Prospectus

Theory of Technological Politics & the Effect of Automation on Less Privileged Populations

(STS Topic)

By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Socio-Technical Problem

In 2015, the Port of Virginia made a $217 Million deal with Konecranes, a Finnish crane company specializing in port-side crane infrastructure, to acquire 86 semi-automated cranes for the Virginia International Gateway (VIG) fleet in the Hampton Roads area. The port of Virginia has moved about 2.2 million TEU containers (unit of cargo capacity, in either 40 or 20 foot-units) and are projected to exceed the coveted three million TEU threshold, which rivals the volume processed in Los Angeles's fully automated port (Joseph, 2016). As trends favor automation and consequently lead to a loss of blue-collar jobs, we look to gain helpful insight about constructing a crane manufacturing facility on site to supply cranes to both the Port of Virginia and other interested ports. In addition to a Virginia-owned crane manufacturing facility, we must look forward to the inevitable job loss due to the heightened technicality of the automated industry to gain further understanding of employment factors. I look at a specific case held in Eastern Canada by the ILWU (International Longshoremen & Warehousing Union) on the differences in employment at conventional, semi-automated, or fully autonomous ports (Agnone & Kelly 2008). JOC, a leading port news authority, reports that ports, such as the Long Beach Container Terminal (LBCT), are investing in automated quay cranes have had minimal job loss. This is due to training programs provided by the ports. In fact, the unemployment rate has decreased from 2010 to date (Fred, 2019). The employment rate in both the manufacturing and construction sector of the Hampton Roads area increased over the past few months while shipping and transportation unemployment continues to drop. This understanding of information will either decrease or maintain the current unemployment rate in the Hampton Roads area and overall benefit the Virginian economy.

In this proposal I am looking to garner further understanding of automation's effect on jobs, and subsequently a perspective inclusive of the science, technology, and societal (STS) nature of the issue at hand. To combat the social impact of automation specifically within port services, we delve into efficient salary-cost structures and job opportunities within the VPA (Virginia Port Authority). Not only will this greater understanding assist in maintaining unemployment levels but also combat the widening wealth gap in America. In our efforts to help the Port of Virginia optimize operations, lower cost, and investigate possible ventures while combating unemployment, we also look to avoid similar backlash LBCT endured from the ILWU and political activists after their announcement to transition to full automation.

An understanding that is both financially viable and incorporates social and ethical constraints while implementing Langdon Winner's Theory of Technological Politics is crucial in consultation and further learning with the VPA. This opportunity for understanding will increase job opportunities, offer the first American crane manufacturer, and consider the political nature and consequences of automation. While likely a considerable up-front cost, the long-term benefits would provide a long-term solution for their 2065 plan, and profoundly continue benefit the surrounding community.

Technical Problem

There are no American-owned crane manufacturing facilities. As mentioned before, there are many foreign companies supplying American ports with cranes—both automated and conventional. The VPA and their main competitor, Georgia Port Authority, purchase cranes from a Finnish company, Konecranes, while Long Beach purchases from ZPMC in Shanghai, China;

both primarily manufacture their respective cranes in China. As President Trump is working with the heightened tariffs on Chinese imports, this offers an opportunity for Americans to enter an entirely new business. Our Capstone team is working closely with the Port of Virginia, and we are still in developmental talks with them. Although we do not yet have an exact solution, we have been advised to investigate this opportunity to implement cranes into one of VPA's seven terminals: five in Hampton Roads, one in Richmond with a barge connection to Hampton Roads, and one inland in Northern Virginia. We propose the VPA lease owned land and internally run the proposed manufacturing plant. This could be located in either land surrounding the Portsmouth Marine Terminal (PMT) or the Richmond Inland Terminal (RMT) which offers larger land areas near the barge and cheaper real estate.

Bringing a traditionally foreign business into America seems to be a lucrative venture. Implementing automated Virginian cranes into the port of Virginia's arsenal will assist the ports unemployment rate and subsequently improve Virginia GDP and trade. This is fortified in the tests of the effects of automation in ports. JOC reports in conjunction with McKinsey & Co. that "operating expenses [for automated cranes] will be over 25% lower than those of a conventional terminal." They conversely report fully automated cranes can only move about 70% compared to a semi-automated in an eight-hour shift; however, fully automated cranes work 24 hours a day rather than the usual 16-hour workdays performed by semi-automated processes. Thus, fully automated cranes improve efficiency and GDP will follow (Knowler, 2018). Also, the crippling cost of a typical ship-to-shore or gantry crane will be slashed because of American manufacturing, and emission reduction and sustainable constraints can be enforced at the American standard.

Consequently, my goal is to be aware of the social and environmental consequences while constructing a crane manufacturing plant under the VPA's jurisdiction. This could generate a trend in American based crane construction companies and avoid heightened tariffs on crane imports from countries of interest. As value of eco-friendly manufacturing and mechanical work increases, automated cranes will become electrically powered and thus slash emissions created by the port due to a switch from diesel to electric cranes. We look to gain insight from a study held in Canada by the ILWU that analyzes the effect of automation on port employment, environment, and cost efficiency (Mongelluzzo, 2019). More so, electrification of equipment creates a more efficient, reliable, and safe port, and environmental impact improvements will assist in decreasing emissions from the sector that deals with 85% of all world cargo (Iris & Lam, 2019). By looking at our technical approach, the Port of Virginia will eloquently introduce a crane manufacturer into the VPA's control while also starting to investigate crane manufacturing training program held within port operations. Nonetheless these two changes will give each other opportunities to emphasize inflections in employment, offer courses to educate tenured employees, and relocate employees that could be better suited working in crane manufacturing as an active solution to inevitable job displacement. In what follows I assess the ILWU case in Canada to understand the natural favor of the educated and privileged in the autonomous industry.

STS Problem

In a swift and effective manner, automation harnessed the attention of the world, and through this companies and operations across the globe are striving to implement it to cut costs

and improve efficiency—we see this blatantly in fast-food restaurants like McDonalds® and Taco Bell®. While automation is extremely valued in optimizing tasks to perform at a rate much higher than human-controlled devices, the actual work automated machinery does offer more than expedited work and improvements—it replaces. The automated industry cannot overlook to impending social and political implications derived from automation. Automation naturally favors the educated, and thus marginalizes those who are unable to keep up with current methodology in automation. While granting power to the persons able to troubleshoot and understand the processes behind the autonomous machines, automation's foremost intention is to replace "less-efficient" human employees. This replacement cuts costs for companies drastically, and with the promise of improved efficiency, to the companies there seems to be little downside. On the other hand, the people formerly employed are now at a disadvantage due to their technical work stripped from them with no compensation. By only understanding automation as improving efficiency and operations while disregarding the social impacts there will be social backlash from unions and people themselves. Drawing on Langdon Winner's Theory of Technological Politics we gather further understanding that automation does more than a technical work of improving operations and in fact displaces and disadvantages peoples whom the automated device is intended to replace.

Conclusion

This proposal considers more than a technological solution—adding a crane manufacturing site in Virginia—but also understands and evaluates the crucial societal repercussions due to the offset of longshoremen jobs. This deficit will be narrowed by the opportunities at the proposed crane manufacturing plant. Deriving the secondary option in hopes

to mitigate unfairly firing thousands of people in turn offer them additional job opportunities or possible learning courses for new machinery would positively affect the public and people surrounded by the VPA and longshoremen associations. This novel addition to the VPA's assets would boost economy growth in Virginia and furthermore increase high-paying job opportunities in the Hampton Roads area. The crane facility will draw attention from job-loss at the nearby ports looking for more technically educated candidates but also provide a second job option secured by the VPA. In addition, we will analyze the possible impacts of automation in the future at the port of Virginia and utilize the concepts from Langdon Winner's Theory of Technological Politics to better perform this analysis.

Without this additional research into the societal impacts of an automated industry we may overlook and marginalize less-educated populations due to the increase demand for formal understanding of automated machinery. The critical use of Winner's theory, the entire scope of this venture is possible to be refreshed and aware of the ramifications from such a drastic change in the industry. By proactively creating many more jobs in the place of current positions, we strive to continue to adequately support the members of the ILA and Virginian people and more so the success of the Ports of Virginia without displacing the people of Virginia.

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