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To The Next Mayor: A Transportation Agenda

In January, 1994, when Mayor Rudolph W. Giuliani took office, transportation was not at the top of the list of priorities. Crime, jobs, "quality of life", and education were the issues the Mayor knew he had to address, first and foremost. And then he discovered he had a \$2 billion deficit to cover as well.

As Commissioner of Transportation for the first two and half years of the administration, I strongly supported those priorities. I understood that these were the greatest challenges confronting New York City. Nonetheless, with Mayor

Giuliani's support and a talented team at NYCDOT, we successfully managed the City's transportation system, implementing innovations like red light cameras, design/build construction, borough commissioners, and the Adopt-A-Highway Program (to name just a few), and "did more with less," absorbing some of the hardest budget hits of any line agency. And in between dealing with a plague of potholes from winter storms and a commuter rail strike or two, we moved the Parking Violations Bureau to the Department of Finance, allowing NYCDOT to focus more clearly on its primary mission of mobility and infrastructure maintenance.

At the broader level of transportation policy, the Giuliani administration has also made important contributions. While some disagree with the Mayor's tone and remedy in dealing with the Port Authority, few argue that he has raised important issues regarding the Port Authority's core mission, the future of the airports, equity between New York and New Jersey, and privatization. The Mayor's support of Congressman Nadler's rail freight crusade put that issue on the regional agenda, and the Mayor initiated the idea of extending transit service to support the development of Midtown West and LaGuardia Airport.

But with a new occupant in Gracie Mansion in January 2002, now is the time to frame the transportation agenda for the next administration. Due in no small measure to the success of the Giuliani administration in making New York City a better place to live, work,

and visit, transportation needs to be one of the top priorities for the next Mayor.

Education and housing advocates will make a compelling case to be at the top of the list as well. Criminal justice advocates won't be shrinking violets either, making the compelling argument that any backsliding in crime prevention is done at the City's peril. Mayors Ferrer, Green, Hevesi, Vallone (and should we add Bloomberg or Sharpton?) clearly must attend to the needs of these sectors too.

Nonetheless, the next Mayor needs to ensure that the City's transportation system is both managed well to respond to present demands and is expanded to meet the future needs of Gotham. Automatic pilot won't do it.

First, the Mayor will need to work closely with the Governor and Legislature to ensure that the landmark \$34 billion highway and transit program that was passed last year is implemented. This program starts the Second Avenue Subway and LIRR Eastside Access Projects and maintains a normal replacement program for our transit infrastructure. It also provides adequate funding to improve the pavement and structural condition of New York City's highways and bridges, which while still safe to travel on, are in the worst shape of any region in the State.

Though failure of the bond act blew roughly a 10% hole in that program, it is within the capability of the Governor and Legislature to provide adequate funds to implement the current program. The real lifting will occur with the next 5 year

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MTA Capital Program, 2005-2009, when the serious bills will come due for the Second Avenue Subway and LIRR Eastside Access. Rough estimates are that we'll need a \$22-24 billion MTA program to make that happen. Without the next Mayor championing the cause with strong support from Albany and Washington, these critical projects won't happen.

Second, the next Mayor will have to deal with the issue of congestion in Midtown. Innovative pilot programs like the recent value pricing project involving in-car parking devices, re-invigoration of NYPD's Traffic Control Division, further prioritization of public transportation, and incentives to move traffic off-peak are clearly some of the items that need to be considered.

Third, important advances can be made in the City's bike and pedestrian network, the application of intelligent transportation systems, and the City's use of its waterways to move people and freight. Priority will still need to be given to maintain the City's bridge reconstruction program, and to keep the roads, highways, and bridges in good operating condition and graffiti-free.

Fourth, the next Mayor will have to decide how to deal with the Port Authority. New York is in a fierce competition to become the major hub port on the East Coast, and demand on its airports will continue to grow exponentially. With an over-dependence on trucks to move freight to NYC and Long Island, can the City of New York with its institu-

tional partners respond to these challenges? Failure to do so will threaten Gotham's position as a world capital.

Fifth, some institutional reform may be in order as well. The City has a myriad of agencies dealing with transportation, like NYCDOT, City Planning, the Taxi and Limousine Commission, EDC, and the Police Department. Solutions often require one or more of these agencies to coordinate both amongst themselves and with state agencies like the MTA, the Port Authority, and NYSDOT. A coordinating mechanism like a transportation sub-cabinet led by the NYCDOT Commissioner with support from City Hall might make a difference with more than one project, not to speak of facilitating a more cohesive strategy for dealing with Albany and Washington.

If the next Mayor is looking for legacy material, either in a first or second term, he or she may want to explore developing a dedicated source of revenue to help fund some of the excellent transportation projects and initiatives that have been proposed in recent years. These include, in addition to the Second Avenue and LIRR Eastside Access projects, tunneling the Gowanus (which would transform a large swath of Brooklyn), extending subway service out to LaGuardia Airport and extension of the #7 line to Midtown West, creation of an extensive bike and pedestrian network, or as Gene Russianoff has pushed for, a significant reduction of subway waiting times in rush hour and provision of greater non-rush hour service.

In the past, tolling the East River and Harlem River Bridges was one of the third rails of politics in Gotham.

With EZ technology, increasing congestion in midtown, the City of London embarking on a similar effort, and a list of excellent projects and initiatives that would be funded, an electronic toll system designed to limit single car entrance to Midtown in rush hour and encourage truck deliveries off-peak would be an interesting proposal to consider. Last year Congressman Nadler testified before the NY State Assembly Committee on Critical Transportation Choices in support of consideration of a toll system on the East River Bridges focused on trucks. While a full-blown East River and Harlem River Bridge toll system might be a tough lift for a first term Mayor, a smaller scaled initiative must at least be considered.

These are just some of the ideas that the next Mayor should entertain. In the next several months the Empire State Transportation Alliance will be formulating a transportation agenda to be presented to all the Mayoral candidates. From a policy and political perspective, transportation must be high on the "To Do" list for the next occupant of Gracie Mansion.



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INTERVIEW

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stir over whether that should go forward or not. I think it shouldn't, that it needs to be drastically changed before it can be sensible. The good news is that there is a huge public debate in the UK about transportation, which unfortunately we don't have here in the US.

JSK: What are the barriers to privatization in the US and what can we learn from the UK? What are the downsides to privatization in the UK and what can they learn from models we have adopted in the US?

RK: The most important thing about privatizing an asset that is truly public is that there needs to be public or government control maintained. You can't ever really turn the management over completely to the private sector. You can bring a private firm in and give them very substantial responsibility and profit opportunities with respect to rehabilitation, investment, construction and engineering. But when it comes to actually running something, these things have to be done with surgical precision and care. It can work, but the more public the asset is, the harder it is to pull off because public means reacting to political considerations where your ability to earn raw profit is mitigated by public needs. For example, ensuring that the handicapped and disabled have easy access to transportation modes is an expense that does not translate into profit. Or making sure that school children are able to travel, or that there is always some service available even to the remotest part of your region or at the oddest hours while essential political goals, may not turn into profit. That means some operations are in the public interest but that may not turn into private profit. You want the private sector involved because they are very good at getting things done faster and with maximum productivity and the application of the newest technology. If there is going to be any kind of public subsidy, direct or indirect, the public has to maintain true management control over what is going on or you will lose it in a flash. As an example of that, it would be very easy to privatize British Air because that can be

comfortably situated in a free marketplace. It is a little more complicated to privatize transportation in the U.S. system and it is extremely complicated to privatize rail and subway operations. I like to think that the higher up in the air, the easier it is to privatize. You bring it down, you have more and more people who actually depend on it for their daily bread and you can't make it just strictly a creature of the profit mode.

JSK: Do privatized rail/bus lines in the UK make money or are they subsidized? We don't hear criticism of corporate welfare as we do in the US.

RK: The last time I had the numbers, there are somewhere between 7,000 and 8,000 buses that traverse the streets of NYC every day. Half of them are owned and operated by NYC Transit. The other half are franchised out by the City of New York to half a dozen private operators, maybe two or three of which are dominant. That's the rough equivalent of what's happened in the UK. I could make an argument that many of NYC Transit's bus lines are better operated, make better profit margins, and carry more customers than many of the lines operated by the private sector. The reason for that is that these private franchising outcomes can actually result in regulated monopolies. Not really competitive so you end up with quasi-public organizations. The worst of both actually. That is what most public transportation was in the US through World War II. When it was seen that it wasn't working in New York, Boston and Philadelphia and all over the east coast, all of these facilities which we take for granted as being publicly owned and operated, were run by private companies. They absolutely fell off the cliff and they got taken over by the government between say 1950 and 1965. The IRT and the BMT were private companies.

JSK: How does capital project finance in the US differ from in the UK?

RK: The UK has not discovered the municipal bond as an instrument of secured cash which can be converted into a vehicle for significant investment in capital goods. It just doesn't happen there. That is one of the things I'm pushing hard on. I'm told the UK Treasury has a 250-

year history of this, and it's not going to be overcome in 250 days.

JSK: Do you see differences in the way safety issues are treated with regard to accidents?

RK: I think there is a lot of sensitivity in England to accidents and a long safety tradition, which is shared in the US. But I think confusion has followed privatization on the above ground rail system. The issue is who is responsible for safety and proper allocation of resources to it and what is priority in the minds of the people who are at the upper echelons of all the organizations that are responsible for safety, Railtrack and the operating companies. It is really a mess at the moment. Therefore, risks have increased.

JSK: What drew you back to the public sector from the nice life of running the Partnership?

RK: That's a good question – not sure I can answer it. I really enjoyed the Partnership and was getting tremendous satisfaction out of it. I love the city and we have many friends and the kids grew up here and they've either just left the nest or are about to leave. New York is a very hard place to leave, even temporarily. However, having run the Boston system and the New York system, which are, respectively, number two and three in historic age, why not go to the oldest one of them all. The most venerable system, the London Underground, seems to need help. Pretty irresistible. And the other part of this is they are starting a new local government and there has been a major constitutional change so it is very exciting, even at my long in the tooth point, to be part of it. It makes you young again.



Janette Sadik-Khan is President of Company 39, an e-business subsidiary of Parsons Brinckerhoff, an international engineering, planning and construction management organization. She has also served as Deputy Administrator at the Federal Transit Administration. She currently serves on several research panels for the National Academy of Science, is a board member of the Women in Transportation Seminar and was recently selected as a Rockefeller Fellow for 1999-2000.

is important to understand that employment in agriculture represented less than 1% of total covered employment in the study area in 1997.

◆ All counties in the study area except Hunterdon and Ocean lost manufacturing jobs consistent with the overall trend in the state.

◆ All counties in the study area except Hudson, Hunterdon, Passaic, and Union, had strong employment growth in the transportation industry consistent with the overall trend in the state.

◆ All counties in the study except Essex had strong or moderate employment growth in retail trade.

◆ All counties in the study area had strong or moderate employment growth in the services industry consistent with the overall trend in the state.

◆ A recent article in the New York Times indicates that the pharmaceutical industry is consolidating in New Jersey. "More than 40 percent of all new medicines approved by the Food and Drug Administration in 1999 were developed by companies based in New Jersey." This trend may lead to more jobs in this industry segment.

Development of the Land Use – Transportation Model

Analysis of these trends based upon transportation investments will be made using a battery of models. One, in particular, will use population and employment locations and their influence by accessibility. Accessibility shall be measured by transportation network characteristics, including quantifiable costs of travel. The steps leading to this model approach are summarized below.

The first step is to characterize and quantify the transportation system to be analyzed and its environment. Figure 1 shows the system and environment for this study. The study area has been arranged into transportation analysis zones (TAZs) as shown in Figure 2. Finally, the highway and rail network networks have been defined as shown in Figures 3 and 4. These have all been put into a regional GIS to link the transportation modeling component with regional socioeconomic characteristics (e.g., population density,

employment density), land uses (e.g., retail shops, sq.ft. of floor space), job types (by SIC code) and other important characteristics.

The next steps, now taking place, and to be reported in a subsequent paper, will show how the models are used to predict economic impact. Data is also being collected on a study of residents of Northern New Jersey who moved because of the initiation of Midtown Direct service. This service eliminated a change at Hoboken for Manhattan bound riders on some NJT lines; the direct service saved time as well as convenience and influenced housing choice for a significant number of residents in the impacted areas. It is clear that these changes are having a major impact on activity location and travel in Northern New Jersey. This study hopes to capture and codify those changes.

The work was sponsored, in part, by the new Jersey Department of Transportation, and U.S. Department of Transportation.



Robert Paaswell is the former head of the Chicago Transit Authority, and is currently the Director of the University Transportation Research Center at City College of New York. He has been involved in transportation operations, policy and management since the late 1960s, and has served as the Director of both the Center for Transportation Studies and Research at the State university of New York at Buffalo and the Director of the Urban Transportation Center at the University of Illinois.

Dr. Joseph Berechman is currently a Visiting Scholar and Research Associate at the University Transportation Research Center at City College of New York. He is an international consultant on transportation investments. Dr. Berechman is currently a professor in the Public Policy Program and Economics Department and a member of the faculty of Social Sciences at Tel-Aviv University, Israel. In addition, he currently heads the Transportation Management and Research Institute, Recanati School of Business Administration at Tel-Aviv University.

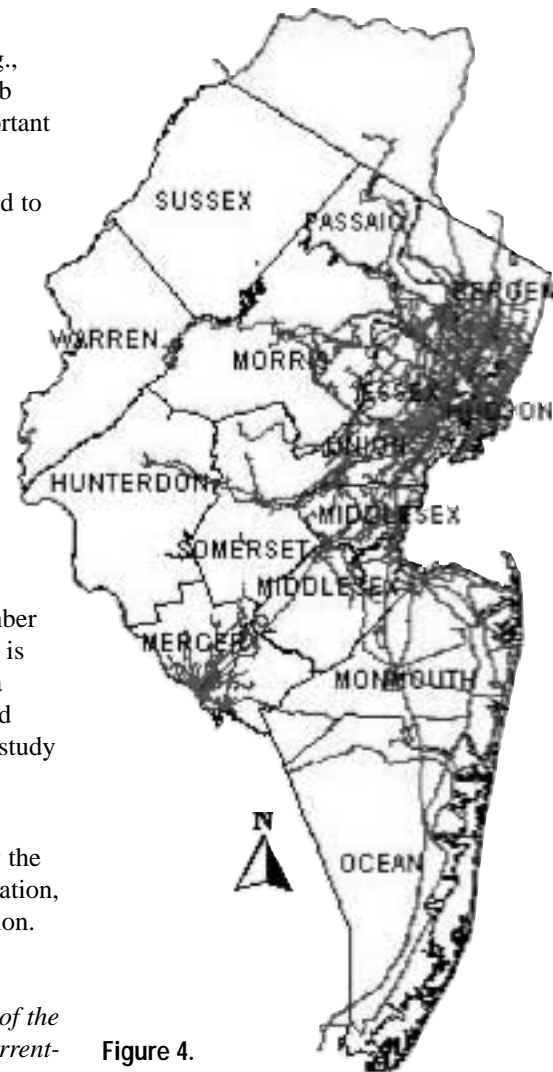


Figure 4. The study area transit network.

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Comparative Transportation Studies: *What Have We Learned?*

By Bill Shore, Senior Associate, Institute of Public Administration

Recently, New York's transportation system has been compared twice to Tokyo's and Paris' and three times to London's. London obviously benefited from the comparison, hiring Robert Kiley to run its bus and Underground system. What can we get out of the comparisons? Are We Competitive?

The Citizens Budget Commission asked: Are we competitive with Tokyo, Paris and London (also Chicago and Los Angeles) for talent, business leadership and jobs? The other two studies also asked that among other questions.

The data collected didn't answer the competitive question, and transportation does not seem to be decisive in determining where people work or locate businesses. All four of the "World Cities" studied are bursting with jobs and eager young people enjoying urbanism. Nevertheless, New York should keep its eye on the competitive question. Three times in the last 40 years, most of the world pronounced New York dead. That cycle could come again. It keeps coming because, despite the tremendous magnetism of the City--the myriad of reasons why people want to be here-- there are a myriad of hassles and costs that make people fed up. Difficult and expensive travel is a large element on the cost side. As New York's prosperity goes on, the jobs pile up in and near the center, but the expansion of transport capacity is threatened or delayed by financial gimmickry. Hassles could again outweigh the magnetism.

Though data from the comparisons is not decisive on whether our transport is as good as the other cities' now, we see Paris and Tokyo continuing to build modern public transportation and locate jobs, services and housing so people will use it. As of 1998, Tokyo was building 72.5 km of new commuter rail lines, 61.6 km of new subway lines and 28.4 km of new monorail lines. Paris was building (in addition to the newly-opened Meteor line, below) 4 km of RER and 1.4 km of metro. The roads they build are expensive toll roads or paid for by developers who will benefit. Tokyo tolls are approximately 60 cents a mile! London, though lagging in transit as New York is, recently opened a new subway extension following a new light rail line and is speeding bus service with traffic priorities and electronic guidance. London elected as its first metropolitan mayor a man who made a reputation favoring public transport—and then hired Kiley to underscore his seriousness. All three of these cities and the European Union are consciously trying to reduce driving. They seem to know where they're going.

We are not idle. New Jersey's building a 32.8-km light rail line, partly opened, serving fast-growing riverfront development.

Subway connections from Queens through the 63d Street tunnel are being completed along with train-to-the-plane connections in Jamaica (to Kennedy) and along the Amtrak-NJ Transit Northeast Corridor line (to Newark).

Is New York competitive? Lifting our eyes from the numerous tables and charts of these studies, we can see it is. Will it be?

What Can We Learn?

The studies do spotlight differences that might show New York better ways to run our transport and settlement pattern if we investigate how they do it.

Operationally:

On time subway service in Tokyo was phenomenal despite crowding: 98% of all trips arrive within one minute of scheduled time--compared to Paris' 87.5% within 3 minutes in peak periods and 6 minutes off-peak; London's 85% no more than 5 minutes late and New York's 80% within 5 minutes. Though The Four World Cities study didn't get on-time data from Tokyo's commuter railroads, they, also, are reputed to be precise.

Speeding buses. London and Paris provide electronic bus guidance to control bus flow and to inform passengers at bus stops how long they must wait. London created "Red Routes," cleared of parked cars for uninterrupted bus travel. On some routes, traffic lights turn green when a bus approaches. Failure of local communities to cooperate has limited the effectiveness, but that was before London had a metropolitan government with a transport-oriented mayor.

Efficiency. New York's bus operating cost per passenger mile was twice London's (1995 NY, 1997 London) and two-thirds greater than Paris'—and even 40% more than Los Angeles' as well as slightly higher than Chicago's. Cost per vehicle mile also was higher in New York—except for Paris: NY: \$7.91; London: \$4.10; Paris: \$9.32; Chicago: \$6.88; Los Angeles: \$6.89. Higher passenger/mile costs reflect New York's late night operations; higher vehicle/mile costs reflect street congestion and conditions, though the huge difference in London suggests other causes as well.



On rails, New York did no better. Vehicle mile operating cost of commuter railroads was 15% higher in New York than Tokyo, 40% than Paris. Passenger mile cost: Tokyo's was less than half New York's (they pack them in!), but the other cities' were about the same as New York's.

Subway vehicle mile cost in New York was nearly 25% greater than in London and slightly higher than in Chicago, but below Paris' and less than half Tokyo's. Passenger mile cost in New York was 25% higher than Tokyo's and two-thirds higher than Paris'—reflecting New York's low passenger volume overnight when only New York's transit operates. Even so, the New York subway passenger mile cost is very little higher than London's and better than Chicago's. And in this 24/7 economy, all-night subway service adds value to a New York City location.

Privatization—An Experiment to be Watched

Bus operating costs were cut in half when service was privatized in London—but was this increased efficiency or just successful pressure to reduce wages? If wage depression, were wages unreasonably

high before the reduction? The startling cost reduction is certainly worth examining. A government agency supervises service standards within urban London, but outside—in the suburbs and exurbs—bus service is completely free enterprise.

London's exact reversal of New York's commuter railroad reorganization is far from proven—but worth watching. In the 1960s and '70s, the New York Region consolidated seven private commuter railroad services into two public systems, NJ Transit and the MTA (with Metro-North and Long Island Rail Road subsidiaries and some responsibility by Connecticut DOT). In the 1990s, London split a single government national railroad agency into seven private companies, which provide national as well as London regional service. A quasi-governmental corporation owns and maintains the track and a government agency supervises the standards.

Tokyo is hedging its privatization bets. Tokyo Metropolitan Government operates 30% of the subway lines and is building a new line; it operates 10% of the bus lines, none of the railroads. Private companies in Tokyo and Paris are building toll high-

Improved transit technologies

All the new subway lines opened recently have glass doors in the stations, separating waiting passengers from the tracks. Both Tokyo and Paris operate completely automated lines. Automation is important because it allows high frequency off-peak service without great expense. Other lines use a single on-train employee, a driver who can scan platforms via TV to open and shut doors.

Tokyo has a linear induction subway that reduces the circumference of the tunnel needed by eliminating high wheels. Tokyo also has 37 kilometers of monorail. Paris' new Meteor line—fully automated, 12 miles long through the center of the City—averages 25 mph with 18 stations and 85 second headways.

Planning and implementing the plans.

Both New York and London have had severe failures in planning and implementing their plans. Paris and Tokyo have developed ambitious transportation plans—and carried them out. Paris' basic land-use/transport plan has survived changes in administration and political parties, perhaps because it was based on widespread public participation. (However, its large-scale highway construction program has been substantially cut back.) Much of Tokyo's new rail construction is provided by private firms that are developing and will profit from the new towns the transport will serve.

London's Jubilee line extension had a lower benefit-cost ratio than two other lines that had been considered. In 1989, a Central London Rail Study recommended a new line called CrossRail, estimated to cost 1.2 million pounds. The government of the time approved CrossRail. Private financing and/or transfer of existing subway funds to build the line are now being considered. In the meantime, the Jubilee Extension was built instead, in part because the developer of Canary Wharf on the Docklands promised to pay part of the cost.

New York's planning-implementation record is worse. In 1967, New York State voters approved a transportation bond issue that would have provided \$600 mil-



Figure 2.
The study area transportation analysis zones.

and highway corridors through the northeast conurbations, and to its marine ports with good access to the hinterland west of the coast.

◆ The old industrial core of New Jersey was predominantly in Essex County (centered on Newark), Hudson County (Jersey City), Union County (Elisabeth), and the eastern section of Passaic County (Paterson). These counties still retain a major proportion of jobs and residential density, but they are now largely slow growth areas (with the exception of that part of Hudson County that is along the Hudson River). The new growth follows the familiar pattern and general trend of suburbanization. This effects lower densities spreading residences and jobs away from the older centers. Population also tends to be moving to the south; jobs have not yet shown as strong a southward movement.

◆ There is a counter trend of growth of jobs along the west shore of the Hudson, and particularly the Jersey City and Hoboken areas in Hudson County. Much of this growth results from developers and

businesses seeking less expensive land in New Jersey while taking advantage of proximity and good access (via PATH, NJT Rail, and the private ferries) to Manhattan. The Hudson-Bergen Light rail will probably enhance this growth.

◆ In the past (1970 - 1990) there was substantial growth in the counties along Route 1 and the northeast rail corridor radiating from the older core through Middlesex and Mercer Counties.

◆ As these counties become more developed and probably in response to higher land prices and congestion along Route 1, growth has moved to adjacent counties. Employment will continue to grow at a healthy rate in Middlesex, but the adjacent Counties of Monmouth, Ocean, and particularly Somerset are predicted to grow rapidly also.

◆ Recent development in Northern New Jersey particularly along the Hudson-Middlesex-Mercer Counties tends to be in the growth industries of high technologies and services, which builds on the academic institutions in the corridor of Rutgers and Princeton. An agglomeration growth center is the concentration of pharmaceutical companies in Northern New Jersey.

◆ The projected growth industries throughout the area are in business and health services; which is not that different from the country as a whole. The counties that have a predominant growth in a different industrial area are: Hudson - Securities (growth of back offices for the Wall Street concerns); Essex - air transportation (reflecting the importance of Newark Airport to the economy); Sussex - recreation (taking advantage of the hilly, undeveloped land); and Somerset - communications.

◆ The northwestern parts of the area (Sussex, Warren and Hunterdon Counties) are much more rural and less developed than the rest of the area. These three counties have the most acreage in agriculture. The terrain is rugged and recreation is a major industry. The open land may invite development, but the terrain may discourage it.

Employment Trends in the Study Area

◆ In 1997, in the study area, 34.1% of jobs were in the service industry; 18.9% of jobs were in retail trade; 16.6% of jobs were in manufacturing; 8.9% of jobs were in wholesale trade; 8% of jobs were in finance, insurance, and real estate; 5.4% of jobs were in the transportation industry; 3.9% of jobs were in construction; 3.4% of jobs were in communication and public utilities; and, 0.8% of jobs were in agriculture. Comparing the employment in the different industries, employment in service, retail trade, and manufacturing is relatively high, whereas the employment in transportation, communications, construction, and agriculture is relatively low. Hence, strong or high growth in agriculture or construction may imply fewer jobs than moderate growth in retail trade or services.

◆ All counties in the study area except Essex and Hudson had strong employment growth in agriculture consistent with the overall trend in the state. However, it

Figure 3. The study area highway network.



New Jersey Link to the 21st Century:

Maximizing the Impact of Infrastructure Investment

By Robert E. Paaswell, Joseph Berechman, José Holguín-Veras, Raghavan Srinivasan, and Claire McKnight

New Jersey has undergone a significant investment in transportation infrastructure during the last decade. Taken together, projects including the Kearny Connection, Hudson Bergen Light Rail, access to the Northeast Corridor HSR from Newark Airport, and other planned rail investments have changed the accessibility of Northern New Jersey. Many anecdotal responses to this change have been noted in Real Estate pages of New York and New Jersey papers, citing new development in response to both the gain in accessibility of Northern New Jersey and the growing congestion and real estate prices in the core of Manhattan.

The University Transportation Research Center at the City College of New York has begun a study for New Jersey Department of Transportation to investigate the co-influences of these investments and economic development. This three year study (now in year 2) will examine the base line and trends of these interactions and develop a set of analytic tools to be used by decision makers when evaluating the impacts of transportation investments. This paper, the first of a series of reports in this Journal will discuss the initial conditions and some of the background of the study.

The Relationships between Transport Investment and Economic Development

The fundamental assertion of this study is that planned and in progress transportation infrastructure investment projects in New Jersey have the potential to affect economic development in the state. This economic development will be manifested primarily in the form of land use activity changes, improved environment, and increased employment. These effects, in turn, will transpire mainly from improved accessibility and from the non-transportation impacts of the investments. For this study a key question is how to define and quantify these impacts and how to model the functional links between the investment projects and the resultant economic development.

Objectives

- 1 To describe, quantify and assess the nature and impact of current and proposed transportation infrastructure investments upon accessibility and economic development.
- 2 To review and quantify recent and proposed land-use changes and developments, and evaluate such changes as a response to investment and accessibility.
- 3 To develop analytical tools to assess the ties of investment to accessibility to assist in policy decisions concerning future infrastructure investments and development projects. These tools will be especially useful to assess New Jersey's potential for growth within the highly competitive region.
- 4 To conduct the above assessment looking at all modes, freight and passenger, understanding that both are essential for economic well being and that investment strategies must examine means of providing both.
- 5 To study the above in a joint academic-NJDOT setting, providing training and education for the professionals who will eventually be responsible for infrastructure and land use planning and implementation. Some may be agencies and firms today; others may be students, soon to be employed by agencies.

To achieve these objectives, several major phases in the study have been identified including the analysis of population, employment and land use trends in northern New Jersey and the development of a land use-transportation model. The work that has been completed in these phases is summarized below.

Significant Socio-economic Trends in Northern New Jersey

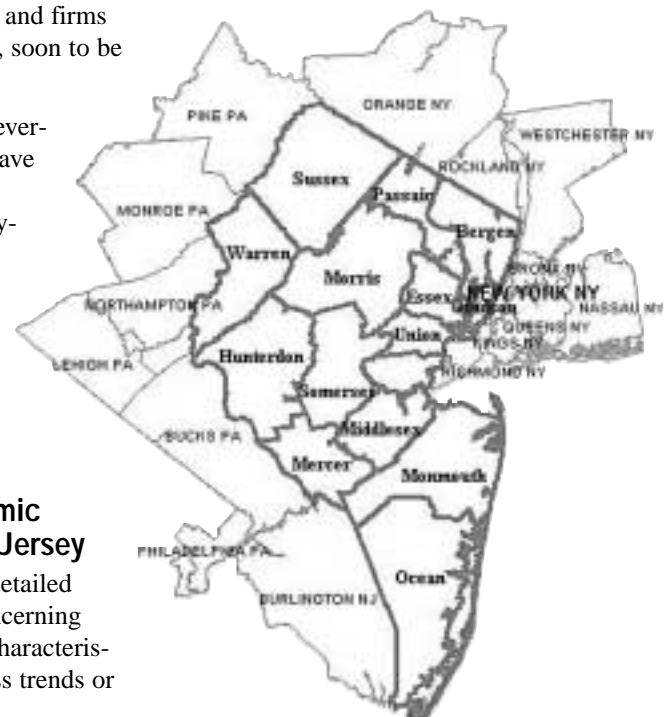
The initial work examined a detailed set of socioeconomic data concerning population and employment characteristics of the region, and to assess trends or

changes in these characteristics that could influence or be influenced by transportation investments. Noting that economic development concerns job creation and retention as well as increases in regional productivity, the study concentrated on types of employment as well as labor force characteristics and their access to employment. A report on the socioeconomic characteristics found:

◆ Although incomes vary widely within the study area, Northern New Jersey is a relatively high-income area; in 1989, Morris County had the highest household income in the immediate region, considerably higher than the U.S. as a whole. Since 1990, household incomes in Somerset and Hunterdon Counties have surpassed Morris County.

◆ Northern New Jersey is a highly developed, densely settled area compared to almost anywhere else in the United States. Its past and continuing development owes a great deal to its proximity to New York City, to its location between New York City and Philadelphia along the major rail

Figure 1. The study area and its environment.



lion from the State for the City's subways. The federal government was expected to match that with \$4 for every State dollar. In addition, New York City was regularly contributing to the subways' capital needs. Altogether, there was about \$3 billion for subway capital expansion. In 1968, the Metropolitan Transportation Authority released a "Grand Design" for spending the money: 28 miles of new subway line in 10 years followed by 13 miles more. First, delays in designing the new lines during a period of rapid inflation dissipated some of the funds. Then one mayor diverted capital funds to operating subsidies (with congressional approval) to keep from raising the fare—for a very short time. Later mayors delayed construction further to try to find less costly solutions as the dollars bought less, further dissipating the funds through inflation. The best subway use of the 63d Street tunnel was studied seven times; the best benefit-cost answer was continuously shoved aside because a neighborhood through which the proposed line would pass objected. At no time was construction delayed by lack of funds. The result: short unconnected holes under Second Avenue and, finally, a new Queens subway connection for one tube of the 63d Street tunnel and promise of an East Side Long Island Rail Road terminal at Grand Central through the lower tube in about 10 years—42 years after the plan was approved.

Service and Environmental Quality

Waiting times. A small percentage (7%) of New York subway riders are the only ones in the four cities who have to wait five minutes or more during rush hours for a scheduled train. Actually, New York and London commuters often wait longer because cars are jammed so they can't get on the first train. Wait times for commuter railroads are much less for Tokyo commuters than for those in the other three cities. Off-peak, London subway riders don't wait longer than five minutes, but 15% of Paris and New York off-peak riders have to wait up to 10 minutes and a third of Tokyo's subway riders do.

Off-peak travel is important because the transport problem for the CBDs is not simply bringing masses of people in and

out but allowing them to come together during the day.

Manhattan and Paris have by far the most subway stations in their CBDs, minimizing walk time. Manhattan offers a more important advantage: density—2 times the CBD employment density of London and Paris, 50% denser than Tokyo's CBD. There are more than 1.2 million jobs in Midtown Manhattan, about three square miles—almost a million of them between 3d and 7th Avenue, 42d and 57th—a half square mile with the farthest points less than 1 mile apart. Even at congested street speeds and local subway speeds (including waiting time) of about 6 mph, that's only 15 minutes between those farthest apart.

Taxi service is important for the kinds of people the four CBDs cater to, i.e., tourists as well as high-level business people and diplomats. London has the most cruising taxis—22,800, Paris the next, 14,900, compared to New York's 12,200. London also has 45,000-80,000 taxis licensed to pick up passengers on call, compared to New York's 29,000-31,000.

Convenience. One-seat rides or easy transfers also are important to commuters, as we learned from the unexpectedly large response to NJ Transit's MidTOWN Direct service. Both Tokyo and Paris have emphasized connections, allowing subways and commuter rails to share tracks and providing the Paris RER, which combines the qualities of commuter rail and

subway, e.g., a line running through the City center from one major airport to the other. Commuter railroads in the other three cities have many stations in their CBDs compared to our 2—14 in Paris, 16 in London, and 17 in Tokyo.

Access to other cities. All the other cities provide high-speed rail service from airports to their CBDs—London with a spectacular 15-minute service from Heathrow--baggage check-in at the London station.

London's Heathrow handled 54 million passengers in 1995 compared to Tokyo's Haneda airport's 46 and JFK's 30. Kennedy, however, handles 1.6 million tons of freight compared to Heathrow's 1.1 million. Looking at all airports in each metropolitan area, London's handled 82 million passengers in 1995, New York's 80, Tokyo's 70 and Paris' 55. In freight, New York's handled 2.6 million, Tokyo's 2.3, London's 1.4 and Paris' 1.1. Pressure on airports is relieved in Paris and Tokyo by very high-speed intercity trains.

Tunneling. All of the other metropolitan areas are putting highways and parking underground—to protect neighborhoods and, outside Paris, to save a forest. New York is debating the value of a tunnel that would save several highly populated neighborhoods from a decade of traffic turmoil, permanently improve their environment and open the waterfront to public enjoyment.



More Use of Commuter Railroads

In New York City outside the CBD (with Hudson County, NJ, but without Staten Island), there are 39 commuter rail stations. In a comparable area of London, there are 305, in Paris 265, in Tokyo 235. Not surprising, a much smaller percentage of trips in our zone are on commuter railroads than in the other cities. That part of the New York Region has an unusually low ratio of jobs to population: 32% compared to 35% in comparable London, 42% in Paris and 62% in Tokyo. Locating jobs around existing or new commuter railroad stations there could accommodate employees from both City and suburbs,

the whole U.K., traffic rose 60% since 1981. U.K. planners and transport people express concern that the countryside is plagued by sprawl. There are shopping centers attached to highways here and there, but through most of England, cities and towns remain compact and distinct from the countryside. Leave central London on a train and in 40 minutes you see sheep on the hills and no random subdivisions. Cordon counts of autos entering central London have been essentially stable since 1981 while the number of vehicles entering the Manhattan CBD on a typical business day has risen from 679,000 in 1981 to 808,000 in 1997, 19%--the highest ever recorded. London is talking about congestion pricing for

personal choice threatens the 18 benefits. Unless governments or civic organizations array these 18 values and demonstrate to the public how these values are threatened by sprawl, individual decisions will continue to move the whole world toward autos for every trip.

Paying for Transport

What people pay to travel. Is travel a public good deserving subsidy? Global warming and low travel costs' inducement of sprawl suggests it is not. On the other hand, the needs for a well-greased urban region in which low-income households are not barred from the wide opportunities a large urban region affords argue maybe.

Travel is far less subsidized in London, where public transport revenues more than cover operating costs. In 1995, London's subway revenue was \$1.36 for every dollar of operating cost, Tokyo's \$1.15. In that year, New York subway riders were paying 92 cents, Paris' 82 cents per dollar of operating cost.

Tokyo commuter rail riders paid \$1.18 per dollar of operating cost; Paris' commuter rail riders paid \$1.19, New York's 58 cents. Chicago riders paid only 45 cents.

London buses made a 6-cent profit per passenger mile, Paris had a 6-cent deficit, and New York had a 30-cent deficit per bus passenger mile.

U.K. gasoline taxes are at least three times New York taxes—making up half of the cost of London's petrol. (Only 40% of our retail gas price is the tax.) Tokyo drivers also pay about three times New York's gasoline taxes. However, many of the cars lodged in the Tokyo CBD are company cars. French employers must pay half of their employees' public transit commuting cost. As in the U.S., parking in the outlying parts of metropolitan London is free to motorists. U.S. employers may give employees \$155 a month worth of parking cost tax free but only \$65 a month for transit travel to work.

If transit subsidies are to be diminished, drivers should be billed for more of the public costs of driving. The Sierra Club found seven studies on subsidies to motorists and 11 sources the studies used. The conclusions ranged from subsidies of about \$3 a gallon of gasoline to over \$7.

London buses made a 6-cent profit per passenger mile, Paris had a 6-cent deficit, and New York had a 30-cent deficit per bus passenger mile.

and recentralizing jobs in New York's outer boroughs would promote use of transit and walking. The railroads would increase efficiency by carrying more reverse commuters in trains now almost empty, particularly from Atlantic terminal through Brooklyn to, say, Jamaica, Queens.

Promoting commuter rail service from the outer edges of these boroughs also might attract more Manhattan employees to live in the City. Subway service is tedious from the outer edges of the City compared to commuter rail service. Adjusting fares and schedules, improving walking access from apartments to stations, building new apartments near existing or new stations and making new connections, e.g., to Co-op City, are the steps needed.

Disciplining the Auto

Public policy. London, Paris and Tokyo as well as the European Union have declared it to be public policy to restrain growth in auto use. Auto ownership per person has been rising in those three metropolitan areas—very rapidly between 1980 and 1990 (though it went down a bit in the outer areas of Tokyo, 1990-94). In

driving throughout central London and is enforcing 32 km/hour traffic calming in neighborhoods with speed bumps and street narrowing.

Traffic safety was greatly improved in London between 1984 and 1995. Tokyo maintained a low fatal accident rate, 1984-96—but only because there was little driving in the City. New York had by far the most fatalities within the City. Even when compared with the number of car miles driven, London had only 3/4ths as many fatalities as New York.

Public participation. Almost everywhere, auto trips are increasing—even in Paris where transport is good and trips are short. People in all four cities object to the increase in traffic but add to it themselves; our personal choices conflict with our community choices. In none of the four countries is the issue confronted openly for public discussion and for conscious resolution.

I have found in over 40 years of fighting sprawl 18 important benefits of centers-and-communities over sprawl—social, economic and environmental benefits. These are not considered when an individual chooses to buy and use a car, but that

regional economic policy, which influences firms' location, labor market conditions and land market economies; lastly, general public policy making whose essential task is to resolve conflicts among stakeholders. In Western democracies, the ability of governments to coordinate their activities and design complementary policies to gain maximum economic development effects from their capital investments, by and large, is fairly limited. Paradoxically, however, it is only in democratic societies that economic development reaches its maximum potential.

Conclusions

Do transportation infrastructure investments generate national and regional economic growth? This question remains an important policy issue as planners and policymakers repeatedly provide a strong affirmative answer that is based on popular writings and basic intuition. But reality is not that simple, as the empirical evidence on the causality link between transport investment and growth, at best, is equivocal. What then have we learned from the discussion in this article? The following are key conclusions.

First, while at the national or state level capital stock expansion seems to be correlated with economic growth, transportation development is carried out incrementally, by the implementation of individual projects. Hence, it is at the project level that a link must be established between the project's primary accessibility benefits and economic growth. It is for this reason that a careful microeconomic analysis must be done to ascertain causality.

Second, transportation capital projects can be justified only if they generate sufficient transportation benefits. If not,

attempts to rationalize their implementation on the basis of alleged economic growth benefits is fundamentally wrong and is likely to lead to the execution of inferior transportation projects. Put alternatively, transportation investments should be carried out, first and foremost, on the basis of the social rate of return from their primary transportation benefits. Expected economic growth is a secondary decision criterion that cannot replace transportation output evaluation.

Third, by and large, transportation capacity investments serve as supporters of regional economic growth, which almost universally is spurred by non-transportation factors. It is only when certain conditions, related to the impact of accessibility benefits on market externalities, are met that transportation development can potentially generate economic growth. If such conditions cannot be shown, the frequently used practice of adding up accessibility benefits with other non-transportation benefits, amounts to double counting.

Fourth, even when positive externalities can be ascertained, critical policy conditions must prevail in order for growth benefits to materialize. This is particularly important at this time and age when major policy and logistic efforts are made to decouple economic growth from further increases in passenger traffic and freight movement.



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of firms and the formation of new sub-centers of business and employment. By and large, other factors, such as availability of skilled labor, override high transportation costs. It appears that, in the long run, the cumulative accessibility improvement impacts from transportation development tend to encourage more dispersed spatial patterns that may not be regarded as efficient. In general, available empirical evidence cast a strong doubt on the effectiveness of specific transportation projects to influence relocation decisions and land use changes (Giuliano, 1995).

Empirical Evidence

Attempts have been made in recent years to validate and measure the impact of specific transportation investments on economic growth mainly at the local and state levels. In this section I very briefly review three studies of rail, highway and airport development.

The Buffalo Light Rapid Rail Transit (LRRT) is a massive capital investment project (about US\$520 million, in 1982 prices) whose explicit objective was to revitalize the Buffalo CBD by offering high quality rail accessibility, thereby encouraging economic development.

Berechman and Paaswell (1983) have studied this project and have derived two main lessons. First, that improved rail transit accessibility in a region with high quality highway access, is neither a necessary nor a sufficient condition for revitalizing the CBD. Second, the lack of regional or citywide coordination of policies to ensure the attainment of the LRRT objectives was probably the most serious threat to the revitalization of the Buffalo downtown. Conflicting highway, parking, transit and zoning policies are examples of this problem.

The highway example is the orbital motorway around Amsterdam, the Netherlands, completed in 1990. This highway is only 5 km. from the city center and diverts through-passing traffic from city streets. It was suggested that this project would have a major impact on office location and commercial development in the region. A study by Bruinsma et al, (1996), however, has found no significant impact on office rents and locations. In fact factors like building amenities had greater impact on office location decisions than improved accessibility had.

The airport

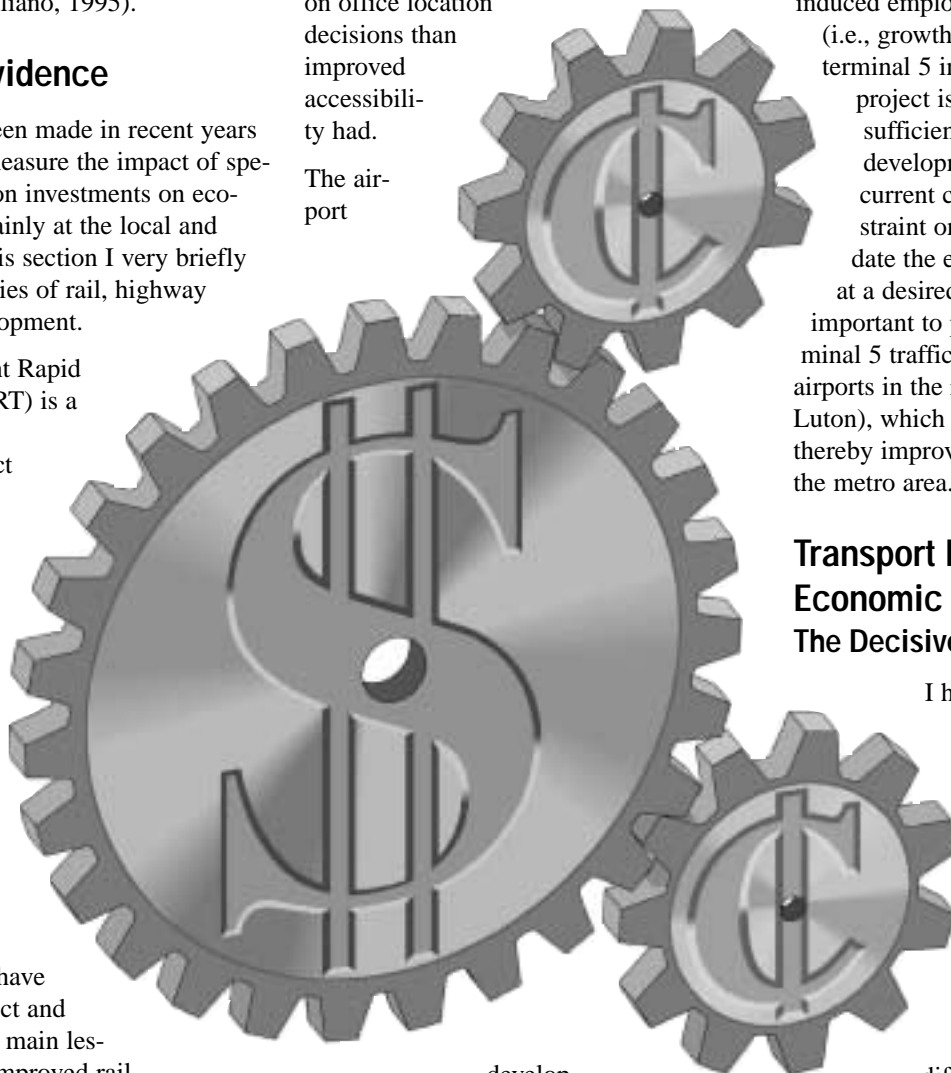
development case study is the proposed terminal 5 at Heathrow Airport. The growth and restructuring of domestic, European and intercontinental aviation markets have created a business opportunity for development at hub airports such as Heathrow. Thus, Heathrow's management believes that it would be commercially advantageous to expand the capacity of Heathrow by constructing a new terminal alongside the four existing ones. A

key issue in the decision-making process is the role of the airport as a generator of economic activity, mainly in the airport's region. Using employment as a key growth measure, studies by Peda (1994) have raised some difficult questions on the airport's ability to boost employment. Most importantly is the fact that a sizeable increase in total employment attributed to the investment, is a direct function of the expected increase in air traffic at Heathrow. This means that the real generator of economic growth, in the form of induced employment, is an external factor (i.e., growth in aviation traffic) and not terminal 5 investment per se. Thus, this project is neither a necessary nor a sufficient condition for economic development. Rather, the airport's current capacity represents a constraint on its ability to accommodate the expected increase in traffic at a desired level of service. It is important to point out that without terminal 5 traffic may go to two other major airports in the region (Stansted and Luton), which presently are underutilized, thereby improving traffic distribution in the metro area.

Transport Investment and Economic Growth: The Decisive Role of Policy Design

I have already emphasized the important role of policy-making in effectuating potential economic growth from transportation investments. Quite often, various stakeholders have conflicting interests and agendas, thus making the coordinated design and harmonious policies rather difficult. Even if underlying economic conditions are favorable, political conditions will ultimately determine the degree to which economic growth outcomes are attained.

Three types of policies are vital for the attainment of potential growth benefit. The first is investment policy, which determines attributes such as mode type, investment's scale, facility location and function in the larger network; second,



The calculations included governments' out-of-pocket costs related to cars and trucks, unpriced costs such as environmental degradation, accident costs not paid by insurance, vibration damage to buildings and infrastructure, and the value of land used for parking and roads. In addition, there are indirect social costs of auto dependence, e.g., isolating poor and old people from jobs and services, destroying sense of community, spreading ugliness, weakening health by discouraging walking and bicycling, raising public costs of infrastructure by spreading development and depriving people of a choice of living near places they want to go to often—since those places are scattered and spread to accommodate the auto.

Connecting Land Use to Transportation

From the four-city comparison, by far the most important lesson is the link between the settlement pattern and transport mode choice. Both Japan and the U.K. have just consolidated their government departments responsible for transportation and land-use. The principle is simple: only if people are coming from the same general area and going to the same places can they ride together. Paris and Tokyo grow in real places that neighbors go to—subcenters and new towns; New York grows with a scatter of jobs and services and a spread and scatter of housing. London has done a little of both and is wrestling with the direction to take.

In the New York Region's outer areas, everything is so spread and scattered that walking, bicycling, and even riding buses are all but impossible. Neighbors go in different directions to work, shop, recreate and pray, and they're not living close enough together to walk to the same bus stops in sufficient number. Driving to a bus or train is the only possibility of using transit, and that is limited by parking restrictions of the municipality where the bus or train stops. So from the New York Region's outer areas, only about 30% of the trips even to the CBD are on commuter rail, while over 90% of Tokyo's are—though nearly all New York rail commuters sit comfortably and get there faster than their motoring neighbors while many of Tokyo's suffer what they call "commuter hell," packed so tightly that

passengers cannot move arms or legs.

Tokyo has been building new rail access to the CBD rapidly, reducing but not eliminating commuter hell. So Japan is resorting to land-use policy as well, moving activities from the CBD to subcenters in the suburbs, even considering moving the national capital to a subcenter.

While fewer than 1% of trips within New York's outer ring (not to the CBD) are via transit and less than 3% in the older suburbs, a third of the trips within Tokyo's suburbs and exurbs are on transit. Around Paris, 10% of the suburban-exurban trips are on transit, though the total density in outer Paris is much lower than New York's comparable area. The reason is that jobs and housing are clustered and related to each other and to transit. In the process, Paris' exurbs remain 82% farms and forests. Within New York City, there is an opposite story. Even outside the CBD, New Yorkers own fewer cars than their counterparts in Paris and London and use their cars less. Their public transportation is not better, but they are clustered at relatively high density around subway and bus stops.

In the U.S., metropolitan areas typically try to relieve congestion by building circumferential highways so drivers can skirt congestion in the center. But development typically forms around the circumferential highway, quickly clogging it. Then a second ring of highways and even a third ring and fourth ring are contemplated or built—achieving the same level of congestion because development follows. Residents near these highways plead for public transit instead of widening the roads, but there is no place that transit can serve that could remotely compete with the automobile, even when autos are crawling. Paris and Tokyo are building circumferential rail lines as well as highways because they have real places to connect—new towns and subcenters deliberately placed so they can be connected both to the CBD and the other subcenters around the center. (This was the pattern recommended for this Region by the 1929 Regional Plan.)

Connecting transport and land-use in the New York Region is difficult because municipalities have the responsibility for land-use—and there are 780 of them in

this Region. State Transportation Departments have responsibility for transport policy, on the whole. No one has the responsibility for raising the joint land-use/transport issues for serious public discussion except in New Jersey where a State plan provides a framework.

Where From Here?

To benefit from the three studies:

- ① Examine the mechanisms by which the other metropolitan areas are doing some things better than we are—transit operations and technology in all three cities, planning and national-metropolitan relations that make Tokyo and Paris more satisfactory places to move around, and traffic safety measures of London. Particularly, look at the settlement patterns that promote walking and public transit: subcenters, new towns and building on old communities rather than sprawl.
- ② Continue the international relations that produced the data. Konheim & Ketcham produced New York's data (www.transport-link.com), in large part with its own funds. New York needs a source of funds to continue comparative data.
- ③ The cities should work together on strategies to achieve the conscious public will needed to discipline the auto—presenting the damages of growing auto dependence and the community decisions needed to discourage unnecessary auto trips.
- ④ Take action now to keep transportation capacity equal to the economic growth in and near our CBD. Otherwise the hassle of being here could again outweigh the benefits, and the cycle will return to "New York is dead." The dependable planning/implementation processes of Paris and Tokyo should be considered.



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INTERVIEW: Robert Kiley

Commissioner of Transport of London, former President and CEO, New York City Partnership

by Janette Sadik-Khan, President,
Company 39, an e-business subsidiary
of Parsons Brinckerhoff

JSK: *You were very instrumental in developing five-year plans at the MTA and developing a stable operations and maintenance funding program. Is there a comparable funding program in the UK?*

RK: At the moment, there is nothing. And that's the main reason, certainly one of the most important reasons why the London Underground is in such a sorry state. I've had a chance to be on the Underground network now, three or four times. And everywhere you look there are the signs of deterioration and decay. There is a pretty heroic workforce trying to pull it together but it's a losing battle at the moment. The financial reason for that is they never know what next year's budget for investment is going to be.

JSK: *How do they decide what they are going to do?*

RK: What happens is they barter for each year's grant from the government. Some years it might be significant and other years it may not be. As a result, they can't plan from year to year. Also it is a cash accounting system for an April to March fiscal year. So you find out in February finally what your number is and if you don't get it committed, you lose it. This means you have limited ways to spend the cash. It means that you have to obligate funds quickly so they end up painting a lot of things and maybe they can replace some track. But it means that the longer-term initiatives, anything that takes say two years or longer, they are never able to do. And this expenditure pattern has now come to haunt them.

JSK: *I think that the money management skill you brought to the NYC MTA will be certainly something that they look forward to. This brings me to another question. Another key element of your success in rehabilitating the New York system was changing work rules and relationships with the unions. Are there similar changes that are required in London?*

RK: I don't know enough about the labor contracts and work rules that might potentially be an impediment. I've met with the unions and I've told them that. Since I came with this reputation for being tough on the unions, I said you should talk to the Transport Workers Union and they'll tell you we had a pretty good relationship. They had already done that so it wasn't a very tense meeting. I said let me give you an example of what can happen over time if you are not paying attention to the real world of work. A job might have been defined as a perfectly good one in year 1 but by year 20, while not exactly outmoded, it had become a very narrow job because technology and skill levels changed. So at the MTA we realized that was a problem early on, especially in the Transit Authority so we did something called broad banding. We tried to broaden the scope of individual jobs and reduce dramatically the number of different job titles. The union at first thought this was an effort to reduce their membership through attrition because we were trying to streamline the number of job titles. What we were really doing was saying that individual jobs can be more challenging and exciting. We still need a similar number of people. They may need some upgrading in skills and they may need to accept more challenge but the jobs would be changed to fit the world we live in and that would fit modern transportation technology. They finally bought into that and I said in London we'll probably go through a similar exercise but it's never going to be confrontational. We'll get there but we're not going to do it without the unions.

JSK: *At the Partnership you raised the issue of the need to develop new mechanisms to fund major capital projects so that agencies can plan for those projects that may take 10-20 years. How can we get political leaders to focus on creating funding programs that address long-term needs, particularly at a time when officials have a short-term perspective?*

RK: I wish I could answer that question in a way that would be credible. That's the toughest question of them all because if there were a good answer for it, you wouldn't be asking the question. As long as I've been in this business, this has been a perplexing question. My view is that you have to, whether it's at the state or federal level, or say in London at the city level or the national government level, you have to identify a permanent source of revenue that's committed to transportation and in a way where it's understood what the modal splits are for allocating the funds. The modal split part of it could change, say every four or five years, getting back to your question about the five-year plan. It needs to be predictable enough so that you can actually have a capital plan that makes sense and get the work done and utilize it for collateral and coverage of debt service. And that's not happening in England right now at all. Also it's really starting to collapse here in New York because we have this unbelievably debt-loaded plan which finally almost toppled with the interest load so now they have to go back to the drawing board. I think the economy is really slowing and this debt loaded plan is really not going to go very far.

JSK: *Do you think tolling the East River bridges is a politically feasible solution to the funding shortfall we face? What strategies can be developed to make such a plan feasible?*

RK: First of all, I've always said that all the ways into the central business district should carry a price with them because you have to limit the number of automobiles. Those who choose to drive, for

Can we regard transportation development as economic generator in cases where positive market externalities can be ascertained? The answer is a "qualified yes" since we need to recognize that the amount of growth is a function of the degree of improved accessibility produced by a project (see Figure 2). And given that in well-developed economies, where the in-place transportation network is quite extensive, additional accessibility, even from a large-scale capital project, cannot be significant. Additionally, even this economic growth is confined primarily to transportation intensive sectors where accessibility matters (e.g., retail, agriculture or food distribution). Since contemporary economies are fueled primarily by innovations in the information and data processing sectors overall, the amount of transportation generated growth is rather limited.

All in all there is plenty of evidence showing long-term regional economic growth despite the lack of any significant transport investment. Apparently, many other forces ranging from a sharp rise in international trade, technological innovations, human capital betterment to successful local economic policies that can support growth. Hence, in general transportation development serves as a growth supporter and not as a growth generator. By and large, within a reasonable degree of regional accessibility, growth is achieved by an assortment of forces and policies, not necessarily transportation related.

Some Conceptual and Empirical Disputes

Given the common view explicated above on the relationship between transportation development and economic growth, in this section I discuss three misconceptions that frequently appear in the popular and professional literature.

1. Accessibility benefits and potential growth benefits can be added to produce total benefits from a transport capital investment. It has been argued that in the evaluation of transportation capital projects, only direct travel time and costs savings should be regarded as benefits from the project, since all other alleged benefits, in fact, result from the capitalization



of these costs savings (Mohring, 1993). The inclusion of other effects, like potential economic growth, as additional benefits amounts, therefore, to double counting of benefits. In the absence of positive externalities the welfare gains (actually the change in consumer surplus), resulting from the primary transportation benefits represent total benefits from this project.

2. Transportation improvements are associated with long-term economic growth; hence they must also generate it. A number of authors have found correspondence between the timing of major transportation improvements and long-term cycles of economic growth. They have deduced, therefore, that the former is a major cause of the latter (Garrison, and Souleyrette, 1996). But what is the cause and what is the effect? Can key transportation advances underlie economic growth (the "generator" function) or a surge in interregional and international trade, which strains the capacity of the in-place transportation systems, requires new transportation improvements and innovations to sustain this growth (the "supporter" function)? The empirical historical research literature on this question is quite equivocal. To illustrate, in a renowned study, Fogel (1964), has analyzed the impact of railroad development on the American economic growth during the 19th century. He concluded that while railways had a primary impact on the

costs of transport and that social savings have resulted from the movement of agricultural output by rail, "no single innovation was vital for economic growth during the 19th century". Economic growth was primarily a consequence of the knowledge acquired in the course of the scientific revolution and this was the basis for a multiplicity of innovations. Thus, rail development in the US has helped shape growth in a particular direction but was not a prerequisite for it.

3. Transportation improvements produce efficient spatial patterns thereby generate economic growth. A common view holds that improved transportation will stimulate efficient spatial patterns of households and businesses, which, in turn, will spur economic growth. This inference is supported by a vast amount of theoretical analysis, the main conclusion of which is that improved accessibility will encourage further activity decentralization and, at the same time, will intensify agglomeration and urbanization economies (Anas et al., 1998). How valid is this view in light of available empirical evidence on metropolitan expansion? Gordon and Richardson (1994), for example, have found that in the Los Angeles metropolitan area over the last two decades average travel times and congestion levels have declined even though no significant investments in transport infrastructure facilities were made. The main reasons are the decentralization

allocation of resources in the economy. Traffic congestion is an example of negative allocative externalities, whereas firms' agglomeration represents positive ones.

Transportation accessibility improvements can potentially trigger several major positive externalities, which are susceptible to accessibility enhancement. In turn, they can boost productivity, reduce production costs and promote more efficient use of resources. Collectively, these changes can bring about economic growth as defined at the outset. And these benefits must be in addition to the primary accessibility improvement benefits and not merely their market capitalization.

To summarize, the main argument regarding economic growth ensuing from transport infrastructure development is that the mechanism that transforms accessibility benefits into economic growth benefits is the presence of allocative positive externalities in specific markets, which are amenable to improved accessibility. The scale, spatial and temporal distribution of these externalities will affect the magnitude and scope of economic growth, given the transportation investment. Noticeable examples are labor markets economies; an economy of industrial agglomeration and transportation markets economies. An important example of the latter is when two disjoint networks are linked by a newly constructed facility, thereby opening up for trade previously non-trading

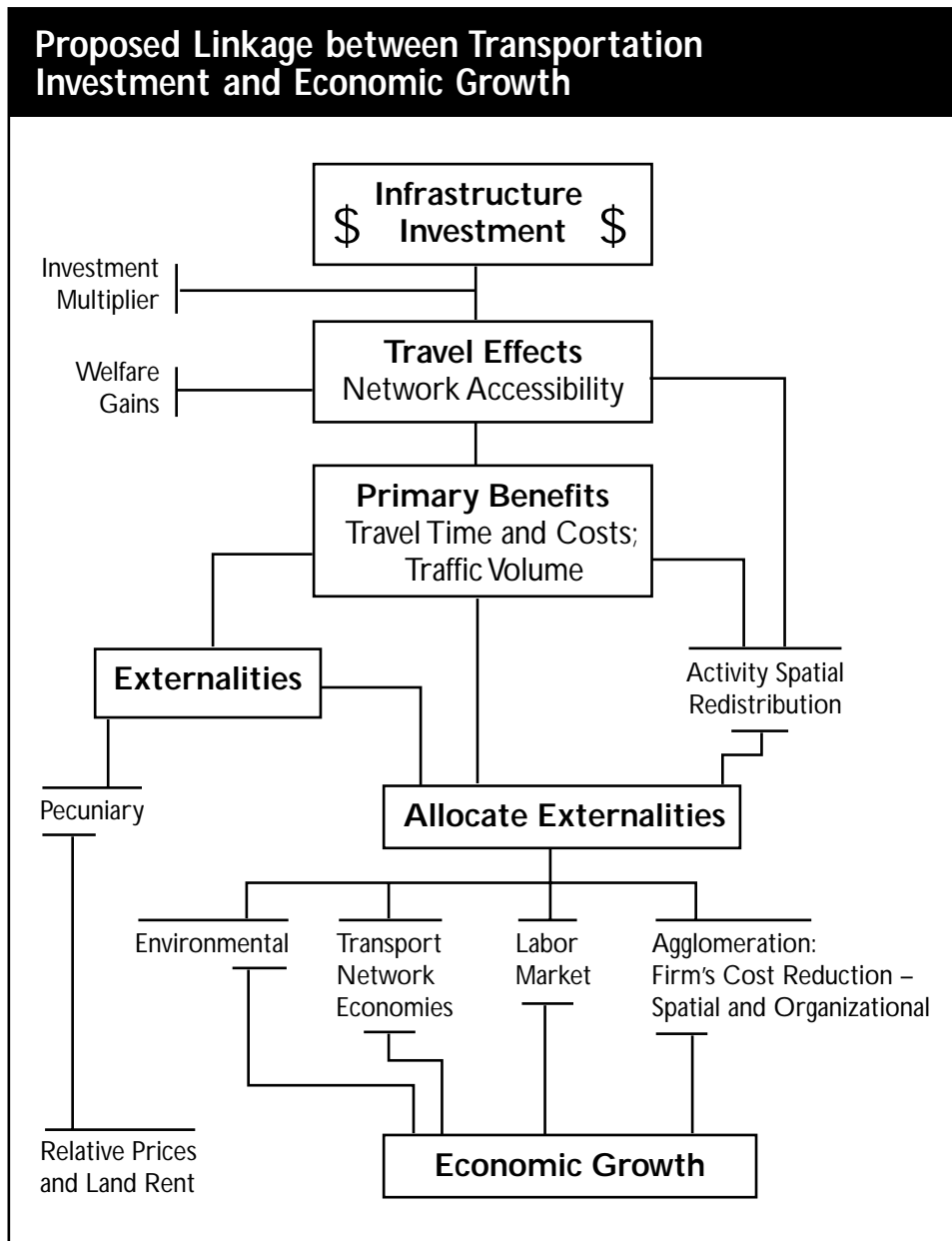
markets. Another example is when a new freight terminal enables intermodality (say, between truck and rail), which improves "just in time production", thereby reducing inventory costs to producers.

Is Transport a Generator or Supporter of Economic Growth?

The common view regards transportation as a sufficient condition for economic growth in the sense that its development generates growth. At times transport development is also regarded as a necessary condition in the sense that unless further transport investments are made growth will retard. Are these claims true or they hold only in some very special cases? My principal argument is that transportation development is neither a necessary nor a sufficient condition for economic growth. As depicted by Figure 2 it is only when positive externalities can be established that transportation can potentially generate growth.

In general, transportation infrastructure acts as a binding constraint on the local economy. That is, if transportation capacity is rather limited, given the level of economic activity in an area, its further expansion will enable the region to become more competitive relative to adjacent regions. Can this improved competitiveness be regarded as a long-run economic growth? In an open economy the answer must be negative as factor mobility, mainly of capital and labor, and the frequently used economic preferential policies, like tax incentives, can perhaps make such an edge significant, but only in the short-run. On the other hand, to regard this constraining characteristic of the transportation system as unimportant or inconsequential is a serious mistake. In many regions (e.g., new York metropolitan area), regional competitiveness can vastly be enhanced if critical transportation investments, in particular, those related to freight movement were implemented. Given budget constraints, as long as the time and costs savings from transportation investments yield a positive social rate of return they should be undertaken regardless if economic growth follows.

Figure 2



whatever reason, must pay to enable the great bulk of people, 85% of them, to come in by other means in order to make Manhattan work. It also makes Brooklyn work. It's not just one borough; it's at least two. So, no free lunch. Secondly, technology has really gotten to the point where this can be done with true facility and ease and with enough wisdom that if there are people who should be allowed to bring their cars in because for whatever reason they cannot use other forms of transportation, you give them a break. If you want to let seniors have some discount, you can do that because with the E-ZPass, and the technology that lies behind that, we don't need to have toll-booths and barriers. We can just get to a fixed point on a route whether it's over a bridge or through a tunnel, or through some other means that's not now tolled, you start paying when you enter the city. And you might pay one price at rush hour and another price at 1 o'clock in the morning if you're a truck. There are all kinds of ways to do this which results in congestion management and you get more capacity out of the existing road system and better trip times on the one hand and on the other hand you develop financial resources by collecting revenues from the tolls and the prices to invest back into the subway and bus systems.

JSK: *You have seen the city from different perspectives over several years as head of the NYC Partnership. From an efficiency perspective, would you reorganize transportation in New York City and New York State?*

RK: I think we are at the point where we are truly regional in New Jersey and New York and I would definitely add Connecticut as far as commuter movements are concerned. There needs to be some way of developing policy and implementing transportation programs both on the surface and underground (on the rail or on the roads) that commit all three states, and I think there needs to be some sort of organizational solution to that problem. I wish I were wise enough to outline it for you but it could be to take the MTA and extend it a little bit. The MTA has a contract service with Connecticut for MetroNorth rail operations and now the bi-state Port Authority

has rail operations through PATH. In addition, you have an independent NJ Transit. I think these rail operations should probably be under one broad umbrella. In order to have a constituent basis that would take into account people's needs and concerns, which would be more democratic, you might even want to elect some of the members to the Board of such an agency. The truth is that the three states are heavily dependent now on non-automotive transportation. Most people can't get to work without access to transportation other than cars. That's not just people coming into the central business district but people traveling to commercial and job concentrations on the periphery. They really need to be able to travel there through means other than their own cars. Also, you can make parking rates reflect these same concerns. It should be very expensive to park in highly congested areas, Manhattan being the most obvious place. We are nowhere near where we need to be on parking fees, charging people enough to build up our transportation resources.

JSK: *We still had difficulty getting even basic commuter benefits to be equalized in a parking versus transit debate in the last legislative session. The Partnership has been involved in reviews of transportation issues (Airtrain, Access to the Region's Core, the freight tunnel project). Are there similar studies underway in the UK? Are there representatives of the business community who are willing to be involved in such studies in the UK?*

RK: There really is not one place that is directing the planning process and sending out signals about what is really needed. To some extent the MTA and the Port Authority have played that role in our region, and while there is a lot to be desired, it is a lot better than nothing. In the UK, it is very hard to know where that planning function is. In fact it has been opposed in the national government until now. The thing to understand about what's happened in the UK is that you have devolution with new regional governments in London, as well as in Scotland, Wales and Northern Ireland. So there is now the potential through the organization that I will be running, to be the center of that activity. Since this is a new organiza-

tion, and there is nothing in place at the moment, it's going to take awhile to organize that. I have been impressed by the awareness of the business community in the three or four organizations that reflect business concerns, one of which is called London First, which is a lot like the NYC Partnership. They have long range planning at the top of their agenda, just as we do here. They are pressing very hard, and they are actually an effective pressure group for change. I was pleasantly surprised to discover that. But today there is no overriding planning capability and to underscore that, the Underground does not now have a true assessment of the condition of their own physical plant. They are going through a process, which they call a public-private partnership, where they are going to divide the Underground into segments and bid it out to consortium companies, to do the equivalent of the "state of good repair" program that the MTA has been doing for the last 25 years. These contracts are being bid against a very unsatisfactory base line assessment of the condition of the plant. I'm not a fan of this effort and I'm trying to get it to change. One of the reasons for changing is that they've never gone through this process before.

JSK: *You talk about decentralization, it seems that in the UK on the one hand there seems to be more privatization and decentralization but on the other hand you have more centralized regulation than in the US. Could you comment on that?*

RK: They have in the UK this long tradition of a unitary central government that holds all power. On the other hand, over the last 20 years there is an accent on privatizing activities, functions and organizations that were basically government sponsored. It has worked in some cases as in British Air to use a very common example, and it seems to have spectacularly failed in another case, the privatization of British Rail. Almost everyone in England agrees that it absolutely has fallen apart and they have the worst rail service since World War II. They are now revisiting the whole basis on which they privatize. Now there is a proposal to do something similar in privatizing the Underground. I think there is this huge

HONG KONG BUILDS A NEW AIRPORT

By Ed Seeley

Hong Kong is a city of ten thousand legends, not all of which are apocryphal.

One of the most recent concerns an eight year old boy making his first trip through Hong Kong's new international airport at Chek Lap Kok on a sunlit afternoon some two months after its July 6 opening in 1998.

He was standing all by himself on one of the broad entry ramps just inside the south end of the airport terminal's vast departure hall, intently studying the full-sized model of a 1909 Farman biplane that hung in the open space next to the ramp. It was an exact replica of the primitive bamboo-and-canvas flying machine that had begun the Age of Flight in Hong Kong eighty-eight years earlier.

The boy had read newspaper stories about the biplane. Wanted to see it up close. But knew his parents would insist that there wasn't time to visit it on this trip. So he decided to check it out on his own, and managed to slip away unnoticed from his mother and father as they chatted with other grown-ups in the crowded check-in line for the flight to Shanghai.

As he gazed at the fascinating old biplane, he became aware of a beautiful woman standing near him on the ramp. Wearing a traditional jade-green Cheong Sam dress. With dramatic eyes and a face that looked as if it belonged in a book of Chinese fairy tales.

The woman smiled at him when he worked up the courage to turn and face her. He smiled back shyly. Then heard her begin to talk, in a strangely distant and musical voice. Telling him wonderful stories about the new airport.

• Like how it stands on a 4.8 square mile landfill platform next to Lantau Island some 15 miles due west of Central Hong Kong, and incorporates the two small islands of Chek Lap Kok and Lam Chau....

• How its 121 acre passenger terminal contains nearly six million square feet of wide-open interior space. With 48 plane gates, 288 check-in counters, 144 retail stores, 63 escalators, 54 moving walkways, and an automated people mover running along its half-mile spine. Using tall glass walls and roof panels to make maximum use of natural light. And gently sloping ramps to connect its various levels....

• How the 21 mile Airport Railway speeds travelers to and from satellite air passenger terminals in downtown Kowloon and Central Hong Kong in little more than twenty minutes. In trains that depart every ten minutes. Whose interiors are arranged like Business Class in commercial airliners...

• How the 1.4 mile long Tsing Ma suspension bridge carries the rail line and the airport's 25 mile expressway system across the broad Ma Wan Channel on the way to Kowloon....

• How Hong Kong built the airport, the rail line, the expressway system, the Tsing Ma Bridge, and two new tunnels under Victoria Harbor in only six years. For a cost of \$21 billion (in U.S. dollars). Which turned out to be five percent less than its original cost estimate. But was still 30 percent more than the cost of the Channel Tunnel between England and France...

Fascinating stories full of facts and figures about what became known during the 1990s as "the world's largest construction project". Which left the boy spellbound...

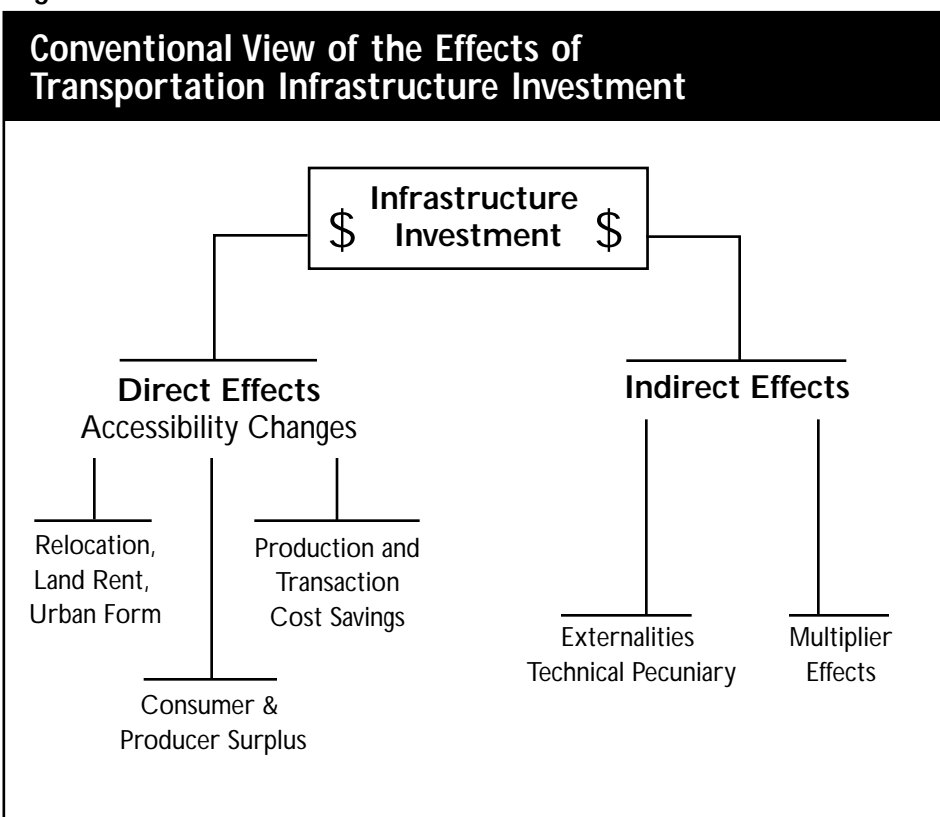
Airport Program: US\$21 Billion

	Total Cost (US\$ Bill.)	Funding Sources		
		HK Gov.	Gov. Corps.	Private Firms
Program Total	\$20.9	\$14.8	\$3.2	\$2.8
*% of Program Total	100.0%	70.0%	15.3%	13.6%
Check Lap Kok Airport	9.6	5.9	1.7	2.0
Airport Railway/Terminals	4.4	2.9	1.5	0.0
Airport Expressway System	4.6	3.7	0.0	6.8
New Land & Utilities	2.2	2.2	0.0	0.0

Real Estate Developments: US\$26 Billion

	Total Cost (US\$ Bill.)	Site Size (acres)	Number of Bldgs.	Floor Space (Mill. F ²)
New Towns Total	\$22.1	154.1	141	37.0
Hong Kong Central	3.4	14.1	5	4.5
West Kowloon	6.5	33.5	23	11.7
Olympic	4.2	39.6	25	6.8
Tsing Yi	1.4	13.3	13	3.1
Tung Chung (Phase One)	6.1	53.6	75	10.9
Hong Kong Disneyland	\$3.6	311	N.A.	N.A.

Figure 1



I challenge the view depicted by Figure 1 of the economic growth outcomes from transportation investment. To begin, as already explained, economic growth is a long-term phenomenon. Thus, to regard indirect multiplier effects as contributing to economic growth negates its basic definition. Moreover, these effects ignore the specific nature of transportation improvements and their unique effect on the economic behavior of firms and households. In general, various forms of government sponsored work programs, unrelated to transportation, can generate short-term income, employment and other local economic effects.

Turning to the direct effects, I further challenge the assumption implicit in Figure 1 that accessibility improvements from transport capital investment necessarily promote economic growth. I present this argument in two steps. First, I note the declining role of accessibility improvements in the contemporary economies of cities and regions. I then argue that several market conditions must prevail in order for accessibility benefits to potentially generate economic growth impacts.

Because of key demographic, transportation and economic trends, contemporary

Western economies are much less impacted by transportation improvements than few decades ago. To start with, there is a marked change in the relative importance of work related trips, which traditionally were the major cause of congestion, thus of capacity improvements. Data from the UK show that of the 8 major categories of daily trip purposes in 1994/96, work travel accounts for 18.6 percent of all trips, down from 22 percent twenty years earlier. A similar phenomenon has been observed in the USA.

This trend is strongly related to another major change, namely the development of highly dispersed employment pattern, mainly at the expense of the CBD. As a result, commuting patterns have become highly complex, with cross commuting becoming more important than travel to city centers. Findings on auto commuting trip times for the twenty largest USA metropolitan areas show that average trip times have remained constant during the 1980's and 1990's or were reduced. Apparently, the market operates through the relocation of firms and households to achieve the balance of keeping commuting times within tolerable limits.

The restructuring of the economy in the postindustrial society is another major

structural trend. In today's economy the main source of profits and market dominance is knowledge and information, a major part of which is unrelated to transportation. New information and telecommunication technologies are considered more vital to improved production and distribution processes than transportation does.

The last structural change discussed here relates to the effect of transportation on the environment. In 1996 transport was responsible for over 25% of world primary energy use and 23% of CO₂ emissions from fossil fuel use, where developed countries contribute the majority of this figure. Recently, environmental arguments have been linked to those of sustainability, connecting environmental concerns with those of economic development and equity. To achieve the objectives of sustainable development, individuals and firms must carry out their daily activities differently, mainly in ways that significantly reduce travel.

In general, a large proportion of all transport investments is made to improve accessibility and alleviate congestion, mainly for daily commuting and freight movement. The simultaneous operation of the above trends lessens the alleged linkage between accessibility improvements and economic growth as described in Figure 1. How then can transport investments induce economic growth? To answer this question I now introduce an alternative analytical framework, depicted in Figure 2.

Figure 2 highlights the idea that the main output from a transportation investment, is network accessibility improvement. Assuming a positive net value of these effects they also represent welfare gains to households and firms. Subsequently, two additional effects may arise. First is the impact of network accessibility improvements on activity location, which if ensues, may improve spatial patterns and economic efficiency. Later I return to this issue. The second potential result is economic growth. This effect is predicated on the presence of certain market conditions, labeled in Figure 2 as "allocative externalities". These effects emanate from the non-compensatory action of one economic entity on the utility level of another, which in turn, can affect the efficient

Generator or Supporter:

Transport Investment and Economic Growth

By Joseph Berechman Professor and Chairman, The Public Policy Program, Tel Aviv University, Israel and Senior Researcher, University Transportation Research Center, The City College, New York.

This paper examines the general question of whether transport infrastructure investments can engender economic growth in well-developed economies. The paper first explains the nature of the problem and then explicates the possible linkage between transport investment and economic development. It concludes that transportation mainly serves as a binding constraint on economic activity so that its expansion acts to facilitate the achievement of externally induced economic growth. Only when some market conditions can be shown that accessibility improvements from transport investments can generate economic growth. But even in this case the attainment of growth benefits is predicated on the design and enforcement of complementary and supportive public policies.

This article examines the general question of whether, in advanced economies, transport infrastructure investments, can engender economic growth at the regional level, or merely facilitate its attainment when it transpires. This article will examine some key conceptual and analytical issues that underlie this question and, with the help of some empirical evidence, draw policy conclusions.

I begin by pointing to the prevalent belief among decision-makers and transportation analysts that transportation development plays a vital role in enhancing economic growth by lowering production and distribution costs, improving labor productivity and stimulating private investments and technological innovations. Underlying this conviction is the theory that the availability of fast, reliable and affordable transportation historically has been the building block around which cities and regions have developed and flourished. The ability to move people and goods easily and economically is still used to explain the relative economic advantage of regions and states.

Although I challenge this widespread perception, it is important to note its policy implication. Proponents of this view tend to regard planned transportation infrastructure investments as a key policy means for generating metropolitan, regional or national economic growth. Numerous statements by public officials and policy makers support this opinion and its corollary that the lack of transport investments will necessarily impede future growth and productivity improvements. By and large, these views are held as a "truism" even though the available

evidence on the subject is rather ambiguous. Moreover, in many cases these alleged "economic growth impacts" are used to rationalize capital investment projects, even when it is difficult to accept them on the basis of their transportation effects. Hence, the importance of this inquiry into the nature of the relationship between transportation improvements and economic growth.

In the present context I define "transportation investment" as a capacity expansion or addition to an existing network of roads, rail, waterways, hub terminals, tunnels, bridges, airports and harbors. I further define "economic growth" as a continuous process of annual increases in per capita income, factor productivity, national, state or regional product and employment. Mainly for practical reasons, in empirical analyses employment is the most well used measure of growth. I further recognize that transportation capital improvements are carried out incrementally, project-by-project over many years, and that each new facility constitutes but a segment of a larger network. Hence, while each new project needs to meet evaluation criteria, its primary transportation impacts are appraised relative to the in-place network in terms of improved travel times, costs and traffic volumes over the network.

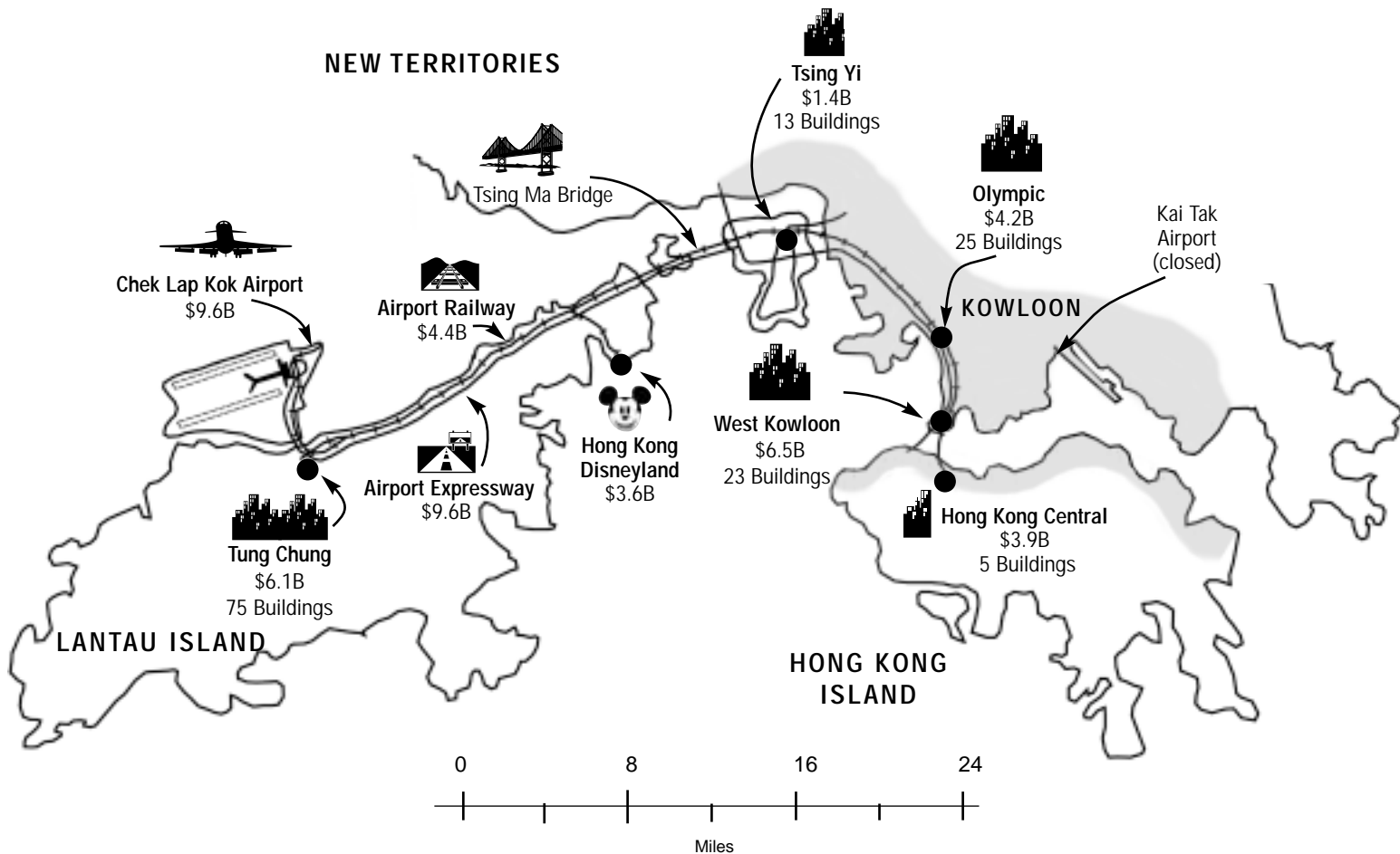
Given these definitions, is there a sound rationale for the above transportation-economic growth contentions? If so, what is the underlying mechanism that links new transport infrastructure investments with economic growth? How does this linkage manifest itself in face of emerging forms of regional and national economies? If it

exists, how can we model and measure it? What does empirical evidence tell us about the real-world impact of transport investments on growth? Given these questions we also need to ask what are the implications if these alleged linkages are rather loose or insignificant? Will it then require a reassessment of the ways transportation projects are evaluated? Given space limitations in this article I will examine these questions only very succinctly, referring the reader to the book by Banister and Berechman (2000).

The Causality Question

The common approach to the linkage between transportation investment and economic development suggests that transportation investments generate two major effects: "indirect effects", mainly economic multiplier and environmental impacts, and "direct effects" defined in terms of accessibility improvement impacts. The multiplier effect is a short-term phenomenon that results from the public-work nature of the investment as it generates employment and income in the local area, and that lasts only throughout the project's implementation period. The second category contains the transportation benefits whose magnitude and spatial distribution depend on the specific transportation facility (e.g., rail, port, or highway), the network and various regional features. These benefits, in turn, are assumed to generate long-term growth effects as they improve the economic performance of individuals and firms and generate more efficient locational patterns. Figure 1 depicts these alleged relationships.

(and some other interesting things)



The Airport Challenge

A modern airport is one of the most important transportation facilities for any metropolitan region that wishes to be a serious player in the global economy. But it's often the most difficult transportation facility to develop successfully.

An airport needs enormous amounts of open space and generates lots of noise from its flight activities. This argues for locating it in some distant corner of the metropolitan region with ample amounts of vacant land and few residents to be bothered by noise. That's why Tokyo's Narita Airport is some 40 miles from the Ginza.

But most air travel activity is generated by the region's main commercial and residential centers. If traveling between these centers and the airport is too time-consuming because of its remote location, many potential visitors may avoid making business and vacation trips to the region. So "airport access travel time" has to be minimized.

At the same time, a new airport can be a powerful economic development tool if these problems can be overcome. This is especially true when the airport is designed as part of a true air travel terminal complex that integrates airside facilities with the region's major activity centers in ways that open up new development opportunities. All of which requires some fairly heroic urban planning.

But heroic planning has been the backbone of Hong Kong's approach to managing the development of its 423 square mile metropolitan region, where seven million people enjoy one of the world's highest levels of per capita Gross Domestic Product. So it's no surprise that the new air travel terminal complex centered on Chek Lap Kok is as different from an old-fashioned big city airport as a Boeing 777 is from that Farman biplane. Or that its rail and expressway links also serve as the transportation spine for new real estate development projects that are spectacular even by Hong Kong standards.

To put all this in perspective, Hong Kong's per capita investment in its US\$21 billion airport development program would be

equivalent to the New York metropolitan region spending nearly \$70 billion on better air travel facilities during the next six years.

As the left-hand table on the title page indicates, the program consisted of three main investment packages.

① \$9.8 billion for the new airport at Chek Lap Kok

In its present form, the airport can handle 96,000 air travelers, 8,200 tonnes of air cargo, and 500 landings and take-offs each day. But its landfill platform has enough extra space for future expansion to raise these daily totals to 238,000 air travelers and 25,000 tonnes of air cargo.

Hong Kong's Airport Authority built and operates the airport. The government funded nearly two-thirds of its construction cost through equity investments in the Authority (which it owns), plus direct spending for police, fire, and other public facilities on the airport site.

② \$4.6 billion for the Airport Railway

As the fourth line of Hong Kong's state-of-the-art subway system, this high-speed rail line now carries 32 percent of all those traveling between the airport's passenger terminal and the rest of the metropolitan region.



Its satellite air passenger terminals in Central Hong Kong and Kowloon serve as the airport's downtown front doors. Travelers leaving Hong Kong can arrange their tickets at these terminals, receive their boarding passes, and check their bags through to their destination airports before boarding express trains to reach their flights at Chek Lap Kok.

The government-owned MTR Corporation (which operates the subway system) built the Airport Railway. Two-thirds of its cost was funded by new government equity investments in the Corporation, with MTR debt and operating profits covering the rest.

③ \$4.6 billion for the Airport Expressway System

The government's Highways Department built most of this system, including its three major highway links, the Tsing Ma Bridge, plus two other bridges and a connecting tunnel on Tsing Yi Island. A private company built and operates the system's 1.2-mile toll tunnel under Victoria Harbor.

Hong Kong's government funded its 71 percent share of the airport program's total cost without issuing any debt. It followed its standard "pay-as-you-build" practice for funding large infrastructure projects - generating \$14.8 billion for the

airport program from its on-going capital revenues and operating budget surpluses. (During the program's six-year construction period, these sources also funded the government's \$21 billion outlays for non-airport capital projects and \$15 billion increase in its budget reserves. But that's another story.) Most of the program's remaining funds came from \$3.2 billion in debt issued by the Airport Authority and the MTR Corporation, plus \$2.8 billion in private capital supplied by the

firms that built the toll tunnel plus the airport's hotel, air cargo terminals, aircraft maintenance depots, and certain other facilities.

The airport program's master plan intended the new rail line and expressway system to form a transportation corridor for a

new group of large-scale real estate development projects. As the right-hand table on the title page indicates, projects totaling US\$26 billion are currently under construction. They consist of:

① The \$22 billion package of five "New Towns"

Hong Kong's real estate industry is funding and building these high-rise communities on 154 acres of land around five stations along the Airport Railway. The MTR Corporation (which is supervising the projects) followed the airport program master plan's guidelines in preparing detailed plans for each community.

When these New Towns are completed in 2007, their 141 buildings will contain 37 million square feet of new floor space (40 percent more than all existing floor space in downtown Denver). This will provide homes for 86,000 Hong Kong residents, workspace for 123,000 jobs, 4,300 rooms for travelers in seven hotels, and new stores for shoppers in six multi-level retail malls.

② The \$3.6 billion "Hong Kong Disneyland"

This 311 acre theme park is being built at Penny's Bay on Lantau Island, 7.5 miles northeast of the new airport. It will be served by a new rail connection from the Airport Railway.

Hong Kong Disneyland is example of how the government uses the immense wealth generated by its land and tax collection monopolies to play a venture capitalist role on behalf of the region. It is providing nearly three-quarters of the capital for the commercial corporation it created to build and operate the theme park. This is on top of \$1.8 billion in direct government spending to prepare the park site and build its roads, water and sewer systems, and other basic infrastructure facilities.

The government is the principal owner of the theme park corporation, but (in the best venture capitalist tradition) expects to sell a portion of its ownership to the investor public in the future. The Walt Disney Company holds a minority interest.

Why Hong Kong Needed A New Airport

Hong Kong has been a key international air travel center since the 1930s, when it became the main Asian terminal for Pan American World Airways' trans-Pacific flying boat services and Great Britain's colonial airline routes from Europe.

By the mid-1990s, half the world's population lived within five hours flying time of Hong Kong. Its annual air passenger volume had reached nearly 30 million (about the same as New York's JFK, which serves a metropolitan region with three times Hong Kong's population). Its 1.8 million annual tonnes of air cargo made it one of the world's top generators of goods shipped by air. More than 165,000 annual flights handled this air transportation activity.

For 73 years, Hong Kong's commercial flights flew in and out of historic **Kai Tak Airport** ("The Airport of the Nine Dragons") on the southeastern side of Kowloon. Like New York's LaGuardia Airport, Kai Tak occupied a cramped shorefront site near Hong Kong's main commercial centers and created serious noise problems for the 380,000 people who lived in the surrounding communities.

By the end of the 1980s, Kai Tak was fast approaching capacity and couldn't be expanded to accommodate the air travel demands of the 21st century. Government planners studied several locations for a replacement airport and finally settled on the Chek Lap Kok site off the north shore of Lantau Island. The decision to proceed came in September 1991, following discussions between the British and Chinese governments over Hong Kong's 1997 transition from a British colony to a largely autonomous "special administrative region of China".

Kai Tak ceased flight operations the night before Chek Lap Kok opened. Its site will be redeveloped into several large new residential communities surrounded by landscaped parks

Planning Considerations

Hong Kong's government realized at the outset that a new airport for the 21st century needed an environmentally-friendly location that could be closely linked with the business centers generating most of the region's air passenger trips and air cargo tonnage. So the airport program's master plan reflected the following considerations:

- **The north shore of Lantau Island offered the best location for a new airport.** It faced the broad expanse of the Pearl River Delta, allowing all landings and take-offs to be made over water to keep jet noise away from Hong Kong's residential areas.

- **But Lantau was undeveloped and isolated, with access limited to ferry services from Central Hong Kong and Kowloon.** So the airport would need new rail and highway connections to these commercial centers. As the map shows, their most logical route was along the north shore of Lantau, across the Ma Wan Channel and Tsing Yi Island to the mainland, then down the west side of the Kowloon peninsula and under Victoria Harbor to Central Hong Kong.

- **The rail link's stations in Central Hong Kong and Kowloon should be developed into satellite air passenger terminals with a full range of landside services.** Locating these services in the commercial centers that generate most of Hong Kong's air passengers would smooth out check-in volumes during peak periods and provide added conveniences for travelers.

- **The airport's rail and highway links would also provide high-capacity transportation access for the first time to Lantau Island and other undeveloped areas along their routes.** These areas could provide badly-needed land to house the region's growing population and economic activity. To develop this land in a rational manner, planners sketched out the general parameters for the five New Towns that private developers are now building at stations along the rail link.

The end result of this master plan was a new benchmark for how air travel terminal complexes should serve urban soci-

eties. In the process of carrying out this plan, Hong Kong generated a host of new ideas for integrating commercial airports more effectively with the economic, social, and developmental realities of First World metropolitan regions. Many of these ideas can be adapted to help make existing airports work better.

Meanwhile, we left that eight year old boy standing on the ramp next to the Farman biplane at Chek Lap Kok, eagerly listening to the woman in the jade-green dress tell him fascinating stories about the new airport.

Suddenly he heard familiar voices calling his name. And saw his parents rushing towards him up the ramp in a state of high excitement. Before they could scold him for wandering off, he quickly assured them that he hadn't gotten lost. Then turned to introduce his new friend.

But the woman was gone. And as his parents led him firmly away by the hand to catch their flight, he tried to figure out how she could have vanished so abruptly.

Several months later as the boy sat in school back home in Hong Kong's spectacular New Town of Sha Tin, his teacher told the class about the Goddess of Chek Lap Kok. According to legend, she had risen from the waters of the Pearl River Delta after a fierce typhoon long ago to become the guardian of Lantau's indigenous fishermen.

The teacher's words made the boy remember the woman in the jade-green dress. And he couldn't help wondering if the Goddess of Chek Lap Kok might have found a new role for herself. As guardian of the 80,000 air travelers coming and going each day through Hong Kong's stunning new airport.

There on the edge of Asia's dramatic "City of Life".



Ed Seeley is a Brooklyn-based economist who spent 26 years in New York City government as a strategic planner and manager. This article is based on material from the book he is currently writing on why Hong Kong has become one of the world's most successful metropolitan regions.