From the mass psychology and the crowd (The Age of Crowds) to the crowd sourcing in the era of the social networks: implications for the research design in mobility

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GRETTIA/COSYS - IFSTTAR

summary

- Motivations
- Crowds and publics when mobile
- Definition of urban mobility
- Data and models
- Social representations
- Innovations, behavioral change and social network
- Shared mobility in private modes
- Multimodal Information and crowdsourcing

Motivations

- Pedestrian simulation (stadium, railway or metro station)
- Incident, crisis, emergency, evacuation
- Agent / Crowd
- The age of crowds (Moscovici)
  - The leader and the mass (Le Bon)
  - Tarde and the public

shibuya hachiko crossing, Japan.mp4   Try crossing this street in India__ Part 2.mp4

The leader and the crowd

- Representations   before Le Bon: asocial (popular), crazy, criminal

- Melted in mass, fusion of individualities (physical contact : proximity of the bodies and visibility)
  - Avoidance of logical thinking
  - Splitting the individual rationnal/irrationnal
- Deindividuation theory
  - Result: loss of self-consciousness and control
  - The idiot : Unison, contagion, anonymity
- Ready for The suggestion or influence to create it (explain the dissolution)

- The Leader to guide and govern them through their passions, beliefs (staging, transition from the image to the act, imposing key idea)
  - The sleepwalker: hypnotism as a model of the action for the leader , first stage of imitation, mental state of the urbanite

- Evolution
  - Organisation, party (artificial crowds)
  - The timid : against the current, transitional
  - Social identity model of crowd action (S. Reicher)
    - Projection of the Is on We
    - Self categorisation as psychological basis of group behavior
    - Interchangeability in a group accentuates group normative behavior

Tarde and the public(s)

- The public is a community of interest. Social link between men detached from the crowds : Simultaneity of their convictions and sharing of ideas
- Communication is the social process par excellence (soft, verbal and gestural)
- in plural (assembled to dispersed state but cohesive)

- The press = opinions' source in two stages (circles) mass media
- Polarisation (dissymetry) and intensity of imitations

Individuation (B. Stiegler)

- I as a psychological individual belongs to a We, a collective individual
- Processes
- The link between I and We relies on the preindividual environment composed of devices making (agencés) systems
- Triple individuation : psychological, collective, technical

- Capture of attention by the networks
- Standardisation, digitalisation = loss of individuation, fusion in One (On), consumerism
- No more memory/history (ind. or col.) , put in the environment (pheronoms) like ants

# Mass Transit and/or Public Transport systems

Social interaction in a urban mobile crowd

- Avoidance of contacts to save attention with minimal recognition (reserve and mutual indifference) (civil inattention Goffmann)
    - The eye the gaze (Simmel)
    - Individualization and freedom in a big city. Tension distance/ proximity, socialisation/individualization
    - Rituals of interaction in public places(Goffman) with apologetic games
    - Foreigner according to Simmel (with mobility as a specific caracteristic and objectivity) = model of coordination and interaction
- (Relative) Trust in others as a resource (collective skills)
    - in favor of distraction
    - especially in times of crisis (adoption of the salient or dominant behavior)
- Handling a plurality of scales and languages + flexible devices in the environment (articulation of spaces, thresholds, connective spaces) or accessibility as quality of space (prise(affordance)/déprise) (Joseph)
- Methodical Opportunism

- Man of the queues as (Hennion)
  - gathering different from group with identity
  - Joint action versus collective action
  - Focused versus unfocused interaction
  - Weak / strong ties
  - To flow smoothly = Objective (emergence) of the system

- Situated activity
  - Dialogically adjusted
  - Negociated rather than planed

- More connection = less interaction

- Public according to Dewey as experimentation (making) of a public space (debate/forum)
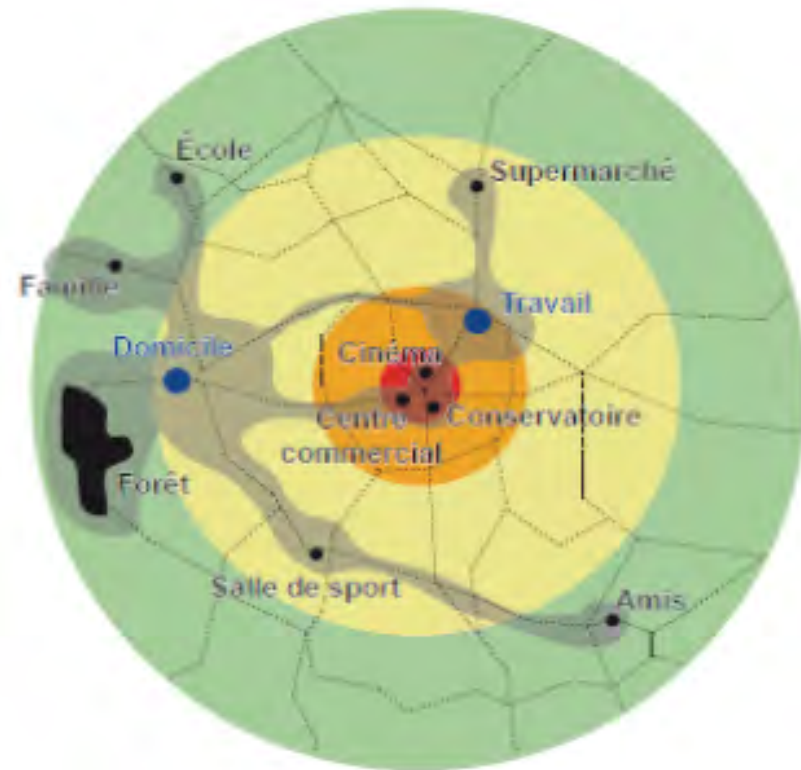
What is spatial mobility ?

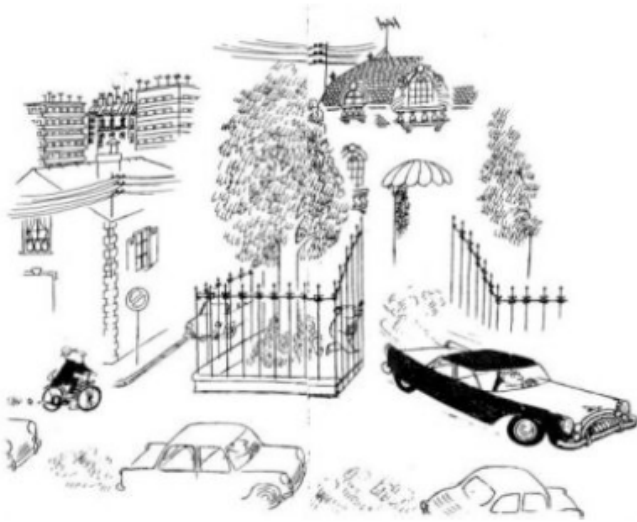- Urban, persons/goods
- Daily , activities, trips, modes
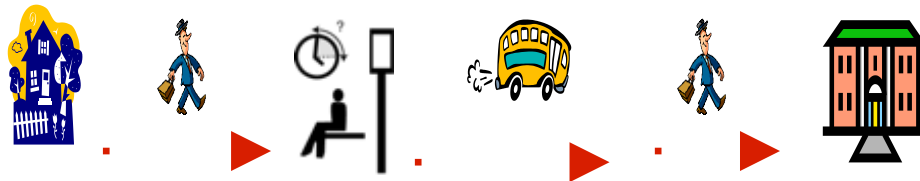
Territorial anchoring

- Travels as an expression of spatially anchored lifestyles (S. Carpentier)
- Coupling Home/transport

Les mobilités quotidiennes: représentations et pratiques. Vers l'identité de déplacement (2007)

Socio-economical anchoring

Sempé

Social anchoring

Urban mobility patterns Universal laws

Schneider CM, Belik V, Couronne T, Smoreda Z, Gonzalez MC. 2013 Unravelling daily human mobility motifs. J R Soc Interface 10: 20130246. http://dx.doi.org/10.1098/rsif.2013.0246

- Noulas A, Scellato S, Lambiotte R, Pontil M, Mascolo C (2012) A Tale of Many Cities: Universal Patterns in Human Urban Mobility. PLoS ONE 7(5): e37027. doi:10.1371/journal.pone.0037027
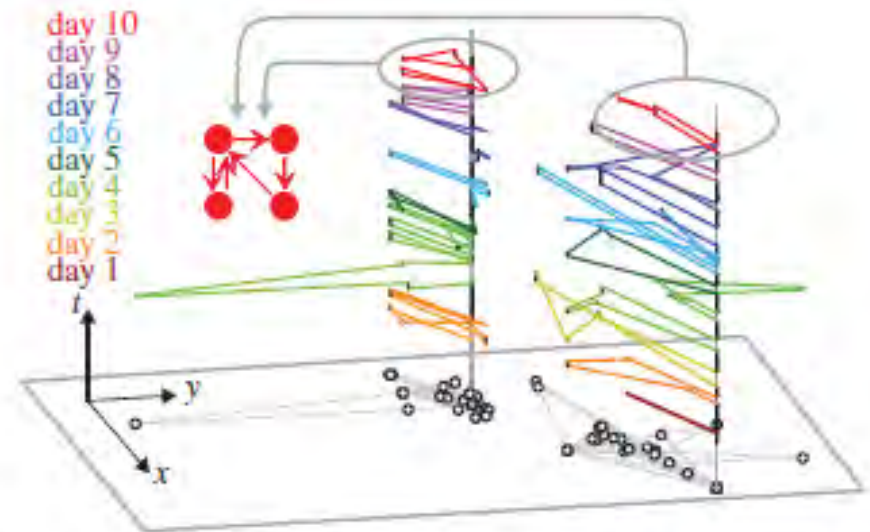

Figure 1. Decomposition of the mobility profile over 10 days into daily mobility patterns for two anonymous mobile phone users. The home location of each user is highlighted and connected over the entire observation period with a grey line. While the entire mobility profiles (black circles and grey lines in the xy-plane) are rather diverse, the individual daily profiles (brown to red from bottom to top for different days) share common features. The aggregated networks consist of $N = 16$ (22) nodes and $M = 37$ (43) edges with an average degree of $\langle k \rangle = 2M/N = 4.6$ (3.9). By contrast, the daily average number of nodes is $\langle N \rangle = 4.4 \pm 1.8$ (3.9 ± 1.3), and the average number of edges is $\langle M \rangle = 5.3 \pm 2.8$ (4.2 ± 2.2). The left user prefers commuting to one place and visits the other locations during a single tour, whereas the right user prefers to visit the daily locations during a single tour. On the last day, both users visit not only four locations, but also share the same daily profile consisting of two tours with one and two destinations, respectively.

- Number of places visited

- Time spent (Travel Time budget constant)

- Zahavi, Y., The TT-relationship: A Unified Approach to Transportation Planning. Traffic Engineering and Control, pp. 205-212, 1973.

- Kölbl, R. & Helbing, D., Energy laws in human travel behaviour. New Journal of Physics, 5, pp 48.1–48.12, 2003.

Unimodal
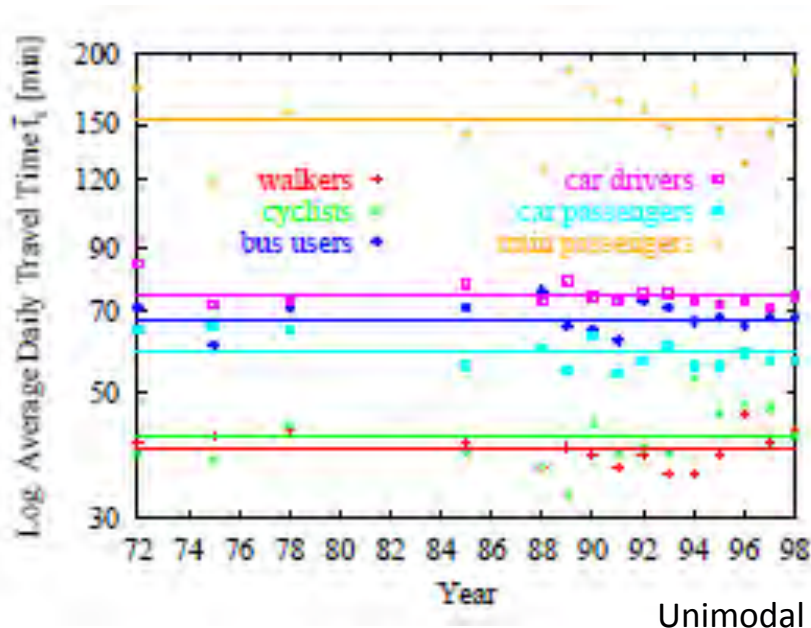
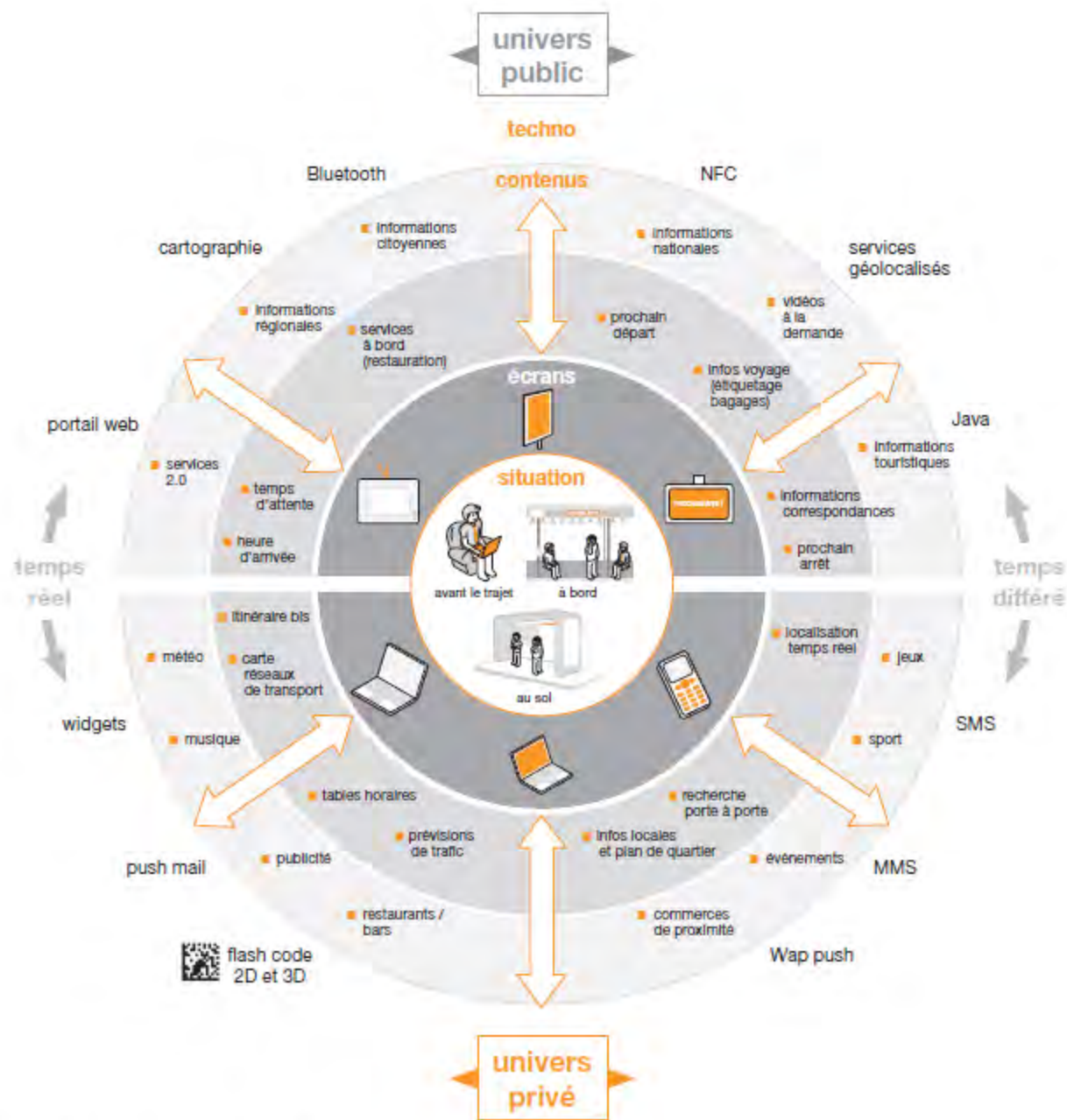| Activity	Speed (km/h)	Energy Consumption (kJ/min)
Sitting on a chair		1.5
Standing, relaxed		2.6
Standing, restless		6.7
Walking on even path	4	14.1
	5	18.0
Cycling on even path	12	14.7
Car, roads		4.2
Car, test drive		8.0 (5.9–12.6)
Car, in city, rush hour		13.4

Quantified traveller

Jariyasunant, J., Abou-Zeid, M., Carrel, A., Ekambaram, V., Gaker, D., Sen- gupta, R., and Walker, J. L. (2013). Quantified traveler: Travel feedback meets the cloud to change behavior. *Journal of Intelligent Transportation Systems*, published online 31/10/13. DOI:10.1080/15472450.2013.856714

- Distance per trip

Actors of the urban transportation (eco)systems

- State and government (transportation laws)
- Local authorities , Network authorities, Transit authorities (regulator, operator), Mobility authorities
- Public and private transport operators
  - Bus, train, metro, tram + stations
  - Taxi, VTC, shuttle (van, car, two-wheeler, three-wheeler)
- Car rental companies, autoshare bicycleshare companies (services)
- Carsharing platforms
- Telephone operators, Google and co., … (Multimodal Information system)
- Households and individuals (consumer, user, citizen)
- Social networks
- Mobility generators (companies, schools, hypermarkets, festivals, …)

univers
public

techno

Bluetooth

contenus

NFC

cartographie

- informations citoyennes

- informations nationales

services géolocalisés

- informations régionales

- services à bord (restauration)

- prochain départ

- vidéos à la demande

- infos voyage (étiquetage bagages)

portail web

écrans

Java

- services 2.0

- temps d'attente

situation

- informations touristiques

- heure d'arrivée

- informations correspondances

temps réel

- prochain arrêt

temps différé

avant le trajet   à bord

- itinéraire bis

- localisation temps réel

- jeux

- météo

- carte réseaux de transport

au sol

widgets

- musique

- sport

SMS

- tables horaires

- recherche porte à porte

push mail

- publicité

- prévisions de trafic

- infos locales et plan de quartier

- événements

MMS

- restaurants / bars

- commerces de proximité
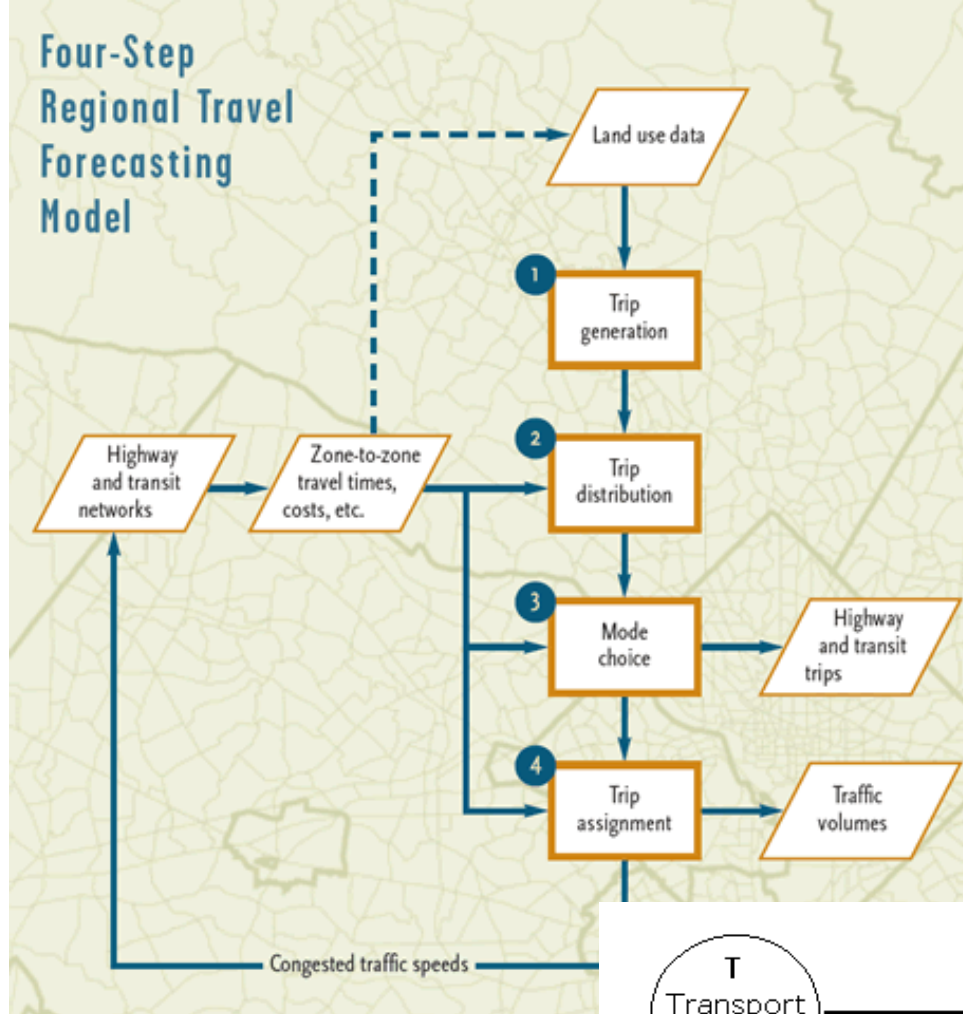
flash code 2D et 3D

Wap push

univers
privé

Data

- Supply : network, timetables (open data)
- Demand : storyboard, GPS, traces
  - vehicle (car, bus, …),
  - individual : smartphone, phone, ticketing, tweet (Big data)
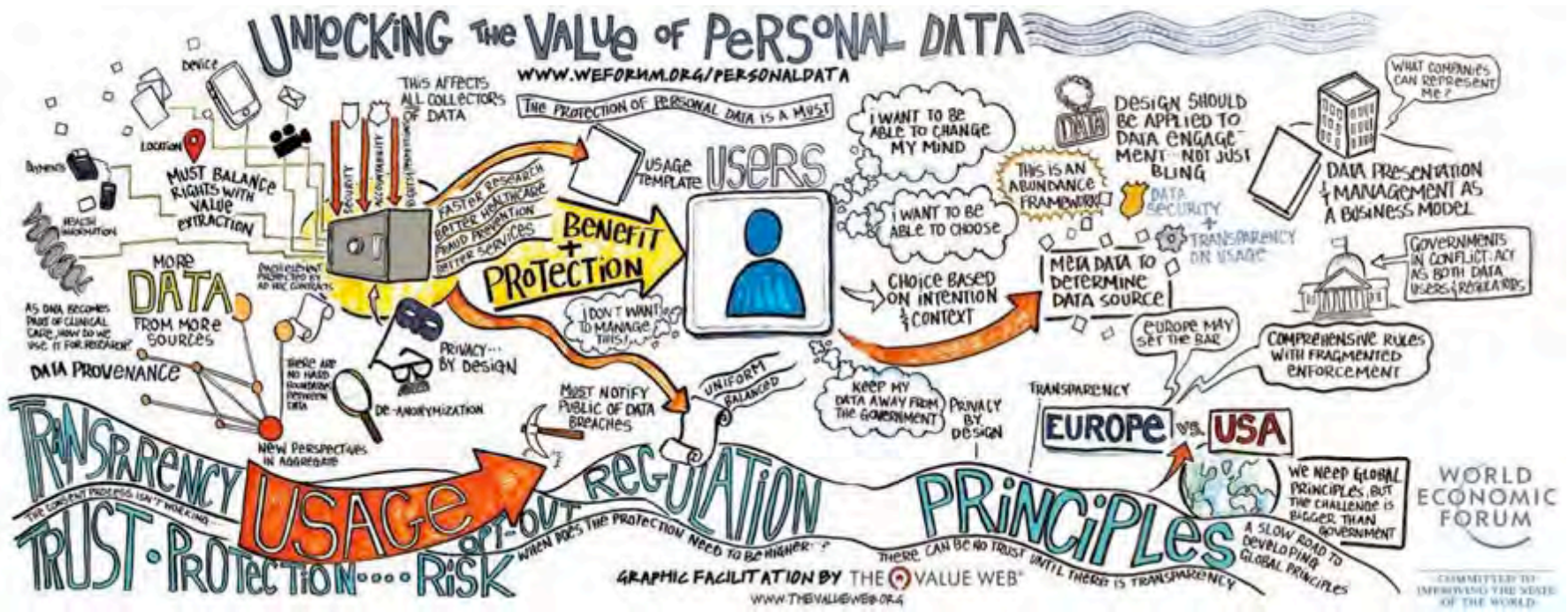
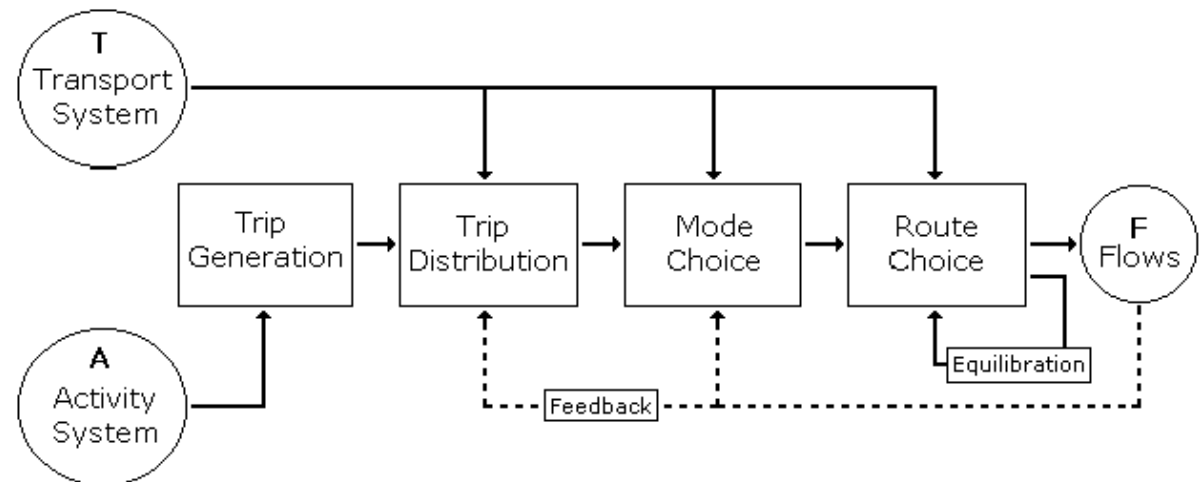# Four step model

Four-Step Regional Travel Forecasting Model

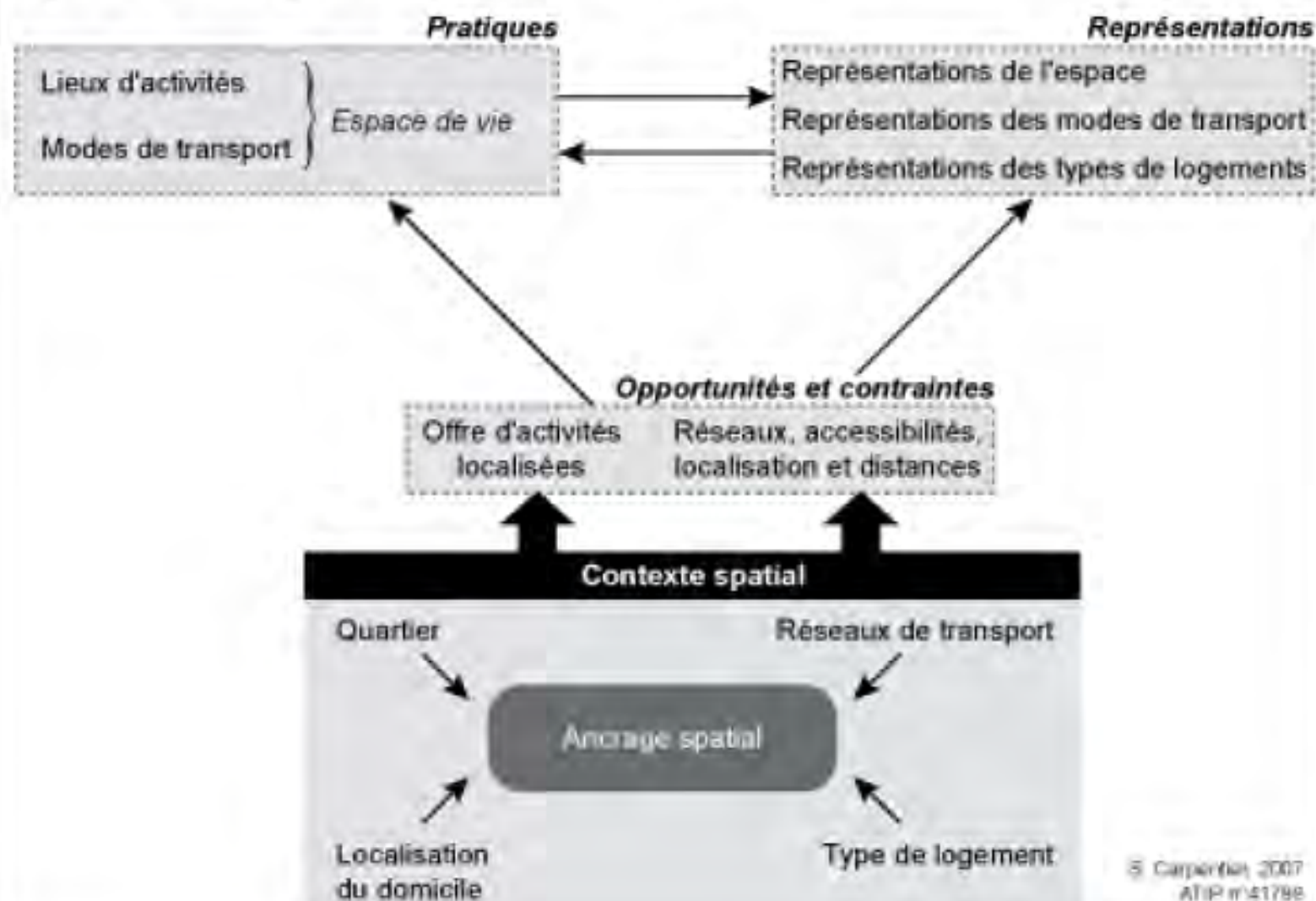Road transport

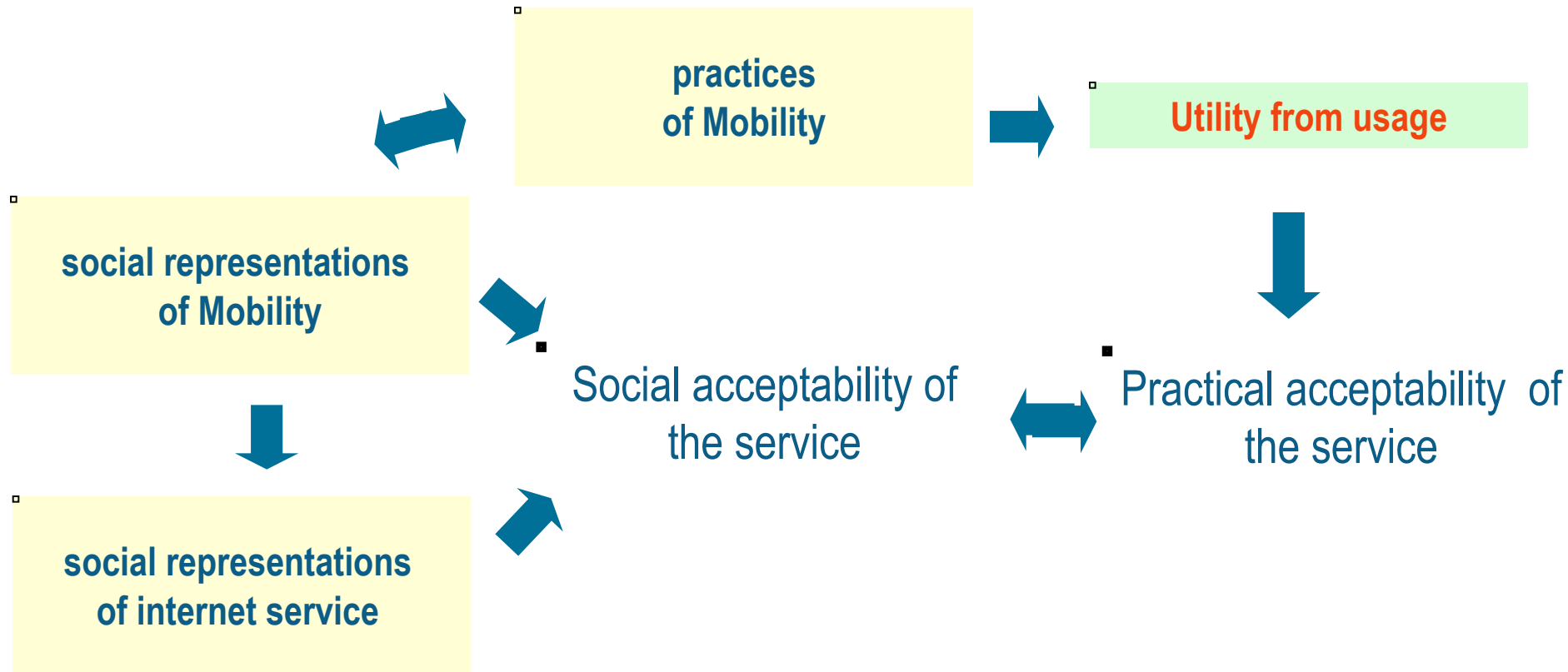Multimodal transport

Speed/Capacity

Time spent optimised

Individual Behavioral models

- Mode choice
- Route choice
  - Econometric formulation of the probability to choose a mode or a route i among the alternatives according to its utility depending on a set of factors : time spent, price, reliability, comfort, … (subjective value)
  - Five factors: *safety (security), pleasure, gain, performance and identity as main* dimensions for a modal choice (Brisbois)
  - Captive (poor, young)
  - Adherence to space and multi-activities chaining (car/metro)

- Traffic models

- Habits/routines

Figure 1.1 - Ancrage résidentiel et mobilité quotidienne

practices
of Mobility

Utility from usage

social representations
of Mobility

social representations
of internet service

Social acceptability of
the service

Practical acceptability of
the service

Social representations (SR) are "**images**" people have
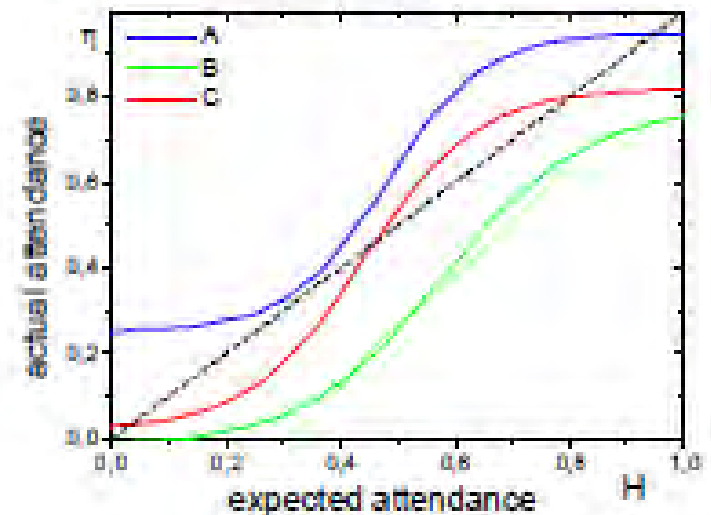about a social object : they **guide people behaviour**
(Moscovici, 1961).

Collective Behavioral models

- Discrete choice with externalities

$$V_i \equiv H + \theta_i + J \frac{1}{\|\vartheta_i\|} \sum_{k \in \vartheta_i} \omega_k = H + \theta_i + J \eta_i$$

Utility V_i compared to price P

- Schelling's model

(seminar attendance,

segregation) (Nadal, Gordon)

Social representations of mobility

- «Mobility» names a movement in space in a stretch of time. It's thus strongly related to social representations of space and time.

- Ideology
  - Mobilitarian ideology
  - Liquid society (rich mobile, poor motionless) (Bauman)
- Themata
  - Individual/Collective
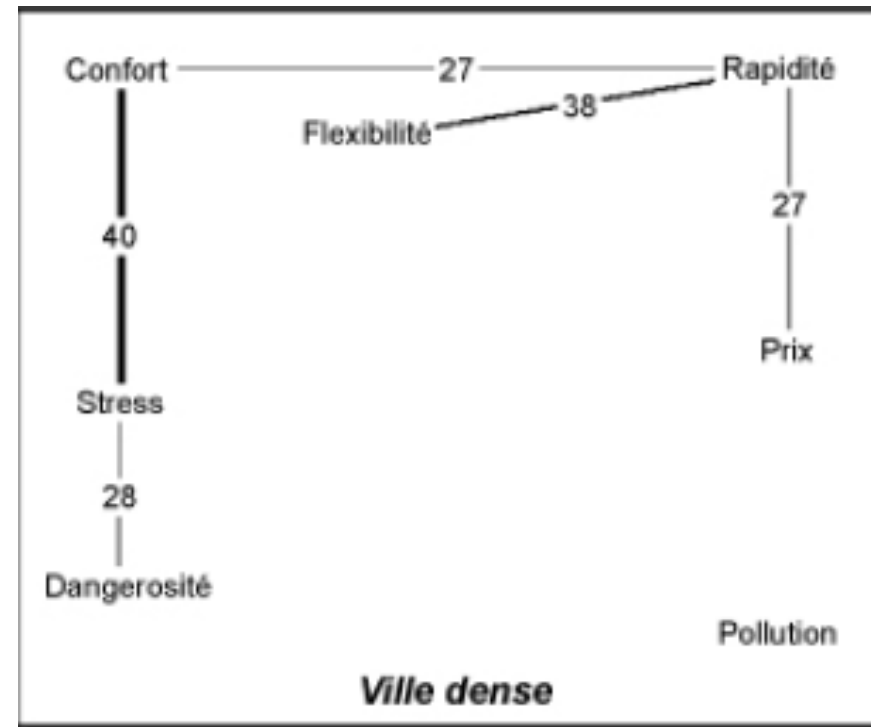 - Private/Public   Ownership/Access
  - Active/Passive

Urban Space representations

- Places and relations between places and networks
- Mental maps (Depeau)

Modes of transport SR
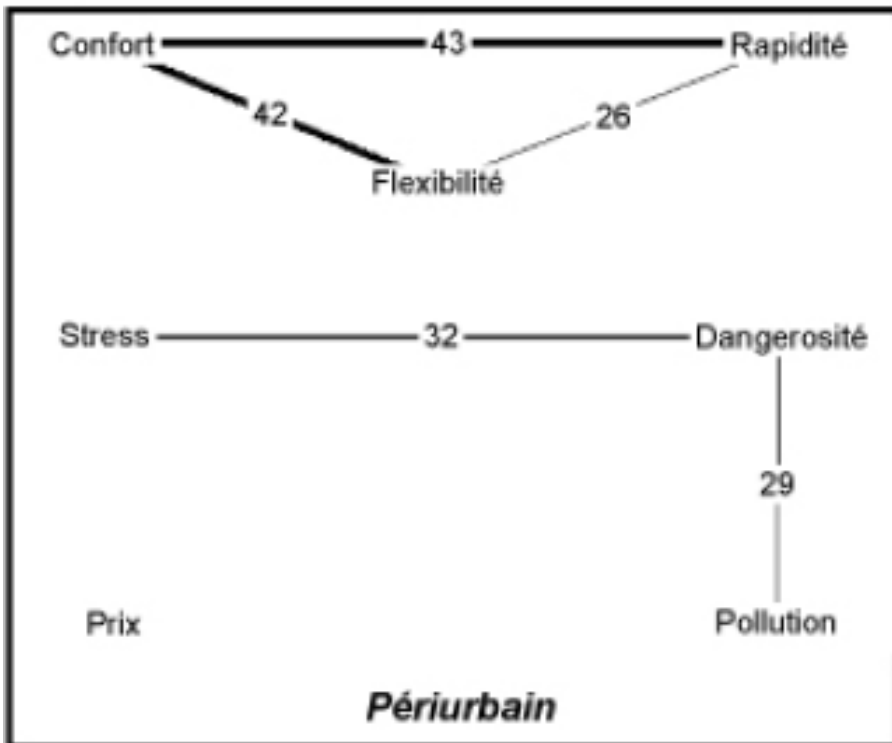
Car   Bus

(S. Carpentier)

Emergence and Innovations

- Mobility 2.0
- Sharing economy
- Environmentally soft (energy sustainable electric …)

Mobility 2.0

- Intelligent transport system
- From web 2.0 to Mobile 2.0
  - The social web meets mobility
  - Extensive use of user-generated content, so that the site is owned by its contributors
  - Personal, Local, Always-on, Ever-present
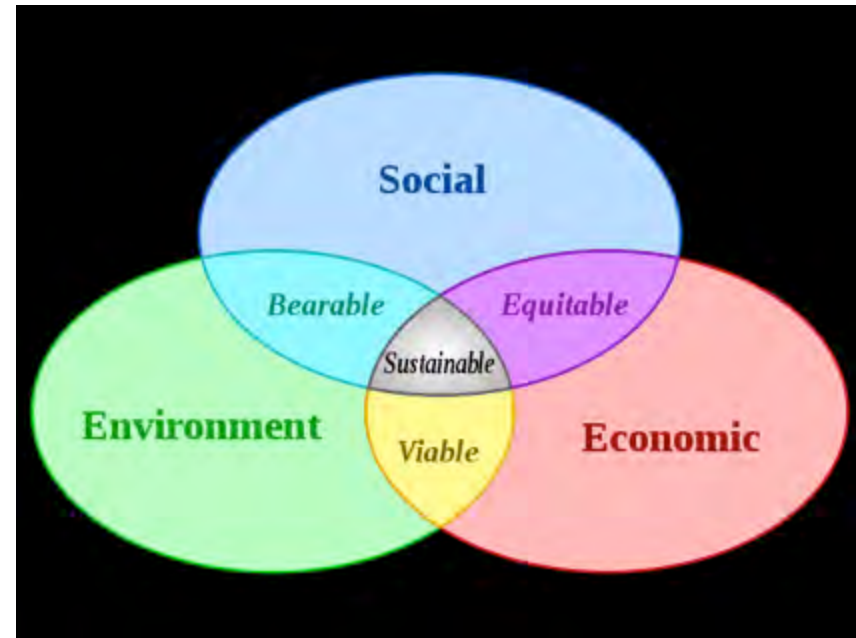- Web of things (connected)

Sharing economy
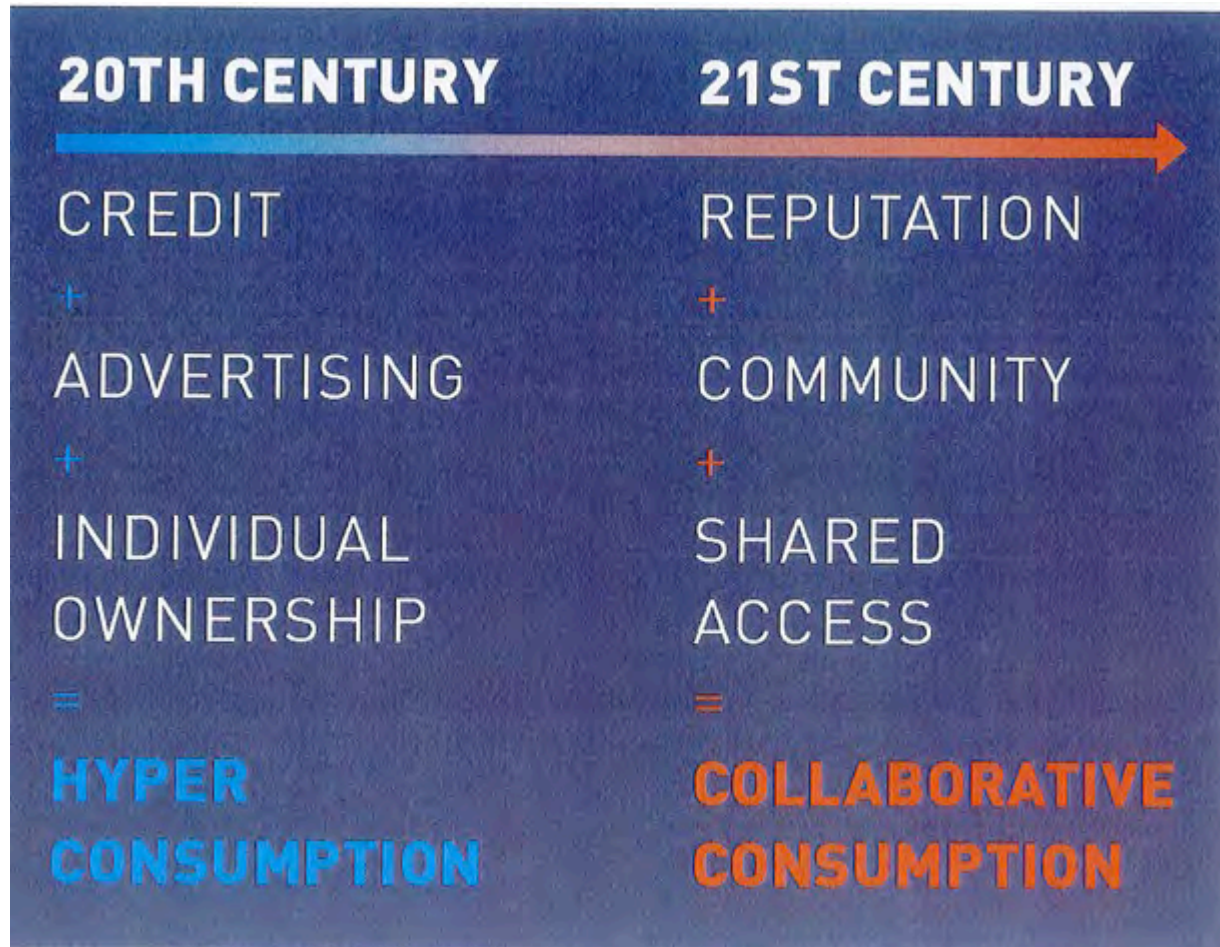
Rachel Botsman What's mine is yours: the rise of collaborative consumption
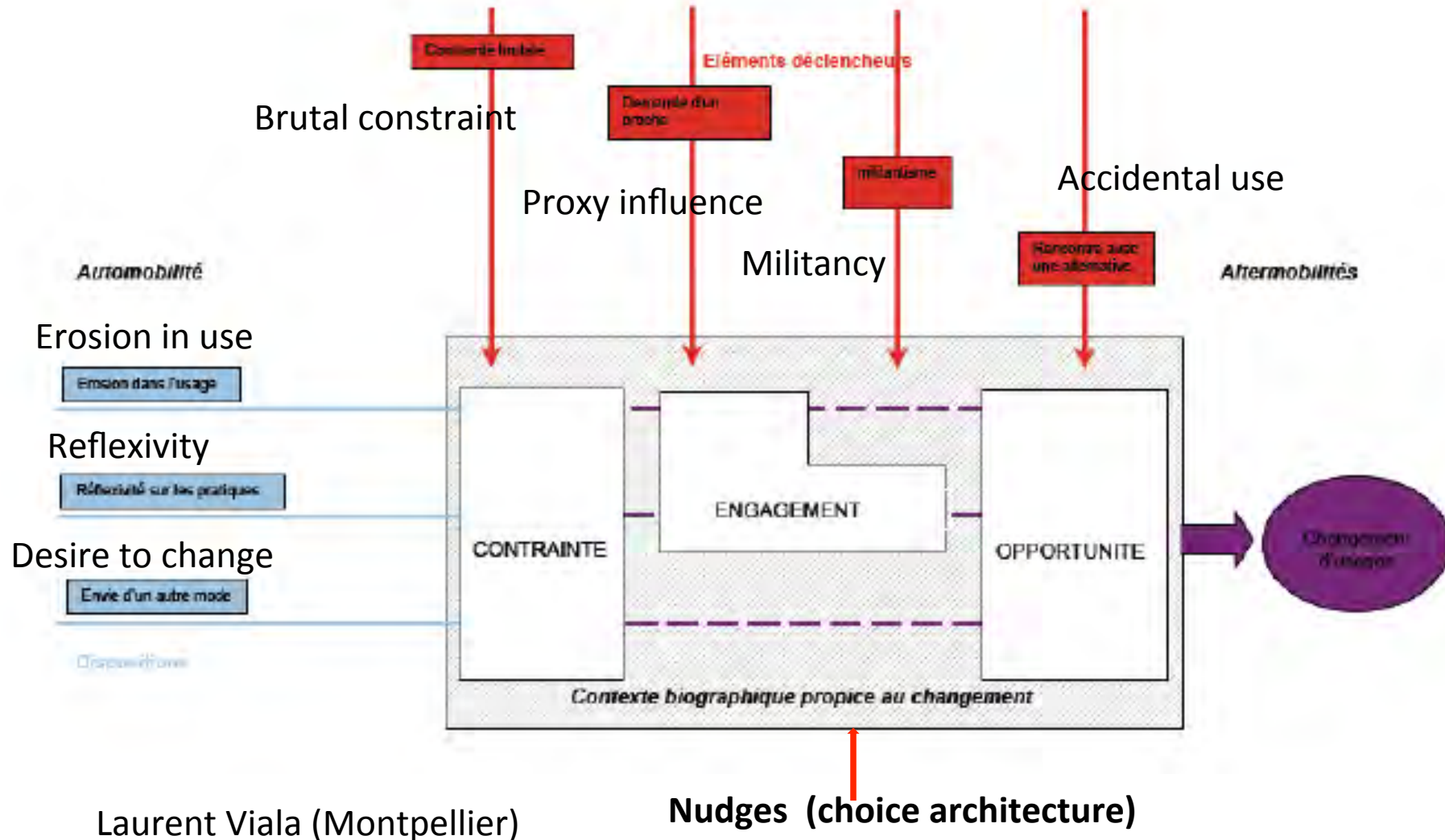
Sustainable development in cities

- Climate change and CO2

- Air pollution and noise

- Accidents
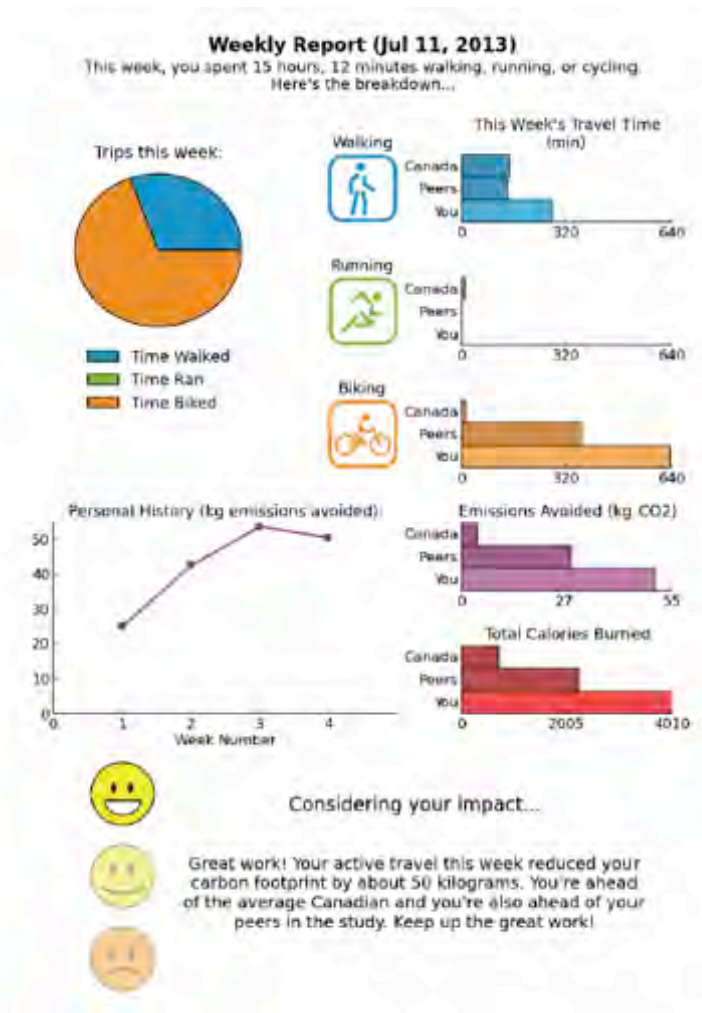
- Energy consumption
(oil/electricity)

- Health (obesity) and social problems (inequity)

- When mobility is made plural and becomes mobilities it stems from the newly emerging field of interdisciplinary Mobilities research. The concept of 'mobilities' (Urry, 2000) encompasses the large-scale movements of people, goods, capital, and information, as well as the more local processes of daily transportation, communication and the travel of artefacts.

- http://www.cosmobilities.net

Behavioral change

Brutal constraint

Proxy influence

Accidental use

Militancy

Automobilité

Erosion in use

Reflexivity

Desire to change

Aftermobilités

CONTRAINTE

ENGAGEMENT

OPPORTUNITE

Contexte biographique propice au changement

Laurent Viala (Montpellier)

Nudges (choice architecture)

- Moves = activity diary

Weekly Report (Jul 11, 2013)
This week, you spent 15 hours, 12 minutes walking, running, or cycling.
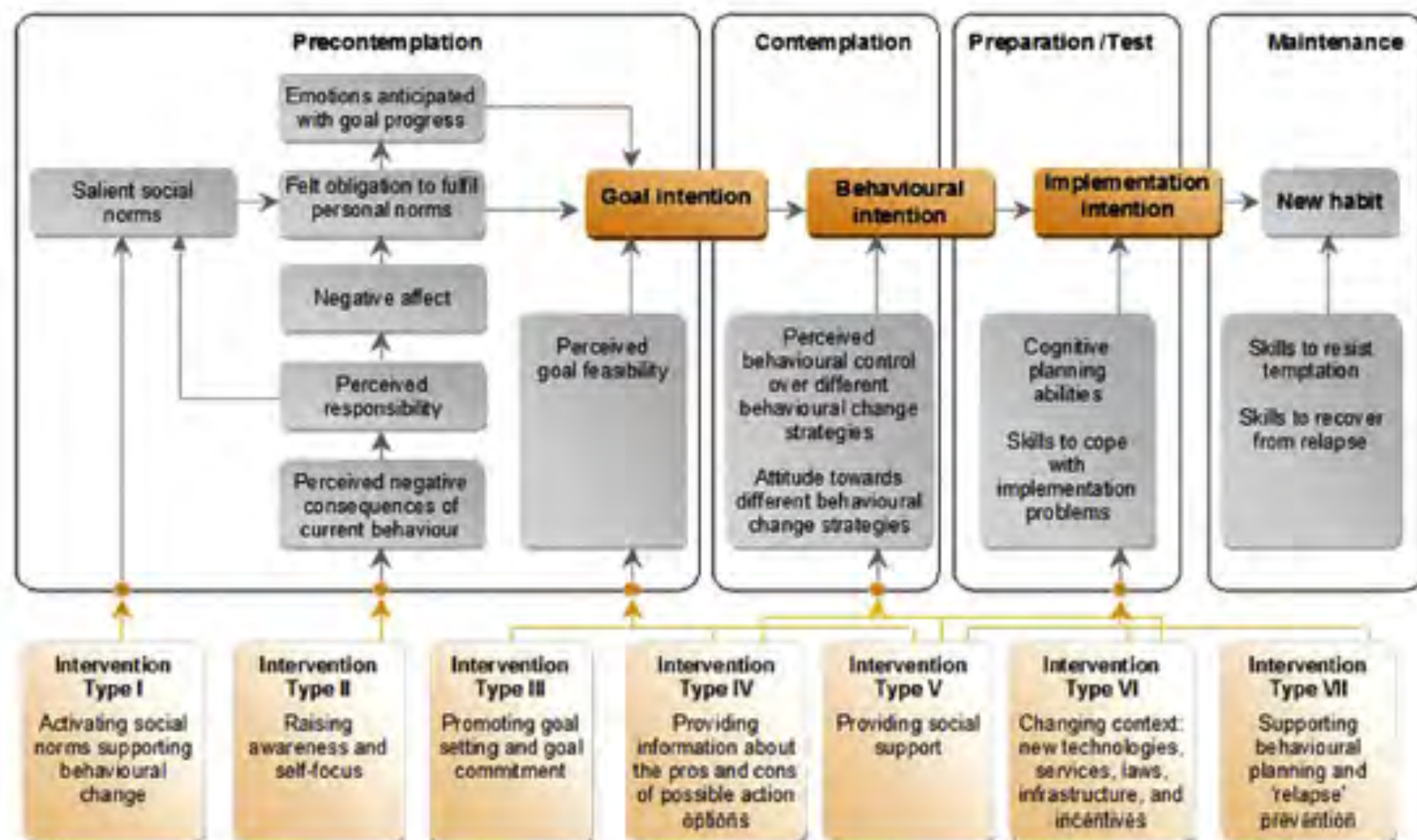Here's the breakdown...

Fig. 3. Self-regulation theory's hypothesized stages of the process of behavioural change and their determinants.

Shared mobility with private modes

- Typology
- Markets and exemples
- Existing research on dynamic ride sharing
- Research proposal

Typology

Ridesharing

Source : Chan N. D., & Shaheen, S.A.(2012). Ridesharing in North America : Past, Present and Future. Transport Reviews, 32 (1), 93-112.

Ad hoc

Acquaintance based

Organisation based

Casual carpool « Slug lines »
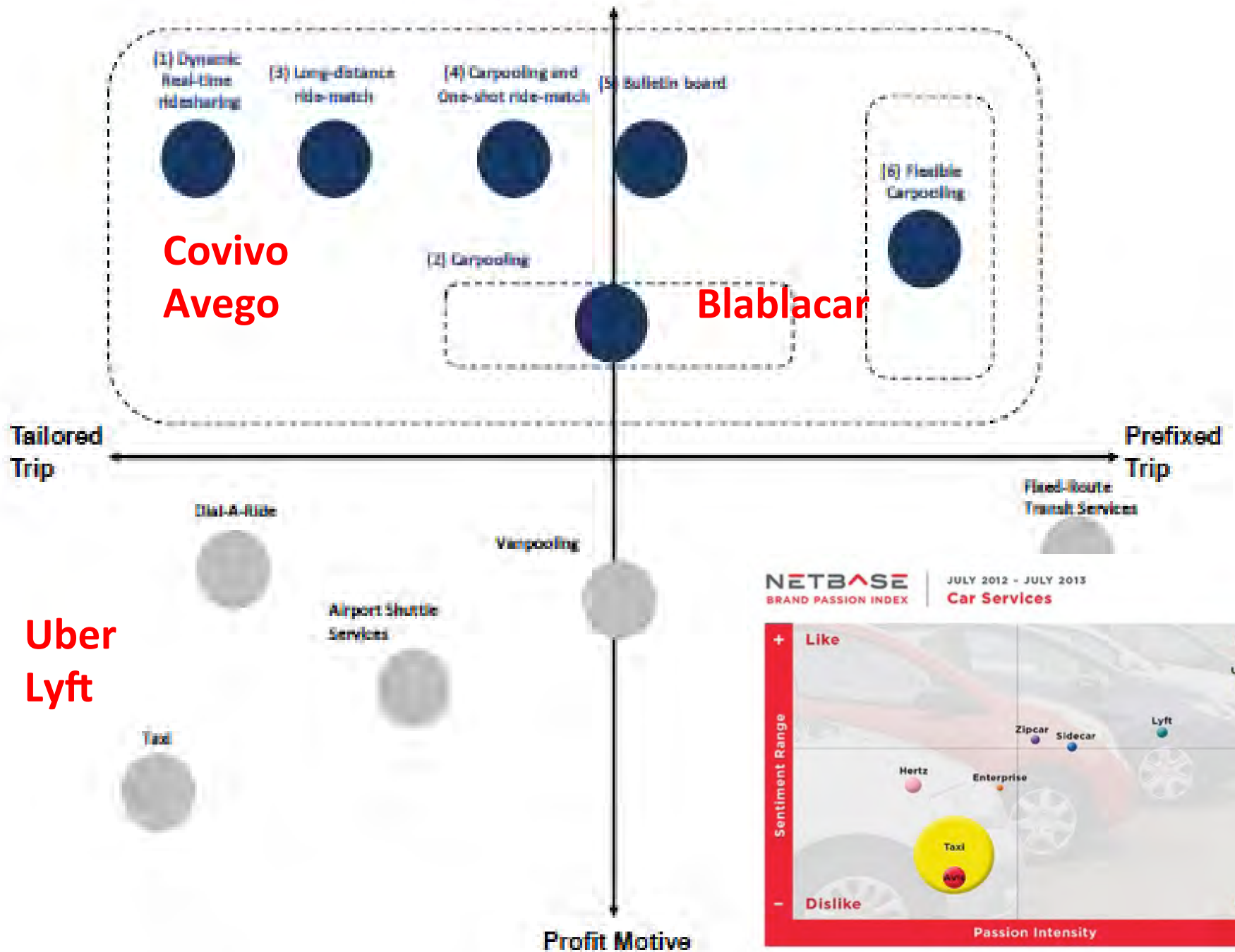
« Fampool »

Coworker carpool

Carpool

Vanpool

Self organised
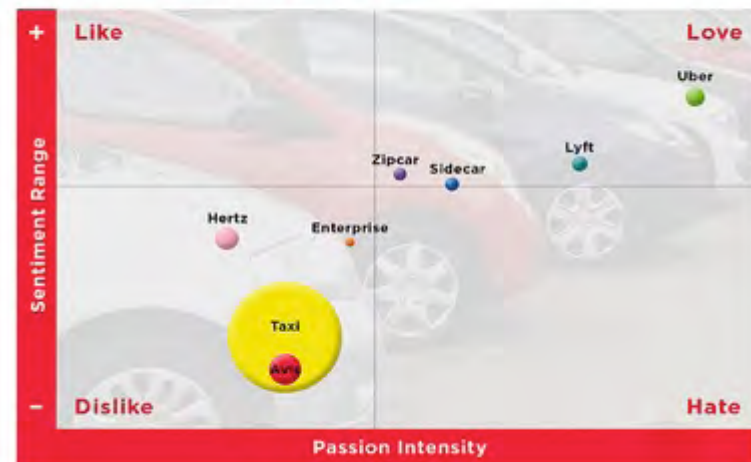
Self organised / incentive based

Notice boards Internet notice boards Telephone/Internet/GPS/ Smartphone based computerized
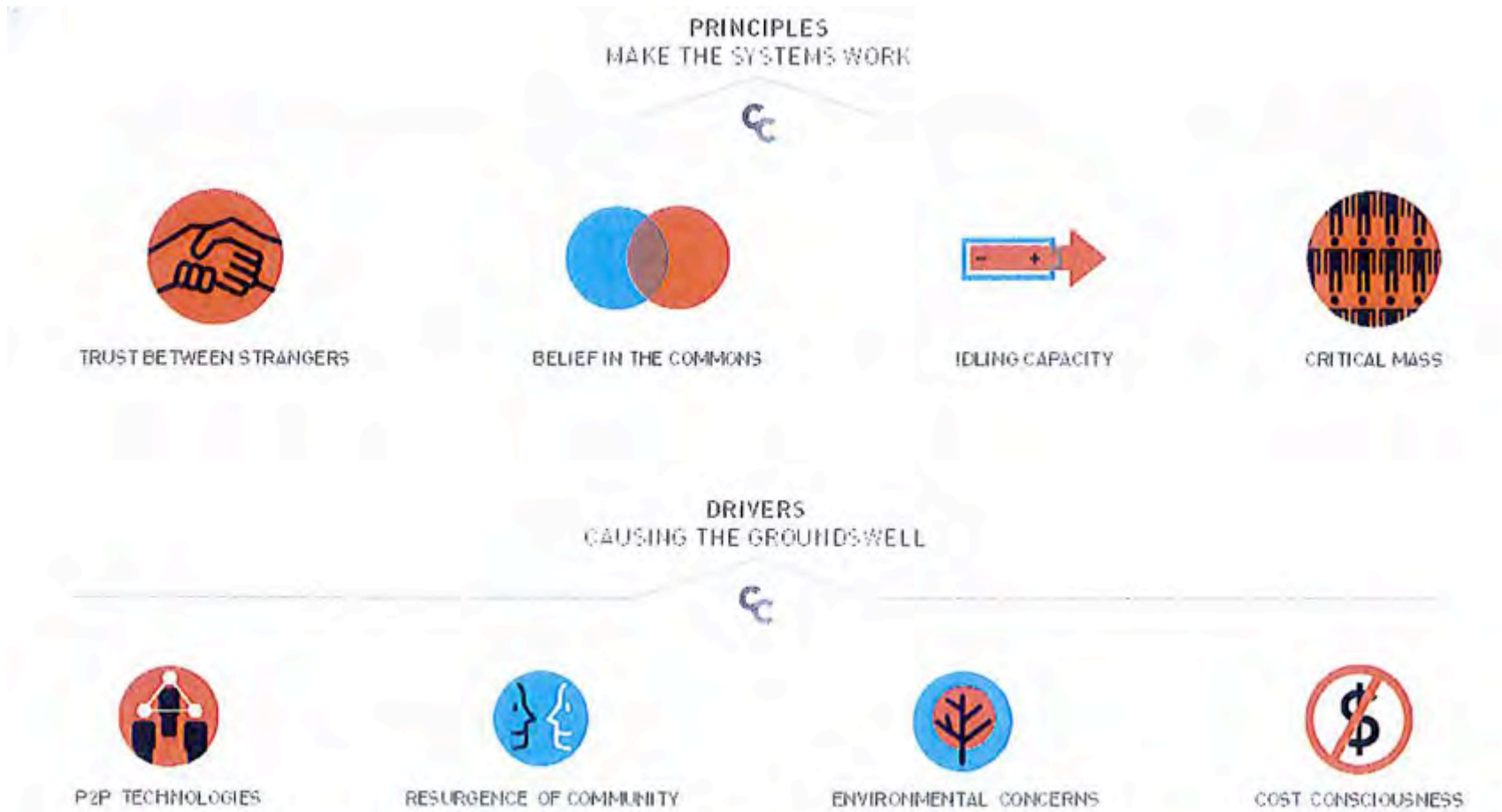
Cost-Sharing Motive

(1) Dynamic Real-time ridesharing

(3) Long-distance ride-match

(4) Carpooling and One-shot ride-match

(5) Bulletin board

(6) Flexible Carpooling

Covivo Avego

(2) Carpooling

Blablacar

Tailored Trip

Prefixed Trip

Dial-A-Ride

Fixed-Route Transit Services

Vanpooling

Airport Shuttle Services

Uber Lyft

Taxi

Profit Motive

NETBASE
BRAND PASSION INDEX
JULY 2012 – JULY 2013
Car Services

+ Like — Love

Uber

Sentiment Range

Zipcar Sidecar Lyft

Hertz Enterprise

Taxi
Avis

− Dislike — Hate

Passion Intensity

Matching

Rachel Botsman

Dynamic ridesharing

- Territorial anchoring (Optimod Lyon) with dedicated stops and lanes
- Community anchoring (Wayz-Up) in companies (+grant from local authorities)

- Business model ?

Study– territory	Sample	Study– territory	Sample
*Écovoiturage – Axes Grenoble/Crolles & Bougoin-Jallieu/Lyon	138 et 507 personnes	*Ride Now - Californie	65 personnes (avant) 61 personnes (après)
*Écovoiturage - Vercors	230 personnes	Berkeley (Californie)	58 personnes 444 personnes
Acody – Pays Tolosan	590 personnes représentatives de la zone	Baie de San Francisco (Californie)	722 personnes habitant ou travaillant sur la zone
Province de Wallonie (Belgique)	1378 personnes (non représentatives de la zone)	Nottingham (Grande Bretagne)	24 personnes
SR520, projet Avego devenu Carma – Seattle	60 personnes	Virginia Tech	125 participants à majorité étudiants et 11 testeurs du prototype
Hirondo - Gironde	11 personnes et 10 personnes	Pooll – Pays-Bas	58 répondants
*Carlos – Mitteland Suisse	Non connu		

Sonia Adelé

Research about the shared mobility in a prospective and interdisciplinary view

- This will imply:
  - Contacts with different stakeholders in order to identify the principal societal, economical, technological trends explaining the emergence and the growth of shared mobility
  - The use of an integrated methodological protocol to understand individual multimodal mobility strategies and the inclusion of new services of shared mobility in those strategies.
  - A confrontation of those ideas with different experts of the field of mobility in technological, economical and policy point of view
- The objective is to propose some innovative solutions for shared mobility build with the participation of potential users and designers from start-ups (Covivo, Wayz-Up for exemple) and large transport companies such as RATP, SNCF. Public authorities could be locally also involved in the process in relation to their "mobility" policy.
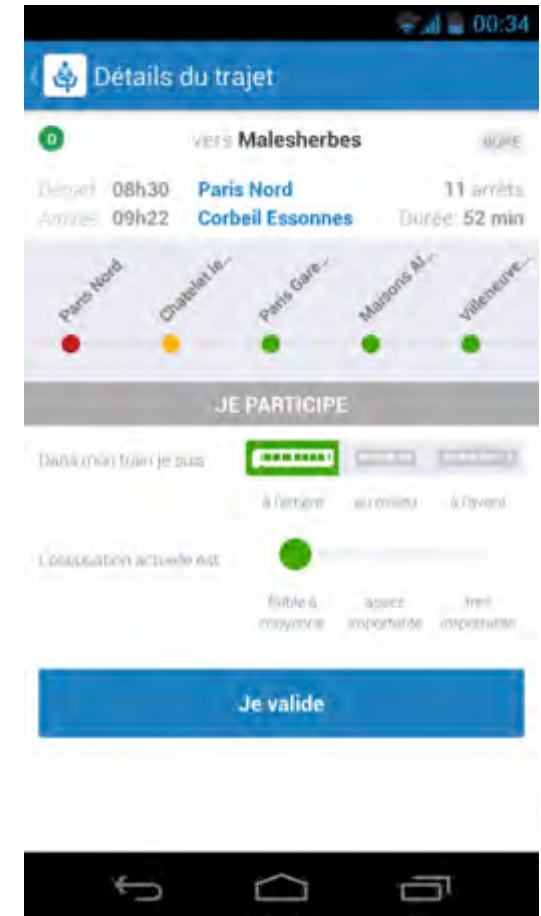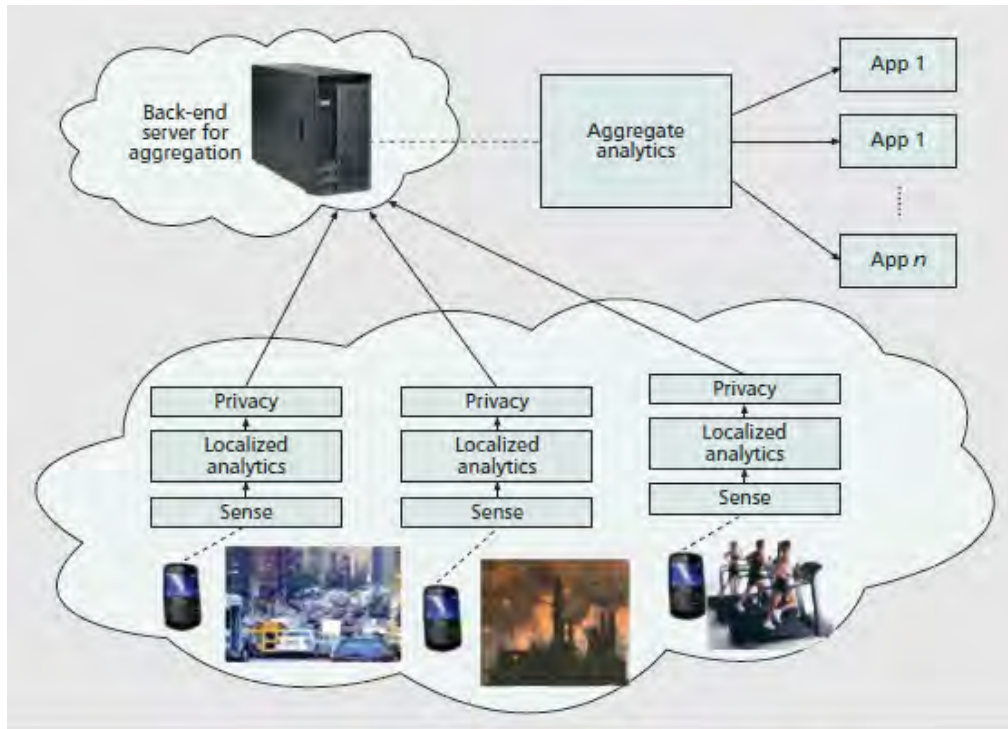- Shared-Use Mobility Center Transportation Sustainability Research Center of University of Berkeley

Information and transportation

- BtoC oriented

- Real time

- Multi sensors

- Multimedia

Mobile Crowdsensing and transportation

- Personal (Quantified traveller)

- Community (Tranquilien)

Ganti

- Privacy protection and geo-localisation

Crowdsourcing and transportation

- Co-production of the service

- Tiramisu (Zimmerman)

- Consume: Customer makes use of services and passively co-produces by creating the perception of value.
- Co-perform: Customer performs some of the tasks of a service.
- Co-create: Consumer uses resources (such as information) from a service to create their own value.
- Co-design: Dialog between customers and service round the types and form of service desired.
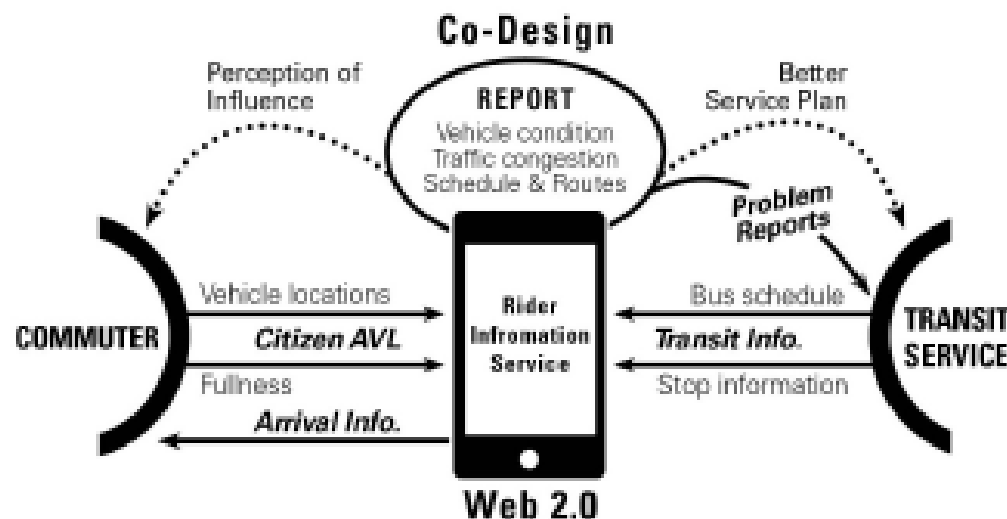
- Waze
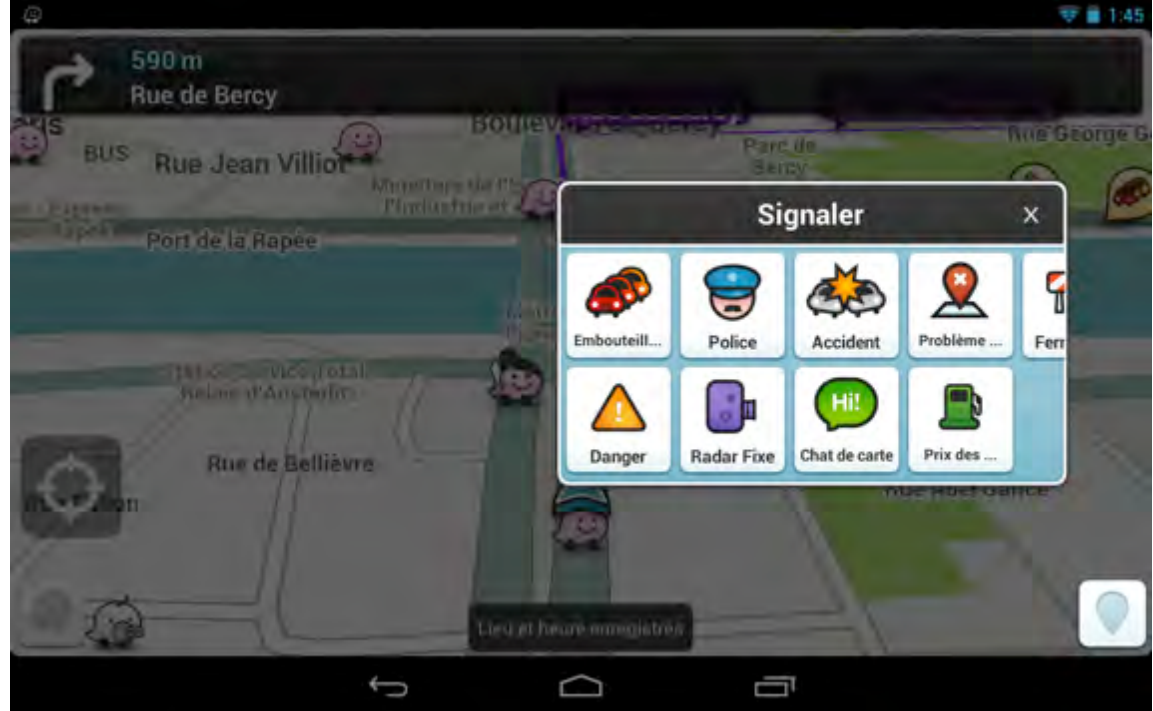
- Motivations for participation (sharing)
- Critical mass
- (semi)-trust

- **Asking**: People are more likely to contribute if they are asked, and if they are asked specifically/individually.
- **Intrinsic Motivation**: People will contribute if they perceive an intrinsic motivation, such as their own enjoyment in doing the work. In addition, people perceive value in helping others and in helping groups of people they feel an affiliation towards.
- **Rewards**: People will contribute for different kinds of rewards including praise, increased reputation, an increase in privileges, and financial compensation.

- Speed cameras Alert and more

- Coyotte and co (driving asssitant) (Pauzié)
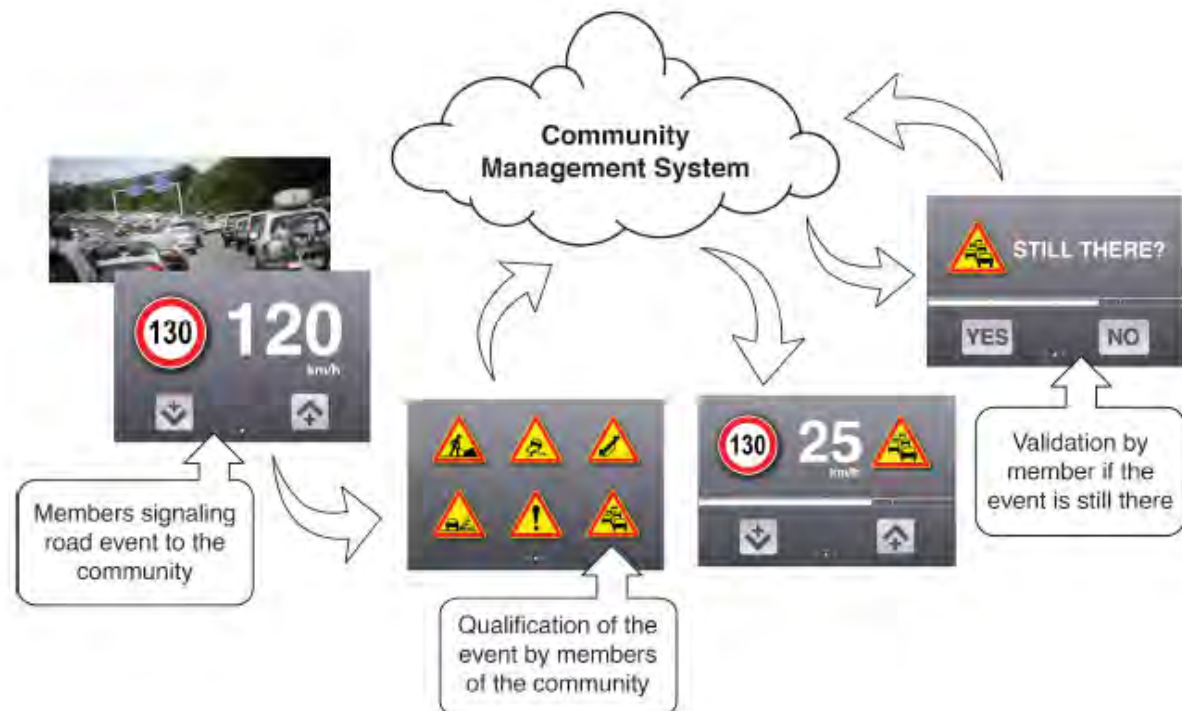
Research proposal

- Contacts with the main urban transportation providers in order to identify their willingness to get a structured information from the users or consumers about the actual state of the transportation system. Such app as "tranquilien" exists already to get data about the occupancy of the wagons on metro lines in real time.

- Use of an integrated methodological protocol to understand the willingness at the individual level to give such kind of information directly to the service provider or share this information through a platform, and the trade-off at stake between privacy, individual and collective benefits in terms of mobility.

- Confrontation of those practices within and between different modes of transport to analyse their acceptability from functional, organizational and social points of view .

Tweets on transportation

- Microblogging , text (ungrammatical). Content about real world events
  - Incidents (Normal, degraded, perturbed situations) in transportation system
  - Traveller's opinions
  - Information on journey needs

- Human/Robot (operator+authority) posted messages

- Pushing information out
  - https://twitter.com/RERA_RATP

- Crowdsourcing system architecture over Twitter
  - Voice tweet in cars (server sends tweet digest to Vehicle social network group)
- Mining of tweets (Topic detection and tracking) (Gal-Tzur)
- Exploitation of social network structures in Twitter

Method for mining

- Textual analysis

- Representative sampling

- Integration of text and geographical information

Research proposal

- Use of an integrated methodological protocol to understand the reasons and motives of the traveler at the individual level to send in their social network such kinds of information and also to look at the process of diffusion trough the network by retweets and the use made by such information by other users. Three situations will be contrasted: normal daily transport situations, exceptional transport situations (big events) and degraded transport situations due to incident or accident.

- Contacts with the main urban transportation providers in order to identify their willingness to collect and treat these data in order to extract useful information in different transportation situations.

- Confrontation of those practices within and between different modes of transport to analyse their acceptability from functional, organizational and social points of view .

Conclusion

- Urban mobility in an era of change
  - Decline of the conflict automobile versus Public tranport (mass transit)
  - New comers : mobility 2.0, collaborative economy, sustainability and eco-slow mobility
- Call for social representations research to analyse
  - Emergence of mobile groups of individuals/crowds/publics in relation to rythms and places of the transportation network and the city (solid/liquid and communities)
  - Modification of the synthesis distance/proximity of social interaction when mobile, due to the social networks (prise/déprise and connection)
  - Co-design of mobility services with operators and users (multimodal information and crowdsourcing)