

A green geometric logo consisting of three overlapping trapezoidal shapes in shades of green, arranged to form a stylized, abstract shape.

CISMOB

Interreg Europe



European Union
European Regional
Development Fund

Exploring the impact of ICT on urban mobility in heterogenic regions



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"ICT has brought a significant improvement in terms of performance and reduction of externalities in transport systems"

1

influence people's
mobility behaviour

2

offering greater flexibility in
people's travel patterns

3

reducing
congestion

4

reducing
emissions

5

reducing
noise

6

reducing
road accidents

"the transfer of an indisputable **good practice** from one area to another with different socioeconomic and environmental characteristics may not have the expected results"

London Congestion
Charging Scheme

+5%

in traffic volumes in 2007

Milan's road
pricing policy

insignificant

emission reductions

- The quantification of environmental and economic impacts of ICT interventions can not be based on real world measurements.
- The estimation of transport externalities has to consider several uncertainties.
- The existing emissions calculation methodologies face limitations in terms of data availability and reliability.
- Several studies have outlined a number of additional shortfalls of traffic and emission models.

...highlight the importance of ICT by exploring their potential **environmental and economic impacts** in a set of cities and regions with heterogenic characteristics.



Examination of
potential effects

1

ICT deployments
assessment

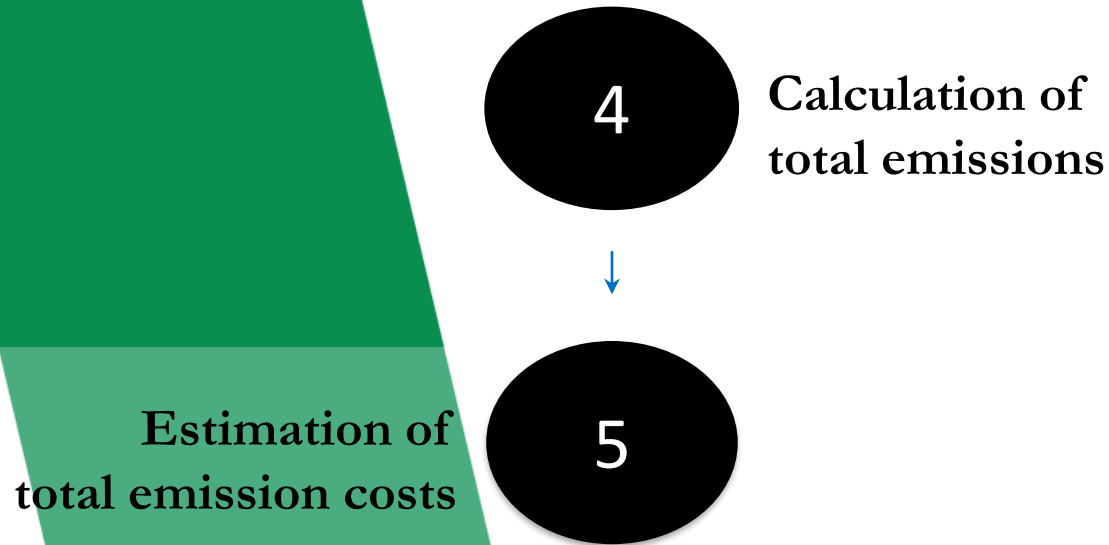


2



3

Estimation of fleet
composition



Urban congestion charging system

- mitigate traffic congestion and,
- bring environmental benefits
- potential to decrease CO2 levels more than 10%.

Eco-routing navigation system

- can contribute in reducing fuel consumption and emissions,
- reported results ranging from 5% to 40%
- proved benefits in real world examples ranged from 4.8% to 6.8%.

Congestion Charging System of Stockholm

- Introduced in 2006 as a trial and in 2007 as a permanent
- Reduce traffic congestion and improve the efficiency of the transport system.

During the trial period:

- traffic **-16%**,
- total vehicles kilometres **-15%**,
- CO2 emissions **-14%**,
- air-borne pollutants **-10%** to **-14%**,
- NOx emissions **-8.5%** and,
- injury accidents **-9%** to **-18%**.

Ahn and Rakha (2013) estimated the potential effects of implementing a dynamic eco-routing system in a full level of market penetration in Columbus, Ohio, USA.

- travel distance **-5.5%**,
- travel time **+3.2%**,
- average speed **-8.4%**,
- fuel **-6.1%**,

Eco-routing navigation system

- HC **-17.7%**,
- CO **-17.6%**,
- NO_x **-9.5%**,
- CO₂ **-5.2%**.



	Centro Region	Bucharest - Ilfov	Extremadura
Population (inh)	2,327,755	2,264,865	1,104,499
Total Area (km ²)	28,199	1,821	41,611
Density (inh/km ²)	82	1,244	26

1st Scenario

instalment of a congestion
charging system in
Bucharest - Ilfov

> 10%

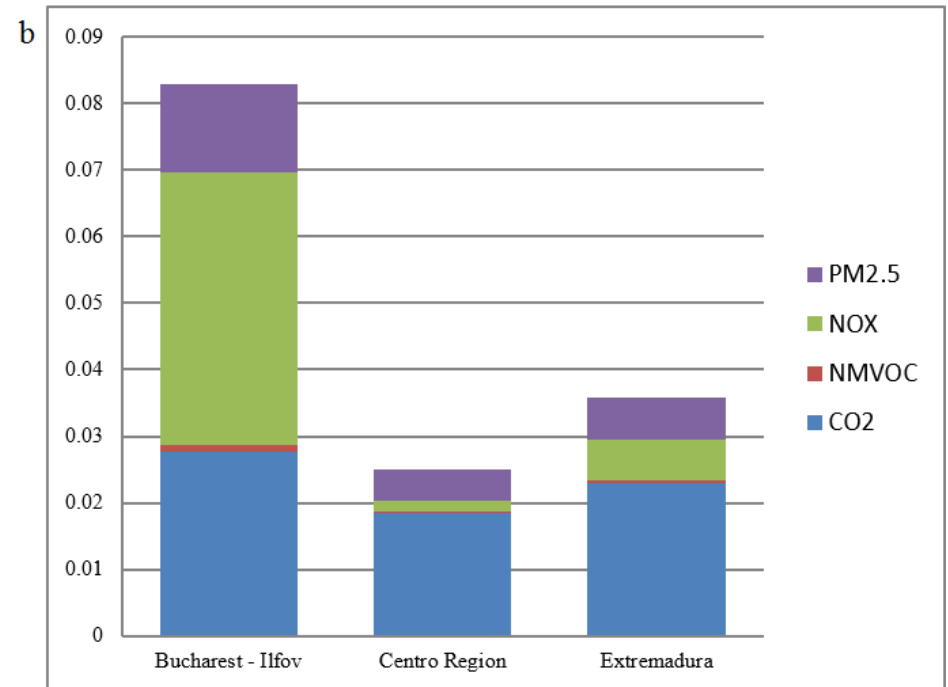
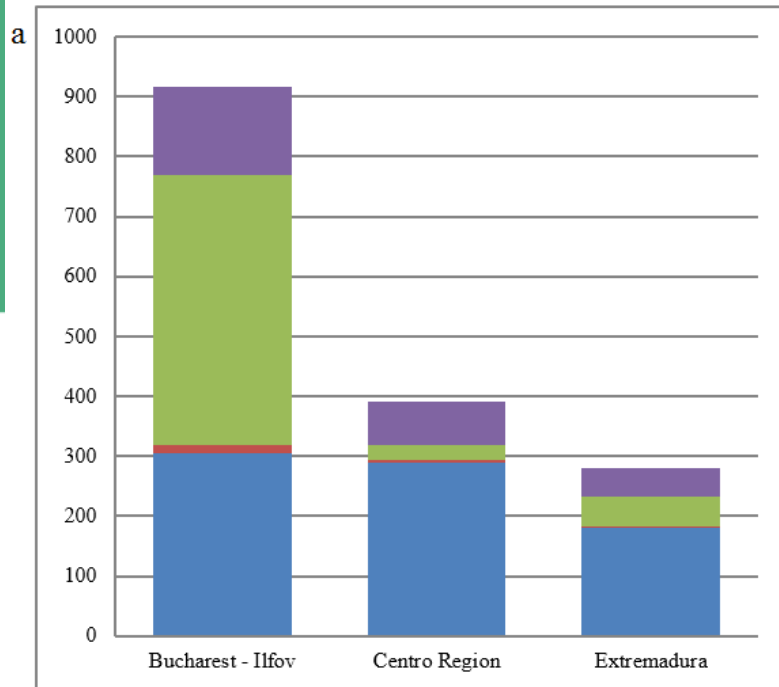
-14%
CO₂

2nd Scenario

adopting an eco-routing
driving approach in a full
level of market penetration

-5.16%
CO₂

4.8% - 6.8%



(a) Total costs in 2014 (in M€); (b) Costs per kilometre in 2014 (in €)

Total emissions and damage costs of CO2 (2014)

Studied Area	Total Emissions (in million tones)	Damage Costs (in million euros)	Damage Costs (per capita in euros)
Bucharest – Ilfov	2.521	226.9	100.2
Centro Region	3.220	289.8	124.5
Extremadura	2.011	181.0	163.8

Total emissions and damage costs of CO2 in each scenario

Scenarios	Studied Areas	Total Emissions (in million tones)	Damage Costs (in million euros)	Damage Costs (per capita in euros)			
Scenario 1	Bucharest – Ilfov	2.168	0.353	195.1	0.353	86.1	0.353
Scenario 2	Bucharest – Ilfov	2.391	0.130	215.2	0.130	95.0	0.130
	Centro Region	3.054	0.166	274.8	0.166	118.0	0.166
	Extremadura	1.907	0.104	171.7	0.104	155.5	0.104

From the literature review:

- lack of a comprehensive methodology,
- simulation models contains various uncertainties, and
- absence of relevant and organized data.

ICT interventions:

- can be beneficial in terms of CO₂ emissions and costs reductions and also,
- become an important tool for local authorities and policy-makers.

The estimation of the total emissions:

- based on the type of vehicles for each region,
- their specification in terms of technology and,
- their annual travel activity (kilometres travelled).

Future work:

- exploring the effects of combining different measures and,
- overcoming the barriers of assessing the implementation of an ICT measure in a new area.

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thank you
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