

# **Needs based vs Utilitarianism approach. A change of paradigm in travel behavior.**

**London, March 20 2017**

**Floriea Di Ciommo – Responsible for Research Area - CENIT**

**TEA Cost Action Chair**

# Overview

- **Transport and Equity**: equity appraisal and measures
- How to deal with **equity in the evaluation** (i.e. Value of Time or travel time saving)
- **Measures critique**: technologically and socially speaking
- **Benefits** for users
- How to give the word to people: **participative approach**

# Genesis

- **Debating equity definition:** “Distribution of goods and bads”
- **Problem assessment:** bad consequences of travel behavior of some people on others.
- **Equity appraisal:** Overcome the CBA approach, could - we include equity out of the welfare approach?
- **Equity measures:** are still current measures (i.e. Travel Time) appropriate for selecting transport policy/project (**Technologically** and **socially** speaking)?

## Two relevant aspects between travel behaviour and equity

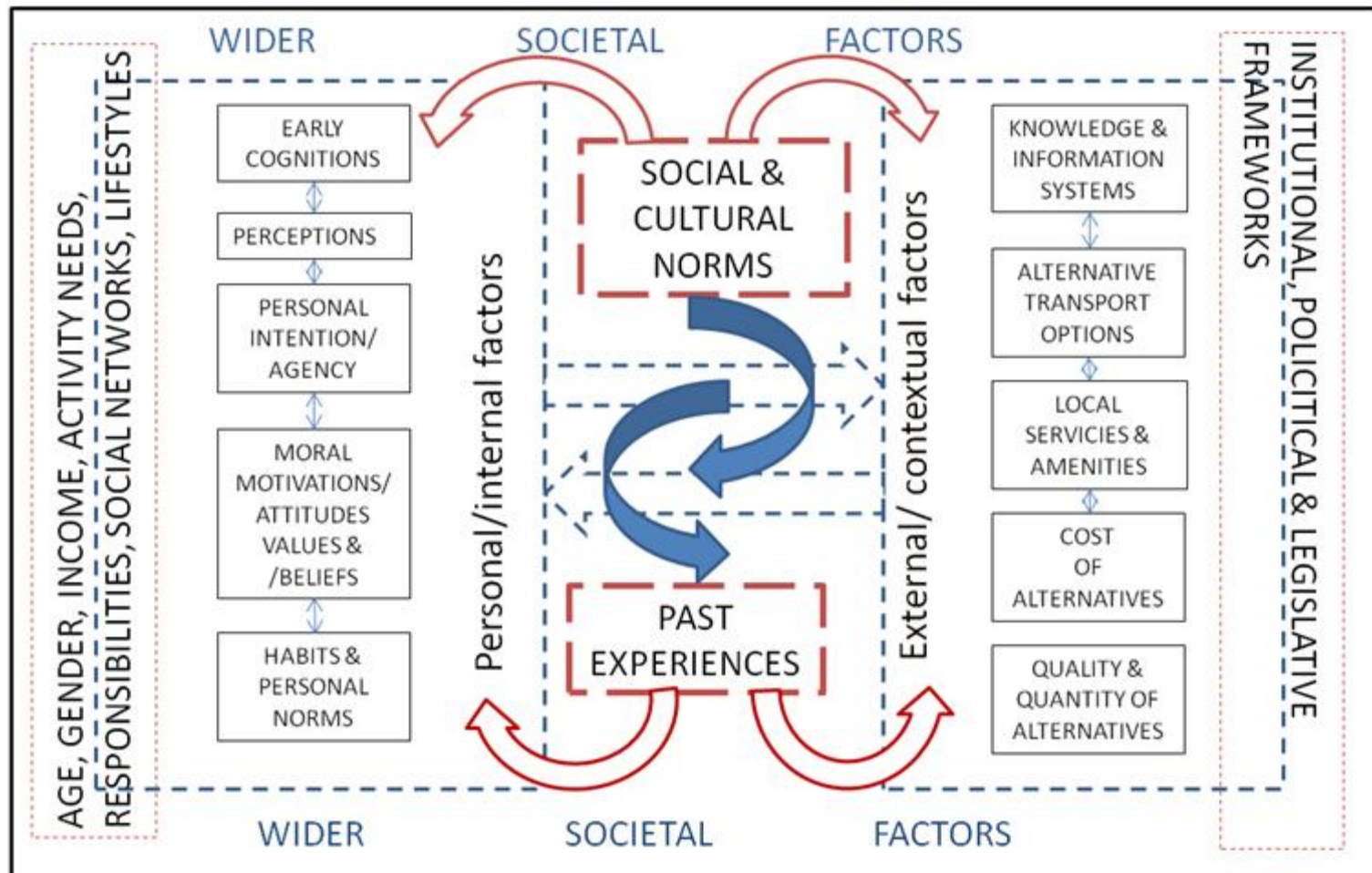
- A. How the **equity and social inclusion** perspective helps to understand **differences in travel behaviour**.
  
- B. A need to investigate to what extent **transportation** contribute to **inequalities**

## Some orientation:

A. **Individually** speaking

B. **Collectively** speaking

# Travel behaviour and choices: very complicated



# What costs/benefits need to be disaggregated?

- **User benefits** (i.e. journey time savings, cost of travel, option values)
- **Noise, Air quality, Accidents, Security, Severance**
- **Accessibility** (i.e. Public transport access to local services)
- **Affordability** (i.e. Cost of travel)
- **Participation** in transport decision-making (and in modeling)

# And what is 'fair' anyway?

- **People** should have only **what they can afford to pay** for (either now or later)
- Some people **need to be protected** from the actions of others
- Everyone even **in the model should** be given the opportunity to **participate on an equal basis**
- People should get (at least) what they need and are capable of using (i.e. **metrics of needs in models**)





# Challenges for models

- **Qualitative studies:** metrics issues
- **Activity-based models:** the spatial context data specification
- **Accessibility-based models** tend to focus on potential to travel and usually do not also take account of behaviors at the level of individuals
- **Time use geographic** models have tended not to consider accessibility by different modes
- **Micro simulation** and agent-based models can be useful for modelling system & policy changes

# The devil is in the detail

- Representing **multi-dimensional and multi-level processes and concepts** (e.g. diagram 1)
- Representing the **socio-spatial and temporal context** (available survey data is often not geo-coded)
- Finding consistent and **transparent measurements**
  - i) comprehensible, ii) measureable, iii) complete, iv) operational, v) decomposable, vi) non-redundant. vii) minimal
- Deciding whether to **use integrated** vs. composite indicators
- Dealing with issues of **representativeness, normalization**, aggregation, uncertainty and sensitivity
- Incorporating **stakeholder perspectives** (inclusivity)  
(see Miller et al (2013))

# How to do that?

- Take into account **different contexts** (i.e. developed and developing countries)
- There is a need of stressing the **critical perspective** (i.e. assessment of social capital, VOT)
- What kind of **methods for equity** consideration in Travel behaviour?
- Do we need to develop **new/hybrid modelling approaches** and methodologies to measure transport equity ? (metrics of needs?)

## Give the word

Needs-based approach: needs of people related to a specific trip, mode, activities, and time of the day



Unsatisfied needs such as indicators?

For identifying the distribution of “goods” (i.e. accessibility to transport and activities).

# Need-based Approach

## DATA COLLECTION SUGGESTED METHODOLOGY

### Goal:

- Collecting data about the **people's aspirations on the extent to which their needs are satisfied** through activity participation.

### Steps:

1. Sociodemographics
2. List of frequently conducted activities
3. Eliciting needs:
  1. Choice sets of 3 activities are created
  2. *" Assume that on a day there is time available to conduct an activity and that you can choose between the following three activities"*
  3. *"What are your considerations when choosing between the three activities?"*
  4. *A list of needs is created*
  5. *Grouping of closely related needs.*

# Need-based Approach

## DATA COLLECTION SUGGESTED METHODOLOGY

### 4. Needs satisfaction level

	Activity 1	Activity 2	Activity 3	Activity 4
Need 1	1	1	3	5
Need 2	2	5	2	4
Need 3	1	1	2	1
Need 4	1	2	1	2

### 5. Focus on the unsatisfied needs

- List of activities
- “Can this activity potentially satisfy to a greater extent this need?”
- If yes, indicate what should be improved:
  - Travel time decrease
  - Travel cost decrease
  - Parking availability increase
  - Crowdedness in public transport decrease
  - Public transport quality of service increase
  - More destinations
  - More transport modes available

# Need-based Approach

- Empirical data on the **needs** of the relevant population groups.
- Exploiting **social media platforms** for collecting **direct and indirect information** about needs of citizens
- Facilitating the collaborative design
- Information on which **activities** serve which needs.
- Which are their **unsatisfied** needs?
- Which are the activity **attributes** that could be improved?
- The analysis results can be used during the appraisal process, guiding the prioritization and decision making process.

# From utility based assessment to something else

Utility  
goes for the  
majority

$$\Sigma$$

Diversity and  
pluralism  
for the different groups  
that participate in society

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$





## Switching to time saving

- In **name of the equity**: we decide to consider all people in the same way with the same value of time..., but
- Some issue: the **equity regressive** effect.

## Switching to time saving

- **Equity effect:** an assessment technique that is likely to skew the outcomes of a cost-benefit analysis towards a particular population group.
- **Progressive** in nature if it works to the benefit of disadvantaged population groups.
- **Regressive** in nature if it works to the advantage of the majority of the population and thus to the detriment of disadvantaged population groups.

## Broadening the perspective in practice

- Conservative – **adjust** current **tools** to improve equity considerations (i.e. the discount rate variation, transparency solution for social welfare)
- Moderate – expand and add new tools. **Accessibility gains vs. travel saving in CBA** (Martens & Di Ciommo 2017)
- Progressive – new paradigm. **Looking for a new starting point, by** enlarging transport project assessment: i.e. no more transport projects exclusively based on travel time saving and on utility function

# Broadening horizons in evaluation approaches for local authorities

## Preferences based approaches

- COST-BENEFIT ANALYSIS
- MULTI-CRITERIA ANALYSIS
- COST-EFFECTIVENESS ANALYSIS
- NARRATIVE

## Alternatives

- AFFORDABILITY MEASURES
- EQUITY INDICATORS (i.e. through based analysis)
- **NEEDS-BASED APPROACH** (i.e. social contract, insurance mechanism...)



## CBA: *raison d'être*

CBA for rationalising public decisions: by merging into a unique **unidimensionnal value in monetary terms all relevant information** for an uncontroversial **decision rule**.

When, for all the society's members, benefits are higher than costs (goods higher than bads) CBA concludes that doing the project is a Pareto-effective improvement compared to the status quo. And conversely.

**Stage 1.** We assess direct and indirect effects for each period of time

**Stage 2.** The flow of benefits for different periods of time are summed and compared with a social discount rate.

# CBA: raison d'être



If  $NPV > 0$ , society is better off with than without the project. If  $NPV < 0$ , society is better off without than with the project.

Let a public investment of 150 000 Me . Anticipated flow are 200 000 Me the 5 first yrs, then 25 000 Me for 3 yrs and 20 000 Me for 2. The social discount rate is 6%.

$$NPV = -150000 + 20000(1.06)^{-1} + 20000(1.06)^{-2} + 20000(1.06)^{-3} + 20000(1.06)^{-4} + 20000(1.06)^{-5} + 25000(1.06)^{-6} + 25000(1.06)^{-7} + 25000(1.06)^{-8} + 20000(1.06)^{-9} + 20000(1.06)^{-10} = 7\,188.89 \text{ Me}\$$$

Finally, we have the number!

# Possible conflicts



**Conflict with agency** Implementing policies supposedly best for people without their consent is an issue

**Conflict within the collective decision** Participation of the concerned stakeholders in the decision process cannot be just accepting or refusing, which would be easily manipulable.

**Conflict with democracy** Who is the expert to decide what should be important or not (time), or how to apply it ?

**Conflict with information efficiency** Some relevant information, including diversity issues, are not straightforward in data but may be gathered from the field

# Conclusion

**Reason** rather than rationality. Using models, simulations, and considerations of normative theories to feed public debate rather than providing a solution

**Surveys, participation and deliberation** to provide relevant information and its diversity

**Equity as a result of the participation** thanks to the concern of all and their own view of what is important for their needs in mobility.



# Questions?

Floriea Di Ciommo, chair of Transport and Equity Cost Action\_ TU1209

[http://www.cost.eu/COST\\_Actions/tud/Actions/TU1209](http://www.cost.eu/COST_Actions/tud/Actions/TU1209)

[www.teacost.eu](http://www.teacost.eu)

Responsible for sustainable mobility and travel behavior at CENIT-UPC- Barcelona tech

[floriea.diciommo@upc.edu](mailto:floriea.diciommo@upc.edu)