

# *RECORDIT Conference*

## *The Intermodal Perception Index*



20-21 December 2001

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# *What is the IPI?*

- ◆ The main output of the IIT study
- ◆ An indicator of the potential market share of freight Intermodal Transport that:
  - ◆ represents the value that the European shippers attribute to the intermodal transport alternative with regard to the road transport alternative
  - ◆ foresees the shipper's transport choices whether prices and services are modified
  - ◆ foresees the consequences of these choices on the intermodal transport market share

# *What is the use of the IPI?*

- ◆ To foresee the shippers ' reactions to the « action variables »:
  - ◆ prices
  - ◆ door to door delivery time
  - ◆ number of arrivals a week
  - ◆ tracking information delay

## *What is the use of the IPI? (2)*

- ◆ Taking also in account « Passive variables »
  - ◆ other characteristics of the supply
    - ◆ corridor
    - ◆ mode
  - ◆ characteristics of the demand
    - ◆ attributes of the shippers
      - ◆ industrial sector, annual turnover, yearly number of shipment, volume of shipment, location related to intermodal terminal(s), shipper ' s transport activity,...
    - ◆ attribute of the goods
      - ◆ type of goods (basic, semi-finished or finished goods)  
containerised goods or not, importance of in-time delivery...

# *The stated preference survey technique*

- ◆ In depth quantitative interviews of shippers
- ◆ Based on the consumers theory
- ◆ Estimation of the utility function coefficients and evaluation of the models with statistical tests (Mc Fadden)
- ◆ Scaled with actual corridor data

# *Definition of the IPI*

- ◆ The perception index is defined as follows

$$\text{◆ IPI} = \frac{\text{Potential market Share of Intermodal Transport}}{\text{Current market share of Intermodal Transport}}$$

# *Scope of the IPI prototype*

- ◆ Shippers survey
  - ◆ 12 segments based on :
    - ◆ 5 *GEOGRAPHICAL* corridors
      - ◆ Rotterdam-Vienna, Rotterdam-Basel, Antwerp-Milan, Antwerp-Bilbao, Lyon-Antwerp (one-directional)
    - ◆ 4 industrial *SECTORS*
      - ◆ Automotive & Machineries, Chemicals, FMCG, Heavy Metals
    - ◆ 3 intermodal alternatives *MODES* to road
      - ◆ Inland Waterways, Rail, Sort sea

# Definition of the IPI prototype segments

Segment	Corridor / Route	Industrial sector	Alternative mode
Seg 1	Antwerp-Bilbao	Chemicals	Short Sea (SS)
Seg 2	Antwerp-Milan	Automotive & Machineries	Rail (R)
Seg 3	Antwerp-Milan	Heavy Metals	Rail (R)
Seg 4	Rotterdam-Basel	Chemicals	Inland Waterways (IW)
Seg 5	Rotterdam-Basel	Fast Moving Consumer Goods	Inland Waterways (IW)
Seg 6	Rotterdam-Vienna	Fast Moving Consumer Goods	Rail (R)
Seg 7	Rotterdam-Vienna	Heavy Metals	Rail (R)
Seg 8	Bilbao-Antwerp	Fast Moving Consumer Goods	Short Sea (SS)
Seg 9	Lyon-Antwerp	Automotive & Machineries	Rail (R)
Seg 10	Milan-Antwerp	Automotive & Machineries	Rail (R)
Seg 11	Basel-Rotterdam	Fast Moving Consumer Goods	Inland Waterways (IW)
Seg 12	Vienna-Rotterdam	Heavy Metals	Rail (R)

## *Data collection*

- ◆ Preliminary phone screening initiated on the basis of a randomly selection
  - ◆ 4648 initial shippers contacts
  - ◆ 1761 did not fill the required criteria
    - ◆ Established within 150 km of the segment origin point
    - ◆ Active in the relevant industrial sector for the segment
    - ◆ Exporting within the relevant corridor
    - ◆ Exporting full-loads of non-hazardous and non-refrigerated goods
  - ◆ 1289 shippers chosen to participate to the survey

## *Data collection(2)*

- ◆ Mail-back survey with phone assistance
  - ◆ two components
    - ◆ “revealed preferences” part
    - ◆ “stated preferences” part
  - ◆ 1289 mailed questionnaires
  - ◆ 302 questionnaires sent back and usable

# *Revealed Preferences component*

- ◆ Collect information on the shippers
  - ◆ company identification
  - ◆ description of the exported flow on the corridor
  - ◆ detailed description about a transport flow
    - ◆ origin, destination, transport mode, shipping unit and size, door to door delivery time, door to door price per ton
  - ◆ qualitative questions about the expectations in intermodal transport services

# *Stated Preferences component*

- ◆ 16 trade-off between two - intermodal and road transport - alternatives
- ◆ Characteristics considered for each alternative
  - ◆ distance (km)
  - ◆ door to door delivery time (hours)
  - ◆ door to door transport price by trailer equivalent
  - ◆ tracking information delay
  - ◆ number of arrivals per week

# Results of the contacts per segment

Segment	Total initial contacts	Dead-ends	Do not fill the required criteria	Fill the criteria but did not complete the questionnaire	Completed questionnaires	Response rate
<b>Seg 1 - Antwp-Bilbao Chemicals - SS</b>	<b>489</b>	<b>159</b>	<b>186</b>	<b>114</b>	<b>30</b>	<b>21%</b>
<b>Seg 2 - Antwp-Milan Automotive - R</b>	<b>308</b>	<b>109</b>	<b>60</b>	<b>108</b>	<b>31</b>	<b>22%</b>
<b>Seg 3 - Antwp-Milan Heavy Metals - R</b>	<b>387</b>	<b>163</b>	<b>90</b>	<b>102</b>	<b>32</b>	<b>24%</b>
<b>Seg 4 - Rott.-Basel Chemicals - IW</b>	<b>353</b>	<b>44</b>	<b>118</b>	<b>155</b>	<b>36</b>	<b>19%</b>
<b>Seg 5 - Rott.-Basel FMCG - IW</b>	<b>221</b>	<b>91</b>	<b>46</b>	<b>56</b>	<b>28</b>	<b>33%</b>
<b>Seg 6 - Rott.-Vienna FMCG - R</b>	<b>259</b>	<b>96</b>	<b>92</b>	<b>51</b>	<b>20</b>	<b>28%</b>
<b>Seg 7 - Rott.-Vienna Heavy Metals - R</b>	<b>372</b>	<b>109</b>	<b>171</b>	<b>61</b>	<b>31</b>	<b>34%</b>
<b>Seg 8 - Bilbao-Antwp FMCG - SS</b>	<b>214</b>	<b>43</b>	<b>145</b>	<b>19</b>	<b>7</b>	<b>27%</b>
<b>Seg 9 - Lyon-Antwp Automotive - R</b>	<b>302</b>	<b>67</b>	<b>148</b>	<b>70</b>	<b>17</b>	<b>20%</b>
<b>Seg 10 - Milan-Antwp Automotive - R</b>	<b>1109</b>	<b>526</b>	<b>473</b>	<b>92</b>	<b>18</b>	<b>16%</b>
<b>Seg 11 - Basel-Rott. FMCG - IW</b>	<b>286</b>	<b>109</b>	<b>87</b>	<b>68</b>	<b>22</b>	<b>24%</b>
<b>Seg 12 - Vienna-Rott. Heavy Metals - R</b>	<b>348</b>	<b>82</b>	<b>145</b>	<b>91</b>	<b>30</b>	<b>25%</b>

# *Survey weighting*

- ◆ mail-back survey weighting by segment :
  - ◆ based on the distribution of turnover observed in the universe
  - ◆ reconstituting the flows transported within the corridors

# *The IPI model characteristics*

- ◆ The universe is constituted of :
  - ◆ all the shipment realised in the base year within the here above mentioned :
    - ◆ 5 geographical corridors
    - ◆ 4 industrial sectors
    - ◆ 3 intermodal modes
- ◆ The results are significant:
  - ◆ the model adjustment are of satisfactory to very good quality
  - ◆ the size of the sample are sufficient to produce significant results

## *Easy to use IPI prototype software*

- ◆ The software comes under the form of an EXCEL notebook
- ◆ Values for the action parameters that characterise a strategy to be assessed are defined on an input data screen
- ◆ Simulation results are available on result screen
- ◆ Curves can be drawn in order to represent responses variations to variations of action parameters



# Input data screen

SEGMENTS	Mode	Route	Industrial Sector	Intermodal transport current characteristics				
				Price	door-to-door	information	number of arrival	% of shippers
				EURO / trailer	transfer time (hour)	delay (hours)	per week	close to a terminal
2	Rail	Antwerp-Milano	Automotive	1050	48	18	5	77%
3	Rail	Antwerp-Milano	Heavy Metal	1100	60	18	5	85%
6	Rail	R'dam-Vienna	FMCG	1400	44	18	3	39%
7	Rail	R'dam-Vienna	Heavy Metal	1200	44	18	3	59%
9	Rail	Lyon-Antwerp	Automotive	950	46	18	5	53%
10	Rail	Milano-Antwerp	Automotive	1150	60	18	5	78%
12	Rail	Vienna-R'dam	Heavy Metal	1100	44	18	4	72%
4	Barge	R'dam-Basel	Chemistry	800	108	1	5	48%
5	Barge	R'dam-Basel	FMCG	750	108	1	5	13%
11	Barge	Basel-R'dam	FMCG	850	96	1	5	26%
1	Shortsea	Antwerp-Bilbao	Chemistry	1250	140	24	1	31%
8	Shortsea	Bilbao-Antwerp	FMCG	1250	140	24	1	73%
Segment	Mode	Route	Industrial Sector	Intermodal transport characteristics to be tested				
				Price	Door-to-door	information	number of arrival	% of shippers
				EURO / trailer	Transfer time (hour)	delay (hours)	per week	close to a terminal
2	Rail	Antwerp-Milano	Automotive	945	43	10	3	77%
3	Rail	Antwerp-Milano	Heavy Metal	990	54	10	3	85%
6	Rail	R'dam-Vienna	FMCG	1260	40	10	3	39%
7	Rail	R'dam-Vienna	Heavy Metal	1080	40	10	3	59%
9	Rail	Lyon-Antwerp	Automotive	855	42	10	3	53%
10	Rail	Milano-Antwerp	Automotive	1035	54	10	3	78%
12	Rail	Vienna-R'dam	Heavy Metal	990	40	10	3	72%
4	Barge	R'dam-Basel	Chemistry	720	100	10	3	48%
5	Barge	R'dam-Basel	FMCG	675	100	10	3	13%
11	Barge	Basel-R'dam	FMCG	765	88	10	3	26%
1	Shortsea	Antwerp-Bilbao	Chemistry	1125	126	10	3	31%
8	Shortsea	Bilbao-Antwerp	FMCG	1125	126	10	3	73%



# Result screen

Segmentation		Intermodal transport market share						Perception Index		
		Current intermodal			Intermodal supply					
		Supply characteristics			characteristics to be tested					
		All Products	Low Value	High value	All Products	Low value	High value	All Products	Low value	High value
Per sector	Automotive	38.3%	52.2%	30.2%	55.2%	70.3%	46.5%	1.44	1.35	1.54
	Heavy Metal	48.1%	65.4%	36.2%	66.9%	81.2%	57.0%	1.39	1.24	1.58
	FMCG	40.9%	62.4%	38.7%	56.0%	74.0%	54.2%	1.37	1.19	1.40
	Chemistry	80.8%	83.6%	79.6%	90.7%	93.9%	89.2%	1.12	1.12	1.12
Per Corridor	Antwerp-Milano & Milano-Antwerp	40.3%	50.8%	34.2%	61.0%	70.8%	55.3%	1.51	1.39	1.62
	Lyon-Antwerp	33.8%	51.2%	28.3%	49.1%	67.4%	43.3%	1.45	1.32	1.53
	R'dam-Vienna & Vienna-R'dam	55.4%	70.4%	41.2%	73.9%	84.7%	63.7%	1.33	1.20	1.55
	R'dam-Basel & Basel-R'dam	53.9%	66.1%	52.8%	60.5%	73.7%	59.4%	1.12	1.11	1.12
	Antwerp-Bilbao & Bilbao-Antwerp	74.3%	84.4%	69.1%	89.5%	94.8%	86.7%	1.20	1.12	1.25
Per Country	Belgium	63.4%	71.2%	58.6%	79.3%	85.5%	75.5%	1.25	1.20	1.29
	The Netherlands	55.2%	71.0%	50.5%	66.0%	83.6%	60.7%	1.19	1.16	1.20
	France	33.8%	51.2%	28.3%	49.1%	67.4%	43.3%	1.45	1.32	1.53
	Italy	55.1%	64.8%	40.7%	72.1%	80.2%	60.1%	1.31	1.24	1.48
	Switzerland	53.5%	43.9%	54.4%	58.4%	49.5%	59.3%	1.09	1.13	1.09
	Austria	35.7%	49.3%	31.4%	58.8%	72.2%	54.5%	1.65	1.46	1.74
	Spain	49.0%	77.5%	48.2%	74.9%	92.2%	74.4%	1.53	1.19	1.54

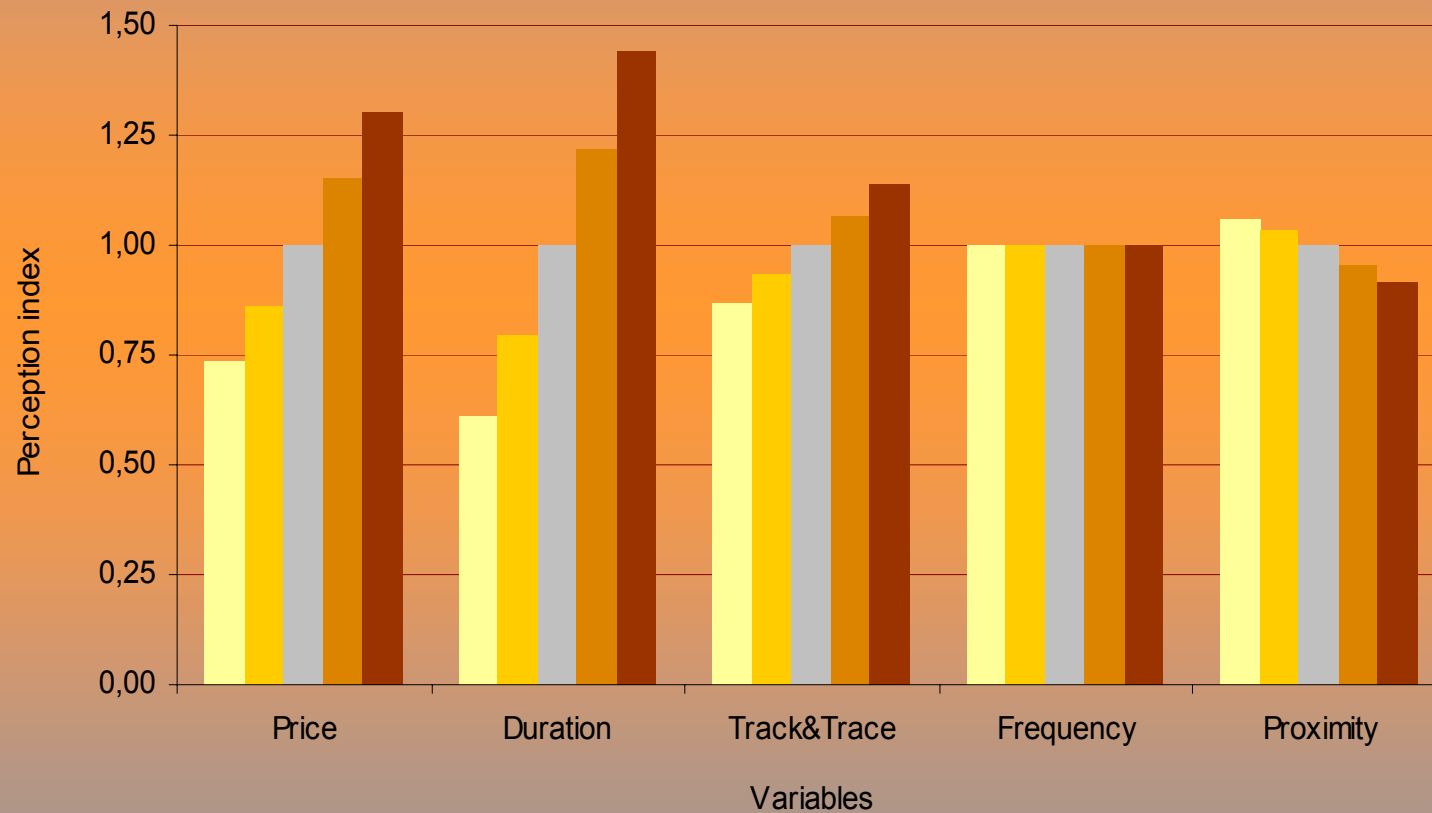


23/11/99

100 % = curent volume



# INTERMODAL PERCEPTION INDEX Variables Impact - Overview



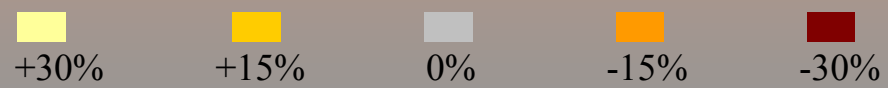
**Characteristics**

**Mode**  
Rail

**3 Segments**  
- Antwerp / Milan  
- Milan / Antwerp  
- Lyon / Antwerp

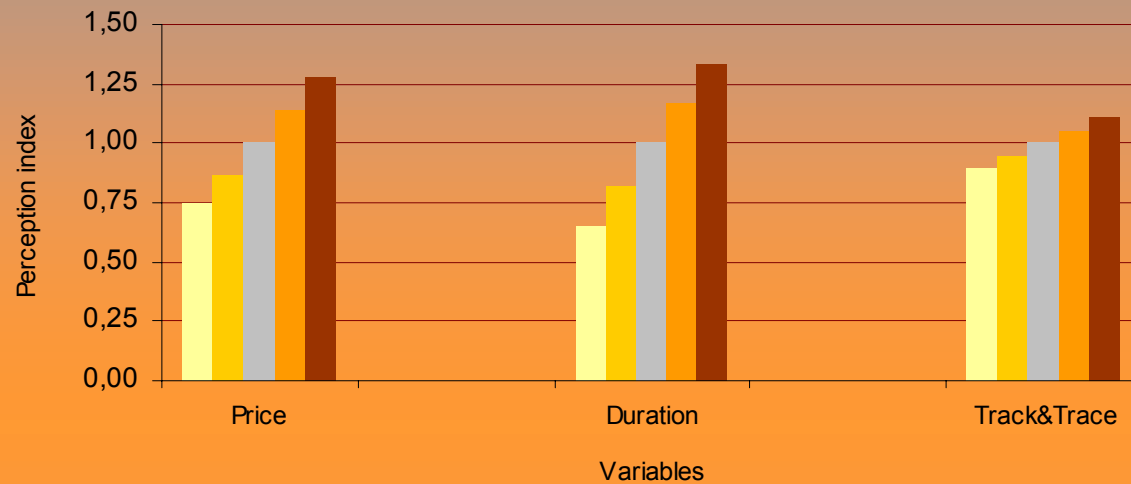
**3 Countries**  
- Belgium  
- Italy  
- France

**2 Products**  
- Low Value  
- High Value

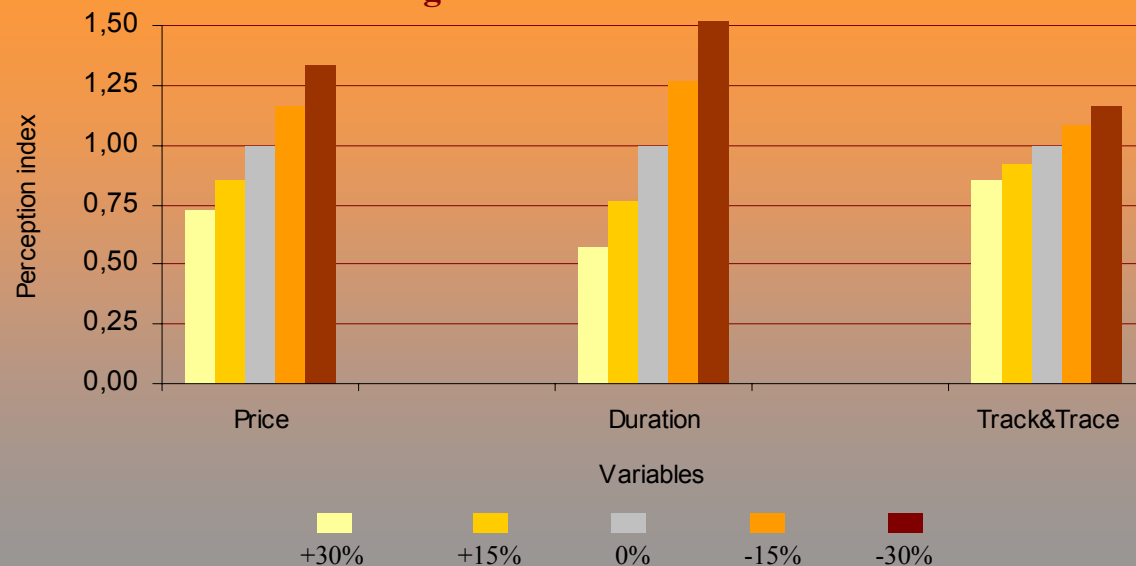


# INTERMODAL PERCEPTION INDEX Variables Impact - Products

## Low Value Products



## High Value Products



### Characteristics

#### Mode

Rail

#### 3 Segments

- Antwerp / Milan
- Milan / Antwerp
- Lyon / Antwerp

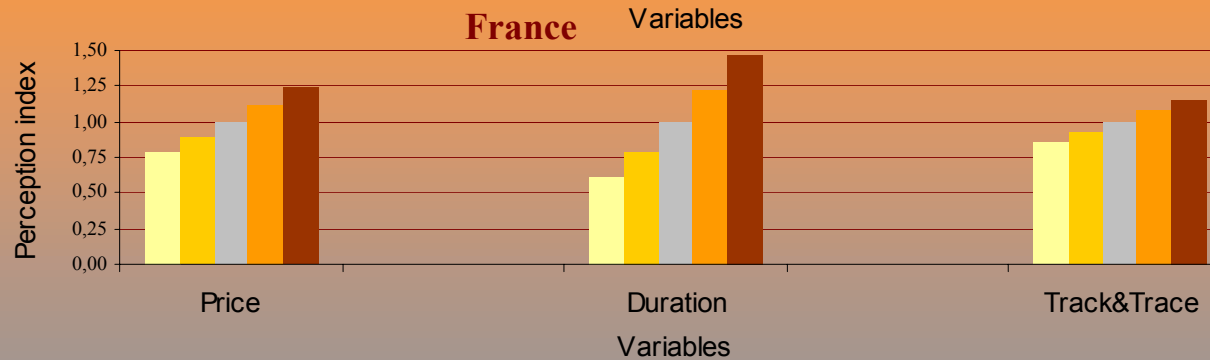
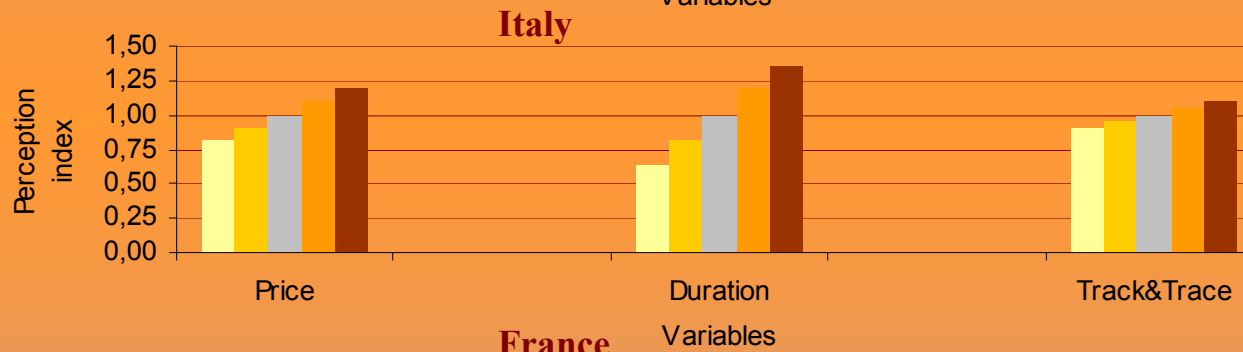
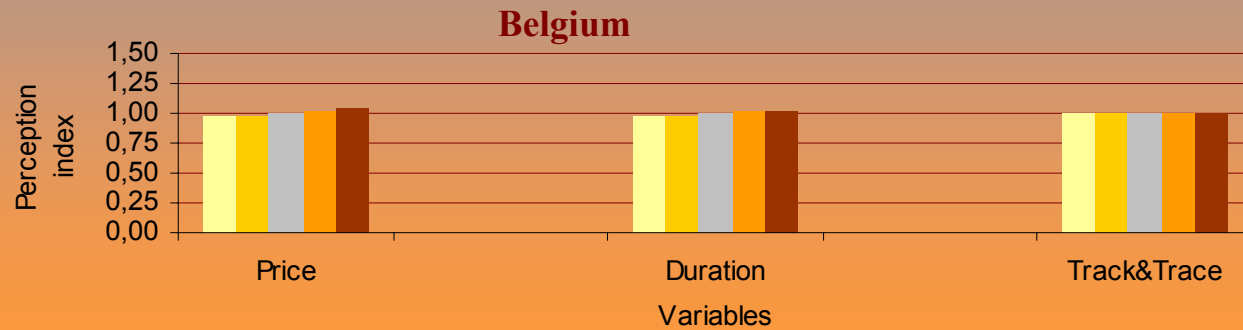
#### 3 Countries

- Belgium
- Italy
- France



# INTERMODAL PERCEPTION INDEX

## Variables Impact - Countries



### Characteristics

**Mode**  
Rail

### 3 Segments:

- Antwerp / Milan
- Milan / Antwerp
- Lyon / Antwerp

### 2 Products:

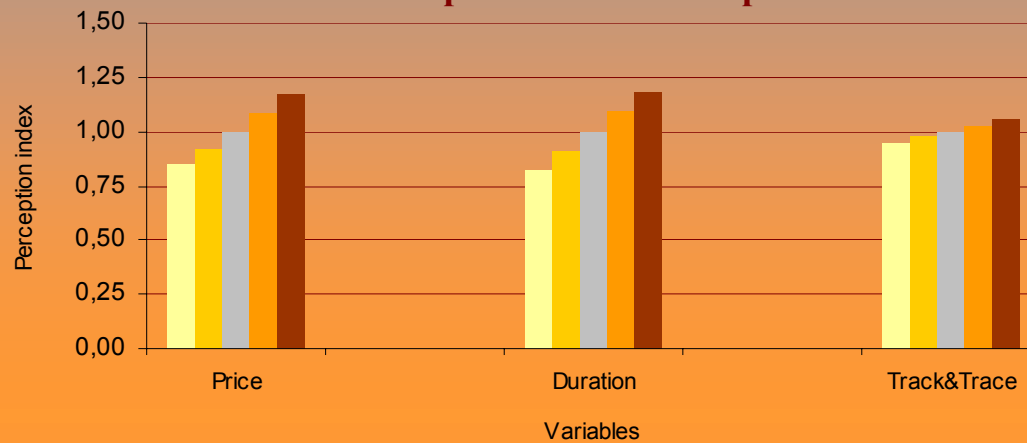
- Low Value
- High Value



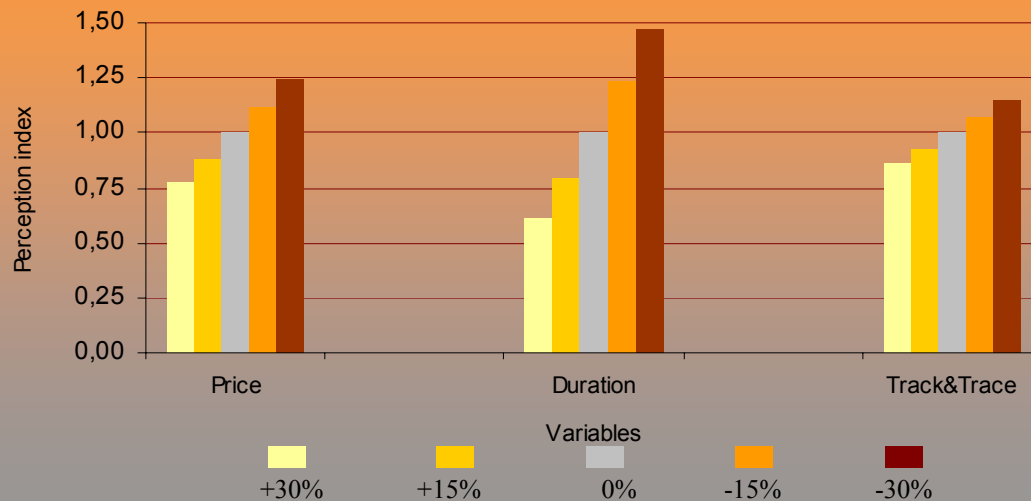
# INTERMODAL PERCEPTION INDEX

## Variables Impact - Corridors

### Antwerp - Milan - Antwerp



### Lyon - Antwerp



### Characteristics

#### Mode

Rail

#### 3 Segments

- Antwerp / Milan
- Milan / Antwerp
- Lyon / Antwerp

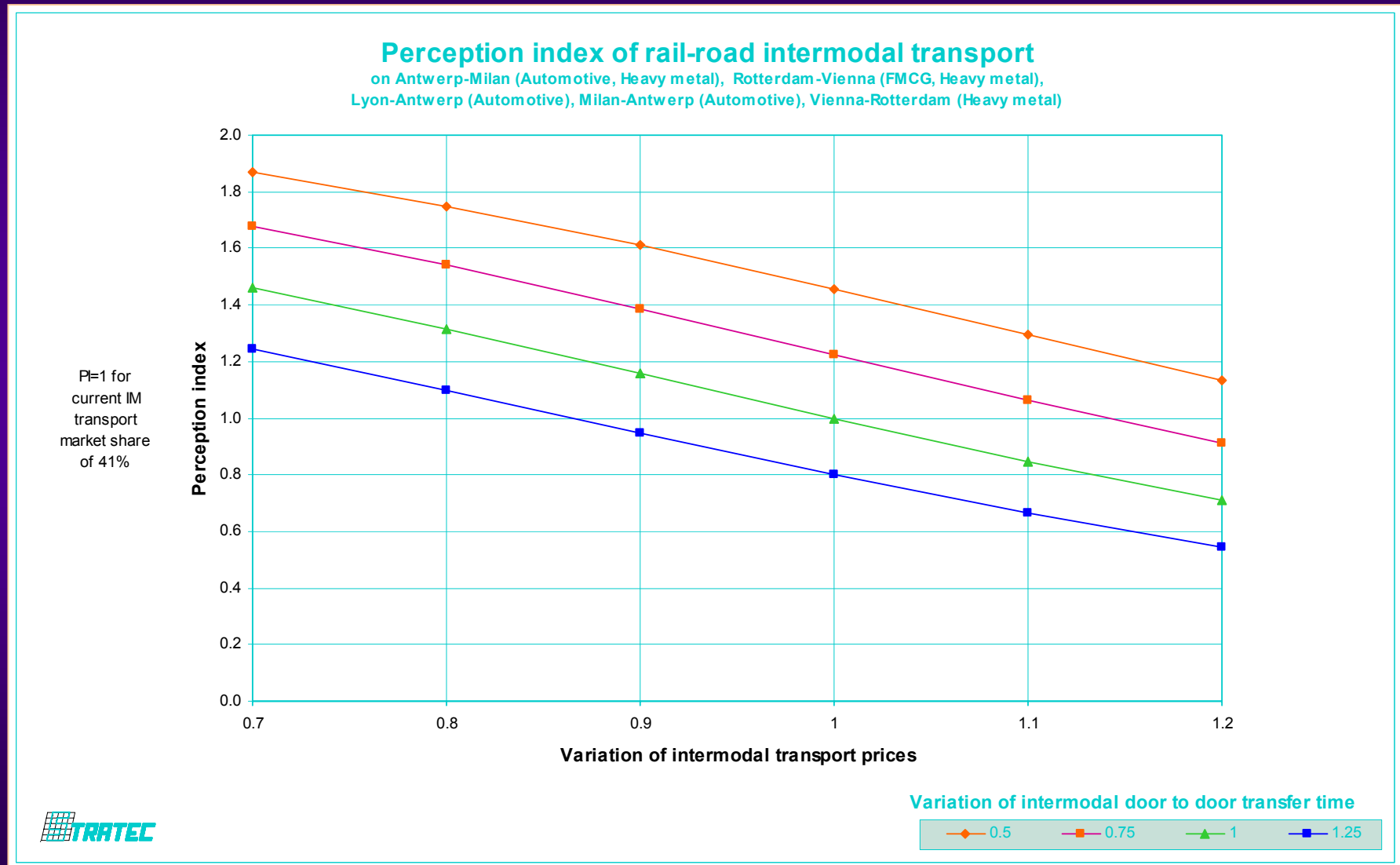
#### 3 Countries

- Belgium
- Italy
- France

#### 2 Products

- Low Value
- High Value

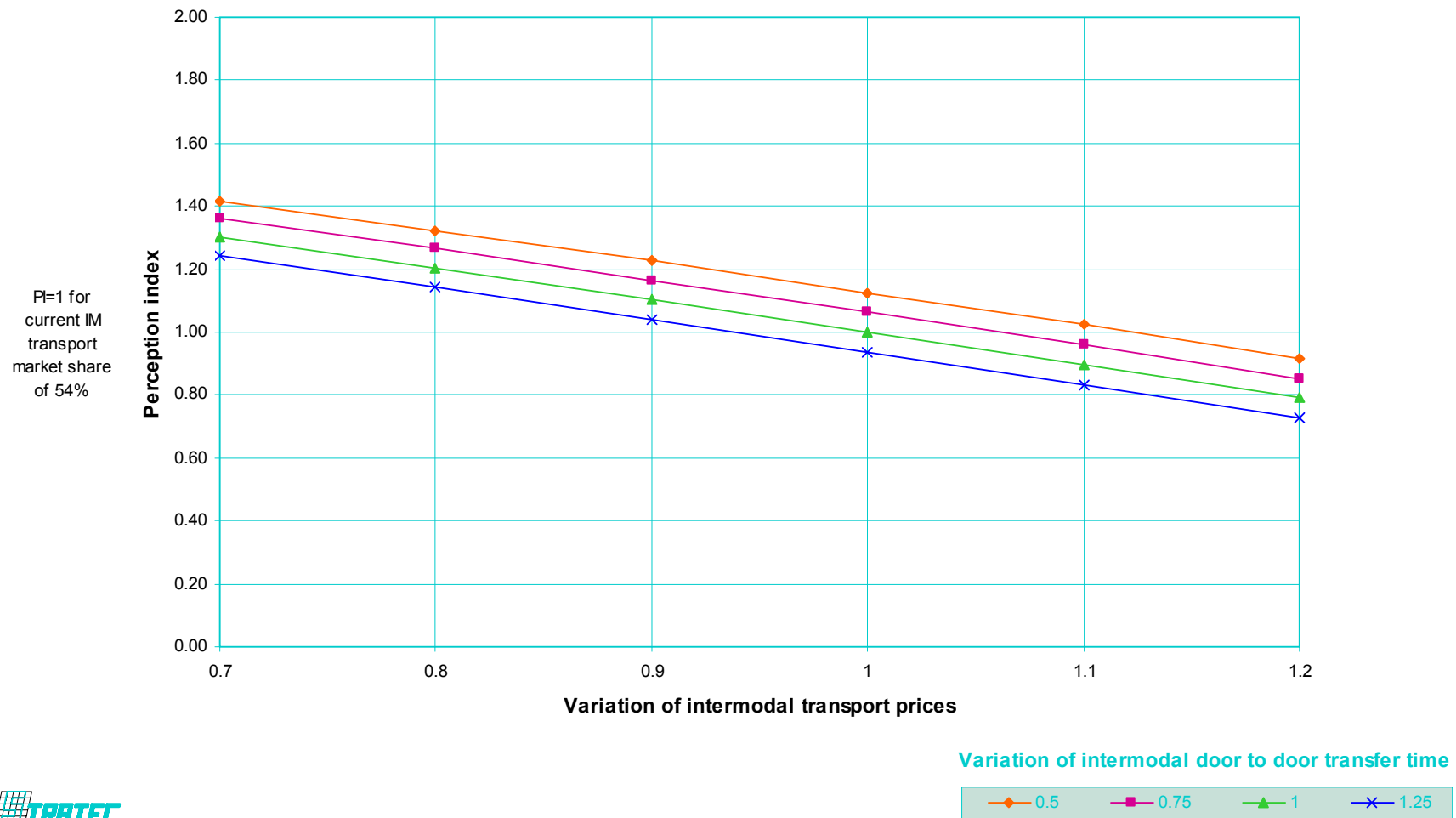
# Rail-road intermodal transport fare impact on Intermodal perception



# Inland waterway-road intermodal transport fare impact on Intermodal perception

## Perception index of inland waterway-road intermodal transport

on Rotterdam-Base1 (Chemicals, FMCG) and Basel-Rotterdam (FMCG)



# Short sea-road intermodal transport fare impact on Intermodal perception

Perception index of shortsea - road intermodal transport  
on Antwerp-Bilbao (Chemicals) and Bilbao-Antwerp (FMCG)

