



UNIVERSITY TRANSPORTATION CENTER

RESEARCH BRIEF

Blockchain-based Smart Contracts for Transportation Infrastructure Project Funding

Joseph Louis, PhD



Background

A significant portion of the transportation infrastructure in the United States is in poor condition – up to 173,000 miles and 45,000 bridges – which cause a variety of mobility-related traffic concerns for the traveling public. Much of the major transportation infrastructure

projects that are funded in response to the above problem using federal monies will typically be executed through public-private partnerships (PPPs) wherein a consortium of private contractors in partnership with relevant public agencies form a special-purpose project company.

While PPP has been touted as an effective means of sharing project risk across public and private entities for capital transportation projects, critics have noted that it suffers from certain disadvantages including the following: (1) Complicated project procurement, (2) Potential for significant cost and time overruns, and (3) Lack of accounting for uncertain events. These disadvantages specifically relate to the financial methods for funding and recovering cost from transportation infrastructure projects – causing huge delays and cost overruns during project execution. This project investigates the use of an alternative and decentralized method for infrastructure project funding to increase its transparency and efficacy.



Research Project

The goal of this research is to investigate the use of decentralized financing methods enabled by blockchain technology to provide efficient and effective financial control for capital transportation infrastructure projects. Specifically, this project will result in the creation of a prototype framework for the issuance of a 'transportation infrastructure token' cryptocurrency that is issued by project owners (typically government agencies) for specific capital transportation assets. This cryptocurrency is expected to provide a transparent and efficient means of funding and recovering cost from transportation infrastructure projects using smart contracts for toll collection from the traveling public and issuing dividends to owners. The resulting prototype can serve as a template for its use across multiple capital projects. It will also allow non-traditional methods of financing such projects by making investment available to a wider and more diverse range of investors and enabling crowd-funding – thereby also increasing the equity of transportation funding mechanisms. The following tasks will be undertaken in this research: (1) Literature Review of blockchain technology and PPP infrastructure funding; (2) Creation of PPP smart-contract on Ethereum blockchain; (3) Validation of PPP smart-contract by transportation experts.

ABOUT THE AUTHORS

The research team consisted of Joseph Louis of Oregon State University.

ABOUT THE FUNDERS

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EXPECTED DATE OF COMPLETION

March 2023

FOR MORE INFORMATION

<https://depts.washington.edu/pactrans/research/projects/blockchain-based-smart-contracts-for-transportation-infrastructure-project-funding/>