Emerging transport technologies and the modal efficiency framework: A case for mobility as a service (MaaS)

15th International Conference on Competition and Ownership in Land Passenger Transport (Thredbo 15)
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Emerging Transport Paradigm
Emerging Transport Paradigm

Digital Technologies

- Collaborative Consumption
- Vehicle Automation
- Demographic Change
Collaborative Consumption and Vehicle Automation

- Already disrupted taxi industry
- Both competes and complements public transport—depends on market and demographic (Rayle et al., 2016)
- Ownership model—
  - Own and share model (Musk, 2016)
  - Universal automated taxi service (Enoch, 2015)
- Impacts on network efficiency unclear
Youth licencing decline across developed countries (Delbosc and Currie, 2013)

Mixed evidence—due to education/employment or symbolism/ideology

Difference between sharing information and sharing space

Aging population—transport disadvantage

Digitalisation of economy—Fourth industrial revolution
Implications for Urban Efficiency
Future Scenarios for Modal Development

1. Modal convergence to automated taxi service
2. Microtransit displaces and replaces fixed route public transport
3. Microtransit evolves into fixed route public transport
Modal Efficiency Framework

- Proportion of Time On Road (In Revenue Service for PT)
- Passengers per Vehicle (or per Unit Road Space)

More Temporally Efficient
Less Temporally Efficient
Less Spatially Efficient
Part of a Fleet
Privately Owned

PUBLIC TRANSPORT

PRIVATE TRANSPORT

INTERMEDIATE MODES

MOBILITY AS A SERVICE
- Metro / Heavy Rail
- Light Rail Transit
- Bus (Rapid Transit / Frequent)
- Bus (Coverage / Peak-Only)
- Fixed Route Minibus / Demand Responsive Transport
- Peer-to-Peer Microtransit (UberPool)
- Peer-to-Peer Ridesourcing (UberX)
- Conventional Taxi
- Fleet Car Share (GoGet)
- Fleet Autonomous Taxi (Enoch / Uber / Google Model)
- Private Autonomous Ridesourcing (Tesla Model)

Shared Occupancy
Sole Occupancy
Spatial and Temporal Integration

Legend:
- Trunk services operated by the formal sector
- Feeder services operated by the paratransit sector
- Formal trunk station where interchange between formal and paratransit modes occurs.

Note: Line widths difference between formal and paratransit modes depict variations in demand.

TOP UP
INTERMEDIATE MODES
PUBLIC TRANSPORT

BASE LOAD

Ridership

Time of Day
6AM 9AM 12:00 3PM 6PM 9PM
A Case for Mobility as a Service (MaaS)
Introducing the Concept

- Total transport integration across public, private and intermediate modes
- User, provider and societal benefits
- Major players bought together diverse stakeholders
- “Bundles”: mobility packages representing bundles of mobility
- “Budgets”: end user preferences and service provision possibilities
- “Brokers”: new contracting models and business interest

Mobility as a Service enables new market approach

Urban commuter package for 95 €/month:
- Free public transport in home city area
- Up to 100 km free taxi
- Up to 500 km rental car
- Domestic public transport 1500 km

15 minutes package for 135 €/month:
- 15 minutes from call to pick up by shared taxi
- EU wide roaming for shared taxi at 0.5 €/km
- Free public transport in home city,
- Domestic public transport 1500 km

My mobility operator

Business world package for 800 €/month:
- 5 minutes pickup in all EU
- Free taxi in home city
- Lease car and road use
- Taxi roaming worldwide

Family package for 1 200 €/month:
- Lease car and road use
- Shared taxi for all family with 15 minutes pickup
- Home city public transport for all
- Domestic public transport 2 500 km
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<th>Publication</th>
<th>Principal Technical Topic</th>
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<td>Mulley (2017)</td>
<td>Implementation and scalability of mobility as a service</td>
<td>Editorial</td>
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<td>Matyas and Kamargianni (2017)</td>
<td>Stated choice investigation on demand for mobility as a service packages</td>
<td>Empirical (London, United Kingdom)</td>
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<td>Kamargianni and Matyas (2017)</td>
<td>Potential business models for delivering mobility as a service</td>
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<td>Hensher (2017)</td>
<td>Future of public transport contracts under mobility as a service</td>
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<td>Sochor et al. (2016)</td>
<td>Travel behaviour impacts of mobility as a service, based on ex-ante and ex-post questionnaires and interviews with users</td>
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<td>Mukhtar-Landgren et al. (2016)</td>
<td>Institutional requirements for implementing mobility as a service</td>
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<td>Kamargianni et al. (2016)</td>
<td>Integration opportunities and evaluation of existing mobility as a service schemes</td>
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<td>Giesecke et al. (2016)</td>
<td>Conceptual issues in mobility as a service implementation for users, infrastructure and sustainability</td>
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<td>Brendel and Mandrella (2016)</td>
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<td>Sochor et al. (2015)</td>
<td>Stakeholder expectations on mobility as a service, based questionnaires and interviews with users, the mobility provider and government</td>
<td>Empirical (Gothenburg, Sweden)</td>
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<td>Rantasila (2015)</td>
<td>Potential impacts of mobility as a service on land use</td>
<td>Interviews (Helsinki, Finland)</td>
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<td>Hu et al. (2015)</td>
<td>Evaluation of mobility cloud service for smart transportation</td>
<td>Product evaluation</td>
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<td>Heikkilä (2014)</td>
<td>Government interest in mobility as a service and industry transition opportunities</td>
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Popular Research

Transport as a service
It starts with a single app
Combining old and new ways of getting around will transform transport—and cities, too.

'Mobility as a Service' – the new transport model?

Developing Intelligent Mobility and exploring Mobility as a Service
Final Report
19th February 2016

George Hazel
Consultancy

ATKINS

The University of Sydney
Service Delivery Models and Final Observations

**ECONOMIC DEREGULATION**
- MaaS being implemented in policy vacuum, driven by market
- Intermediate modes more lucrative and may hasten demise of public transport
- Self-regulation opportunities like ORR and Ofwat models in UK

**GOVERNMENT CONTRACTING**
- Government procures mobility broker and regulates for societal equilibrium
- Sets accessibility standards (output to outcome-based contracts)
- Opportunity to add *road price* as input into package design

- Potential for more virulent form of existing transport paradigm
- Must ensure that digital disruption occurs to our advantage

*“Change is certain, progress is not”* (E H Carr)
The modal efficiency framework: A case for mobility as a service (MaaS)

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