

Thesis Project Portfolio

Big Bank Technology: My Experience Interning at a Big Bank

(Technical Report)

How Can We Best Navigate an Automated Future?

Assessing the Effectiveness of Geels' Multi-Level Perspective for Analyzing Socio-Technical Transitions to Automation

(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

Sam Harless

Fall, 2023

Department of Computer Science

Table of Contents

Sociotechnical Synthesis

Big Bank Technology: My Experience Interning at a Big Bank

How Can We Best Navigate an Automated Future? Assessing the Effectiveness of Geels' Multi-Level Perspective for Analyzing Socio-Technical Transitions to Automation

Prospectus

Sociotechnical Synthesis

(Executive Summary)

Living in the 4th Industrial Revolution

My projects intertwine the practical implementation of automation in a corporate setting with a broader STS exploration of automation's societal implications. At Wells Fargo, I developed a tool to automate server maintenance tasks, reflecting the efficiency and user autonomy technology can offer. Meanwhile, my STS research attempts to help further research into automation's broader societal effects, such as impacts on employment and social norms. This combination demonstrates the relevance of STS perspectives in assessing the ethical dimensions of engineering practices.

In my technical project, my work at Wells Fargo involved creating a tool to automate server maintenance tasks, a process that was previously manual and time-consuming. By leveraging technologies like C#, .NET, and Angular, I created a function to send API requests to Autosys, then created a web page to access this function. This solution significantly reduced the operational time for server maintenance from minutes to a mere button push. This project didn't just enhance internal efficiency; it exemplified the transformative power of automation in professional environments, underscoring the importance of user-friendly, self-service technologies.

In my STS research project, I analyzed the effectiveness of Geels' Multi-Level Perspective (MLP) for analyzing future potential socio-technical transitions to automation. Automation technologies have already made wide societal impacts; in the future it has the

potential to impact human labor, urban/rural migration, and education conventions. I used MLP to analyze current socio-technical transitions to AI scriptwriting and autonomous vehicles. From this, I concluded that MLP was only effective for future potential socio-technical transitions to automation if the researcher had an accurate understanding of future landscape-level pressures.

Before I had taken STS, I had never really thought about the purpose of technology. I had a 'capitalistic' view of technology; where I thought of technology as something that businesses engineer to make money, and to make money they needed to solve a pain point so that people would buy their technology. Now that I am taking my 4th STS class, I have a greater understanding of how the organizational and cultural elements combine with the technical aspects of technology. Readings like *Engineering as A Social Experiment* by Martin have helped me think more about what the purpose of technology should be, and although I have not arrived at a perfect answer, I think that if I keep the idea in mind, it will contribute to keeping my ethics strong in my engineering. Ultimately, my journey through both the practical implementation of automation at Wells Fargo and the in-depth STS research on its societal implications reinforces the critical importance of a balanced sociotechnical perspective in engineering, guiding me towards a future where ethical responsibility and thoughtful technology development go hand in hand.