

12th International Conference on Transport Survey Methods – March 20-25, 2022 – Portugal

Identifying and understanding long-distance travel demand by combining official transport statistics and survey data

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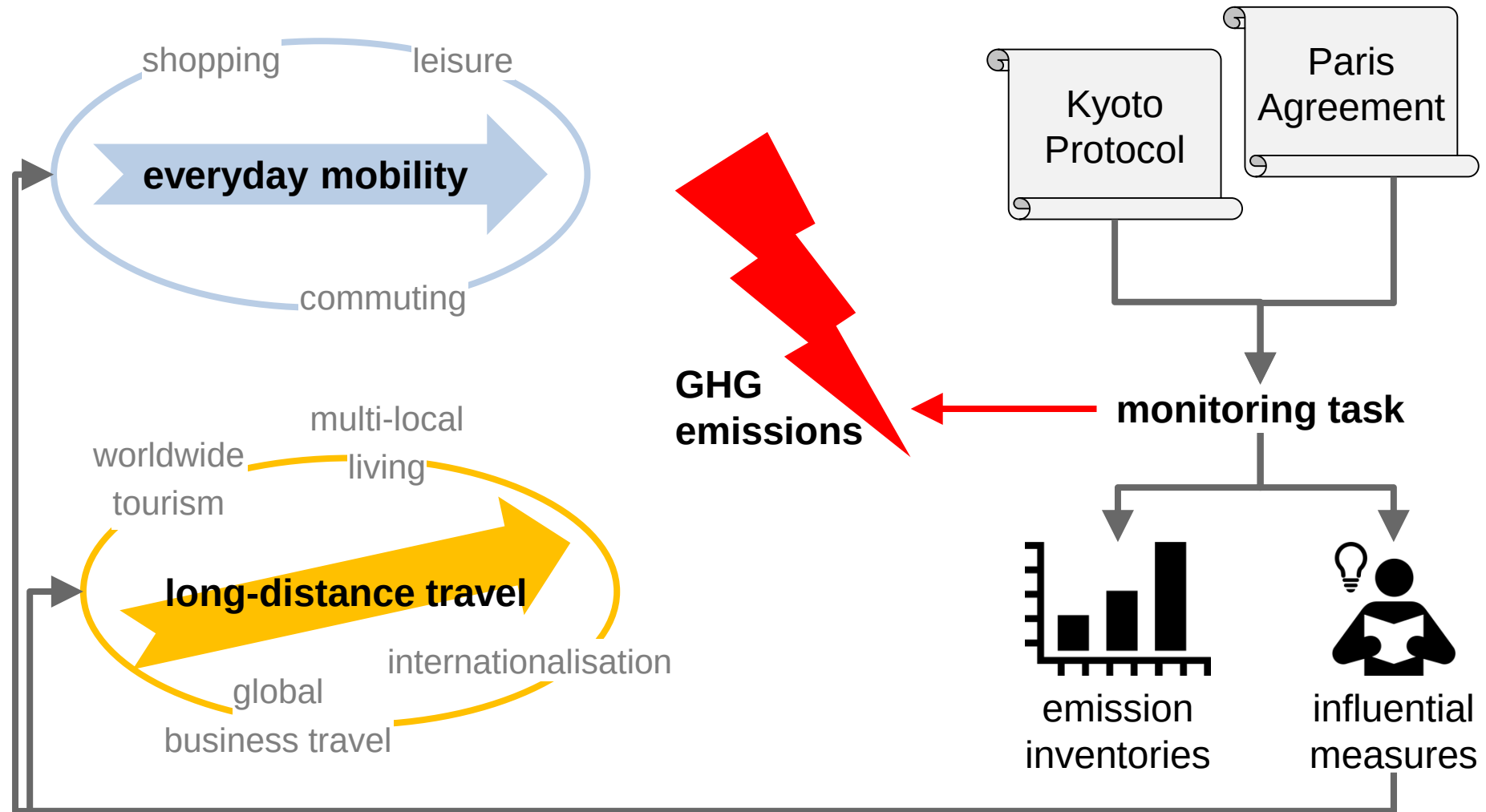
Workshop B15
Innovations in Travel Survey Collection to Support
Long-distance and Tourism Travel Analyses



Knowledge for Tomorrow



Long-distance travel: Why should we care?



Long-distance travel: What do we need to know?

TASK

- Quantitative & qualitative description of
- travel volumes & resulting emissions

APPROACH

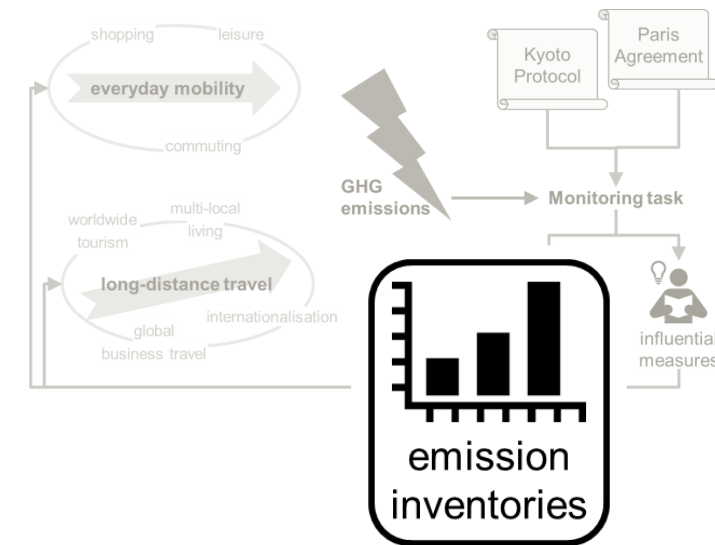
- Comprehensive data base
- transparent & up-to-date
 - consistent & reliable
 - accessible for research

CHALLENGE

- long-distance travel is a very heterogeneous phenomenon
- no “all-in-one” source of data that explains everything

SOLUTION

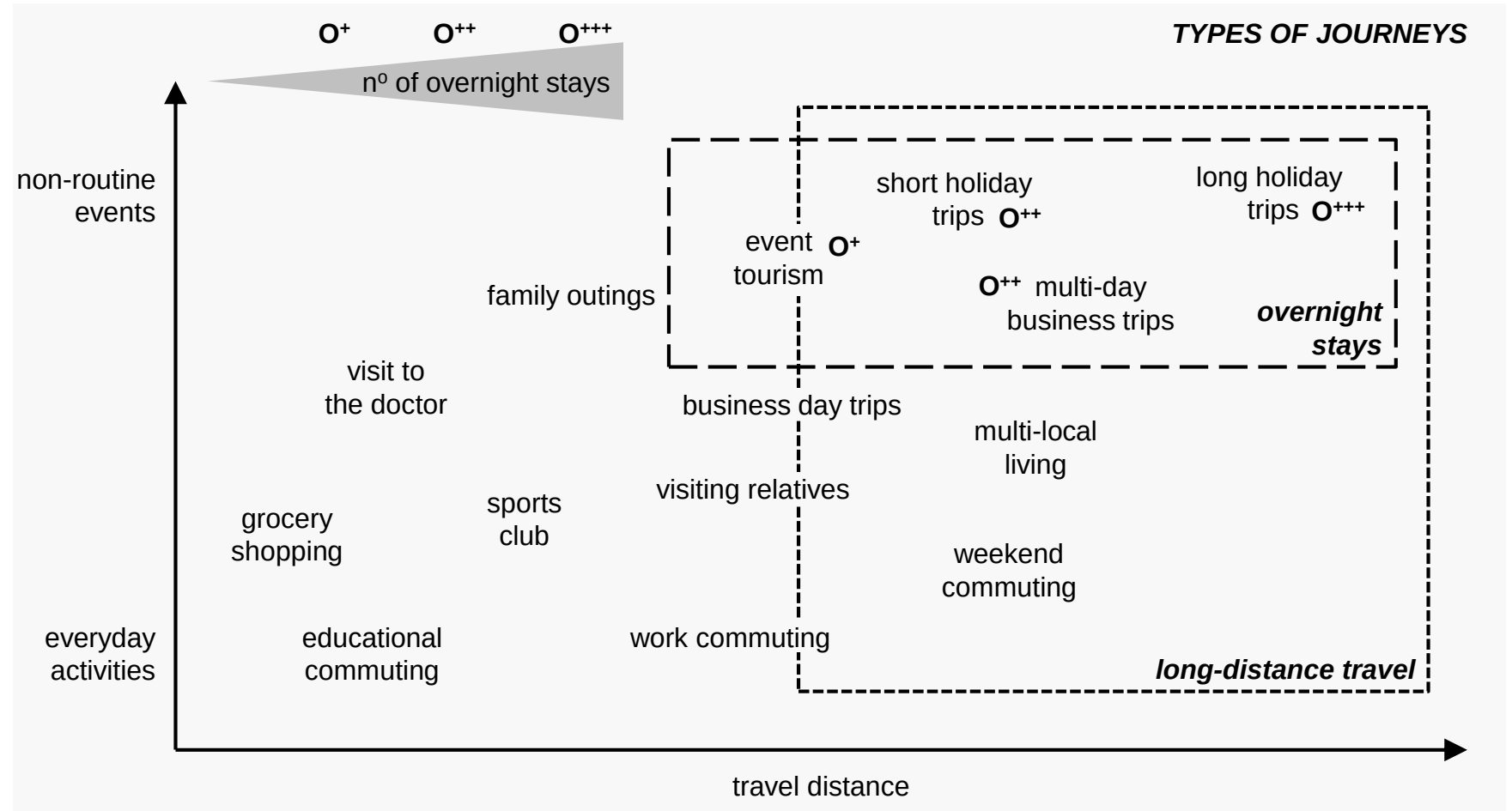
Combined data base of several complementary sources (survey data, official statistics)



- ▶ gaps
- ▶ overlaps
- ▶ inconsistencies

Long-distance travel: How to define and delimit?

- **purposes** range from activities carried out almost every day or only once a year (if at all)
- **distances** vary as well, and respective threshold values are set according to the research question
- in terms of **duration**, there are both one-day trips as well as journeys with overnight stays

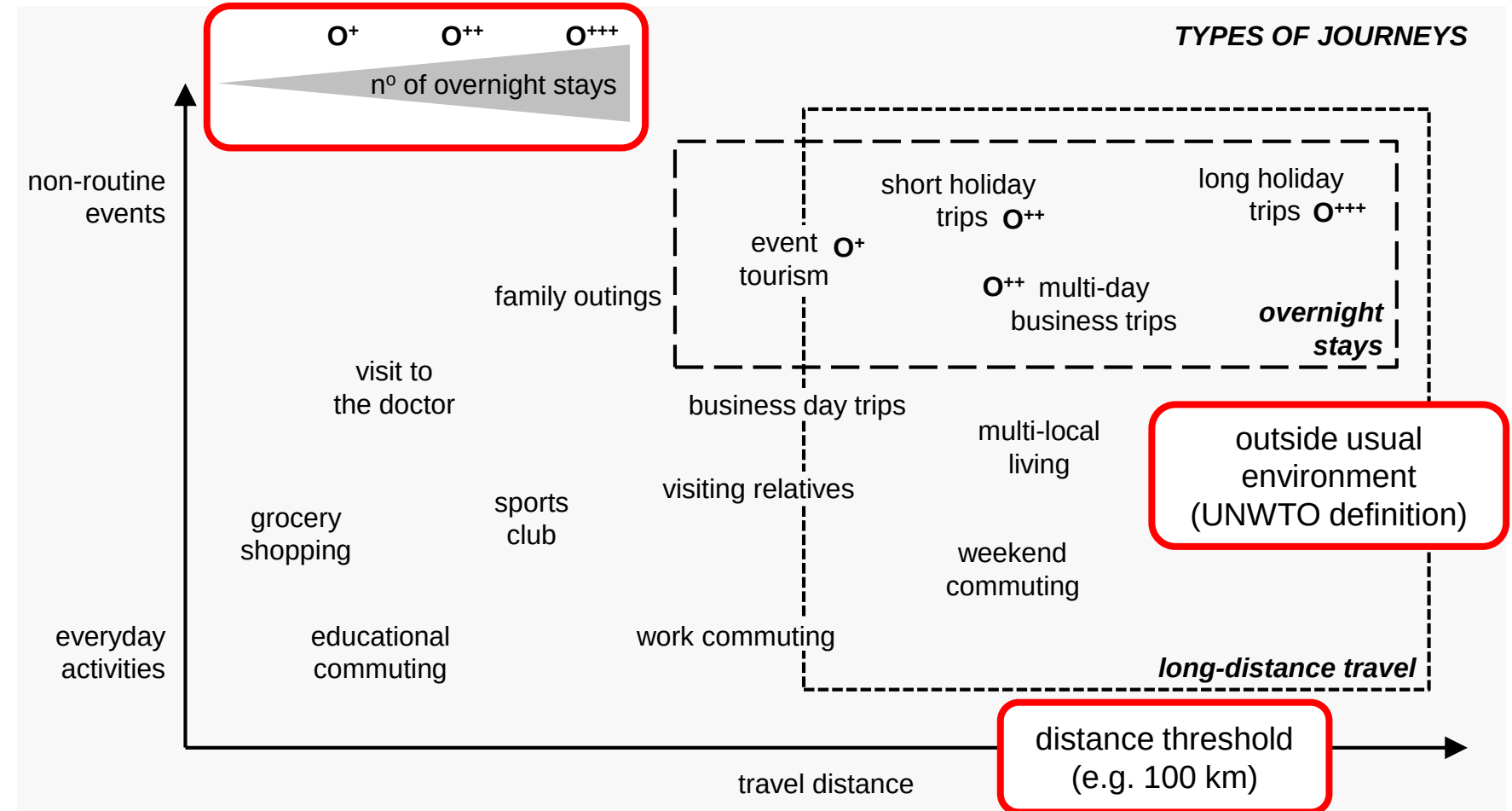


Source: KUHNIMHOF & SCHULZ, in NOBIS & SCHULZ (2017)



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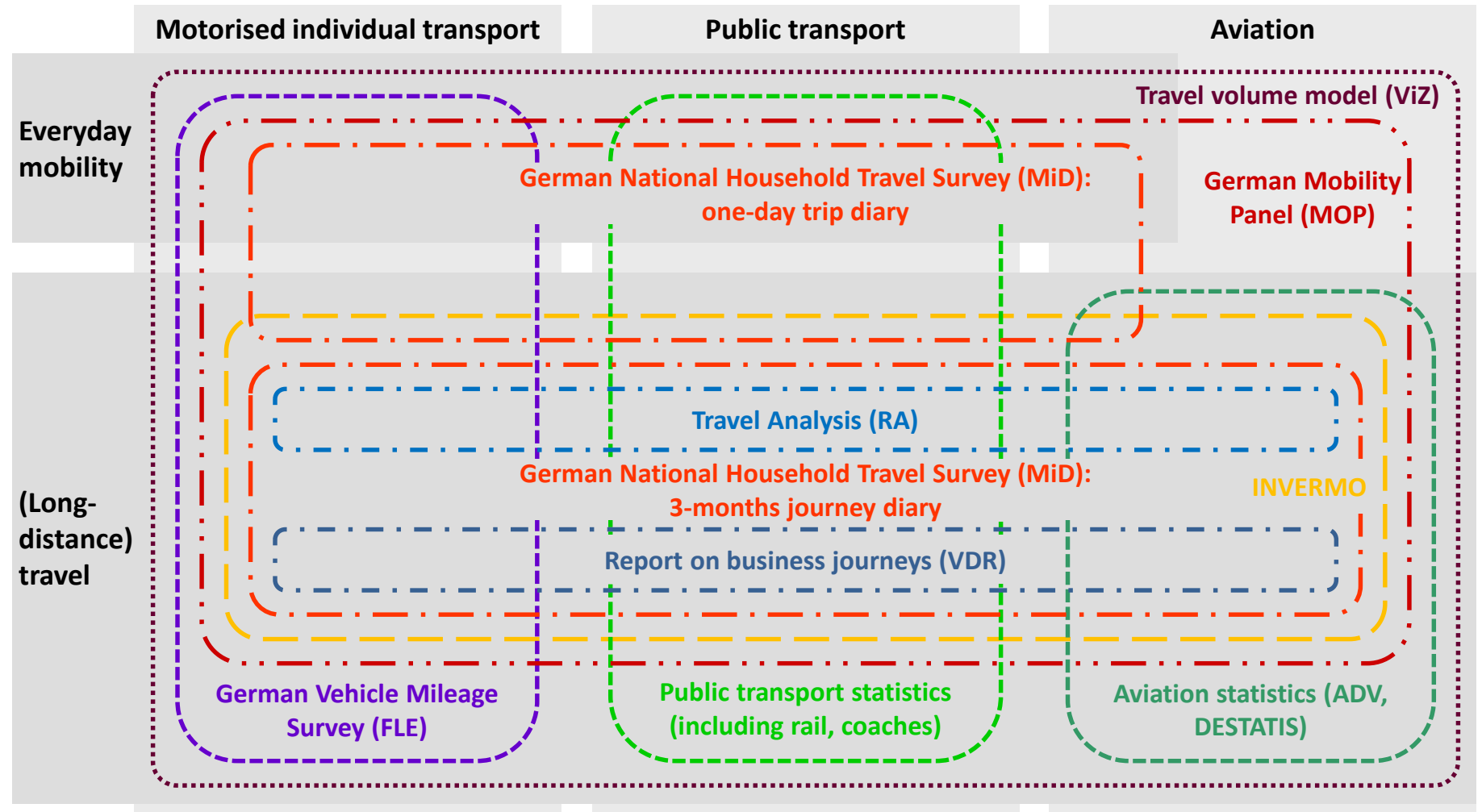


Source: KUHNIMHOF & SCHULZ, in NOBIS & SCHULZ (2017)



Available data sources: Example of Germany

- data landscape resembles a puzzle or a toolbox:
 - for each area of travel there are dedicated data sources
- BUT: hardly no information about individual background of long-distance travelers:
 - motives
 - preferences
 - attitudes
 - travel-related decision making



Source: SCHULZ et al. (2020), modified and translated

Coverage of long-distance travel: Methodological ‘shortcomings’ of data sources

Surveys on everyday mobility



- under- or over-coverage due to survey design
 - one-day trip diaries vs. retrospective, multi-month journey module
 - missing trips (only outward/return trip of a multi-day journey)
 - potential double counting (both in trip diary as well as in journey module)
 - incomplete mileage due to distance thresholds (focus on domestic travel)
- selectivity due to sampling (highly active people are hard-to-reach)

Data from companies and service providers



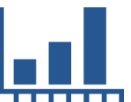
- particular coverage and/or selectivity due to commercial purpose of data collection
- limited and/or costly access to data (confidential business data)

Surveys on long-distance travel



- under-coverage due to recall effect (retrospective reporting)
- maybe biased reporting (only ‘interesting’ or extraordinary trips are reported)
- selectivity due to sampling (highly active people are hard-to-reach)

Official public transport statistics



- no distinction between residential population, incoming tourists & transit passengers
- potential double counting in case of intermodal trips/journeys



Different coverage according to territorial or national principle

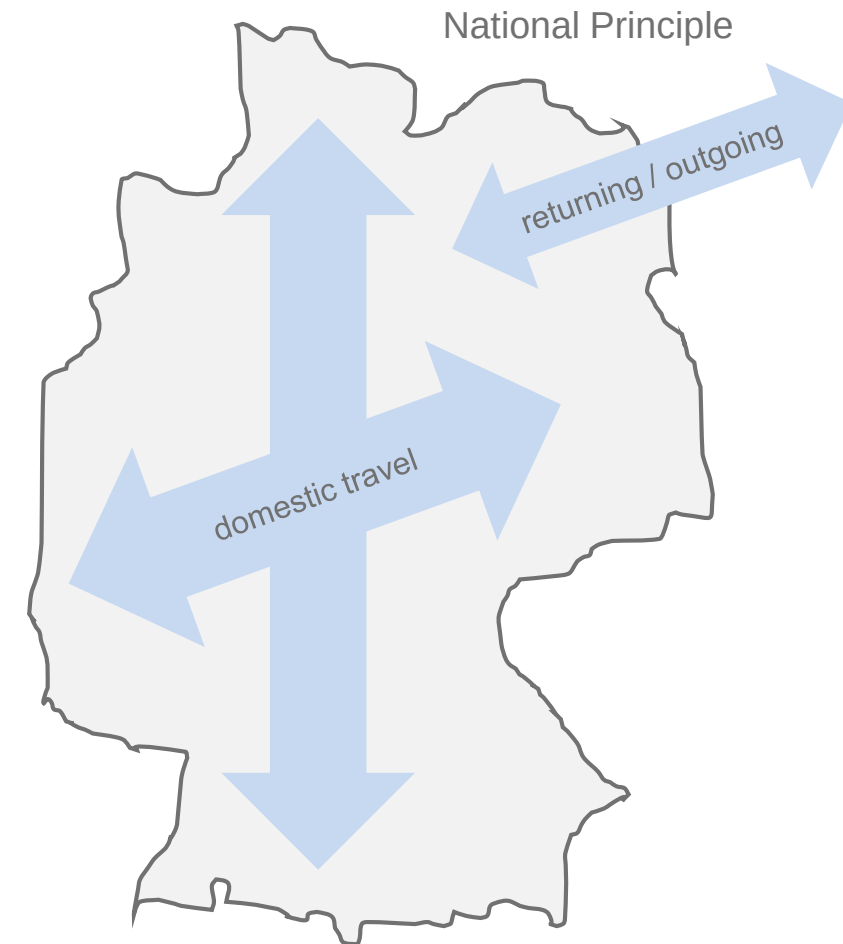
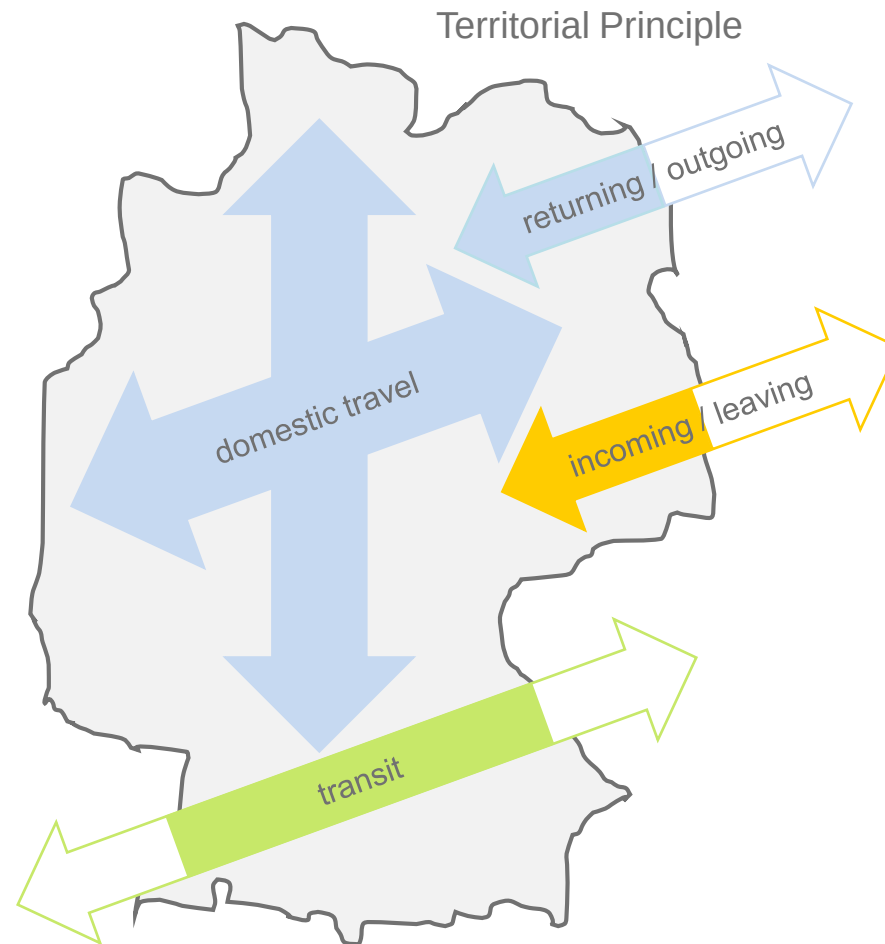
- **Territorial principle**

- trips conducted within the country by residential population and incoming tourists

- **National principle**

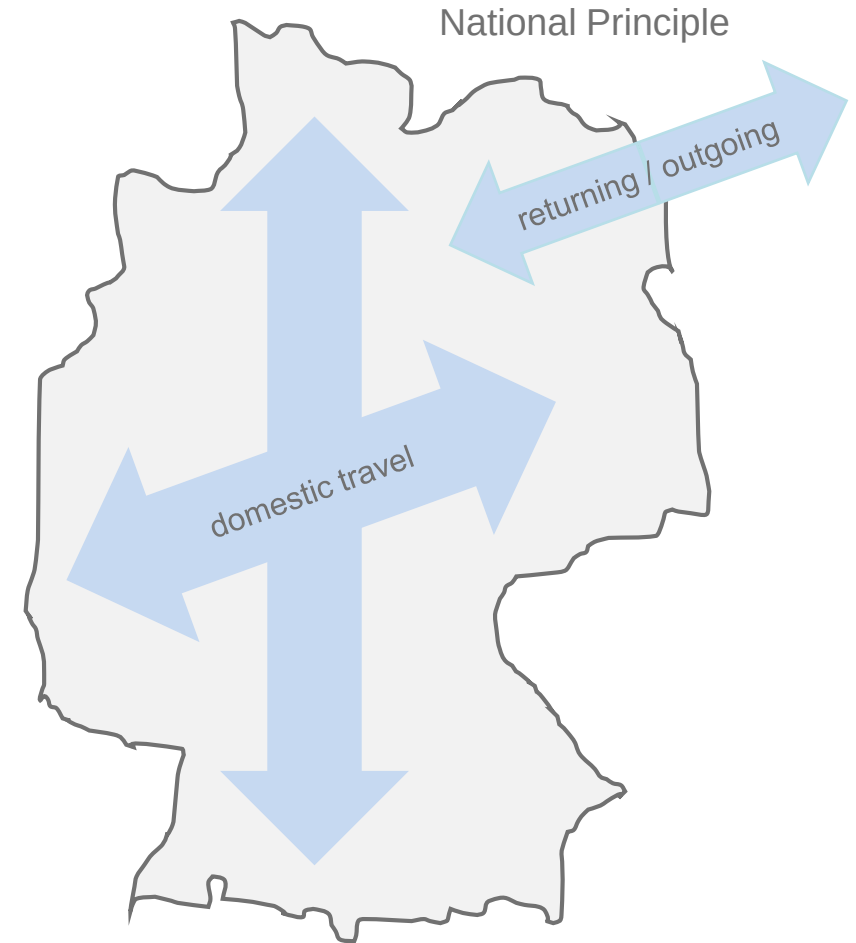
- trips conducted by residential population inside and outside the country

→ German NHTS “Mobility in Germany (MiD)”

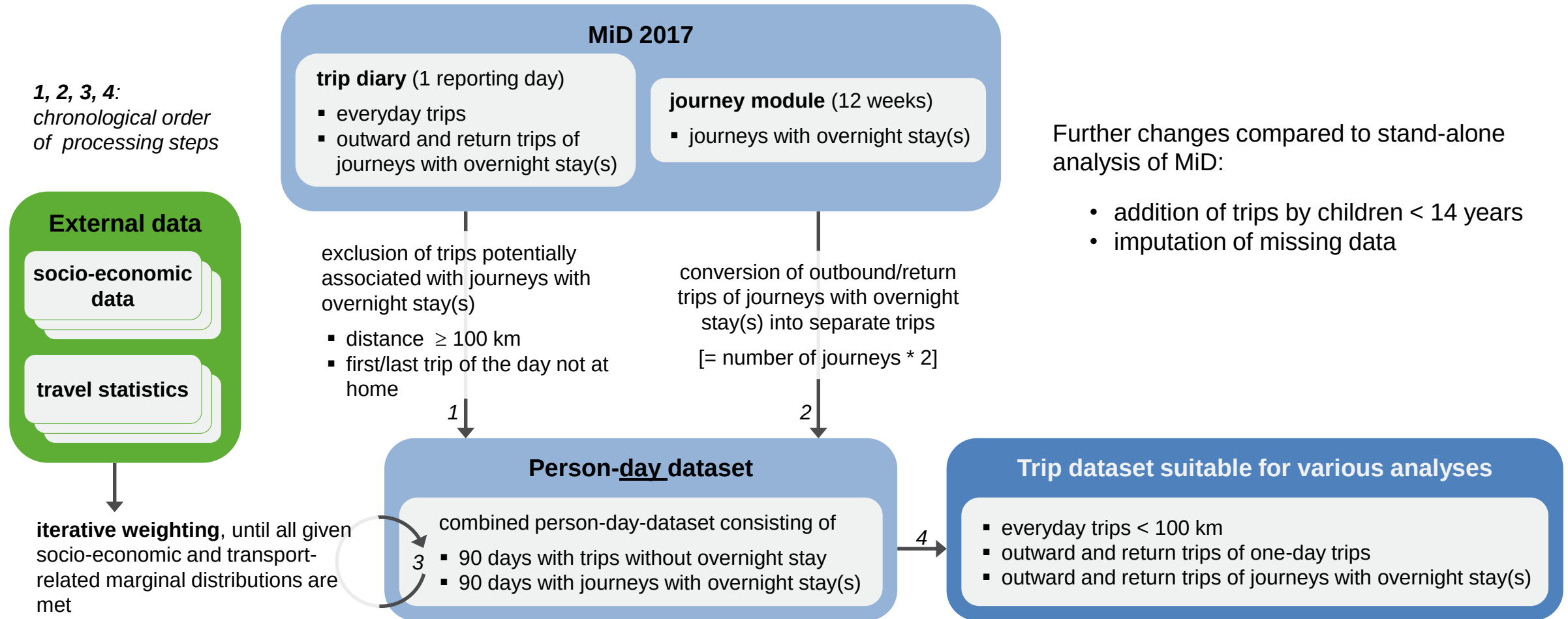


Central data source for Germany: National Household Travel Survey (MiD)

- coverage of residential population only (➔ national principle)
- focus on domestic travel (distance threshold 1,000 km)
- dedicated survey instruments for ...
 - everyday trips
(one-day trip diary, inside Germany)
 - journeys with overnight stay(s)
(up to 3 journeys, 3 months retrospectively, no spatial limitation)
- few information on trips abroad (outgoing travel)
- no information on
 - incoming tourists
 - transit passengers

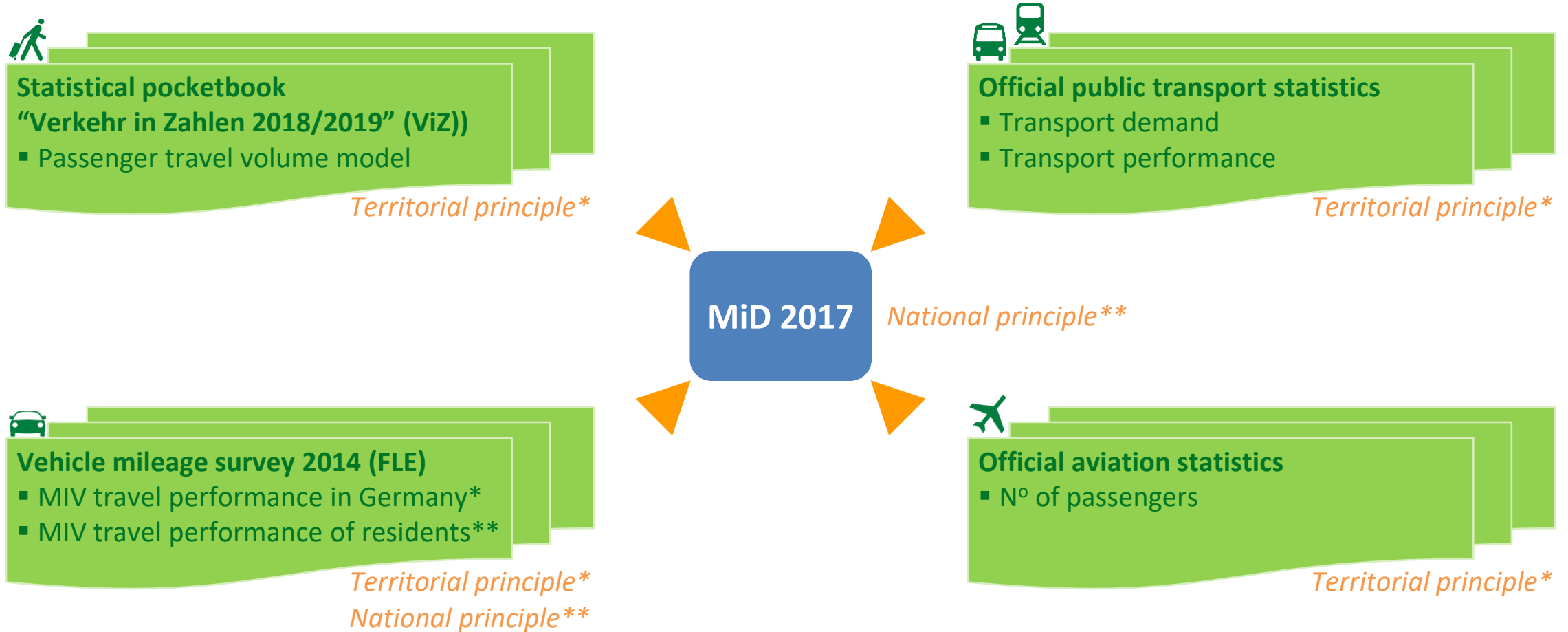


Combined MiD file consisting of trips & journeys („fusion dataset“)



Source: SCHULZ et al. (2020), modified and translated

Fusion model: Use of various additional data sources for calibration



* Travel of residents and non-residents; ** Travel in Germany and abroad

Travel volumes ‘before & after’: Improved key figures after data fusion

Analysis based on original MiD data

- extrapolation of trips/journeys reported in ...
 - one-day travel diary and
 - 3-month journey diary

> 960,000 trips and > 38,000 journeys

- overall annual travel volume

**23,000 km (~ 14,300 miles)
per person per year**

- share of long-distance travel (≥ 100 km)

57 %

... based on enhanced MiD fusion data

- correction of overlaps
- imputation of missing data
- iterative re-weighting procedures

> 995,000 trips

- overall annual travel volume

**18,400 km (~ 11,400 miles)
per person per year**

- share of long-distance travel (≥ 100 km)

46%



Touristic and long-distance travel of the German residential population: 2017 key figures based on different definitions

Travel volume

Total: 94.7 billion journeys/ trips

-  outside usual environment/ ≥ 100 km
-  inside usual environment/ < 100 km

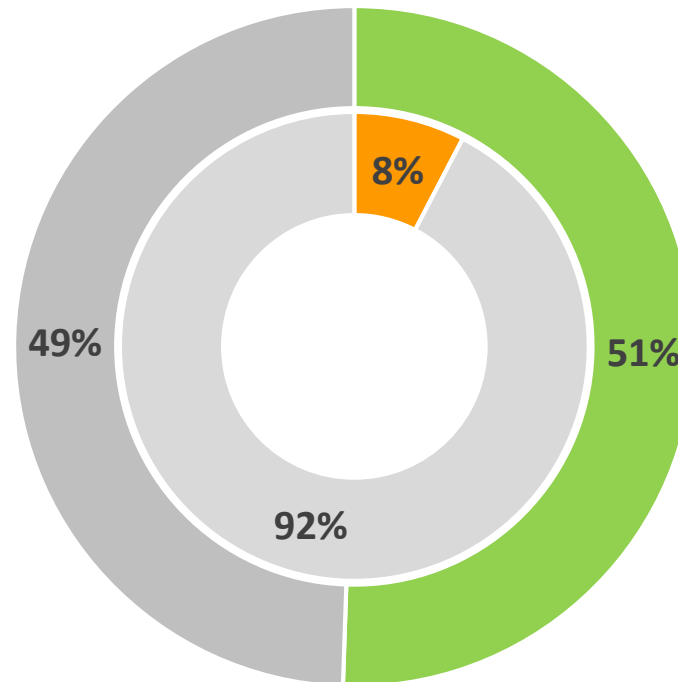
Travel performance

Total : 1,517.8 billion passenger kilometers

-  outside usual environment/ ≥ 100 km
-  inside usual environment/ < 100 km

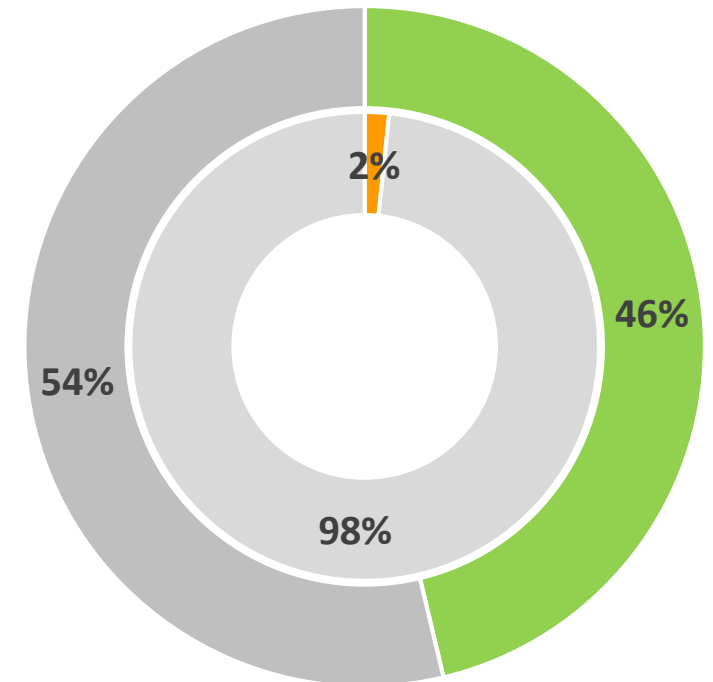
(Touristic) travel events

Journey =
destination „outside the usual
environment“ (UNWTO definition)



Long-distance travel

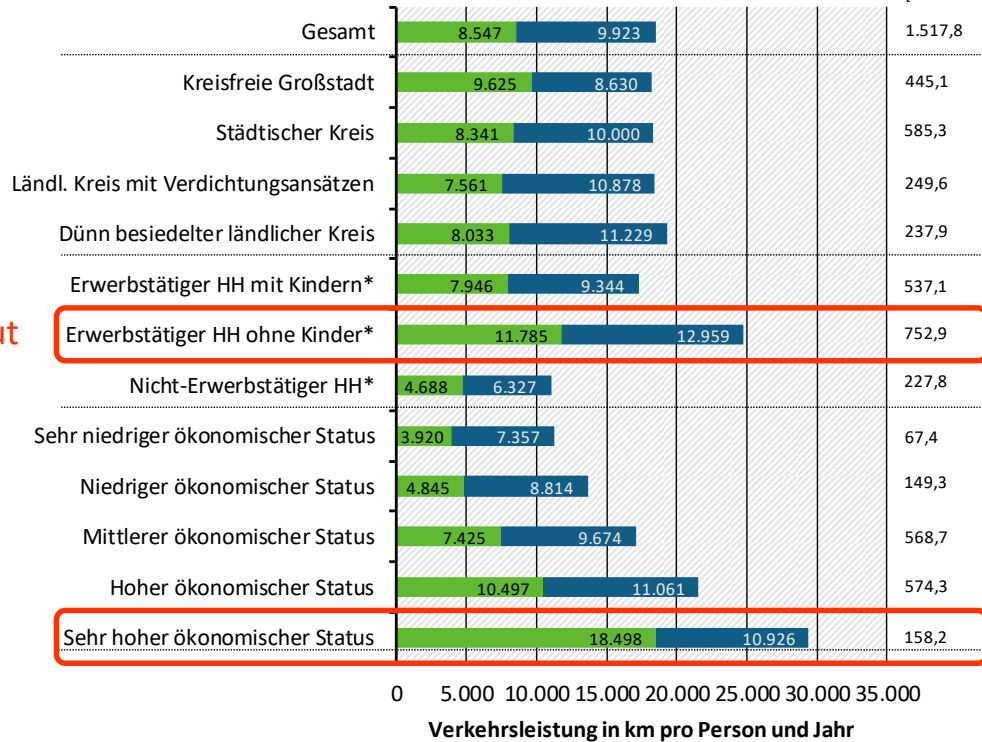
Long distance =
trip distance ≥ 100 km



Average travel performance of different groups of people

Verkehrsleistung pro Person und Jahr

Gesamtverkehrsleistung des Segments [Mrd. Pkm]



■ Wege ≥ 100 km

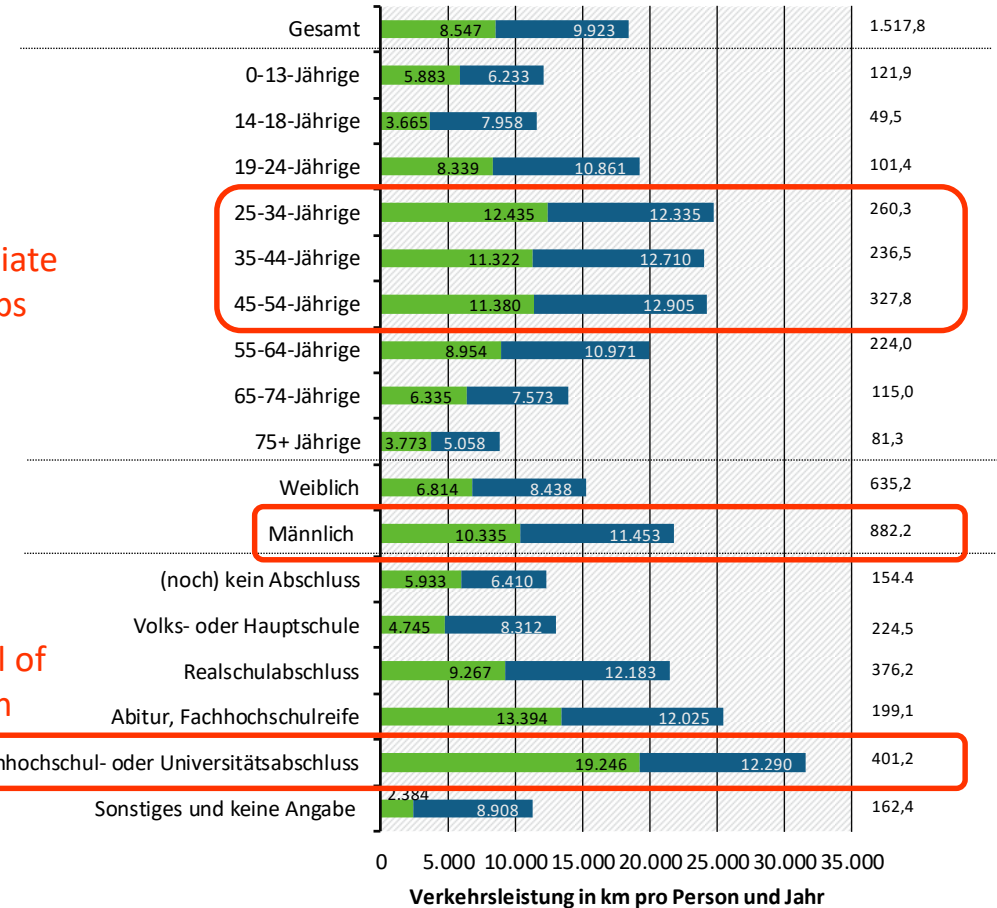
■ Wege < 100 km

*HH = Haushalt

Quelle: Eigene Berechnung auf Basis des Fusionsdatensatzes

Verkehrsleistung pro Person und Jahr

Gesamtverkehrsleistung des Segments [Mrd. Pkm]



■ Wege ≥ 100 km

■ Wege < 100 km

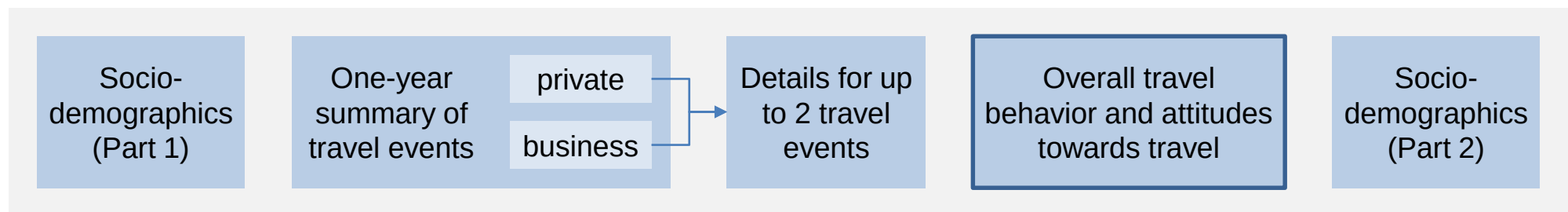
Quelle: Eigene Berechnung auf Basis des Fusionsdatensatzes



Complementary empirical work ‘in brief’

- **Net sample:** 1,002 individuals aged 18+
- **Recruiting:** online panel with screening
(journeys ≥ 100 km within last 2 months, total n° of journeys during last year)
- **Composition of sample:** disproportionate inclusion of frequent travelers (50%) with at least 10 trips ≥ 100 km
 - ▶ allows for targeted analyses
- **Data collection:** Spring (5/23-3/6/2019) & Fall (9/3-15/9/2019)
 - ▶ taking seasonality into account
- **Length of interview:** 21.9 minutes (median)
- **Survey instrument:** CAWI

Data collection before
beginning of the pandemic 2020



Complementary empirical work: Focus on motivation, decision making and behavioral dimensions

Parameters of decision

- Destination(s) (including accessibility)
- Trip purpose
- Travel date
- Availability of transport modes
- Special requirements (e.g. luggage, ...)

Parameters of the assessment

- Duration (travel time)
- Expenses
- Subjective convenience (organization of the trip, trip itself, ...)

Context of decision

- Who plans and decides?
- Flexibility in terms of destination, time and mode choice

Socio-demographics

- Household and individual characteristics (e.g., household structure, vehicle ownership, income, driver's license, occupational status, etc.)

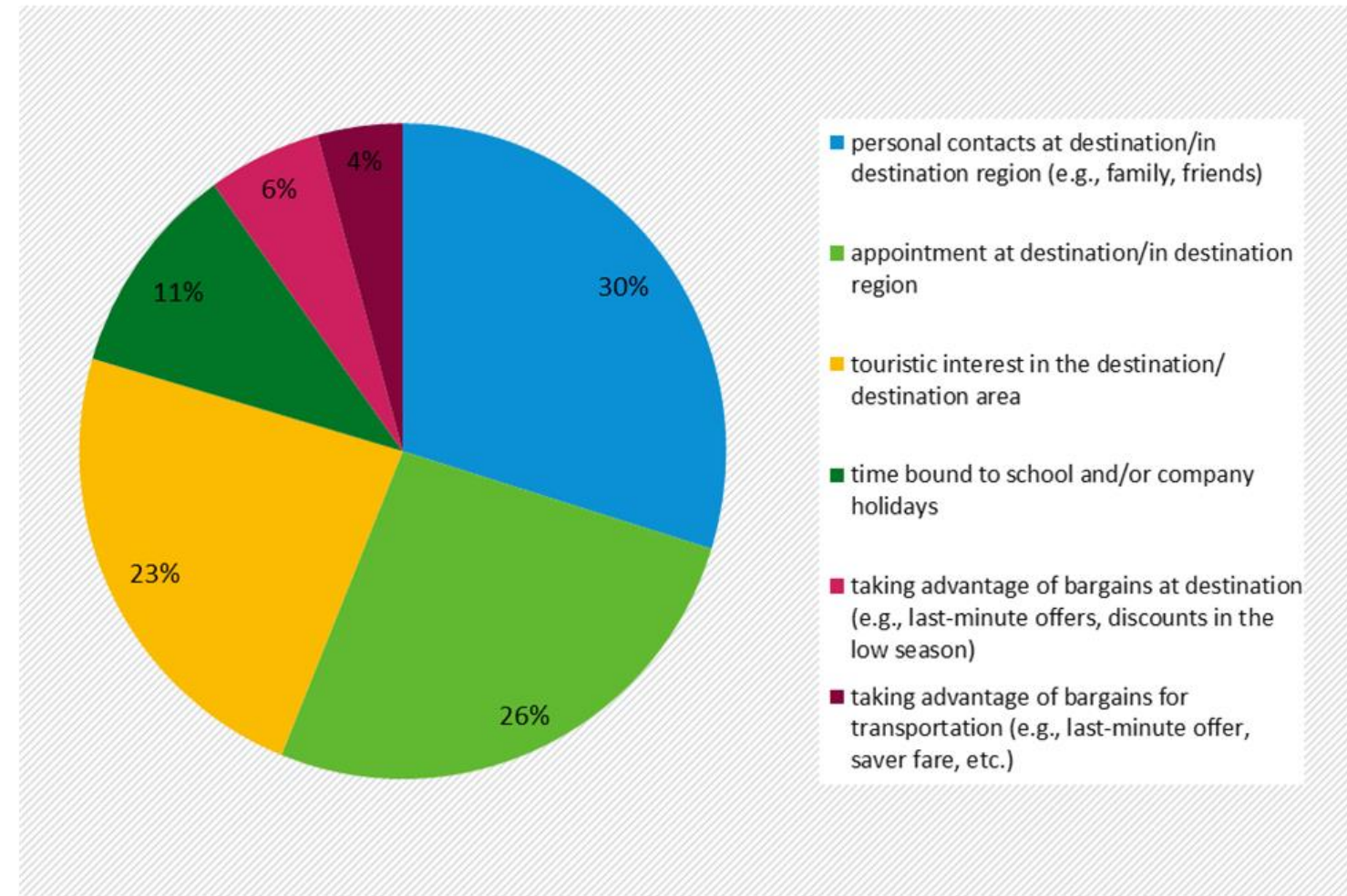


Private journeys: Reason for traveling 'just like this'

- Almost 80% of the journeys are linked to the destination regions
 - personal contacts
 - fixed appointments
 - explicit touristic interest
 - Monetary considerations such as bargains play a subordinate role.
- **limited options to influence travel behavior by any measures**

Private journeys: Reason for traveling 'just like this'

n = 1,453 journeys



Source: own calculation based on own survey

Methodological challenges

Modeling approach ...

- requires detailed (methodological) knowledge about genuine input data as well as data used for calibration
- underlying definitions (e.g. distance threshold or overnight stay)
- population addressed (e.g. residential population only vs. all travelers, age groups etc.)
- spatial coverage (e.g. domestic vs. international travel)

- if different data sources are used in an appropriate way, they will complement each other to a more comprehensive picture
- relying on one single data source might lead to ‘wrong’ results and misleading interpretation

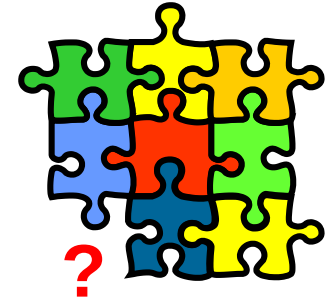
- informed assumptions based on ‘external’ sources will continue to be necessary



Unresolved issues

- depending on research question and applied definition, the actual volume of long-distance travel may be incomplete
- travel volumes of incoming tourists and transit passengers remain unknown

► **subject to assumptions**

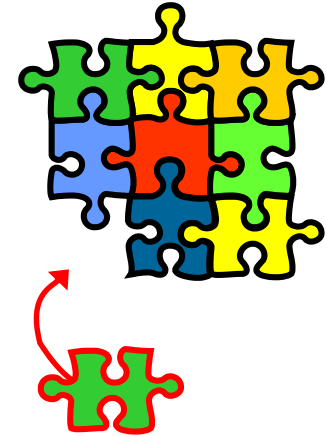


- ‘shortcomings’ of traditional household travel surveys with respect to journeys
- no detailed information on trip stages and respective transport modes (only main mode)
- in particular with respect to overnight journeys:
no information on trips conducted at the destination (local mobility)



Conclusion

- combination of different data sources based on a ‘fusion model’ ...
 - reduces the ‘shortcomings’ of individual data sources
 - helps to get a consistent picture, provided that initially heterogeneous input and calibration data are adequately post-processed and harmonized
- resulting data set ...
 - covers the travel volume of the German residential population
 - allows for flexible and multi-purpose data analyses, e.g. to identify and analyze ...
 - different socio-economic groups of travelers
 - different types of trips and journeys
 - modal share



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