“Investigating the extent to which Blockchain-based smart contracts can support the operation of decentralised groups.”

Introduction

Blockchain technology has gained widespread attention for its ability to create tokenized cryptocurrency economies and revolutionise the financial world through the application of distributed ledger technologies. Programmable code on the blockchain, known as smart contracts, are being used to develop and deploy an ever growing set of distributed applications. Although infamously used in the creation of the Ethereum network (DuPont, 2017), an aspect of smart contract capability which has been largely overlooked recently is the ability to codify the rules and regulations of an organisation in a so-called Decentralised Autonomous Organisation.

“The most complex form of a smart contract is a decentralized autonomous organization (DAO), governing a group of people who share the same interests and goals. DAOs run according to a set of token governance rules written in code of the application layer, obviating the need for human management involvement. These token governance rules, of the blockchain layer and the application layer alike, have the potential to disrupt governance as we know it.” (Shermin, 2017).

This project aims to study organisations and groups which operate in a decentralised manner, and to try to understand whether the rules and processes by which they operate could be coded into smart contracts and deployed on a blockchain. Through case-study and implementation of smart contracts, we will provide recommendations on the feasibility and best practice for using blockchain-based DAO’s to govern organisations.

Literature Review

The literature review has two themes, firstly reviewing research on group and decentralised team behavior in the domains where our proposed solution could be deployed. This will help us to understand how such groups operate.

This would cover material on organizational structure, including Holacracies (Robertson, 2007) and Teal Organisations (Laloux, 2014), as well as case studies on groups which operate in a decentralised way in order that we can start to distill some of the processes which we may encode in the DAO contracts. This would include emergent groups and citizen teams which form both locally and remotely during disaster or emergency situations (Twigg, 2017) (Takazawa, 2014), and groups which have formed to work together in fields including open source software (Crowston, 2007), Wikipedia curation (Arazy, 2016), and the sharing economies (Hamari, 2016).

The second theme for study is the latest state of work in the DAO sector of the blockchain space (Aste, 2017) (Shermin, 2017), including studies of companies or organisations, if any, who are operating as DAOs or using blockchain contracts to govern or aid the management of their businesses.

Research Question

The project goal is to understand the potential for applications written on a public blockchain implementation to support emergent teams - especially where “best practice” can be captured, encoded and enacted by smart contracts in the form of Decentralised Organisations and Decentralised Autonomous Organisations (DAO).

Methodology

The project will identify a compelling case study of an emergent group or decentralised team scenario from the literature or real-life, and will then attempt to:

Understand the types of rules and policies that exist in such groups, and the chosen group in particular.

Understand the background and current state of DAO’s in Blockchain literature and development.

Determine whether a DAO implementation can provide a framework for groups to operate (based on the chosen case study/studies)

- Where does it work well?
- Where does it fail?

Identify whether there could be “off the shelf” DAO’s that can “bootstrap” groups quickly and provide best practice? (For operation, decision-making, rewards, etc. - distribution of funds.)

Develop the smart contracts for a “case study” DAO to explore issues, and test hypothesis, considering how to make the resultant applications readily deployable and accessible.

Outcomes

The project outcomes will be:

To identify core rules and policies or behaviours which exist or emerge in decentralised groups.

To convert these rules and policies to smart contracts and deploy them in a blockchain-based application.

To evaluate the effectiveness of the DAO application in modelling the behavior of the decentralised organisation.

To make recommendations on the suitability of DAO structures to support decentralised organisations or teams.

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