Thesis Project Portfolio

Network Provisioning Encryption: Securing Digital Money

(Technical Report)

Controversies of a Cashless Society

(STS Research Paper)

An Undergraduate Thesis

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

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

Mobile payment options are becoming more widely available at businesses and more widely adapted by consumers each year. The use of physical cash has decreased dramatically as consumers tend to favor the convenience of paying digitally. Eventually people might stop using physical money altogether and, as a result, central banks might stop printing paper money and minting coins. Although we are still in the early stages, those who are responsible for creating these mobile payment options need to consider the societal impacts that might arise from widespread adaption. The following technical and STS theses discuss the development of improving already existing mobile payment options in order to increase consumer adaption and what societal impacts might arise as a result of total consumer adaption, respectively.

The technical thesis discusses the development of an Application Programming Interface that would theoretically improve how cards are added to a mobile wallet. The goal for the technical project was to successfully deploy an API that could encrypt payment card information in a manner defined by both mobile wallets as well as card networks while making the codebase easier to maintain for future improvements. The end goal of the technical project was to ultimately increase consumer adaption of mobile wallets. The team was able to complete a few but not all of the API endpoints.

The STS thesis discusses what societal impacts total adaptation of digital, including mobile, payment options could have through the beliefs and imaginaries held by different actors. The goal for the STS research was to understand what different sociotechnical imaginaries consumers, businesses, and governments had regarding a potential futuristic society in which there is no physical money, known as a cashless society. Through analysis of legal cases, statistics, and prior scholarships, it was apparent that there are many positive and negative

imaginaries held by all three actors that could usher in or prevent a society from no longer using physical money.

Both the technical and STS were valuable in that they increased my understanding of the technology I could be working on in the future as well as the potential dramatic impacts it could have on our lives in the future. Although I feel that I accomplished a lot, there's still a lot of work to be done on both the technical and STS portion of my work. For the technical work, the remaining API endpoints need to be configured, tested, and deployed. Regarding the STS thesis, it is still not apparent whether or not some of the negative imaginaries I discussed can be resolved and thus whether a cashless society is even possible. There may be solutions that I haven't been able to uncover or ones that no one has though of yet.