


Urban Landuse and Transportation Planning
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Lecture-14
Transport Planning Surveys, Part-1

Welcome back. In lecture 14 different types of transportation planning surveys will be covered. And this is part 1 of the lecture and after this there will be part 2.

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CONCEPTS COVERED

- Transportation planning surveys
- Revealed Preference and Stated Preference surveys
- Contingent valuation
- Conjoint analysis
- Typical travel behavior survey

The different concepts that will be covered in this lecture are different kinds of the transportation planning surveys, revealed preference and stated preference surveys, contingent valuation, conjoint analysis and typical travel behavior survey.

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Common Surveys in Transportation Planning

Inventory of road-network systems

Physical characteristics and hindrance of transportation infrastructure (i.e. road network, flyover, underpass)

Same road width: At two section

Different road width: At every change

Road Inventory Survey Format

| Link ID | Section ID | Type of carriage way | Width of ROW (m.) | No. of lane (No.) | Condition of Road(Options) | Encroachment on ROW (Y/N) | Nature of encroachment |
|---------|------------|----------------------|-------------------|-------------------|----------------------------|---------------------------|------------------------|
| | | 2 | | | | | |
| | | 1 | | | | | |

| Footpath continuity (Y/N) | Footpath width (mm) | Shoulder width (mm) | Drainage type (Options) | Parking length(m.) | Parking width(m.) | Width of service road (m.) |
|---------------------------|---------------------|---------------------|-------------------------|--------------------|-------------------|----------------------------|
| | | | | | | |

Arterial - 1
Collector - 2



Common surveys in Transportation planning

The first one is inventory of road network systems. This is carried out to measure the physical characteristics and hindrances of the transportation infrastructure, such as that of a road network or a flyover or underpass. For road width, it can be taken at two sections. The image shows the format of a road inventory survey. The link ID and section ID is followed by the type of the carriageway, width of right of way, road condition and type of encroachment on the right of way. All data fields are objective, except the column on the nature of encroachment. Another set of fields may include parking length, parking width, width of service road and so on.

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Household Personal Interview Survey Questionnaire : Typical Travel Diary

Name of the surveyor: _____ Date: _____
 Name of respondent: _____ Address: _____

A. Socio-economic profile (HH Level)

1. No. of persons (per day): a. 1. b. 2. c. 3. d. 4. e. 5. f. 6. g. More than 6

2. Duration of stay in this area
 (a) Since birth (b) First since birth, then the reason for migration
 (c.1) Employment (c.2) Education (c.3) Search of employment (c.4) Others, specify _____

3. When did you move to this area? From where do you migrate (District name)
 (a) 0-2 Years (b) 2-5 Years (c) 5-10 Years (d) More than 10 Years

4. Tenure of housing: a. Owned b. Rent _____ (Rent Monthly)

5. Monthly Household Income _____ (Rs. Monthly)

6. Number of abodes in the household a. 1 b. 2 c. 3 d. 4 e. +4

7. Number of owner in the household a. 1 b. 2 c. 3 d. 4 e. +4

8. Vehicle Owned and No.: a. Cycle b. 2 Wheeler c. cycle motorbike d. Auto rickshaw e. Others (Specify)

9. Monthly Household Expenditure _____ (Rs. Monthly)

| Sl. No. | Head | Monthly Expenditure (Rs.) |
|---------|-----------|---------------------------|
| 1 | Food | |
| 2 | Cloth | |
| 3 | Home | |
| 4 | Transport | |
| 5 | Health | |
| 6 | Others | |

10. How much do you save? _____ (Rs. Monthly)
 If any savings, how do you invest your savings?
 i. bank (with an interest rate) f. buy immovable properties h. invest in business
 k. Other (specify savings)

B. Socio-economic Profile (Personal Level)

| Sl. No. | Relation with Head of the family | MF | Age | Education | Occupation | Income (Rs. Monthly) |
|---------|----------------------------------|----|-----|-----------|------------|----------------------|
| 1. | | | | | | |
| 2. | | | | | | |
| 3. | | | | | | |
| 4. | | | | | | |
| 5. | | | | | | |
| 6. | | | | | | |
| 7. | | | | | | |



Household personal interview survey questionnaire

The slide shows a typical travel diary survey format conducted at the household through personal interviews. The first part of the questionnaire starts with the survey details like the name of the survey, the name of the respondent, the date and the time and the address where the survey is being done. This helps in tracing back the responder in case of a problem.

This is followed by the socio economic profile of the responder like the size of the household, the duration of the stay in that area, tenure of housing, ownership details, monthly household income, savings, vehicle ownership, etc. Using this data the samples can be classified into smaller homogeneous groups. Besides the socio-economic profile of the household, socio-economic data concerning the individuals and the inter-relationship between members in a household can also be collected.

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C. Trip Details
(HH level O-D Survey)

| Person No | Trip No | Origin | Destination | Mode 1 | Trip Length | Waiting Time | Travel Time | Cost | Interchange Point | Mode 2 | Trip Length | Waiting Time | Travel Time | Cost |
|-----------|---------|--------|-------------|--------|-------------|--------------|-------------|------|-------------------|--------|-------------|--------------|-------------|------|
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

Origin bus stop/stop
Destination bus stop/stop
Transfer bus stop/stop

Mode specific variables
Bus crowding (interval scale/ratio scale)
Bus safety (ordinal scale)
Bus type (nominal scale)

Trip specific variable
Trip time ✓
Trip purpose ✓
Escort trip(Y/N)

Neighborhood and access mode characteristics at access end and egress end
Density
Accessibility (regional)
Accessibility (local)
Access mode, time cost

Additional policy variables
Parking price
Parking availability
Congestion charge

The socio-economic data is followed by the collection of data on the trips that the persons in the household make. Trip data includes purpose, origin, destination, mode, route, transfer points, trip cost, trip time, etc. Trip purpose may include work trip, recreational trip, escort trip (parent taking a child to a school), etc. Sometimes, depending on the purpose of the study, additional information like bus stop, type of para-transit used, etc can also be sought. In studies conducted for comprehensive mobility plans, responses can be sought on vehicle type (using nominal scale), comfort level, crowding (using an interval scale) and safety level (using ordinal scale) of public transit and other modes. Additional variables include neighborhood and access mode

characteristics like walkability, regional accessibility, density, etc which determine a person's mode choice.

Finally, there can be some additional policy variables, which can be a part of the travel diary like parking price in the person's destination or the parking availability, congestion charge along the way, etc. All these things determine the mode choice of a person.

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Traffic Volume Count Survey

- To identify the traffic characteristics across different time of the day
- e.g., At cordon and screen line generally for 24/48 hours
- Manual, sensors, video photography

Volume Count Survey (24 Hours)

| Time | Cycle | 2-wheeler | Car | Bus | Minibus | Truck | LCV | Others |
|-------------|-------|-----------|-----|-----|---------|-------|-----|--------|
| 6-7 | ✓ | | | | | | | |
| 7-8 | ✓ | | | | | | | |
| 8-9 | ✓ | | | | | | | |
| 22:00-23:00 | | | | | | | | |
| 23:00-24:00 | | | | | | | | |

Roadside origin-destination Survey

| Sl. No. | Time of Survey | Trip No. | Origin | Destination | Mode | Purpose | Cost | No. of Passenger | Frequency |
|---------|----------------|----------|--------|-------------|------|---------|------|------------------|-----------|
| | | | | | | | | | |
| | | | | | | | | | |

- OD matrix and travel pattern
- Generally for one working day and weekend
- Intercept interview (roadside), Automatic Number Plate Recognition (ANPR) systems

Traffic volume count survey

For traffic volume count in a particular study area, there can be cordon points (at roadways or railways), screen lines, etc. Here traffic can be measured during peak hours or across the entire day to understand variability. The counting of vehicles (2 wheeler/4 wheeler) can be done in 20-30 minute slots manually or continuously using sensors or video photography.

In roadside origin-destination surveys the aim is to find origin-destination and travel pattern. It can be done on a weekday and on a weekend using roadside intercept surveys or by using Automatic Number Plate recognition (ANPR) systems.

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Speed-delay Survey

- ❑ To determine level of service, congestion level, delay causing factor, running speed
- ❑ Location of survey: Multiple runs
- ❑ Moving observation method, sensors, video photography, Automatic Number Plate Recognition (ANPR) systems

Speed-delay Survey

| Name of the road | | Time of survey | | | |
|------------------|----------------|----------------|---------------------------|--------------------------|----------------|
| Sl. No. | Distance (km.) | Control Points | Second Stop watch (MM:SS) | First Stop watch (MM:SS) | Cause of delay |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Speed delay surveys are conducted to determine the level of service, congestion level, delay causing factor, and running speed of a vehicle at a particular road. This can be done using the moving observation method where the surveyors record the observation from a moving vehicle. In this method multiple runs can be conducted to record observations using different kinds of sensors, video photography, and automatic number plate recognition to record the number of times a vehicle stops and the reason for the stop and the time of that particular stop.

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Revealed preference and stated preference surveys of travel behavior

Revealed preference (RP) surveys of travel behavior include determining preferences based on decision maker's actual choices, in the real context.

Stated Preference (SP) surveys is a method used to analyze decision maker's choices when there are hypothetical choice alternatives and new attributes or new hypothetical levels of attributes of existing choices.

One draw back of stated preferences is that it may not match actual preferences because of systematic bias in SP responses.

Both RP and the SP choice behavior is based on the neo classical theory of consumer behavior which states that, individuals will choose the alternative which has higher utility.

Travel behavior surveys

These are specialized surveys to understand how travel behavior changes with the introduction of new policies, new modes, or change in certain parameters of existing mode or change in consumers' choices. They can be revealed preference or stated preference surveys.

Revealed preference surveys of travel behavior include determining preferences based on decision makers actual choices in the real world. For example, a person using a public transport reveals his/her choice in the real world. Whereas stated preference surveys is a method to analyze decision makers' choices when there are hypothetical choice alternatives or new attributes or new hypothetical levels of attributes of existing choices. For example, one may be asked about his preference of shifting to metro rail when it comes up in the future. Or a person maybe asked about his preference of shifting to a public transport if the frequency is increased. Since the metro rail and increased frequency are non-existent now people are stating their choices in a hypothetical situation which may not match their future preference. Thus, one drawback of stated preference is that it may not match actual preferences because of systematic bias in SP responses. A responder may state about his/her intention to buy environment friendly bags but may not do so in reality if the costs are high.

Both RP and SP choice behavior is based on the neoclassical theory of consumer behavior which states that individuals will choose the alternative which has got the highest utility. That means, using both these surveys, we are able to get the choices of individuals and using their choices we can develop statistical measures and models to say what influences their mode choice.

And usually we assume that the higher the utility a particular mode has got, more is its chance of being chosen.

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Stated preference theory

Stated Preference has been used in market research since 1970s.

Conjoint analysis was the first form of SP study introduced in 1960s in the field of mathematical psychology.

Green and Rao (1971) exploited this method in consumer choice studies and made SP methods popular in academic research.

In the field of travel behavior, Bates(1983) conducted an SP experiment on choice of train and coach(bus) using 16 pairwise comparisons using hypothetical levels of five variables'(main mode in-vehicle time (MIVT), other mode in-vehicle time (OIVT), walk time (WALK), wait time (WAIT) and COST.' (Wardman,1988)

Contingent valuation

Conjoint analysis

Stated preference theory

Since 1970s, stated preference has been used in market research. There are different techniques to determine or analyze the responses obtained through a stated preference survey. One is contingent valuation and the other is conjoint analysis.

Conjoint analysis was the first form of SP study introduced in 1960s in the field of mathematical psychology which was then popularized by Green and Rao in consumer choice studies and academic research. And in travel behavior research Bates in 1983 conducted an SP experiment on choice of trains and bus using 16 pairwise comparisons using hypothetical levels of 5 variables. That means he changed the levels for 5 variables (which include the main mode in-vehicle time, the second mode in-vehicle time, the walk time to the mode, wait time and the cost of that particular mode) to hypothetical values and found out if a people will choose a bus or a train and also the relative cost of time. So, this was the instance where this conjoint analysis was used in travel behavior research.

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Contingent valuation

□ Contingent valuation (CV) method is used in experiments dealing with willingness to pay (WTP) or willingness to accept (WTA) for a certain good/ service.

It can be further classified into

Open-ended CV

How much a person is willing to pay is asked

Referendum CV

A person is asked if he/she is willing to pay a certain amount

Payment card CV

A person chooses from a list of amounts which he/she is willing to pay.

| | | |
|---|---|--|
| If coverage of water supply were expanded to include this area, would you be willing to get it installed? | | |
| Yes | How much would you pay (INR) for installation? (drop asking from less to high till respondent decides to pay) | How much would you pay (INR) for water consumption (monthly)? (drop asking from less to high till respondent decides to pay) |
| | 1000 / 1500 / 2000 / 2500 | 300 / 500 / 800 / 1000 |
| No | Why cannot you afford? | |

Contingent valuation

Contingent valuation, which is also known as the CV method, is used particularly in experiments dealing with willingness to pay or willingness to accept a particular goods or service. For example people are asked about their willingness to pay a certain amount of money for a particular service at a particular cost or a particular level of service at a particular cost.

Contingent valuation method can be categorized into 3 types. One is open ended CV, where people are directly asked how much they are willing to pay, and they state a particular amount. Though simple, the method can lead to a lot of bias.

Then there is referendum CV, where a person is asked if he or she is willing to pay a certain amount. The amounts are a more realistic valuation of the particular alternatives and a person can also choose from a list of amounts that he or she is willing to pay. In Payment card CV a person is asked to choose from a list of amounts he/she is willing to pay. As can be seen from the slide, each time a person says yes he is asked about his willingness to pay a higher amount. Why a responder is not willing to pay a higher amount can also be probed in this method. This method is more realistic compared to open ended CV.

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Conjoint analysis

- ❑ Conjoint analysis is a method where a person is subjected to a hypothetical scenario.
- ❑ Each scenario is a combination of certain levels of some factors.
- ❑ The factors and its levels are decided by the researcher through literature study and other observations.
- ❑ The respondent is supposed to make a choice from a defined choice-set keeping in mind the hypothetical scenario.

| Scenario | Bus fare | Waiting time at bus stop | Crowding level in bus | Auto-rickshaw fare | Order to purchase by bus | Choice |
|----------------------|-----------------|--------------------------|----------------------------------|-----------------------------------|--------------------------|------------|
| Current trip details | ₹ 10 | 10 min | High | ₹ 10 | Bus | Auto |
| Sc. 1 | 50% increase | 10 min | 50% more bus seat capacity | 40% increase bus current bus fare | Same as current | Bus / Auto |
| 2 | Same as current | 15 min | 50% more bus seat capacity | 40% increase bus current bus fare | 1 rickshaw increase | Bus / Auto |
| 3 | Same as current | 6 min | 1 more bus seat capacity | 20% decrease bus current bus fare | 1 rickshaw increase | Bus / Auto |
| 4 | Same as current | 6 min | Less than equal to seat capacity | 50% decrease bus current bus fare | 1 rickshaw increase | Bus / Auto |

Conjoint analysis

Conjoint analysis is a method where a person is subjected to a hypothetical scenario like the study by Bates that was discussed earlier. Each scenario is a combination of certain levels of some factors which are decided by the researcher through literature study and other observations. And the respondent is supposed to make a choice from a defined choice set keeping in mind the hypothetical scenario. As shown in the example, a response is sought between choosing an auto or bus under different scenarios of changed fares, crowding level and waiting time. Here five parameters are used. So, one can go till 7 or 8 parameters, but that is the maximum extent possible, beyond which people will not be able to give a response. As is evident from the example, using a certain combination of parameters of bus fare (like 50% increase, same as current), waiting time at stop (10, 15 and 6 minute), and etc. different scenarios can be created.

The method to reduce the number of combinations or rather use the combinations which are more appropriate is called a fractional factorial design, which will be taken up in the next lecture.

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Comparison of RP and SP surveys

| | RP data | SP data |
|-----------------------|--|--|
| Performance inference | The result of actual behaviour. Consistent with the behaviour in the real market. | Expression under hypothetical situation. Possibility of inconsistency with the behaviour in the real market |
| Alternatives | Only existing alternatives ✓ | Existing and non-existing alternatives. |
| Attributes | Measurement error Limited range of attributes' levels Possibility of collinearity among attributes | No measurement error Extensibility of the range of attributes' levels. Controllability of the collinearity among attributes. |
| Choice set | Choice-set is non-clear to the respondent. | Choice-set is clear to the respondent. |
| No. of responses | One response per respondent | Multiple responses per respondent |

Comparison between RP and SP survey

Comparison between RP and SP survey shows that RP data is based on the results of actual behavior and is consistent with the behavior in the real market, whereas SP data is expression under hypothetical situation and it may be inconsistent with the behavior in the real market. RP survey considers only existing alternatives whereas SP survey considers existing and non-existing alternatives. In RP survey the range of the attributes are limited and there may be measurement errors as well because of non-availability of data and other reasons. Additionally, there could be possibility of collinearity among that attributes whereas, in SP data, collinearity can be controlled to some extent. Because the survey scenarios are designed and the range of the attributes extendable, measurement error is absent in SP surveys. In case of RP, the respondent may not be aware of all the available choices whereas in SP, a person can see exactly what the choices available are and decide accordingly. The number of responses could be only one in case of RP, but in the case of SP data, there can be multiple responses by one individual.

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JOINT RP-SP STUDIES.

- Joint RP-SP method has been found to be able to harness the positives of both RP and SP methods and mutually overcome each other's drawbacks.
- SP data has a greater depth of information as compared to RP data but it also has higher bias.
- Combining both (RP and SP) the methods result in lesser bias as compared to SP only models and increases model accuracy as compared to RP only models.
- The estimation of such models incorporates a **scale parameter** to mitigate the unequal variances in RP and SP data.

Joint RP-SP surveys

Joint RP-SP methods can harness the positives of both the methods while overcoming their individual drawbacks. SP data has a greater depth of information (owing to the multiple scenarios), but it also has a higher bias. Combining the two can result in lesser bias and increase model accuracy. A scale parameter is incorporated to mitigate the unequal variances in RP and SP data.

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Bicyclists' Accessibility Improvement to Rail Stations in Kolkata | Indian Institute of Technology, Kharagpur

Travel behavior Survey

a). Surveyor Name: _____ b). Date _____ c). Form no: _____ d). Location _____ e). Time _____

SOCIO ECONOMIC CHARACTERISTICS

- Age: _____ yrs
- Gender: Male / Female / Transgender
- Educational Qualification: (illiterate/primary/secondary/higher secondary/graduate & above)
- Income: < 4,000 / 4,000-10,000 / 10,000-20,000 / 20,000-50,000 / 50,000-1,00,000 / 1,00,000-5,00,000 / > 5,00,000
- Occupation: (Student / unemployed / employed for wages / self employed / private employee / government employee)
- Do you own a private vehicle: Yes / No Two-wheeler _____ / Four-wheeler _____
- Do you have a driving license? Yes / No
- Household size: _____

TRIP CHARACTERISTICS

| Origin (Surrounding) | Step 1 to Step 2 | | | Step 2 to Step 3 | | | Step 3 to Destination | | | |
|----------------------|------------------|-------------|-----------------|---------------------------|-------------|-----------------|-----------------------|-------------|-----------------|-------------|
| | Location | Access Mode | Access Distance | Transfer Station Location | Travel Mode | Travel Distance | Travel Cost | Travel Mode | Travel Distance | Travel Cost |
| | | | | | | | | | | |

9. How frequently do you travel to this rail station using bicycle: (Everyday / 3-4 times in a week / Weekly / Other _____?)

10. If you do not use bicycle, then what other alternate modes do you use?
Auto rickshaw / Private Vehicle / Taxi / Bus / Others _____

Here is an example of a travel behavior survey combining SP and RP techniques. This was a survey of people coming to a railway stations and the purpose of this research was to improve bicyclist accessibility or determine the causes which prevent a person from using a bicycle to

come to a station. And the hypothesis was, if people use bicycles to stations it would reduce the share of polluting transport. In the first part is the surveyor's name, date, phone number, location and all the details and the time of the survey followed by the socio economic characteristics of the respondent- age, gender, education, income, occupation, vehicle ownership, driving license, household size and so on. This is followed by the trip details of his entire trip, which is an important determinant in his choice of a bicycle. Because if a trip is too long, one may feel disinclined to use a bicycle. The trip details include origin location, stop location, access mode, access distance, access cost, transfer station location, travel mode, travel distance, travel costs, egress mode, egress distance, egress cost, destination, frequency of such trips and mode.

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Perception survey(attitudinal scale)

13. Assess the factors based on their importance in determining the intention to use bicycle and rate the current level of satisfaction

| Factors affecting bicycle use | Level of importance | Level of satisfaction |
|--|---|--|
| | Not important/ Slightly important/ Important/ Very important/Critical (1/2/3/4/5) | Very poor/ Poor/Average/Good/Very good (1/2/3/4/5) |
| Safety and security | | |
| Safety from risk of car/bicycle collision/cyclist injury | | |
| Safety against bicycle theft and vandalism at the parking location. | | |
| Safety from assault, harassment and burglary | | |
| Traffic conditions | | |
| High speed traffic flow along the route | | |
| Unsafe conditions for bicyclists at intersections and traffic signals due to vehicle crossings and turning | | |
| High proportion of heavy vehicles in the total traffic volume | | |
| Slow moving traffic / congested conditions | | |
| On street parking | | |
| Number of pedestrians on the road | | |
| Comfort and convenience | | |
| Difficulty to carry baggage while cycling | | |
| Exposure to climate and weather conditions. | | |
| Exposure to environmental pollution. | | |
| Physical exertion. | | |
| Increased travel time. | | |

| Efficiency | |
|--|--|
| Avoids traffic problems such as traffic jams | |
| Easy to park | |
| Enables quick door to door transport. | |
| Competitive with other modes of transport over short distances | |
| Flexibility in using of any preferred time | |
| Flexibility in using any preferred route including shortcuts | |
| Infrastructure characteristics | |
| Segregation from motorised vehicle traffic | |
| Parking facility at the rail stations | |
| Amenities like rain shelters, repair shops, etc. | |
| Street lighting | |
| Way finding signage elements | |
| Health benefits of cycling | |
| Fulfillment of environmental concerns | |
| Cycling is associated with low social status | |

Level of importance
Level of satisfaction

In the next part, a perception survey using an attitudinal scale is conducted to determine the important factors that influence the use of bicycles. Also the current level of satisfaction of the important determinants of bicycle use is also enquired into.

This is also RP, but this is not the numerical values or actual values of his choices, but these are his attitudinal values or perceptions. The factors affecting bicycle use are safety and security, safety from collision, safety from bicycle theft, safety from assault harassment, etc. Traffic conditions, high speed traffic flow along the road, unsafe conditions for bicyclists at intersections, high proportion of heavy vehicles, comfort and convenience, difficult to carry loads while cycling, exposure to climate and weather conditions are the different factors which determine perception about bicycling.

There are also other factors which determine efficiency- easy to park the bicycle, flexibility of usage, segregation from heavy traffic, etc. The questions probe both level of importance and level of satisfaction. Level of importance helps us to understand what should be provided in the future and level of satisfaction captures the existing conditions. Level of importance is related to both current and potential users, unlike level of satisfaction which concerns current users only. By doing a regression analysis on the data one can find out which are the factors actually influencing overall satisfaction.

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Conjoint analysis
Four scenarios in each survey.
Eight parameters, multiple levels.

| Parameter | Existing scenario of the current transportation mode | Scenario 1 | Scenario 2 | Scenario 3 | Scenario 4 |
|---|--|---------------------------|----------------------------|----------------------------|----------------------------|
| Travel Distance from source to Railway station (km) | | >4 | >4 | <1 | 1-2 |
| Presence of bike lanes | | Partially Present | Absent | Absent | All along the route |
| Congestion along the route | | Less congested | Moderately congested | Less congested | Moderately congested |
| Walking Distance from the bicycle parking location to the railway station | | <100 m | <100 m | >500 m | 300-500 m |
| Weather protection infrastructure | | not present | not present | closely located shelters | closely located shelters |
| Temperature | | 15-25° | 15-45° | 25-35° | 15-45° |
| Air quality | | Bad | Medium | Medium | Good |
| Parking cost(₹) | | 5 per day & 150 per month | 15 per day & 450 per month | 10 per day & 300 per month | 10 per day & 300 per month |
| Choice(Y/N) | | | | | |

15. What is the maximum distance you can bicycle along the bicycle track: < 1km, 1 to 2 km, 2 to 3 km, 3 to 4 km, 4 to 5 km, > 5 km

16. What will be the desired distance you can bicycle : 1 km, 1 to 2 km, 2 to 3 km, 3 to 4 km, 4 to 5 km, > 5 km

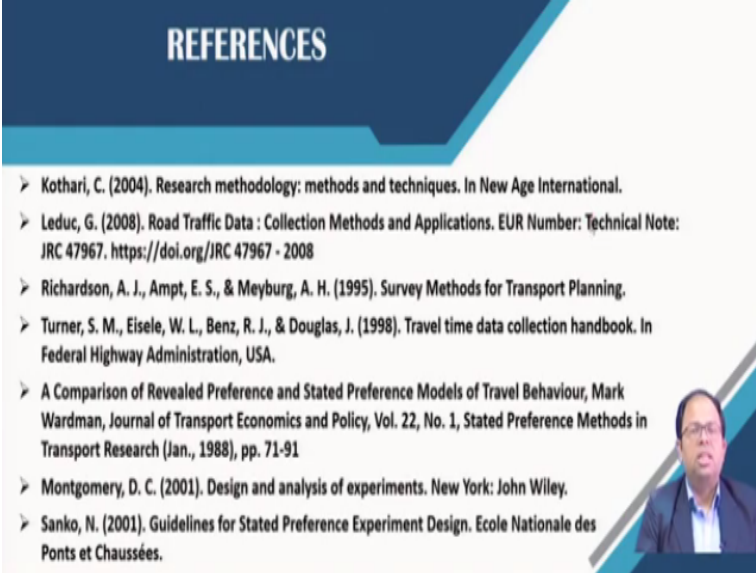
Conjoint analysis

In the above example, stated preference survey is carried out using conjoint analysis. Four scenarios are present with eight parameters and multiple levels. The eight parameters are- travel distance from source to railway station, presence of bike lanes, congestion along the route, walking distance from bicycle parking location to the railway station, weather protection infrastructure, temperature, air quality and parking. Bike lanes are absent and are considered as a hypothetical scenario. Using these parameters four scenarios are constructed and a binomial response is sought- ‘will the responder choose to bicycle?’

So, this survey includes 3 parts one is the basic RP part, then there is RP part but attitudinal survey and then there is a stated preference which have all been combined in one survey.

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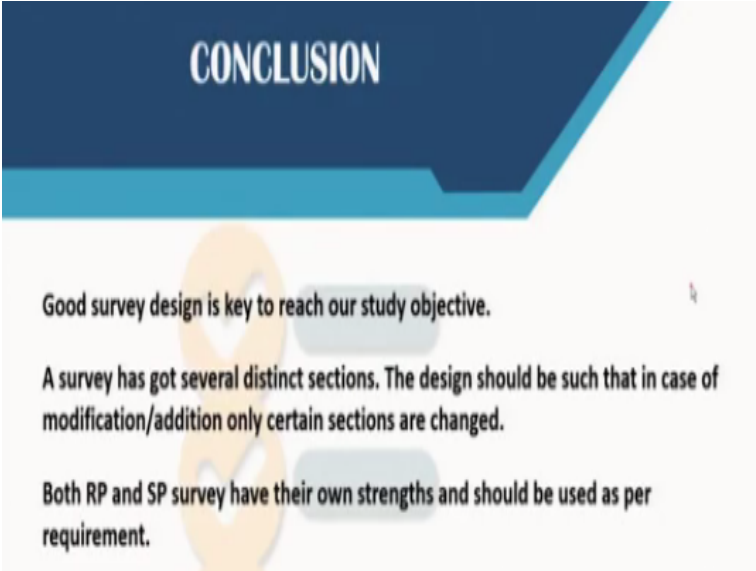
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CONCLUSION

- Good survey design is key to reach our study objective.
- A survey has got several distinct sections. The design should be such that in case of modification/addition only certain sections are changed.
- Both RP and SP survey have their own strengths and should be used as per requirement.

To conclude it can be said that, a good survey design is key to reach the desired study objective. A survey has got several distinct sections and the design should be such that in case of modification or addition, only certain sections have to be changed. Both RP and SP surveys have their own strength and should be used as per requirement. Thank you.