

**All components are  
in place to migrate  
towards mobility as  
a service (MaaS) in  
urban areas**

**Paavo Moilanen,  
Strafica Ltd & Tuup Ltd**



# Strafica, Finland: A transport consultancy

- Land-Use And Transport Strategies
- Mobility surveys, analytics and models
- Transport Policy Studies
- ITS and Mobility Management Studies
- Transport Systems Impact Assessments
- Land Use and Service Networks impact assessments
- Network and Infrastructure Management Studies
- Sustainable Mobility
- Public Transport Plans and Assessments
- Cycling and Walking Studies
- Transport Safety Studies and Strategies

We do strategic transport and land use planning, analytics and policy studies, forecasts, research, impact assessments.



# There are both policy based pressures and technology-based opportunities to think transport as a service ecosystem rather than a stock of vehicles that are owned

## Sustainability and global warming calls for urgent actions on mobility

- Need to cut carbon footprint by 80 %
- Person Traffic is a major source for CO<sub>2</sub> and growing especially in cities due to urbanization
- Utilization of private car stock is less than 5 %

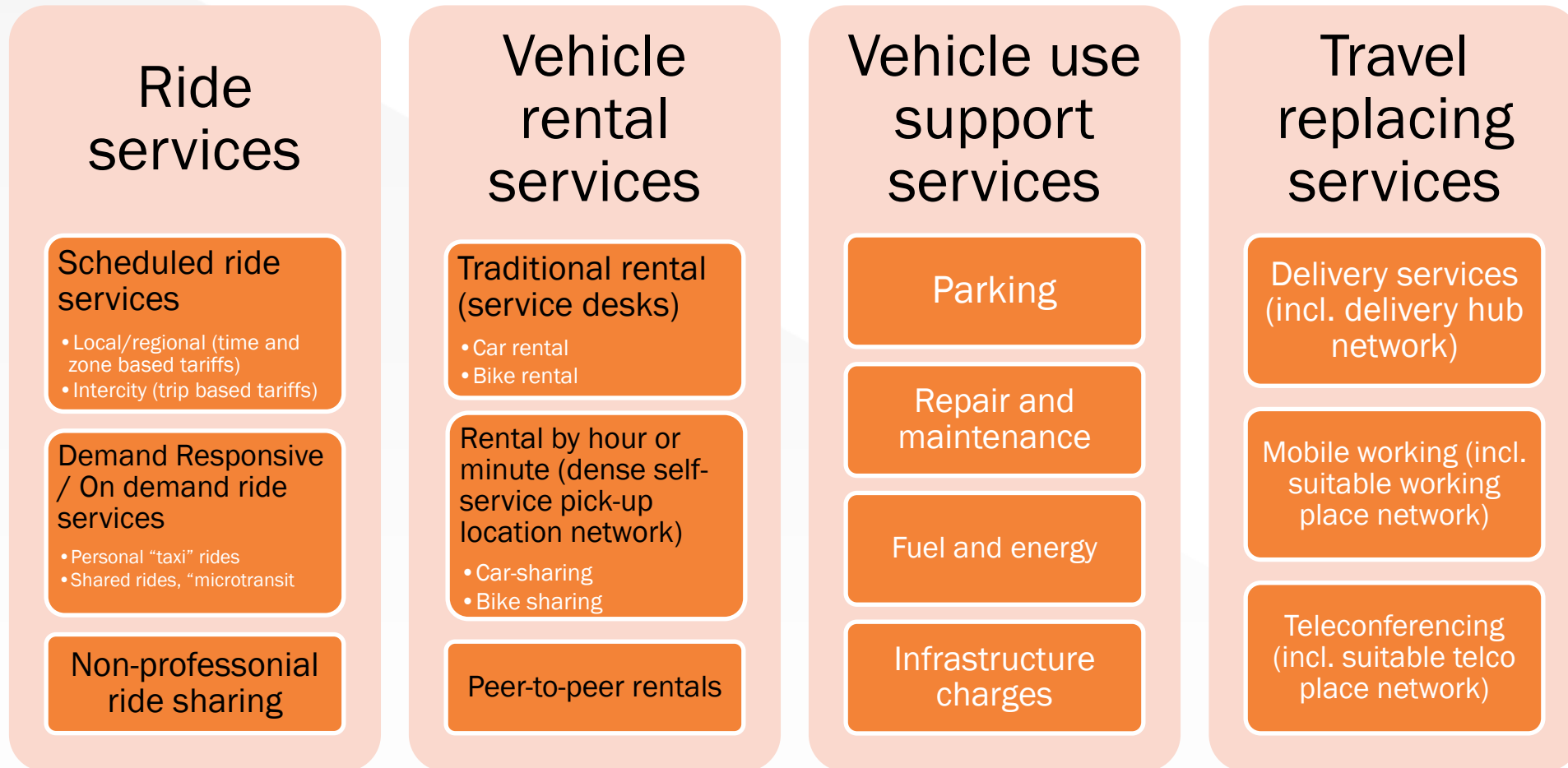
## Digitalization enables innovative solutions to renew transport industry

- With smart phones people are online
- Internet of Things and Big Data enable location aware and personalized services
- Resource wisdom through vehicle sharing

## MaaS - Mobility as a Service

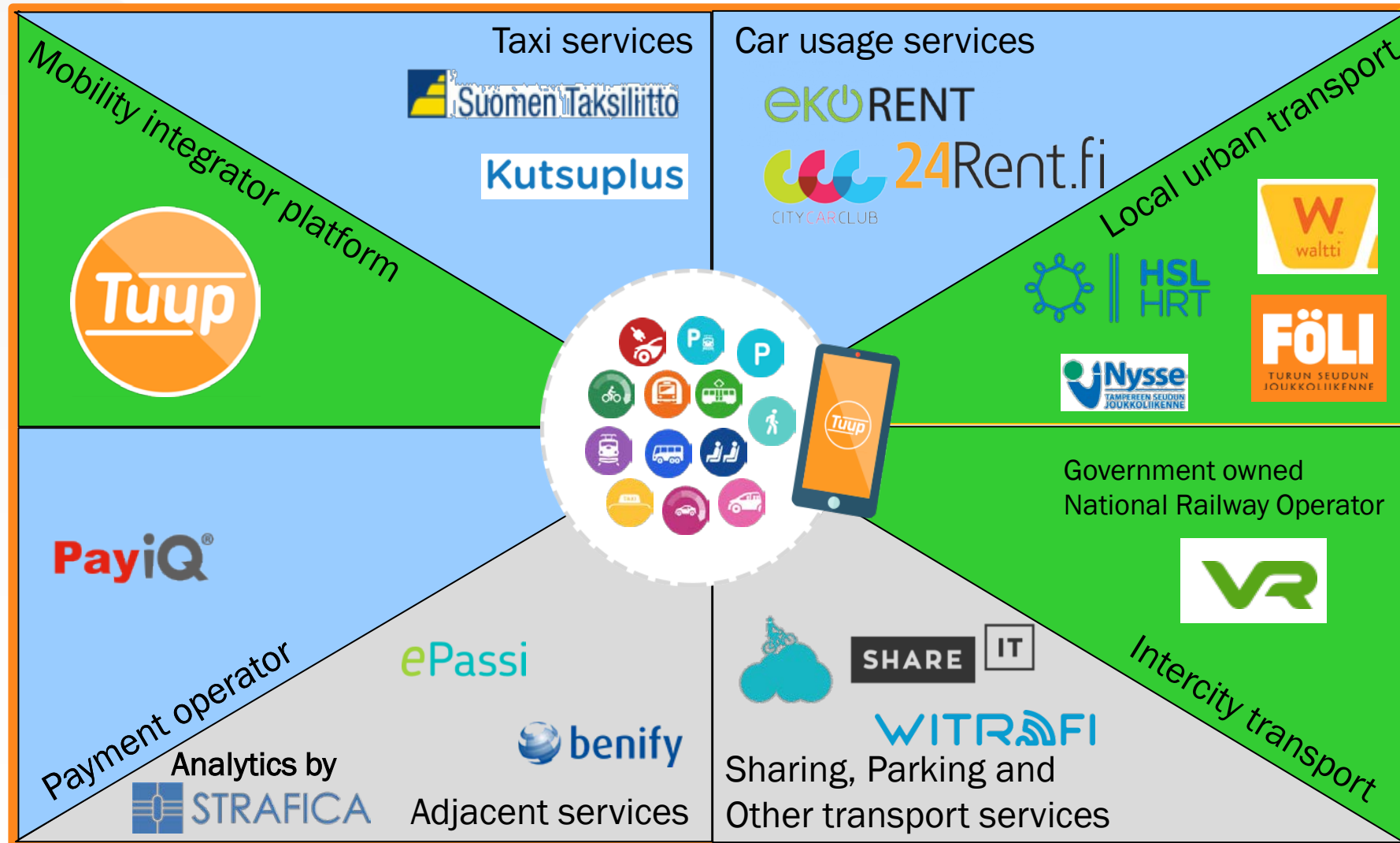
- Buying mobility services instead of vehicles
- Private and public services are interconnected
- Demand driven instead of regulated supply

# Servitization and digitalization of mobility enable a wide spectrum of existing and new choices to be reached with a smartphone



But it is unlikely that every service could have its own customer interface that differ from each other and do not play well together

# Tuup is a start-up setting up a MaaS-operator. It is forming an ecosystem with many transport operators in Finland to mobilize the MaaS-concept



# Short history of a start-up

Tuup Oy

as an example

MaaS-  
operator

## Tuup was founded in 2015 to:

- Respond to the demand of operators realizing MaaS that emerged as a concept in Finland. Tuup's founder Johanna Taskinen has been actively researching the concepts and issues together with Sampo Hietanen (who founded another operator *MaaS Global*).
- MaaS is supported strongly by the Finnish government e.g. through new transport legislation and Tekes-innovation fund for companies and research organizations.
- The MaaS concept relied heavily on the market-oriented approach, thus largely ruling public sector organizations out from evolving into MaaS operators.

## The mission of Tuup is:

- To explore the possibilities of MaaS and digitalization to reduce the use of car.
- To bring added value to the service ecosystem especially through intelligence and good user experience.
- Try to fill in some gaps in the current services (example: Kutsuplus-service in Helsinki)

# The basic idea is to provide a single solution and interface to all mobility needs



**USER**

I want to get my things done quickly and easily!



**EMPLOYER**

We want to manage parking and mobility fairly and cost-efficiently – and promote sustainable mobility!



**SERVICE PROVIDERS**

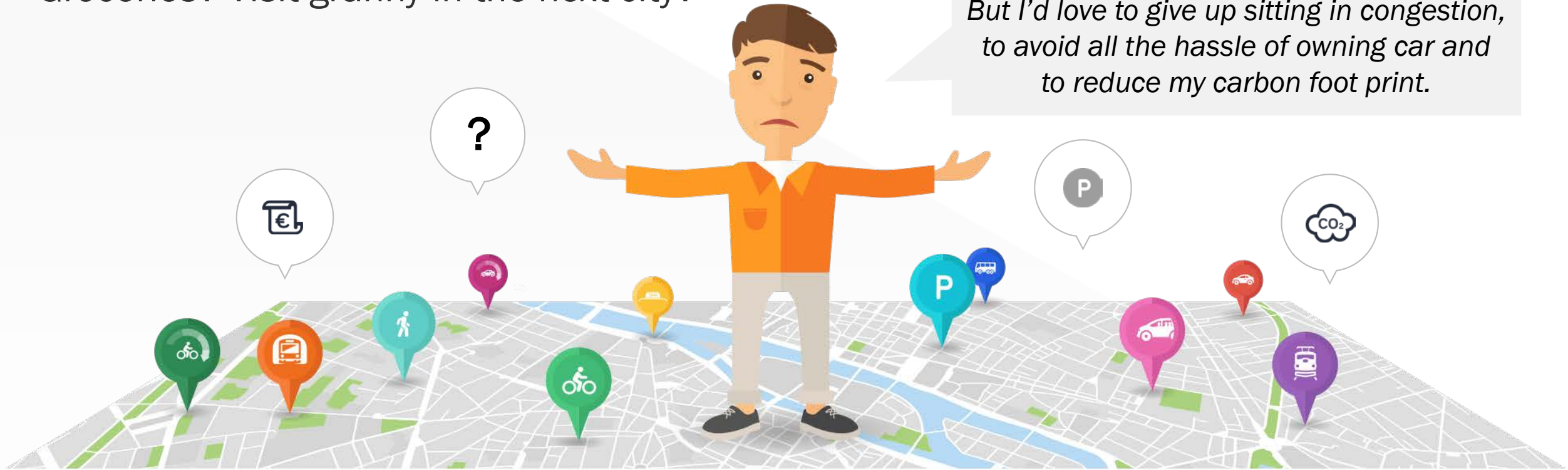
We want more paying customers!



# From the ordinary people's point of view it is all about the quality and ease of use of all services together

Kids to day care? Meeting? Lunch?  
Groceries? Visit granny in the next city?

*"Argh, too difficult to find out and pay –  
I'll just take the car as usual!  
But I'd love to give up sitting in congestion,  
to avoid all the hassle of owning car and  
to reduce my carbon foot print.*



# To make a dent in the car-owning universe shared economy needs to **outsmart owning a car**



Easy to find travel alternatives and buy tickets and services



All options included: urban transit, interurban bus and train, car- and bike-sharing, taxis



New innovations for flexible and affordable door-to-door services.

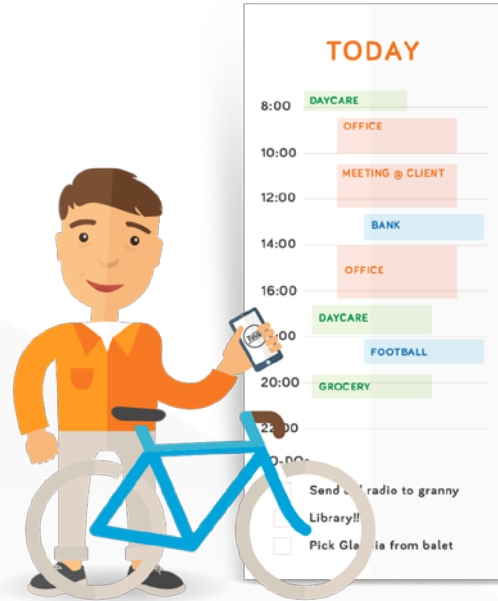


**Tuup**

# This is how multi-modal digital mobility works:



**Compare and find new travel options.** Tuup customizes a suitable plan for you.

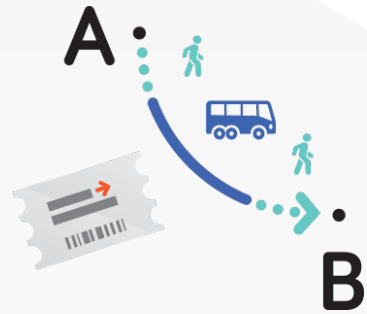


**Relax and travel through your day.** Services you use are automatically charged from your Tuup account.

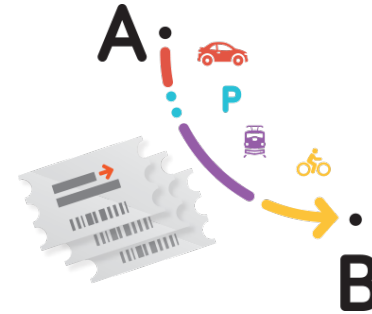


**Nudged into right direction** you'll save time, money or energy – which ever you prefer.

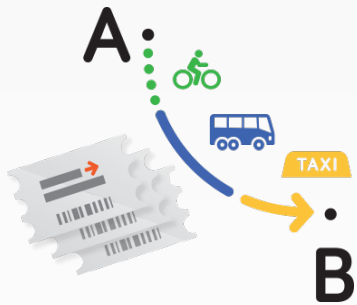
# Understanding how the activities and mobility needs form multi-/intermodal travel chains is important



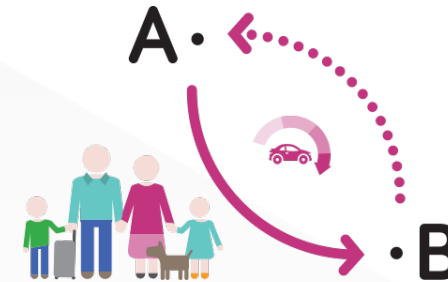
- Single journey, single service
- E.g. **bus ticket** in the city centre



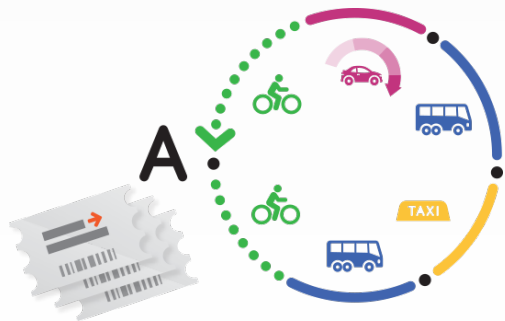
- Park and ride
- Take your **own car to station**
  - continue by **train**
  - last mile with a **citybike**



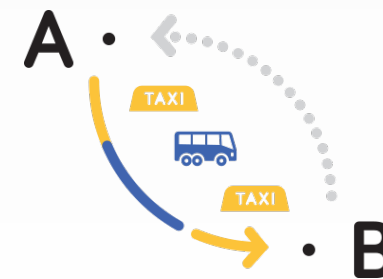
- Single journey, several services
- E.g. **city bike – bus – taxi** from suburbs to the city centre



- Weekend visit to relatives
- **Carclub car** for a day or two



- All trips of the day
- E.g. your **own bike** to work,
  - **On demand ride** to a business meeting,
  - **carclub car** to pick up the kids to football training, grocery shopping and back home



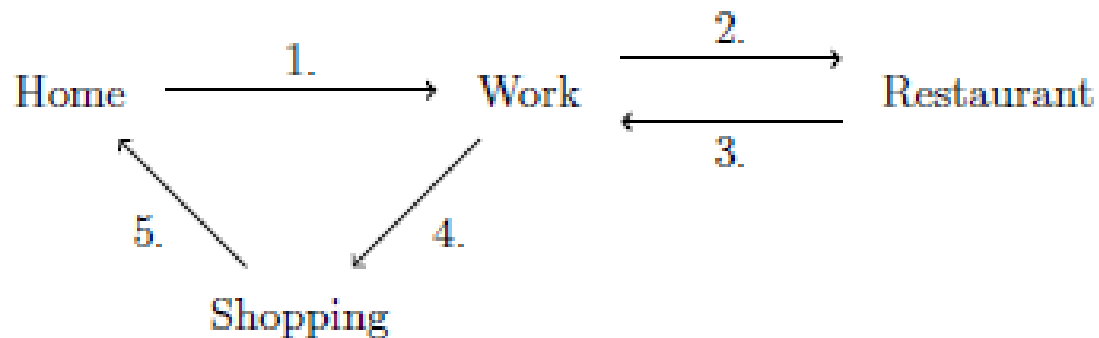
- Cottage vacation for a week
- **On demand ride** from home
  - **Intercity bus**
  - **On demand ride** to boat harbour
  - **Boat taxi** to your own island

# That is why you need to have analytical power

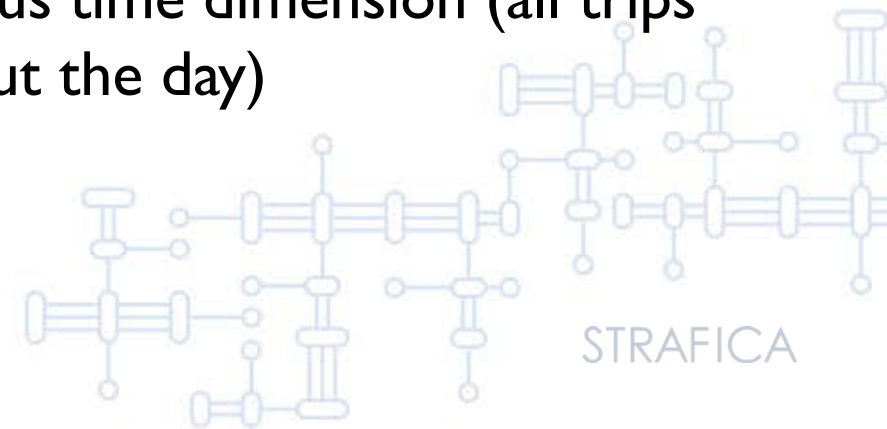
Brutus – simulation of every individual's behaviour

Brutus is a mathematical model that present how each citizen is likely to be traveling in the local circumstances

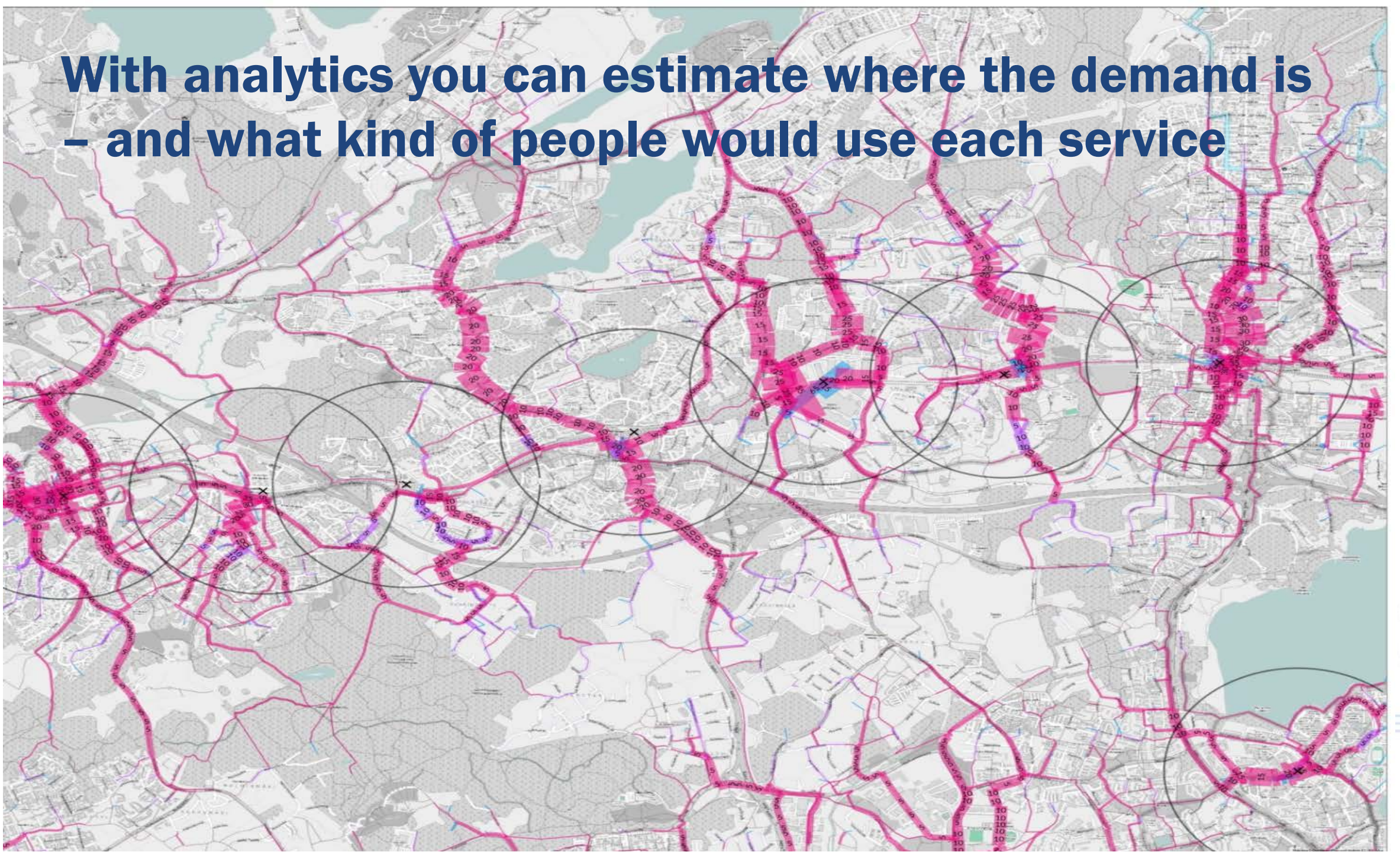
- Deals with the mobility needs of households and individuals
- Trips are handled as chains taking into account all travel needs during the day as well as travel conditions




- Realistic modeling of the choice of destination and travel mode in the multimodal setting – all modes included
- Especially highly developed handling of cycling
- Geographical accuracy is 250 x 250 m grid
- Continuous time dimension (all trips throughout the day)




**With analytics you can estimate where the demand is  
– and what kind of people would use each service**



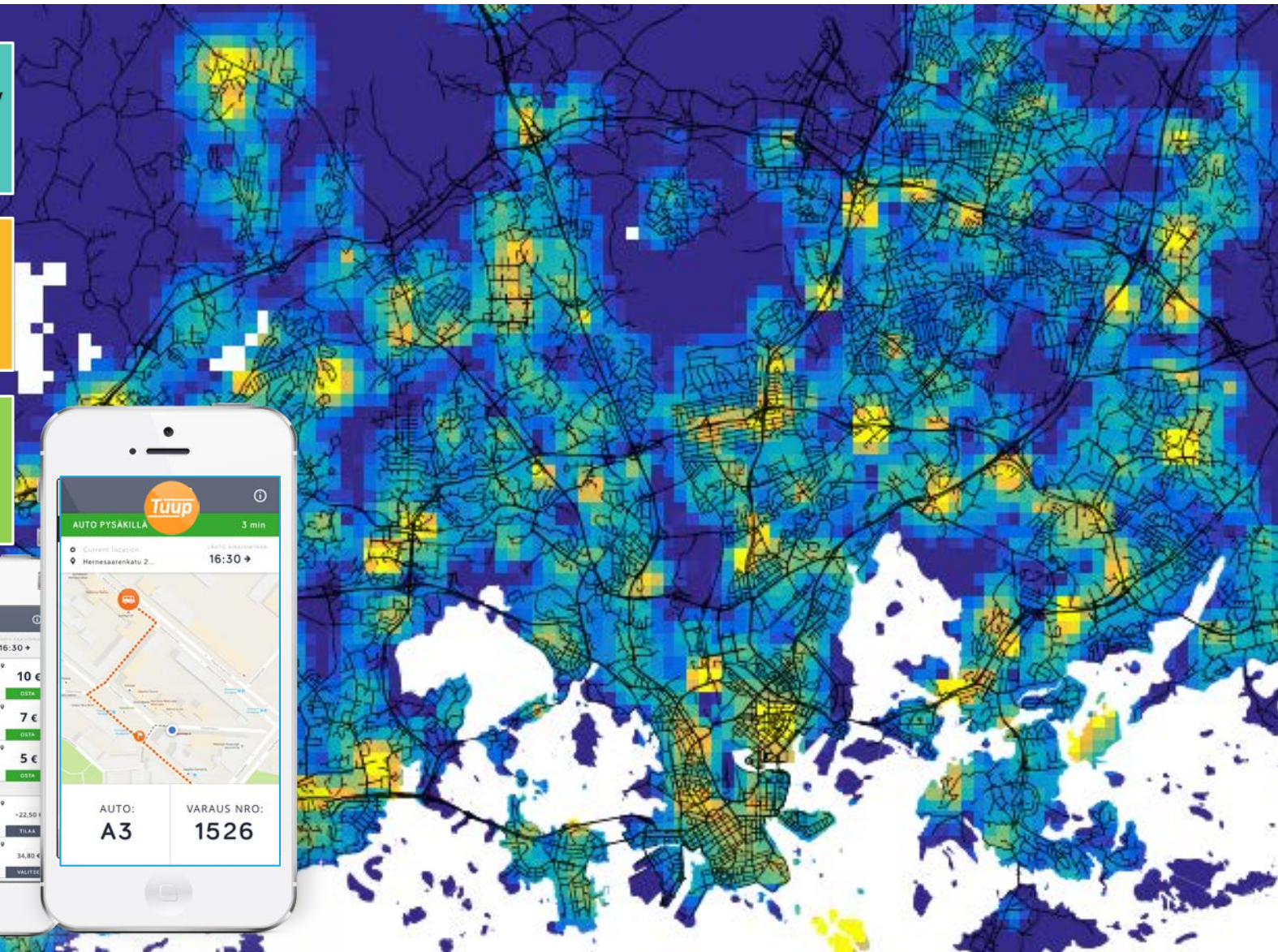
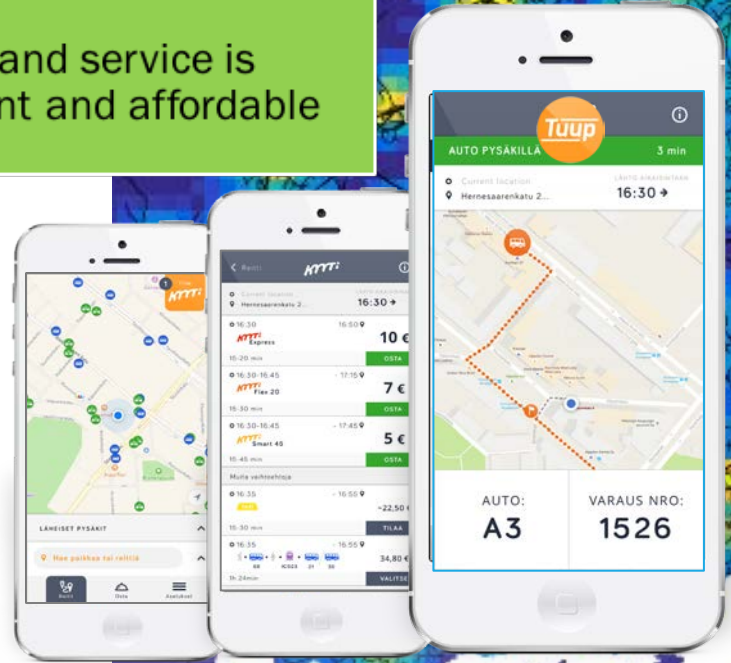
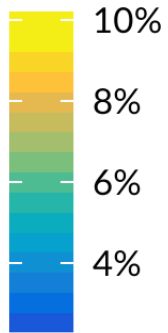
# Thus developing new MaaS services is easier if you can estimate what will happen (and e.g. what the revenues are)

 Alternative mobility services are easy to find, compare, book and pay

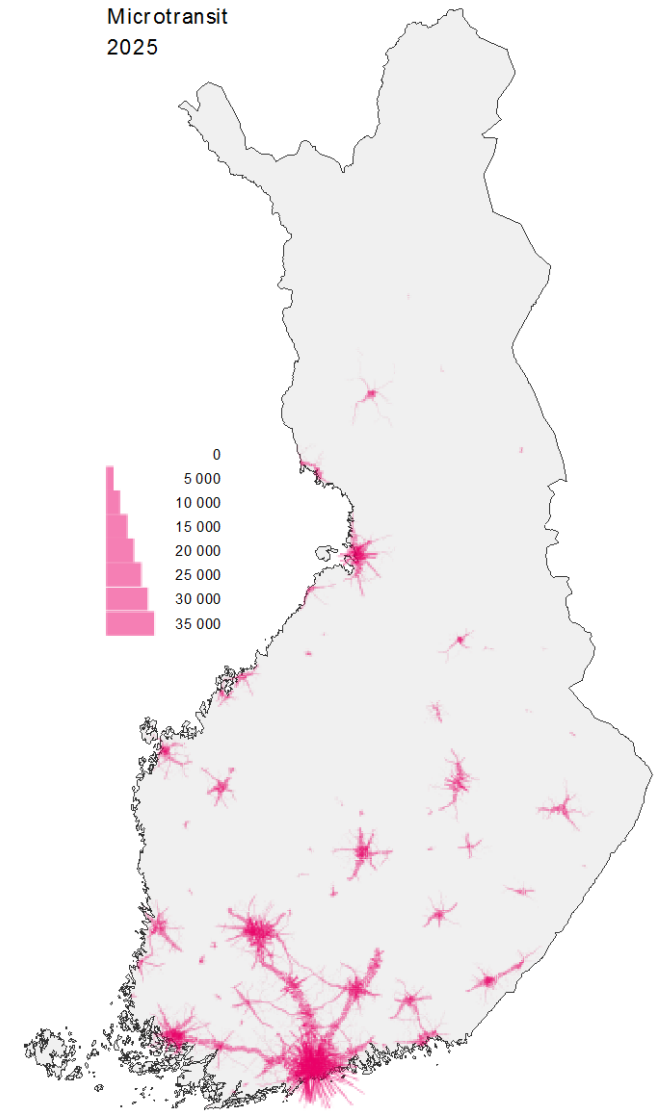
 All mobility options are included: urban transit, intercity bus & train, car rental & sharing, city bikes and **Kyyti**

 **Kyyti** ride on demand service is flexible, convenient and affordable

The share of Tuup Ride-OnDemand-service from all trips (inc. Cycling and walking)



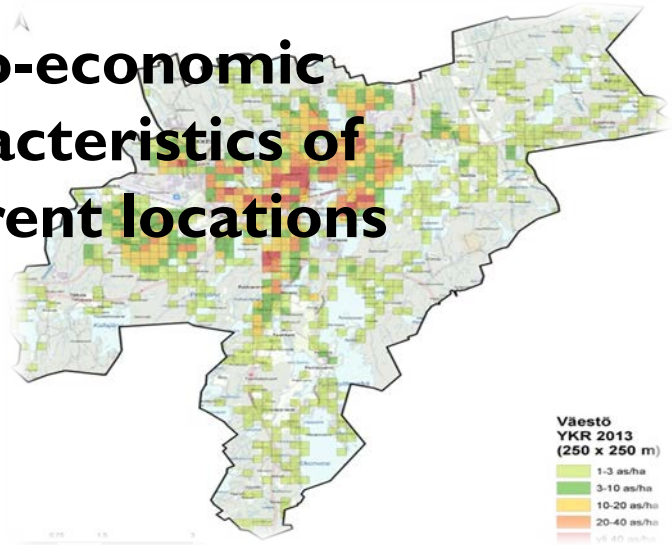
# Or how effective MaaS-enabling policies would be in different places and regions



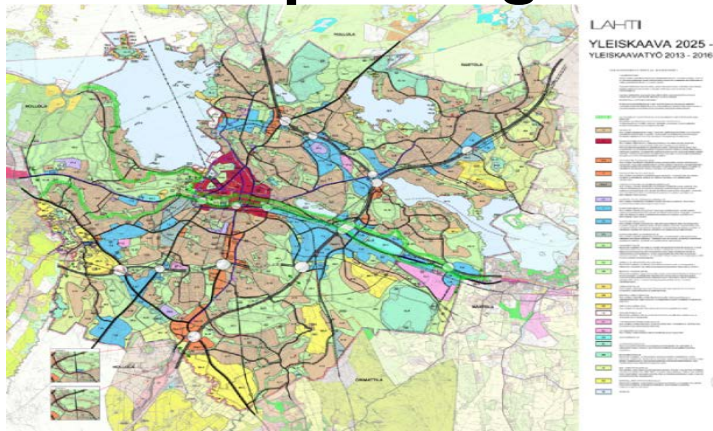


# Data needs for this kind of analysis are of course substantial

Socio-economic characteristics of different locations



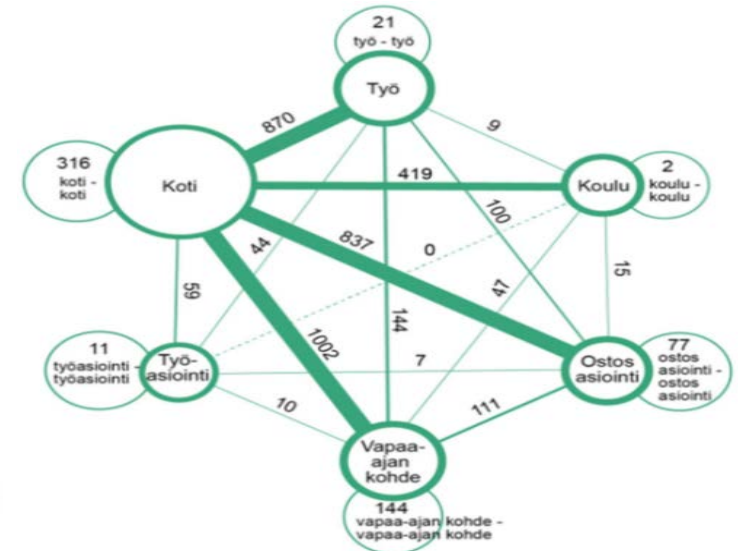
Land-use planning data



Networks and travel flows



Surveys of mobility needs



Transit timetables

Matka.fi

Route  
Planners  
(GTFS)

Uusi haku / Ohjeet / Usein kysyttyä / Palaute På svenska In English Suomeksi

Mistä  [Kartalta](#)  [Hakemistosta](#) Esim. Porkkalankatu 18, Helsinki

Mihin  [Kartalta](#)  [Hakemistosta](#) Esim. Näsineula, Tampere

Kello 09 :42 Lähtöaika ▼

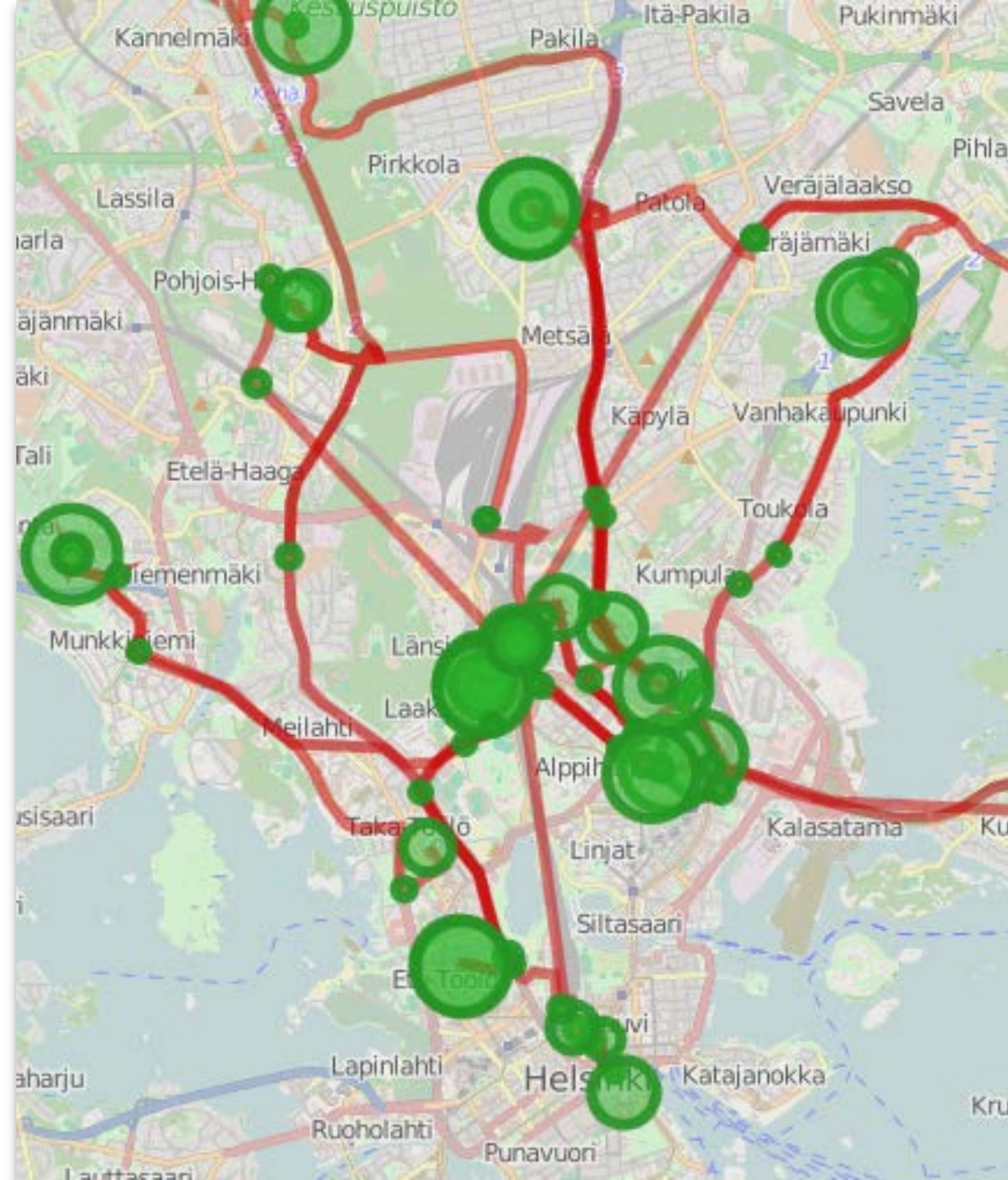
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Bussi  Juna  Lentokone

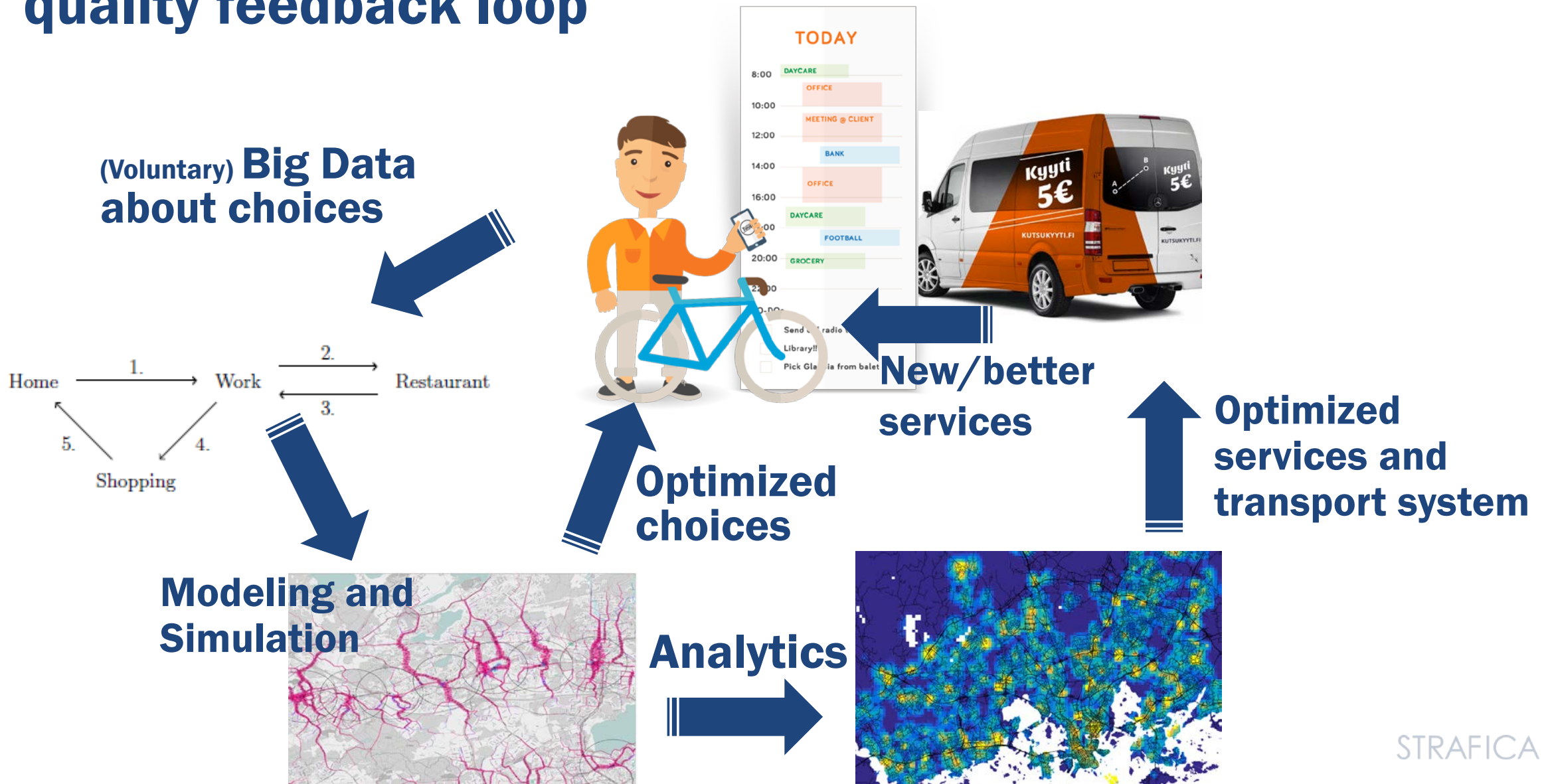
## Digitalization of travel surveys with mobile phones into Big Data to learn about mobility behavior will help

E-diary can be a component of both Brutus and Tuup:

- Mobile application to collect trip data
  - Simple app/component for both Android and iPhone
  - The issue is the phone battery and GPS accuracy
- Back-end server storage
  - Interfaces and storage for data
  - Analysis of the trips, stops, modes used and activities
- Administration and visualization web-interfaces
  - To see and analyze the data

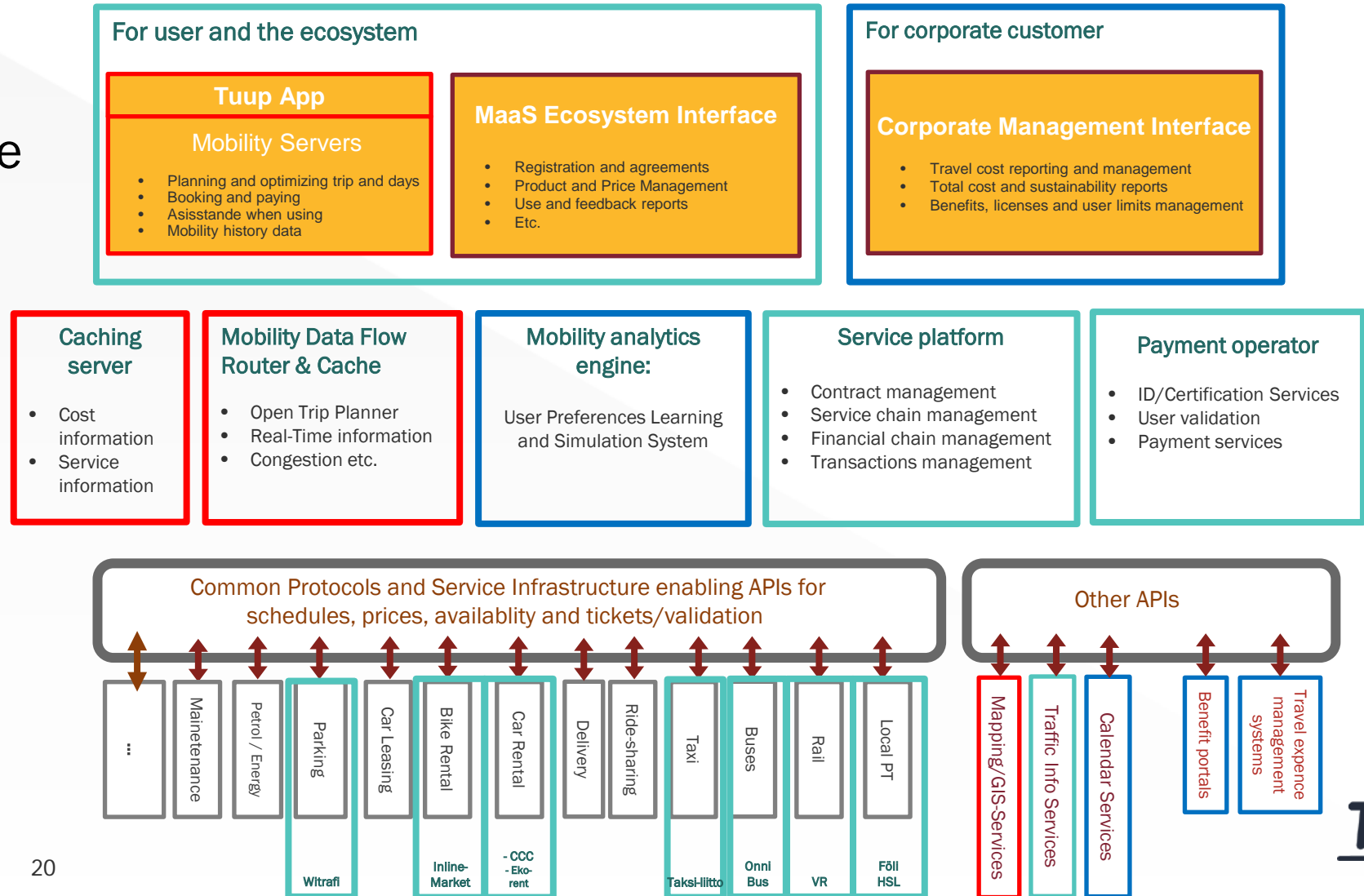


# All components can be made to work in tandem in a “quality feedback loop”



# Digitalization of the smart transport service ecosystem needs a lot of IT technology under the hood...

Here's the architecture of the Tuup platform:



# ...co-operate with existing transport systems and providers...

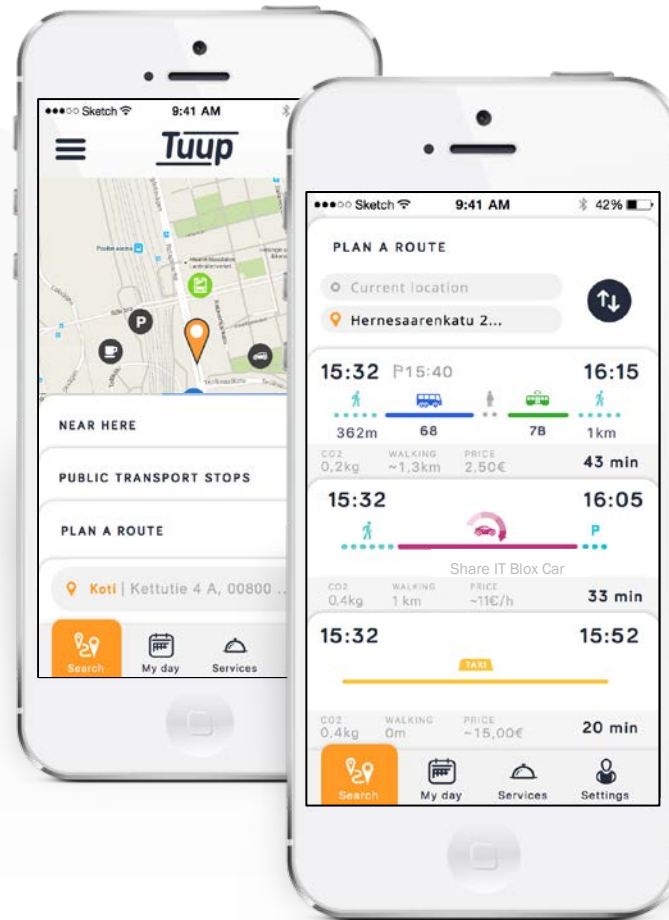
Tuup connects the existing ecosystem into one interface:

Smart travel solution for users and employers

More demand: efficient use of resources

With new pricing models: attracts significant customer growth

etc. etc...and there are still gaps for more providers...



All public and private services, working together

Easy to use, sustainable way of travel

Employer compliance with transport demand management requirements



**Tuup**

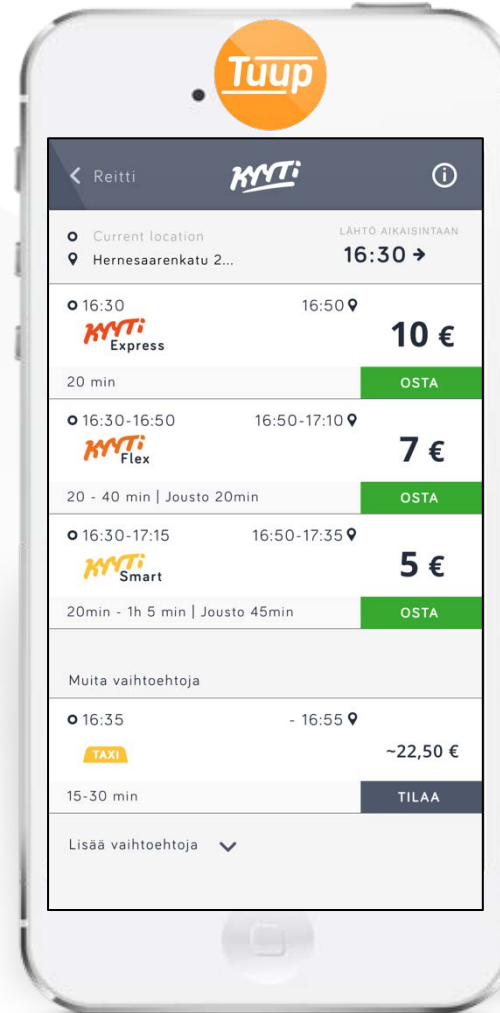
# ...we ourselves identified a gap in Finland between public transport and taxis...

**Kyyti: "Kutsuplus New Gen" – new markets for operators**



**Boost ride sharing:**  
effective use of fleet capacity

**With a dynamic pricing model:**  
attracts significant customer growth



**Smart travel solution for users and employers**

**Affordable** price like public transport, but **flexible** like taxis

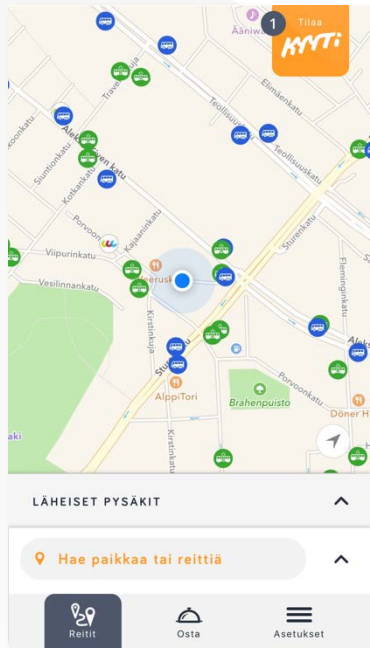


**Easy** to use, sustainable way of travel

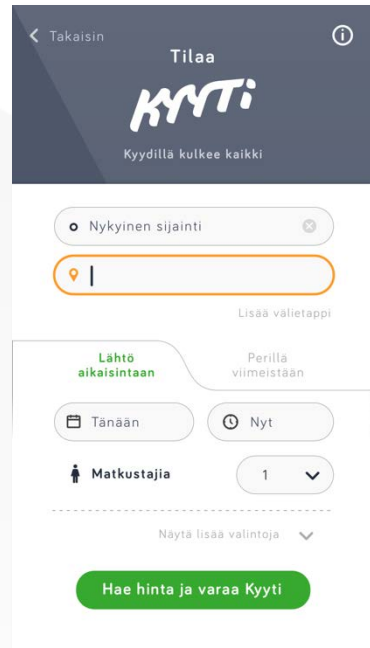


**Tuup**

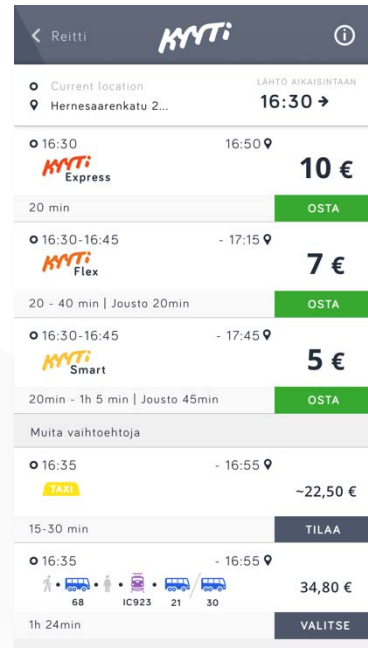
# ...nice design and good user experience...



**1. No idea how to get there quickest?**  
Open the Tuup app and tap "Order Kyyti".



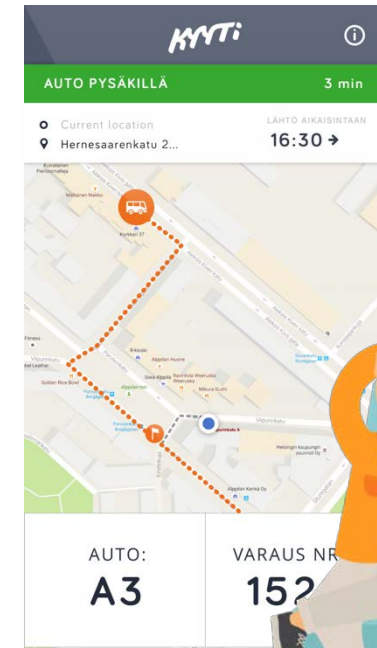
**2. Enter your destination,** number of passengers and when do you wish to go.



**3. Tuup finds Kyyti rides for you.** You'll see the prices and travel times. Rides are shared and prices low. Lowest when you're flexible or book in advance.



**4. Book the Kyyti ride.** It is automatically charged from your account. Digital receipts stored. You can attach private and business cards to your account.



**5. Relax and hop in!** You can follow on a map the approaching Kyyti vehicle and its updated departure time.

*If no Kyyti is available, don't worry: Tuup finds public transport, taxi, bike and car-sharing options as well!*

# ...planning and analytics...

- Traditional taxi gets under 1 % of daily trips and public transport roughly 30% in Helsinki Metro Area (including cycling and walking).
- New service will attract 7 % of all daily trips - modelled using Brutus
- Meets the hidden demand for using taxi type services on short distances.

## Potential in:

Helsinki metropolitan area

Tampere

Oulu

Basel

Stockholm

Berlin

## Trips per day

140 000 trips

75 000 trips

40 000 trips

40 000 trips

155 000 trips

700 000 trips

## Spending

350 M€/year

185 M€/year

100 M€/year

100 M€/year

385 M€/year

1 750 M€/year



# ... and practical know-how and experience how to actually set up and market successful transport services.



## Pekka Möttö, CEO

- Founder of OnniBus.com, innovative intercity bus operator with dynamic pricing and strong branding
- Awarded customer experience and marketing professional
- Mobility service market disruptor keen on revolutionizing urban mobility market by digitalization



## Johanna Taskinen, CXO

- Founded Tuup in Jan 2015
- Sustainable mobility developer: cycling, car-sharing etc
- Expert in workplace mobility management
- Engineer and social scientist keen on improving car-ownership-free life



## Paavo Moilanen, CTO

- Founder of Strafica, a shareholder in Tuup
- Strategic partnership with Strafica brings Tuup 20+ years experience in mobility analytics and modelling.
- Simulation models for daily travel.
- Digital travel survey methodologies to learn users' preferences and to provide Big Data.



**Jouni Lounasmaa** Business and service development, founder of 3 startups



**Kaisa Hernberg** Business development for cleantech startups, marketing



**Hannu Tapanila & Tapani Moilanen** Software developers, Hannu developed the awarded "Nysse" route planning app



## Conclusions

### There is **a lot of potential in MaaS** for immediate execution:

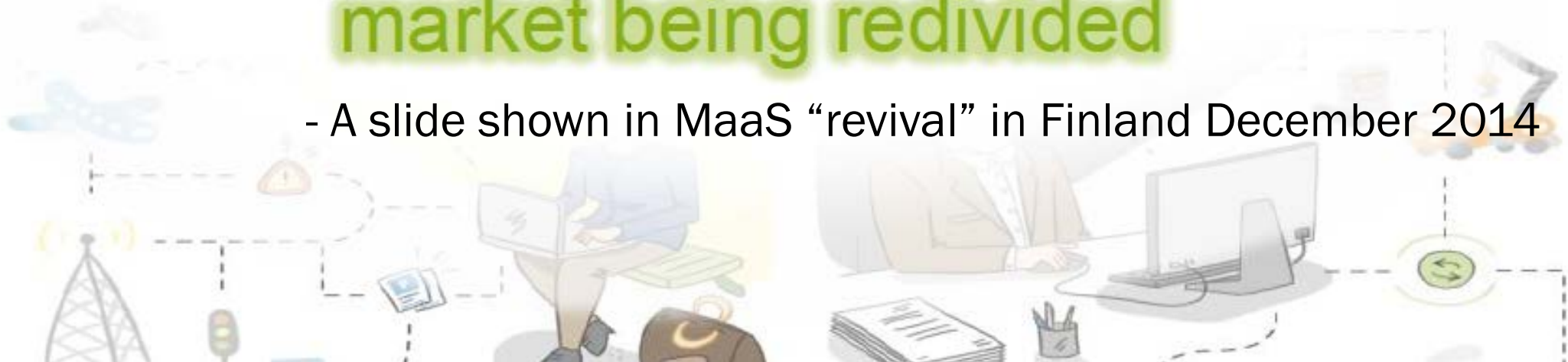
- Widespread agreement that digitalization will change the transport system. Benefits are imminent (but care is needed as usual).
- Technologies and operators exist. Apps and servers are ready (yes, work still in progress).
- There are various operational models to implement MaaS: as market based competition or as government based public services (with white label suppliers of technology). Political choice – both can work.

# Why the Finnish ITS-sector found transport and MaaS after Nokia phones were made obsolete by Apple and Google?



10 000 000 000 000 €  
market being redivided

- A slide shown in MaaS “revival” in Finland December 2014



# Problems of a Mobile/IT-industry -driven concept

- Mobile phone industry one-business-model-fit-for-all?
  - Monthly SLA-based packages vs transport systems production cost structures.
- Focus on commercial global transport market – not people
  - One can lose the basic idea of making better transport systems for mobility needs i.e. welfare economics
  - Finland can be a right-sized and institutionally manageable laboratory but there are also organisations with (also justifiable) national and urban level interests

Customer



MARKET PRICE



Private sector  
Service providers

Citizen



FAIR & EQUITABLE FARE



Public sector  
Service providers

SUBSIDIES



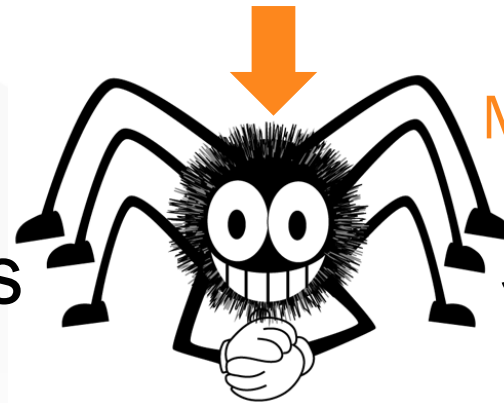
SUSTAINABLE  
PROFITS



Markets



MONTHLY PACKAGE PRICE FOR INDIVIDUALS



MaaS-operator

PROFITS

SUBSIDIES

BULK PRICE WITH BUYING POWER

HARD WORK



Private sector  
Service providers



Public sector  
Service providers

PROBLEMS

# Practical experiences about MaaS

## Practical experience has been somewhat mixed:

- Transport is still flows of people and goods, not digital stream of bits.
- Confusion about everyone's role in the big digital picture.
- Takes much longer to talk about digital APIs and common standards than to program them.
- Modal operators are reluctant to "give away" their customers.
- Public sector run institutions and thus services are desperately slow to transform to the new paradigm.
- Public subsidies and aging expensive ticketing technologies are perfect excuses to stick to the old institutions.



Everyday travel the smart way

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+358 40 527 3277

Facebook: [www.facebook.com/tuupapp](https://www.facebook.com/tuupapp)

Twitter: @Tuupapp



# That is why we in Tuup talk about a platform and not just an app.

Tuup is not just another guidance and ticketing app, such exist already many.



Tuup is a digital platform that transforms whole transport system and its users into a unified mobility management system boosting more efficient and sustainable travel patterns



Tuup team consists of down-to-earth **transport professionals** which have decades of experience in operational management, research, mobility analysis, analytical modelling and data simulation of transit



With superior big data platform Tuup can offer **transit and pricing options** not available through competing apps: sharing, peer rentals, on-demand, company employee plans.

Tuup creates unique value through world class **big transit data analysis and simulation**

Tuup gets involved and **learns through partner services on the platform**. Thus Tuup can innovate transit options like **KYYTI ride on-demand** based on operational knowledge of demand and price elasticity.



**Tuup**