Paying for Access, Getting Immobility: 
Rethinking finance and governance models for the 21st Century

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Abstract:

Urban centers are increasingly concentrated spaces for living and working in socially segregated metropolitan regions. Urban transport, however, is still largely conceived, financed and organized as a fragmented set of modally based services intended to serve lower-density metropolitan regions. Overcoming this disconnect between transport and land use requires a major rethinking on three dimensions: the definition of the required service, the methods of finance and the institutional structure.

*Urban Access for the 21st Century: Finance and Governance Models for Transport Infrastructure*
The First Global Urban Generation in Human History

The world is changing from a planet where most people lived in rural places to one where most people live in urban places.

At the start of the 20th century 15% of the global population was urban.

At the start of the 21st century over half of the global population is urban.

By mid century three of every four people on the planet three will live in urban places.
The Urbanization of the World’s Population

Percentage of World Population


1950 Tot Pop 2.5 Billion
2050 Tot Pop 10 Billion

1950 Urb Pop 750 Million
2050 Urb Pop 7 Billion
We are about half-way through a rapid and steeply rising wave of global population growth.
Urbanization is the economic and sustainable development story for the 21st Century.
In about one century we went from land intensive urban land use forms with good co-location.....

to radial forms defined by streetcar & railroad lines also with good co-location....

to early auto suburbs with diminished co-location...

to spatially untethered subdivisions and gated communities with very poor qualities of co-location.

**Note:** At each step along the way land uses became ever more specialized.
A Tale to Two Cities

The fight bubbled up in mid 20th century
Competing 20th Century Urban Visions

She saw mixed use vitality

He saw the corrosive impact of congested lives

He envisioned the promise of mobility

She envisioned the promise of co-location

He one round one and she won round two.

It is time to move to synthesis.
Three key economic factors underlie that land use transformation

Energy costs were relatively less expensive than urban land acquisition costs, hence land extensive urbanization was economically more efficient and socially more attractive than the land intensive urbanization that preceded it.

The environmental costs of land extensive urbanization were small to nonexistent or at least were socially and not privately borne. It was also the case that the light, air and sanitation benefits were large.

Mobility and ICT (telegraph, telephone and early radio) inexpensively substituted reasonably well for co-location.

The three factors powerfully acted to embed the notion that enhanced mobility and single use land uses could efficiently solve the congestion problems of rapidly industrializing and urbanizing cities in Western Europe, North America and Australasia.
For much of the 20th century (and even into the early 21st century the conflation* of mobility with access has driven in urban planning globally.

*“Conflation occurs when the identities of two or more ...concepts ...shar(e) some characteristics of one another, become confused until there seems to be only a single identity. In logic, the practice of treating two distinct concepts as if they were one ... produce(s) error or misunderstanding, ...” See: http://en.wikipedia.org/wiki/Conflation

Harbor Freeway Los Angeles 1950s
Beijing Road 2000s

Conflation in this case caused a powerful global process of path dependency.
The current challenge as a matter of both environmental sustainability and social equity is breaking the current path dependent pattern of urban development globally.
GHG Emissions by Economic Sector: EPA

2012 US Distribution

- Agriculture: 10%
- Commercial & Residential: 10%
- Industry: 20%
- Transportation: 28%
- Electricity: 32%

2004 Global Distribution

- Energy supply: 26%
- Forestry: 17%
- Agriculture: 14%
- Industry: 19%
- Transport: 13%
- Residential & Commercial buildings: 8%
- Waste and wastewater: 3%
## 2010 GDP per capita and GHG per capita*

<table>
<thead>
<tr>
<th>Country</th>
<th>GDP per cap</th>
<th>GHG per cap</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$48,357.67</td>
<td>17.56</td>
<td>309,326,295</td>
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<tr>
<td>Australia</td>
<td>$51,824.80</td>
<td>16.93</td>
<td>22,031,800</td>
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<tr>
<td>Canada</td>
<td>$47,465.35</td>
<td>14.68</td>
<td>34,005,274</td>
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<tr>
<td>Belgium</td>
<td>$43,150.78</td>
<td>9.98</td>
<td>10,920,272</td>
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<tr>
<td>Germany</td>
<td>$40,407.96</td>
<td>9.11</td>
<td>81,776,930</td>
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<tr>
<td>Denmark</td>
<td>$56,410.83</td>
<td>8.35</td>
<td>5,547,683</td>
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<td>Austria</td>
<td>$45,016.70</td>
<td>7.97</td>
<td>8,389,771</td>
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<tr>
<td>United Kingdom</td>
<td>$36,572.50</td>
<td>7.86</td>
<td>62,766,365</td>
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<td>Sweden</td>
<td>$49,376.82</td>
<td>5.60</td>
<td>9,378,126</td>
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<td>France</td>
<td>$39,448.10</td>
<td>5.56</td>
<td>65,023,142</td>
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</tbody>
</table>

* World Bank Data
An opportunity to break path dependency?

“..... in the rich world the cars previously inexorable rise is stalling.”*  

<table>
<thead>
<tr>
<th>City</th>
<th>1960</th>
<th>1980</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>7.7 million</td>
<td>7.1 million</td>
<td>8.2 million</td>
</tr>
<tr>
<td>Stockholm</td>
<td>0.81 million</td>
<td>0.65 million</td>
<td>0.85 million</td>
</tr>
<tr>
<td>Copenhagen</td>
<td>0.72 million</td>
<td>0.49 million</td>
<td>0.53 million</td>
</tr>
<tr>
<td>Amsterdam</td>
<td>0.87 million</td>
<td>0.72 million</td>
<td>0.77 million</td>
</tr>
<tr>
<td>Paris</td>
<td>2.6 million (1968)</td>
<td>2.2 million (1982)</td>
<td>2.3 million (2011)</td>
</tr>
<tr>
<td>Vienna</td>
<td>1.6 million (1961)</td>
<td>1.5 million (1981)</td>
<td>1.7 million (2011)</td>
</tr>
</tbody>
</table>

*“Seeing the back of the car,” The Economist 22 Sep., 2012
“All over the rich world, young people are getting their licenses later than they used to - in America and also in Britain, Canada, France, Norway, South Korea and Sweden. Even in Germany, car-culture-vulture of Europe, the share of young households without cars increased from 20% to 28% between 1998 and 2008.”*

*“Seeing the back of the car,” The Economist 22 Sep., 2012

![Graph 1: US Vehicle Miles Traveled Per Capita](chart1.png)

![Graph 2: US Total Vehicle Miles Traveled](chart2.png)
Income elasticity of automobile ownership (Selected Chinese Cities)*

<table>
<thead>
<tr>
<th>City</th>
<th>Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weihai 2001-2006</td>
<td>2.7</td>
</tr>
<tr>
<td>Zhengzhou 2005-2006</td>
<td>2.4</td>
</tr>
<tr>
<td>Shanghai 2005-2006</td>
<td>2.2</td>
</tr>
<tr>
<td>Urumqi 2001-2006</td>
<td>1.9</td>
</tr>
<tr>
<td>Xi’an 2002-2006</td>
<td>1.8</td>
</tr>
<tr>
<td>Jinan 2002-2006</td>
<td>1.6</td>
</tr>
<tr>
<td>Guangzhou 2003-2006</td>
<td>1.5</td>
</tr>
<tr>
<td>Luoyang 2001-2005</td>
<td>1.5</td>
</tr>
<tr>
<td>Beijing 2003-2006</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Simple Average</strong></td>
<td><strong>1.8</strong></td>
</tr>
</tbody>
</table>

“People in Asia, Latin America and Africa are buying cars pretty much as fast as they can afford to, and as more can afford to, more will buy.”**


**“Seeing the back of the car,” The Economist 22 Sep., 2012
Sub Saharan Africa could avoid the place destroying path dependence that characterized too much of late 20th century urbanization in the global north.
But path dependent ideas do not fade easily on their own.

Proposed new elevated highway through the center of Nairobi
Reality bites: Nairobi’s Urban Transport Modal Split

- Private Car: 15%
- Public Trans: 36%
- Walk: 49%

Adapted from Aligula et al., 2005
Congestion and Pollution
The poor options of informal urban expansion

Dense underserviced and overcrowded close-in slums
“plus ça change, plus c'est la même chose”

SW Denver, CO metro area

Dong Dianhu Manor: Housing development west of Shanghai.

Photo Credit: John Fielder
http://jcnerr.org/education/coastaltraining/urbansprawl/background.htm

Photograph Credit: George Steinmetz/NY Times

Center for Sustainable Urban Development
Earth Institute | Columbia University
We need to get back to basics

*Cities are about meetings, interactions and transactions.* The greater the number of meetings, the more diverse the participants and the richer the quality of the interactions, the more vibrant and productive is the city.

*Ease of access* is the urban quality that facilitates all the interactions and the ensuing business and personal transactions. Cities create easy access partly through crowding people together and partly through the ways they permit them to move from one place to another.
Co-Location should not be confused with access.

Density contributes to access only when it is socially inclusive and well supported by high quality public services.

“Increasing social polarization in its (i.e. China’s) global cities challenges the government’s capacity to maintain social harmony.” From a study of Shanghai, Beijing and Guangzhou.

Timberlake, et.al. (2014) “Global cities with Chinese characteristics,” Cities http://dx.doi.org/10.1016/j.cities.2014.02.009
It is important to understand urban transportation primarily as a public good.

Urban transport is simultaneously a public and a private good. The finance challenge depends upon how we choose to view it.

Economics the study of **material** incentives and disincentives in influencing human behavior.

Clearly a public good even if privately produced.

**Non excludable**
**Non rivalrous**

**Excludable**
**Rivalrous**

But is this a private good, even if privately produced?
Urban transport is a complex of modes, not a “system”

With the exception of rail all other modes compete for urban space

It is both monopolistic and competitive
Systems for the poor quickly become poor systems and poor systems drive people into autos

We must creates systems focused on the needs of a rising middle class that also meet the needs of the poor.
The financial problem is a problem of fragmentation and silos.

Infrastructure finance is separated from service finance.

Land use decisions are separated from transport decisions.

Modes more often compete than cooperate.
Governance silos built on a mid 20th century understandings of the role and technological possibilities for urban transport lock 21st century policy makers into undesirable financial and operational options.

A New York “siloization” story:
City DoT maintains the city’s streets.
City Taxi and Limousine Commission (TLC) regulates taxi services
Buses, subways and commuter rail are regional responsibilities (MTA)
MTA also operates most bridges and tunnels in region
NYNJ Port Authority operates regional airports and interstate tunnels and bridges
Metro wide taxi services are regulated town by town.

The existing organizations are the result of ad-hoc adaptations of structures created in a completely different era in response to completely different pressures and technologies.

An approach to transport planning and governance consistent with the current structure of urban life and politics will need to address the institutions that govern urban transport.
The way fragmented finance is distributed among user payments, taxes and fees on indirect beneficiaries or absorbed as unaccounted social costs has a major impact on land use patterns and hence on social equity.

*Regardless of mode, users tend to underpay for their transport*

The issue is **not** full cost recovery from users, but how to balance the equities of access across urban society.
Value Capture: The Future of Cost Recovery

Value Capture:
It reflects thinking beyond silos and fragmentation.
It privileges the public goods nature of transport over the private goods aspect.
It is a sufficiently flexible concept to be embedded in many different institutional and historic settings.
Value capture as a potential path forward

Hong Kong; Mass Transit Railway
The policy challenge going forward

How do we shift our transport financial models away from incentivizing mobility towards incentivizing alternative means for enhancing access?

**User pays** and private market theories of finance dominate our thinking. We need to more fully embrace the reality that urban transport is *primarily* a public good and *secondarily* a private one. Hence an overemphasis on fuel taxes, carbon taxes, VMT based taxes, parking charges, congestion charging and PPPs have only a limited role to play.

Urban transport is more importantly a public good. **Non-user beneficiaries** pay via value capture, property taxes, taxes on parking lots and garages also has a role to play as does public provision.

Each of these has political and economic pluses and minuses and the combination in any place is highly dependent upon local institutions and governance. Ultimately there must also be elements of **everyone pays**, that is some general revenues in the mix if equity is to be achieved.
Report: 98 Percent Of U.S. Commuters Favor Public Transportation For Others

The politics of change will not be easy
Kenneth Jackson argued that the United States is the world’s first and last suburban nation. No other country will be able to afford what we did.

But that suburban nation was born at a unique time in history: the middle class was prosperous and growing.

“The top decile claimed as much as 45 – 50 percent of national income in the 1910s – 1920s before dropping to 30 – 35 percent by the end of the 1940s. Inequality then stabilized at that level from 1950 to 1970. We subsequently see a rapid rise in inequality in the 1980s, until by 2000 we have returned to a level on the order of 45–50 percent of national income.” (Thomas Piketty Capital in the 21st Century 2014, page 23.)

Why should we care about the distribution of income and wealth? We are concerned with transport finance.
Exhibit 6: Growth in Mean and Median Family Income Reveal Widening Gap

Note: Mean income is the average income across all families regardless of how that income is distributed. Median income is the level at which 50% of families have lower income and 50% have higher incomes.

Source: Federal Reserve, Morgan Stanley Research.
The research challenge going forward:

Access is generated through a combination of co-location and mobility

How do we measure access?
- Is it a physical quality or a social quality?
- What are the equity implications?

The challenge of metrics: “If you can’t measure, you can’t manage”
- Mobility is easy to quantify and travel time is easy to assign a $ value
- Access, the ultimate public good, is not as easily quantified and valued

Moving from a research challenge to a planning challenge we need to focus on three social-economic questions:
- Access for whom?
- Access to what?
- How to value that access
Is time always $? 

A) If you can save 1 million people 2 minutes a day of travel time assuming an average value of time of $60 per hour, you create a benefit of $2 million per day. Over a 240 day work year that equals $480 million per year.

B) If for the same expenditure you save 100,000 people 15 minutes a day at the same value of time, you create a benefit of $1.5 million per day. Over the same year that equals $360 million per year.
Assume both options have a 30 year life expectancy, assume zero interest, that amounts to a $3.6 billion money advantage for A over B.

❖ Does the qualitative difference between 15 minutes of time saved and 2 minutes count? Or is the latter merely a linear extrapolation of the former?

❖ What if A is more highway capacity and B enhanced service on an existing metro?

❖ Does the political reach between 1 million and 100 thousand factor in to this?
Towards a 21st century urban vision

Sustainable urbanism in this century is going to require both co-location & mobility
Final random thoughts:

Access is the vital public good
Access = f (Co-location, Mobility)

We must value mobility as a means and not an end.

20th century transport policy has implicitly transformed mobility into a self evident policy end. Time savings over all else!

Can we develop policy relevant access metrics across social classes in ways that are as intuitive as those we have developed to measure mobility?
Thank you!

http://csud.ei.columbia.edu