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Airport Access and Travel Time Variability

Airneth seminar
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GRRR
Next time I leave
earlier from home

Outline

1. Introduction
2. LMS and travel time variability
3. Travellers' preferences
4. Results for Schiphol Airport

   (comparison LMS road network 2010 and 2020)
5. Conclusions and discussion

Introduction

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1. Introduction
2. LMS and TTV
3. Preferences
4. 2010 vs. 2020
5. Conclusions and discussion

- Reliable access of airports is important!

- Empirical studies show that air travellers dislike high standard deviation of airport access time

- No large scale evaluation of impact of improvements in reliability available

- **Question:** How can existing national transport models be used to calculate the Value-of-Time and Value-of-Reliability benefits of road network improvements for air travellers?

- Focus on car travellers going to Schiphol Airport

LMS and Travel time variability

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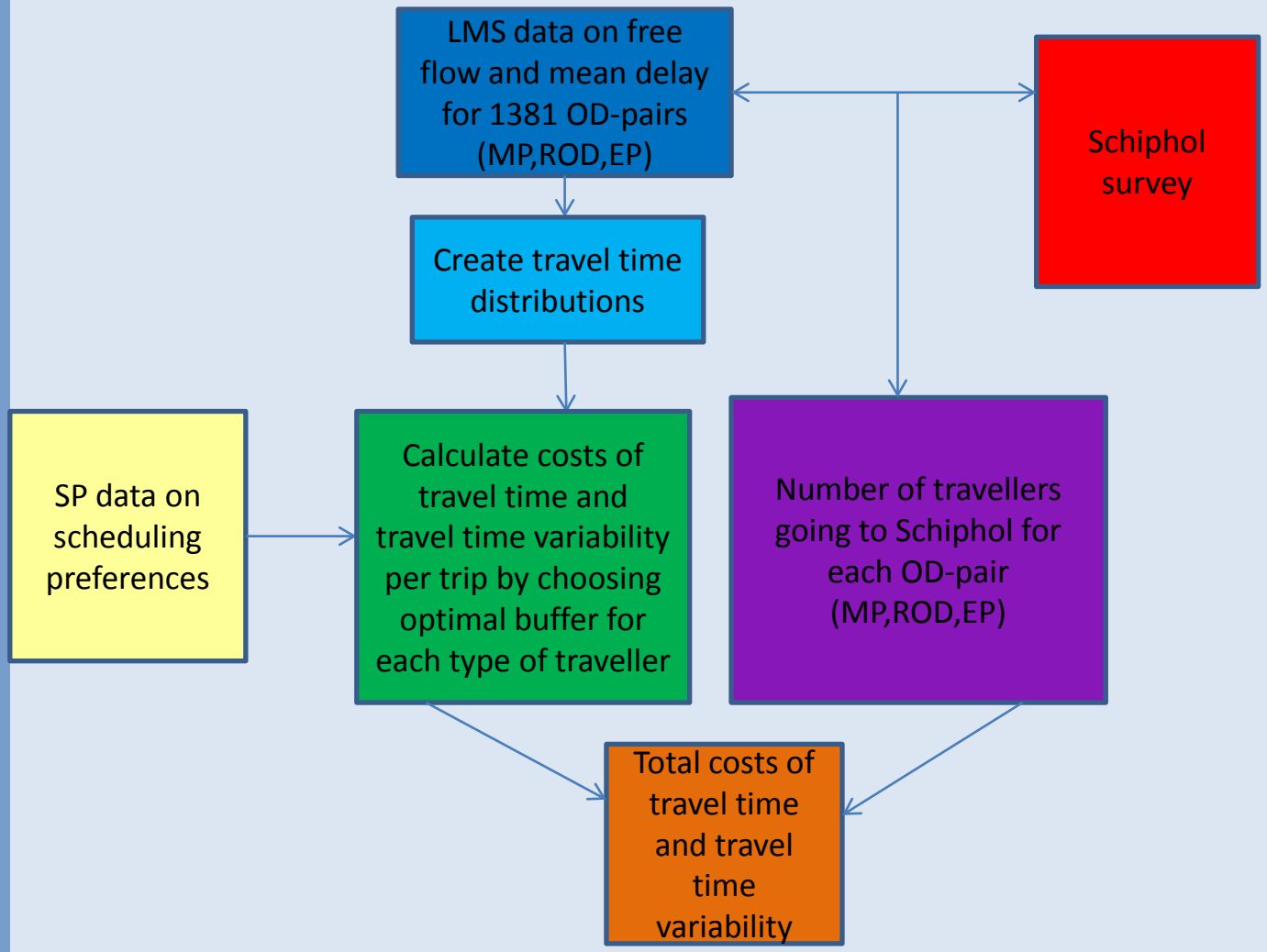

LMS and Travel time variability

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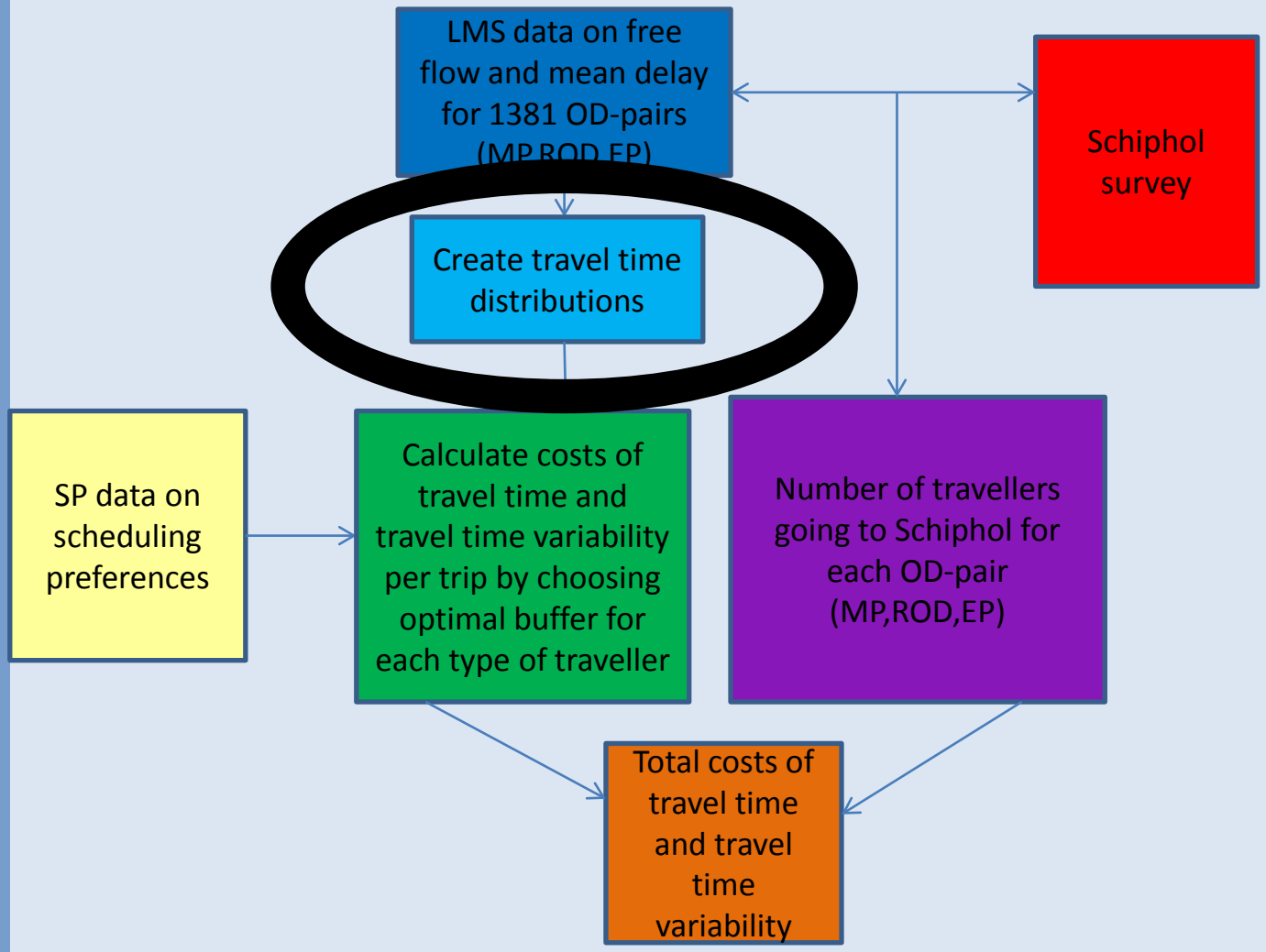

LMS and TTV

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- We make two assumptions for the analysis:
  - ✓ Travel delays follow a lognormal distribution
  - ✓ The standard deviation of delays increases linearly in the mean delay (stdev= 0.8*mean delay)

- LMS-BT will use better estimations for the stdev in the future
- We can construct travel time distributions for each OD-pair (Morning Peak[MP], Rest Of Day[ROD] and Evening Peak [EP]) for 2010 and 2020

LMS and TTV

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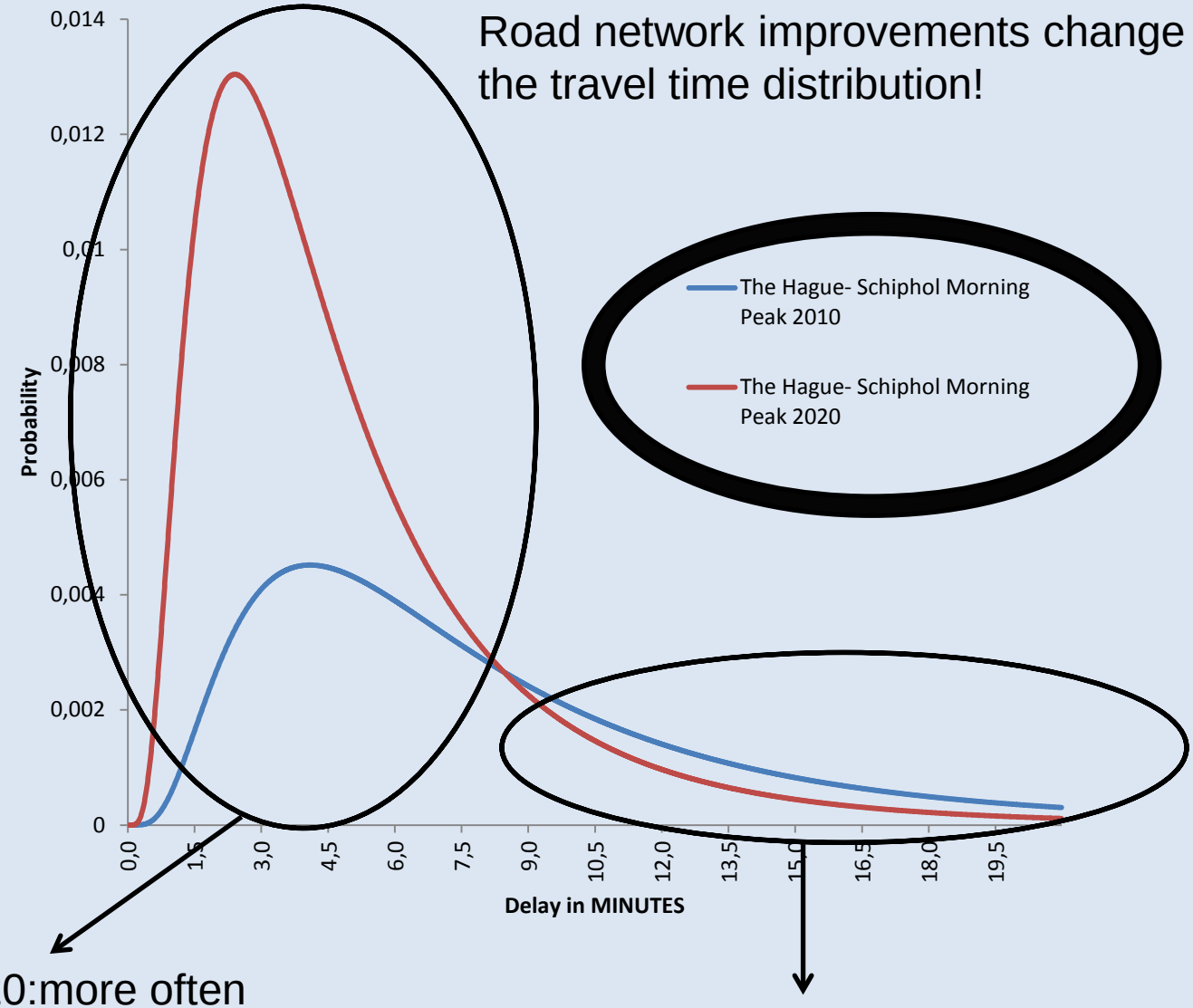
Road network improvements change the travel time distribution!



2020:more often <u>small</u> delays

2020:less often large delays

Preferences

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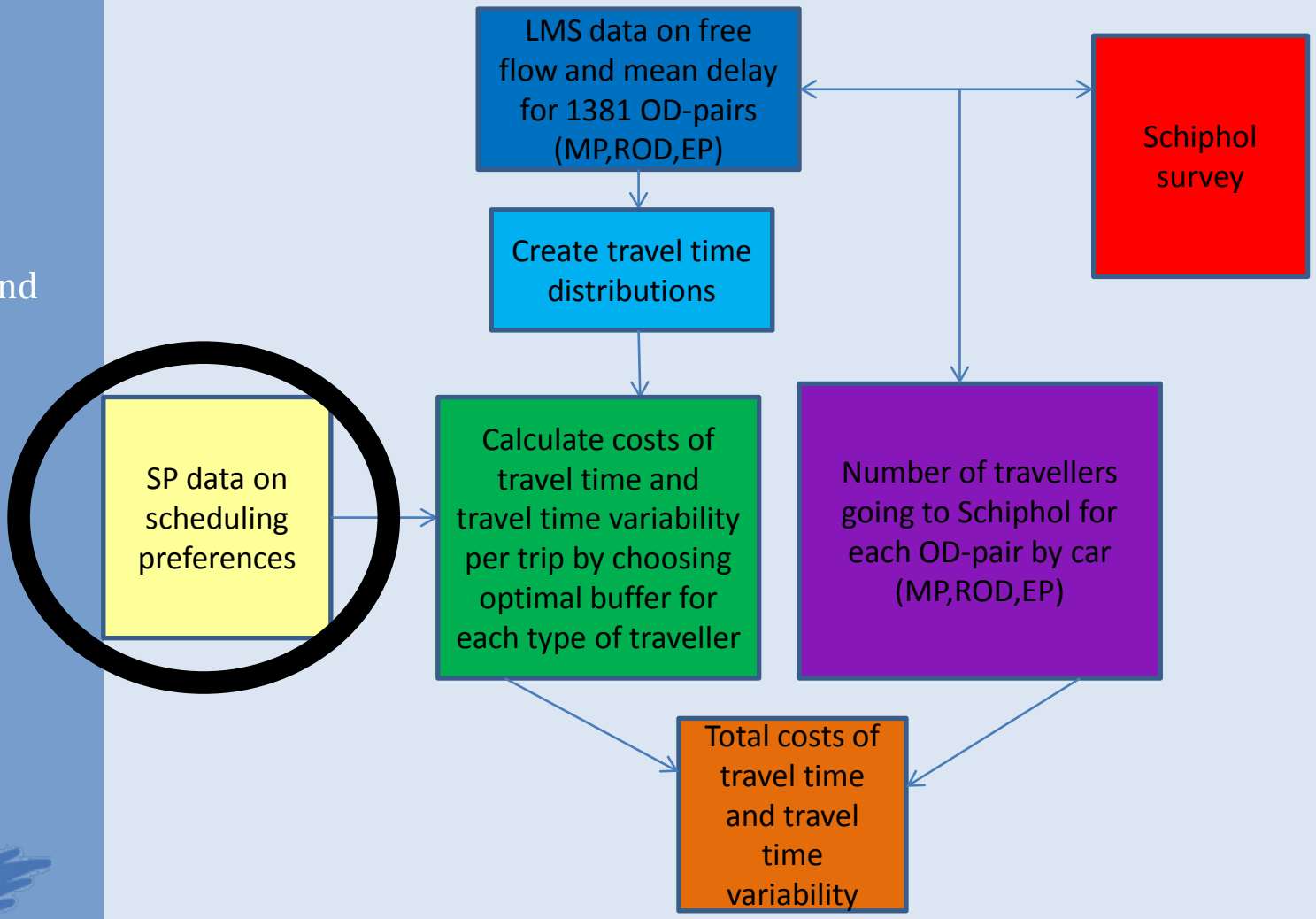

Preferences

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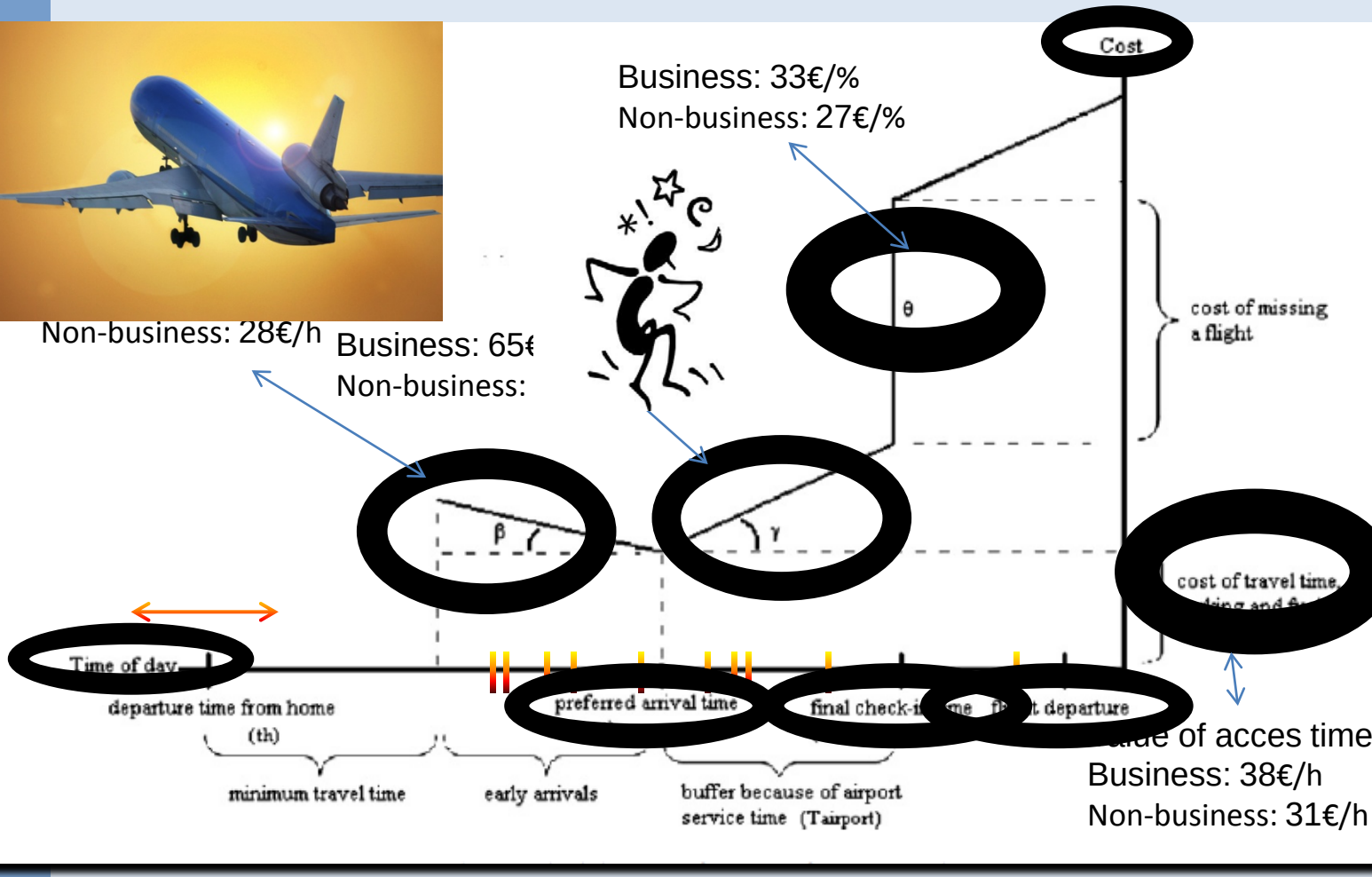
Business: 33€/%
Non-business: 27€/%

Non-business: 28€/h

Business: 65€
Non-business:



Business: 38€/h
Non-business: 31€/h

Koster, Kroes, Verhoef (2011 Tr Res Part B)

Preferences

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Not all people have the same scheduling preferences.
Factors that matter:

- income
- type of traveller (business, non-business)
- time of the day (MP, ROD, EP)
- age
- gender
- other unobserved factors

- We re-estimated the model of Koster et al. (2011) for Schiphol travellers using recent econometric methods (eg Panel Latent Class)
- Costs of travel time variability are fully explained by scheduling preferences (no effect of stdev)

2010 vs. 2020

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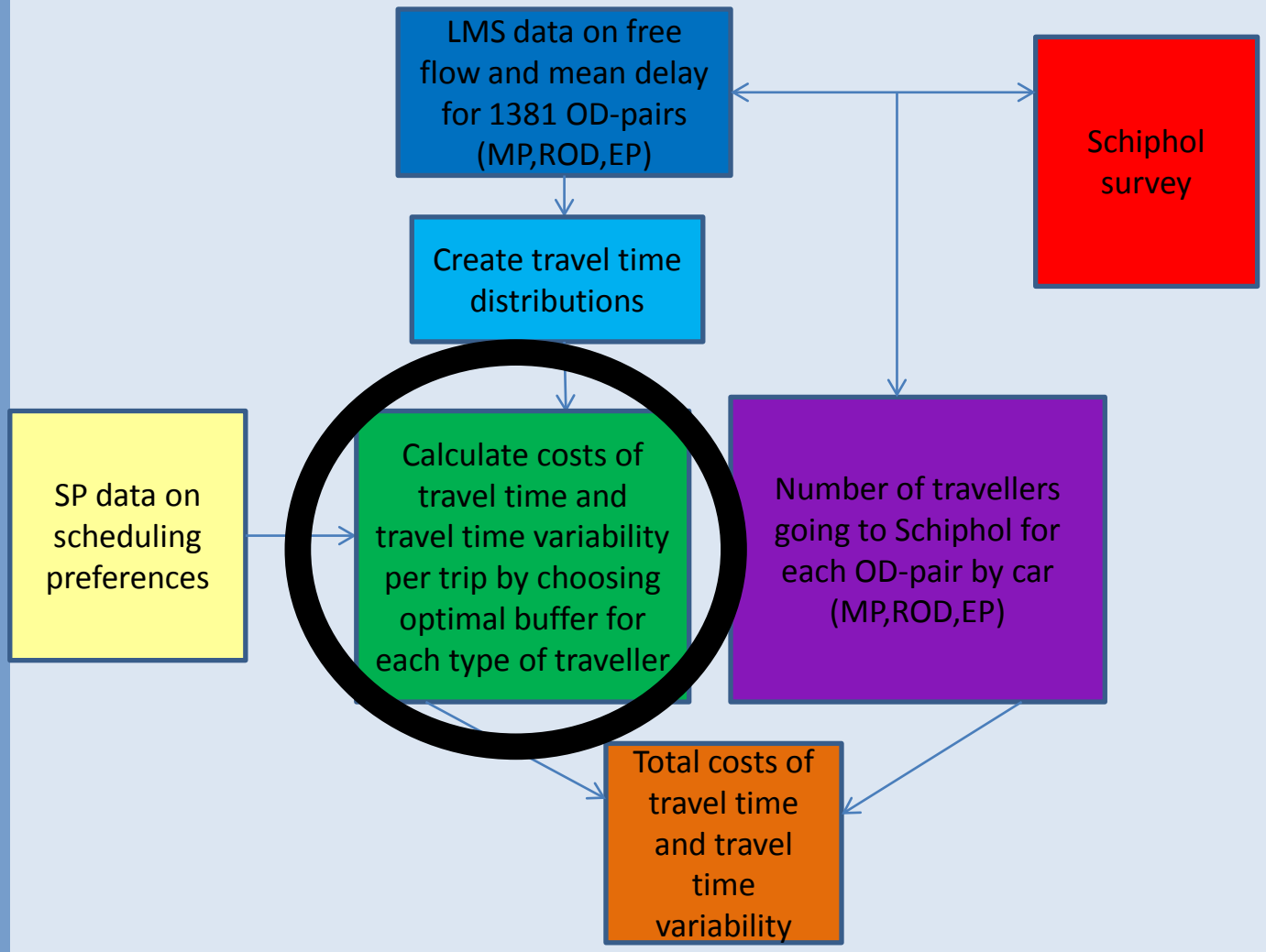

Preferences

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Scheduling preferences + optimal choice departure time -> VoR

Travellers choose a larger *buffer* if travel time variability increases

VoR therefore depends on the stdev

2010 vs 2020

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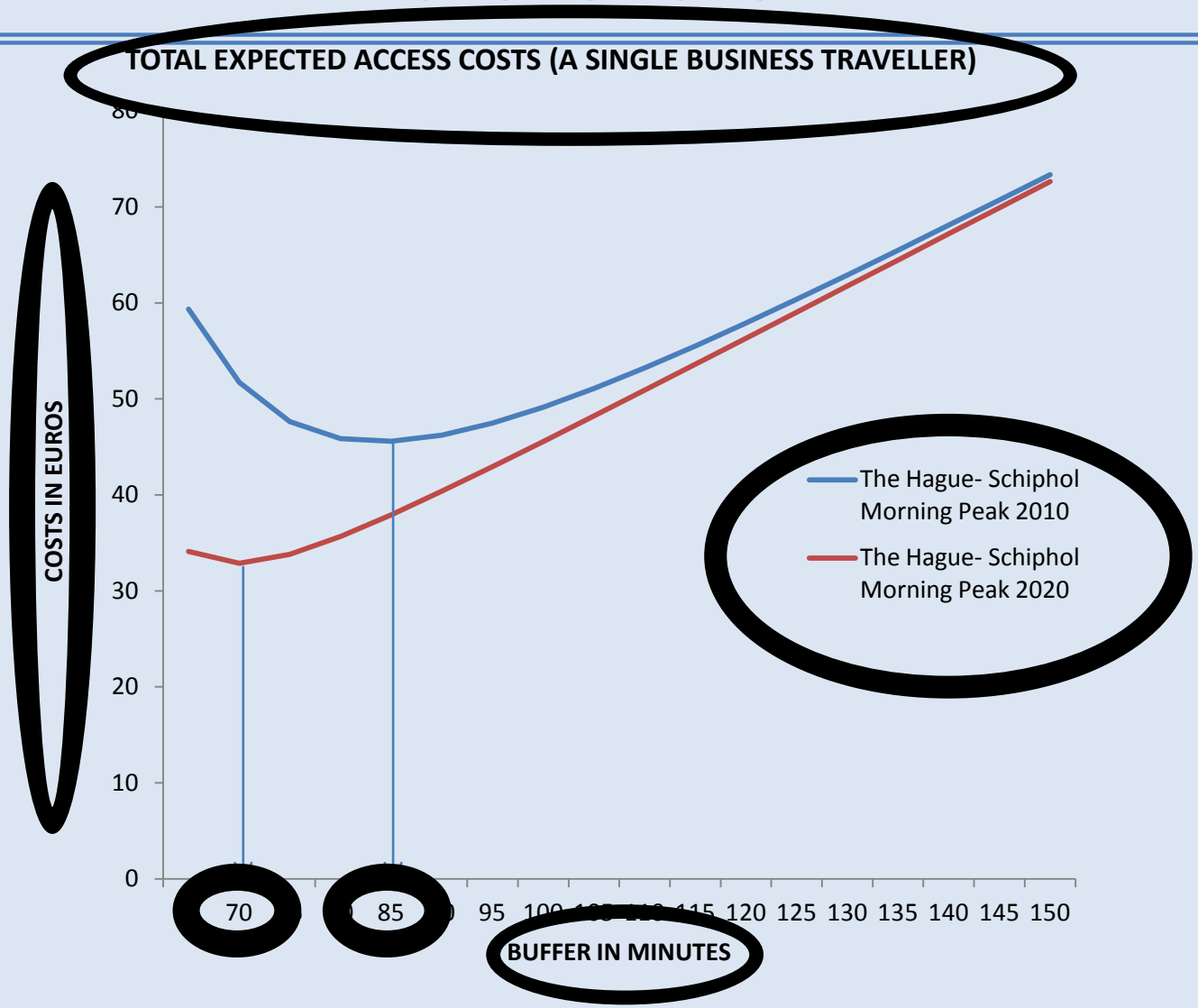

The buffer for this passenger decreases with 15 minutes!
Repeat this for all types of travellers, OD-pairs, MP,ROD and EP

2010 vs. 2020

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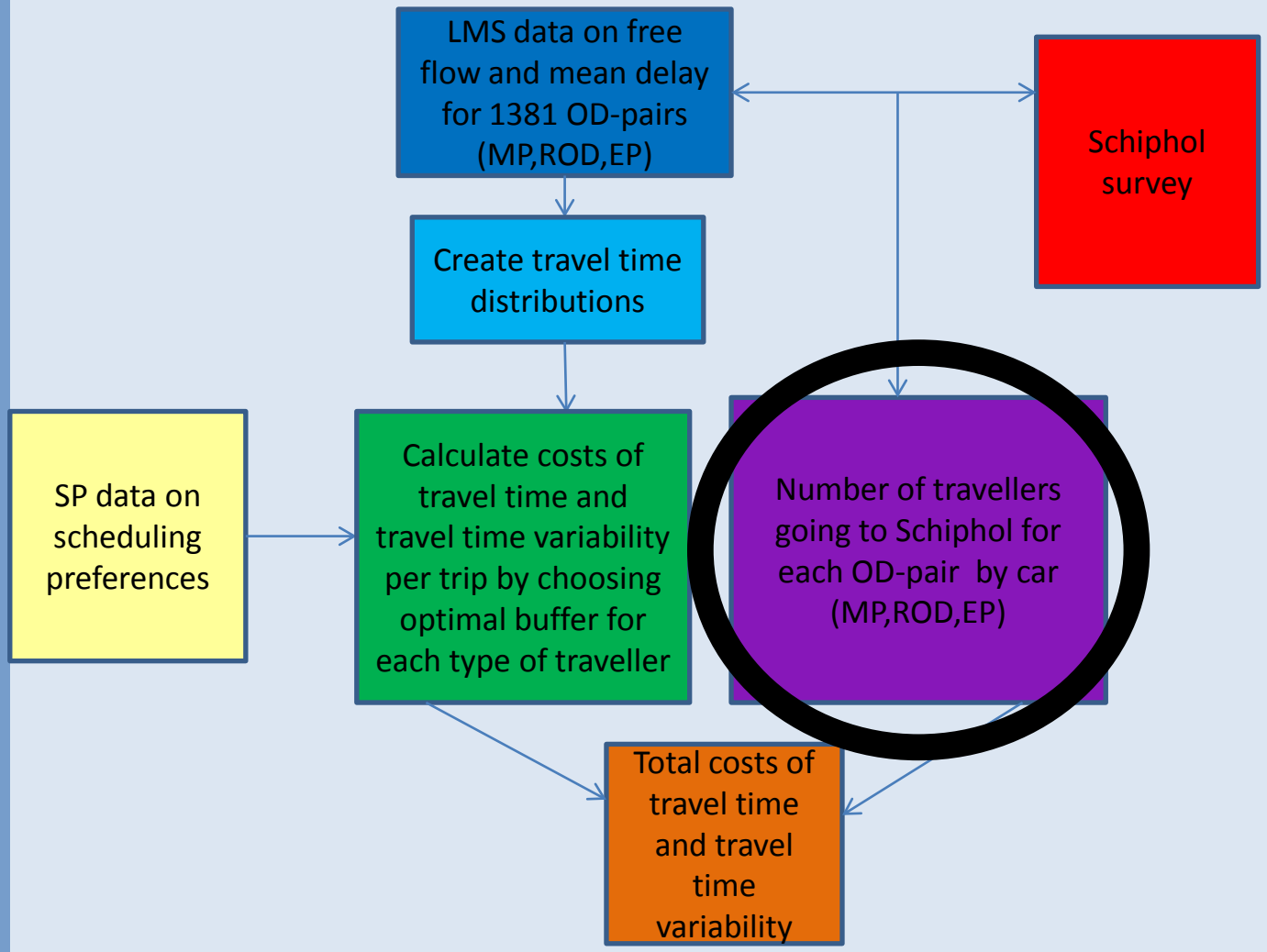

2010 vs 2020

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NUMBER OF CAR TRAVELLERS PER DAY								
MORN G PEA	OFF-PEAK	ENING EAK	MORN G PE	OFF-PEAK	ENING EAK	TOTAL BUSINESS	TOTAL NON-BUSINESS	TOTA	TOTAL YEAR (320 DAYS)
2,17	9,095	,154	1,8	9,348	241	13,421	12,414	25,836	8,267,405

Most travellers travel off peak

Only to Schiphol!

2010 vs. 2020

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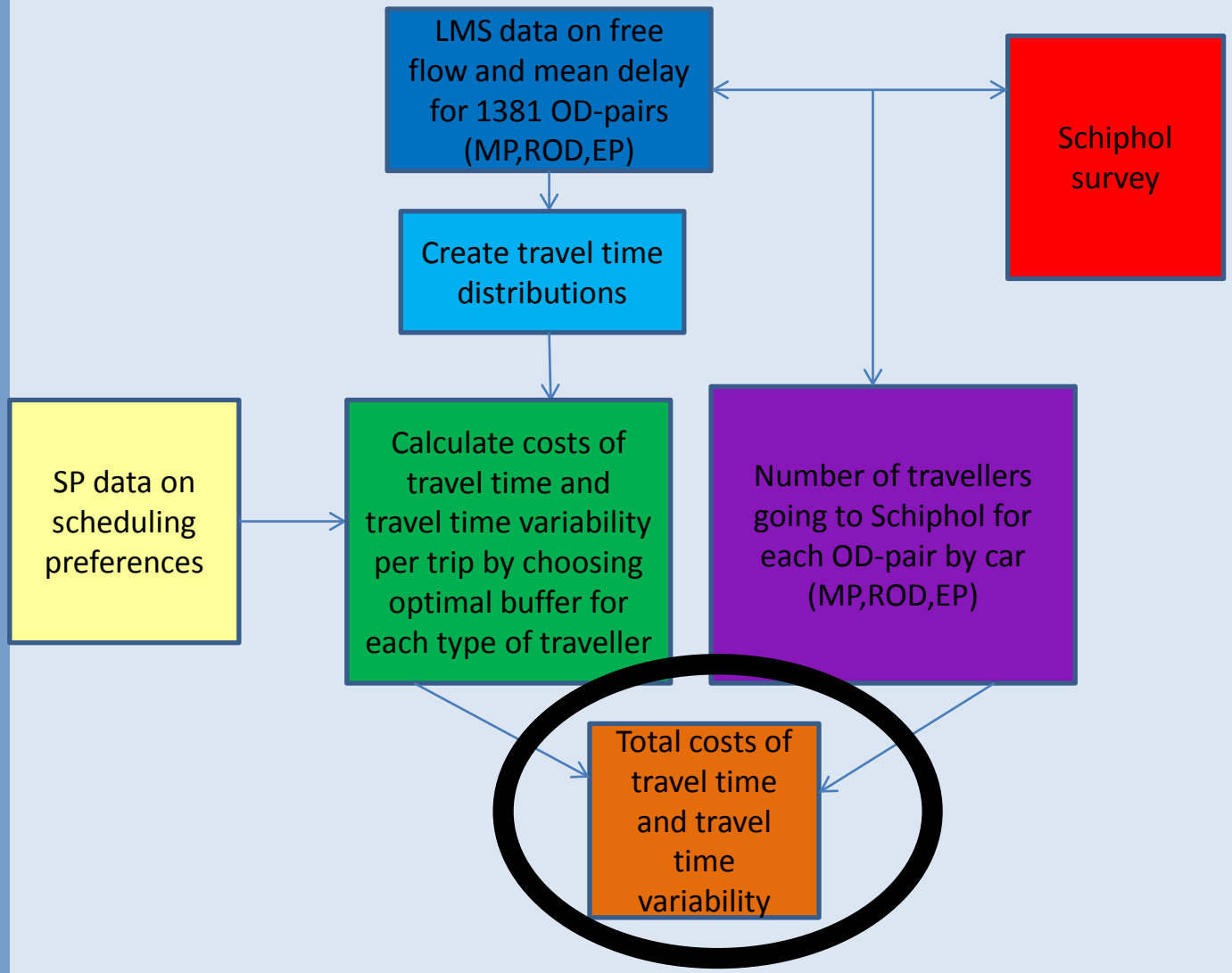

2010 vs 2020

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TOTALE KOSTENVERBETERING PER JAAR	BUSINESS		
VERSCHIL 2010-2020	MORNING PEAK	OFF-PEAK	EVENING PEAK
VERSCHIL KOSTEN REISTIJD	2,823,830	948,794	795,674
VERSCHIL KOSTEN ONBETROUWBAARHEID	3,877,289	454,578	495,954
VERSCHIL TOTAAL	6,701,119	1,403,372	1,291,628

TOTALE KOSTENVERBETERING PER TRIP	BUSINESS		
VERSCHIL 2010-2020	MORNING P	OFF-PEAK	EVENING PEAK
VERSCHIL KOSTEN REISTIJD	4.06	0.33	1.15
VERSCHIL KOSTEN ONBETROUWBAARHEID	5.58	0.16	0.72
VERSCHIL TOTAAL	9.64	0.48	1.87

Large gain in the morning peak (8-14% of access cost)
Large contribution of the VoR

2010 vs 2020

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TOTALE KOSTENVERBETERING PER JAAR	NON-BUSINESS		
VERSCHIL 2010-2020	MORNING PEAK	OFF-PEAK	EVENING PEAK
VERSCHIL KOSTEN REISTIJD	3,063,338	1,231,101	464,285
VERSCHIL KOSTEN ONBETROUWBAARHEID	3,826,003	428,995	266,603
VERSCHIL TOTAAL	6,889,340	1,660,096	730,888

TOTALE KOSTENVERBETERING PER TRIP	NON-BUSINESS		
VERSCHIL 2010-2020	PEAK	OFF-PEAK	EVENING PEAK
VERSCHIL KOSTEN REISTIJD	5.25	0.41	1.17
VERSCHIL KOSTEN ONBETROUWBAARHEID	6.55	0.14	0.67
VERSCHIL TOTAAL	11.80	0.55	1.84

Large gain in the morning peak (up to 16% of access costs)

2010 vs. 2020

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Weight results with number of travellers

TOTALE KOSTENVERBETERING PER JAAR				
VERSCHIL 2010-2020	TOTAAL BUSINESS	TOTAAL NON-BUSINESS	TOTAAL	%
VERSCHIL KOSTEN REISTIJD	4,568,298	4,758,72[illegible]	9,327,021	50%
VERSCHIL KOSTEN ONBETROUWBAARHEID	4,827,821	4,521,[illegible]2	9,349,423	50%
VERSCHIL TOTAAL	9,396,120	9,280,32[illegible]	18,676,444	100%

TOTALE KOSTENVERBETERING PER TRIP				
VERSCHIL 2010-2020	TOTAAL BUSINESS	TOTAAL NON-BUSINESS	TOTAA[illegible]	%
VERSCHIL KOSTEN REISTIJD	1.06	1.20	1.13	50%
VERSCHIL KOSTEN ONBETROUWBAARHEID	1.12	1.14	1.13	50%
VERSCHIL TOTAAL	2.19	2.34	2.26	100%

Average cost improvement: €2.26 per trip

18.68M per year car access cost improvement

50% of the improvement in costs can be attributed to improvements in reliability!

2010 vs. 2020

Outline

CBA rule of thumb business car travellers to Schiphol:
1 euro ↓ in travel time cost ~ 1.06 euro ↓ in VoR costs

CBA rule of thumb non-business car travellers to Schiphol:
1 euro ↓ in travel time cost ~ 0.95 euro ↓ in VoR costs

Conclusion and discussion

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- The VoR part of airport car access cost improvements is subtantial (50%)
- The VoT part is therefore only half of the story
- VoR of car travellers to Schiphol is not one number but *increases in the stdev*
- VoT and VoR of KiM cannot be used for airport access
- VoT airport car access < airplane VoT for business travellers

Conclusion and discussion

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- VoT and VoR are not fixed numbers but come with a confidence interval
- Because VoTs and VoRs are uncertain, policy outcomes are as well

Conclusion and discussion

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- How *certain* are we about the 18.7M?