Arthur D Little

Which Business Models for integrated urban mobility?

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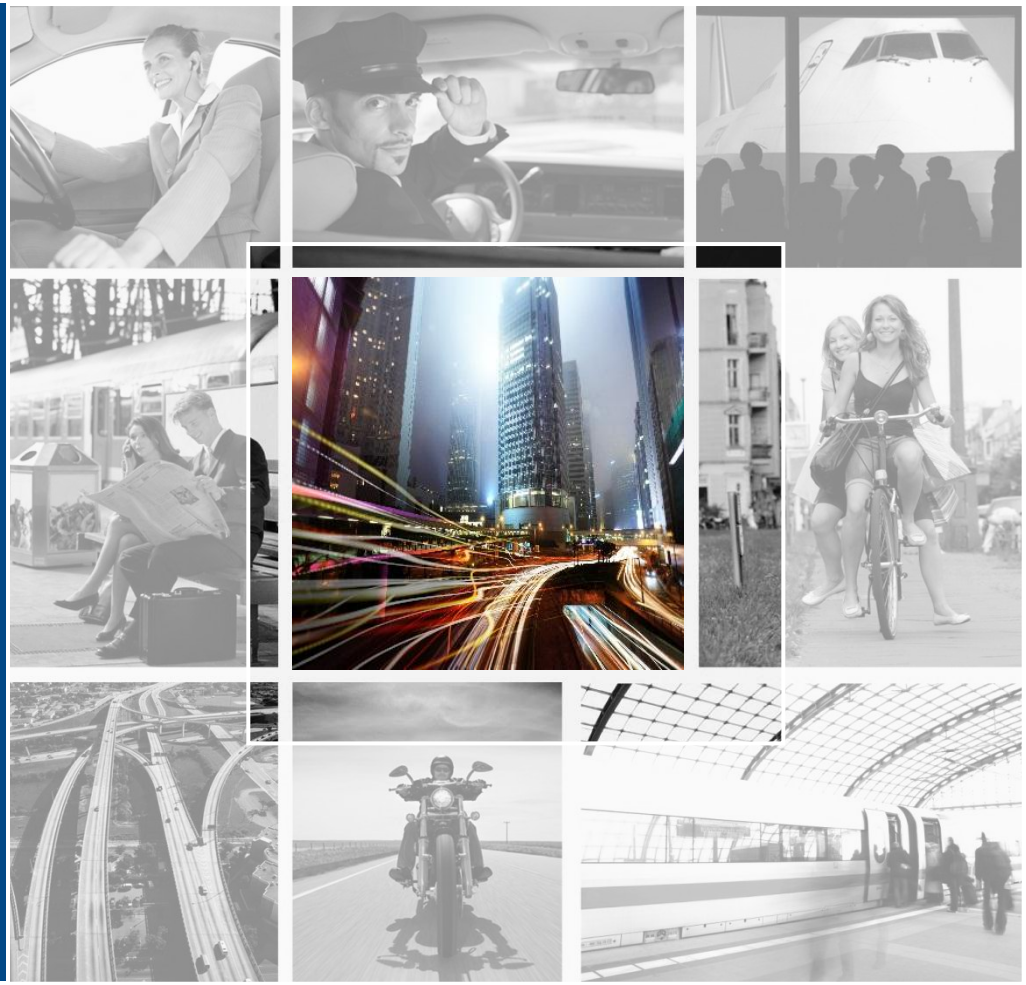


The future will be urban… but urban mobility systems are under pressure and eco-systems extensions are emerging

Evolving Mobility Needs

- Drastic **increase of urban population** in coming years[1)]
- Evolving mobility needs requiring **mobility service portfolio extension**:
  - Changing **travel habits** and **transport mix**
  - Demand for services increasing **convenience, speed and predictability**
  - Changing expectations toward **individualization and sustainability**

Technology (R)evolution

- Generalized use of **web-based applications** and smartphone penetration…

  … allowing for **one-stop-shop** for identification, planning, booking, payment, billing
- Ability to process big data to provide **real-time, integrated and customized information**

Eco-system Extension

- **Extension of the mobility eco-system**[2)] (e.g. B2C and P2P car sharing, car pooling, etc.) …

  … leading to cannibalization of traditional transport modes and **profit pool redistribution**
- Interest of specialized **players from other sectors** to **enter into the extended mobility system value chain** and assess opportunities to act as Total Mobility Providers

1) By 2015, 60% of the world population will live in urban areas and the number of trips in urban areas is projected to increase by 50% from 2005 level ; 2) B2C Car Sharing, P2P car sharing and Bike sharing boast expected CAGR 2012-16 in Europe of respectively 43% (46% in US), 20% (34% in US) and 30% (51% in US)

Questions addressed today

- To which extend are cities currently equipped to cope with the urban mobility challenges?
- What are strategic imperatives for mobility actors to better shape the future of urban mobility?
- Which innovative business models will emerge and shape future urban mobility eco-system?
- Which today's mobility actors emerge as winners or losers in future extended mobility eco-system?

- **Understanding the urban mobility challenge**
- System-level collaboration: integrated mobility platforms
- Conclusions

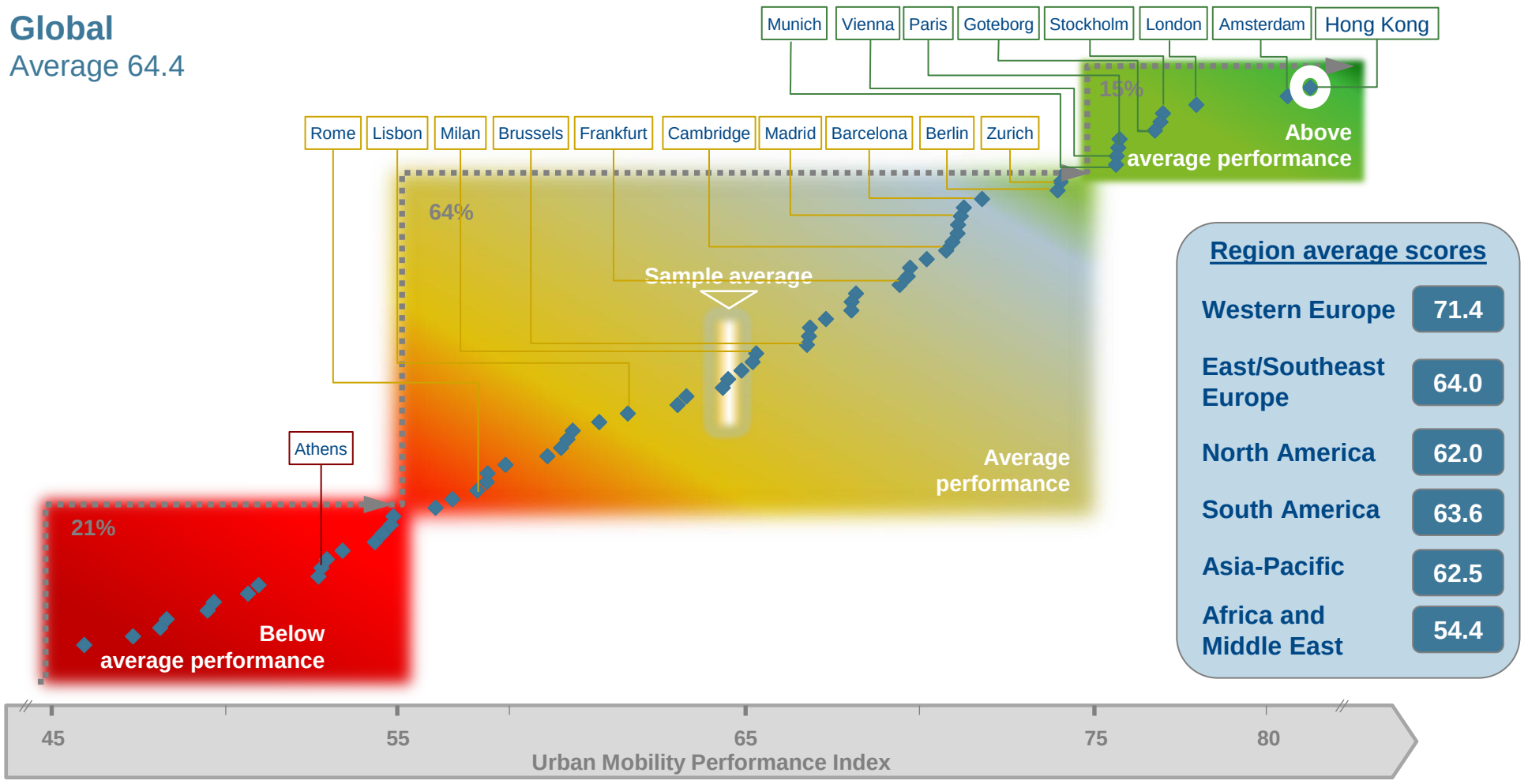
In 2011, Arthur D. Little conducted a global study on urban mobility and compared performance across 66 cities

- *What are the key mobility challenges to be faced by cities tomorrow?*
- *What are the key solutions under development to cope with these challenges?*
- *What are the key levers for value chain actors to shape the future of urban mobility systems?*

Urban Mobility Index: 11 Criteria	
Mobility Maturity	■ Vision/ strategy for future mobility ■ Share of public transport, walking and cycling in modal split ■ Number of shared cars ■ Number of shared bikes ■ Penetration rate of smart cards
Mobility Perfor-mance	■ Average travel speed ■ Mean travel time to work ■ Number of fatalities ■ Registered vehicles ■ Transport related CO_2 emission ■ Satisfaction with transport

Source : Arthur D. Little Urban Mobility Index

The overall results indicated that the majority of cities were badly equipped to cope with the mobility challenge ahead



Source : Arthur D. Little Urban Mobility Index

The identified root causes of bad performance is the lack of innovation and collaboration

Broad range of business models and technologies readily available

- Comprehensive review of 36 urban mobility business models reveals sufficient availability of solutions to address the pressing mobility challenges
- Analysis of 39 key mobility technologies reveals a broad range of early and emerging technologies with significant potential to enable transformation to high performance urban mobility systems

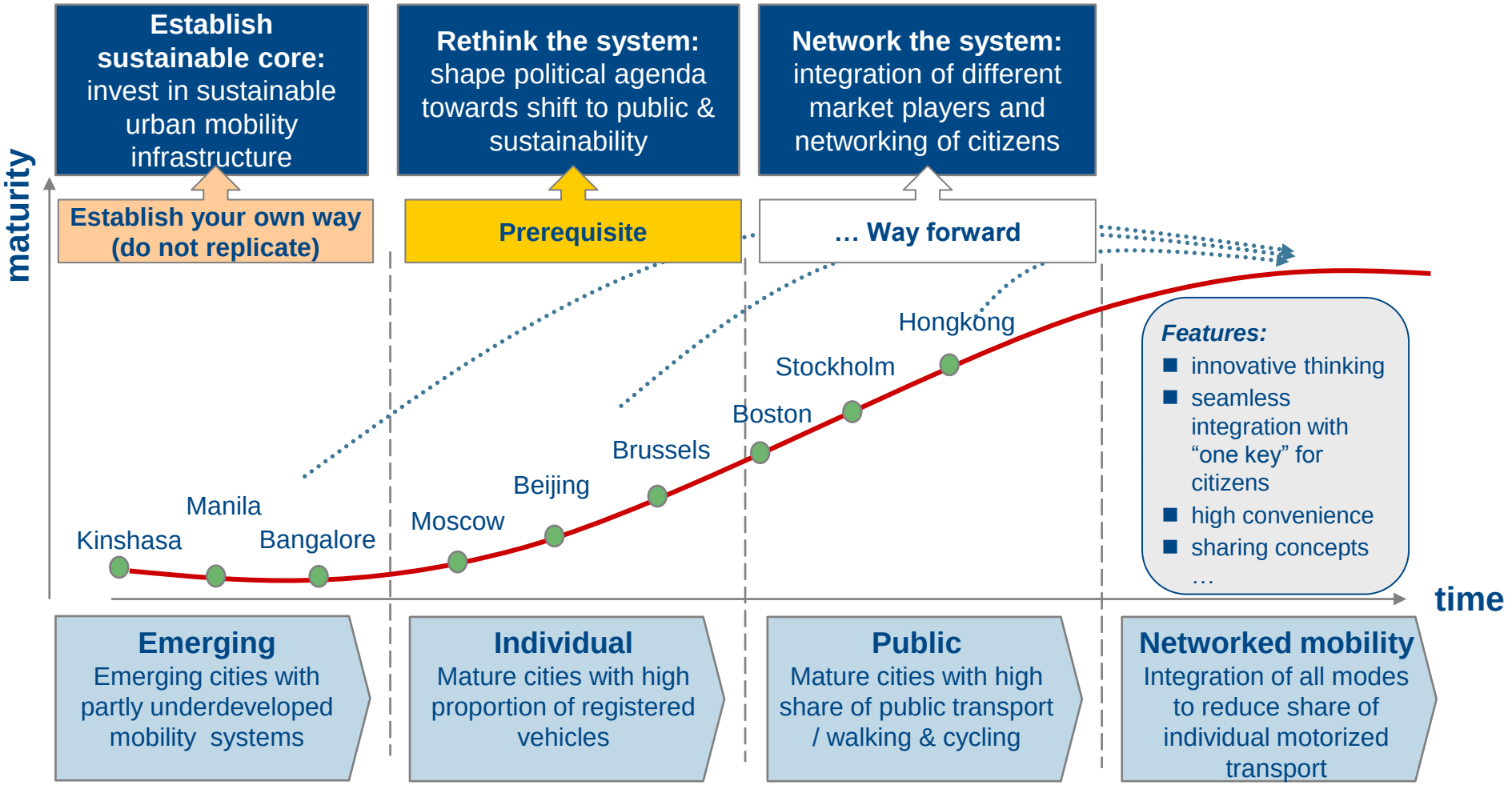
Innovation hostility as a key barrier for evolution of urban mobility systems

- Current mobility systems do not adapt to changing demands, combine single steps from a value chain to a new system, learn from other systems
- Current mobility systems do not bring together key players to work jointly on solutions and rarely provide for a rewarding environment for investors

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

Three strategic imperatives were identified for urban mobility depending on cities' level of maturity and share of PT



Source : Arthur D. Little

- Understanding the urban mobility challenge
- **System-level collaboration: integrated mobility platforms**
- Conclusions

System level collaboration can happen at 3 different levels and range from alignment to integrated mobility concepts

Strategic alignment

- Coordination of stakeholders to ensure a common understanding of political vision and directives and feedback to ensure right balance between stretch and achievability
- Alignment of mobility priorities and investment (e.g. within region or state) to achieve global objectives and timetable for delivery; link with urban planning and sustainability

Technical / Operational alignment

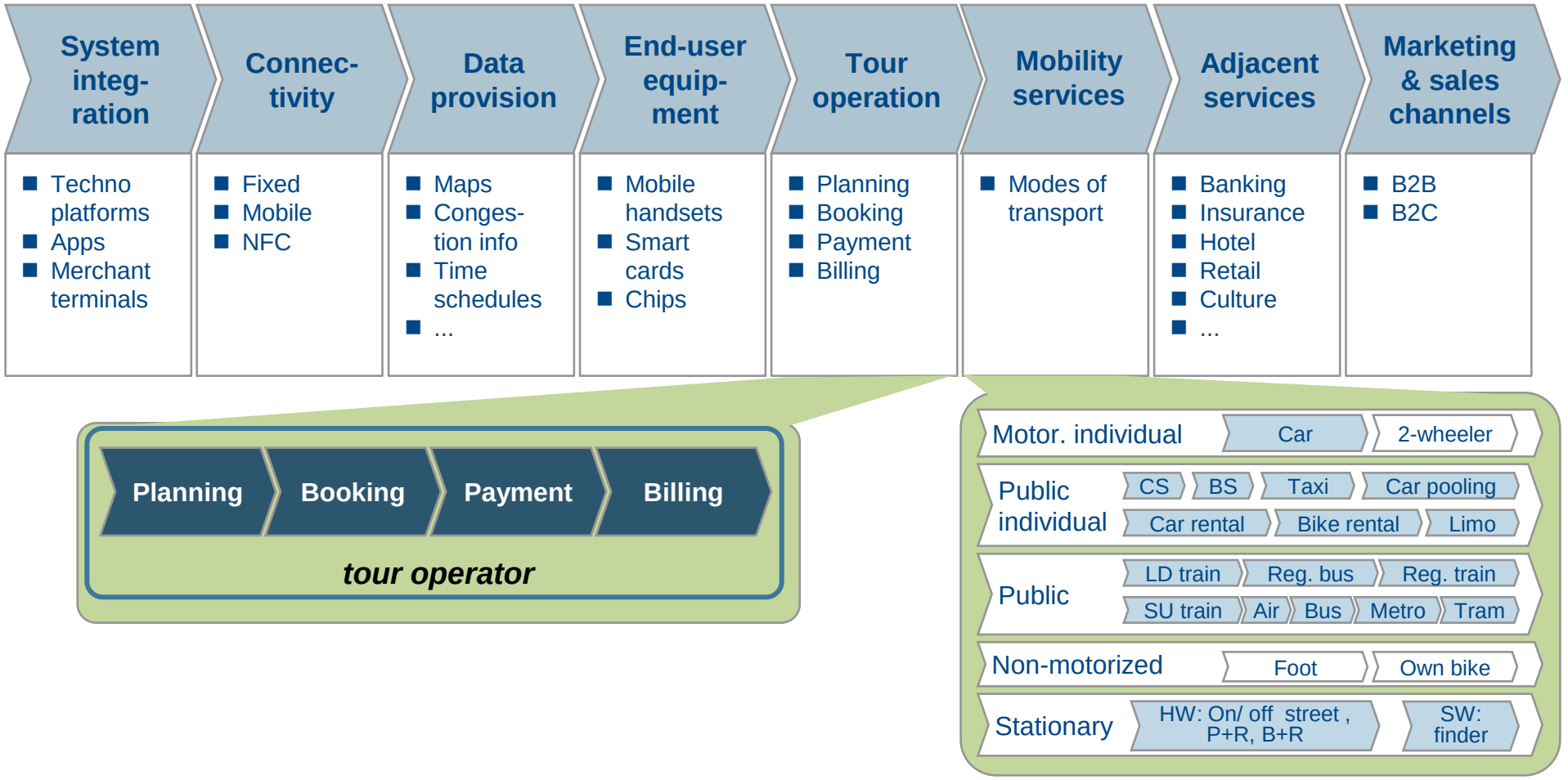
- Definition of common technical solutions to support interoperability of mobility systems/services, without integrating mobility services, e.g.:
  - Interoperability of mobility smartcard across regions
  - Collaboration in development of contextual journey planner encompassing different transport modes

Integrated mobility platforms

- Provision of integrated mobility concepts thru integration of own mobility and aggregation of services offered by third-party providers
- Offering of service for own account, taking full responsibility for actual service delivery and risk associated with using the services, thereby ensuring “one face to the customer”

Source : Arthur D. Little

Integrated mobility platform requires integration of relevant public and private stakeholders within the extended mobility eco-system



Source : Arthur D. Little

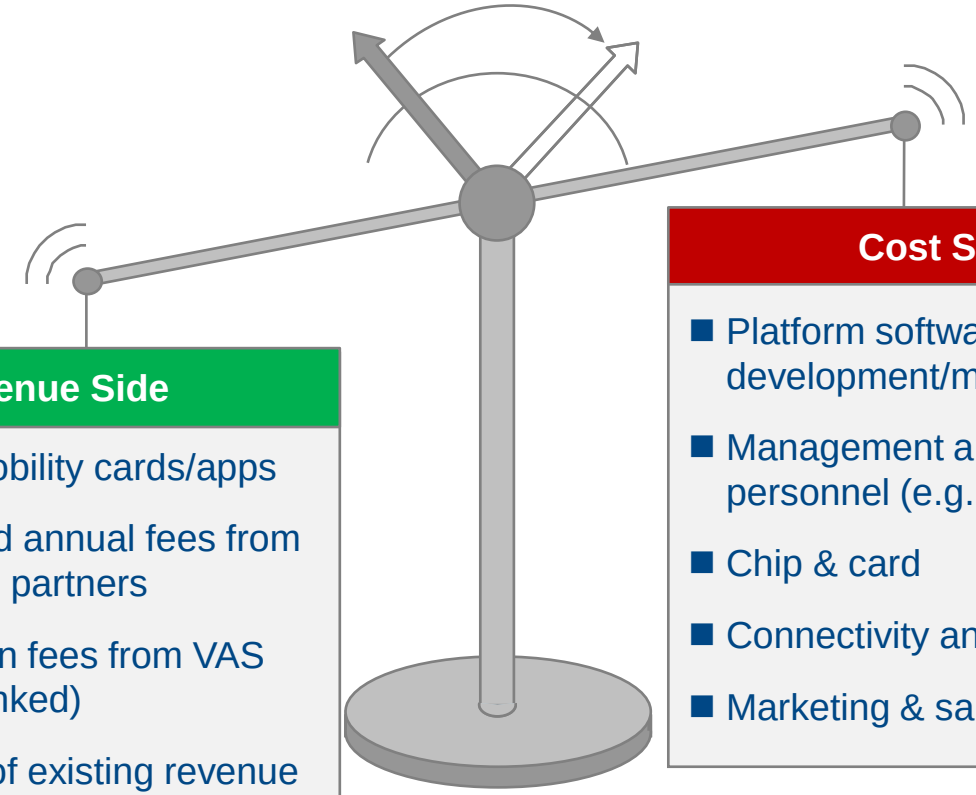
Note: CS = car sharing, BS = bike sharing, SU=suburban, LD = long-distance

What should an integrated mobility platform operator be able to offer and do?

Value Proposition of Platform Operator	Requirements
Acts as a single point of contact for travelers and full service provider: **Planning** → **Booking** → **Payment** → **Billing**	■ **Bundling** of third-party services and selling them for own account ■ **Responsibility for delivery** of third-party services and associated risks ■ **Collection of payments** and management of security and fraud
Integrate or aggregate all mobility service providers across all modes of transport **Individual** → **Public individual** → **Public** → **Stationary**	■ **Design and management of partner ecosystems** ■ Penetration of new regions through **contracts with local mobility providers** ■ Reaching **maximum of mobility providers** to keep the promise of total mobility
Offers tailored solutions considering customer preferences, lifestyle and budget	■ **Customers profiling** ■ **Achieving balance** between legal requirements on data security and need for transparency

Source : Arthur D. Little

If kept at regional level, extension of the revenue pool through introduction of VAS[1)] will be required to get a balanced business case and PTA is likely to take the lead



Revenue Side

- Sales of mobility cards/apps
- Sign-up and annual fees from aggregated partners
- Commission fees from VAS (revenue-linked)
- Extension of existing revenue streams (e.g. new customers penetration)
- Advertising

Cost Side

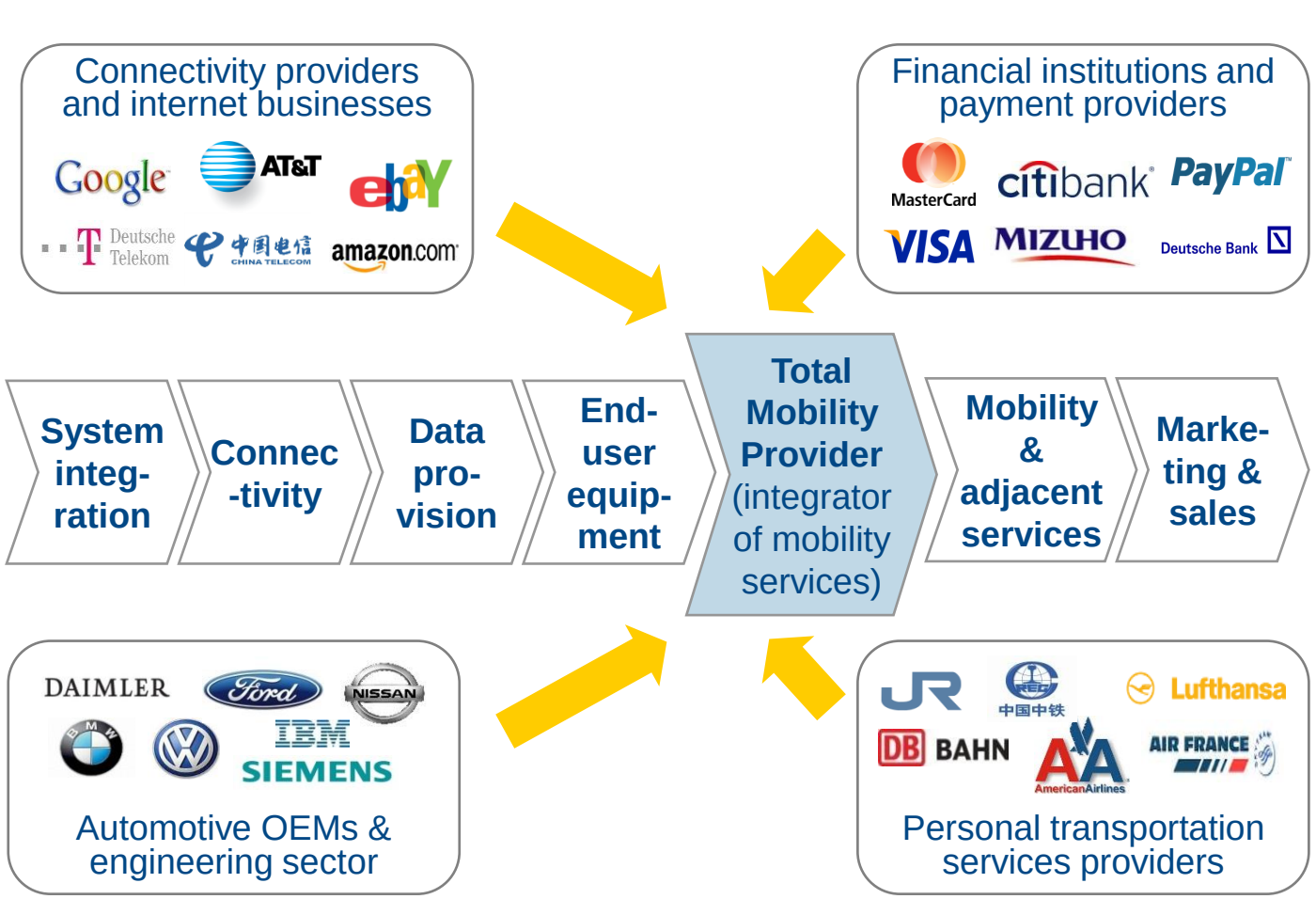
- Platform software development/maintenance
- Management and operating personnel (e.g. call center)
- Chip & card
- Connectivity and data cost
- Marketing & sales

VAS Partners

- **Retail** (large and small stores, services)
- **Culture** (museums, theatres, cinemas)
- **Sport** (stadiums, fitness, wellness)
- **Gastronomy** (cafes, restaurants)
- **Tourism** (sightseeing, hotels)

Source : Arthur D. Little 1) Value Added Services beyond core mobility services

If carried beyond regional borders, there can be numerous candidates for the role of mobility platform operator



Comments

- Future passenger mobility – **not a domain of transportation providers** only
- Companies, that enjoy **strong customer trust**, are able to **master technology** and **integrate partners,** can act as Total Mobility Providers
- **First mover advantage** as a key success factor

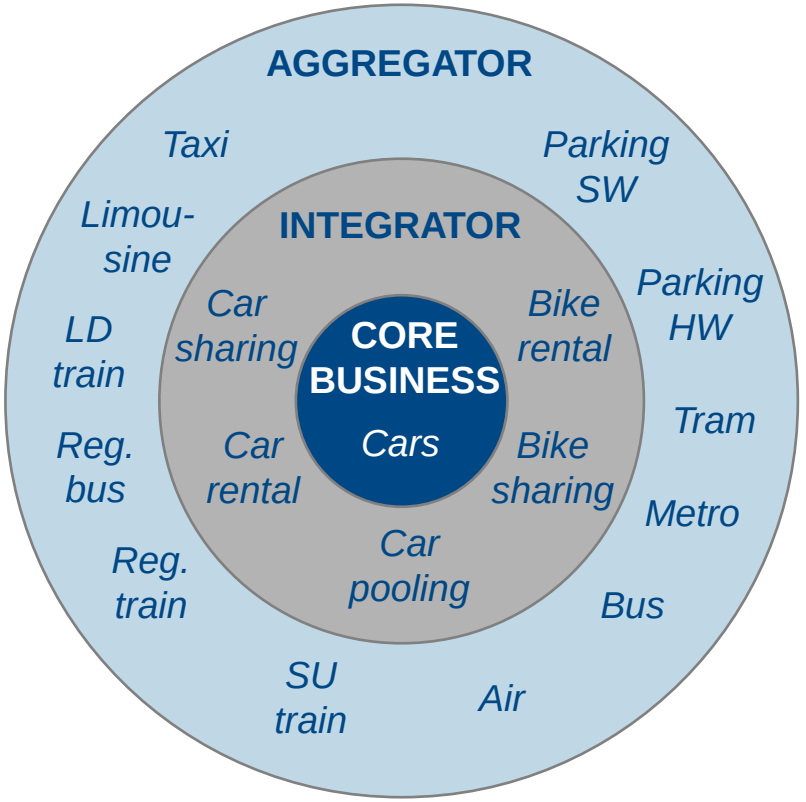
Source : Arthur D. Little

Illustrative example of Total Mobility Provider business model from an automotive OEM perspective

Modes of Transport – Morphological Box

Motor. individual	Cars	2-whellers
Public individual	CS, BS, Taxi, Car pooling	Car rental, Bike rental, Limo
Public	LD train, Reg. bus, Reg. train	SU train, Air, Bus, Metro, Tram
Non-motorized	Foot	Own bike
Stationary	HW: On/ off street, P+R, B+R	SW: finder

Business Model Illustration for Automotive OEMs



Source : Arthur D. Little

Note: CS = Car Sharing, BS = Bike Sharing, SU=Suburban, LD = Long-Distance, HW = Hardware, SW = Software

Key challenges encountered while setting up integrated mobility platforms

Business model profitability

- At regional level, extension of revenue pool beyond transport require to venture into VAS such as retail to get a balanced business case
- If platforms is to be rolled out in numerous cities:
  - Economies of scale and learning curve across cities will make the business case profitable
  - Integration of long-distance mobility (long-distances trains, buses, flight) can significantly increase potential revenue streams

Technology

- Technological networking of different transport modes and infrastructure
- Seamless integration of mobility services and underlying management mechanisms
- Next to building real-time information interfaces, collection of large amount of static information is required – exchange between partners is critical

Stakeholder management

- Finding the right set of partners to close all competency gaps along the value chain while ensuring positive business case for each partner
- 64% of Mobility is in cities; critical to have local authority involvement which may imply long time for vision and business model alignments
- Finding the right (legal and operational) structure for the operating company

Source : Arthur D. Little

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Overall conclusions

- Urban mobility is a key challenge, particularly given under-satisfied customer needs and extension of traditional mobility eco-system

- The majority of cities are badly equipped to cope with the mobility challenge ahead and a critical root cause for bad performance is lack of system-level innovation and collaboration:
  - In the near future, innovative mobility services will be much less driven by improvements in individual transport modes but the next step will be integration

- There is a clear customer need 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.

- Those players who take up the challenge as mobility platform operator will have a tremendous market potential to address

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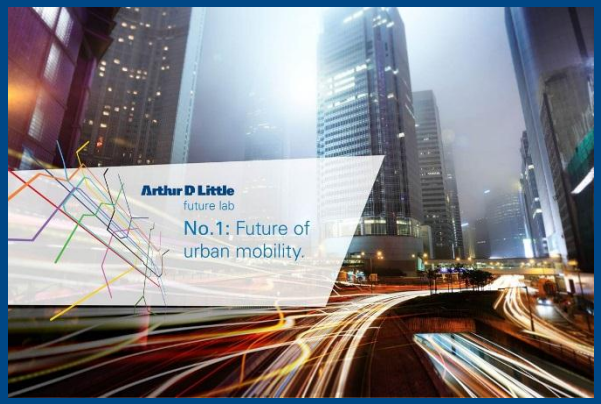

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