Arthur D Little

Future of Urban Mobility 2.0

Imperatives to shape future urban mobility ecosystems of tomorrow

Presentation to UITP's Sustainable Development Commission

London, May 8th 2014

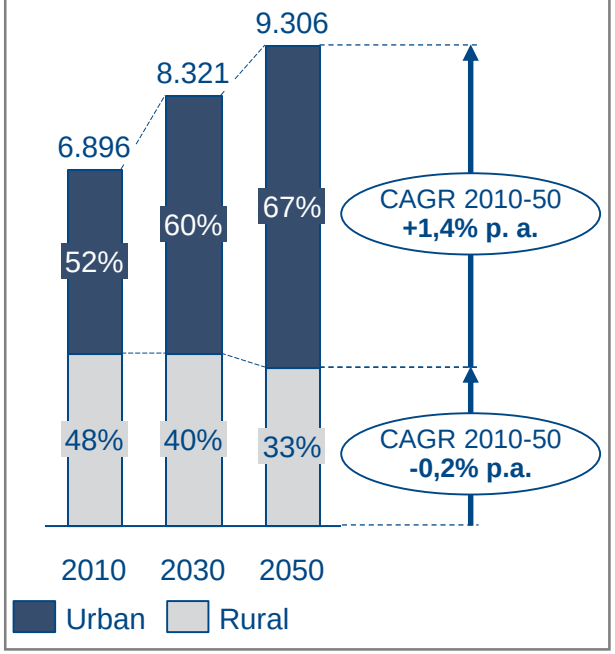
- **The Future of Urban Mobility – Setting the scene**
- Arthur D. Little Urban Mobility Index 2.0
- What is holding back changes?
- Recommendations on strategic directions and imperatives

1 Plotting the trend

The future of earth will be urban as demand for both passengers and goods mobility are expected to triple by 2050

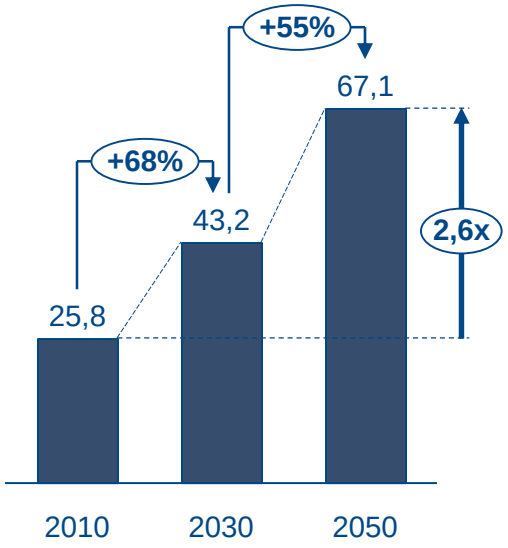
The world is becoming increasingly urban

Urban and rural population, 2010-2050 [m people %]



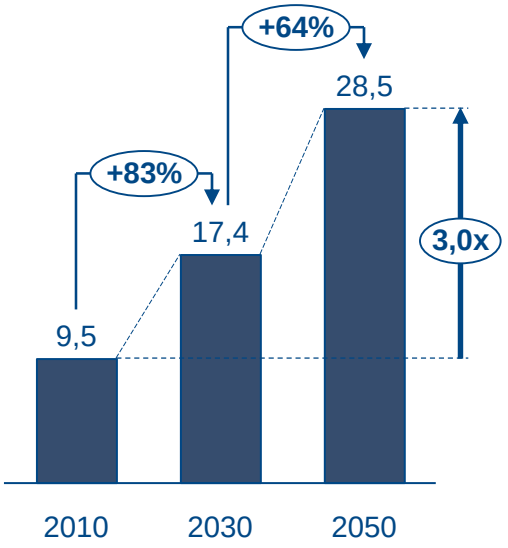
Urban passenger mobility demand explodes

Urban passenger mobility demand, 2010-2050 [trillions person-km p.a. %]



Urban goods mobility demand explodes

Urban goods mobility demand, 2010-2050 [trillions of ton-km p.a. %]

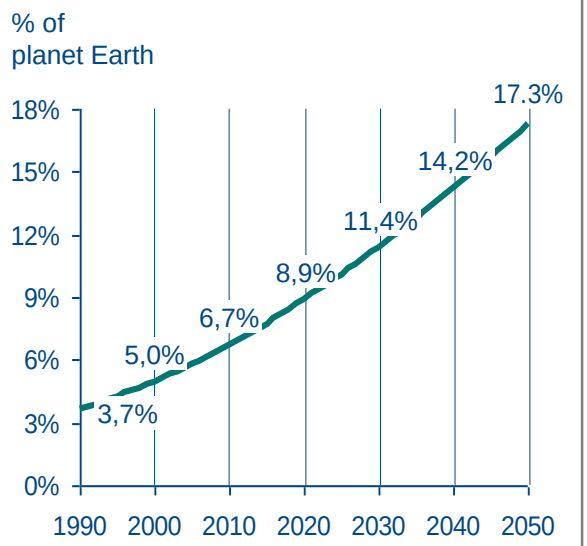


Source: UN Population Division, Schäfer/ Victor 2000, Cosgrove/ Cargett 2007, Arthur D. Little

1 Plotting the trend

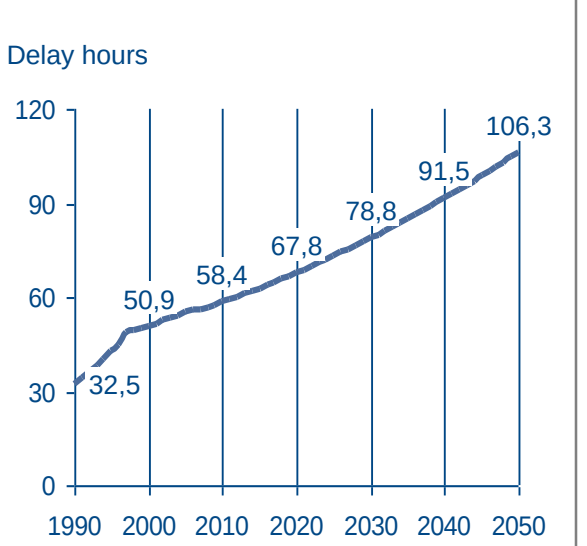
Current urban mobility trends will impose a heavy toll and urban mobility systems are confronted with new challenges

Ecological footprint urban mobility



- In 1990, global ecological footprint of urban mobility amounted to 3,7%
- In 2050 17,3% of planet's biocapacities will be needed to make urban mobility possible

Delay hours due to congestions p.a.



- In 1990 an average delay per year due to congestions totaled in US to 32,5 hours
- 2050 forecasts result in 106 hours p.a.

Cities are confronted with new challenges

Planet

- Air pollutions
- CO2 emissions
- Noise
- Increasing ecological footprint

People

- Traffic chaos
- Traffic security
- Traffic jam
- Decreasing quality of life and convenience

Profit

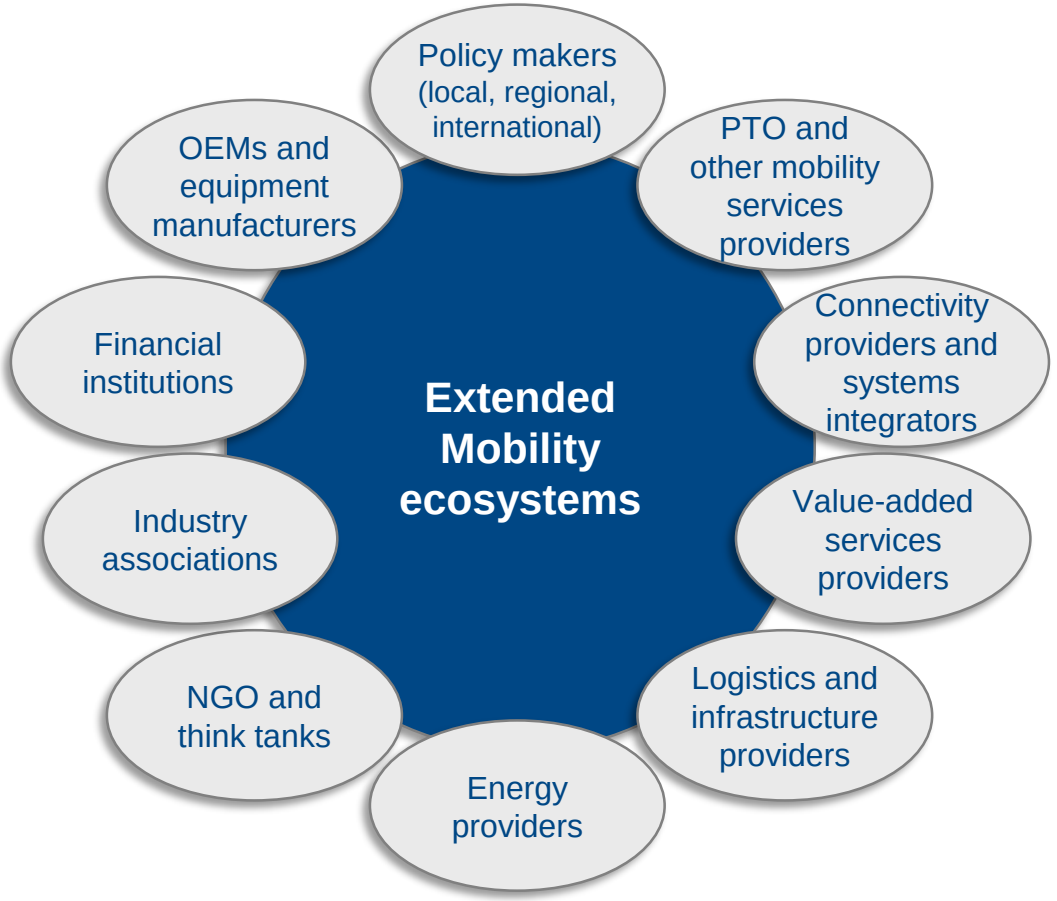
- Overloaded infrastructures
- Insufficient public transport capacities
- Increasing motorization
- Limited parking places

Source: Stockholm Environment Institute, US Census Bureau, UN Population Division, Schäfer/ Victor 2000, Siemens, Bureau of Transport Statistics, Arthur D. Little

With its FUM lab, Arthur D. Little aims to support cities and nations in shaping the extended mobility ecosystems of tomorrow and facilitate dialogue between urban mobility stakeholders

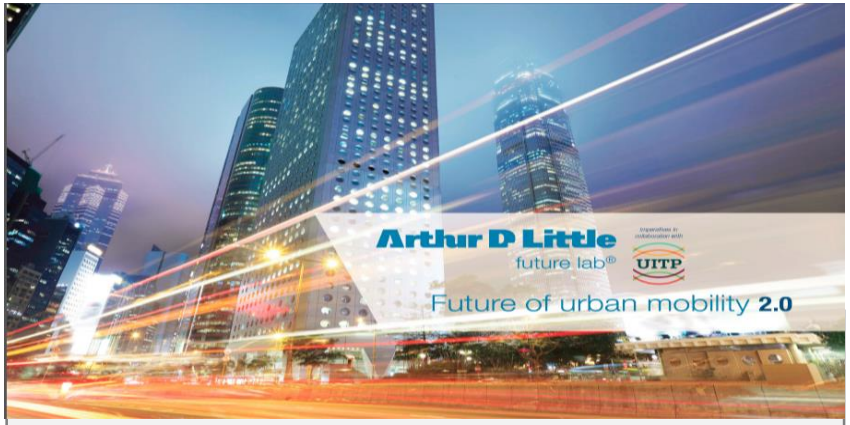
Future of Urban Mobility lab offerings

1	Assessment of urban mobility performance
2	Definition of nation/regional urban mobility strategies and roadmaps
3	Definition of urban logistics strategies
4	Opportunity assessment and development of Innovative mobility ecosystems
5	Business cases for innovative business models and technologies
6	Development of commercial offering for airports, subway and railways stations



Source: Arthur D. Little

"The Future of Urban Mobility study 2.0" – Arthur D. Little contribution to tackle the urban mobility challenge, developed in collaboration with UITP



- *To which extent are cities currently equipped to cope with the urban mobility challenges?*
- *What are the strategic imperatives for mobility actors to shape the future of urban mobility?*
- *Which cities are demonstrating good practices?*

A joint initiative by Arthur D. Little and UITP

Arthur D Little

- World's first management consulting firm
- Linking strategy, innovation and technology with deep industry knowledge
- Launched Arthur D. Little Mobility Lab in 2010 as a contribution to tackle the urban mobility challenge

- International network for worldwide cooperation, business development and knowledge sharing between public transport authorities, operators, policy decision-makers, scientific institutes and suppliers to the transport industry
- 3,400 members from 92 countries

UITP

Content

- The Future of Urban Mobility – Setting the scene
- **Arthur D. Little Urban Mobility Index 2.0**
- What is holding back changes?
- Recommendations on strategic directions and imperatives

Our benchmark sample includes 84 cities covering seven geographical regions across all continents

	Americas 22	Europe, Middle East & Africa 33	Asia Pacific 29
"Megacities"-cluster of C40 Cities Climate Leadership Group 40	**USA/Canada** Chicago Houston Los Angeles New York Philadelphia Toronto Washington D.C. **Latin America** Bogota Buenos Aires Caracas Lima Mexico City Rio de Janeiro Sao Paulo	**Europe** Athens Berlin Istanbul London Madrid Moscow Paris Rome Warsaw **Africa** Addis Ababa Cairo Johannesburg Lagos	**Asia** Bangkok Delhi Dhaka Hanoi Ho Chi Minh Hong Kong Jakarta Karachi Mumbai Seoul Tokyo **Pacific** Melbourne Sydney
World's largest cities determined by GDP share[1)] 24	Atlanta Boston Dallas Miami	**Europe** Barcelona Lisbon St. Petersburg **Middle East** Baghdad Tehran **Africa** Kinshasa	Ankara Bangalore Beijing Chennai Guangzhou Hyderabad Kolkata Lahore Manila Osaka Shanghai Shenzhen Tianjin Wuhan
Smaller cities with good practices 20	Portland Montreal Curitiba Santiago de Chile	Amsterdam Copenhagen Frankfurt Prague Stuttgart Brussels Munich Stockholm Vienna Zurich Nantes Hanover Helsinki Dubai	Kuala Lumpur Singapore

Source: Arthur D. Little Urban Mobility Index 2.0; 1) not included into group 1 (C40 Megacities)

The Mobility index assesses cities along a set of 19 criteria aggregated into Maturity and Performance buckets

Arthur D. Little Urban Mobility Index 2.0

Maturity
[max. 58 points]

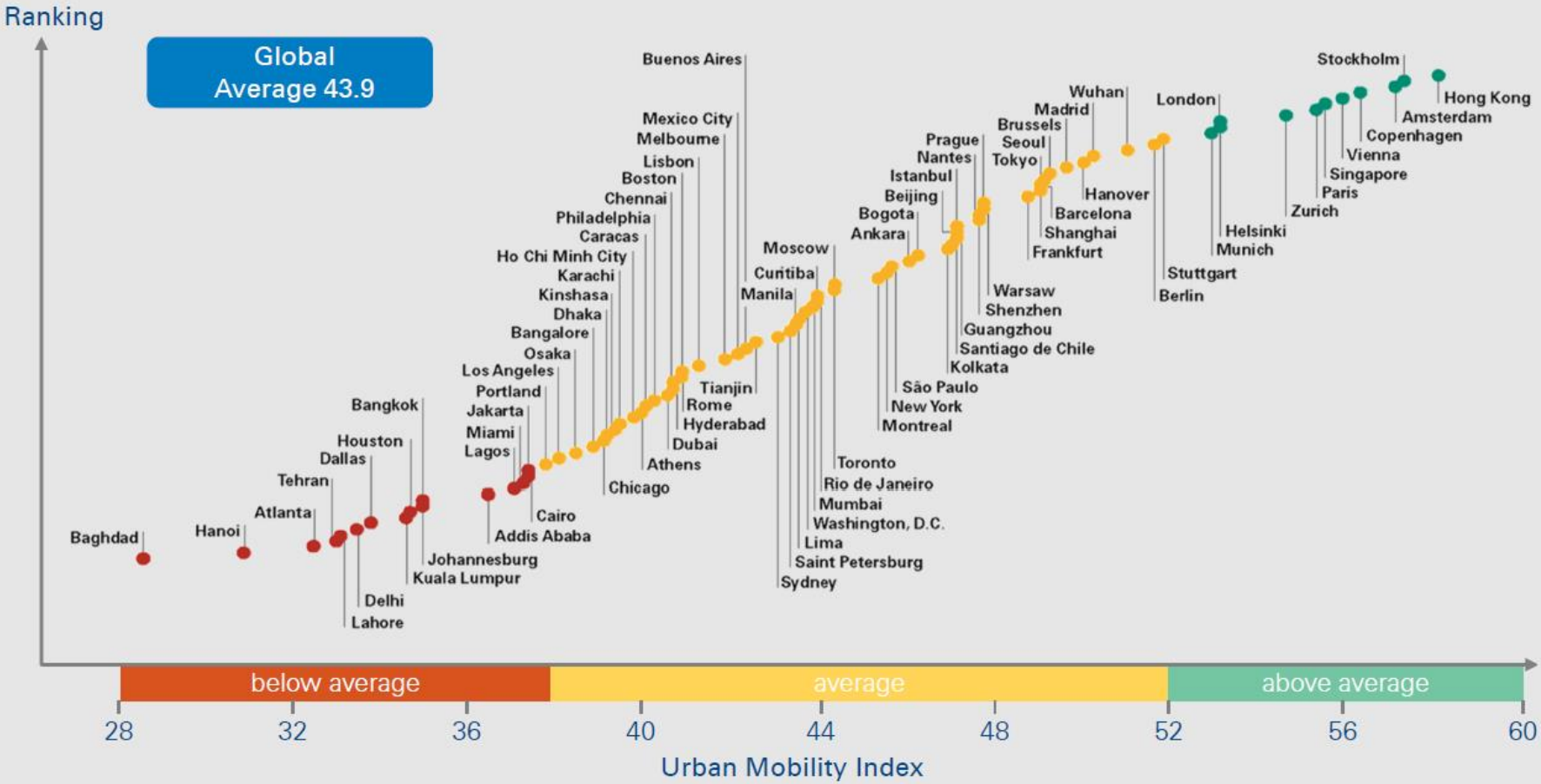
Criteria	Weight[1)]
1. Financial attractiveness of PT	4
2. Share of PT in modal split	6
3. Share of zero-emission modes	6
4. Roads density	4
5. Cycle path network density	6
6. Urban agglomeration density	2
7. Smart card penetration	6
8. Bike sharing performance	6
9. Car sharing performance	6
10. PT frequency	6
11. Initiatives of public sector	6

Performance
[max. 42 points]

Criteria	Weight[1)]
1. Transport related CO_2 emissions	4
2. NO_2 concentration	4
3. PM_{10} concentration	4
4. Traffic related fatalities	6
5. Increase of share PT in modal split	6
6. Increase of share of zero-emission modes	6
7. Mean travel time to work	6
8. Density of vehicles registered	6

Source: Arthur D. Little Mobility Index; [1)] The maximum of 100 points is defined by any city in the sample for each criteria

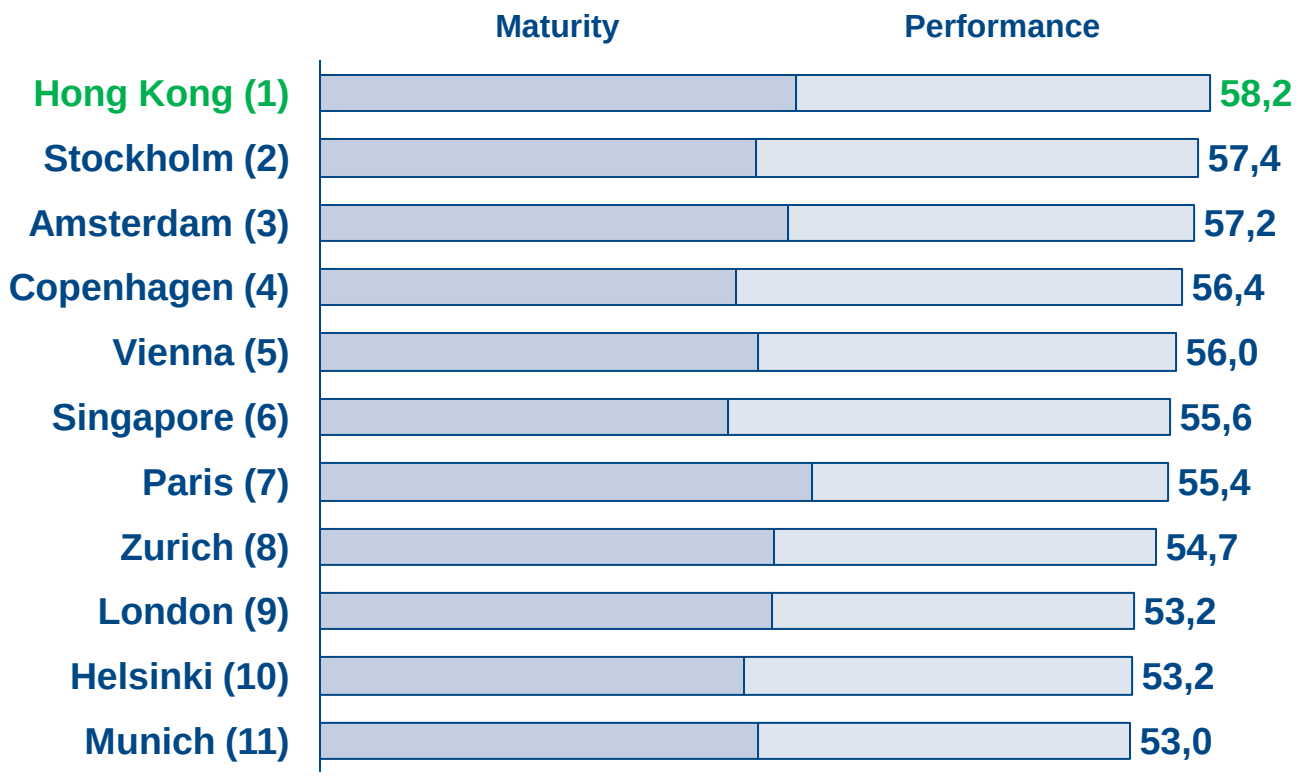
The overall results indicate that the majority of cities are badly equipped to cope with the challenges ahead



Source: Arthur D. Little Urban Mobility Index 2.0; UITP is independent of this index, which does not necessarily reflect its opinion'; 100 index points for city that would achieve best performance on each criteria.

Highest score for Hong Kong (58,2), followed by Stockholm, Amsterdam, Copenhagen and Vienna

11 above average scoring cities [top 20% of score range]



- Overall, only **11 cities** are performing "above average" – top 20% of the score range
- Highest score for **Hong Kong (58,2 out of 100)**, still indicating significant potential for improvement
- **On average less than 1/2 of potential** of urban mobility systems is **unleashed** today – Action needed!

Source: Arthur D. Little Urban Mobility Index 2.0

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- **What is holding back changes?**
- Recommendations on strategic directions and imperatives

What is holding back changes? – Current mobility policy and strategies do not cover requirements

Suboptimal mobility strategies

- A lot of mature cities **do not have a clear vision and strategy** on how their mobility systems should look like in the future
- Lack of synergies between individual initiatives and lack of integration between different transport modes leading to **sub-optimal outcome** in terms of performance

Lack of integration across mobility systems

- **Lack of integrated approach of urban policies**: need to further integrate urban planning with other regional policy (environment, land planning, energy, social policy)
- **Integration** between regional mobility systems still remains low in comparison to other parts of the economy and cross **regional-links constitute bottle-necks**

Need for cities to develop a long term political vision of urban mobility leading to well grounded urban mobility objectives and strategy

Source : Arthur D. Little Urban Mobility Index 2.0

3 Understanding the urban mobility challenge – Root causes of poor performance

What is holding back changes? – The main root causes of poor performance are the lack of innovation and collaboration between actors of the extended mobility ecosystem

Broad range of business models and technologies readily available

- Comprehensive review of urban mobility technology and business models reveals sufficient availability of solutions to address the mobility challenges and enable transformation to high performance urban mobility systems

Innovation hostility as a key barrier for evolution of urban mobility systems

- Current mobility systems do not sufficiently adapt to changing demands, combining single steps of the mobility value chain into an integrated system
- Actors of the mobility ecosystem do not collaborate sufficiently to foster lateral learning and jointly develop innovative mobility solutions

Need for system level collaboration between all stakeholders of the mobility eco-system to come up with innovative and integrated business models

Source : Arthur D. Little Urban Mobility Index 2.0

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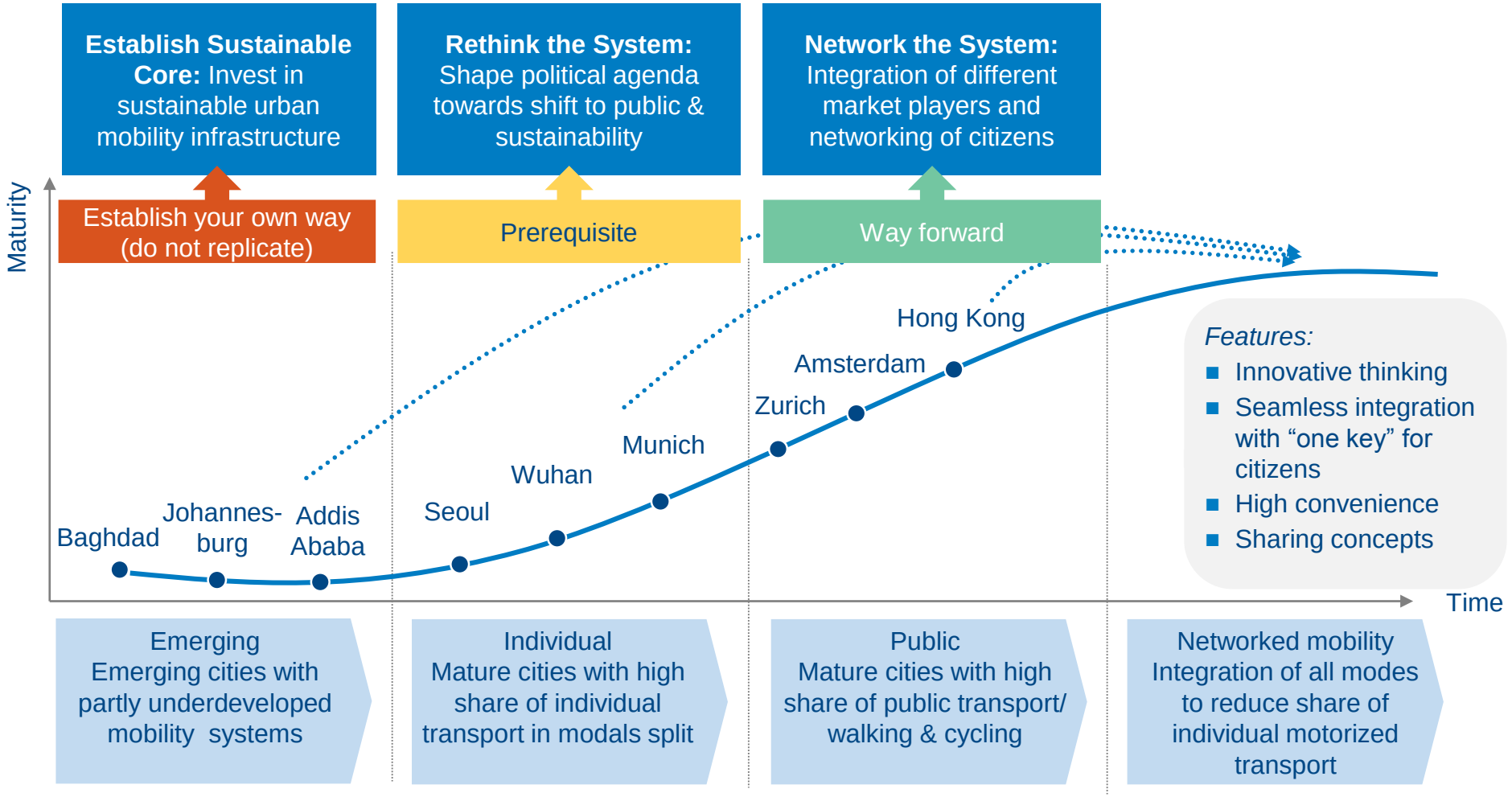
- **Recommendations on strategic directions and imperatives**

Three strategic directions were identified for urban mobility depending on cities' maturity and the share of sustainable transport in their modal split



Source: Arthur D. Little

Network the system - Illustration:
Passenger Mobility ecosystem: SMILE

Region: Austria countrywide (Europe)

Initiative: SMILE* (prototype phase)

Innovative solution: Integrated Mobility platform and Digital Multimodal mobility assistant (app)

Ecosystem members:

- Initiated by **Wiener Stadtwerke (PTA)**
- **≈30 partners involved**, including:
  - Mobility service providers (urban transport, rail, car and bike sharing, taxi, parking operators,…
  - Connectivity providers, system integrators
  - Energy suppliers,…

Initiated in 2012, currently in piloting phase, go live expected in 2015

SMILE: **S**mart **M**obility **I**nformation and ticketing system **L**eading the way for **E**ffective mobility). For more information see: http://smile-einfachmobil.at/

Network the system - Illustration:
Last Mile Delivery ecosystem: Regional Freight plan

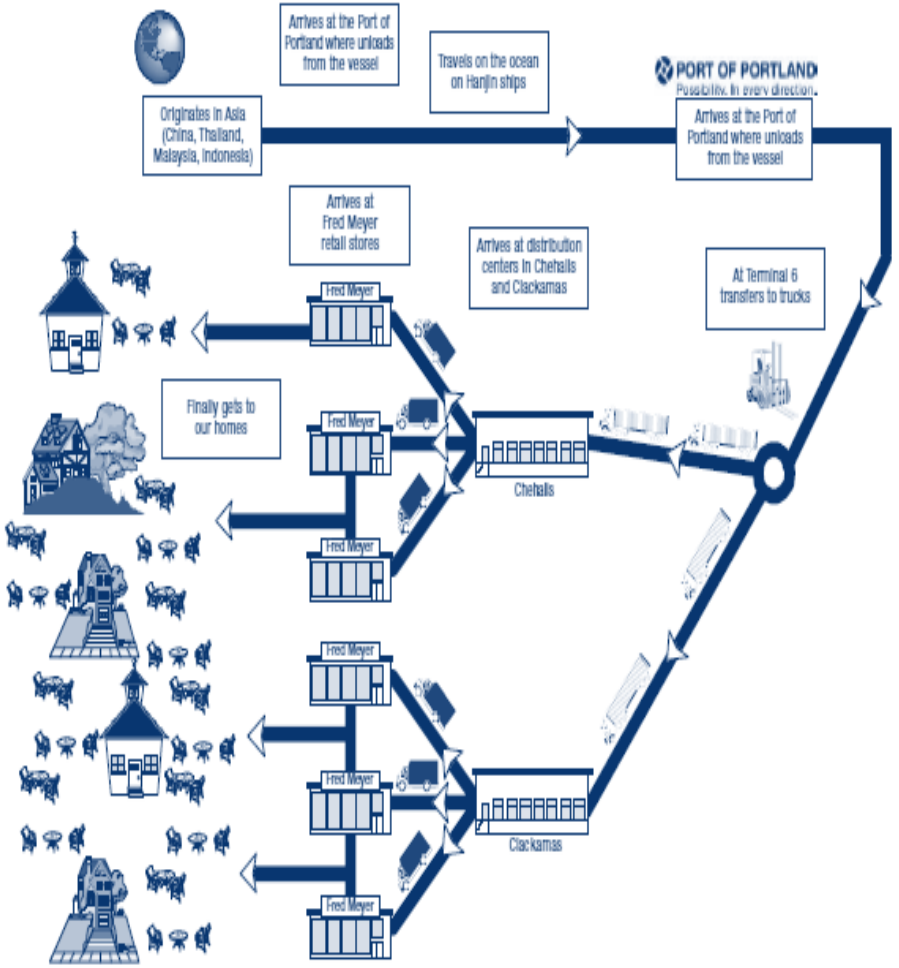
Region: Portland (Oregon, USA)

Initiative: Regional Sustainable Freight Strategy

Innovative solution: Urban Logistic scheme for Last Mile Delivery

Ecosystem members: ~40 stakeholders

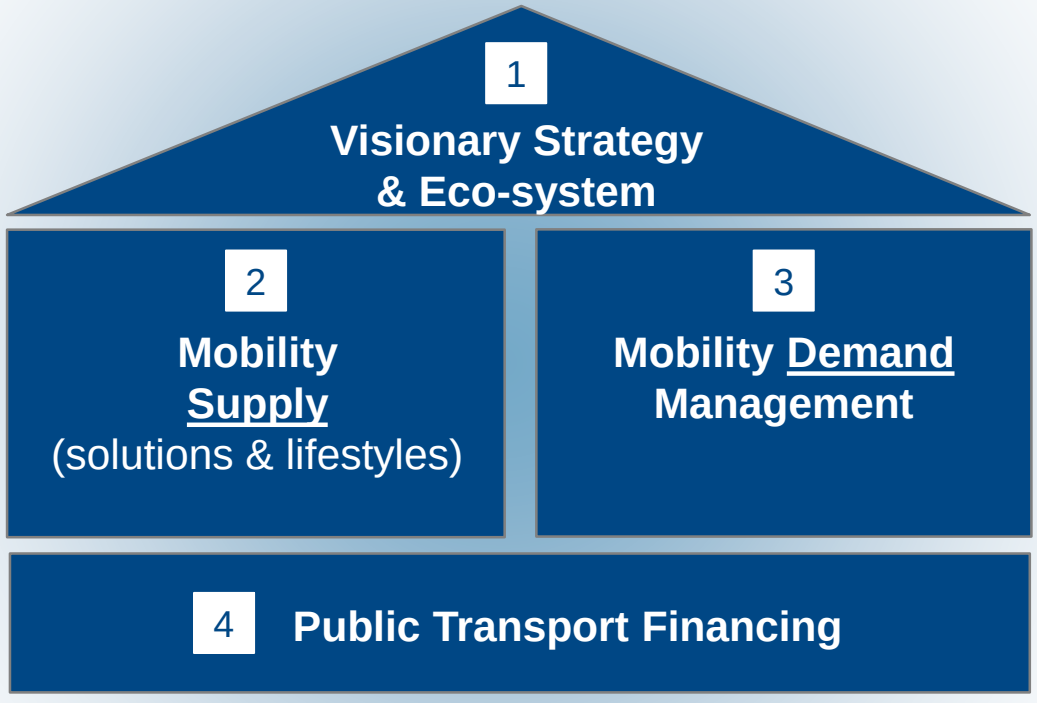
- Initiated by **Metro Council (city administration)***
- **≈40 partners** involved, including:
  - City administrations, transportation, sustainability and planning offices
  - Logistics providers
  - Manufacturers and retailers
  - Engineering and planning companies
  - Road and trucking associations, transportation alliances



* The Metro Council appointed a Regional Freight and Goods Mobement (RFGM) Task force made of 33 mublic and private members

Four dimensions need to be considered by cities to shape extended mobility ecosystems of tomorrow

System-level framework for sustainable mobility



System-level approach

- **Policy imperatives** for cities of different **maturity stages** can be clustered around **4 dimensions**
- **System-level approach required:** Sustainable improvement of mobility performance requires simultaneous improvement on each dimensions

  … the weakest link will influence overall mobility performance

Source : Arthur D. Little & UITP FUM 2.0

25 imperatives[1] should be considered by cities when defining sustainable urban mobility strategies; the relevance of which depends on cities' development stage

	Establish Sustainable Core	Rethink the System	Network the System
1 **Visionary strategy & ecosystem**	1. Transparent regulatory framework		
	2. Formalization of Public Transport	3. Alignment on Political vision and urban mobility objectives	
	4. Urban mobility strategy and master plan		
	5. Coordination of transport planning with other urban policies	6. Integrated urban management approach	
			7. Fair competition between modes/ business models
2 **Mobility Supply** (solutions & lifestyle)	8. Establishment of sustainable mobility offering	9. Introduction of innovative business models and partnerships	
		10. Customer centric culture: enhance quality and customer experience	
		11. Service offering extension (VAS) through alliances with third parties	
		12. Interoperability and development of multi-modal packages	13. Development of integrated mobility platforms
3 **Mobility Demand Management**		14. Engagement with citizens and business community	
		15. Introduction of traffic calming measures to optimize street usage conditions	
		16. Introduction of pricing measures to steer mobility demand	
	17. Introduction of parking policy and improve regulation structure		
	18. Definition of appropriate land-use policies		
		19. Development of corporate policies and urban logistics schemes	
4 **Public Transport Financing**	20. Maximization of fare revenue while increasing offering quality		
		21. Individualization mobility offering with bundles tailored to customer groups	
		22. Derive additional revenues via aggregation of third party services	
	23. Prioritization of public funding for investments with sound business cases		
		24. Assessment of opportunities to perceive charge from indirect beneficiaries	
	25. Stimulation of private partnerships while preserving business solidity		

Source : Arthur D. Little & UITP FUM 2.0; [1] Very simplified descroiption; Please see detailed study for more detailed description of the 25 imperatives

Final considerations

- Urban mobility is a **key challenge** for cities, particularly given under-satisfied customer needs and possible extension of traditional mobility eco-system
- The majority of **cities are badly equipped** to cope with the mobility challenge and the main root causes of poor performance are the **lack of system-level innovation and collaboration**
- The FUM 2.0 study provides cities and mobility actors with a number of considerations to evolve toward networked, multimodal mobility systems:
  - **3 strategic directions** to better shape the future of urban mobility
  - **4 dimensions** and **25 imperatives** to consider when defining sustainable urban mobility strategies
- There is a clear customer need for better mobility systems and emerging business models, hence **what does it take to make it happen**?
  - ➢ It needs **vision, creativity, courage, and entrepreneurship** to turn the mobility paradigm towards full integration

Arthur D Little

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