

The Effect of Public Transportation Policy on Low-Income and Minority Communities

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Anisha Sharma

University of Virginia

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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.

Signed: Anisha Sharma Date _____

Approved: _____ Date _____

Richard Jacques, Associate Professor, Department of Engineering and Society

Approved: _____ Date _____

Christopher Goyne, Associate Professor, Department of Aerospace Engineering

Introduction

There are over 57,000 miles of roadways that need to be maintained by the state of Virginia and the Virginia Department of Transportation. These roadways are crucial to transportation efficiency and the daily lives of the public. This University of Virginia spacecraft design capstone project will develop solutions to address Virginia's transportation problems using data fusion and remote sensing methods.

In August 2020, key stakeholders from MITRE, University of Virginia, Virginia Tech, Old Dominion University, George Mason University, Virginia Transportation Research Council, Virginia Space Grant Consortium, Federal Highway Administration, and National Academy of Sciences met in the University Innovation Exchange (UIX)-MITRE Space Initiative Transportation Efficiency Workshop. Their discussion and deliberation identified three key areas to improve transportation efficiency and safety in Virginia: (1) Real time weather data to improve roadway safety, (2) Remote-sensing-enhanced non-destructive evaluation of roadway infrastructure, and (3) Management and tracking of truck parking (Kordella, 2020, Slide 5). University of Virginia students taking the spacecraft design course were divided into three sub teams corresponding to the problems outlined above.

This semester, it was determined that given the large scope of these three problems, the entire capstone team would focus on the first key area: alleviating weather-related traffic congestion and improving roadway efficiency and safety in Virginia by sending predicted weather and traffic data to roadway users through a combination of the state-of-the-art that includes spacecraft, aircraft, and ground-based systems. The solution decided upon was a spacecraft CubeSat that was integrated with data collection systems on the ground.

There has always been a connection between the decaying roadway and public transportation infrastructure in America and the growth of economic and social inequality. The cities and their transportation systems are highly automobile centric with roads created to maximize car speed and capacity. Buildings surrounded by large parking lots, and highways and freeways allowing long distances between work, home, and shopping have become the norm. This system has contributed to staggering economic growth. Furthermore, the lack of focus on public transportation and building infrastructure to support has produced disastrous environmental and social impacts (Fleisher, Cohen, et al., 2020). This research seeks to understand the larger economic and social implications of transportation policy on low-income and underserved communities and examine the feasibility and effectiveness of proposed solutions to these issues.

The Current Environment of Public Transportation

Decisions about transportation policy and the funds directed towards it are rarely made with consideration toward low-income communities. Additionally, the spending programs disproportionately benefit higher income neighborhoods, leaving other communities to fend for themselves. Unfortunately, the communities that are disproportionately affected has resulted in historic neighborhoods being divided by freeways, communities disrupted, and those who rely on public transit isolated from essential services. This unequal handling and allocation of resources has been termed as “transportation apartheid”.

The struggle to end transportation inequality along class and racial lines has been part of American history for years. During the civil rights movements in the 1950s, key transportation mechanisms were segregated, and communities of color were forced to use lesser quality options. For example, the Montgomery Bus Boycott was a civil rights protest centered on segregated bus seating in Alabama in 1955. Under segregation, front seats were reserved for white people at all

times and bus drivers frequently stiffed or abandoned black passengers. The boycott, sparked by Rosa Parks refusing to give up her seat to a white passenger on a bus, led to a supreme court decision that segregated buses were unconstitutional.

Despite some of the legal wins of the Civil Rights movement and other activist efforts, transportation apartheid has persisted in society to this day and the unequal allocation of resources related to policies has continued. According to Quamie (2011), working families in large metropolitan areas spend about 57% of their daily income on housing and transportation with almost half of that solely going to transportation due to ever increasing fares and rates and decreasing of efficiency and quality. Car ownership in the United States is also highly varied depending on socioeconomic status and race. 63% of households in the lowest real income quintile do not have access to a car. That number drops to less than 10% for higher income classes. Also, only 5% of white households are carless while 20% of black households, 15% of Native Hawaiian/Pacific Islander households, and 14% of Hispanic households are carless (Quamie, 2011). In addition, Yeganen (2018) found that access to jobs using public transportation instead of a personal automobile is statistically higher for low-income and non-White populations (Yeganeh, Hall, Pearce, & Hankey, 2018). Households without access to a car are forced to use public transportation to reach their work, homes, and retail stores. Consequently, the funding and maintenance of public transportation directly affects the ability of low-income people to survive and thrive in their community. Public transit has been routinely neglected by policy makers causing public transit to fall into disrepair costing large amounts of money to fix and causing rate and fare increases. This cycle is self-perpetuating and forces low-income households to spend larger portions of their income to access essential services. Beyond the decline in public transportation services and increased cost of public transit fares, the dependence on cars has resulted in more

accidents, and an increase noise pollution, negative environmental impacts that includes soil and water pollution, increased landscape costs, and energy dependency (Maibach, Schreyer, & Sutter, 2008).

It is critically important to examine other barriers affecting low-income individuals. Policing and high levels of crime in low-income neighborhoods makes people reluctant to travel in them, especially at night. Businesses in these neighborhoods have higher insurance costs and break-ins with very little support from law enforcement. All these challenges lead to the closure of neighborhood businesses and deter new businesses from investing in the area. The gaps in key retails and service stores force residents to travel farther distances outside their neighborhood to purchase necessities. This situation is substantiated by the fact that low-income families spend nearly 40% of their net income on transport (Clifton, & Lucas, 2004). The increasing costs of public transportation and the lack of public transportation to many areas presents a special challenge to them. The only alternative is walking unreasonably long distances, disturbing work and travel patterns while inhibiting job searches.

Transit systems themselves are plagued with many problems beyond the unequal handling on resources and funding. They lack efficient communication systems between the operators and users, making users wary of ineffective and tardy routes. Subways and metros in major cities are notorious for being slow and unreliable for example, a barrier for people that have tight schedules or are unwilling to wait on the train. The labor needed for these systems is also incredibly high cost and inefficiently used so services like buses are also infrequent and unreliable. Many cities are not built for public transportation either with a lack of bus lanes or train spaces, providing an additional challenge.

Potential Solutions

An effective solution involves a multifaceted approach working towards tackling the root of the problem. Creating people centered streets and walkable areas will phase out car-centric places and make trips by walking or public transit easier. Focusing on creating better well-lit sidewalks and crosswalks will make it safer for workers and community members traveling at night or in less crowded areas. Compact neighborhoods where people live close to where they work, shop and play will cut down on transport times and cost and foster a sense of community. This will all enable working families to avoid the high costs associated with owning a car and taking advantage of other modes of public transportation.

“On demand” transportation services that includes e-bikes, ride shares, and shuttles need to be used to fill the gaps when public transit is not available or provide an alternative to metros, subways, etc. (Fleisher, Cohen, et al., 2020). Studies have shown that those who move to neighborhoods where public transportation is more available and locations are walkable are more likely to be carless by choice and opt for other modes of getting around (Klein, & Smart, 2019), that supports the need for a transition to the system described. Providing redundancy in transit options using methods such as e-bikes and shuttles also allows the system to continue functioning effectively during crises. A prime example of this is the coronavirus pandemic. When the pandemic first hit the United States, many public transportation options were shut down or reduced the system’s routes. The public transit routes that remained open were run by essential workers that had to risk their own safety by being in close quarters with strangers and were unable to social distance well. Having redundant public transport systems allows low income working families without access to cars, alternate ways to travel without risking overcrowded options. These services can be publicly and privately deployed and offer improved mobility at lower costs for

communities that have been marginalized and disproportionately burdened by existing transportation policies.

Additionally, the ways roads themselves are run needs to be changed. Road capacity needs to be developed to accommodate needs in congested areas of major towns and cities and traffic management measures like the reorganization of traffic flows and directions should be instituted to further deal with the issue. Beyond these changes, both regions and neighborhoods need to be tied together with high quality public transit that is fast, frequent, and reliable. Government policies need to be passed to support such a system. Current government structures and labor agreements that are not designed to manage this kind of shift in transportation must be addressed. The current system is already under strain due to its inadequacy in many areas and governments are focused on simply maintaining this failing system instead of being quick to adapt and looking at new alternatives. However, to solve a widespread problem like this, steps need to be taken beyond just maintaining the status quo. There must be a shift in thinking from focusing on individual modes of transportation like automobiles and towards an integrated and robust public transportation system.

Current governmental structures and regulations are inherently rigid and slow to adapt to attempts to expand transport and mobility. Many of the solutions proposed would end up being the responsibility of both the public and private sector and it is an additional challenge to ensure that private companies are properly motivated by a return on their investments. Private companies are highly competitive, especially in an industry such as this one, and are focusing more on market share than on solving these deep-seated social issues. Furthermore, many of our alternate transportation avenues have not been proven to be sustainable long-term and nationally. For example, ride-shares have had many issues. Safety issues have been numerous with Uber and Lyft

drivers assaulting and abusing passengers. In 2017 and 2018, there were almost 6,000 reports of sexual abuse by Uber drivers alone, sparking widespread concern as to the safety of using services like these especially for unaccompanied and young passengers. In addition, deadheading (the miles driven with no passengers in the car) creates even more carbon emissions. A recent study found that the average ride-sharing trip creates almost 70% emissions than the trips it replaces (“Ride-Hailing is a Problem for the Climate”, n.d.), calling into question whether these services are causing more harm than good and what steps need to be taken to solve these issues.

All these challenges mean that changing the infrastructure will not happen without collaboration and creative solutions from the government, the private sector, and the general public. As difficult as these changes will be, the current method is with no doubt unsustainable for many American people. These solutions will allow us to fight the transportation inequality that plagues marginalized and low-income communities and begin to solve the larger issues connected to it like access to high quality healthcare, lack of access to high paying jobs and good schools, and rising carbon emissions.

Conclusion

Transportation policy has been plagued by social inequity and unequal distribution of resources and funding and minority communities have been suffering as a result. Transit systems in America are also in general built poorly and do not scale to accommodate the need of the communities they are built to serve. An effective solution focuses not only on remedying the immediate effects of this inequality but also tackling the root of the problem by focusing on building infrastructure and ensuring that all communities are equally treated. Moving away from the car-centric model of transportation and instead coming up with creative systems that work for the user will go a long way towards solving this problem of transportation apartheid and ensuring

everyone, no matter their income level or location, has access to high quality, safe, and efficient transit.

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