Urban Services Planning
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Lecture 08
Service Planning Basics Part : III

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Welcome back. In Lecture 8, we continue with Service Planning Basics, and we are into Part 3.

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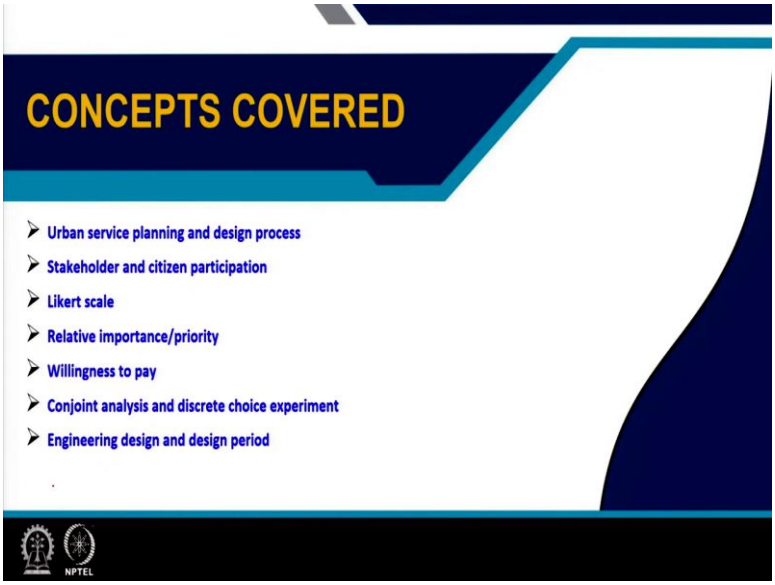

The concepts that we will cover in this lecture are on we will, we will look into the urban service planning and design process once more, we will talk about stakeholder and citizen participation, we will discuss about Likert scales, then we will discuss how to determine

relative importance and priority, then we will talk about willingness to pay and the different methods to determine willingness to pay either by conjoint analysis and discrete choice experiments. Then we will talk about engineering design and design period.

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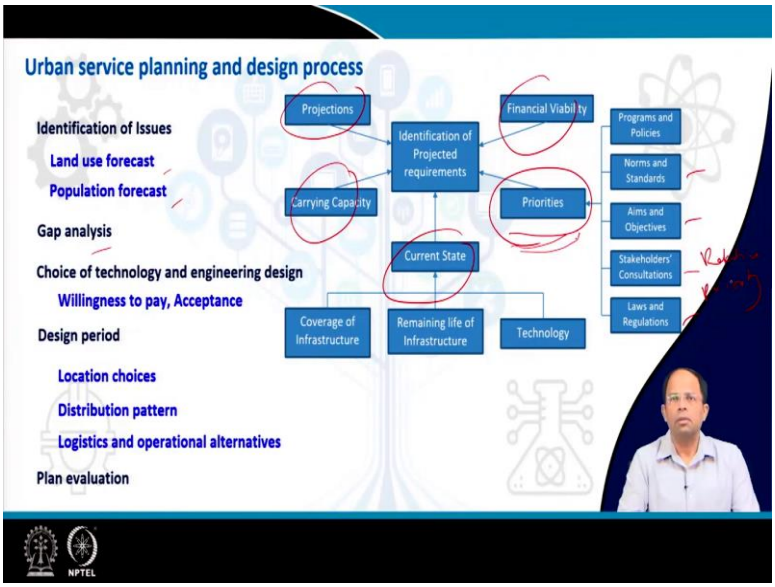

So, just to give you, remind you about our earlier discussion, when we are talking about the urban service planning and design process, we have to go through different steps. In the last lecture, we were discussing gap. Analysis and before that, we have looked into land use forecast and population forecast. And before that, we also have discussed on a little bit about the overall process as well.

So now, we can see that within this particular process, when we are doing gap analysis, this determination of priorities is very important. Of course, financial viability, carrying capacity, current state of affairs, all these are important, the projections, all these are important, but the priorities that what people want and what can be provided, that is has to be determined.

Now, to determine, arrive at this list of priorities, we have to look into the laws and regulations, norms and standards, aims and objectives and so on, and of course, there is also stakeholder consultation, and of course, within stakeholder consultation, the public participation or what are, what does people want for that area. And within, that we had discussed earlier about relative priority of attributes. So, that is what we are going to focus on this lecture.

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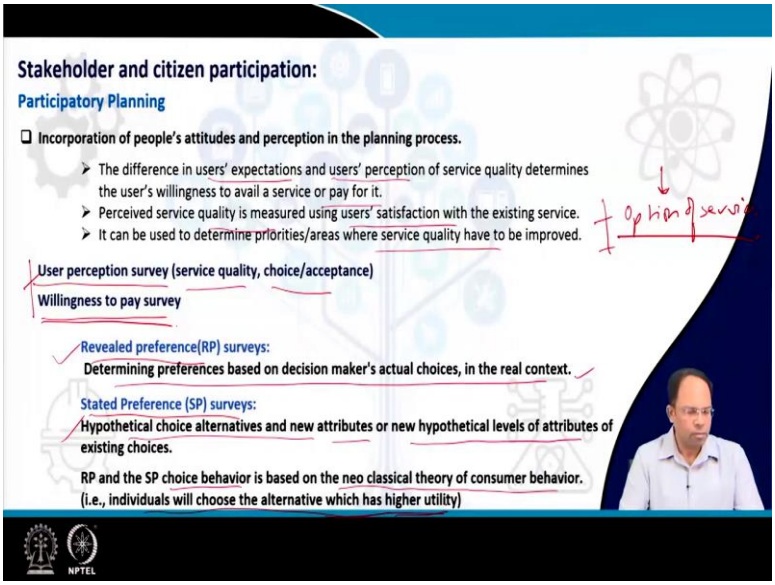

So, in participatory planning, we, basically we want to take into consideration people's attitude and perception, and that means that if I include this in the planning process, obviously, the difference, obviously, the planning process would be much smoother and people would be more willing to participate in the entire process and the number of protests and all these things arising out of certain projects, that would obviously reduce.

So, the difference in users' expectation and users' perception of service quality determines the users' willingness to avail a service or even pay for it. So, that means people expect certain things and they also, they have their own perception about a particular service. Now, perception is not the actual value. That means the municipality may be providing a certain kind of service, the, as per the municipality it is up to standard, but people may perceive it to be very poor. Or people, municipality may feel that no the service that is being provided is not adequate, but for people it may be adequate.

For example lighting level, lighting. Now, the municipality may start thinking that well the lighting is not adequate, I will add on new set of lights in the urban area. But for people, if you go and ask the people, they are more or less happy with the lighting in the city, or it could be just the opposite as well. That means people may, municipality may feel like lighting is adequate but people may say it is not. So, perception is very, very important.

Another thing that is important is expectation, that is, what people expect. So, there is always a gap between perception and expectation. So, that gap has to be fulfilled. Now, expectation, people may say they want many things but if you really ask people and take their consensus

or their opinion, they also know the economic condition, people also understand what is possible to be provided, and accordingly, they build up their expectation. It is not like people will have too high expectations also. So, people have to tell their realistic expectations.

So, based on these two things people will be willing to avail a new service or a modification of the existing service or they may be able to, they may be willing to pay additional value from what they pay, or if they do not pay anything, they may be willing to pay something for it. So, one way to measure perceived service quality is using user satisfaction level with the existing service.

So, that means existing satisfaction with a particular service, that is one way to see, to determine that how happy people are with it or what is their perception about it. So, in another case, sometimes what we can do is we can also give choices to the people and ask them that which choice they want. So, it is not only about their satisfaction about a service but if there are different options also, like option for service, this also could be chosen by the people.

So, that both can, both, you can say that this is also another form of user perception where they give that opinion about a particular option. So, both these techniques, this option or your determining user satisfaction, both of this could be utilized to determine priorities or rather relative priorities or areas where service quality has to be improved.

So, both of this, so this perception, taking perception about different service aspects or taking their opinion about which option to be provided, both of this can help us in determining priorities, for relative priorities among the different options or among the different services. So, to conduct this kind of studies we need to do user perception survey where we can ask them about their service quality, their satisfaction with that or we can ask about their choices or acceptance about a particular project or a particular technology or a particular service design.

And we can also directly ask them about their willingness to pay. So, for that we conduct willingness to pay service. So, these are the two kinds of service that can be done. Now, both this service could be again done in two ways. One is Revealed Preference approach, we call them Revealed Preference service, and the other is the Stated Preference approach or the Stated Preference service.

Now, what is Revealed Preference approach? Revealed Preference approach is determining preferences based on decision makers' actual choices in the real context. So, I survey the people regarding the service quality of street cleaning services. We break down street cleaning services into multiple attributes and I ask them about that overall street cleaning, what do you feel, what is the level of satisfaction.

Or I can even take for each of these smaller attributes, which describes street cleaning, that is cleaning frequency, cleaning, how, equipment, and hundreds of things we can consider when we decide the questions, and we can take the satisfaction with each one of this. So, that means in the real context, based on the service that is being provided, we can ask them about the feedback, and from there, we can determine which are the things which people want to be improved and so on.

So, that is based on the real context and real things. But sometimes what happens, certain choices that I want to provide, like for example, I want to start a incineration plant, which is a alternative of landfill for Urban Waste Management. So, if there is no incineration plant, that is a hypothetical choice alternative.

So, hypothetical choice alternative, people cannot give their opinion. They can give their opinion but they cannot say what is, what was their satisfaction with that service. They cannot say that because that service is not there. So, in this case it is a hypothetical choice alternative. Or similarly, if I introduce some new attributes or new hypothetical levels of attributes of existing choices, then also those attributes are not there.

So, this kind of service are known as Stated Preference service. That means I ask them about their opinion about a particular service or a level of, attribute of a particular service or a level of a particular service and take their opinion about it. So, it is a hypothetical choice whereas the first one is a actual choice or a revealed preference.

Now, so, you can understand that revealed preference, because it is based on actual choices, it is more, it gives more realistic or more correct estimates whereas because it is a stated preference, obviously sometimes people say very state things but actually they were not going to do that. So, there is that based always remaining with Stated Preference service. But there is no other way because these alternatives are not at all present. But if I do not consider them, we cannot have people's opinion without doing this kind of stated preference service.

So, both RP and SP choice behavior, that is a person's choice to give a certain rating or to choose a certain option is based on the neo classical theory of consumer behavior. So, what it says is, individuals will choose the alternative which is the highest utility for them. That means, a person will give a choice for a particular item if it is giving him the highest utility.

So, the utility is based on many characteristics. It is based on his socio-economic characteristics, it is based on what he does, it is based on the characteristics of that particular option or technology option, infrastructure or service option and so on. So, if it gives him more utility compared to the others, other options, then he will choose that. Similarly, when he chooses a particular satisfaction rating, that is also, he is choosing that because he feels that is the most appropriate for that particular rating. So, it is the same concept.

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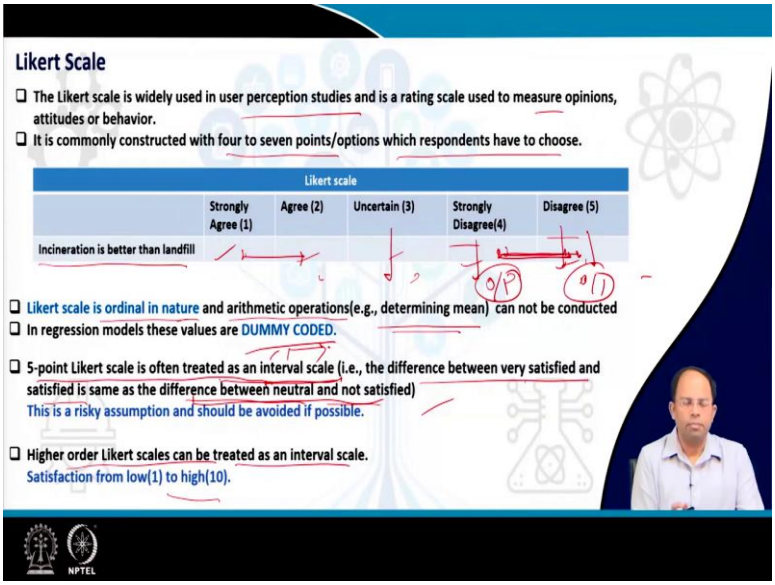

So, now, how do I take these ratings. So, usually we will use the Likert scale to take the ratings of people's opinions, attitudes and so on. So, the Likert scale is widely used in user perception studies, and it is of course a rating scale to measure opinions, attitudes or behavior. So, it is commonly constructed using four to seven points from where respondents have to choose.

So, this is an example. So, I give an opinion that incineration is better than landfill. Now I can ask people's opinion about that. So, they may strongly agree, they may agree, they may be uncertain, then strongly disagree and disagree. So, you can see that there is a order. That means from disagree to strongly agree, there is a order. We can obviously say this is number 1 or number 5, and similarly strongly agree will become number 1 or 5 as per the order.

So, there is, it is a, these are independent options, but at the same time, there is a order in those options. So, Likert scale, because there is a order in the choice of this options. So, Likert scale is ordinal in nature, that is where order is there. And in any kind of ordinal scales, the arithmetic operation such as determining mean, that is cannot be conducted.

So, this is very, very important. Why? Because sometimes people do, take ratings of 1 to 5, rating satisfaction scale, they take averages of that rating. So, usually, that is not allowed because these are independent values. There is a order among them, but these are basically categorical values, but because there is order, we call them, we are, those are ordinal in nature.

But at the same time, these are categorical values. Disagree is different from strongly disagree. So, the difference between strongly disagree and disagree is not the same as difference between strongly agree and agree. So, whenever you are determining mean, you are saying that the difference between all these are more or less same because 1, 2, 3, 4, 5, I am then taking a, we are dividing them and saying the average value is this, average value of opinion is this. But actually that cannot be done because the gap between these two things are not the same.

But sometimes, when the Likert scale is of a higher order, like it is a 5-point Likert scale, sometimes people consider this to be an interval scale. That means they say, that means they assume that the difference between very satisfied and satisfied is same as the difference between neutral and not satisfied. So, you see that even though these are very, very qualitative statements, the gap, how people feel when he is not satisfied and neutral, the gap between that is not may not be the same as satisfied and very satisfied. But people assume these are same.

So, in that case we can consider this as a interval scale. That means we can then take mean or we can take a measure like that. But usually, it is better to avoid. Particularly if the scale is of a higher order, like around from a 10-point scale, because the gaps are more, that means we have more data points coming over here. So, in that case it is still safer to assume that this this gap between two items are more or less same in all the cases.

But its only good for higher order scales, but if I go for 3-point scale, 4-point scale, it is better not to go for this kind of, considering them as interval skills. So, we should consider them as ordinal scale. And in case for ordinal or categorical scales, if I want to do, use them then

particularly in case of developing regression models, then we have to dummy code them. That means we have to take them, disagree is 0 or 1. Strongly disagree, 0 and 1. So, each one of them are dummy coded, and then they are included in a regression model.

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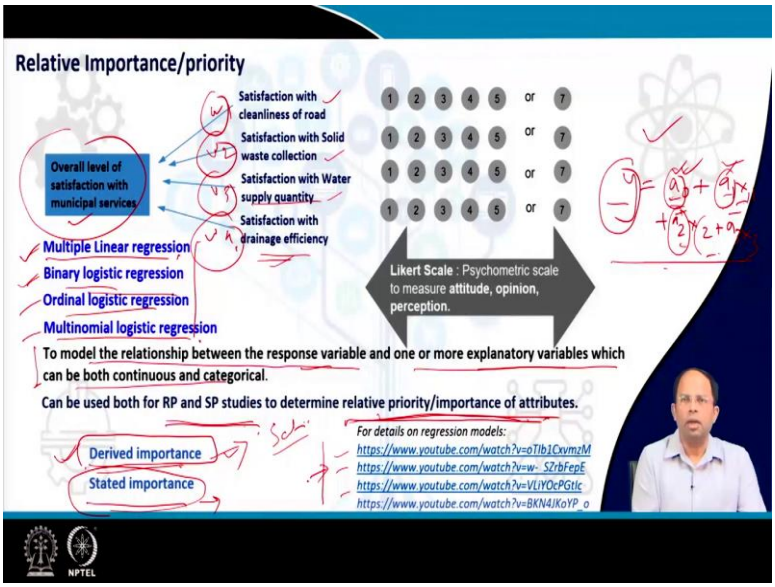

So, now we will talk about the regression models. We cannot cover the regression models in detail. So, there is multiple regression model, binary logistic regression model, ordinal logistic regression model, multinomial logistic regression model. So, these regression models model the relationship between the response variable and one or more explanatory variables which can be both continuous and categorical.

So, as you can see that if I have y is equal to a 0 plus a 1 x 1 plus a 2 x 2 plus a 3 x 3, where x 1, x 2, x 3 are the response, the explanatory variables and y is the response variable. Now to bring, give you a better example, overall level of satisfaction with municipal service is y whereas x 1, x 2, x 3 are satisfaction with cleanliness of road, satisfaction with solid waste collection, satisfaction with water supply quantity, satisfaction with drainage efficiency and so on.

So, you can see that each of these aspects influence the overall satisfaction with municipal services. So, these are the explanatory variables, and this is the final response variable. Now the relationship between that is defined by this particular equation, where y is equal to a 0 plus a 1 x 1 a 2 x 3. So, this is the linear regression model which is this multiple linear regression model.

Now, our goal is to determine this a 0, a 1, a 2, a 3 because we are assuming it is a linear model. So, this attribute weights are being determined which gives us the weightages of this x 1, x 2, x 3, these variables. So, if I know the weight of this one, weight w 2, w 3, w 4, for each of these different variables, I can determine how important is this having a role on overall satisfaction.

So, this determination of weightages is important. Now this determination of weightages could be done using different types of regression model. We have multiple linear regressions. Similarly, we have got logistic regression models where we determine the probability of a particular choice. So, binary logistic is probability between two choices, it is a dichotomous choice.

Ordinal logistic is where binary, it is a variation of a binary logistic, I can say, but there are multiple categories. But because there is a order, we can always predict one in reference to another. So, then we can do binary comparison between the alternatives. Then multinomial logistic regression is between multiple alternatives which one I will choose.

So, both this RP and SP studies, wherever we have got hypothetical data as well as actual data, can be used, this can be used, they use these regression models to determine relative priority or importance of attributes. So, if I can develop regression models like this based on the different explanatory and the final response variable, I can determine the relative priority and importance of attributes.

Now, when I say the relative priority or importance of attributes, what we are determining is the derived importance of those attributes. That means based on this equation, based on the regression I will get values of a 0, a 1, a 2, a 3 and so on. So, that means this weightage values or importance values are derived. So, these are known as derived importance.

So, even though we use satisfaction scale or Likert scale with satisfaction values, we can derive the importance of priority. So, that is why we call them derived importance. So, what is stated importance? Stated importance is when we directly ask people that how important do you think is drainage efficiency in the overall municipal service? They will give, they can give a rating in a Likert scale as well. Same goes for how important do you think. So, it is a stated importance. That also could be determined.

So, these are two approaches to determine importance or relative priority for an attribute. But overall, if, this derived importance is more important because again, for stated, people can

say many things, but when it is derived, you can actually, we are determining based on the overall satisfaction and the individual factors which influence, that we can determine what are the relative weights, which is a more better way to determine the weights for a particular, for different attributes.

Now, if you want to study these regression models in detail, these are some of the video lectures where you can find. Like, the first one is multiple linear regression and the same one, the next ones are for binary logistic, multiple logistic and also in general, how to do this kind of regression models. So, these are again, part of my earlier NPTL lectures. You can take a look at these particular videos.

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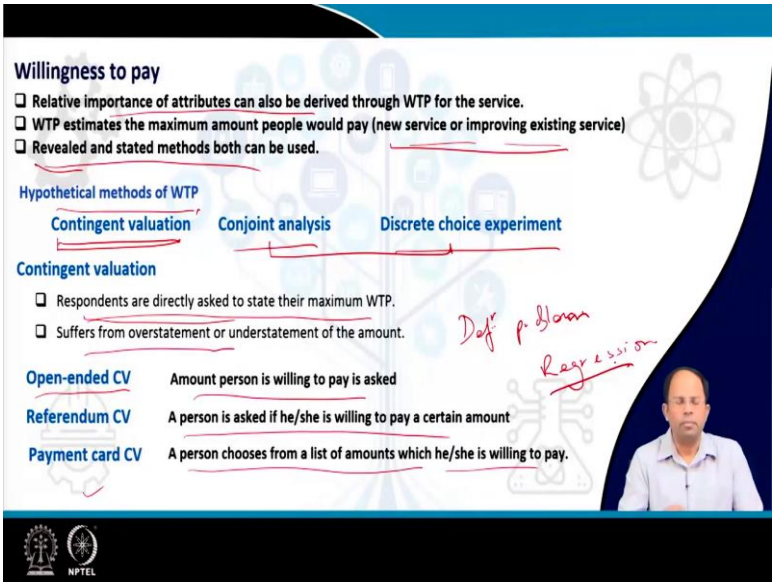

Next, coming to willingness to pay. Once we have determined the importance and priority, relative priority of different attributes for a service, we can also look into their willingness to pay, willingness to pay by people. So, willingness to pay can also determine the relative importance of attributes.

Why? Because if you are willing to pay for certain thing, then of course it is, that means you are giving more importance to that. For other things, we not, we are not willing to pay. So, that is not important. So, this is one way of looking at things. But that does, so we may not be willing to pay for certain things because we feel that government should provide that services.

So, in that way willingness to pay, willingness to pay could be also utilized to determine some relative importance, but it is not always the case like that is the only measure that

should be considered. WTP estimates the maximum amount people would pay for a new service or improving existing service. And again, we can use both Revealed and Stated methods for determining willingness to pay.

How Reveraled methods? We can actually provide the service, we can ask them for a particular price. And if they pay that price, that means they are willing to pay that. So, for another area, we can set another price, we can see how much people are willing to pay are not willing to pay.

If I get those kind of data, that is a revealed data. But in most cases it is not possible because most services are hypothetical, they are not being provided. We just want to understand how much money we can increase or we can charge or what kind of service we can provide and what charges we can ask for them. So, these are most, in most cases, these are hypothetical services.

So, there are three ways to conduct this kind of hypothetical analysis, hypothetical methods of willingness to pay. These are Contingent Valuation, Conjoint Analysis and Discrete choice experiment. Now, conjoint analysis and discrete choice experiments are more or less similar. It follows the same regression that we learned earlier. But how do I set the regression parameters, the different components of the regression? That is important. That, I will discuss. But first let us look into contingent valuation.

In case of contingent valuation, respondents are directly asked to state their maximum willingness to pay for a particular service or for a particular aspect of a service and so on. So, as people are asked directly, it may suffer from overstatement or understatement. That means some people can say a lot of values.

Like, if I say that how much are you willing to pay for door to door collection, some people will say 50 rupees, other will say 100. So, this may not be right. So, there we have to take lot of careful, we have to design our service very, very carefully so that this kind of biases could be overcome. For example, there are different ways to do that. First of all, we have to give them a very detailed idea about what we are providing.

So, first, they should understand that what they are getting. Accordingly, they should give it a thought that how much they can afford per month. And then, they can give that value. So, that is first, the most important thing, to define the problem. So, definition of the problem is the most important aspect. Once that is defined, then it is easier for people to judge.

The other thing is, we can do this in many ways. For example, it could be an open-ended CV. We can directly ask how much you are willing to pay directly? So, people can say a value. But again, there is chances that that this may be wrong, this may be, lot of biases there. Instead, we can ask a person if he or she is willing a certain amount.

That means instead of asking them to give an open, say on their own, I can give them certain values. and tell them are they willing to pay. So, we can do this also in a bidding game format. I can ask them are you willing to pay 5 rupees, then I can ask them, okay, if you are, if he says yes, then I can ask him, okay, if you are willing to pay 10 rupees for the same thing. Then he say yes, then I say 15 rupees, then he says no. That means that is his limit.

So, this is called a bidding game approach. So, in this way, we can generate data points. Like, for example, for this kind of service are you going to pay rupees 5? Yes. So, that is one data point. Are you going to pay, the same question but with 10 rupees, are you going to pay? Yes. That is another data point. Or when he says no, then it becomes another data point.

So, these data points are nothing but the explanatory variables and the outcome variable together. And using this we can form a regression to determine for which factors, he can, his willing to pay.

So, finally a payment card CV is person chooses from a list of amounts which he or she is willing to pay. So, I can put down all the options in a list and he would be willing to pay which one, which one he is willing to pay, he can mark that out. So, these are the different types of ways we can do a WTP survey. But at the end of the day we have to do regression to determine what is the willingness to pay.

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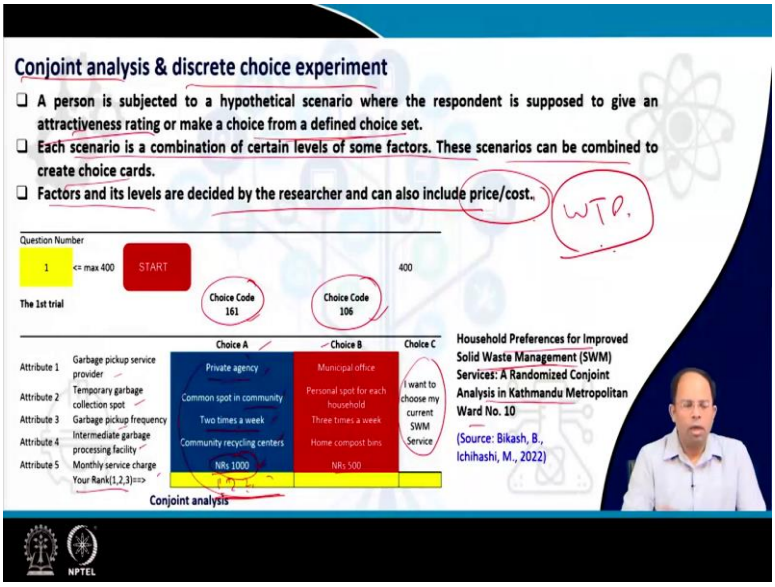

Now, coming to conjoint analysis and discrete choice experiments. These are very, very interesting, there are a lot of similarities. In both cases, a person is subjected to a hypothetical scenario where the respondent is supposed to give an attractiveness rating or make a choice from a defined choice set.

So, in case of conjoint analysis, I can give a set of options to a person and ask him that what is his rating for that, how attractive is that particular service. So, that is called a conjoint analysis. Whereas I can also give them a choice, that means, Choice 1, Choice 2, we can define a particular service in certain way, and I can ask him that will he choose that particular choice. Then it is, he is choosing that from a defined choice set. So, in that case, we call it discrete choice experiment.

So, it is more or less the same thing. In one, we get the attractiveness rating or some sort of rating. In the other, he chooses one of those options that is being presented with. Each scenario is a combination of certain level of factors. These scenarios can be combined to create choice cuts. So, I will explain that with this example.

For example, in this particular paper, Household Preferences for Improved Solid Waste Management Services, it is a conjunct analysis in Kathmandu Municipal Cooperation, Kathmandu Metropolitan Area, Ward Number 10. So, what they have done is, so if you see that they are talking about this overall, this household preferences for improved solid waste management.

What are the different attributes they are considering for improved solid waste management? That is, garbage pickup service provider, who is going to be the garbage pickup service provider, temporary garbage collection spot, garbage pickup frequency, intermediate garbage processing facility, monthly service charge. So, these are the different attributes of the garbage collection service.

Now, Choice A, you can see that this is choice code 161. Then the next one is choice code 106. So, in this way, there are different choice cards or different options that are created. So, in case of Choice A, garbage pickup is done by private agency, temporary garbage collections spot is common spot in community, garbage pickup frequency is two times a week, and monthly charges is rupees or Nepali rupees 1,000.

Similarly, Choice B, the amount is 500, the processing, intermediate processing is at home compost bins and the three times a week is the collection frequency and so on. So, these are two choices given to the people. And also, the third choice is whatever is current situation. And then we can ask them that what is your rank. The rank is in 1, 2, 3, something like that. Ranking is like the attractiveness of the service.

So, based on the attractiveness of whichever choice, I can this, I, this becomes a data point. So, the final outcome is a categorical variable which is 1, 2 or 3. So, this is, there are only three options. So, we will call it categorical, we are not calling it a continuous variable. So, in that case these are the explanatory variables, and then I can do a logistic, ordinal logistic regression to determine what is the effect of all these externality variables on that choice.

So, this categorical and also ordinal, it is an ordinal variable because 1, 2, 3, there is order of choice. So, we can determine that what, changing which factor will make them to jump to the next choice or the next higher choice. So, the weightages will be determined by a regression model by ordinal regression model and we can determine what is the weightage of each of this factor. And at the same time we can determine what is the WTP for that particular factor.

So, that means for each of these factors, what is the WTP, because all these variables are independent variables influencing the final outcome. So, we can also determine for each of these attributes or change in attribute, what is the willingness for people to pay extra money. So, that also could be determined from this analysis.

So, this is the factors or these attributes that you see over here, factors and its levels. So, these are factors and these are the levels that you can see, two times a week, three times a week,

this is level of garbage pickup frequency. These are decided by the researcher and they also include price and cost that allows us to determine the WTP. So, this is how a conjoint analysis is being done.

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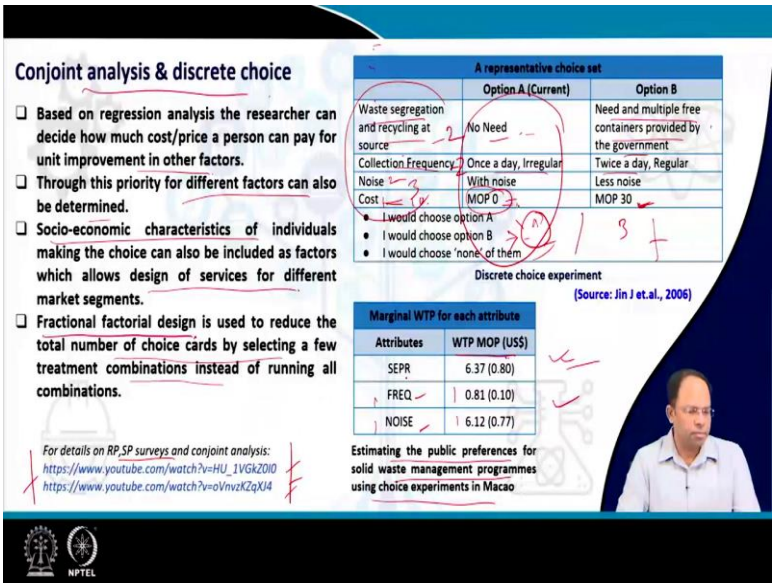

Similarly, in case of discrete choice analysis, you can see that its more or less the same thing. It is, this is another paper where estimating the public preferences for solid waste management programs using choice experiments in Macau. So, here you see that waste segregation and the attribute service segregation and recycling at source, collection frequency noise, the noise generated because of solid waste collection and the cost.

So, over here the cost levels are given as 0, that is, free, the other is given as 30. Whereas frequency is once a day, irregular in the, in case where you are charging 30, you are giving twice a day, regular. Waste segregation is not required in Option A. Waste need and multiple free containers provided by the government for facilitating waste segregation. This is Option B.

So, which would you choose? So, at the end of the day the option is Choice A or B. So, these are discrete choices. So, if there are only two choices, we can go for a binary logistic regression, if there are multiple choices we can go for a multinomial logistic regression. So, from that also we can determine what is the likelihood of a person choosing a particular choice. And based on that we can determine which are the factors which influence that choice. That means, increasing the value of which factor will increase the probability of choosing that particular choice.

So, that is how discrete choice experience and conjoint coice varies. But in both cases, we are using WTP, we have a estimate of WTP or we can predict that for changing which parameter what could be the extra amount that we can charge or what is the willingness to pay off people for that particular change.

So, as you can understand, over here you can see for frequency, for noise you can determine this WTP value for one unit change of frequency, one unit change of noise, what is the amount of money that a person is willing to pay. So, this could be you, this can be easily determined by taking a ratio between the attribute weight for this particular factor with attribute weight of other factors.

So, anyway, so this again, the detail regression techniques, I am not covering in this particular course because then it will make the course very large, but you can please refer to these YouTube videos where detailed way of conducting this regressions are being given and also how to conduct RP, SP service, how to create these payment cards or how to create these option sets, that are also being discussed.

Now, based on regression analysis, researcher can decide how much cost price a person can pay for unit improvement in other factors. So, that is what is being done over here. Through this, priority for different, through this, means via this regulation process we can also determine the priority of the different factors which are important factors in making our choice.

In addition to all this, we can also include socio-economic characteristics of individuals in the regression model which can help us in determining what sort of services can be designed for which market segments. So, that is another beauty of it. So, in addition to all these factors, if I take the socio-economic characteristics of the person who is doing this or who is participating in this choice experiment, in that case, we can determine which socio-economic factors influences their probability of choosing a particular option.

Accordingly. I can design the services for different market segments or different socio-economic groups. Finally, if there are many attributes and each attribute has got many levels, how do I create this choice set? Should I create all combinations? That means, suppose cost has got 10 varieties or 10 options, noise has got 3 options, collection frequency has got 2 options. This first one has got another 2 options.

So, you can see that we can create many combinations based on, we can take Cost Level 1 with Noise Level 2 with Collection Frequency 1 and so on. So, there could be millions and millions of combinations. So, how do I reduce that? So, one technique to do that is called a fractional factorial design. So, this technique help us in creating these payment cards not utilizing all the factors, but some factors and some combinations are utilized which are good enough to generate or conduct the regression so that we can get better estimates for each of these factors for regression.

So, fractional factorial design is used to reduce the total number of choice cards by selecting a few treatment combinations instead of running all combinations. So, again, details for fractional factorial design, how to create RP,SP service, you can actually follow these videos for doing, for details. But understand this, for WTP, conjoint analysis and discrete choice analysis, these are the main techniques for conducting WTP experiments. Open-ended, this conjoint valuation can also be done, but these are the, these are more standard techniques or this give us more robust results.

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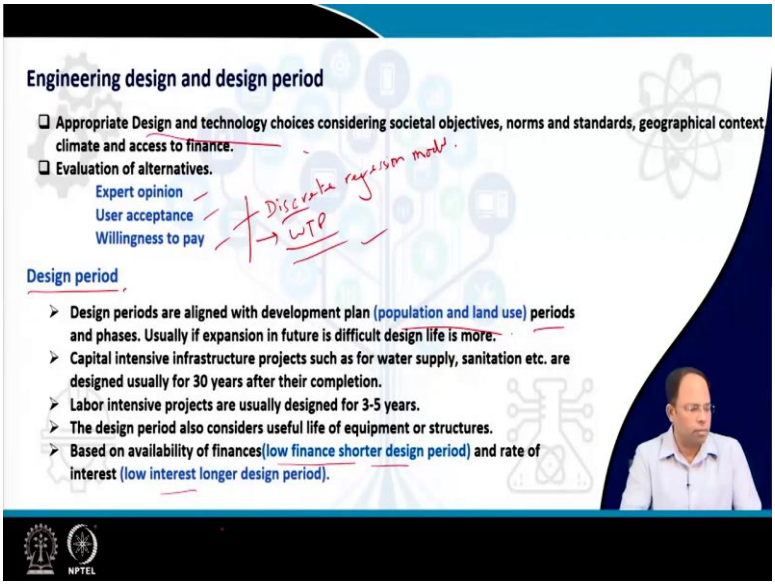

Finally, coming to the last point for this lecture. We, along with the WTP or the acceptance level of a particular option, technology or a service provision, we also need to consider the engineering design and the design period of that particular option. So, appropriate design and technology choices has to be as per societal objectives norms and standards, the geographical context, the climate of that area and of course the access to finance. So, the actual design and technology choice obviously depends on all these factors.

So, when we do, evaluate the alternatives that which option has to be chosen, again, it could be done based on expert opinion, user acceptance and willingness to pay. The same with user acceptance, discrete choice models, discrete choice regression models or willingness to pay or WTP models, regression models, all these things could be repeated when we put a particular option in front of people and ask them to choose which option is suitable for them. So, that, for a particular technology, like incineration plant or landfill and so on.

So, this is another aspect that has to be considered. Along with that, the design period is also very, very important. So, design periods will align with development plans. That means population and land use changes as per different phases of the development plan. Accordingly, the designs can be determined based on that.

So, that means for a short time period we can take certain technology, certain approaches whereas for a long time period we have to take another approaches. So, usually if expansion in future is difficult, then the design life is more. Suppose, if I know that in future it would be difficult to change the infrastructure of that facility, then it is better it should be designed for a longer period.

Capital intensive infrastructure projects such as for water supply sanitation are designed for 30 years, more or less. Labor intensive projects are usually designed for 3 to 5 years because as we have discussed, we can change that after certain time periods. The design period also considers useful life of equipment and structures.

Like for example, certain kinds of equipment like vehicles have got a certain life, like waste collection vehicles, we have a life of around 10 years, commercial vehicles or maybe 15 years in some places. So, that also has to be considered. Based on availability of finances and rate of interest we also, the design period is determined.

For example for low finance availability, then the design period would be shorter. If lower interest rate then the design period would be longer. So, these are the different things which determines the design period for the overall project.

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So, these are some of the references you can use.

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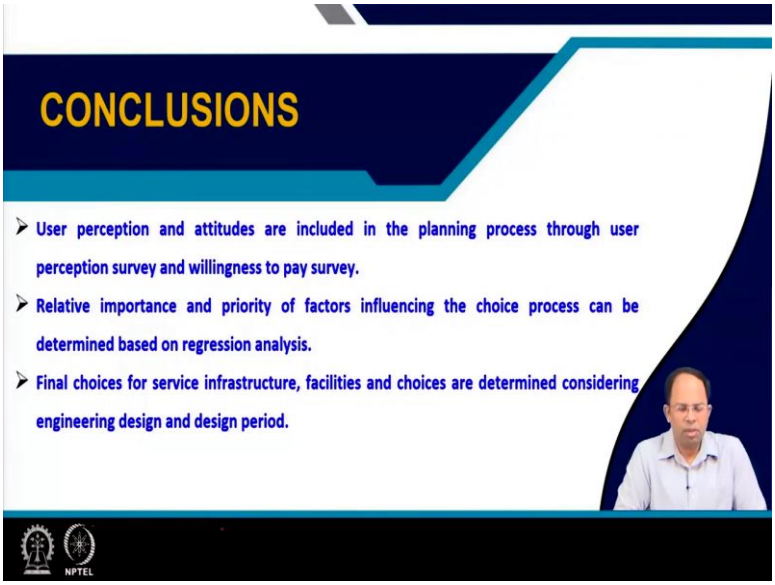

To conclude, user perception and attitudes are included in the planning process through user perception survey and willingness to pay survey. Relative importance and priority of factors influencing the choice process can be determined based on regression analysis. Final choice for service infrastructure, facilities and choices are determined considering engineering design and that design period. Thank you.