

Thesis Portfolio

Human-Powered Vehicle

(Technical Report)

The Rise of the Digital Labor Market

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

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In Fulfillment of the Requirements for the Degree

Bachelor of Science in Engineering

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Table of Contents

Sociotechnical Synthesis

Technical Report: Human-Powered Vehicle

STS Research Paper: The Rise of the Digital Labor Market

Prospectus

Sociotechnical Synthesis

With the expanse of the internet at our fingertips, products and services have been globalized. My STS research tackles an analysis of the this rise in globalization with a focus on labor. One circumstance of this shift is the development of the digital labor market, a place where labor is bought and sold in an online marketplace available to people all over the world. Ride-sharing services like Uber are just one of many examples that utilize a digital interface in which labor can be bought easily over the web. As society continues to rethink efficient means of travel, I believe ride-sharing services will rely more heavily on eco-friendly options of delivery. The final product of my technical project is an example of just that. My capstone team and I built a three-wheeled, human-powered vehicle (HPV) that optimizes multiple aspects of design to offer riders a safe and simple means of travelling. In this context, the focus of the human powered vehicle project is to provide an easy, economical, and sustainable alternative to using cars for those interested in pursuing a role in the ride-sharing economy.

Through my STS research, I discovered the dark side of the digital labor market. The digital labor market has a lot of seemingly obvious benefits: remote access to employment, ability to choose one's wage, flexibility of hours, etc. However, many of these benefits in practice either 1) appear to be false or 2) come with unseen caveats. My analysis spans the practice of those participating in ride-sharing companies like Uber and Lyft as well as those using digital labor marketplaces for freelancing such as Fiverr, Upwork, and Freelancer.com.

The goal of the our capstone project was to design, build, and test our own human powered vehicle, to compete in the 2020 ASME Human-Powered Vehicle Challenge, a regional competition between colleges creating similar vehicles. The team was established by 12 mechanical engineering undergraduate students with various engineering skills and experiences.

Our design aimed to use these principles to provide comfort, efficiency, and safety towards the manufacturing of a competitive HPV. Overall, our team hopes that this will provide practical knowledge and experience that will translate to real design challenges in the engineering industry.

In conclusion, I'm very pleased with what I achieved throughout both of these projects. Although my capstone team and I were not able to compete in the regional HPVC competition due to COVID-19, we were still able to design and assemble roughly 95% of our vehicle before our build process was cut short. As it relates to my STS research, I gained an immense amount of insight on the digital labor market and create a thesis which I am excited to share with others.

I want to thank my friends, family, and peers for supporting me throughout the completion of these projects. Most importantly, I'd like to acknowledge Professor Natasha Smith for her guidance on the HPVC capstone project and Professor Sean Ferguson for his assistance as I undertook the STS research process.