Thesis Project Portfolio

FSAE Data Acquisition Corner Board Final Project Report

(Technical Report)

Integrated Circuitry's Integration In Automotive Manufacturing and the Impact on Employment

(STS Research Paper)

An Undergraduate Thesis

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

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Jack Hebert

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Department of Electrical and Computer Engineering

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Sociotechnical Synthesis

The automotive industry is one of the most omnipresent industries in the entire country. These technical marvels have undergone over a century's worth of innovations, yet one stands above all else. The introduction of the integrated circuit into the automobile industry revolutionized what could be possible within the limited power and confined space of cars. Digital components can do things that would've been unimaginable with the limited and finicky potential of analog circuitry. However, while adding integrated circuits and other digital devices to vehicles has clear monetary and function value, it comes at the cost of the employment of everyday workers in the United States. The US automotive industry, which was once booming, has been left a hollow shell of its former self as all of the unskilled labor positions have been exported to overseas countries with more lax labor laws, leaving all of the remaining jobs in the industry requiring higher education in circuit design and programming. Utilizing Bruno Latour's framework of Actor Network Theory found in the 1992 paper "Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts", one can begin to piece together how these different groups impact and are impacted by the technology. Introducing integrated circuitry has widespread effects throughout automotive manufacturing. The actors that have the least agency in influencing these results are undoubtedly the laborers, who are at the mercy of their employers. To further research this, I have combined three different avenues. First, I utilized the US Bureau of Labor Statistics database, focusing on the automotive industry's stats to create a timeline of employment trends. Next, I created another timeline for the adoption of integrated circuitry, which was then combined in order to determine the possible correlation between these two datasets. This was generated from two books, being Understanding Automotive Electronics: An Engineering Perspective and the Handbook of Automotive Power Electronics and Motor Drives. In order to bring this closer to my Capstone project, I've also looked into the creation

and updating of CAN, utilizing the CAN in Automation group's technical documentation that chronicles the various versions of CAN. All of these different timelines can be viewed as different actors in the ANT, showing how they interacted with each other over time. From this analysis, trends of employment's stagnation and decline coinciding with implementation of new technologies emerged. This brings to light an often overlooked aspect of technological innovation. While forward progress can allow for technological capabilities that were previously impossible, it often comes at the expense of those whose jobs are replaced by the new tech.