An Evaluation of Regional Transit in America, as Seen on the Northeast Corridor

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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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STS Research Paper

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In the 1995 Nationwide Personal Transportation Survey, almost 80% of U.S. households reported having as many cars as persons with a driver's license (Giuliano, 2006). For decades, the United States has been a country built on the automobile. A 2013 study of commuter tendencies showed that more than three-quarters of commuters drove to work alone, while an additional 10% carpooled (Stromberg, 2015). This should come as no surprise; access to a vehicle is associated with incredible personal freedom, the ability to access jobs away from one's housing, and a sense of independence from lackluster public transit.

With such a bias toward automobiles, it may come as a surprise to learn that the Northeast Corridor (NEC) of the US, or the transit network that spans the distance between and around Washington DC, Philadelphia, New York City, and Boston, is the busiest rail artery in the country. This paper explores the current modes of regional transit in the NEC, and evaluates the effect to which they contribute to accessibility and efficiency for their users. Furthermore, emerging and future trends in the transportation sector will be contextualized in an effort to identify which stakeholders will benefit from future development.

Presently, the NEC serves as an excellent model for an evaluation of the interactions of different stakeholder groups, as well the modes of transportation on which they rely. While the corridor encompasses a massive geographic area, its central arteries of highway I-95 and Amtrak's electrified tracks run through a dense megapolis, and as such the population of the corridor is consistent in their need for reliable, efficient transportation. Additionally, the role of Amtrak in this area is unique in that it is a federally funded operation, and as such involves the government as a key stakeholder. In its analysis, this paper will examine the current values of key users and decision makers, especially with regard to policy and financial support of various

ventures. Currently, longstanding trends in user preference as well as influence from transportation companies have created a scenario in which planners have had to sacrifice efficiency and sustainability in favor of immediate solutions that are more economically feasible. With the assumption that all parties would prefer a network of regional transit that is more efficient and accessible, this thesis seeks to analyze the existing state of the transportation in the NEC, how users interact with it, and how future developments can better serve the population.

Literature Review

The State of US Passenger Rail

For the first time in its history, the United States' passenger rail service, Amtrak, could turn a profit. After seeing a record 32.5 million passengers in 2019, the longstanding federally subsidized railroad appears to be on a path towards success, and a large part of that has to do with its most popular routes. These services, all of which run on the Northeast Corridor between Washington DC, New York, and Boston, have been Amtrak's highest, and often only, earners in recent years, and their success comes at a pivotal moment for transit in America (Lazo, 2020).

In the congested NEC, air traffic accounts for just 5% of Washington to Boston trips (CBO, 2003). When comparing the trip from New York to DC, the statistics are even more staggering; 75% of public transport travelers go by train (Nixon, 2012). It's clear that rail has the potential to continue its current trend of success, but when compared to lines of Europe and Asia, it still appears the US is far behind. Despite record investments in infrastructure, Amtrak's growth strategy of focusing on adding short haul trips that compete with car rides and flights is a far cry from the blazing fast high-speed trains in countries such as Germany, Japan and China.

There are those that still believe in the future of American high-speed rail. Brightline, an intercity passenger rail startup, is the first private company to move customers between cities by rail in almost a century (Leonard, 2020). Despite being unprofitable, the company currently runs trains between Miami and West Palm Beach Florida, with future plans to expand to Orlando and Tampa. What sets Brightline apart from Amtrak, according to company President Patrick Goddard, is their focus on comfort and climate benefits (Leonard 2020). And Goddard may be onto something, as "flight shaming" has become more prevalent in countries such as Germany, leading to increased ridership. Regardless, in order to sell American public on rail, it will take more than defeating airlines.

Amtrak's fastest route, the Acela Express from Boston to Washington, takes roughly 2 hours and 35 minutes on its non-stop leg from DC to NYC (Kaji, 2019). However, the vast majority of riders utilize the Northeast Regional Service, which is far slower at 3 hours and 45 minutes. Regardless of which service is taken, Amtrak holds an advantage over driving in terms of duration. What kills this advantage, however, is delays. According to Tolulope Ogunbekun and Joseph Sussman at MIT's Department of Civil and Environmental Engineering:

> "[In 2014,] Amtrak had a record high of 11.6 million passengers on the Acela and Regional services combined. However, only 3.9 million passengers arrived at their destination at the scheduled arrival time; that is, 7.4 million passengers experienced delays for a myriad of reasons," (Ogunbekun & Sussman, 2015).

If Amtrak is to reign supreme in the Northeast Corridor, it will have to improve its reliability. This is especially a problem with government funded transit, as blogger Alon Levy notes: "In 1912, Boston had this great public transit system, with four subway lines and streetcars that fed it, and then they spent the next 60 or 70 years destroying it." A major problem that occurred in

this time was municipalities treating transit as welfare (Stromberg, 2015). While this seemed to address the key value of accessibility, it quickly was undermined by a lack of reliability. When politicians see the transit industry as a form of welfare, it prevents local agencies from charging high enough fares to provide efficient service, effectively limiting transit to those who are too poor to drive (Stromberg, 2015). While Amtrak certainly provides affordable transportation, its competition from automobiles is unlikely to disappear anytime soon. In fact, it may only be starting.

Driving on the Northeast Corridor

The number of jobs within a typical commute distance for people living in high-poverty urban areas declined by nearly 15% between 2000 and 2012 (Stromberg, 2015). This is not a new trend in the United States, as for decades urban sprawl has routinely left behind inner-city poor residents, and their transportation infrastructure is largely to blame. For decades the urban transit systems of cities have been caught in a vicious cycle, as agencies meant to cater to poorer residents are underfunded, causing reduced service and therefore less reliability. Cars, as always, have been keys for reliable personal transportation, and lately have become more affordable for poorer residents.

Interstate 95, which serves as the backbone of the NEC, sees roughly 72,000 motorway trips daily, with peak days of 300,000 (Romano, 2019). In a 2019 study of the elasticity passenger transport demand in the NEC, it was determined that "road transport does not have clear substitutes," but also that "The growth rate in the demand for transportation is exceeding the ability of the highway system to expand at a rate to handle the growth," (Romano, 2019). What this equates to is a general need for highways and the ability to drive, but the inability of the current system to address the needs of its users. Driving is as accessible as ever before, due in

part to safer, cheaper to operate, and longer lasting cars. In future developments, planners should explore how best to improve the network of highways so that it has efficiency to mirror its accessibility.

Future Technology

When mentioning future city transportation, it is impossible to ignore the impact of mixed model programs. Currently, scooter and bike sharing programs are taking many American cities by storm, and serve as an inexpensive and accessible alternative to traditional transportation options.

However, intercity travel is an entirely different affair. As fewer and fewer people buy cars, the need for reliable transit is paramount. For many, ride-sharing services like Uber could be an answer to poor public transit. Uber can especially help alleviate the risks of relying on fixed-schedule transit. “Predictability is crucial for poor people," says Robert Hotchkiss, a low-income San Diego transit user, "I would often walk rather than wait on a bus that might or might not come," (Stromberg, 2015). Uber has the ability to provide those unable to afford a car an option that is both reliable and accessible, but likely still unaffordable. Uber, and similar services like Lyft, then would serve as a complement to public transit rather than a substitute, with average Uber fares being $5 against the $1 average transit fare (Hall, Palsson, Price, 2018).

While novel, these approaches don’t yet satisfy the requirements for improved transportation infrastructure with regard to accessibility. It’s possible the United States will need sweeping changes to adequately address the needs of the public with regard to public transit, but should those changes occur the benefits will be significant.

Research has shown that ease of access to transport has a stronger influence on whether someone will earn more than their parents did than the level of crime in their area or whether they grew up in two-parent households (Criden, 2008). This is especially important in the NEC, a city with a diverse racial and socio-economic population. As mentioned before, the number of jobs within a close commute distance of inner-city residents is declining. As the cities of the NEC continue to expand both outward and upward, reliable transportation can help reduce economic inequalities by providing access to higher paying jobs outside of a citizen's primary residential area (Criden 2008). Additionally, residents with reliable transportation options will contribute to the regional economy, by saving money on transportation costs and instead spending it elsewhere.

Discussion

The SCOT Framework Illustrated

The SCOT framework, or Social Construction of Technology, is a popular framework when analyzing topics that affect varied groups of people. It pairs the stakeholders with their challenges, as well as solutions that may address the problems they face. With a problem as complex and multi-faceted as transportation, SCOT acts as a way to simplify the vast network of stories, needs, limitations, and potentials that exist for a city, and for a community. With regard to the US, and especially my project of assessing solutions for its citizens, this framework was well suited. Chief among the stakeholders were the citizens, but it quickly became apparent that this was too broad an umbrella to use. Below is a sample SCOT diagram for public transportation in Charlottesville, a city I know well and chose as an example. While not comprehensive, it illustrates well the approach that was taken for evaluation.

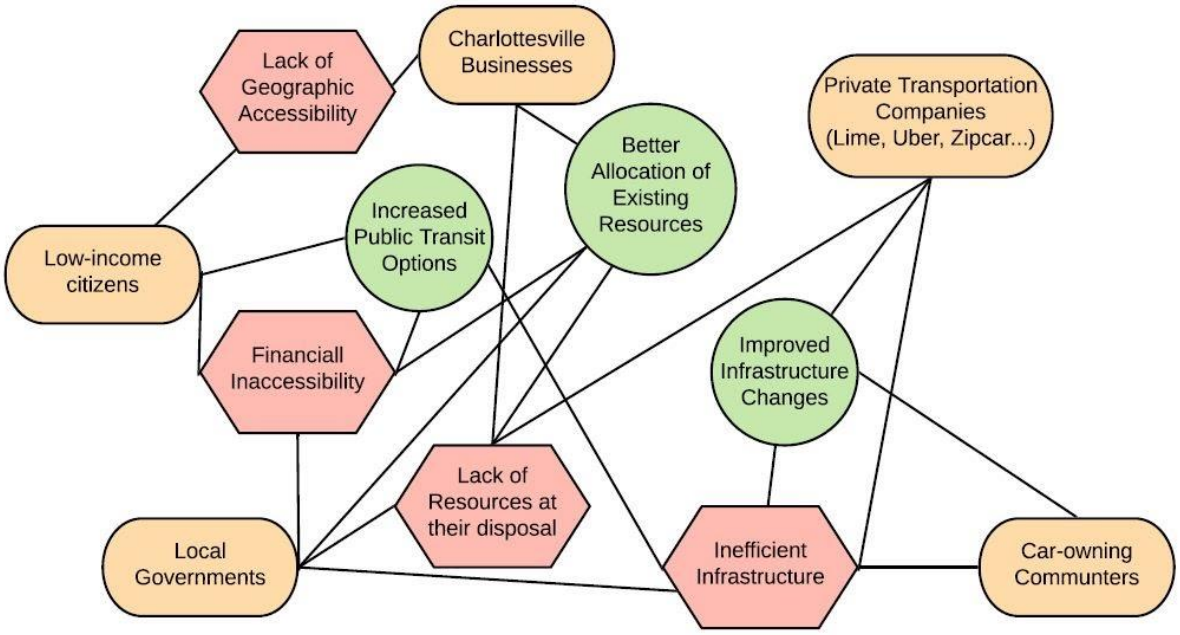

Diagram 1: Charlottesville SCOT

In orange are some of the stakeholders of Charlottesville. They include low-income citizens, car-owning commuters, local governments and others. Each bubble is connected to several others, with problems facing that stakeholder in red and possible solutions in green.

Charlottesville in particular was chosen because I understand the interactions of the community well, having lived here for over a decade. One of the tremendous benefits of a framework such as this is that it lays bare the shortcomings in current understanding. While elaborated on in the following sections, it was clear that the methodology of analysis, or how these groups, problems, and solutions are defined and redefined, needed further refinement. While it was known that both financial and geographic accessibility were challenges facing many citizens in Charlottesville, this framework made it clear that we lacked an understanding of the extent of these problems, and the desires of those who face these challenges. As such, this, or

any framework can be thought of as an equation. Each input must be considered, and only when all of the pieces are in place can the whole image be seen. In Charlottesville's case, more voices need to be heard before a solution can be deemed ideal for each stakeholder involved.

As mentioned, while the framework serves an equation representing a given place and its groups, a chosen methodology is a way of finding these inputs. This paper analyzes transportation through a lens of accessibility, noting past failures and successes as well as current practices. This research can also be applied to numerous US cities along the NEC through community outreach focusing on current infrastructure and its accessibility. This engagement, which can help create a bigger picture beyond the scope of local policymakers or citizens, will then help to characterize the actual state of transportation in the United States, and the extent to which future smart technologies can be implemented to benefit all stakeholders.

Previously, I had interviewed an anonymous Charlottesville resident regarding their perceptions of transportation accessibility, as well as smart city technologies. While this direct community engagement certainly helped characterize the situation, it was clear that other entities must be consulted as well. Consulting with municipal government leaders, city planning officials, engineers, and developers will allow for a better understanding of the community, as well as the processes that must take place in order to create meaningful change while working within the constraints of government.

Serving Stakeholders

Ultimately, the future developments of regional transportation on the NEC should serve the primary stakeholders. While all modes of transit discussed above seek to provide similar goals, each can be improved through an analysis of their users. Providing citizens of the region options in how they choose to travel is an essential component in making regional travel

accessible, but prioritizing efficiency and resiliency in the face of changing conditions should not be abandoned.

In planning, more initiative should be taken regarding the needs of the primary stakeholders. In the case of the highway system, if demand is outpacing the ability to expand current infrastructure, planners should seek help from those users for whom they are expanding. If the Northeast Corridor seeks to continue setting an example for regional transit in the United States, policy makers and planners should prioritize not just the solution that is the best in terms of timeline or budget, but that which is most effective at addressing the needs of millions of Americans who will rely on that solution each day.

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