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ALICE PROTOCOL FOR DECENTRALISED SOCIAL IMPACT BONDS

Solving the limitations of social impact bonds thanks to blockchain technology

I.   Social Impact Bonds are not living up to their promise

Social impact bonds (SIBs) are an innovative payment by results financial structure pioneered in the UK, and are increasingly used by governments around the world to deliver social projects. They bring together three types of actors:

- Donors, generally government entities, who pay for social outcomes.
- social organisations, who run projects to deliver those outcomes.
- impact investors, who provide loans to the social organisations, and underwrite the risk of projects failing in exchange for an interest payment in case of success.

In theory, SIBs are very promising, as they guarantee to donors that they will only pay for successful outcomes, while protecting social organisations from projects failing, and providing more security to impact investors, whose investments are backed by money pledged by the donor. They have been touted as a way to drive innovation in service delivery, while reducing costs and increasing measurable social impact.

In practice, however, the use of SIBs have proven controversial[1], due in large part to their complexity, exorbitant transaction costs, opacity and the lack of conclusive evidence that they help deliver social services more cheaply and effectively. This has limited the amount of impact investment deployed in SIBs to date, put smaller charities at a disadvantage, and made the use of SIBs difficult without substantial public subsidies[2]. Moreover, many well designed projects have failed to secure a government service to fund them, and the trend has been for SIBs to focus on already proven delivery models, hence putting into question their overall value as a tool for innovation.

Finally, it is important to note that SIBs are bonds in name only, as they cannot be traded due to their rigid legal structure.

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[1] *Stronger charities for a stronger society*, House of Lords, 2017
[2] Centre for Public Impact, *Social Impact Bonds An Overview of the Global Market*, 2017

II.   Fixing SIBs thanks to blockchain technology

Alice has developed a blockchain protocol built on Ethereum that aims to fix many of the shortfalls of the current SIB model. In particular:

- Eliminating the need for charities to rely on single donors (such as a government entities) by crowdfunding donations.
- Reducing legal costs by encoding their rules into smart contracts, which can easily be ported from project to project and adapted as necessary.
- Allowing SIBs to be traded on secondary markets by tokenising investments.
- Reducing due diligence, reporting and project design costs by ensuring that all impact data is publicly shared.

Alice has released its protocol in phases, and piloted outcome payments in 2017, in partnership with the Greater London Authority (GLA) and St Mungo's. This project was spun out of the London Rough Sleepers SIB, and was funded through conditional donations crowdsourced from the public, in fiat currency[3].

In 2018, Alice rolled out the technical infrastructure for impact investments, effectively creating a basic, fully functional, decentralised social impact bond platform on Ethereum. A live demo was performed at the Ethereum community conference in Paris in March 2018[4], and a real-world pilot is being planned for later this year.

III.   Technical description of the Alice social impact bond protocol

This is a step by step breakdown of how the Alice SIB protocol works:

- Step 1: the project's outcomes, their price and the investment interest rate are set in the project smart contract.
- Step 2a: donors give money to the project in fiat. Donations are tokenised through a stablecoin mechanism and held in escrow in a donation wallet.
- Step 2b: impact investors provide upfront seed capital (via stablecoin) to the project. They receive a tradable "coupon" token in return.

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[3] Fiat currency means "real world" money, in this case pounds sterling, not cryptocurrencies, allowing donors to give with their credit cards.
[4] See: https://www.youtube.com/watch?v=NDJ_kbIleHE

- Step 3: the service provider (charity) achieves an outcome, and provides proof of achievement to the project validator
- Step 4a: the validator verifies the claim
- Sep 4b: the validation triggers part of the donations held in escrow to be transferred from the donor wallets to the service provider's account.
- Step 4c: part of the donations held in escrow are transferred to the investment wallet and progressively "fill" each impact investors' coupon tokens.
- Step 5: the impact registry is updated, creating a fully auditable, real time report of the project's performance to date.
- Step 6: repeat steps 1-5 as necessary
- Step 7: once coupon tokens are fully "filled" impact investors can burn them, triggering a payment from the investment wallet to their account.

This diagram illustrates the flow of transactions in the Alice SIB protocol. Components of the diagram are given in the table below.
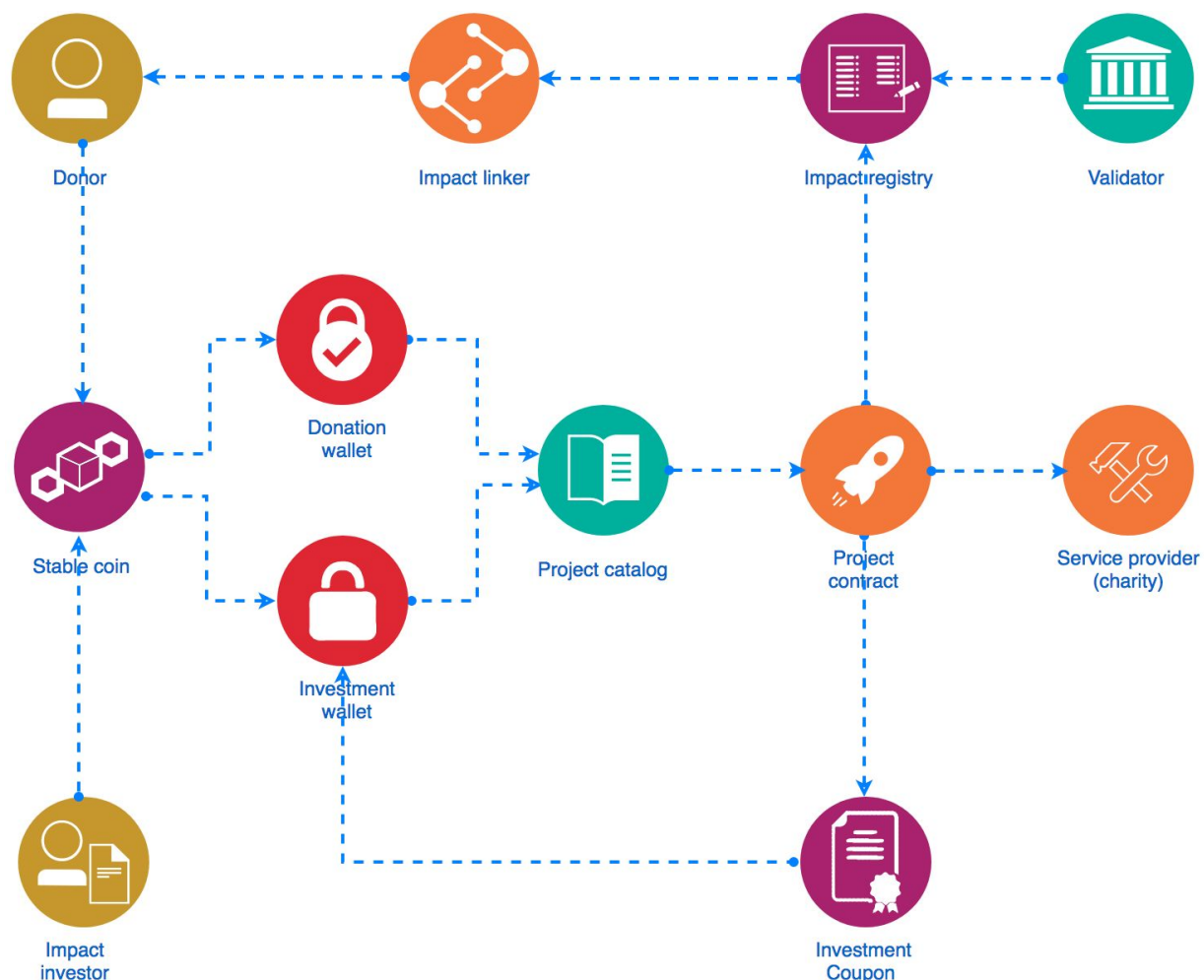
All of the components introduced in the previous diagram are classified and described in the following table.

ACTORS	
DONOR	An Ethereum account that represents a person or institution that donates money that is paid out to service providers (charities) for achieving social impact.
INVESTOR	An Ethereum account that represents an entity that provides working capital for social organisations so they can start working on a project.
VALIDATOR	An Ethereum account that represents a trusted, independent third party that can verify if a social outcome has been achieved.
BENEFICIARY	An Ethereum account that represents a service provider (charity) that collects donations to achieve social impact.
INTERACTIONS	
PROJECT	A smart contract that contains the logic of accepting donations and investments and transferring them to beneficiaries. It also handles the issuance and redeeming of the impact bond coupons.
PROJECT CATALOG	A registry of whitelisted project smart contracts that donors and investors can interact with.
IMPACT REGISTRY	A dedicated contract for storing all of the information about the social impact achieved in the given project.
IMPACT LINKER	A contract that implements the rules of matching donations to the impact achieved providing donors with detailed information how they money were spent.
DONATION WALLET	A secure wallet for storing stablecoins and transferring them to verified projects.
INVESTMENT WALLET	A secure wallet for storing stablecoins and coupons that allows transferring them to verified projects.
TOKENS	
STABLECOIN	A token that is pegged on-to-one to fiat currency in which the donation/investment was made.
COUPON TOKEN	An token that is issued to the impact investor with the guarantee of payments with interests when outcomes are achieved.