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**REG NO 14374**



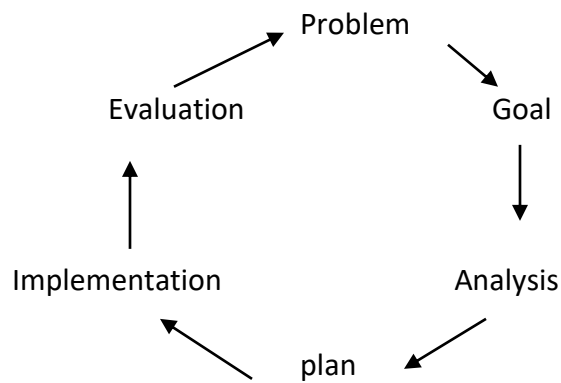
***TRANSPORTATION PLANNING AND MANAGEMENT***  
**ENGR MAJID NAEEM**

**QNo1: What is planning; briefly describe the studies carried out in the scope of transportation planning strategies in their modeling with assumptions & limitation . present your answer in the form of a formal technical report ?**

## **Planning**

Planning is the process of thinking about the activities required to achieve a desired goal. It is the first and foremost activity to achieve desired results . It involves the creation and maintenance of a plan such as psychological aspects that requires conceptual skills. It is an intellectual process which lays down an organization objective and develops various courses of action by which the organization can achieve those objectives .Planning is nothing but thinking before the action takes place. Transportation planning is the process of defining future policies, goals investments and designs to prepare for future needs to move people and goods to destinations. As practiced today , it is a collaboration process that incorporate the input of many stakeholders including various ,government agencies ,the public and private business. Transportation planners apply a multi model comprehensive approach to analyzing the wide range of alternation and impact on transportation system to influence beneficial outcome .It involve the evaluation assessment design and siting of transport facilities. Transportation planning has followed the rational planning model of defining goals and objectives , identifying problem generating alternatives evaluating alternatives and developing plans. Other model for planning include rational actor transit oriented development incremental planning organization process collaborative planning and practical bargaining .planners are increasingly expected the adopt a multidisciplinary approach especially due to rising importance of environmentalism. For example the use of behaviour psychology to persuade drivers to abandon their automobiles and use public transport instead. The role of transport planners is shifting technical analysis to promoting sustainability through integrated transport policies.For example , increasing number of motercycle is responsible for not only environmental damage but also slowing downeconomic growthe in the long run,the plan is to reduce the traffic through a change in urban planning

## Planning and policy cycle



### TOOL TYPE

- (1) Sketech planning tools
- (2) Travel demand forecasting model
- (3) Deterministic models
- (4) Traffic signal optimization tools
- (5) Simulation tools
- (6) Archieved operation date
- (7) Operation oriented performance measure

### PROJECT CASE STUDIES

CASE STUDY 1; the development of guidance to assist transport practitioners deciding what conditions are favorable to support particular operation strategies and identifying the likely impact (through time travel safety etc )

#### CASE STUDY 2

Incorporating highway capacity manual procedures into long range transportation planning for arterial signalization strategies

#### CASE STUDY 3

Application of microsimulation model in combination with a travel demand model to improve analysis of freeway management strategies.

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## **CASE STUDY 4**

The use of achieved operations data to support operations planning activities.

STEP 1 : Build on vision

STEP 2: Focus on top level objection

STEP 3: plan your attack, choose the battlefield

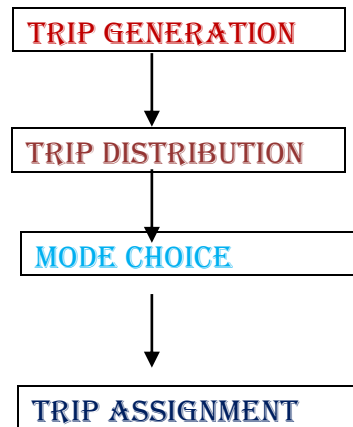
STEP 4: reality check does model stand

STEP 5: build the strategic framework

**QNo 2: in planning for a four step conventional transportation modeling Discuss in detail with reference to different zonal production and attraction attributes?**

### **Four step conventional transportation modeling**

The four step travel model a ubiquitous framework for determining transportation forecasts that goes back to the 1950s. It was one of the first travel demand models that sought to link land use and behavior to inform transportation planning.



#### **Trip Generation:**

Trip generation is the first step in the conventional four steps transportation planning process, widely used for forecasting travel demands. It predicts the number of trips originating in or destined for a particular traffic analysis zone.

#### **Objective:**

The objective of a trip generation model is forecast the number of person trips that will begin from or end in each travel analysis zone within the region for a typical day of the target year.

Trip generation uses trip rates that are averages for large segment of the study area. Trip productions are based on household characteristics such as the number of people in the household number of vehicles.

#### **Trip purpose:**

Predetermine the frequency of origins destinations of trips in each zone by trip purpose as a function of land uses and household demographic and socio economic factor.

- ❖ School Trips
- ❖ Work Trips
- ❖ Shopping Trips
- ❖ Recreational Trips

Table growth rates of different variables after 10 years.

Variable	Growth Rate
Population	4.5%
Income level	10%
Land price	25%
Employment	2.5%

### Trip Distribution:

Trip distribution is a model of the number of trips that occur between each origin zone and each destination zone. It uses the predicted number of trips originating in each origin zone (trip production and the predicted number of trips ending in each destination zone (trip attraction model.) Thus trip distribution is a model of travel between zone trips or links.

- ❖ Trip distribution is the second component in the traditional 4 step transportation planning model.
- ❖ This step metals trip maker's origins and destination to develop a trip table a matrix that display the number trips going from each origin to each destination.
- ❖ Similar to trip generation all the modes are still lumped together by purpose.
- ❖ This creates a problem for non vehicular trips because distance affects these trips very differently.

### The gravity model:

A model that is usually used for trip distribution is that of the gravity function an application of Newton's fundamental law of attraction  $F = g \frac{M_1 M_2}{D^2}$

### Mode Choice:

Mode choice predicts the choices that individual or groups make in selecting their transportation modes.

- ❖ An important objective is to predict the share of tips attracted to public transportation. This is new to BFCG travel demand modeling.

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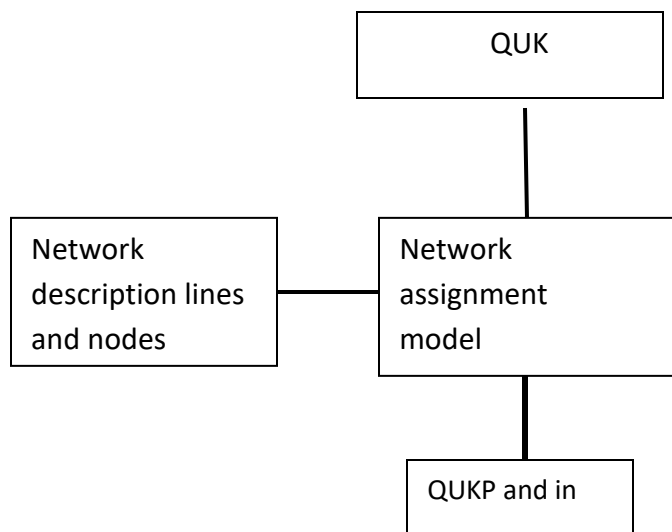
- ❖ Factor are include in mode choice, such as travel time, travel cost and access to mass transit option.
- ❖ A mode choice or mode split, model is concerned with the trip makers behavior regarding the selection of travel mode.
- ❖ For example a significant increase in the parking fees charged at a destination may induce some people to shift from driving a car to riding a bus.
- ❖ The characteristics of the trip also have an effect on the choice of mode. It seems more likely for example, that a person would choose to travel to work or school by mass transit system but prefer the private automobile if available for social trips.

### **Trip Assignment:**

Trip assignment, traffic assignment or route choice concerns the selection of routes between origins and destination in transportation network it is fourth step in the conventional transportation planning model.

To determine facility needs and cost and benefits, we need to know the number of traveler's on each route and link of the network.

Once trips have been split into highway and transit trips the specific path that they use to travel from their origin to their destination must be found. These trips are then assigned to that path in the step called traffic assignment.



## **Production and attractions:**

The trips that are predicted by a trip generation model for each zone are often referred to as the trip ends associated with zone. Trip ends may be classified as either origins and destinations or production and attraction. As used in trip generation studies the term origin and production on one hand and destination and attraction on the other are not identical.

The term production and attraction on the other hand are n't defined in term of the direction of trips but in terms of the land use associated with each trip end, a trip production is defined as a trip end connected to a nonresidential land use in a zone this destination is made because the zonal trip production can be more easily estimated from the socioeconomic characteristics of the zone population and the related travel needs of the population for various purposes.

## **Attraction:**

- ❖ Number and type of retail facilities.
- ❖ Number of employee.
- ❖ Land use.

## **Production:**

- ❖ Car ownership.
- ❖ Income.
- ❖ Population.

## **Conclusion:**

- Travel demand forecasting is a key component of the transportation engineer's technical repertoire.
- The four step model (FSM) is the primary tool for forecasting future demand and performance of a transportation system, typically defined at a regional or sub- regional scale.
- The trip rate for the zone=2 .30 trip per home, and the total number of trip is 105 for the sample.
- The numbers of tip generation for peak period are 26 trips. Secondly, note that although the vast majority (92%) of trips in the AM peak are compulsory (i.e, either to work or education). This is not the case in the off peak period.
- The pedestrian percentage (53%) increase in peak period morning because majority of population are student (54%) and most of them traveling to CIU by walking. In addition , the public transport has increased from (9%-23%).



**Q No3:** The settle area of KPK is being divided into different districts .Few of them are as (1)Peshawer (2)Charsada( 3) Mardan (4) Nowshera ( 5) Sawabi ( 6) Abbottabad(7) Kohat. consider each district an independent zone having attributes of area as given in table below .calculate the trips generation and attraction of each zone .comments on your answer?

**SOLUTION**

As we know that

$$\text{Trip Generation per Zone} = \frac{\text{Person Trips}}{\text{Zone 1}} \times \text{Trips per Thousand}$$

LAND USE CATEGORY	ZONE 1	PERSON TRIP	TRIP PER THOUSAND	ZONE 2	PERSON TRIP	TRIP PER THOUSAND	ZONE 3	PERSON TRIP	TRIP PER THOUSAND
RESIDENTIAL	7740	6574	849.3540052	24900	6574	264.0160643	17064	6574	385.8
RETAIL	6972	54833	7864.744693	5688	54833	9640.11955	26220	54833	2091.3
WHOLESALAS	14940	3162	211.6465863	10744	3162	294.3037975	20976	3162	150.7
SERVICE	5976	70014	11715.86345	2528	70014	27695.41139	1748	70014	40053.8
MANUFACTURING	1290	1335	1034.883721	4980	1335	268.0722892	1264	1335	1056.2
TRANSPORTATION	1935	5630	2909.560724	8964	5630	628.0678269	5688	5630	989.8
PUBLIC BUILDING	2580	11744	4551.937984	9960	11744	1179.116466	4424	11744	2654.6
PUBLIC OPEN SPACE	3010	25886	8600	22908	25886	1129.998254	15800	25886	1638.4
<b>TOTAL</b>	<b>44443</b>	<b>179178</b>	<b>37737.99117</b>	<b>90672</b>	<b>179178</b>	<b>41099.10564</b>	<b>93184</b>	<b>179178</b>	<b>49019.98</b>
<b>AVERAGE</b>	<b>5555.4</b>	<b>22397.25</b>	<b>4717.248896</b>	<b>11334</b>	<b>22397.25</b>	<b>5137.388205</b>	<b>11648</b>	<b>22397.25</b>	<b>6127.90</b>

ZONE 4	PERSON TRIPS	TRIP PER THOUSAND	ZONE 5	PERSON TRIP	TRIP PER THOUSAND	ZONE 6	PERSON TRIP	TRIP PER THOUSAND	ZONE 7	PERSON TRIP	TRIP PER THOUSAND
42204	6574	155.8	29317	6574	224.2	576416	6574	11.4	53445	6574	123.0
6172	54833	8884.2	126091	54833	434.9	15270	54833	3590.9	1290	54833	42506.2
7715	3162	409.9	90065	3162	35.1	7635	3162	414.1	1935	3162	1634.1
6172	70014	11343.8	162117	70014	431.9	10180	70014	6877.6	1720	70014	40705.8
1748	1335	763.7	4629	1335	288.4	36026	1335	37.1	12725	1335	104.9
5244	5630	1073.6	4629	5630	1216.2	90065	5630	62.5	10180	5630	553.0
6992	11744	1679.6	3086	11744	3805.6	252182	11744	46.6	30540	11744	384.5
71668	25886	361.2	92580	25886	279.6	468338	25886	55.3	114525	25886	226.0
<b>147915</b>	<b>179178</b>	<b>24671.7</b>	<b>512514</b>	<b>179178</b>	<b>6715.9</b>	<b>1456112</b>	<b>179178</b>	<b>11095.5</b>	<b>226360</b>	<b>179178</b>	<b>86237.7</b>
<b>18489</b>	<b>22397.25</b>	<b>3084.0</b>	<b>64064.25</b>	<b>22397.25</b>	<b>839.5</b>	<b>182014</b>	<b>22397.25</b>	<b>1386.9</b>	<b>28295</b>	<b>22397.25</b>	<b>10779.7</b>

Now we find the values of Trip Attraction of each Zones, by using the formula's given below:

$$\text{Trip attraction} = 1.213 (x) + 106.213 (x \text{ is in } 1000 \text{ sq-ft of gross area})$$

$$\text{Zone-1} = 5828 \text{ Zone-2} = 6337 \text{ Zone-3} = 7538 \text{ Zone-4} = 3847$$

$$\text{Zone-5} = 1124 \text{ Zone-6} = 1788 \text{ Zone-7} = 13181$$

$$\text{Total} = (39647) \text{ ANS}$$