

**Analysis of mobility effects due to the opening of a metro service:
Torino and Copenhagen**

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This work aims at detecting the changes due to the recent metro opening in two territorial contexts, Torino and Copenhagen, which are different for their planning traditions, for survey methods and for their typical travel patterns.

The Copenhagen case study was deeply analysed thanks to a Short Term Scientific Mission of the [COST Action 355](#) "Changing behaviour towards a more sustainable transport system", spent at DTF (Danmarks Transport Forskning) - Kongens Lyngby (Copenhagen).

The thesis includes a *bibliographical* part, which aims at collecting definitions of "induced traffic", at studying quantitative and qualitative survey methods and at understanding the regional and transport planning evolution in the Copenhagen metropolitan area.

Then an *experimental analysis* let the effective application of the survey methods that have been studied.

▪ Torino

→ quantitative tools

- a one week travel diary (stratified sample of 107 people¹, see Fig. 1);
- a face to face questionnaire addressed to metro passengers (casual sample of 402 people).

After a descriptive analysis, quantitative data have been treated with the statistical software BMDP: the ANOVA detected the reciprocal relations existing between the different variables.

→ qualitative tool


- a focus group (8 workers, PT users and car users).

¹The sample includes students, workers and pensioners living in the Torino metropolitan area (N, S, E, W).

SPOSTAMENTI DURANTE LA GIORNATA
Suddivida ogni spostamento in tratte intermedie e compili una tabella per ogni tratta.

Oggi è il __ settembre 2007, ed è L M M G V S D

ATTENZIONE ALLE TRATTE!



TRATTA N°	METEO:		Mezzo di trasporto		Quanto è soddisfatto delle seguenti caratteristiche del suo viaggio?					
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	TRATTA PERCORSATA: <input type="checkbox"/> Abituale <input type="checkbox"/> Non Abituale VIAGGIO DA SOLO: <input type="checkbox"/> Sì <input type="checkbox"/> No ORIGINE Ora: __: __ <input type="checkbox"/> Torino Via / P.zza / Staz.: _____ <input type="checkbox"/> Fuori Torino Comune: _____				Per nulla Pochissimo Poco Abbastanza Molto Moltissimo <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
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Fig. 1 – The travel diary's structure

- Copenhagen
 - qualitative tool
 - depth interviews (focus on the survey methods chosen to analyse the metro's effects², and focus on the planning evolution in the Copenhagen metropolitan area, with deep interest addressed to the Ørestad city, which is growing up supported by the metro line).

Both in Torino and in Copenhagen, the integration between different survey methods allowed a better comprehension about the studied phenomena, ensuring a higher validity of the obtained results.

It is obviously hard to compare results obtained with different survey methods and analyzed in different ways, but it is interesting to compare the differences that characterize changes in modal choice after the opening of the metro in the two contexts.

Table 1 shows some comparative data concerning modal choice before the metro opening for home-work trips of about 5 km, accomplished in Torino and Copenhagen.

	Average distance (km)	Average time (min)	Main mean of transportation		
			Car	PT	Bike / foot
Torino	4,9	27,5	68 %	21 %	11 %
Copenhagen	5,5	15,5	33 %	19 %	48 %

Tab. 1. Comparative data Torino - Copenhagen

²Survey methods used to analyse metro's effects were traffic counts, questionnaires and panel interviews.

The different travel patterns revealed in Torino and in Copenhagen cause consistent differences concerning changes in modal choice after the metro opening:

- Torino (questionnaire addressed to metro passengers)
 - the diversion from foot/bike to metro is unimportant
 - 14,3% of metro passengers was car users
- Copenhagen (panel interview)
 - the decrease in bike use is up to 9%
 - the portion of car users varies from +2% to -5%.

These data show that in Copenhagen car users have a very low interest for the metro, so the new PT supply is somehow redundant as it does not produce a reduction in car use. On the other hand, metro could have a positive role in reducing car trips where the PT supply is quite low.

The work carried out with the thesis shows that there is a need of financial support to grant a contribution to the ones that participate to the surveys in order to have a sample which is representative of the population and in order to ensure a higher validity of collected data.

For the future, it could be interesting to implement a periodical survey in the Torino metropolitan area in connection with the opening of new metro branches. It would than be possible to monitor the perception trend concerning the level of service and to notice the influence of a better integrated PT supply on commuters modal choice.

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