

Thesis Project Portfolio

Decentralized Time Clocking System

(Technical Report)

Issues Impacting Bitcoin and Blockchain Technologies

(STS Research Paper)

An Undergraduate Thesis

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Table of Contents

Executive Summary

Decentralized Time Clocking System

STS Research Paper Title

Prospectus

Executive Summary

Cryptocurrency and Blockchain enjoyed a meteoric rise to prominence, but recently, the technology has become a controversial topic. The technology has its supporters and its detractors, and the future of the technology is uncertain. My research aims to gain a better understanding of these technologies and their role in our society. My technical research report proposes a decentralized time clock system. It serves as an exploration for an implementation of a decentralized blockchain-based system and an investigation into the potential of the technology. My STS research paper is an overview of Blockchain technology and Bitcoin using the Social Construction of Technology framework. It provides an analysis of involved social groups and problems with the technology that need to be understood in order to evaluate the future of the technology. Both papers explore the technology in an attempt to gain a multi-faceted view of the technology's pros and cons.

By describing a possible implementation for a decentralized blockchain-based time-clock system, my technical report provides a concrete use-case for decentralized technologies. Decentralized software systems are underexplored, and there is potential for innovation in many spaces. This paper helps demonstrate the potential use of the technology. If decentralized systems are deemed to be useful and necessary, it would justify the existence of the blockchain systems on which they live. Decentralized systems have massive potential to revolutionize many widespread sectors such as commerce, finance, shipping and more. My report provides a small contribution towards the collective knowledge pool of decentralized system use cases. The development of this system would also serve to gain knowledge on potential challenges in implementation of such a system. While it could be theoretically sound, there could be human or other factors that make it impractical.

My research question is whether blockchain technologies have a future or whether their problems are too great to overcome. As stated earlier, the technology has great potential to make great changes to our world. There are interesting new blockchain-based technologies like “Web-3,” which promises a radical transformation of our internet. However, it is important to take an informed and honest look into what exactly the technology is and reckon with its issues instead of blindly buying into the hype. In my analysis, I utilized the Social Construction of Technology (SCOT) framework. I choose this framework because it provides an avenue of analysis from the perspective of relevant social groups and their issues with the technology. Additionally it allows for discussion of possible solutions to these problems, and the subsequent evolution of the technology.

My report reviews evidence related to the many social groups involved with the technology. Outlines issues that impact these social groups, such as electricity usage and carbon emissions, volatility of cryptocurrency, regulatory issues. Additionally, evidence relating to possible solutions to these problems are presented and discussed. The paper concludes with the optimistic opinion that many of blockchain’s problems can be solved. Cryptocurrency can exist alongside fiat currency, and serve to enable and participate in decentralized systems.