Michael Allegra
Member, APTA Executive Committee
and President/CEO
Utah Transit Authority
Angela Iannuzziello, P.Eng.
Member, APTA Executive Committee
and VP Canada National Transit Market Sector Lead
AECOM
Study Mission
Innovative Funding and Financing
to London, Stockholm, Munich

Presentation to
Mobility 2.0 – What International Best Practice Can Mean for
US Rail & Public Transportation
June 24, 2015
<table>
<thead>
<tr>
<th>Study Mission – Participants</th>
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<tbody>
<tr>
<td>Angela Iannuzziello - Chair</td>
</tr>
<tr>
<td>AECOM</td>
</tr>
<tr>
<td>Bo (Henry) Li</td>
</tr>
<tr>
<td>Jacksonville Transportation</td>
</tr>
<tr>
<td>Authority, FLA</td>
</tr>
<tr>
<td>Louwana Oliva</td>
</tr>
<tr>
<td>Centre Area Transportation</td>
</tr>
<tr>
<td>Authority, State College, PA</td>
</tr>
<tr>
<td>Damian Carey</td>
</tr>
<tr>
<td>Jacobs</td>
</tr>
<tr>
<td>Janice Li</td>
</tr>
<tr>
<td>CH2M Hill</td>
</tr>
<tr>
<td>Gloria Salazar</td>
</tr>
<tr>
<td>San Joaquin Regional Transit</td>
</tr>
<tr>
<td>District, CA</td>
</tr>
<tr>
<td>Francis “Buddy” Coleman</td>
</tr>
<tr>
<td>Clever Devices</td>
</tr>
<tr>
<td>Marla Lien</td>
</tr>
<tr>
<td>Regional Transportation</td>
</tr>
<tr>
<td>District, Denver, CO</td>
</tr>
<tr>
<td>Stephen E. Schlickman</td>
</tr>
<tr>
<td>Urban Transportation Center</td>
</tr>
<tr>
<td>University of Illinois-Chicago</td>
</tr>
<tr>
<td>Sharon Greene</td>
</tr>
<tr>
<td>HDR/Sharon Greene + Assoc.</td>
</tr>
<tr>
<td>Brian McCartan</td>
</tr>
<tr>
<td>Sound Transit – Puget Sound,</td>
</tr>
<tr>
<td>WA</td>
</tr>
<tr>
<td>Michael I. Schneider</td>
</tr>
<tr>
<td>HDR Global Strategic</td>
</tr>
<tr>
<td>Consulting Practice</td>
</tr>
<tr>
<td>Susan Herre</td>
</tr>
<tr>
<td>Transportation Professional</td>
</tr>
<tr>
<td>Raymond Melleady</td>
</tr>
<tr>
<td>USSC Group</td>
</tr>
<tr>
<td>Raj Srinath</td>
</tr>
<tr>
<td>Santa Clara Valley Transportation Authority, CA</td>
</tr>
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</table>
London
## Crossrail Funding Summary (£, Billion)

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Government</td>
<td>4.7</td>
</tr>
<tr>
<td><strong>Mayor</strong></td>
<td></td>
</tr>
<tr>
<td>- Business Rates Supplement</td>
<td>4.1</td>
</tr>
<tr>
<td>- Section 106 Contribution</td>
<td>0.3</td>
</tr>
<tr>
<td>- Community Infrastructure Levy</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>TfL Contribution</strong></td>
<td></td>
</tr>
<tr>
<td>- Prudential Borrowing</td>
<td>1.9</td>
</tr>
<tr>
<td>- OSD Receipts</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Other Third Party Funding</strong></td>
<td>0.7</td>
</tr>
<tr>
<td><strong>National Rail</strong></td>
<td>2.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>14.8</td>
</tr>
</tbody>
</table>
Stockholm
Public opinion 2005 – 2013

Stockholm - changes in support of congestion pricing
**Bus Contract Business Structure**

**Contract Includes**

- **Traffic Operations**
- **Analysis, Planning and Local Marketing**
- **Buses Ownership /Finance**
- **Bus Maintenance**
- **Depot Maintenance**
- **Bus Shelter Maintenance**

**Remuneration /Payment Model**

Operator is reimbursed based on how many customers board the bus with a valid ticket.

*We call this VPB – Verified Paid Boardings*

**Revenue and cost efficiency focus**

**Customer focus**

**Attractive traffic solutions**

**Increased ridership**
Applicability to North America

1. Capture property value from beyond transit stations.

2. Engage developers to contribute to both capital and long term operating.

3. Change travel behavior through congestion pricing in large and small communities.

4. Demonstrate new measure first, then seek binding public support.
5. Contract out with passenger boardings and customer service incentives.

6. Put transit “where people are and not where people scream”.

7. Manage transit as a business center:
   - “Price fares” for cost recovery; subsidize concessions directly to user
   - Generate other operating revenues as a mobility manager.
Applicability to North America

8. Ensure customers see a consolidated service.

9. Look to future to build long term support for transit.

10. Embrace transit as an economic revitalizer, job creator, congestion reducer, improver of quality of life – not as a cost.
“Fundamentally, a shift in mindset is required in North America, from providing transit to increasing customers' accessibility and mobility regardless of how we do it and regardless of the challenges of any one community.”
Laurent Dauby
Director, Knowledge & Membership Services Dept.
International Association of Public Transport (UITP)
OUR VISION
We are working to enhance quality of life and economic well-being by supporting and promoting sustainable transport in urban areas worldwide.

OUR MISSIONS
We engage with decision-makers, internat. organisations and other key stakeholders to **promote** and **mainstream** public transport and sustainable mobility solutions.

We **inspire excellence and innovation** by generating and sharing cutting-edge knowledge and expertise.

We bring people together to **exchange** ideas, find solutions and forge mutual beneficial business **partnerships**.
OUR STRATEGY FOR THE SECTOR

PT x 2

Doubling transit market share by 2025

Launched 2009

Energize the sector

Unite the sector around one strategic horizon

Good for PPP

Planet, people, productivity
World Urban mobility
baseline 2005

7500 m trips / day

Public transport
Non motorized transport
Private motorized transport
World Urban mobility
2005 – 2025 scenarios: +50%

B.A.U.
DO WE HAVE TO BE RESIGNED?
Loss of market shares but +25% trips

PTX2
ECO-FREAKS?
Doubling of market shares but +200% trips
PTx2 = « More balanced mobility »
Mid-term evaluation: Where do we stand?

**Growth in urban density**

<table>
<thead>
<tr>
<th>Year</th>
<th>Prague</th>
<th>Vienna</th>
<th>Oslo</th>
<th>Munich</th>
<th>London</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>68</td>
</tr>
<tr>
<td>2001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>64.5</td>
</tr>
<tr>
<td>2012</td>
<td>+16%</td>
<td>+12%</td>
<td>+11%</td>
<td>+11%</td>
<td>+8%</td>
</tr>
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</table>

**Evolution of motorisation**

<table>
<thead>
<tr>
<th>City</th>
<th>1995</th>
<th>2001</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>London</td>
<td>345</td>
<td>117</td>
<td>264</td>
</tr>
<tr>
<td>Geneva</td>
<td>403</td>
<td>418</td>
<td></td>
</tr>
<tr>
<td>Glasgow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delhi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beijing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Growth in public transport supply**

<table>
<thead>
<tr>
<th>City</th>
<th>1995</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oslo</td>
<td>+61%</td>
<td></td>
</tr>
<tr>
<td>Geneva</td>
<td>+35%</td>
<td></td>
</tr>
<tr>
<td>Stockholm</td>
<td>+32%</td>
<td></td>
</tr>
<tr>
<td>Singapore</td>
<td>+28%</td>
<td></td>
</tr>
<tr>
<td>Vienna</td>
<td>+26%</td>
<td></td>
</tr>
<tr>
<td>Paris</td>
<td>+22%</td>
<td></td>
</tr>
<tr>
<td>Budapest</td>
<td>-29%</td>
<td></td>
</tr>
<tr>
<td>Casablanca</td>
<td>-22%</td>
<td></td>
</tr>
</tbody>
</table>

**Modal share evolution**

<table>
<thead>
<tr>
<th>City</th>
<th>1995</th>
<th>2001</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oslo</td>
<td>34.1%</td>
<td>35.5%</td>
<td>33.2%</td>
</tr>
<tr>
<td>Geneva</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stockholm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singapore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vienna</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paris</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Budapest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casablanca</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Urban mobility trajectories: modal share evolution
Success factors

Design Lifestyle services and conveniency

But not enough!!!! Also act to curb demand
PTx2 Scenario lowers total costs in all categories

- Vehicle purchase costs (all modes)
- System infrastructure costs (road, rail)
- Vehicle and system operating costs
- Fuel costs (liquid fuel, electricity)

User costs by Scenario and region, summed across time periods

B.A.U.

PTx2

Source, L. Fulton, UITP Milan 2015
Mobility trends around the world: 1
Big data and deriving new mobility services
Mobility trends around the world: 1
Big data and deriving new mobility services

Car-sharing
and public transport: an evolving interaction
Mobility trends around the world: 2

**BRT**

*Figure 4: BRT World Panorama*

- **Northern America**
  - Countries: 2
  - Cities: 26
  - Passengers/Day: 1,025,515

- **Europe**
  - Countries: 14
  - Cities: 56
  - Passengers/Day: 1,962,400

- **Asia Pacific**
  - Countries: 10
  - Cities: 35
  - Passengers/Day: 6,572,622

- **Latin America**
  - Countries: 12
  - Cities: 64
  - Passengers/Day: 19,376,380

- **African Countries**
  - Countries: 2
  - Cities: 2
  - Passengers/Day: 242,000

- **World**
  - Cities: 190
  - Passengers/Day: 31,931,958

- **South America**
  - Countries: 10
  - Cities: 35
  - Passengers/Day: 6,572,622

- **Australia**
  - Countries: 2
  - Cities: 6
  - Passengers/Day: 430,041

- **MENA**
  - Countries: 2
  - Cities: 2
  - Passengers/Day: 2,750,000

- **Total**
  - Passengers/Day: 31,931,958

Approximately 190 BRT systems worldwide.
Mobility trends around the world: 3 Metro automation

737 km
54 lines
785 st.
36 cities
PIONEERS ERA: 1980-90

99 km

Vancouver
Detroit
New York
Jacksonville
Miami
Lille
Kobe
Osaka
Yokohama

1989
EARLY ADOPTERS: 1990-2000

213 km

- Vancouver
- Detroit
- New York
- Jacksonville
- Miami
- Tokyo
- Yokohama
- Kuala Lumpur
- Singapore
- Lyon
- Paris
- Toulouse
- Lille
- Osaka
- Kobe
A PROVEN REALITY: 2000-2010

2002
- Lille
- Osaka
- Vancouver
- Yokohama
- Kobe
- Detroit
- Miami
- New York
- Jacksonville
- Paris
- Lyon
- Toulouse
- Rennes
- Copenhagen
- Lausanne
- Barcelona
- Torino
- Dubai
- Hong Kong
- Osaka
- Taipei
- Kuala Lumpur
- Singapore

2004
- Las Vegas

2005
- Nagoya
- Hong Kong

2006
- Torino
- Dubai
- Taipei

2008

2009

450 km
A PROVEN REALITY: 2010-TODAY

2010
- Lille
- Osaka
- Vancouver
- Yokohama
- Detroit
- Miami
- New York
- Jacksonville
- Paris
- Toulouse
- Lille
- 737 km
- Copenhagen
- Las Vegas
- Nagoya
- Hong Kong
- Dubai
- São Paulo

2011
- Seoul

2012
- Uijeongbu

2013
- Yongin

2014
- Budapest

2015
- Daegu
EXPONENTIAL GROWTH! 2014-2025

future 2328 km
Mobility trends around the world: LRT and innovative power supply

Various (proprietary) technologies:
France, Spain, Dubai, Luxemburg, Taipei, China, Columbia, Brazil, Quatar...

+30% capex on power supply system

Interchangeability
Mobility trends around the world: 5
More sophisticated funding mix

Fare revenues
- Fare regulation and management,
- Yield management

Non-fare revenues
- Telco assets
- Payroll tax
- Rail + property
- Naming rights
- Retail
Mobility trends around the world: 6
Governance: Transit authorities >> mobility agencies

Wider policy integration:
- Land use planning
- Economic development
- Social inclusion
- Sustainability
- ....
<table>
<thead>
<tr>
<th>Company</th>
<th>Countries</th>
<th>Number of Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>national express</td>
<td>USA, CND, D, Morocco</td>
<td>43,000</td>
</tr>
<tr>
<td>ALSA</td>
<td></td>
<td>7,400</td>
</tr>
<tr>
<td>DB ARRIVA</td>
<td>DK, NL, P, SP, SW, P, I</td>
<td>55,900</td>
</tr>
<tr>
<td>COMFORT DELGRO</td>
<td>China, UK, Malaysia, Austr, Ireland</td>
<td>19,000</td>
</tr>
<tr>
<td>Singap.</td>
<td>NO, DK, FIN</td>
<td>7,600</td>
</tr>
<tr>
<td>Sweden</td>
<td>USA, CND</td>
<td>120,000</td>
</tr>
<tr>
<td>UK</td>
<td>UK, DK, D, NL, S, B, CND, USA, India, AUS, P</td>
<td>56,000</td>
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<tr>
<td>F</td>
<td>HK, China, Sweden, AUS</td>
<td>22,100</td>
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<td>HK</td>
<td>UK, Australia, USA, UAE</td>
<td>7,000</td>
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<tr>
<td>UK</td>
<td>USA, CDN</td>
<td>30,000</td>
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<td>F</td>
<td>D, Austr, B, CND, Col, DK, SP, USA, Irl, NZ, NL, UK, India, China, Columbia, S Korea etc</td>
<td>95,000</td>
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<tr>
<td>F</td>
<td>F, IT, Morocco, Algeria, UK, USA, India, HK, S. Korea, South Afr., Brazil</td>
<td>56,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14,000 excl Paris</td>
</tr>
</tbody>
</table>
Mobility trends around the world: Electric buses

Focus example: E-bus plugs standardization
Mobility trends around the world: 8

Employer branding

**Fight for talents:** A company needs a strong employer brand and a unique **Employer Value Proposition**

Employer branding is the identity-based development and positioning of a company as a credible and attractive employer.

**Gender diversity:** The presence of female directors has been linked to higher market capitalisation, higher revenues and better corporate governance.
Alexander Barron
Associate Director & Metro Benchmarking Manager
Railway and Transport Strategy Centre
Transit Benchmarking: How Operators Worldwide are Comparing Performance and Sharing Good Ideas

Alex Barron, Associate Director
Railway and Transport Strategy Centre
June 24, 2015
INTRODUCTION
Why do public transit agencies need benchmarking?
Mass transit is essential for cities to function effectively

The 70+ transit operators in our benchmarking groups spend $60 billion annually on operations, largely using scarce public funds.

Growing expectations demand modern, safe, reliable and efficient networks and services.

Limited opportunities to gauge performance locally – benchmarking is a key tool for operators to understand performance and identify how to improve.

Our role at Imperial College London:
Manage + facilitate the groups of transit operators
Deep analytical work to understand performance
Disseminate / advise members on best practices
Overall Objective of the Benchmarking: To compare performance and share good ideas, in order to improve

Benchmarking is NOT only a comparison of data or a creation of rankings – it is a structured approach to searching for best practices

The focus of the benchmarking is to understand:

- Strengths and weaknesses, areas for further analysis
- What has/hasn’t worked elsewhere and where improvements are most likely achievable (via trends)
- How to set challenging but achievable targets
- How to use results to inform stakeholder dialogue
- What ‘World Class’ is and how to emulate it
RTSC History and Experience – Over 20 Years of Successful Worldwide Benchmarking Projects

1994 Group of Five formed, which became the Community of Metros (CoMET) for large metros (subway systems)

1998 Success of CoMET led to the formation of Nova for medium-sized metros

2004 International Bus Benchmarking Group (IBBG) established for urban bus operators

2010 International Suburban Rail Benchmarking Group (ISBeRG) established for suburban rail operators

2011 American Bus Benchmarking Group (ABBG) established for mid-sized bus operators in North America
CoMET & Nova: The World’s Metro Benchmarking Groups
33 Urban Rail Systems in 31 World Cities

Rail systems have returns to density rather than scale, so we can compare different sizes.

Wide range of sizes, from 12-300+ miles and 40m to 2.5b annual passenger journeys.
Six Key Principles Guiding the Benchmarking Process

- **Collaboration** – giving and taking the good and the bad, active participation yields greatest benefits

- **Confidentiality** – openness inside, confidentiality outside, with anonymization protocols to allow public use of information

- **Independence** – owned + steered by members, managed by Imperial; complementary to APTA/UITP with different goals/approach

- **Size and Speed** – moderate group sizes, fast online interactions

- **Annual Cycle** – ongoing with a continuous annual cycle (one-time benchmarking studies don’t work!)

- **Depth** – robust analysis to understand performance
Key Elements of the Benchmarking Process

KPI System to compare performance and identify lines of inquiry

Benchmarking Studies: in-depth research to identify best practices

Energy Saving Strategies
Accessibility and Safety
Asset Info Management
Managing Major Events
Driver Productivity
High Frequency Services

Networking via meetings, workshops, Imperial College visits, confidential website
Benchmarking Success Factors: Focus on Understanding of Performance and Details of Good Practices

- **Comprehensive, consistent KPI definitions** and handbook, continuously refined

- **Balanced approach to normalization** – no perfect denominator (e.g. miles/hours) – best practice is to look at more than one KPI to improve understanding, especially if characteristics are extreme

- **Financial data adjusted** for inflation, wages, prices (PPP)

- **Use of econometrics** where appropriate, enhancing KPI analysis or supporting studies
BENCHMARKING BENEFITS
Significant quantified benefits:
- CoMET and Nova have generated nearly $1 billion in benefits
- Small changes add up to big improvements – meaning that every idea is worth consideration

Less quantifiable benefits are likely even greater: improving decision-making, saving resources, and ultimately leading to better service and value for taxpayers

Organizations putting the most in are getting the most benefits, and are often higher performers – **using KPIs and the benchmarking process to spur continuous improvement**
Examples of Benefits: Identifying/Understanding Opportunities for Productivity Improvements and Setting Realistic Targets

Asian Metro
Used driver productivity study and related KPIs to achieve 10% savings in labour cost by reorganizing shifts

IBBG Bus Operator
Used KPIs to identify high staff accident rate – improved and increased training led to reductions

American Metro
Review of station cleaning processes following a related study led to a 10% improvement in productivity
Examples of Benefits: Using Benchmarking Results to Communicate with Stakeholders (e.g. Government, Media)

Hong Kong, Singapore, Beijing
Used benchmarking to support fares policy, making the case for changes to fares, formulas, or structure

San Francisco BART
ISBeRG fleet data showed that BART had the oldest average fleet in the global group and was used to help make the case for replacing the fleet

Coast Mountain Bus Vancouver
Used IBBG data in its peer agency comparison report and to support case for more tax revenue
Example of Benefits: Sharing Technical Information Can Lead to Improvements, Often from Detailed Studies / Drill-Down

London Underground
Projected to save >$800 million over 20 years by changing escalator maintenance and procurement strategy

Montreal STM
Estimated $500m savings from extending the life of MR73 trains, supported by Rolling Stock Replacement vs. Refurbishment study

Toronto TTC
Rolling Stock Procurement study supported the move from 2-car pairs to through gangways on Toronto Rocket trains, adding 5-10% capacity
Benefits for the STM (Montreal)

- Benchmarking allows us to establish priorities
  - Limited resources require that we make choices
- We were able to identify certain weaknesses at the STM and those who are the best in these fields
- We know what to do to get better
- Motivation tool for the workforce
- We use the data to convince stakeholders that:
  - we are well-managed
  - we need more capital funds
- We gained a great deal of credibility
Conclusions – “Rarely is There a Challenge That Another Operator Has Not Already Faced”

- More than 70 transit operators across the world comparing performance and sharing ideas – the benchmarking has continued for over 20 years due to clear purpose and benefits

- Key success factors: confidentiality, size and speed, independence, annual cycle, and depth

- Commitment to continuous improvement with senior-level support to encourage participation is required for success

- Benchmarking is an essential and cost-effective tool for transit managers to meet increasing and complex challenges – “you can’t manage what you don’t measure”
THANK YOU!

Alex Barron, Associate Director
Metro Benchmarking Manager and ABBG Project Manager
alexander.barron@imperial.ac.uk

Railway and Transport Strategy Centre, Imperial College London
http://www.imperial.ac.uk/rtsc

CoMET and Nova Metro Benchmarking Groups
http://www.cometandnova.org
Mobility 2.0 – What International Best Practices Can Mean for U.S. Rail & Public Transportation

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Petra Mollet
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Angela Iannuzziello, P.Eng.
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Laurent Dauby
International Association of Public Transport

Alexander Barron
Railway and Transport Strategy Centre
Annual Meeting

October 4 – 7
Hilton San Francisco Union Square
San Francisco, CA
Rail Conference