

توليد سفر

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## **Trip Generation**





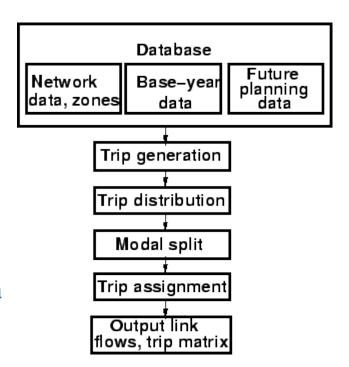
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#### Overview

- "predicting the total number of trips generated and attracted to each zone" or "how many trips?"
- the data on household and socioeconomic attributes

#### The section discussions:

- basic definitions?
- factors affecting trip generation
- the two main modeling approaches (growth factor modeling and regression modeling)

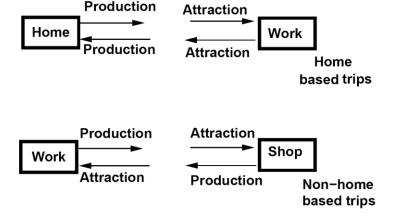




#### برنامه ریزی حل و نعل

## **Trip Generation**

- Types of Trip
  - Journey: movement from origin to destination
  - Trip: an outward and return journey
  - Home-based trip: origin or destination of a trip is home
  - Non home-based trip: neither origin nor destination of a trip is home
  - Trip Production: trips of home based or origin of non home based trips
  - purpose of journey: work, education, shopping, recreation, others



## Trip Generation





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#### Factors Affecting Trip Generation

- Trip Production
  - Income, vehicle ownership, house hold structure, family size
  - value of land, residential density, accessibility
- Trip Attraction
  - roofed space available for industrial, commercial and other services
  - Employment ,accessibility

#### **Freight Trips**

Number of employees, number of sales and area of commercial firms

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## Trip generation

### Growth Factor Modeling

$$T_i = f_i \times t_i$$

- Ti: number of future trips in the zone
- ti: number of current trips in the zone
- fi : growth factor
- P: population of the zone
- I : average house hold income
- V: average vehicle ownership
- d: the design year
- c: the current year

$$f_i = \frac{P_i^d \times I_i^d \times V_i^d}{P_i^c \times I_i^c \times V_i^c}$$

**Limitation:** the trip rate will remain same in the future



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## **Trip Generation**

#### **Cross-Classification Method**

- Income Sub-Model: households within various income categories
- Auto Ownership Sub-Model: household income to auto ownership.
- Trip Production Sub-Model: relationship between the trips made by each household and the independent variables.
- Trip Purpose Sub-Model: relates the trip purposes to income

		Auto Ownership					
		0		1		2+	
		HH	Trips	НН	Trips	нн	Trips
1		1,200	2,520	2,560	6,144	54	130
2		874	2,098	3,456	9,676	5,921	20,165
3		421	1,137	2,589	8,026	8,642	33,704

Number of trips per household size by auto ownership, obtained from regional study

Household Size		0	7	2+
믕	1	2.1	2.4	2.4
seh	2	2.4	2.8	3.4
ջ:	3+	2.7	3.1	3.9

Auto Ownership

Trip rates obtained from previous matrix

2.8		Auto Ownership				
Size		0		2+		
pio o	in the second	25	125	3		
Seh	2	32	175	254		
Household	3+	10	89	512		

Forecasted number of households in study zone by autoownership and size

\*100

		Auto Ownerships					
2120		0	8012	2+			
5	1	52	300	7			
= 1	2	77	490	864			
lonse	3	27	276	2001			

Forecasted number of trips in zone determined by multiplying trip rates by number of households in category

Total 4,094

\*100

FIGURE 3-9 Cross classification analysis

## Trip Generation

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#### **Regression Methods**

$$T_i = f(x_1; x_2; x_3; ...x_i; ...x_k)$$

 $X_i$ : prediction factor or explanatory variable

$$T_i = a_0 + a_1 x_1 + a_2 x_2 + \dots + a_i x_i + \dots + a_k x_k$$

a<sub>i</sub>: the coefficient of the regression equation (by regression analysis)



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## **Trip Generation**

## Experience Based

- Extrapolation of past trends to estimate future travel
- Trend analysis to respond to anticipated growth
- Comparing the past traffic trend to the trend of development during the same period



