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Year 24 Final Report

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Kendall Square: Lessons Drawn from Its Past Development to Guide Its Future Completed

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MITR24-6

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The New England University Transportation Center is a consortium of 5 universities funded by the U.S. Department of Transportation, University Transportation Centers Program. Members of the consortium are MIT, the University of Connecticut, the University of Maine, the University of Massachusetts, and Harvard University. MIT is the lead university.

1. Accomplishments

Completion of Masters thesis by Tatiana Peralta on "Kendall Square: Lessons drawn from its last development to guide its future". The abstract of the said thesis is attached herewith.

The thesis has been used in the preparation of several assignments in the course 1.252J/11.540/ESD.225J, and as a recourse document for students taking this course

The thesis is also being used as a resource in ongoing research by two Masters' students in further analysis of the evolution of higher development densities in urban areas, and the capacity expansions in the transportation system needed to support the increased density, and the importance of economic development at greater density in resolution of Baumol Disease type problems in urban transit systems

In addition, the thesis is being used in the preparation of a summary paper on the combined research products of conclusions reached in the Massachusetts Avenue living Laboratory, which will be submitted to TRB this coming year.

1A. Research Project

Project No.	PI	Project Title	Status
MITR24-6	Murga Salvucci	Kendall Square: Lessons Drawn from Its Past Development to Guide Its Future	Completed

Accomplishments under the New England UTC's research goal

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Project Title: Kendall Square: Lessons drawn from its past development to guide its future

The results of the completed research have provided useful support to the ongoing planning processes in the Kendall Square area in real time, and are being provided to the Cambridge Planning Board and the Cambridge Redevelopment Authority in their ongoing planning process for Kendall Square.

The results of the completed research are also being provided to the business association ABC, "A Better City" for their consideration in planning the transportation infrastructure requirements to support the economic development densification of the Seaport Innovation District in Boston.

How the New England UTC's research results have been disseminated

Nothing to report

1B. Education Projects

Accomplishments under the New England UTC's education goal

Nothing to report

1C. Technology Transfer Projects

Accomplishments under the New England UTC's technology transfer goal

Nothing to report

2. Products

Journal publications, books, or one time publications Websites, media are being pursued, but have not yet occurred.

This research is part of an interconnected series of research products about the complexity of economic development, land use densification, and mode share change in the Cambridge area which is undergoing rapid transformation and growth in a context of capacity constraints in affordable housing, transit capacity, roadway capacity, and parking availability. The series of research projects is called the Massachusetts Avenue Living Laboratory". Related research in this effort includes completed masters theses on residential parking and transit universal passes, employee parking freezes, their strengths and weaknesses, transit capacity constraint relaxation in the context of continued roadway capacity constraint, and Baumol's disease in Public transportation, with the MBTA as a focus case. Two of these research efforts are not yet complete, and will include a synthesis paper unifying the body of work of the Massachusetts Avenue Living Laboratory.

Technologies or techniques

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This research has furthered the use of accessibility quantification in the development of land use models which are ongoing in collaboration with the Department of Urban Studies and Planning of MIT. The results of this ongoing research will be offered to journals for dissemination this coming year.

Inventions, patent applications, and licenses

Nothing to report

Other products

Nothing to report

3. Participants & Other Collaborating Organizations

Organizations that have been involved as partners:

- MBTA - transit provider for the Boston Massachusetts region
- TfL (Transport for London) - transport provider for London, England

Both organizations have provided matching funds.

Other collaborators or contacts that have been involved

Nothing to report

4. Impact

The impact on the development of the principal disciplines of the program

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This research project has resulted in added insights into the unique high tech development cluster now underway in Kendall Square Cambridge, and the Seaport Innovation District in Boston, as well as the Inner Belt development district in Somerville, providing input into the ongoing revision of zoning requirements in the cities involved. This will be an ongoing activity of the principal investigators over the next six months to a year, using the results of the completed research as inputs into the regulatory regimes now being revised.

The further development of techniques in the utilization of transportation accessibility under conditions of capacity constraint is an ongoing activity being pursued in several academic and professional venues, including particularly TRB.

The impact on other disciplines

Nothing to report

The impact on the development of transportation workforce development

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This project has had direct benefit in the education of the student involved in the thesis research, and in approximately fifty students in the Urban Transportation class 1.25J/11.540J/ESD.225J

The impact on physical, institutional, and information resources at MIT

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MIT has been actively involved in promoting and participating in the process of economic change and densification of land uses in Cambridge, and the investigators have been actively involved in these processes, including presenting testimony at public meetings of the Planning Board, City Council, and articles in the faculty newsletter. The results of the research undertaken in MITR24-6, "Kendall Square, Lessons drawn from its past to guide its future" have been directly useful in the preparation of these activities.

The impact on technology transfer

Nothing to report

The impact on society beyond science and technology

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The research undertaken in MITR24-6, "Kendall Square, lessons from its past to guide its future" has been directly useful in supporting and shaping the economic development of the area, benefiting employees and firms and the tax base of the city and the Commonwealth.

5. Additional Information

Additional information regarding Products and Impacts

Project Number: MITR24-6

Project Title: Kendall Square: Lessons drawn from its past development to guide its future

The research undertaken with the support of MITR24-6 "Kendall Square, lessons drawn from its past to guide its future" has been directly supportive of the education of over fifty students, many of them from diverse backgrounds, and the thesis which was a direct product of the research continues to be a useful resource for ongoing research of others.

The improved balancing of economic growth with adequate relaxation of capacity constraints is directly beneficial to the improvement in travel time reliability and reduction of carbon and other harmful emissions from transportation sources.

Outputs

Nothing to report

Outcomes

Nothing to report

Impacts

Nothing to report

Exploring The Relationship Between Destination Accessibility, Cluster Formation and Employment Growth in Kendall Square

By

Tatiana Peralta-Quirós

Submitted to the Department of Civil and Environmental Engineering on May 10, 2011,
in partial fulfillment of the requirements for the degree of

Master of Science in Transportation

Abstract

The exploration of the links between transportation and land use highlights the cyclical relation of accessibility, activities and transit demand. Agglomeration theory focuses on the benefits in productivity that arise from high employment density areas when companies operate in the same sector; while cluster theory examines these centers more closely and stresses the importance of relationships among companies, as well as links to input services and employment. Previous research (Pushkarev & Zupan 1977) demonstrated that high trip density is unsustainable without an efficient public transportation system.

This high employment density center fosters a unique kind of industry, focusing on the cutting edge of technology and research, bio-tech and technology start-ups. The location of Kendall Square, next to the Massachusetts Institute of Technology (MIT), and supporting transportation infrastructure make it highly accessible.

This thesis explores Kendall Square, as well as other employment centers in the Greater Boston Area, in order to determine if Kendall may be considered an employment cluster. Utilizing census data, this thesis looks at employment changes, industries and worker types to explore Kendall's uniqueness. The study of the area also includes the evolution of commuting patterns (trip length distribution, trip origins, modal splits) in the last 30 years. In order to better understand current trends, it also utilizes employee interviews and MBTA service usage.

Three transportation models for the Greater Boston Area that replicate socio-economic and transportation infrastructure conditions of 1990, 2000 and 2010, created using modeling software packages, TransCAD and Cube Voyager, are used to analyze the modal accessibility of each destination for those time periods. Accessibility measures are then utilized to develop a series of linear regression models that explore the relative importance of each modal accessibility measure on employment density and employment changes. The results suggest that transit accessibility is the most important modal measure to support high employment density areas. In order to continue fostering employment growth planners must provide a transit service capable of sustaining the employment changes for the region.

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