Transportation Demand Model (TDM)

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Why TDM is needed

- Future energy service demand is needed in Enduse model and Energy snapshot tool as input
- TDM simulates transportation demand (pass-km, ton-km) which is used as energy service demand in Enduse and Energy snapshot tool
- Transportation demand is affected by change of population, people's travel behavior and industrial structure.
- It is important to consider those factors because they will be change in long-term future.
- TDM simulates transportation demand of each transport mode associated with changes of those factor

General Description

Passenger Transportation Demand Module (TDM_P)

- Input: Population
  Some coefficients which represent people's behavior
- Output: Passenger transportation demand by mode (passenger-km)

Freight Transportation Demand Module (TDM_F)

- Input: Amount of production and import by product
  Some coefficients which represent freight transport characteristics
- Output: Freight transportation demand by mode (tonne-km)

Passenger transportation Demand module (TDM_P)

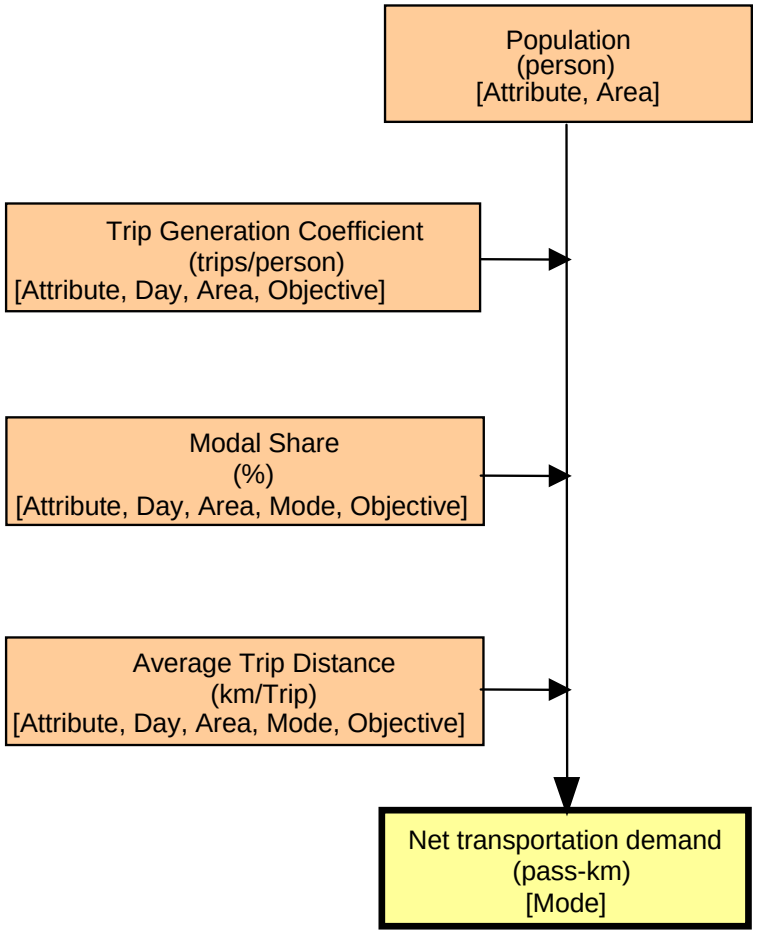
Basic idea of TDM_P

- Using the concept of "trip" to describe people's travel behavior

What is "trip"

The basic unit of travel, a trip, is defined as a one-way course of travel having a single main purpose.

Basic idea of TDM_P



Simplified formula:

Transportation demand (pass-km) [mode] =
Population (person)
× Trip Generation Coeff. (trips/person)
× Modal Share (%) [mode]
× Average Trip Distance (km/trip) [mode]

(Unit) [Index]

: Data Flow
: Endogenous Variables
: Exogenous Variables
(Unit)
[Indices]

Application of TDM_P to Japan

Definition of the terms

●Intra-regional Transport

:Trip within the daily living area

[Purposes]

- ·Commute (to work)
- ·Commute (to School)
- ·Return (to home)
- ·Commercial
- ·Private (ex. shopping)

●Inter-regional Transport

:Trip over the daily living area

[Purpose]

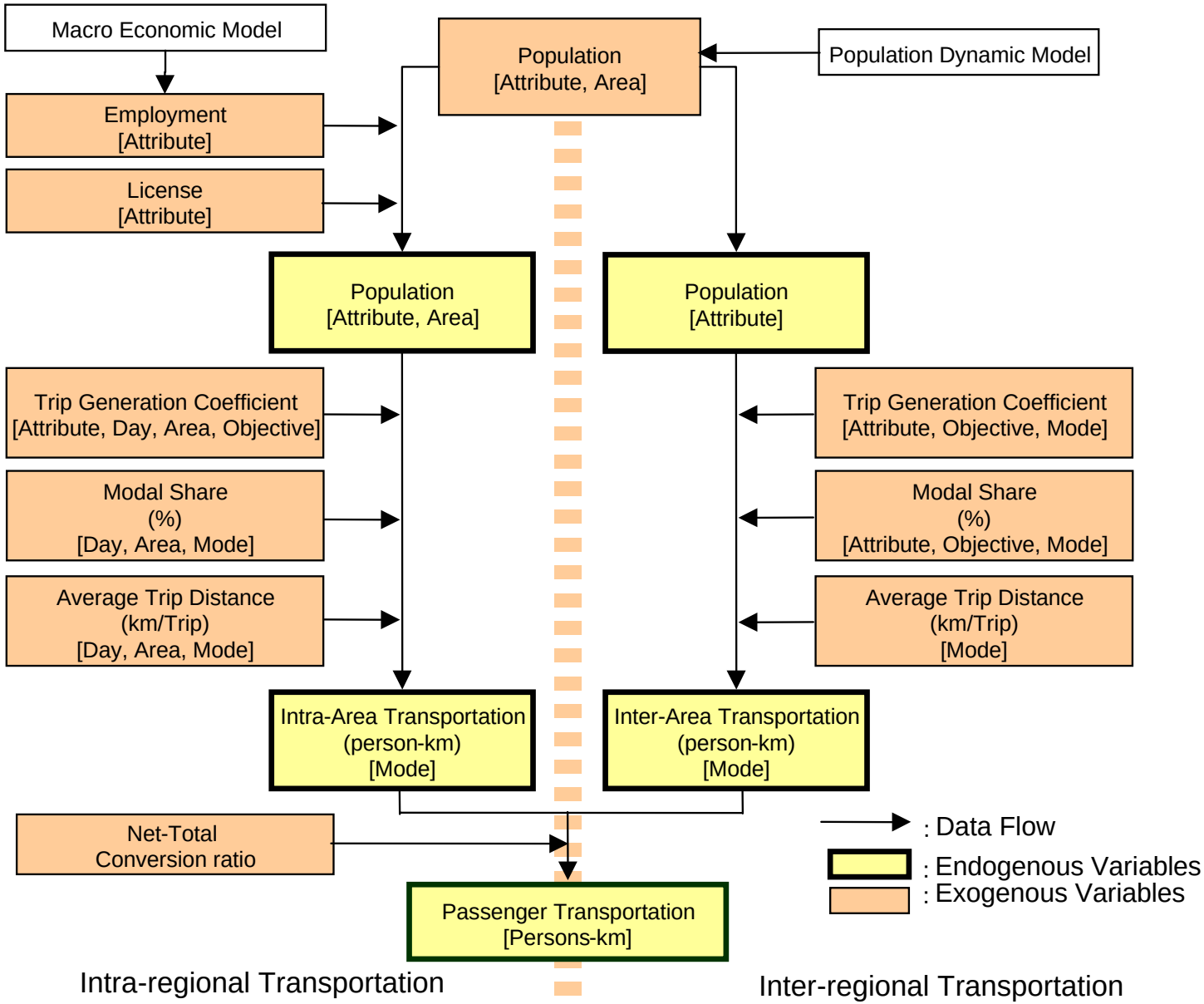
- ·Commercial (Business trip)
- ·Sightseeing (Leisure)
- ·Private (Homecoming)

*Note:Commuting is excluded

[Mode]

- ·Aviation (Airplane)
- ·Railways (Train)
- ·Maritime (Ship)
- ·Buses
- ·Passenger cars

Calculation Flow of TDM_P Japan



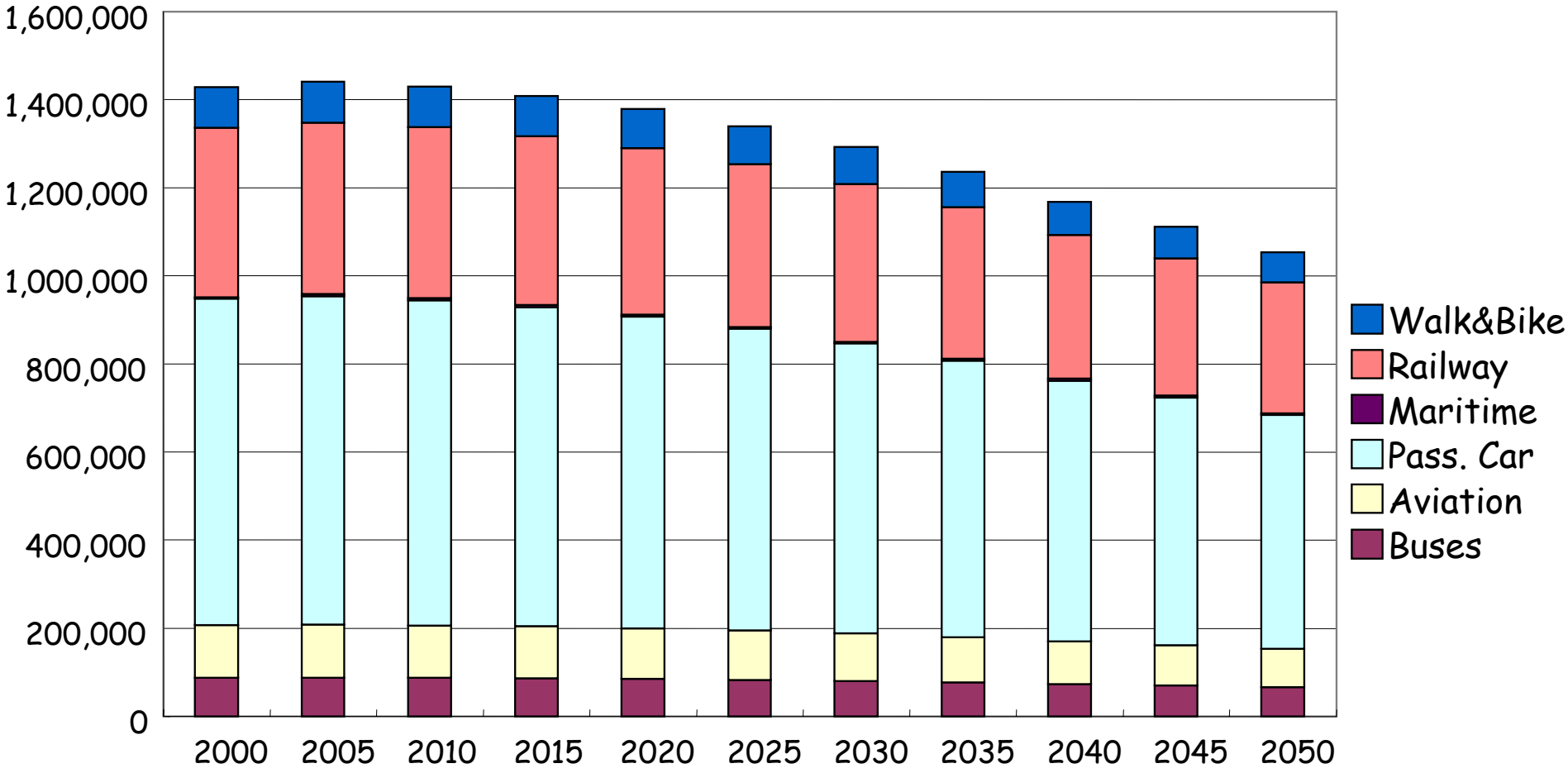
Data Sources of TDM_P Japan

Data	Source
a) License rate	Past record: National Police Agency Future estimation: MLIT
b) Employment rate	Past record: Statistics Bureau
c) Inter*/Intra** regional Transportation Coef. >Trip Generation >Modal Share >Avr. Trip distance	*MLIT PT survey data:90, 95, 00 (Arterious Transportation Survey)
	**MLIT PT survey data:87, 92, 99 (National Urban PT Survey)
d)Net-Total Conversion ratio	Estimated from Total demand (e) and PT data summation
e)Total Demand	Domestic Transportation Statistics Handbook (MLIT)

MLIT: Ministry of Land Infrastructure and Transport

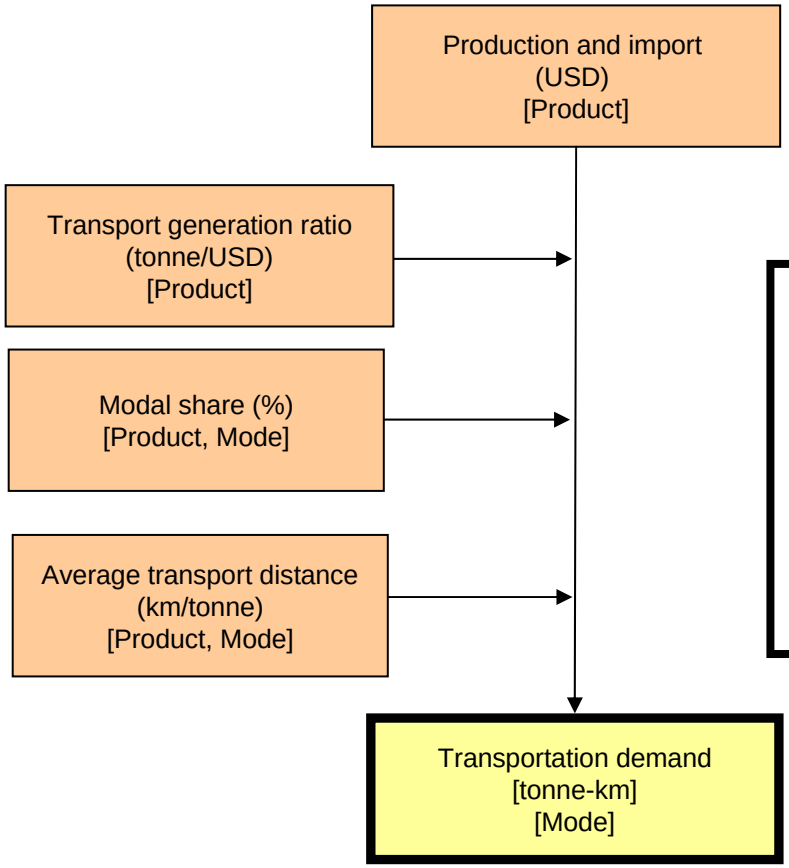
Example of simulation result

(Total transportation demand by mode: mil.pass-km)



Freight transportation Demand module (TDM_F)

Basic idea of TDM_F



Simplified formula:

Transportation demand (tonne-km) [mode] =
Production and Import (USD)
× Transport Generation Coeff. (tonne/USD)
× Modal Share (%) [mode]
× Average Trip Distance (km/tonne) [mode]

(Unit) [Index]

: Data Flow
: Endogenous Variables
: Exogenous Variables

(unit)
[Indices]

Application of TDM_F to Japan

Indices of TDM_F Japan

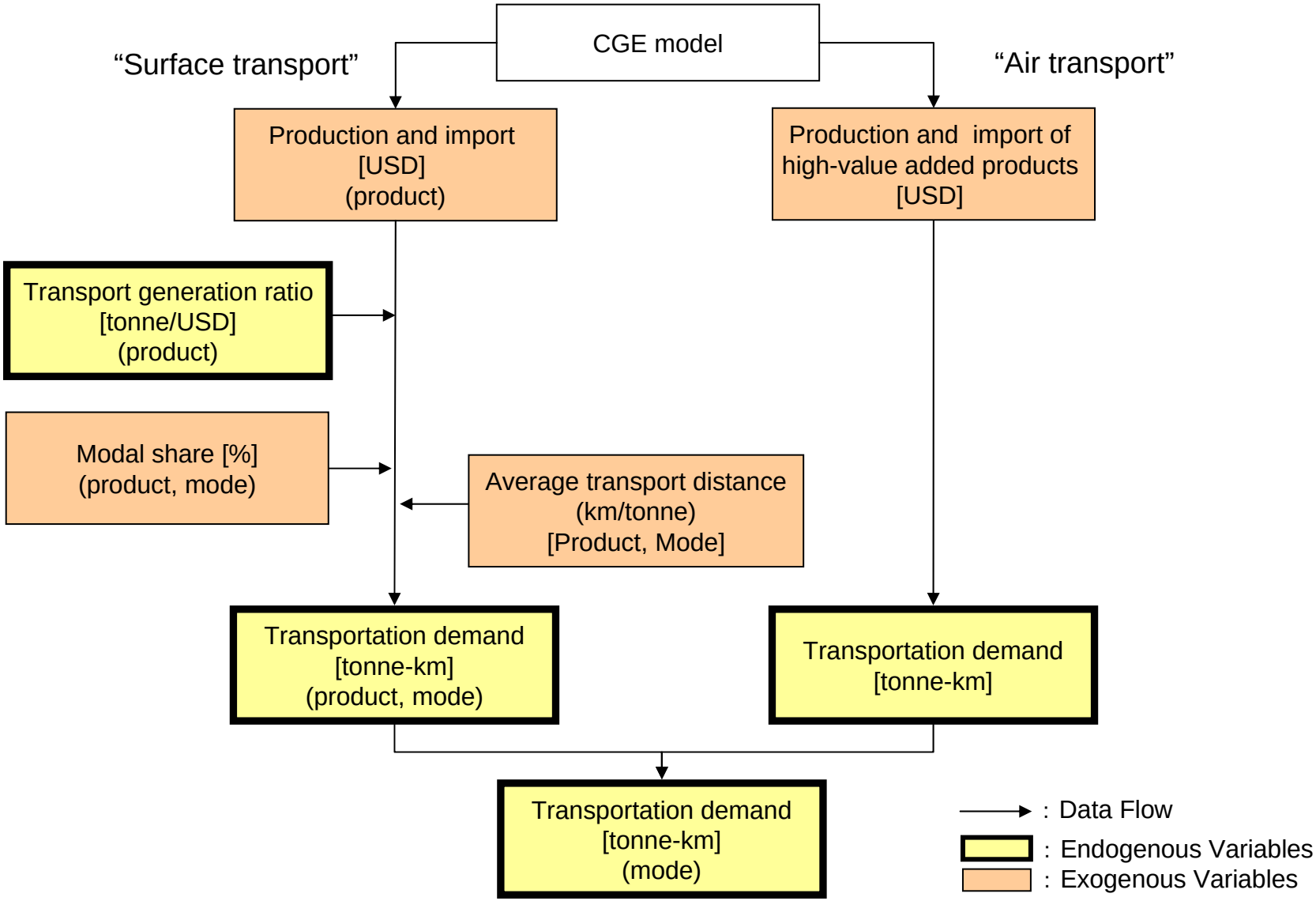
[Product]

- Agricultural product
- Minerals
- Metals and Machinery
- Chemicals
- Light-industry products
- Miscellaneous industry products
- Specialty products

[Mode]

- Small freight vehicle
- Large freight vehicle
- Railway
- Maritime
- Aviation

Calculation Flow of TDM_F Japan

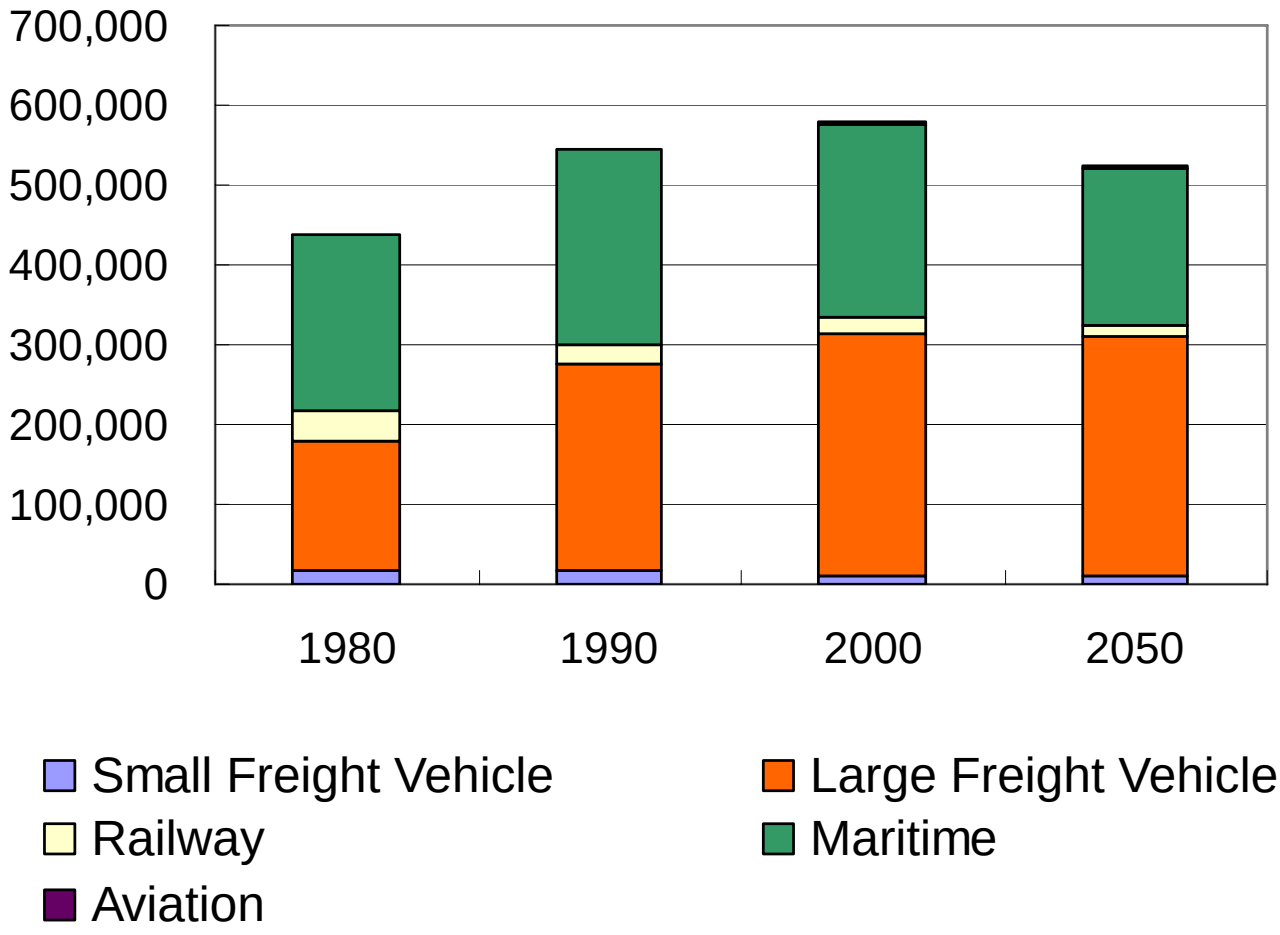


Data Sources of TDM_F Japan

Data	Source
a) Production and Import by product (USD)	・Annual report on national accounts
b) Transportation volume by mode and product (tonne)	・Domestic transportation statistics handbook (MLIT)
c) Transportation volume by mode and product (tonne-km)	・Domestic transportation statistics handbook (MLIT) ・Road traffic census

Example of simulation result

(Transportation volume by product: mil.tonne-km)



Thank you for your attention !!