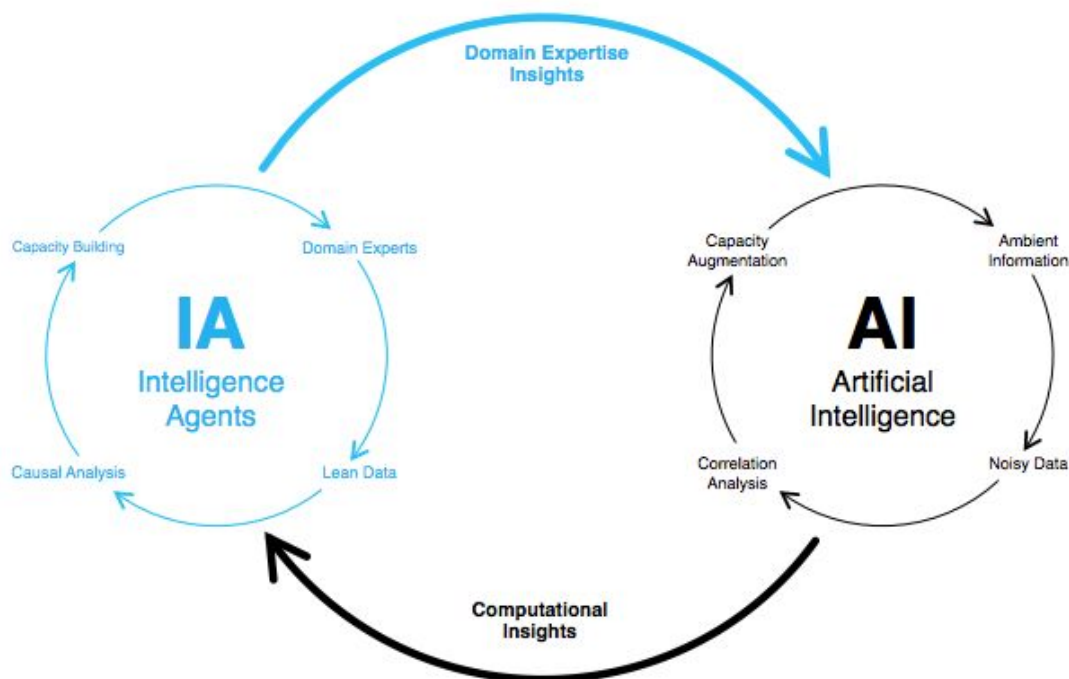


Figure 6. Intelligence Agents and Artificial Intelligence: A systemic feedback loop
Source: CDRF China REACH Datafication Whitepaper, by SZC Holdings Limited

One of the biggest values of iO₂ token is to create the protocol of “Proof of Impact” or Pol, in order to convert local grassroots communities into Intelligence Agents (IA), or *citizen-oracles*, through proof of impact token staking, that provide both passive data collection (ambient data) and active self-reporting needed to complete the social finance ecosystem. Local intelligence from the citizen-oracles are then fed into a larger

system of AI on the cloud which helps SPOs, financial institutions, and governments to make better decisions, and in turn also helps citizen-oracles to make better decisions in the field as more wholly integrated data agents in their communities.

Citizen-oracles are structured and incentivized to provide unbiased information for two reasons: the first is that much of their data is ambient data, for which they will have no point of reference to understand, or “game”, what types of data affect what outcomes, but rather that they will be rewarded for staking their tokens by keeping their wallet “open” (explained further in a later chapter), which will collect information about their surroundings and behaviors; the second is that the Pol oracle wallet is directly tethered to DApps for Social Development directly related to the social program with which they participate, where *how* the user engages with the DApp will directly benefit their own quality of life, instead of gaming an outside system, so that they have the best possible outcomes for themselves and their own community.

In the iO₂ inclusive crypto-economics model, tokens staked by citizen oracles will be tradeable for products and services from our network of Market for Poverty (M4P) partners; as a concrete example, one of our partners provides telecom data services to beneficiaries in exchange for oracle data - so beneficiaries are able to continue upgrading their digital standing, and M4P markets gain better understanding of developing conditions. This fundamentally solves the problems of collecting difficult offline data in developing regions, and setting up an inclusive economic model for end-beneficiaries to participate in the value co-creation process that blockchain has to offer. Furthermore, when the iO₂ Foundation reserve reaches a certain threshold of capital, it will automatically repurchase tokens from the citizen-oracle iO₂ token holder market, as a periodic reward for staking their tokens, and ultimately as a rebalancing of the “Oxygen Tank” and adding value to the overall iO₂ ecosystem.

In the past years of working on digitally automating impact measurement processes, we clearly recognize the urgency of developing sensitive data infrastructure able to penetrate different cultural and community systems. We attempt to solve impact measurement from the ground, because we believe that creating the most appropriate data solutions need to understand grassroots communities. As such, they are key to providing authentic and high quality data, to which, impact measurements will be able to generate useful and actionable insights, and for smart contract Pay-for-Success models, automated infrastructure for grassroots data validation is critical to execute actions structured into smart contract milestones at scale.

From our experience in the field, we have become critical towards the myth and over-promise of 'big data' (massive global noisy data) as an informational panacea, especially for the developing world, where big data is not yet so relevant. Big data forms the basis of Artificial intelligence (AI), a technology that contains machine learning algorithms which consistently self-improve analysis and inferences, and is assumed will generate actionable insights to facilitate decision-making. However, such assumptions neglect the complexity of the data eco-system in developing regions, which consists of various types of data sources, methodologies, and most importantly unique engagement channels with local populations.

More practical to social development, iO₂ engenders a 'lean data' methodology (locally relevant data with controllable quality of input and output) as a more proper, precise, and relevant system for discovering correlation in developing regions. The lean data approach focuses on the specific sub-branch of Intelligence Agents (IA) - defined as an autonomous agent, either machine or human or both, that has the ability to learn and adapt within the system of AI. In iO₂, IA empowers the type of oracle particularly relevant to developing regions.

Building Data Literacy

All too often, in social development programs' frontlines, stakeholders lack incentive and ability to participate in data ecosystems, further confounded by poor data infrastructure, low data literacy and poorly crafted incentives to participate in data contribution, ultimately creates wildly inefficient social development and social finance ecosystems. As such, appropriate data infrastructure is necessary for building and improving contemporary social development policies, projects, and capital deployment. This not only helps enhance

transparency and improve program management, but also enables the decision-making process to be more precise, timely, and better informed.

However, building such data infrastructure is not so straightforward. Despite significant rise of rural internet usage in China, this increase does not directly translate to increased *digital literacy* (ability to use digital tools) or *data literacy* (ability to gain values from systems of data) of rural users. Existing local infrastructure on the ground may not be useful for community users who are unfamiliar and have little incentive to participate with data systems; available 'hardware' does not guarantee that 'software' community users have both the 'desire' and 'ability' to engage.

Users of digital devices at the frontline are crucial as IA in a developing community's data ecosystem. Ideally, grassroots communities would utilize technology "as a magnifier of their intent and capacity" (Kentaro Toyama), where local data infrastructure would be utilized by frontline users who are empowered with the awareness and opportunity to access to such infrastructure for information and knowledge. However in reality, there exists a considerable mismatch between the availability of data infrastructure and the data literacy of frontline users. Frontline users lack the incentive, capabilities and resilience to utilize provided data infrastructure, and current data infrastructure lacks consideration of the context-specific and digital habits of frontline users.

In this light, we propose to build the capacity of frontline users through fostering adaptive capabilities and resilience. This capacity building program would combine with the development and deployment of frontline technologies that are sensitive and adaptive to the developing levels of data literacy and community participation in information sharing systems. It is important to note that capacity building does not refer to didactic platforms that involve training and teaching technical languages and skills, but rather consists of multiple methodologies that aim to empower potential IA to become 'free agents' of information. In other words, one does not have to be able to conduct advanced data analysis in order to become incentivised and data literate.

Thus through an integrated approach of promoting data literacy in targeted communities, we aim to facilitate the fluidity of data communication and processing within the data ecosystem of social development projects. This would potentially empower community stakeholders to participate and seek values from data, and create a continual influx of actionable data at both the operational level and the decision-making level.

Grassroots Communities Providing Data Validation: Proof of Impact

"Proof of Impact" (PoI) is a concept advanced by Impact Oxygen Foundation as a means to measure and validate impact through collective efforts of citizen-oracles mining/staking iO_2 tokens through contributing both ambient and self-reported data, in order to replace third party middlemen. Proof of Impact may not be limited to a singular data point, but rather a triangulation of data sets that correlate towards an intended impact designated by a social purpose organization (SPO), or defined within the statement of work of its related smart contract. Social development SPO's at the onset of their smart contracts may delegate, by consensus of smart contract stakeholders, types of oracles needed to provide proof of impact. Instead of the oracle itself needing to reach consensus, which may create cost ineffective mechanisms that cannot yet manifest in developing regions, oracle types are delegated to participate through the consensus of the creation of metrics and milestones (aforementioned in the chapter on smart contracts and consensus metrics).

With Proof of Impact, iO_2 aims to build a fair trade data economy of transparency as an attempt to solve the contemporary problem of data exploitation, i.e. contributing personal data (digital assets of people) for free without record, particularly in developing regions. Proof of Impact can therefore become a data-product that is, in-part, produced by end beneficiaries, opening the opportunity to create iO_2 mechanisms for rewards-based incentives, whether M4P partnership offerings (like mobile data), reselling tokens on secondary markets, or automated token repurchases, where use of proceeds may be dedicated towards making advancements or managing risks within the community. We are currently testing these inclusive

token economics in small prototypes based in South East Asia and Brazil with our M4P partners and wish to publish the results of our finding in future iterations of this white paper.

In the following sections, we would like to introduce a few cases we are testing how Proof of Impact is facilitated by technology-aided field agents with the China Development Research Foundation (CDRF) to illustrate the aforementioned concepts in action. Placing the social program China Rural Education and Child Health (China REACH) and the case of Guizhou Qixingguan at the center of discussion, this section will illustrate the current data ecosystem within CDRF's research framework, and investigate how data flows from its sources, goes through analog or digital channels, and becomes usable for research.

Value Co-creation Model to Encourage Participation: Data Empowerment

The first way of contributing to CDRF's *datafication* is to develop a value co-creation model towards the design of a two-way data feedback system that involves multiple stakeholders as intelligent agents. Conventionally, impact data collection is a one-way process, from which end-beneficiaries passively provide information according to a predetermined top-down framework of analysis. The set of data flows from end-beneficiaries to data analysts, but the value generated from the data does not directly return back to benefit the end-beneficiaries. In our methodology, we propose to design a two-way 'impact communication system' that not only enables data flow between end-beneficiaries and local frontline agents, but also among end-beneficiaries themselves, thereby not only growing the participating communities informational awareness of the program and its data activities, but so that they are also incentivized to continue contributing accurate data as they see the return of the value as useable insights within their community.

This program is piloted on the China REACH 'home-visiting' program, where a 'mini-impact report' of the program will be communicated among home-visitors, child caregivers at home, and parents who are migrant workers away from home. This feedback system will automatically disseminate selected impact data of the weekly visits to relevant family members. This means that the obtained impact data generates immediate value for end-beneficiaries.

Overall, such two-way data flow aims to establish immediate value creation for end-beneficiaries. Firstly, this system of value co-creation may encourage end-beneficiaries especially parents who are migrant workers to participate in the early childhood development program and the corresponding data collection process. Secondly, this application of two-way impact communication system will promote the Data Literacy in the family unit, thereby creating a more holistic family-unit participation with China REACH. Lastly, this feedback system would inform the online behaviors of end-users, hard- and soft-ware devices information, and other technology user experience information of the family members who engage with the 'mini-impact report'. In the longer term, this information will be useful for improving the data science technology, digital datafication practice, and framework and architecture of the data-empowered platform for social development.

Capacity Building Programs to Improve Impact Data Readiness

The second way of contributing to CDRF's *datafication* is to develop capacity building programs in the targeted regions, in order to enhance the coherency of Data Infrastructure and Data Literacy in that area. Low data literacy is a major barrier to cost-effective solutions for collecting continual ambient data related to understanding the socio-economic status and quality of life for potential participants of social programs. In order to improve the Data Literacy of community stakeholders, it is important to firstly evaluate their data readiness in relation to the accessible local data infrastructure.

This capacity building program aims at empowering IA with higher 'desire' and 'ability' to access existing local data infrastructure. This process of implementing metrics and frontline data technologies would build the data literacy of IA in engaging with the larger data ecosystem.

Automated Visual Recognition Survey and Analysis - Capacity Augmentation

The third way of contributing to CDRF's datafication is to develop a new household survey system based on indexing images based on object and material recognition as well as spatial analysis. We are developing visual recognition techniques to automate assessment of quality of life and developmental potential for existing end-beneficiary households and their surrounding communities. The aim of this visual survey is to rapidly identify degrees of poverty in different geographical regions as contributing factors towards poverty assessment and targeting for future policymaking.

This exploratory research focuses on testing the extent to which visual recognition metrics are able to identify ambient conditions surrounding poverty. This pilot program begins by using proxy metrics, in lieu of formally established metrics, and will improve its technology development in the next phase after CDRF's frontline agents and other experts become more familiar with the utility and development of the methodology.

In alignment with lean data practices, we will devise context-specific and simplified survey methods in order to ensure that IA end-users can easily access data and the data collection process. On the one hand, for verbal surveys, this means asking fewer questions to end-beneficiaries, while on the other hand, for the visual survey, this suggests setting standards for easily attainable angles and minimal number of pictures per household. This will prevent demotivation of IA to participate in the data collection process. In all experiments, levels of intended automation will be manifested at different stages of the process depending on the framework of data collection. For each experiment, there requires certain level of manual classification before data can be 'trained'. For more information, please read our Whitepaper for CDRF.

FOUR / Beneficiary Pol Oracle Wallets & SDKs

From Centralized Data Profile to Decentralized ID

Speculation on future program growth may involve garnering public private partnership or other financial vehicles that will allow more widespread adoption of these programs as they begin to establish their value to society through quantitative and qualitative metrics. This requires an implementation roadmap that indexes geographical areas which are most in need of the social programs. We argue that by providing a data-empowered platform of such indexing, interested social actors will be able increase capacity to:

- Create signals to financial decision-makers with new capital deployment opportunities into viable impact metrics-backed social development projects,
- Rapidly establish pertinent relationships with local government agencies and community leaders that have need and desire to support such programs,
- Pave the way for evidence-based policy making.

In our experience, many international organizations, governments, development banks and impact investing companies [for example, CDRF, World Bank, and Brazil Ministry of Social Development (MDS)], implement nationwide or international social development programs to cover millions of beneficiaries in need, and face the problem of scattered and disconnected databases. Creating an integrated, centralized beneficiary profile database, linking to all scattered database is somehow more important, efficient and urgent than collecting more data. We have been developing integrated beneficiaries profiles for different projects, not to limit by direct end-beneficiaries and also ambient data for bigger population. The case of CDRF, we are providing beneficiaries with means to validate that their data is accurate for immediately better program deployment of services and giving them direct participation in and therefore awareness of the program dataflow.

To move further for grassroots empowerment, we propose to transform beneficiaries data profiles into decentralized identification (digital wallets for all end-beneficiaries), and move the function from just identifying beneficiaries digitally, to create automated transaction of value through blockchain and crypto economics among grassroots community. This dramatically incentivizes grassroots communities to contribute data to gain token for value exchange. It also provides future opportunity for direct subsidy and cutting off middle operation process. In the case of Brazil, we are beginning work with MDS to with the aim to unify the data sources covering over 14 million households by deploying decentralized IDs as a means to provide the base by which data can be collected, verified, and validated.

A more established case can be referenced in India, Aadhaar Unique ID, implemented by World Bank Group in 2016, to develop decentralized ID (akin to digital wallets) for all beneficiaries in areas suffering from poverty. In Aadhaar Unique ID, they deployed the World Bank's ID4D (Identification for Development) protocol for their project, which is one of many adopting ID4D across the world as a more equitable and sensitive approach to universal identification and data sovereignty.

We believe that decentralized IDs will become a fundamental solution the problem in the management of assets, currency flow, and overall economic inclusivity in developing regions, where access so suitable financial institutions and support may be lacking. Underdeveloped 'banking' system in developing regions is only a syndrome. Many local community members lost their economic identity and the rights to receive

financial aid, due to the lack of political identity and simply due to loss of analogy identification documentation due to disasters or wars. This situation is not just limited in underserved communities of refugee, illegal immigrants. In many developing regions, there is no (digital) birth certificate when a baby give birth. This kind of population is called 'ghost population'.

The rapid development of centralized digital payment systems based on mobile devices in rural China, Southeast Asia, Africa and South America over the past decade validates the need for such financial micro-mechanisms. By leveraging blockchain-based DID's intend to further solve problems of security, direct injection of capital, subsidies, and future functions of smart contract transactions. We aspire that one of the biggest contributions iO₂ token economics can make for the developing world is to incentivize majorities of grassroots communities to participate in digital payment and crypto incentive-based activities that can drive the generation of incremental values outside of mainstream markets. We intend to build SDKs for the oracle wallets, where all stakeholders, not only iO₂ DANGO, are able to build different types of oracle wallets with regional or programmatic specificity, for where beneficiaries are incentivized through best-practices of inclusive crypto economics to contribute unbiased data.

On this topic, iO2 Foundation will start a series of research for legal and security framework, to let iO2 tokens to move beyond just an incentivization mechanism, but actually representing person identification sovereignty and digital asset. We believe in developing regions, the value protection of personal asset, such as land, property and proceeds (such as data), plus social capital (such as their network), is more important than monetary value.

Decentralized ID touches data not about political identity, such as passport numbers and nationalities, but about the behaviors of the beneficiaries. This is able to protect beneficiaries' privacy, but provide channels to identify people and for analysis. Decentralized ID's data includes:

- Beneficiaries' biometrics data: fingerprints, voices and etc
- Beneficiaries' knowledge: password, PIN
- Beneficiaries' proceed: mobile device, internet
- Beneficiaries' gesture: activities, location

Beneficiaries Pol Oracle Wallet to Datafy Poverty: Social Development Incentives

One of the unique challenges and opportunities for iO₂ tokens is to face an unprecedentedly huge amount of digital wallet users in our ecosystem, due to the universalization of decentralized ID and opensource SDKs for digital wallets for grassroots community member to gain iO₂ token to proof impact. The token is also used for exchange of values between data contribution and everyday life-service provisions, so we project the potential for a vast amount of transactions increase exponentially over network effects of global adoption throughout the developing world. We expect that the majority of iO₂ community members will be mainly from developing regions.

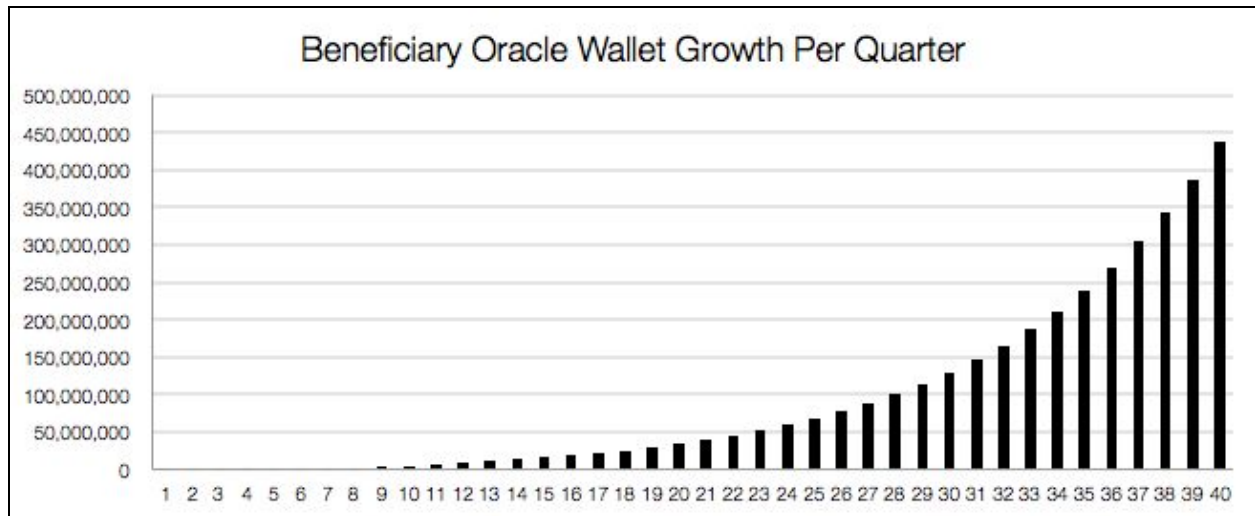


Figure 7. Beneficiary Pol Oracle Wallet user growth

Beneficiary Pol Oracle Wallet and SDKs will be developed with the following characteristics to quickly populating such application in developing regions.

- Technology able to handle 100M+ wallet users for small staking and small transaction at everyday bases
- User experience able to match expectations from users with low data literacy
- Proof of impact for staking tokens - Beneficiary is able to gain tokens when logging on iO₂ DApps or Oracle Wallet to collect ambient data around them

M4P Partners: Commodity Incentives

M4P stands for “making markets work for the poor”, as *a practical approach to reducing poverty, grounded in best practice*. Impact Oxygen Foundation is building a network of partners in the M4P space to exchange value with end-beneficiaries for program participation or collaboration. To start, we are focusing on developing partnerships with telecommunication, data business operators, farm equipment, agricultural supplies, and education providers that service developing regions. Therefore, such M4P commodities and services can further empower data literacy to convert community members to IA.

M4P partners take iO₂ tokens to exchange their services and products. This dramatically lowers the barriers for end-beneficiaries to rely on secondary market to exchange iO₂ tokens to other cryptocurrencies or fiat for everyday life use. It also incentivize digital payment to populate in developing regions, solving problems of accessibility of banking services in remote areas.

Initial partners of Impact Oxygen Foundation include,

- **Comba System Telecom** - telecommunication technology company to provide solutions to rural China
- **ETL Public Limited** - telecommunication operator in Laos
- **IHT** - Blockchain and data company for real estate
- **DVF** - platform for impact investments in southeast Asia
- **People's Goods**, e-commerce platform to provide organic agricultural products to Southeast Asia

Piloting Proposal to Brazil Ministry of Social Development and World Bank

In 2016 in Brazil, a comprehensive early childhood policy, known as the Legal Framework for Early Childhood, was unanimously approved by Law (no. 13,257). In October 2016, the Crianca Feliz program (Happy Child) (hereinafter referred to as CFP) was established by a Presidential Decree (no. 8.869) as a program to enable intersectoral and inter-institutional support of family who are beneficiaries of Brazil's Bolsa Familia to provide needed protection, care and education services for children under 3 and for children with disabilities under 6. This home visiting program aims to scaffold families' competencies to enhance their children's capacities, contributing to the breaking of intergenerational transmission of poverty, the reduction of violence, school dropout, and enhancement of education attainment.

The Brazil Happy Child program scale up is impressive. Since its launch in October 2016, over 2600 out of Brazil's 5000 municipalities have signed up for the program (home visiting services), and is reaching the most remote indigenous villages. As of November 1, 2017, home visiting services have reached 100,235 beneficiaries in 1178 municipalities in 22 states. The goal of the data platform is to help MDS/CFP ensure transparency and accountability, make better informed decisions, and build a more comprehensive data ecosystem. This data empowered platform project will apply a combined IA (Intelligent Agents) and AI (Artificial Intelligence) approach that can use actionable data, the power of cloud computation, and the proliferation of data literacy of community stakeholders to help scale the impact of social development program – the Crianca Feliz Program (CFP).

	Pain Points embedded in Program M&E	SZC Potential Solutions
Stage 1 Building Data Literacy on the Ground	Costly and time-consuming data collection process especially in rural areas where internet coverage and data literacy are low	Index municipal/ village impact data readiness and deploy corresponding people-centered frontline data fieldkits that require little internet connection and data literacy
Stage 2 Two-way Feedback System Building Data Channels among stakeholders	The "Why" and "How" of data collection is not well communicated among stakeholders, therefore: 1. Beneficiary households fear that providing information may bring them out of Bolsa Familia Conditional Cash Transfer (CCT) Program 2. Low participation of busy and absent family members (especially fathers) 3. Low incentive for home visitors to complete long and difficult surveys M&E data is restricted to serving only early child development decisions • Ambient social problems relating to the households need to be identified in order to inform cross-sector policymaking	Automate data insights feedback to beneficiary households about early child development progress, which 1. create value to data contributors, 2. inform the purpose of data collection to data intermediaries, and 3. further incentivize data participation Two-way feedback system also facilitate rapid social problems identification and response across all levels of stakeholders
Stage 3 Improving jobs for data intermediaries	Need of "precision home visiting" - recruiting the "right" local home visitors that match the social needs of various family typologies	Identify and classify potential frontline data intermediaries by tracking online behavior data of beneficiary community members
Stage 4 Integrating Different Databases	Lack of real-time synchronization of online databases between new born children data (from Department of Health) and potential participating family data of Bolsa Familia (from Department of Social Development)	Connect online databases on one integrated dashboard platform; API, data import, data synchronization
Stage 5 Beneficiary ID	Need an integrated and decentralized identification system for beneficiaries and data collection blockchain solution	Explore adoption of technology-driven protocols such as ID4D (World Bank) or DIF (Decentralized Identity Foundation), potentially using open source blockchain decentralized identity (DID) ecosystems to collect ambient data from the ground

Figure 8. Road map of implementing blockchain technologies for oracle for Social Development Ministry of Brazil and World Bank

The above table shows how data literacy capacity building, two-way feedback system, beneficiary insight generation and integrated database are able to lead to blockchain technology. At the end, the goal is to develop decentralized identification system for all end-beneficiaries for the program. Therefore, all their activities are documented and captured, in terms of data flow, will be recorded by their iO2 token ledger. This pilot attempts to research what blockchain technology solution is adaptive to communities. Decentralized identification system then prepares the foundation of beneficiaries to own their own Pol wallets to contribute more data.

Last but not the least, from the Brazil Happy Child program, we also wish to extend the datafication strategies to the entire Bosa Familia overarching program. That program, by the Brazil government, is targeting on 70 millions beneficiaries with all kinds of subsidies. Based on the decentralized identification system blockchain technology is able to support the biggest scale of pay-for-success model for the program to grow.

FIVE / A Brief Overview of iO₂ Blockchain Technology Specifications

Impact Oxygen Foundation's key goals are to be achieved through a distributed ledger technology that we will use to build decentralized application on top of it. The platform will make use of Ethereum's proof of stake protocol and proof of impact concept, which composes a series of smart contracts that govern how the impact data is created, shared, and verified.

Decentralized network - iO₂ Foundation will develop its own public chain platform, a decentralized system that runs smart contracts according to our user characteristics. In addition to values within smart contracts, the platform makes use of oracle wallets to provide external data (outside of blockchain network) to trigger complex smart contract executions such as implementing third party impact metrics and validating impact data.

Standard Web3 - The user interface, IL-X platform (DApp), is built using web3.js, a javascript library for interfacing with smart contracts. Users will be able to use IL-X Platform just like any other web applications except it is interacting with the blockchain. IL-X platform is focused on the simplicity of user experience to ensure that it is nothing different from everyday applications we use today.

IXO Smart Contract Protocol - This is an open source pay-for-success smart contract protocol developed by IXO Foundation. We will adapt this protocol for all smart contract development on our platform. (www.ixofoundation.com)

Proof of Impact - and iO₂ tokens in the Ethereum ecosystem, or future iO₂ public chain, can represent any fungible tradable goods: Tokens, participation in pollings, impacts, etc., Typically, creating the token are relatively easy with detailed instructions provided by Ethereum; however, an effective initial launch of the token is decided long before the initial token sale and iO₂ token has been committed to follow strict guideline that sets up for successful standardized Token launch.

Tokens - iO₂ Tokens are issued on top of Ethereum ecosystem at the very beginning. ERC stands for Ethereum Request for Comments and it is an official protocol for proposing improvements to the Ethereum network. ERC20 defines a set of rules which need to be met in order for a token to be accepted and named "ERC20 Token". While this is not an enforced rule, iO₂ Token is compliant with ERC20 standards which ensures that our token can undergo interaction with various wallets, exchanges and smart contracts without any issues. This set of rules allows iO₂ Token to carry a tradable value and make it available to buy/sell through Ethereum Wallet or any other client or contract that uses the same standards. When *Impact Atmosphere* public chain network is developed, we will launch new iO₂ tokens to exchange all iO₂ tokens based on ERC20 protocol from the marketplace. After iO₂ public chain is developed, all iO₂ ERC20 tokens will be exchanged with the new token in 1 to 1 manner.

User Onboarding: KYC Wallet and Universal Decentralized ID

Getting Started with iO₂ Token- before users can begin using the IL-X platform, they must first go through a

basic KYC process as prescribed by current crypto KYC practices (i.e. Impak Coin Wallet) which forms the basis of a transparent trust economy to thrive, and to de-risk future regulatory requirements as the cryptocurrency market is rapidly evolving.

KYC Wallet - Onboarding an iO₂ Token user will require fundamental proof of identification standards for users that seek to use the system for participating in crowdfunding, but will also maintain needed anonymity

ID4D - Identification for development as a research project by World Bank to develop identification or decentralized identification system for end-beneficiaries in developing regions. In all projects, we will develop strategies to create beneficiary database and incentivize to create decentralized ID for all end-beneficiaries.

Anonymity - user information will not be made public, but users will have the option to disclose their information to other users as needed per requirements and specificities of each smart contract.

User Types - users of the IL-X platform can self-identify as different users types, of which are not mutually exclusive, but each will require a unique set of proof accordingly to user type. The differentiation or specification of user types is designed for the impact investment and social capital ecosystem to better understand how to relate and work with different users on the network. Through the utility of the iO₂ Token ecosystem, different users will be able to communicate to one another to help further identify and refine the call for needs and solutions.

The following types will be developed for the wallets:

Grantor - this is the user to contribute tokens (BTC/ETH or other) or fiat for social development programs. Other user types are also by default grantors since anyone on the platform with a wallet can contribute tokens to any project.

Author - this class of user has identified that they are the creators and owners of the smart contract offering as a means for structuring crowdsourced deals that require impact metrics. Examples of authors can be founders seeking crowdfunding for their projects, or can be seeking to amass tokens to contribute towards specific types of projects or smart contracts. After a smart contract is created with the designated amount of contribution of cryptocurrency or fiat, this class of user also receives a commensurate amount of iO₂ tokens to operate the iO₂ impact data services.

System Contributor - Beneficiary is an open source community, where users can also contribute and test code, develop and execute methods for validating impacts, or create and maintain impact metrics protocols and API's thereof. System contributors may be recipients of iO₂ token rewards for their contributions to the smart contract creation.

Beneficiary Pol Wallet - at the heart of the Impact Oxygen Foundation project is to overcome the digital divide in developing regions, promoting data literacy empowerment to beneficiary communities towards crypto-economic inclusivity. We will be developing methods where target communities can participate in the social capital ecosystem, starting with a form of universal Decentralized Identification (DID) which both protects sensitive personal information (SPI) or Personally Identifiable Information (PII) under the guidance globally accepted information security and privacy laws. Beneficiary wallet for iO₂ is part of the Pol (proof of impact) staking scheme, a tool to mine iO₂ tokens through contributing data from mobile devices. We will opensource the *impact atmosphere* public chain network, provide SDKs for Pol wallets development, to adapt to different contexts.

SIX / iO₂ Token Economics Premises

Token Value Generation

The total SDGs required sustainable development funding for the next 15 years is US\$67Tr (Total obtainable market), with an accumulated funding gap of US\$22.9249Tn (Total accessible market) from 2018 to 2028. In our token economics model, we can serve around 0.95% this market in 10 years (around US\$218.5Bn), and set 4% of this fund is allocated to impact measurement. Therefore the total amount of tokens we needed to generate equals to the value of that, i.e. US\$8.74Bn (total serviceable market).

In year 10, according to our economic model assumption about market coverage (0.95%), token value will be US\$0.076. In our bottom-up calculation of token price in year 10, it will be US\$0.0695. The two models match each other.

	Top-down estimation of token value in year 10	Reality Check from Token Economics Model
Accumulated SDG funding gap over next 10 years (US\$Tr)	22.9249	
Serviceable market %	0.95%	--
Serviceable market (US\$bn)	218.5	218.5
Obtainable market (impact measurement cost required (%))	4%	--
Impact oracle required token cap (US\$bn)	8.74	--
Total amount of iO2 tokens	114,166,666,667	114,166,666,667
Estimated market value iO2 in 10 years (US\$)	0.0765	0.0695

Table 3. Top-down calculations of economic value addressed by iO2 token economics

A few notes about the above-mentioned model,

- 0.1% more serviceable market rate will increase token value by around US\$0.01. Therefore, the bigger the size of the market we are serving, the token value will grow more.
- 0.5% grow of the impact measurement cost, due to incentivization program, marketing awareness, and ESG government regulation will increase token value by US\$0.01.
- The total size of data, which is decentralized and represented by the amount of oracle stakeholders on the ground, is associated with the total value of the impact measurement cost for the serviceable

market. Any new application of the decentralized intelligence agent network will incentivize secondary market development, as well as value of the token.

- Using discount rate of 10% per year, the value of iO_2 in year 1 should be US\$0.0285.

Key Premises of Tokens Economics

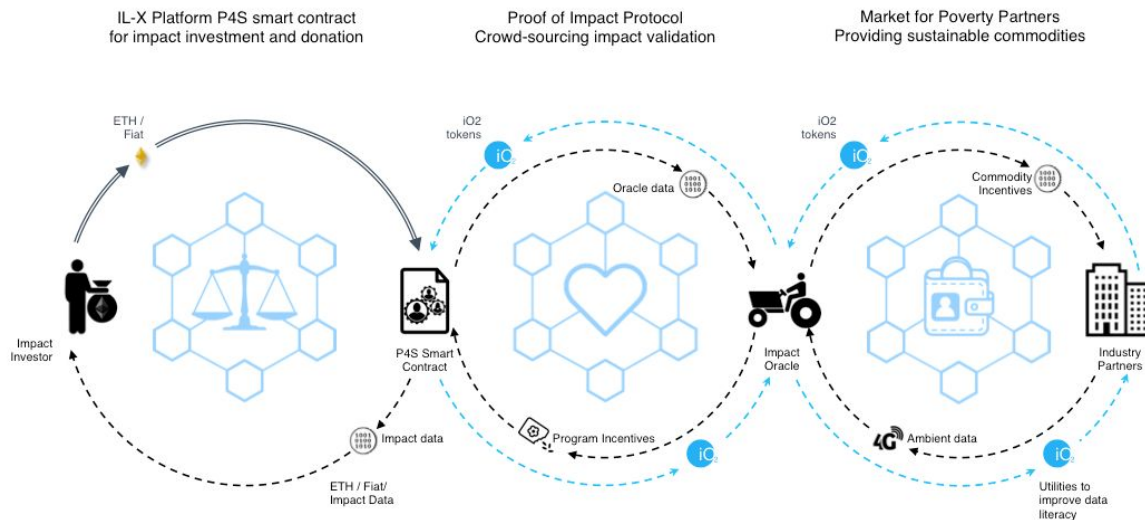


Figure 9. Token economics cycles for value exchange

Total number of iO_2 tokens. We prepare to launch 114,166,667 iO_2 tokens and this number will not change. Detail token distribution, please see latter session.

Gaining iO_2 tokens. All iO_2 tokens can only be gained on IL-X platform (primary market) with a certain % of the transaction of impact investing, donation or any kind of capital outlay based on P4S smart contract protocol. The proportion of investment to be exchanged for iO_2 will decrease from 2% to 0.5% in 10 years. The primary market exchange rate will grow from US\$0.001, according to how much transaction the token economics is serving: due to the logic of decentralizing cost, the more the overall transaction, the less the mandatory exchange percentage, and the higher the price of exchange for iO_2 tokens.

The following table shows, in USD, iO_2 token economics serving the assumed market, how the metrics manipulating the exchange percentage and official price of iO_2 tokens. All exchanged iO_2 tokens will be sent to social development SPO. For example, one organization received 1 million USD donation or investment. It is actually receiving US\$980,000 in fiat or cryptocurrency, and US\$20,000 in iO_2 tokens. All iO_2 tokens are for impact measurement, data validation and so on. Comparing to traditional model, the organization will receive fully 1 million USD, but still need to pay around US\$100,000 to third party to conduct the measurement.

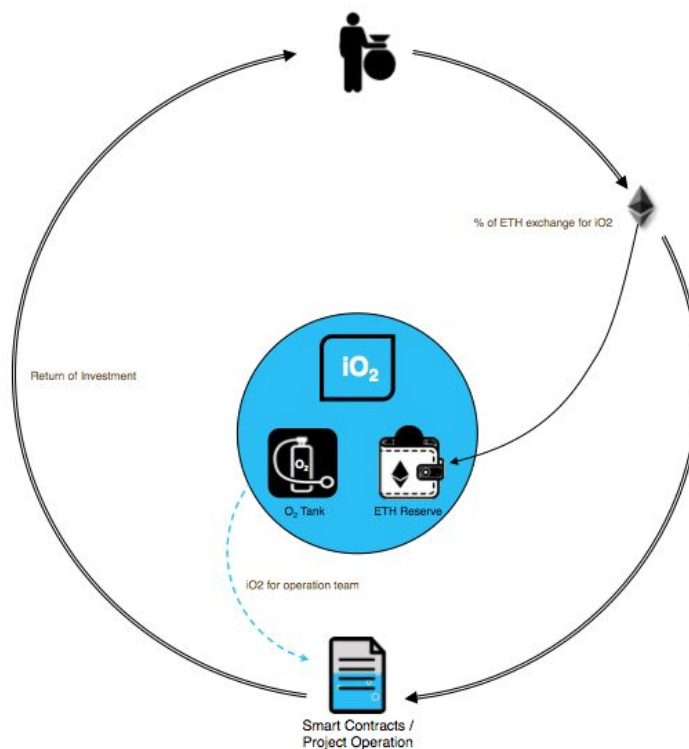


Figure 10. Gaining tokens through impact investing on P4S smart contracts

Years after launched of the platform	Annual Transaction In Mn US\$	% of Fund to be exchanged for iO ₂ (End of each year)	Exchange rate of iO ₂ with US\$ (End of each year)
1	115	1.798%	0.0027
2	1,094	1.559%	0.0094
3	3,088	1.353%	0.0127
4	4,947	1.173%	0.0162
5	7,924	1.018%	0.0207
6	12,692	0.883%	0.0263
7	20,330	0.766%	0.0336
8	32,565	0.664%	0.0428
9	52,164	0.576%	0.0545
10	83,556	0.500%	0.0695

Table 4. iO₂ exchange rate and iO₂ price from the Foundation based on the assumed growth of serving capital market size.

Oxygen Tank

Oxygen tank is 25% of the total token distribution, launched at the beginning of the project, and will distribute to the community through IL-X platform, when transaction happens. The total amount of iO₂ tokens of 28,541,667 will be created at the beginning to place in the Oxygen Tank, and no new iO₂ tokens will be made after that. In our current token economics model, this amount of iO₂ tokens will be decreasing until all tokens are exchanged for projects. We are expecting in 7 years, all tokens from the Oxygen Tank will be used up if there is not buy-back by the Foundation. We will discuss details about buy-back to refill Oxygen Tank in the next section.

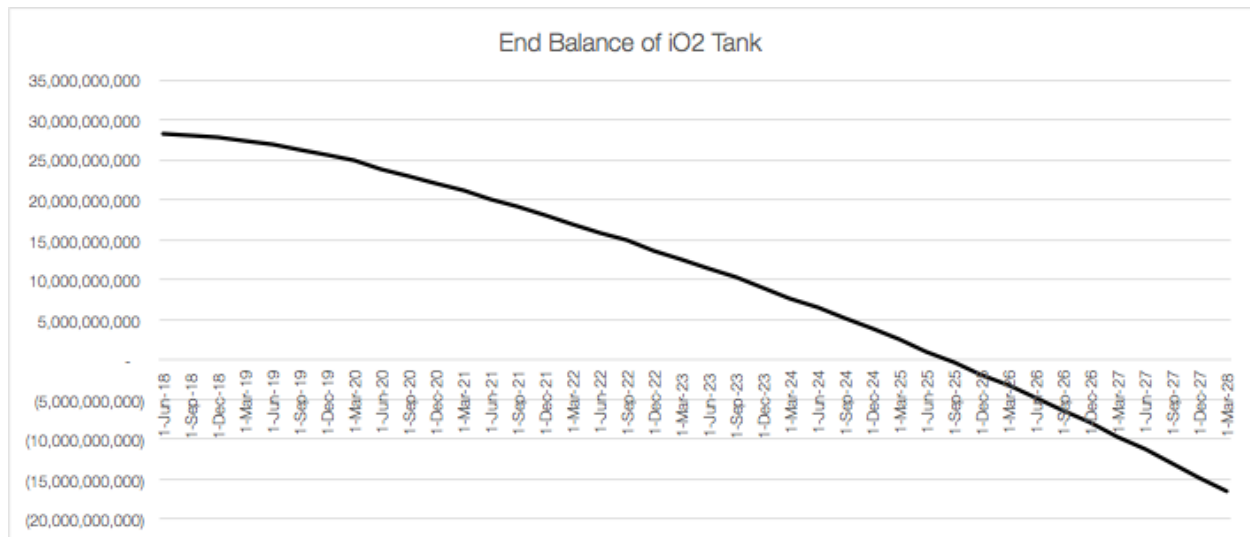


Figure 11. iO2 tokens paid from Oxygen Tank

Computation utility fee in ETH. This mechanism is designed to incentivize sustainable business and impact generation projects. This fee is to sustain, maintain and upgrade IL-X platform. It is equivalent to tax paying to maintain and build infrastructures in cities. The fee will be based on two factors. First is the cost of computation energy consumption, according to the complexity of the smart contract coding. Second is the multiplier to the basic cost. So the computation utility fee formula is as follows,

$$\text{Cost of computation} * \text{Incentivization Coefficient (Y multiplier)}$$

For the incentive coefficient, according to the type of project ROI and SROI outcome, Y multiplier will be different for different projects. This dynamic Y multiplier is to incentivize users to generate both social impact and sustainable financial return, to subsidize non-profit organizations and to disincentivize users to exploit the token economics to only generate positive financial return without social impact or generating negative impact. So the four Y multipliers will be as follows,

- Positive return on investment, Positive social return on investment (+ve, +ve): Y=2
- Negative return on investment, Positive social return on investment (-ve, +ve): Y=0.5
- Positive return on investment, Negative social return on investment (+ve, -ve): Y=5
- Negative return on investment, Negative social return on investment (-ve, -ve): Y=1

The model is designed to always cover basic cost of computation utility. All extra computation utility ETH tokens collected will be reserved. Details about the the incentivization/disincentivization mechanism will be explained in a separate document on demand.

Proof of Impact for Staking of iO₂ for Beneficiaries

In iO₂ token economics, beneficiaries are able to use DApps and Beneficiary Oracle Wallet to collect data from the ground. Proof of impact is the process of beneficiaries to actively logging on the DApps or Beneficiary Oracle Wallet, which activate all the sensors of the mobile devices collecting data, to gain iO₂ tokens from social development SPOs. The purpose of staking on iO₂ tokens is for one to maintain himself into the iO₂ ecosystem. Particularly for the sake of beneficiaries, they are able to access services and products with iO₂ Foundations M4P (Market for Poverty) partners.

Regarding to the management issue of Pol wallets, we recognize the capacity of local beneficiaries to manage their wallet is very limited. Therefore the wallet basic functions are automated. For example, when one villager uploading data, he is earning a certain amount of iO₂ tokens. A part of the tokens he is earning, it is directly paid to telecom companies for the internet fee. When capacity of local beneficiaries got improved, they are able to manage more functions in the wallet, in order to trade more complex items in the P2P way.

Sharing and Exchanging iO₂ Tokens Among End-beneficiaries and SPOs

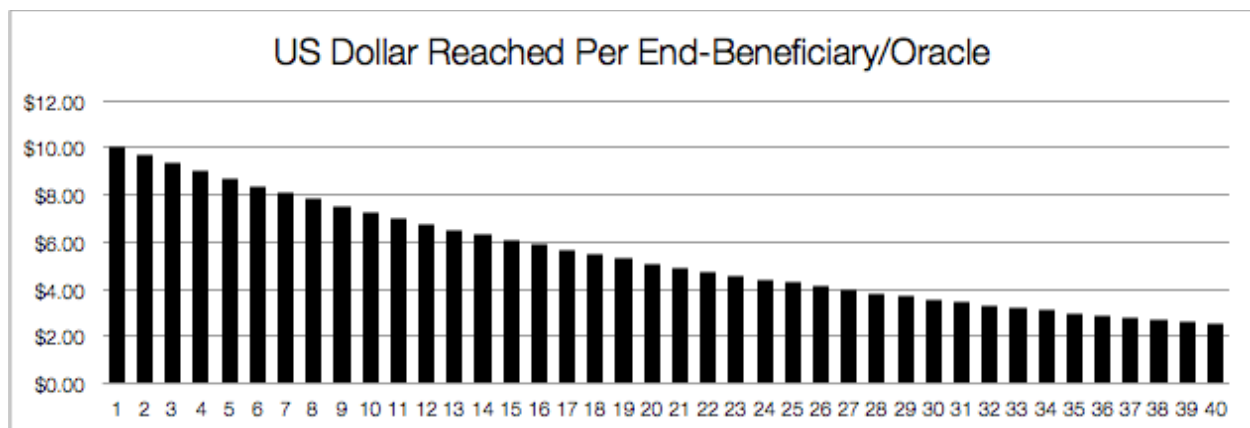


Figure 12. iO₂ token per end-beneficiary across years

The above chart shows how much US dollars can be reached per end-beneficiaries, if all end-beneficiaries are staking on iO₂ tokens through mining tokens with their DApps and Oracle Wallet. In this extreme case, there will be no token left in other stakeholders in the ecosystem, including social development SPO, impact investors or donor, and other stakeholders interested in getting data from developing region. In order to earn the tokens back from beneficiaries, so that they are able to continue to contribute data, other stakeholders need to provide more services and products to exchange the tokens back. We can see the trend that the staking of token for end-beneficiaries is decreasing due to more beneficiaries is getting on board.

Another implication of the model is the frequency of exchange. Let's still use the extreme situation in the chart that all tokens are staked by end-beneficiaries. In quarter 1, each beneficiary is able to stake on US\$10 in iO₂ tokens in one quarter. Let's assume iO₂ tokens are able to pay for internet plan, US\$10 per month. The frequency of transaction between the beneficiary and other stakeholders will be 3 times per quarter, for example 3 training sessions per quarter, or services worth US\$30. At the end of year 10, the same beneficiary is able to stake on US\$2.5 in iO₂ tokens in one quarter. Assuming there are 12 training sessions, end-beneficiaries can also receive services worth US\$30.

The abovementioned calculation is the minimum times of transaction, because the assumption is biased to

an extreme case of beneficiary winning all the tokens. However, in the reality, stakeholders will game the stake of the tokens for a more sustainable ecosystem. Beneficiaries may only stake only less than 50% of tokens in the whole ecosystem. Therefore, the frequency of exchange will be a lot faster than 3 times and 6 times per quarter. This mechanism incentivize staking through proof of impact and also incentivizing higher frequency of transaction across time when the beneficiary size is growing. The faster the frequency of exchange, the more data is generated in the ecosystem, thus more value is accumulated.

We are piloting and researching implications of proof of impact staking in Thailand and the Philippines with our partner Sraya Kultura, a social enterprise promoting cultural tourism, and also Myramner with MMCommunity, a neighborhood crowdfunding platform backed by Myramner Government for local infrastructure upgrade.

Use of Extra ETH/Fiat from The Reserve

All fiat or cryptocurrency collected through exchanging for iO₂ tokens through P4S smart contract and computation fee collected will be stored in reserve account. The reserve account is only for everyday operation of the whole platform. All extra gains will be reinvest to the development of the ecosystem. iO₂ Foundation is a charity organization, there will not be dividend.

The iO₂ Foundation jackpot mechanism of the reserve will release remaining profit to end-beneficiaries or M4P partners to exchange their iO₂ tokens to refill the O₂ Tank. This will slow down the decrease of the Oxygen Tank token amount, also act as rewarding system to all beneficiaries and M4P partners contributing to the ecosystem by staking on iO₂ tokens. This mechanism is also considering limited capacity in local communities, therefore the active buy-back will be a form of donation, incentivizing staking of the tokens by end-beneficiaries.

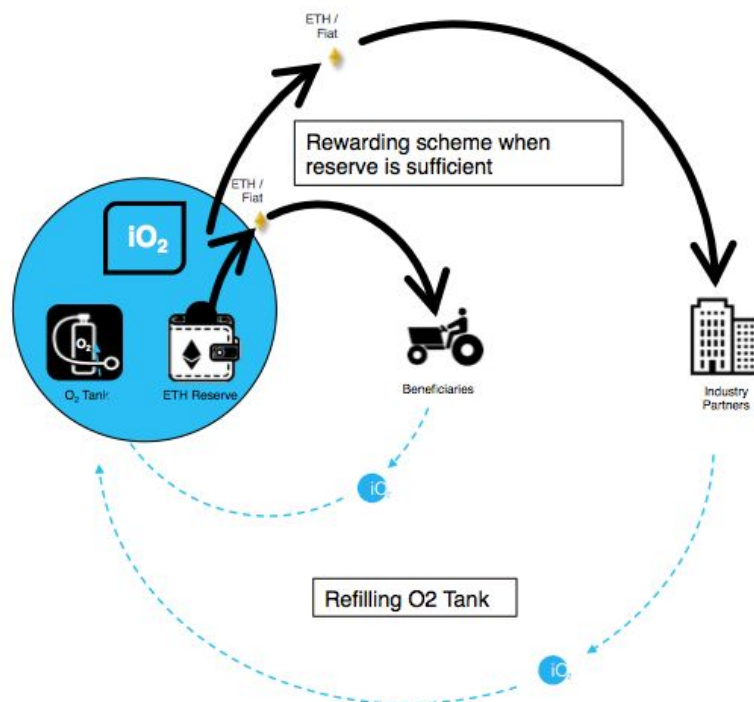


Figure 13. Rewarding mechanism to refill Oxygen tank

SEVEN. Terms and Disclaimers

Use of Proceed from Token Sale

We are launching initial private sale and public sale of tokens to fund the setting up of the infrastructure. After initial sale phases, iO₂ tokens is only able to be gained from the foundation's Oxygen Tank in exchange with a small % of capital deployment. Moreover, iO₂ tokens will be listed on major exchange platforms with US\$1 on the first day. Please consult the founding team for the bonus structure for private sale phases. We provide discounts for different phases of private sale to encourage early adopters of the project.

Token distribution

	# of Tokens	Distribution
Oxygen Tank	28,514,666,667	25%
Founders and team	22,833,333,333	20%
Crypto Economics Lab	5,708,333,333	5%
Advisor/partners	22,833,333,333	20%
Private and public sale	34,250,000,000	30%
Total Tokens	114,166,666,667	100%

Table 5. Token distribution

We aim to raise up to US\$25M (hard cap) or US\$8M (soft cap) from private and public sales. The use of proceeds for the fund raised in ETH is as following.

Use of Fund	
Setting up IL-X consensus metrics platform	10%
Research & Development, including iO ₂ public chain network (impact atmosphere), DApp & SDKs, oracle wallet & SDKs, and iO ₂ tokens	50%
Team Operation	10%
Marketing	10%
Professional fee	20%

Total	100%
-------	------

Table 6. Use of fund

Disclaimer

The purpose of this White Paper is to present the Impact Oxygen Token to potential token holders in connection with the proposed token sale. The information set forth below may not be exhaustive and does not imply any elements of a contractual relationship. Its sole purpose is to provide relevant and reasonable information to potential token holders in order for them to determine whether to undertake a thorough analysis of the company with the intent of acquiring Tokens in the token sale.

The token is purely an utility token for its functions described in this White Paper. Nothing in this White Paper shall be deemed to constitute a prospectus of any sort or a solicitation for investment, nor does it in any way pertain to an offering or a solicitation of an offer to buy any securities in any jurisdiction. This document is not composed in accordance with, and is not subject to, laws or regulations of any jurisdiction, which are designed to protect investors. The product token is not a digital currency, security, commodity, or any other kind of financial instrument and has not been registered under the Securities Act, the securities laws of any state of the United States or the securities laws of any other country, including the securities laws of any jurisdiction in which a potential token holder is a resident.

Impact Oxygen Token cannot be used for any purposes other than as provided in this White Paper, including but not limited to, any investment, speculative or other financial purposes. Impact Oxygen Token confers no other rights in any form, including but not limited to any ownership, distribution (including, but not limited to, profit), redemption, liquidation, property (including all forms of intellectual property), or other financial or legal rights, other than those specifically set forth below. Certain statements, estimates and financial information contained herein constitute forward-looking statements or information.

Such forward-looking statements or information involve known and unknown risks and uncertainties, 3 which may cause actual events or results to differ materially from the estimates or the results implied or expressed in such forward-looking statements.

This English language White Paper is the primary official source of information about the Beneficiary token. The information contained herein may from time to time be translated into other languages or used in the course of written or verbal communications with existing and prospective customers, partners etc. In the course of such translation or communication some of the information contained herein may be lost, corrupted, or misrepresented. The accuracy of such alternative communications cannot be guaranteed. In the event of any conflicts or inconsistencies between such translations and communications and this official English language White Paper, the provisions of this English language original document shall prevail.

EIGHT. Executive Team and Supports

Core Team



Chris Gee

Team lead and impact x blockchain advocate. 10 years experience directing community programs and conducting social development research. Columbia University, M.Arch with focus on informal economies



Dr Tat Lam

Chief impact strategist. 10 years experience in urban and rural development research and deployment. UCL PhD in urbanization and social anthropology.



Harris Lee

Full stack developer. Ripple BSA Analyst, Ripple, White paper development. Frontline datafication solution architect. Hack Reactor Instructor.



Howie Chan

Business development. 15 years experiences in auditing, financing, marketing in start-up to listed companies.



Peter Ko

Finance and economics. 10 years experience in banking, hedge fund, finance and investment.

Supported by: Nicos Kekchidis, Tim Lin, Lina Li, Brian Leung, Sandra Tai, Jessica Cheung, Zheng Ting, Jia Li, Xu Min, Doreena Deng, Ye Lei.

Advisors

Helmuth Aberer, ex-UBS director of Asset Management, currently angel investors and executive coach based in Hong Kong and Switzerland.

Vinci Chow, Professor at CUHK, PhD UC Berkeley, Behavioral economics and machines learning expert

Prabhakar Krishnamurthy, director of Yahoo! Labs in Silicon Valley, data scientist

Louise Lai, Executive Director of DVF, impact investment fund based in Shanghai and Singapore

Terence Lam, General partner, Zhizi Fund, Global and China leading crypto investors

Danil Nagy, Professor at Columbia University, Senior Researcher at AutoDesk, urban data and machine learning expert

Ricky Ng, Founder IHT, Global real estate blockchain platform, US\$35M ICO project in Hong Kong

Joe Reisinger, founder and ex-CTO of Premise Data, San Francisco, expert in developmental economics and machine learning

Mary E. Young, currently director of China Development Research Foundation, previously 22 years at the World Bank

Henry Yu, Chief Legal Advisor, L&Y Law Office

Piloting Partners

Community Onchain: (Brazil MSD) Decentralized ID Piloting with Ministry of Social Development in Brazil, deploying social welfare programs, scaling to 70M people in poverty.

Community Onchain: (Impact Hub Shanghai) Bring all members onchain, and using iO2 tokens to incentivize impact data contribution.

M4P Telecom Partnership: (Comba) Datafying poverty regions in China with mobile edge computing and IoT. (ETL) Datafying poverty regions in Laos with mobile edge computing, IoT and blockchain technologies.

Tokenization of market intelligence data: (IHT) Collecting data from developing regions for real estate development

Token economics and P4S Smart Contract: (Sraya Kultura) Cultural tourism at the Philippines and Thailand. (MMCommunity) Community scale social impact bond in Myanmar.

Smart Contract Protocol: IXO Foundation