Evaluating the Current State of the BOSWASH Transportation Corridor and Indicators of Resiliency

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ABSTRACT

Corridors of highly concentrated transportation networks are not a new phenomenon. A review of the history of the Northeast corridor reveals the role of rail lines and highways in the evolution of this corridor. The Northeast (also referred to as BOSWASH) corridor is a multimodal and multi-generational network connecting Boston, Massachusetts to Washington D.C. Focusing on highway, transit, and freight systems, the corridor faces several issues such as changing metropolitan/land use structure, congestion, safety, aging infrastructure, and competing demands of transporting travelers and freight while protecting the environment.

More specifically, as transportation network density increases within the corridor, planning professionals are faced with the challenge of effectively managing the regional transportation systems. The result is increased traffic congestion, environmental degradation, structural impairment, and social injustices due to limited mobility. In the past, management of complex transportation corridors has been piecemeal, relegated to limited and dispersed jurisdictions that are not always inclined to seek collaboration. As the challenges to managing the Northeast’s transportation infrastructure continue to grow; a new planning model is desperately needed. The basis of this new planning model is found in the 1961 work of French geographer Jean Gottmann where he termed the northeast mega-region as “Megalopolis,” which has been expanded upon by current-day geographers and planners.

The paper explores the challenges of the BOSWASH transportation corridor specifically in terms of infrastructure resiliency. Measuring the performance of the Northeast’s infrastructure through its ability to recover from or adjust to future changes can provide insight into how to effectively manage the complex corridor.
INTRODUCTION

Corridors of highly concentrated transportation networks are not a new phenomenon. As an overview of the history of the Northeast corridor reveals, transportation infrastructure, specifically rail lines and highways, have taken decades to develop, facing many challenges along the way. The Northeast (also referred to as BOSWASH) corridor is a multimodal and multi-generational network connecting Boston, Massachusetts to Washington D.C. This section introduces the research and provides background information including the motivation for this research, the problem statement, and the objectives.

Motivation

As the density of the Northeast corridor’s transportation networks (highway and rail systems) continues to increase, planning professionals find themselves at a loss for how to effectively manage the infrastructure systems. The result is increased traffic congestion, environmental degradation, structural impairment, and social injustices due to limited mobility. In the past, management of complex transportation corridors has been piecemeal, relegated to limited and dispersed jurisdictions that are not always inclined to collaborate.

When addressing future concerns of a corridor’s infrastructure, its resiliency, or “ability to recover from or adjust easily from change,” must be analyzed (1). Resiliency can be evaluated for both regional and local transportation networks through performance measures such as route redundancy, continuity, connectivity, travel time reliability, and irreversibility. Applying these measures to the Northeast corridor’s infrastructure can determine the ability of the regional system to adapt to internal or external changes and reduce land use, environmental, socio-economic, and structural impacts.

Problem Statement

As challenges in managing the Northeast’s transportation infrastructure continue to grow, a new planning model is desperately needed. The basis of this new planning model is found in the 1961 work of French geographer Jean Gottmann and is expanded upon by current-day geographers and planners (2). The paper explores the challenges of the BOSWASH transportation corridor specifically in terms of infrastructure resiliency. Measuring the performance of the Northeast’s infrastructure through its ability to recover from or adjust to future changes can provide insight into how to effectively manage the complex corridor.

Objectives

The objective of this research is to evaluate the resiliency of the BOSWASH corridor’s infrastructure, specifically the transportation networks. Investigating the evolution and development of the corridor provides insight into future growth and land use impacts in order to address challenges and improve management practices throughout the corridor. The objectives in analyzing the resiliency of the BOSWASH corridor’s infrastructure include:

- Determine historical impacts and challenges faced throughout the growth of the BOSWASH corridor
- Review existing models, theories, and projections behind mega-regions
• Define resiliency in a way that pertains to regional transportation infrastructure
• Discuss existing and future challenges faced by transportation practitioners in managing the corridor’s infrastructure
• Apply the concept of resiliency to the corridor by analyzing the relationship between route redundancy and population growth in the Northeast corridor
• Determine future steps towards improving the Northeast corridor’s regional infrastructure management practices

DEFINING THE CORRIDOR

The oldest transportation corridor in the United States, the BOSWASH, is a multimodal and multi-generational land transportation system. Focusing on highway, transit, and freight corridors, the transportation infrastructure faces several issues such as changing metropolitan and land use structure, congestion, safety, aging infrastructure, and competing demands of transporting individual travelers and freight while protecting the environment.

The corridor is defined as a structural region organized around an evolving multi-modal transportation system. Many definitions of “Megalopolis” tend to be static, defining the extent of urban/suburban development from the transportation spine. In contrast, the argument can be made that the transportation corridor is a linear area resulting from land accessibility from the transportation spine. Also, there is an increased ability for interaction between locations along the spine, compared to locations away from the spine. The transportation spine unifies the corridor. Thus, based on the time-distance relationship, places along the spine are closer together – shorter travel times – than places off the transportation spine. The history of the corridor is then the dynamics of its growth.

DEVELOPMENT OF THE CORRIDOR

Influence of the Rail System

Societal changes in mobility have evolved over time, resulting in significant transformations to the Northeast corridor’s infrastructure. Already by the 1830s, the corridor was highly industrialized and the development of a rail network throughout the region became possible (3). Individual states such as Massachusetts, Maryland, and Delaware had begun to construct their first rail lines which were initially pulled by horses (4), laying the foundation for a regional rail network. By the 1850s, the Massachusetts railroad system (the only state required to publicly report ridership) was well-established and reported ridership of 40 million passengers between 1838 and 1847 (5). When locally operated railroads consolidated with the regional system, the number of passengers grew to 200 million passengers between 1861 and 1870 in Massachusetts (5). As ridership increased, the rail network became one of the densest transportation systems in the nation (3).

With the goals of providing mobility to the public and maximizing profit, rail companies strategically placed rail lines from Boston to Washington D.C. in order to connect multiple centralized nuclei with sizable populations (6). The train stations were built in and around cities where the majority of people either lived or worked and typically provided service to regions of similar characteristics. The strategic planning of the rail system throughout the corridor connected pairs of cities such as Baltimore to Philadelphia and Philadelphia to New York City.
This pattern developed the initial interconnected “string of cities” in the northeast, from Boston to Washington D.C. that forms the spine of the Northeast corridor.

The corridor developed based on the strategically placed rail lines rather than as a result of the overlapping suburban areas. The transformation from the rail line network is analogous to the development of a mammal. Prior to the development of an entire skeleton, a spine must first be developed. The railroad “spine” served as a backbone for future development of the highway system leading to the overlap in suburban regions. The highway system is representative of the “skeleton” which strengthened the established transportation network and promoted interconnectivity.

**Rise of the Automobile**

Interconnectivity between metropolitan regions became stronger with the development of alternative modes of transportation including automobile and air travel. These alternative modes began to increase by the 1920’s causing rail ridership to slowly decline. Modal competition between air and rail, as well as automobile and rail, had a significant impact on the corridor. No longer did residents have to rely on fixed rail lines for mobility to and from the major cities of the corridor. The automobile was preferred for short intercity commutes while air travel began to dominate long distance travel, leading to a decrease in rail ridership. In terms of convenience, travel time, and accessibility, the rail system could not compete with the alternate modes.

Within the next two decades, almost every household across America owned an automobile. In 1940, there were approximately 27.4 million passenger cars registered in the United States, and by 1957 there were approximately 55 million privately owned automobiles. The increase in motor transportation led to a demand for transportation infrastructure, more specifically, a nationwide highway network. The National Interstate and Defense Highway Act of 1956 prioritized federal subsidy of highway construction across the country. As a result, the highway system grew and the expansion created an additional increase in automobile ownership. Federal spending on interstate highway systems within the corridor served to strengthen the spine of multi-modal interconnection between cities.

**CHALLENGES OF THE NORTHEAST CORRIDOR**

**Land Use Impacts**

The transition from rail to automobile was not without consequences in the Northeast corridor. With increased mobility from the highway network, residents were willing to live farther away from the inner cities. Suburban home construction, bolstered by federal subsidy through the Federal Housing Act of 1947, grew more appealing to city residents tired of overcrowded housing and crime. Highways that led into cities were also highways that led out of cities and created suburban areas where people could avoid the disadvantages of city life. The Northeast corridor arose from well-developed transportation networks and rapid suburbanization. Today, the Northeast corridor is a mega-region that consists of continuous urban sprawl, long commutes, and a lowered quality of life.

In the 1970’s, many people were living in the suburbs and relying on their personal vehicles to access workplaces located in the centralized city. These commutersheeds created the overlapping urbanized regions that connect the major cities of the Northeast into one
continuous corridor (8). The challenge to engineers and planners alike is that decentralization in the corridor, which manifests as longer commute times, results in greater dependence on personal automobiles for trips of all purpose. In turn, this results in increased traffic congestion and places a demand on infrastructure systems that affects quality of life, response to emergencies, public expenditure on infrastructure, and the environment.

**Environmental Impacts**

The resulting impact of geographical shifts from urban to suburban development throughout the corridor is immense. As was stated, longer commute times increase demand on highways and cause severe congestion (3). Congestion, however, is more than a traffic problem; it is a land use and environmental issue as well. The environmental cost of cars caught in severe highway congestion leads to an increase in fuel emissions that negatively impacts air quality. Environmental and political costs, related to fossil fuel reliance, is a national issue reflected throughout the corridor. Poor air quality emissions, coupled with the land use impacts of highway construction, have created significant environmental degradation throughout the Megalopolis corridor (9).

**Socioeconomic Impacts**

Urban decentralization has resulted not only in congestion – and its related problems of traffic and environmental degradation – but also social and economic restructuring of the corridor. Once the automobile was established as the new form of mobility, those that could afford a vehicle were able to live outside the city. However, those that could not afford to buy a car were forced to remain within a close distance of their workplace, typically in urban districts where passenger rail was heavily relied upon for mobility between cities (10). It became apparent that there was a trend relegating poverty-stricken regions to centralized cities, such as Baltimore, Wilmington, and Camden. This relationship still exists today where the suffering passenger rail system provides service (mass transit) to riders that simply cannot afford personal vehicles (7). Limited mobility traps poverty within certain areas in the Megalopolis corridor. This socioeconomic issue will continue to be a challenge throughout the corridor, along with the related problems of congestion and sprawl.

**MEGA-REGIONS: A NEW PERSPECTIVE ON LAND USE AND TRANSPORTATION PLANNING**

The Northeast corridor in the United States is an influential and important area to the nation due to the political, economic, and social power of continuous urbanized areas. One solution to managing this intricate web of continuous urbanized areas lies in the research of a French geographer, writing over forty years ago – well before the problems associated with transportation and infrastructure were deemed a “crisis.” In 1961, French geographer Jean Gottmann saw the pattern of cities strung along the Eastern Seaboard, including Boston, Providence, New York, Philadelphia, Baltimore, and Washington, D.C., recognized this pattern as important, and termed this unique area “Megalopolis.” (2). According to Gottmann, characteristics such as high density, highly developed infrastructure, growing population, technological advancements, and intricate transportation systems had enabled the Megalopolis corridor to become a significant geographical region (2).
Megalopolis Defined

Megalopolis, meaning “large city,” describes the 455 mile region that stretches from northern Boston to southern Washington D.C. and crosses the boundaries of ten states (8). Gottmann believed that rather than viewing each city in Megalopolis as its own entity, the region as a whole ought to be viewed as a new form of city. The corridor was created when the expanding suburbanized areas around each of the cities caused traditional commutershed boundaries to blur (11). Since 1961, metropolitan growth within this corridor has been extreme. Suburbanization and urban sprawl have both increased in occurrence since 1961, which, in turn, has led to increased population density within and around the major Megalopolis cities. Geographer Richard Morrill (12) updated Gottmann’s map based on population growth in the corridor from 1950 to 2000, proving the continual relevancy of the corridor. Figure 1 shows growth in twenty year increments from 1950-1990 of the expanding Megalopolis region. Population growth for the year 2000 is also included in Morrill’s map (12). Population densities that were once limited to the eastern-most sections of states like Maryland, Pennsylvania, and Massachusetts, have crept westward, and cities such as Harrisburg, PA, and Springfield, MA, are now part of Megalopolis.

Though Gottmann’s theories held potential to reorganize the scale at which decisions were made in the Northeast corridor, planning professionals – transportation and/or land use – have failed to incorporate the idea of the mega-region or mega-corridor into planning and decision making. Despite demonstrable economic dependencies between cities and/or counties in the Megalopolis corridor, planning at that scale has yet to be organized. For this reason, among others, Gottmann’s Megalopolis concept failed to take hold among the general public. Recently, however, as the I-95 corridor becomes increasingly congested and state DOT’s (Department of Transportation agencies) find themselves overwhelmed with the costs of maintenance and new construction, some geographers and urban planners are returning to Gottmann’s transportation corridor concept, with the intention of adapting it to respond to today’s concern of a growing infrastructure crisis.

Megapolitan Corridors Throughout the U.S.

In 2005, geographer Robert Lang and Dawn Dhavale (13) expanded Gottmann’s definition of Megalopolis and wrote that the idea of a transportation/metropolitan corridor was not unique to Megalopolis in the northeastern United States; rather, megapolitan corridors – in 2005 take on Gottmann’s 1961 Megalopolis - are present in ten different locations within the United States. Lang and Dhavale wrote that the Megalopolis characteristics of interconnectivity, population density, distinct regional identity, and lengthy historical connections deign “megapolitan” status to the following regions: Northeast, Midwest, Piedmont, Gulf Coast, Peninsula, I-35 Corridor, Valley of the Sun, Norcal, Southland, and Cascadia (13). These ten megapolitan regions cover thirty-five states throughout the United States and are predominantly located along the east and west coasts. In terms of population density, the megapolitan corridors either currently possess or have the potential to possess ten million residents by 2040 (13). Figure 2 displays the ten megapolitan corridors in their respective locations throughout the country.

Lang and Dhavale predict that as the current megapolitan corridors continue to grow in population, the total number of megapolitan corridors will also grow – doubling from ten to twenty by 2040 (13). Approximately thirty-three trillion dollars toward these regions will be spent on megapolitan growth (13).
Census-Designated Statistical Areas

Lang and Dhavale’s (13) definition of megapolitan areas has gained credibility because it uses data and geography collected by the U.S. Census Bureau to create standards for designation. The researchers use census-designated statistical areas to identify and label the megapolitan areas, with the county as the most basic unit of analysis. Counties, as units of analysis, then combine to form metropolitan statistical areas (MetroSAs), micropolitan statistical areas (MicroSAs), or Non-core Based Areas – all recognized by the U.S. Census Bureau. Megapolitans must consist of at least two – but sometimes as many as one or two dozen – metropolitan statistical areas (MetroSAs), as defined by the U.S. Census Bureau (14). Census-designated “micropolitans” are also incorporated into megapolitans so long as they are contiguous to the metropolitan area and share a pre-determined level of linked economic activity (14). Other criteria determined for identifying megapolitan areas are as follows (13):

- Constitutes an “organic” cultural region with a distinct history and identity.
- Occupies a roughly similar physical environment.
- Links large centers through major transportation infrastructure.
- Forms a functional urban network via goods and service flows.
- Creates a usable geography that is suitable for large-scale regional planning.
- Lies within the United States.

Decision Making at the Regional Level

The true promise for Lang and Dhavale’s (13) megopolitan identification lies within the fifth bullet point listed above. Many benefits will arise from large-scale regional planning at the megopolitan level, once locations with megopolitan areas recognize their economic, cultural, and geographic dependency. This conclusion is not so far from what Gottmann originally proposed in Megalopolis. Lang and Dhavale have attempted to harness the ideas of Gottmann’s Megalopolis and deliver it in a practical way that will be useful to researchers, policy makers, geographers, and residents. Since 2005, Lang has worked to further refine the definition of megapolitans in an attempt to make America’s new urban form relevant to those making decisions about the regions. Megapolitan areas are defined as “big, but not enormous and can easily be traversed by car in a day, round-trip… [megapolitan areas have] economic linkages as demonstrated by commuter patterns (15). The ‘anchor urban cores’ of megapolitans lie at least 50 miles, but no more than 180 miles, apart” (15). Their research is a further attempt to resolve what people often intuitively sense about a place – “metros that were once distinct places now merging into urban complexes” – with how these places are classified by governments, policy makers, and researchers (13). Lang and Nelson (15) use the Dallas/Ft. Worth Metroplex as a starting point for how other megopolitan areas might grow and develop in the future; however, they emphasize that the Dallas/Ft. Worth Metroplex is just a starting point for research as today’s megopolitan areas cast a shadow over the original metroplex in their enormity. Megapolitans,

1 Metropolitans Statistical Areas: An “urbanized area” or “principal city” with at least 50,000 people plus surrounding counties with a 25% “Employment Interchange Measure” (EIM) in 2000 (14).
2 Micropolitan Statistical Areas: Meaningful core-based areas with populations between 10,000 and 50,000 but whose central cities are too small to qualify as MetroSAs. MicroSAs are recognized as self-contained settlements outside of MetroSAs whose boundaries are determined by commuting patterns (14).
regardless of definition, will continue to grow in terms of population and physical space for the coming decades and the U.S. must formally recognize this dominant urban geography.

**Growth Trends within the Corridor**

Although corridors as a whole are increasing in population, a pressing question remains: where within the corridors are people residing? Largely, growth within megapolitan corridors is suburban. According to Vicino, Hanlon, and Short (10), the overall growth of the BOSWASH/Megalopolis corridor masks the decline of major cities such as Baltimore, Boston, Philadelphia, and Washington D.C. Urban decentralization was the original impetus for the rise of megapolitan corridors, but it has come at the cost of population loss in the central cities within metropolitan regions (10). Because the birth rate in the United States has remained relatively constant for the past several decades, growth in one area generally requires decline in another. However, this growth of the megopolitan corridor as a whole has created a decline in central cities. The exception to this trend is New York City which continues to retain its population and remain a centralized force (10).

Though the Megalopolis corridor remains densely populated at approximately 931 people per square mile, population dispersion away from central cities has occurred (10). However, the nature of that dispersion is unique because of Megalopolis’ overall growth rate: “[In 1950] more than one in five of the total population lived in the central cores of the five large cities of Baltimore, Boston, New York, Philadelphia and Washington. Fifty years on, less than one in 10 lived in these same areas. In 1950, less than one in five lived in the suburbs. By 2000, two out of three lived in the suburbs. The urban cores had virtually no population increase during the 50-year period while the suburbs grew by almost 400%” (10).

The population redistribution trend within Megalopolis has led geographers to revisit Gottmann’s original description of the Megalopolis corridor and expand its area of influence. For example, population changes illustrated in Richard Morrill’s (12) map, shown previously in Figure 1, illustrates the growing physical expanse of the Megalopolis corridor. Though population decentralization has caused parts of Megalopolis to decline, it is the very force that has given rise to Megalopolis-like megopolitan areas across the U.S.

**DEFINING RESILIENCY**

When addressing future concerns of a corridor’s infrastructure, its resiliency, or “ability to recover from or adjust easily from change,” must be analyzed (1). Resiliency, the inverse of vulnerability, is a term that holds multiple applications and refers to more than simply the recovery of a system after a catastrophic event (16). It can be viewed as a performance measurement of how adaptable a system is to internal and external changes. Therefore, resiliency comes in two different connected forms: resilience as preparation and resilience as performance (17). Preparation resilience includes the ability to assess the system in order to be ready for change. Performance resilience refers to the ability of the system to respond and recover from change. This research focuses primarily on the connection between the two forms in order to identify the key factors that determine a corridor’s regional resilience.

Resilience, when applied to a transportation corridor, can be viewed at multiple scales. A corridor can be viewed as a whole system where resiliency is achieved at a regional level. However, resiliency can also be achieved at the local level where the individual system elements
such as the infrastructure can be assessed (17). These two scales are strongly interrelated due to the fact that regional resilience is only as strong as the weakest link within the system. Therefore, resiliency must be achieved at the local level in order to successfully achieve regional resiliency.

**Resiliency Properties**

Regional resiliency applies to the corridor at the broadest scale and captures the interrelationships among changes in land use, transportation, weather, and other unexpected events. Michel Bruneau (18) and others developed a framework for assessing resiliency at the regional scale. The framework includes four properties (18):

- **Robustness:** the strength of a system and its elements to withstand disruption without suffering degradation or loss of function.
- **Redundancy:** the extent to which a system or its elements have substitutes to ensure functioning in the event of a disruption.
- **Resourcefulness:** the capacity within a system to identify problems, establish priorities, mobilize, and apply resources in face of disruption.
- **Rapidity:** the capacity to meet priorities and achieve goals in a timely manner to contain losses and thwart future disruption.

These properties of resiliency were originally developed for the assessment of communities; however, they can be equally applied to the regional resilience of a transportation corridor.

In contrast to regional resiliency, local resiliency refers to the ability of the individual infrastructure parts to be able to adapt and recover to stresses both internal and external. In terms of a transportation corridor, traffic-oriented measurements can be used to assess the resiliency of the roadway. The following list includes general resiliency measurements focusing on transportation management:

- **Route redundancy:** number of alternative routes available for travel to a designated destination.
- **Reversibility:** ability of the directional flow of traffic to be reversed in order to accommodate additional capacity.
- **Connectivity:** number of access points that the road is connected to adjacent routes.
- **Continuity:** ability of a roadway to continuously provide access to adjacent land uses.
- **Travel Time Reliability:** ability to estimate the predicted travel time duration on a roadway.

In addition to these general measurements, there are episodic and continuous resiliency measurements. Episodic measurements capture random events that are typically unpredictable. Measurements include the ability to recover from weather related incidents or traffic accidents. Continuous measurements are made on a regular (for example, daily) basis and capture predictable conditions such as daily traffic congestion, road degradation, and the effects of scheduled construction. In general, these measurements are all interrelated and cannot be isolated when determining resiliency of a transportation system.

**PRACTITIONERS VIEWPOINTS**

In order to understand the practical application of corridor resiliency, a workshop was held involving transportation practitioners within the Mid-Atlantic region of the Megalopolis corridor.
Feedback involving their personal definitions of resiliency was received as well as a general consensus of how to view resiliency from a corridor perspective.

The first question posed to the practitioners was how they individually define the term “resiliency” with respect to the corridor’s infrastructure. The following responses were provided:

- Having the ability to recover
- Being able to maximize capacity and having an alternative support network
- Recovering from an incident
- Connection between transportation and land use, specifically identifying the difference between recurring and nonrecurring congestion
- Ability to “bounce back” meaning responding and recovering from all modal changes
- Ability of the driver to adapt and respond to changes
- Ability of the economy to support the changes in the corridor

A consensus definition concluded that resiliency must be determined through performance measures such as travel time reliability. Once the individual definitions were discussed, a general conclusion was made that there are multiple types of corridor resiliency. The following three types were defined:

- Functional resiliency- ability of the corridor as a whole to be able to adapt, respond, and recover to change at the regional scale.
- Behavioral resiliency- ability of the individuals living within the corridor to be able to adapt, respond, and recover to change (example- using real time traffic data to determine which routes to use).
- Economic resiliency- ability of the economy to support change within the corridor

In general, the workshop provided insight into how corridor resiliency is viewed in practice. The main point that arose throughout the workshop was the importance of monetary support. Without adequate funding, the necessary measures to promote infrastructure resiliency throughout the corridor cannot successfully be achieved.

**RESILIENCY APPLICATION**

The Megalopolis corridor has gone through a significant transformation from 1890 to 2006 in regards to population, highway, and railway density. Using population growth and route redundancy as resiliency measurements, GIS (Geographic Information System) was used to map the changes in the Northeast corridor from 1890 to 2006. The Northeast corridor’s rail network density (Figure 3), road network density (Figure 4), and population density (Figure 5), were each graphed for four time periods from 1890 to 2006. They were then compared (Figure 6) to determine the relationship between route redundancy and population growth. The figures provided were selected based on the earliest and most recent time periods for each measurement. It is apparent that as population increased, the networks quickly developed to support the growth. In 1890, the average county population was approximately 100,000 people and the transportation network consisted of minimal fixed route rail lines. By the 1920’s, the development of the automobile spurred highway development continuing through 1947. The most significant population and network growth occurred from 1947 to 2006 in terms of highway interconnectivity within and between the major metropolitan areas. This route redundancy has evolved simultaneously with the growing average county population of approximately 500,000 as shown in the 2006 comparison map (Figure 6). Although in the past, highway/railway
networks have been developing at an increasing rate to support the growing capacity, this relationship has started to weaken over the recent decades. This initiates the question will this interdependency be able to continue throughout future years? The next step would be to evaluate population projections and evaluate how the future transportation networks will have to adapt and respond to the growing population within the Megalopolis corridor.

CONCLUSIONS AND FUTURE STEPS

The challenges facing all highly developed megapolitan corridors must be recognized and addressed. The problems of congestion, environmental degradation, structural deterioration, and social inequities resulting from the current form of urban development in the U.S. have not been adequately resolved through past approaches of delegating authority of sections of the corridor to state DOT’s or local MPO’s (Metropolitan Planning Organizations). The problems facing the megapolitan corridors that increasingly come to shape the landscape of the future know no boundaries such as state lines, watersheds, or city limits. Therefore, responses must encompass regional action. The theories of Gottmann, revisited by Lang, Dhavale, Morrill, Pell, Todorovich et al., Van Eckardt, Vicino et al., and others, hold potential for addressing both present and future transportation and infrastructure needs.

Visually, the development that spans continuously from New Hampshire to Northern Virginia is remarkable. The physical development of the Northeast corridor combines with the corridor’s political, economic, and social supremacy to enable the region to attain a worldly importance. “No other section of the United States has such a large concentration of population, with such a high average density, spread over such a large area. And no other section has a comparable role within the nation or a comparable importance in the world” (2). Though Gottmann wrote this in 1961, the same largely remains true for the corridor today.

Politically, it is a center of government for both the nation and world including facilities such as the White House, the Pentagon, and the United Nations Headquarters (5). Economically, the corridor has the greatest concentration of financial power and its residents receive the nation’s highest average income (5). Socially, the corridor leads the country in higher learning institutions as well as book publishing, radio, and TV broadcasting (5). These factors, true in 1961 and 2007, are just some of the reasons that Gottmann (2) claimed Megalopolis as one of the most influential corridors in the world. For these reasons, the region continues to be a prominent subject of research today. Though the region is proving unmanageable and unsustainable, the value of the resources found in Northeast corridor is too great to be given up on. Rather, continued research in how best to manage this complex corridor is vitally needed.

ACKNOWLEDGEMENT

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REFERENCES


Figure 1- Population Growth within Megalopolis (12)
Figure 2-Ten Megapolitan Corridors in the United States (13)
Figure 3-Northeast Corridor Rail Network Density from 1890 to 2006
Figure 4-Northeast Corridor Road Density from 1920 to 2006
Figure 5-Northeast Corridor Population Density from 1890 to 2006
Figure 6-Comparison of Northeast Corridor Population, Rail Network, and Road Network Density from 1890 to 2006

Legend
- Counties Population > 200,000
- State Boundaries
- County Boundaries

Highway Density
- roads/sq.mile
  - 0 - 8
  - 8 - 10
  - 10 - 12
  - 12 - 16
  - 16 - 18

Rail Line Density
- rail lines/sq.mile
  - 0 - 8
  - 8 - 10
  - 10 - 12
  - 12 - 16
  - 16 - 18