How to improve the efficiency of the transport system in urban nodes of the TEN-T core network

Assessment of transport policy measures

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Content

- Background appraisal methodology

- Explanation appraisal methodology

- Conclusions

Purpose of the methodology

- Urban nodes are at the intersection of:
    - TEN-T infrastructure (mostly hard core infra measures with impact on urban policy objectives)
    - Urban infrastructure measures (with impact on TEN-T objectives)

- Need for a dedicated methodology to:
    - Identify cost-effective measures;
    - Measure/rate cost-effective measures;
    - Predict the impact on the transport systems.

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Why a new methodology?

- Variety of perspectives and stakeholders:
  - For urban policy makers TEN-T is out of their scope;
  - For TEN-T policy makers the urban areas are "just a dot on the map";
- Variety of measures, from hard core infra to smaller measures;
- Existence of different – sometimes conflicting – policy objectives (accessibility, safety, environment, quality, interaction);
- Existence of different budgets
- A CBA does not take into account non monetarized effects

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What kind of methodology?

- Core of the methodology is a combination of CBA and MCA;
- Takes all perspectives into account;
- The assessment needs a variety of stakeholders :
  - Variety of objectives and perspectives needed.
  - Governments, Industry, Citizens, Other
- Stakeholders wish for as much simplicity as can be attained without sacrificing quality;
- A methodology that integrates all objectives

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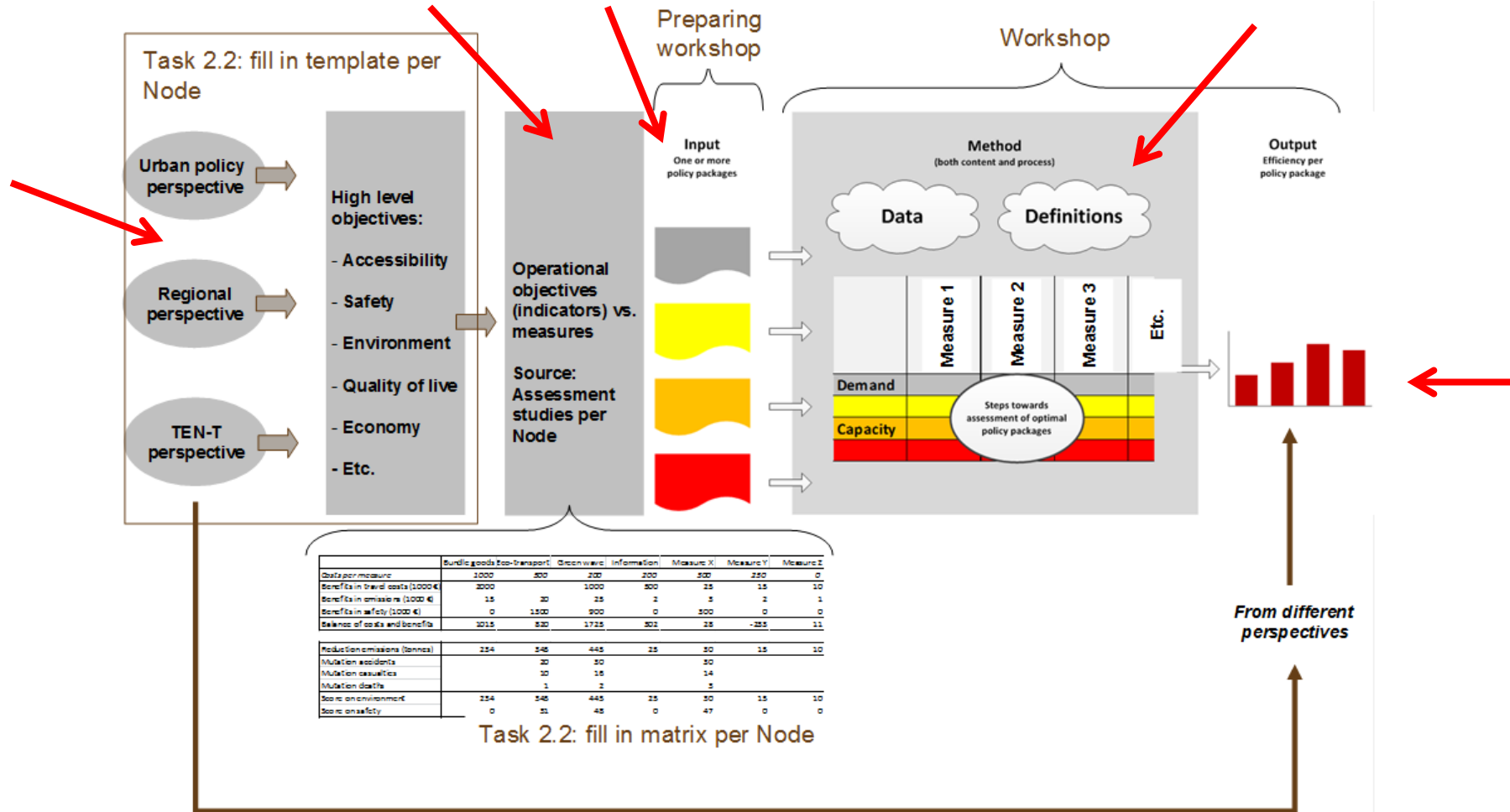RUPPRECHT CONSULT
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Resulting methodology

- A simple methodology which is:
  - tested;
  - understood and;
  - embraced by different type of stakeholders;
- Able to generate **cost-effective** policy measures and policy packages.

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Framework methodology

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General policy objectives

- Five objectives based on TEN-T and Urban policies:
  - Accessibility;
  - Safety;
  - Environment;
  - Quality;
  - Interaction.

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Definitions

- **Accessibility** – refers to the ease of reaching destinations expressed in travel time, travel costs and/or travel distances for different modes

- **Environment** – the way the urban environment is influenced by air pollution (e.g. CO_2) and/or noise;

- **Safety** – concerns material damage, injured and fatalities;

- **Quality** – this is where the soft factors enter the analysis. This concerns measures such as image, comfort, social cohesion, etc.

- **Interaction** – the way in which a transport policy measure relates to other measures. Does it strengthen or weaken another measure.

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Example: operational objectives

Accessibility	Passenger kilometers
	Ton kilometers
Safety	Fatal and serious accidents
Environment	CO_2, NO_x
Quality	Comfort in public transport
	Image of the city
Interaction	Relation (positive/negative) between a measure and the other related measures

Stepwise approach

1. Determine the interaction between measures in the package;

2. Determine benefits and costs of measures;

3. Determine the other quantifiable measures;

4. Determine qualitative effects;

5. Determine ranking of measures;

6. Decide on weights of effects;

7. Perform MCA;

8. Perform sensitivity analysis;

9. Discuss & optimize packages;

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Step 1: Interaction

- Interaction matrix;
- How do the policy measures relate to each other
- High-level assessment, interaction between two measures expressed in one score:
  - (-) 3 means very strong (negative) positive interaction;
  - (-) 2 means strong (negative) positive interaction;
  - (-) 1 means (negative) positive interaction;
  - (-) 0 means no interaction.

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Example: Interaction

Measure	Subway Hoekse Lijn	Greenport	RDH Airport	A13-A16	A15	Totale score		Relative score
Subway Hoekse Lijn		0	1	0	0	1		3
Greenport	0		0	0	0	0		8
RDH Airport	0	1		1	0	2		10
A13-A16 motorway	0	1	1		0	2		10
A15 connection	0	1	0	1		2		6
Totale score	0	3	2	2	0	7		

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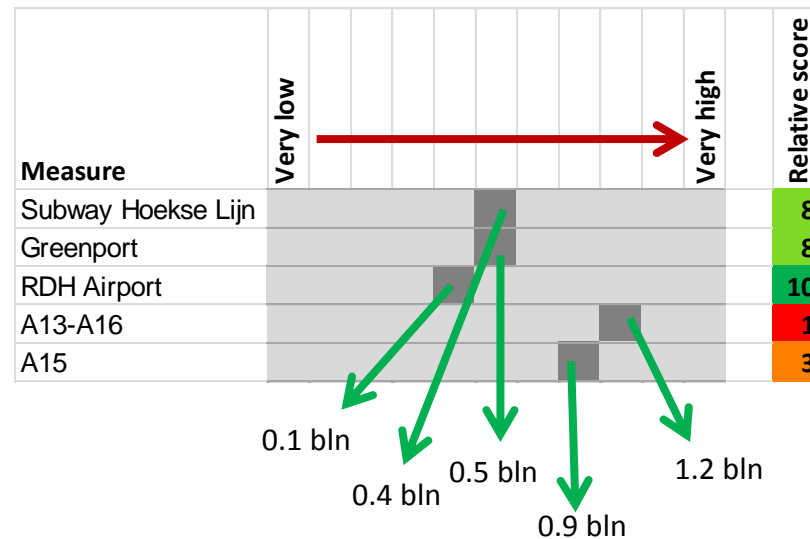RUPPRECHT CONSULT
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Step 2: Costs and benefits

- Goal: Monetization of measures (benefits) and inclusion of costs;
- This step often requires the presence of a CBA or other types of economic assessments (reports);
- If not available, then costs and benefits can be scored qualitatively based on expert views.

- **Costs** concern investment costs and maintenance/depreciation
- **Benefits** concern in principle accessibility, environment, safety, quality and interaction

- Requires cost / benefit information;
- Data sources / expert views / estimations;

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Example: Costs of investment

Total investment costs (Euro)

Measure	Very low	→	Very high	Relative score
Subway Hoekse Lijn				8
Greenport				8
RDH Airport				10
A13-A16				1
A15				3

0.1 bln
0.4 bln
0.5 bln
0.9 bln
1.2 bln

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Example: Accessibility

Generalised accessibility benefits (Euro)

Measure	Very low									Very high	Relative score
Subway Hoekse Lijn									■		8
Greenport								■			6
RDH Airport					■						1
A13-A16									■		10
A15							■				8

0.1 bln

0.4 bln

0.8 bln

0.8 bln

1.1 bln
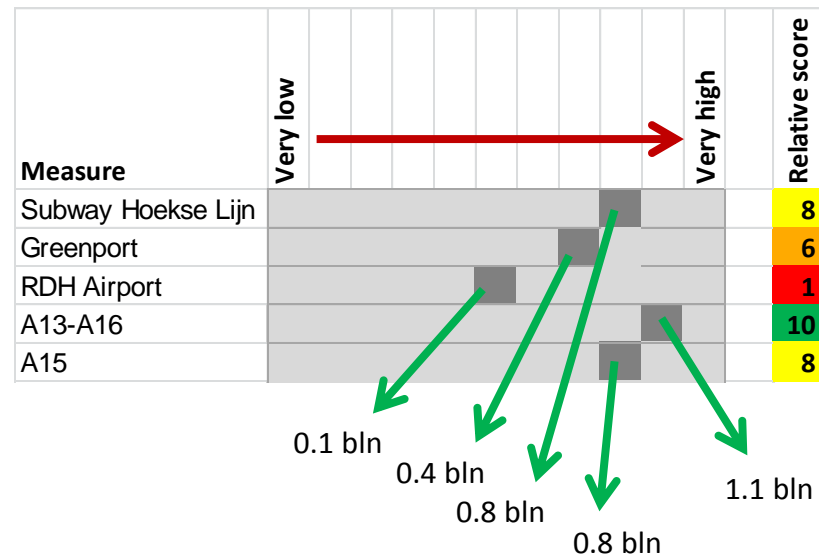
Step 3: Other quantifications

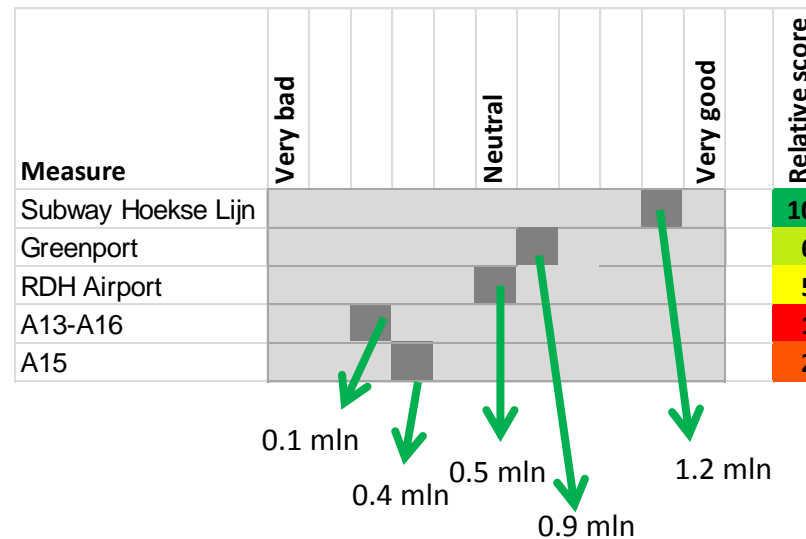- Goal: Identify non-monetizable effects as much as possible to make objective comparison possible;

- This step needs an thourough assessment of available studies;

- Supplemented with interviews and expert views.

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Example: Environment

Environmental benefits

Measure	Very bad			Neutral			Very good	Relative score
Subway Hoekse Lijn							▪	10
Greenport					▪			6
RDH Airport				▪				5
A13-A16	▪							1
A15		▪						2

0.1 mln
0.4 mln
0.5 mln
0.9 mln
1.2 mln

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Example: Safety

Safety benefits

Measure	Very bad			Neutral			Very good	Relative score
Subway Hoekse Lijn				■				**10**
Greenport				■				**10**
RDH Airport			■					**1**
A13-A16			■					**1**
A15				■				**10**

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Step 4: Qualitative aspects

- Such as barriers, social cohesion, comfort or image
- Ranking of measures with regards to an intersubjective --, -, 0, ++, +;
- Or ranking based upon 1 – 10 (small/bad – large/good)

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Example: Qualitative aspects

Quality benefits
(average based on stakeholder views)

Measure	Very bad			Neutral			Very good	Relative score
Subway Hoekse Lijn					■			8
Greenport					■			8
RDH Airport						■		10
A13-A16		■						1
A15				■				5

-    ±   +   +   ++

+

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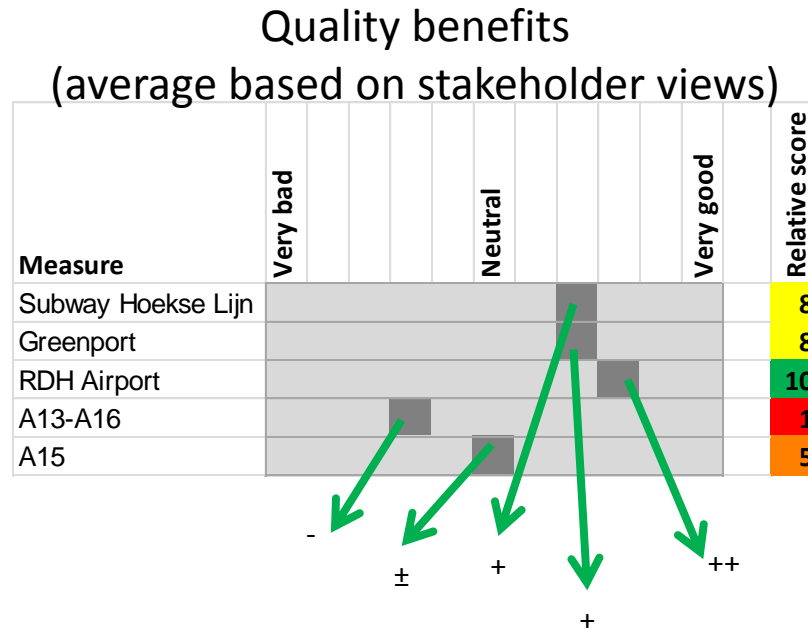
Step 5: Matching the scores

Make the score of measures on different objectives comparable.

- Relative soring on a scale from 1 tot 10;
- Per objective "1" is for the lowest, "10" is for the highest;
- Same measuring stick for all objectives;
- Objectives can be compared.

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Example: Matching the scores

Measure	Costs	Accessibility	Environment	Safety	Quality	Interaction		Total score
Subway Hoekse Lijn	8	8	10	10	8	2		46
Greenport	8	6	6	10	8	4		42
RDH Airport	10	1	5	1	10	5		32
A13-A16	1	10	1	1	1	5		19
A15	3	8	2	10	5	3		31

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Step 6: Choose weights

- By applying weights, the objectives can be integrated or added;
- Weights determined by or need to be agreed upon by stakeholders;
- Weights may differ per region, per stakeholder, per objective or measure;
- Assessment methodology is flexible;
- Weights always add up to 100 (%).

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Example: Choose weights

Aspect	Weight
Costs	22.0
Accessibility	30.3
Environment	13.7
Safety	13.4
Quality	15.8
Interaction	4.8
Total	**100.0**

Step 7: Perform MCA

- This step automatically follows from the previous ones;
- Apply the weights;
- Assessment model flexible, allows for quick adjustments.

Example: Perform MCA

Measure	Costs	Accessibility	Environment	Safety	Quality	Interaction		Relative score
Subway Hoekse Lijn	1.7	2.4	1.4	1.3	1.3	0.1		8.2
Greenport	1.7	1.7	0.8	1.3	1.3	0.2		7.1
RDH Airport	2.2	0.3	0.7	0.1	1.6	0.3		5.1
A13-A16	0.2	3.0	0.1	0.1	0.2	0.3		3.9
A15	0.7	2.4	0.3	1.3	0.7	0.2		5.6

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Step 8: Sensitivity analysis

- For different packages of measures the sensitivity is tested;
- What if different weights are chosen?;
- What is different packages of measures can be combined?;
- What if there is a cap on available budgets?.

Example: Sensitivity analysis

Aspect	Weight
Costs	22.0
Accessibility	30.3
Environment	13.7
Safety	13.4
Quality	15.8
Interaction	4.8
Total	**100.0**

Measure	Costs	Accessibility	Environment	Safety	Quality	Interaction	Relative score
Subway Hoekse Lijn	1.7	2.4	1.4	1.3	1.3	0.1	**8.2**
Greenport	1.7	1.7	0.8	1.3	1.3	0.2	**7.1**
RDH Airport	2.2	0.3	0.7	0.1	1.6	0.3	**5.1**
A13-A16	0.2	3.0	0.1	0.1	0.2	0.3	**3.9**
A15	0.7	2.4	0.3	1.3	0.7	0.2	**5.6**

Aspect	Weight
Costs	40.0
Accessibility	20.0
Environment	15.0
Safety	15.0
Quality	5.0
Interaction	5.0
Total	**100.0**

Measure	Costs	Accessibility	Environment	Safety	Quality	Interaction	Relative score
Subway Hoekse Lijn	3.1	1.6	1.5	1.5	0.4	0.1	**8.2**
Greenport	3.1	1.1	0.9	1.5	0.4	0.2	**7.3**
RDH Airport	4.0	0.2	0.7	0.2	0.5	0.3	**5.9**
A13-A16	0.4	2.0	0.2	0.2	0.1	0.3	**3.0**
A15	1.3	1.6	0.3	1.5	0.2	0.2	**5.1**

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Step 9: Discussion

- Stakeholders discuss the various packages of measures
- Discussion should lead to agreement on which policy package suits the stakeholders best
- If agreement cannot be reached, then the process can be repeated

- Keep in mind: Measures are not bad in itself when they rank low. But compared to others they score less well.

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Essence of methodology

- Approach for different problems at different geographical levels
- Integration of different impacts:
  - Monetized
  - Non-monetized
- Approach is both qualitative and quantitative

- Weighing packages with different types of measures
- Weighing different policy objectives for:
  - Accessibility
  - Environment
  - Safety
  - Quality
  - Interaction

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Lessons learned

- The method offers is different from what policy makers are used to

- Comparing infrastructure options is possible

- Input not always available or available in required formats

- Electronic discussion tools helps to structure discussions

- Explanation of method and measures beforehand is needed

- Result is prioritization, not judgment!

- Stakeholders need to be chosen from a wide audience

- Outcome of the method is robust, not sensitive to different weights

- **Use the method!**

Summarizing

- The method takes soft measures into account
- It takes 'wish lists' into account
- Based upon CBA and MCA
- Simple method
- Does not necessarily lead to most optimal CBA!
- Less rigid than CBA

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Thank you for your attention!

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