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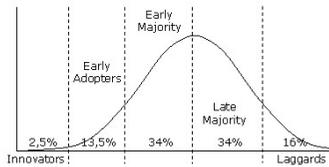
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**Benefits of Mobility as a Service:
Evidence from the UbiGo MaaS pilot
in Gothenburg, Sweden**



Adoption and use of technical products/systems

- users' needs and requirements for technical products/systems
- use and meaning of technical products and systems in everyday life
- prerequisites for users' adoption of new technologies



Human- machine systems (incl HMI)

- interplay between human and "machine" – from simple products to complex socio-technical systems
- performance, safety



Sustainability and everyday life

- design for sustainable behaviour
- understanding behaviour and change



User experience

- sensing, perceiving and react to products and events involving products
- aesthetics
- product identity and meaning

Energy systems and resource efficiency

Urban mobility and transport systems

Well-being and health

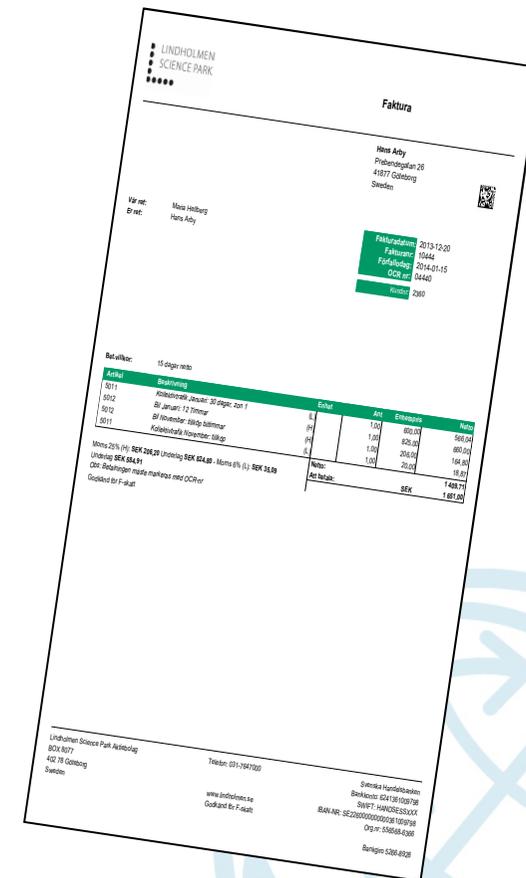
MaaS-related activities at DHF

- Go:Smart / UbiGo Field Operational Test (2012-2014);
quadruple helix project (public and private sectors, academia, users)
- MAASiFiE Mobility as a Service for Linking Europe (2015-2017);
partners VTT and AustriaTech
- IRIMS Institutional frameworks for integrated mobility services in future cities (2016-2017);
partners Victoria Swedish ICT, Lund University, Trivector, Samtrafiken, K2
- PhD Candidate project (2016-) Integrated Mobility Systems: creating favorable conditions for procurement, development and use;
partners Västtrafik and the region of Västra Götaland (VGR)
- Integrated mobility services “strategic case” (2016-)
- Coordinating the End-User Perspective WG (MaaS Alliance) (2015-)

Assumptions behind UbiGo

- A holistic perspective is necessary
- A use(r)-centered problem-solving perspective rather than a focus on change has potential to create new opportunities
- Rather than focusing on individuals, an ‘individual in a societal context’ perspective is necessary.
- Societal trends support service development based on the notion of shared resources/shared economy
- Advances in and dissemination of mobile ICT makes it increasingly possible to create and test new types of offers

UbiGo Real households
Real money
Real services





Data collection

Participants (173 adults and 22 children):

- Before-During-End questionnaires (164, 161, 160 responses; 151 completing all) + a “6-months after” questionnaire
- 2 x one-week travel diaries (40 & 36 responses)
- 3 post-FOT focus groups
- Post-FOT interviews (14 individuals & 3 households)
- Customer service errands

Non-participants (but who had expressed interest):

- Questionnaire (145 responses of 316 invitations)
- 24 individual interviews



Who participated?

83 households (subscriptions), 195 individuals

20 private vehicles set aside, 17 from single-vehicle households

The majority...

- live in an apartment & work full-time
- have a driver's license and PT card, but do not necessarily have daily access to a car
- do not subscribe to a carsharing or bikesharing system
- are highly connected
- are likely innovators/early adopters (e.g. change-seeking, curious)

Socio-demographic differences

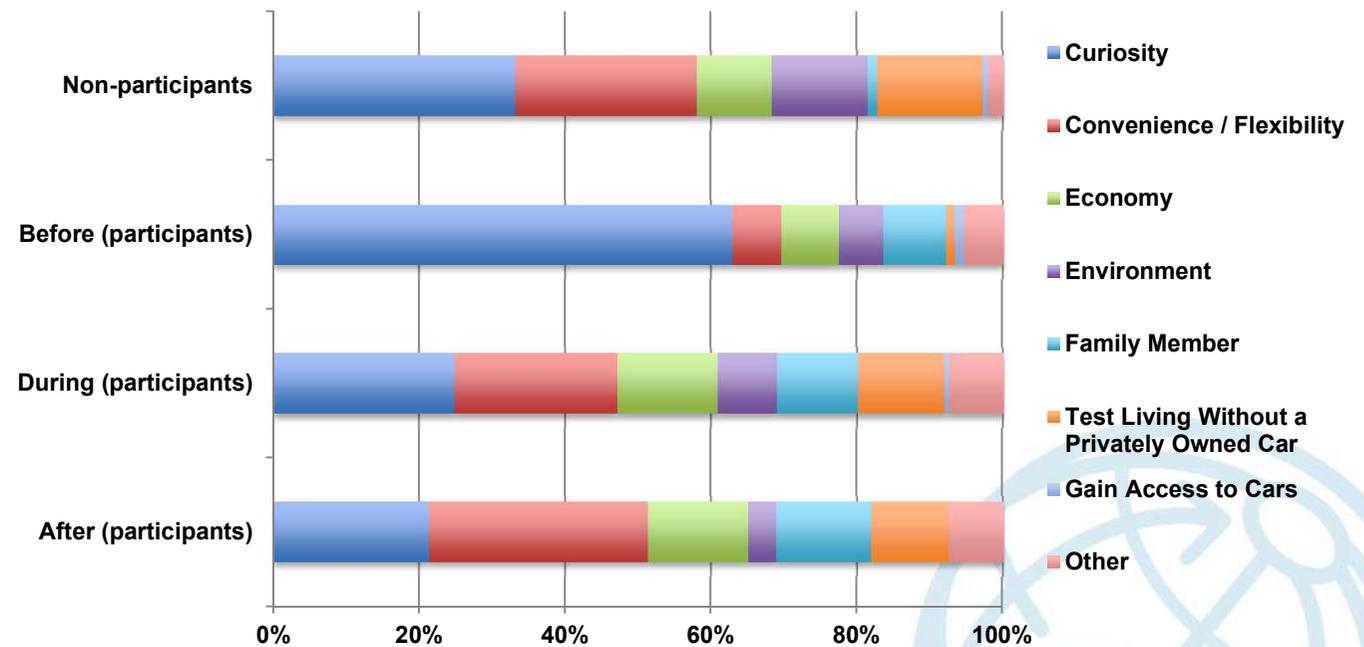
- Car ownership/access/use (shedders & keepers vs carsharers & accessors)
- Keepers – live in a “house” to a greater extent
- Keepers (vs accessors) – more adults, higher household income



Motives

...for joining?
Curiosity!

...for continuing?
**Convenience
and economy**



Travel Behavior (use, travel diaries)

Participants reduced use of (private) car and increased use of other modes.

Mode	“Before” Travel Diary from UbiGo participants, n = 40	“During” Travel Diary from UbiGo participants, n = 36
<i>Walk / Run</i>	25%	- 5%
<i>Bicycle</i>	10%	+ 35%
<i>Private Car</i>	25%	- 50%
<i>Carsharing</i>	2%	+ 200%
<i>Tram</i>	15%	+ 5%
<i>Bus (Local)</i>	15%	+ 35%
<i>Bus (Express)</i>	3%	+ 100%
<i>Train</i>	2%	+ 20%

“The modes we used didn’t at all match with what we had predicted. It was the total opposite, but it meant that we learned, about how we use the car, how we use the bus, how we use walking, etc.” (IP7).

Travel Behavior (use/attitude, questionnaire)

Participants reduced use of (private) car and increased use of other modes.

	<u>USE (less-equal-more)</u>	<u>ATTITUDE (worse-same-better)</u>
Bus/tram:	4% – 46% – 50%	2% – 46% – 52%
Local train:	7% – 75% – 18%	3% – 71% – 26%
Bikesharing:	16% – 61% – 23%	1% – 57% – 42%
Private bicycle:	19% – 65% – 16%	3% – 83% – 14%
Carsharing:	6% – 37% – 57%	3% – 36% – 61%
Car rental:	13% – 59% – 28%	4% – 75% – 21%
Private vehicle:	48% – 48% – 4%	23% – 74% – 3%
Taxi:	12% – 68% – 20%	6% – 76% – 18%
Walking:	6% – 73% – 21%	2% – 82% – 16%



Travel Behavior (misc. changes)

Four identified subgroups – *shedders, keepers, already carsharers, and accessors* – all trialed new travel behaviors and shifted towards more sustainable choices
→ No differences between groups in terms of satisfaction

Car status	Total answering all questionnaires (n = 151)	Group 1 – Owned and set aside car (n=19)	Group 2 – Owned and kept car (n = 52)	Group 3 – No car, but carsharer (n = 34)	Group 4 – Neither car nor carsharing (n = 46)
Reported change					
Mode	44%	74%	31%	41%	48%
Pre-trip planning	34%	89%	31%	32%	17%
Destination	23%	47%	19%	18%	20%
Trip chaining	22%	37%	23%	21%	15%
Exercise	22%	37%	23%	26%	11%
Travel time	20%	53%	19%	18%	9%
Route	19%	37%	19%	15%	13%
Transfer	13%	32%	15%	9%	4%
Arr./dep. time	12%	37%	10%	9%	7%
Travel companion	6%	16%	6%	6%	2%
No change	36%	11%	37%	41%	41%

Behavioral changes...over time?

97% of those who reported behavioral changes were satisfied with those changes...

...but will the changes remain?

- 50% claim the changes will remain
- 32% claim the changes will remain, given that
 - “... we have the same ‘punch card’ system as in UbiGo”
 - “... it is as easy to travel”
- 17% say the changes will not remain
 - Because of moving
 - “... because I will not have access to UbiGo”

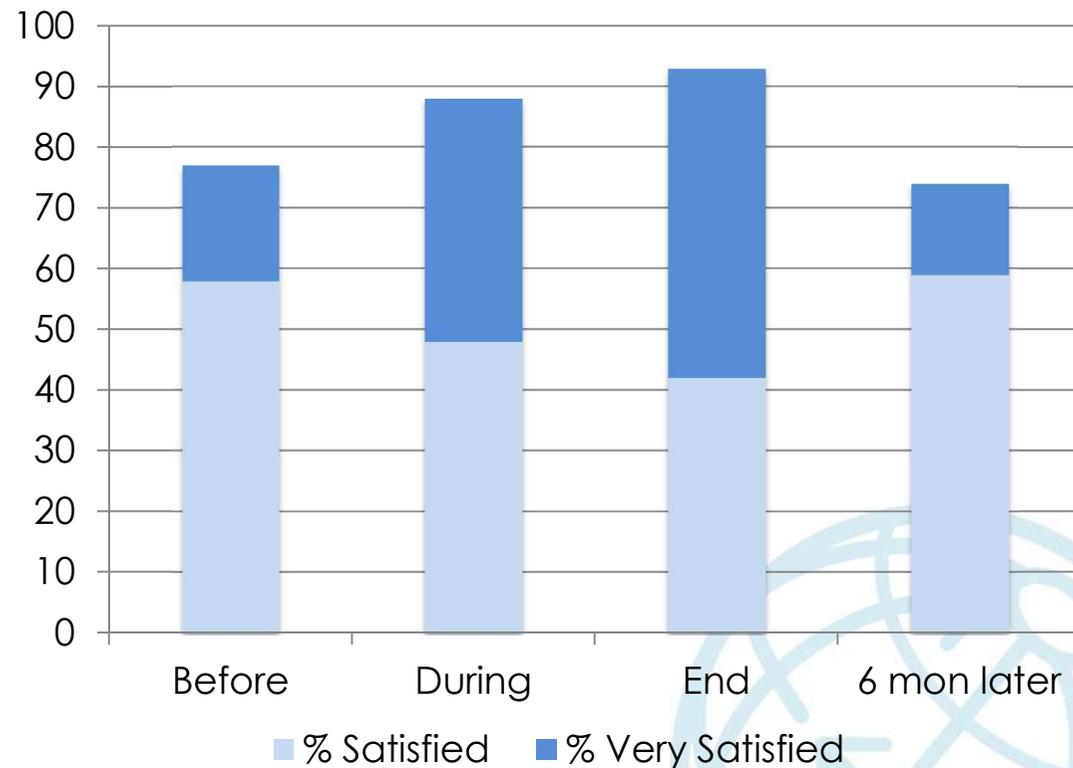


Satisfaction with transport

Participants became more satisfied.

Participants also became less positive towards private car and more positive towards other modes.

“It’s noticeable now that we’re not in [UbiGo anymore] that it’s like ..., it feels awkward to travel in the usual way.”



Associations

Simple Priceworthy Smooth Smart

Convenient Future Cost effective Fast

Practical Innovative Wise Modern

Environmental friendly Göteborg

Service design influences behavior

“Transportation smorgasbord” concept

Simplicity

Improved access (also mentally)

Improved flexibility (& reduced lock-in effects)

Economy

Added value / Relative benefit

Trialability (low-risk environment)

New insights on convenience

“It’s not about being a bus user or a pedestrian or; it’s that you’re everything. And having reasonable proportions of each [mode]. To be able to see when I need one and when I need the other. And that was really important. ... And the threshold was low enough to easily cross, to see what [mode] is good for me today?”

Deterrents

Many were interested but did not become customers/participants

Of those who progressed further than expressing interest, the four most common reasons for not becoming a customer were (irrespective of car ownership):

- more expensive than the current transportation solution
 - travel too little / mostly walk and bike
 - carsharing sites too far away
 - another family member did not want to
- ... but "lack of time" also appears among the comments



Thoughts to ponder

Adoption of an innovation requires **relative benefit or added value** for the users. Here, the service must appeal to the users on a practical level and facilitate their daily travel.

Relative benefit is a matter of perception and differing assessments by different individuals:

- Not more expensive (relative to added value over current solution)
- Not 'inflexible' or 'inconvenient'
- The various infrastructures must be accessible enough
- 'Easy enough' to understand and use

The same behaviors (or behavioral changes) can occur for different reasons, hence the importance of providing **a variety of motivations** to join a mobility service or promote behavioral change.

Environment does not suffice as a motivator for change – **sustainable travel behavior must become the *practical* choice**, rather than the idealistic choice

Thoughts to ponder

Despite UbiGo's "success" (as a project), it was unable to successfully transition to a commercial service due to various institutional barriers (e.g. ticketing; org. roles).

The users/customers are ready to innovate. Is your organization/city ready?

MaaS is more than multimodality or overlaying an app on existing services.

MaaS and MaaS developers should:

- **Focus on the 'service'** aspect of Mobility as a Service. MaaS can demonstrably change thought processes and behaviors but its success is not independent of the service attributes.
- **Understand consumers' needs and requirements** (vs. earlier choices and SP) and **create a low-risk trial environment**.
- Include **quality service design** that addresses both **mobility/accessibility and the opportunity for behavioral change**.
- Capitalize on **collaborative synergies** (public and private) so as to better capture the advantages of each ***Collaboration is vital, but requires dedicated effort to understand each other and find common ground.***

IRIMS Institutional frameworks integrated mobility services in future cities

- Develop knowledge on how existing institutional frameworks (rules and regulations, models, organizational culture, consumption patterns, etc.):
 - influence urban transport
 - create conditions for the development and introduction of integrated mobility services
- Propose recommendations as to how these frameworks could (must) change in order to enable the transition towards more sustainable transport (of people) through, e.g., the introduction of new integrated transport services

IRIMS Institutional frameworks integrated mobility services in future cities

Project consortium:

- Chalmers University of Technology
- Lund University (project coordinator)
- Viktoria Swedish ICT (research institute)
- Trivector
- Samtrafiken
- K2

Funding: Vinnova (national body)

Duration: 24 months (2016-2017)



MAASiFiE Mobility as a Service for Linking Europe

- Create a roadmap for the development of MaaS in Europe and especially in CEDR member states
- Identify enablers and challenges (legal and others)
- Conduct a socio-economic assessment of tentative impacts of different types of MaaS
- Formulate recommendations and propose future activities for implementation of MaaS
- Increase the national road administrations' understanding of MaaS and conditions for a wide scale implementation

MAASiFiE Mobility as a Service for Linking Europe

Project consortium:

- Chalmers University of Technology
- VTT Technical Research Center of Finland (project coordinator)
- AustriaTech

Funding: CEDR Conference of European Directors of Roads Transnational Research Program

Duration: 24 months (2015-2017)

Questionnaire on Impacts: <https://www.research.net/r/maasifie-impacts>

TP49 Mobility as a service, Wed 16:00-17:30, room 218

- Future Needs and Visions for Mobility as a Service: Insights from European Workshops
- State-of-the-art survey on stakeholders' expectations for Mobility-as-a-Service

Proposed topics/perspectives

User/Customer: prerequisites for adoption/use, behavioral change

Service: servitization/servicification, service design, service 'offer'

Organizational: collaboration, partnerships, innovation

Impacts and evaluation: sustainability, behavior, stakeholders' perspectives

Longitudinal studies

Transferability: contextual issues



Selected resources

- Sochor, J., Karlsson, I.C.M., Strömberg, H. (forthcoming 2016) "Trying Out Mobility as a Service: Experiences from a Field Trial and Implications for Understanding Demand", ". In *Transportation Research Record: Journal of the Transportation Research Board, No. 2542, Vol. TBD*, pp. TBD.
- Sochor, J., Eckhardt, J., König, D., Karlsson, I.C.M. (2016) "Future Needs and Visions for Mobility as a Service: Insights from European Workshops". Proceedings of the 23rd World Congress on Intelligent Transportation Systems (Melbourne, October 10-14, 2016).
- König, D., Sochor, J., Eckhardt, J., Böhm M. (2016) "State-of-the-art survey on stakeholders' expectations for Mobility-as-a-Service (MaaS)". Proceedings of the 23rd World Congress on Intelligent Transportation Systems (Melbourne, October 10-14, 2016).
- Strömberg, H., Rexfelt, O., Karlsson, I.C.M., Sochor, J. (2016). "Trying on Change – Trialability as a Change Moderator for Sustainable Travel Behaviour", *Travel Behavior and Society*, Vol. 4, pp. 60-68.
- Karlsson, I.C.M., Sochor, J., Strömberg, H. (2016) "Developing the 'Service' in Mobility as a Service: Experiences from a Field Trial of an Innovative Travel Brokerage", In *Transportation Research Procedia*, Vol. 14, pp. 3265-3273.
- Sochor, J., Strömberg, H., and Karlsson, I.C.M. (2015). "Implementing Mobility as a Service: Challenges in Integrating User, Commercial, and Societal Perspectives", *Transportation Research Record, No. 2536, Vol. 4*, pp. 1-9.
- Sochor, J., Strömberg, H., and Karlsson, I.C.M. (2015). "An Innovative Mobility Service to Facilitate Changes in Travel Behavior and Mode Choice". Proceedings of the 22nd World Congress on Intelligent Transportation Systems (Bordeaux, October 5-9, 2015).
- Sochor, J., Strömberg, H., and Karlsson, I.C.M. (2015). "The Added Value of a New, Innovative Travel Service: Insights from the UbiGo Field Operational Test in Gothenburg, Sweden". In: *Internet of Things Infrastructures, IoT 2014, LNICST 151*. pp. 169-175, R. Giaffreda et al. (Eds.), New York: Springer.
- Sochor, J., Strömberg, H., and Karlsson, I.C.M. (2014). "Travelers' Motives for Adopting a New, Innovative Travel Service: Insights from the UbiGo Field Operational Test in Gothenburg, Sweden". Proceedings of the 21st World Congress on Intelligent Transportation Systems (Detroit, September 7-11, 2014).

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