Retail Management
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Lecture – 19
Trading Area Analysis

Hello everybody, welcome to this NPTEL Swayam course on retail management. This is professor Swagato Chatterjee from VGSOM, IIT Kharagpur who is taking this course for you. This is week 4 and this is lecture 19 and I will be discussing trading area analysis in this particular lecture. So, till now we have discussed about consumer behaviour now one of the major aspects of retail management is the location identification. So, how will you find out that what is your location, what is the prominent place where you will put your retail store.

Now, to find out the location first thing that you have to understand is what is in and around that location, how much business is there, how much population is there depending on what kind of retail you are or how many consumers are there in a particular area. If you identify that this is my territory, this is my trading area, then identifying our site within the trading area becomes much more easier. So, that is the first step in the location identification problem.

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So, retail is all about location, location and location and the criteria to consider a good location includes many things. It includes the population size and traits of the people that means the demographics. The competition, how many competitors are there or how fierce are

the competition in this particular market. The access of transportation because people have to come to your retail store and then by and then again go back, so access is important.

Availability of parking facility is important, in India this might be not so much important because in India probably there are lots of public transport available, but in other countries public transport are not available at that level and you have to go for parking facility because many of the people actually drive down to the retail store, buy the product and then go back. So, parking facility is important.

Nature of nearby stores. If the nearby stores are actually competing with you, then there is a problem. If they are complementary in nature, then that is an advantage. So sometimes this complementarity is something that we look for and I will discuss about this aspect in more detail as we go ahead. The property costs, the length of agreement and the legal restrictions. So, these are basically more operational issues which is how much money to pay to have this property either in a rental or in an ownership.

How much is the length of agreement if it is a rental agreement or lease that I am getting and what will be the legal background of that. So, these are some of the factors people keep into account when they decide their location. But one of the major factors out of this is population size and traits.

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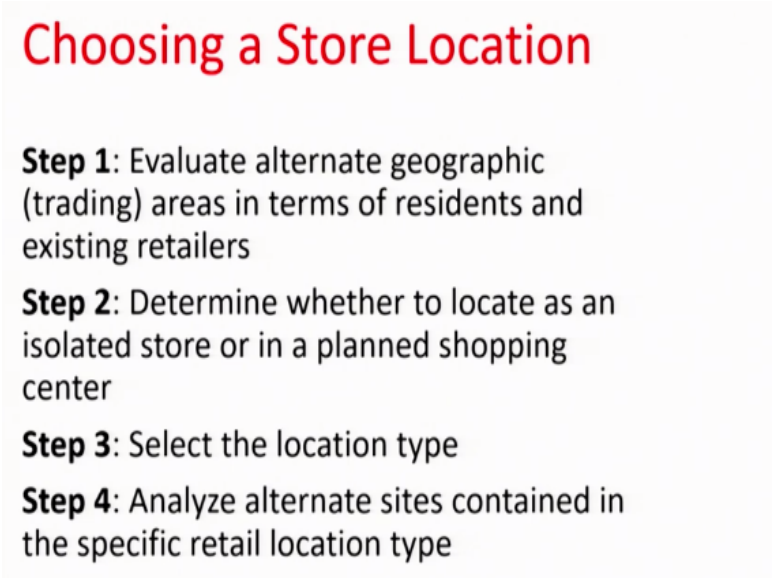

So, location choice has multiple steps as I was telling. So, first is evaluate the alternative geographic areas or trading areas in terms of residents and existing retailer. So first job is to

understand that how a particular trading area or my territory looks like and in that territory, in the trading area it might not be your own alone territory, it might be a shared territory, how the competition is there that will also play an important role. So, competition and the attractiveness, these two.

Attractiveness is defined by how much population is there, what is their; I would say ability to pay, willingness to pay, what is the income size, what is their preference? Do they actually prefer your products or not? This will create attractiveness of that particular trading area. That means attractiveness means you will be interested to open up a store in that trading area. On the other hand, all these attractiveness will be divided by the number of competitors.

If the number of competitors are very high, if the market is almost saturated with the existing retail stores, then that creates an entry barrier that creates a problem for a new retailer to come in in the market because you have to fight and make his own space. So instead of fighting and making his own space, he will probably come up with another retail suit in some other place where probably the fighting will be lower in the volume or lower in intensity.

So, if that is the case then this is the first step when you decide who are the customers you will want to target as simple as that. Then determine whether to locate as an isolated store or in a planned shopping centre. So, what kind of store location you are asking for, this is the second step that are you looking for absolutely isolated retail store or if it is a planned shopping centre which is like malls. Sometimes retail stores also smaller retail people will take a decision that I will come up with an unplanned retail area.

Unplanned district we call them, so even there we can come up. So, there are three choices actually, I have written two. For bigger stores, there are two choices isolate a store or malls. Isolated stored is something like Decathlon in India let us say which is a separate entity altogether, which has a separate location altogether or let us say if I consider Big Bazaar or if I consider I would say Spencer all these kinds of stores, Pantaloons.

These kinds of stores come up in a big mall at a particular area in the big mall or something they come up with their store. So that is basically a planned shopping centre. Out of these two also you can come up. If you are a smaller retail store, if you are not such a bigger retail store you can come up to in an unkind district store, means it is a locality where lots of stores

comes up and they are not organized, but even if they are organized they are not of bigger sizes, so that is one decision.

So once you have decided the training area, what is the format of the location that you are looking for will be the decision. Then select the location type. What kind of location that you are looking for and analyze alternative sites contained in this specific retail location type. So, you analyze the sites. If I choose that I will go for malls, in the trading area there can be multiple malls and in a single mall also there can be multiple location in the first floor, in third floor, in second floor, etc.

So, then you analyze depending on various other factors like the one that I have mentioned here, based on various other factors which one you will go for. So, these are 3-4 steps that we generally follow. But the first step is the geographical location or geographical trading area identification based on the attractiveness of the trading area and based on the number of competitors in the trading area.

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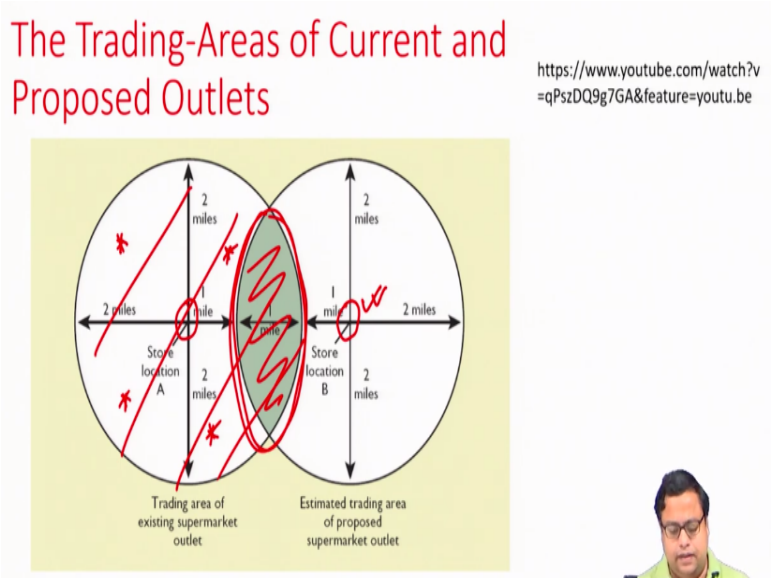

So, there are different mathematical ways. We will discuss some simple mathematical ways which retailers take into account. But there are advanced ones as well which have been discussed in retail management or retail analytics course under marketing analytics. But here are some of the basic ones we will discuss. So, a trading area let us say I am making an assumption that the trading area you have a current store and you are coming up with a new store, how to decide the new store location.

So, you can go to this YouTube video, the link is given here, in the PPT it will be shared and you can copy the link and listen to the video that gives a very interesting analysis of how you find out the trading area of a new store. Ideally speaking, if this is your location and you are trying to plan off with a new store in this particular location, then you have to decide that what is your trading area.

So, ideally what we decide that for a particular location if I take a certain radius, within that radius whatever thing comes on is my trading area. Then there will be multiple other people in that trading area, but I will not come up with another store in that trading area because then my two stores will cannibalize with each other. So, this zone, this particular picture that has been drawn, this circle is basically trading area.

There can be other people's store. So let us say this is another person's store, this is another company store. Those things can be there, but I will not come up with a new store in that trading area. Now, I decided to come up with another store in a different trading area which is this let us say, but there will be some amount of people which will be within both the circles. Now these are people we will be cannibalized basically by one store, other store.

Now absolutely no cannibalizing is not so good because you see when you come up with a second store, you need certain footfall in the second store. And that footfall in the second store will attract newer customers. People will see that these guys are going, there are some amounts of crowd in the retail store and the crowd is actually a crowd puller as well. So, a smaller amount of crowd basically signals that this particular story is upcoming, but it is not so heavily crowded that I will not feel the enjoyment while I am shopping.

So, a little bit of crowd is needed and that is why it is important that you come up with a store while the little bit of overlap is there in the trading area between the previous store and the new store because these are the overlap people who will come to the second store and then create the second store's demand. So, cannibalizing there is an upper limit of the cannibalizing after which it will be very bad, but up to that amount you might probably be beneficial if there is an overlap in the trading area.

And how much it is, is a mathematical question, it cannot be answered in one go. But for a marketing point of view, this overlap is needed and this overlap is generally done so that one

retail store can actually get the benefit of its existing retail store's customer base while the new retail store is still developing.

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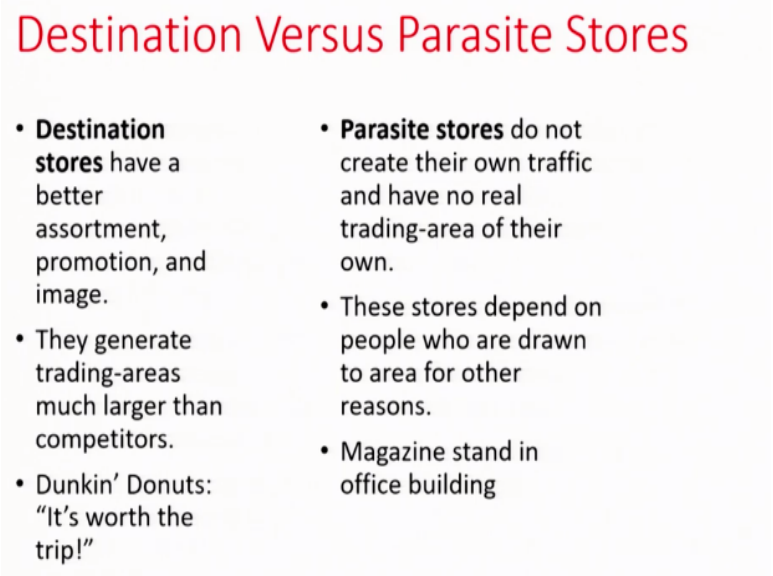

Now, destination versus parasite stores are another choice, so what kind of store type you are looking for. Destination stores are what? Distribution stores are they the stores themselves have the destinations. People go to those stores. Generally isolated stores are also destination stores. So isolated stores may not be destination stores, but oftentimes you generally tried to do that because these two have similar kind of approach.

What is isolated store I just told that they are located in an isolated location. I will discuss about the isolated store location type in detail, but that is based on the location, that is not based on the characteristics of the store. But if I define the same thing let us say Decathlon as I was talking about, if I explain Decathlon from the characteristics of Decathlon, not based on the geographical location but based on whatever assortments the keep or whatever services they provide.

Even though the Decathlon has huge assortment, they do very good promotion and they have a pretty good image in terms of the sports retailing context in India. There are very few sports retailer currently in India which has similar kind of image. They generate trading areas much larger than their competitors. So, basically these are the people who are trading area generators and they will put up their store and probably around 20-30 kilometres around the place.

People will come to that particular store which is not the case for not destinations stores. I will talk about that. For example, Dunkin Donuts is worth that they are located outside the city and people actually go to Dunkin Donuts just to have the donuts but that is almost like a family trip for them. Best Buy in the context of you USA is also such kind of stores where people go for a trip, people plan to go for a visit there.

In India you will see let us say in Hyderabad this IKEA when it came up, IKEA was also this kind of it is a warehouse retail store, it is located in isolated area. So, it is a warehouse store that is the definition in terms of the surprise promotion and what kind of assortment it keeps or what kind of services they provide, based on that it I can say that is a warehouse store. Based on the location I can say that it is an isolated location.

And based on the characteristic of it whether it attracts customer or whether it depends on somebody else who attracts customer, I can say that no, IKEA itself attracts customer. People come to IKEA just to do shopping in IKEA only, it is a day trip for them almost, so that is a destination store. On the other hand, parasite stores depend on a destination store or depend on some other stores who attracts the footsteps.

For example, let us say there will be various stores inside a mall who are not the prominent footfall makers, small speciality stores inside a shopping mall will be the parasite stores. Now let us say if I have a nontraditional store which is like a vending machine in the airport. So, airport is the toolmaker and vending machines are basically making out of that business. Nobody comes to the airport just to have the coke from the vending machine.

But because there are so many footsteps happening, footfalls are happening, you can put up a vending machine there so that those people who are coming to the airport for travel or some other purposes can have a drink from that particular vending machine. So, these are parasites stores who do not create their own traffic and have no real trading area of their own. These stores depend on people who are drawn to area for some other reasons like magazine stand in an office building.

So, this is another choice that you have to decide. So, if you are a destination store, then only this trading area analysis makes sense for you, otherwise trading area analysis does not make sense for you.

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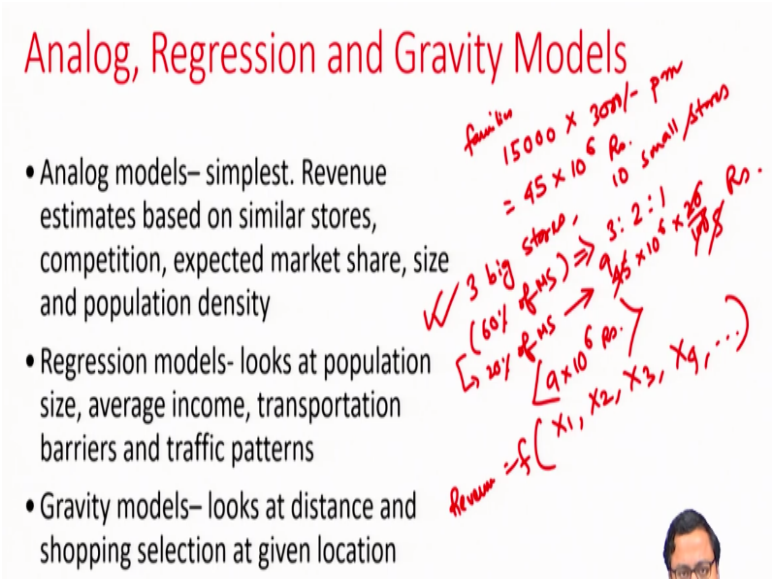

Now, when you are talking about trading area analysis, when you are discussing that whether this area will generate enough footfall or enough traffic or enough demand for me there are different ways of calculating that. One is analog models. Analog models are very simple models. Here in these models, revenue of a particular zone is estimated based on similar stores, competition or expected market share and size and population density.

These are basically based on assumptions. So you assume that from this amount of area this much population is there, if this many households are there and every household do a business of on a grocery store let us say and within a particular district of a city or of a locality of a city, I know in this training area around let us say 5 billion people, 5 lakh will be too high, say 50,000 people stay and let us say there are 12,000 families.

And 12,000 families out of 15,000 families in an average spent 3000 rupees per month for their grocery let us say. So, then it is the basically 45 into 10 to the power 6, 45 million rupees or 450 lakhs rupees that is my amount of money that I can generate from this particular store. That is the overall money. Now, there can be competition. Let us say I am a big store, at my level there are two more stores and smaller level there are many stores, let us say 10 stores.

I think that out of this 450 lakh; how did 450 lakh came, 15,000 families into 3000 rupees per month that is their cost. So, basically 45 into 10 to the power 6 rupees, this is the total market size let us say. Now, I decide that there are three big stores including me and let us say 10

small stores in this trading area and these three big stores contribute to let us say 60% of market share. And out of the 60% market share, there is a ratio between these three stores, which is let us say around 3 is to 2 is to 1.

Where I am this 2 depending on the big store's attractiveness, probability and etc. So, I have one-third of this and one-third of this is 20% of market share. Let us say I have that much market share. Then what will be my total money? It is 45 into 10.6 into 20 by 100 and that becomes 9, so almost 9 million rupees or 90 lakhs rupees is my monthly revenue of a big retail store let us say.

Now if this is good enough for me, if I am happy with this kind of store and I will be basically comparing with similar stores and competitions. If I am happy with this kind of a money, then I will probably choose that this is the location, so this is my trading area good enough. Otherwise, I will increase or decrease or estimate or take decisions according to that. So, this is called analog model. Then there is a regression model.

Regression model says that it is basically regression oriented. You actually have data about your store or your competitor's store's revenue and you also have data about their location, their transportation, their profit patterns, average income of the population, average size of the population, many other variables and you try to find out revenue as a function of all these variables X 1, X 2, X 3, X 4.

All these variables you try to create a linear equation or nonlinear equation depending on how good is your estimation facility. Now, basically this is demand estimation and this comes from regression analysis or this comes from machine learning programming where you are trying to predict the revenue depending on all these factors. While analog models are very low sophisticated, regression models are very sophisticated models.

Now, for having a regression model you need to have analytics team in your store. Now, it is not always possible to have strong analytics team in all different kinds of retail stores. Another analog model is too simplistic. So, there comes the gravity models which is in between them which are neither very simplistic nor very difficult. So, we will come to one of the gravity models now and slowly we will discuss, basically two gravity models that we will be discussing in this particular class.

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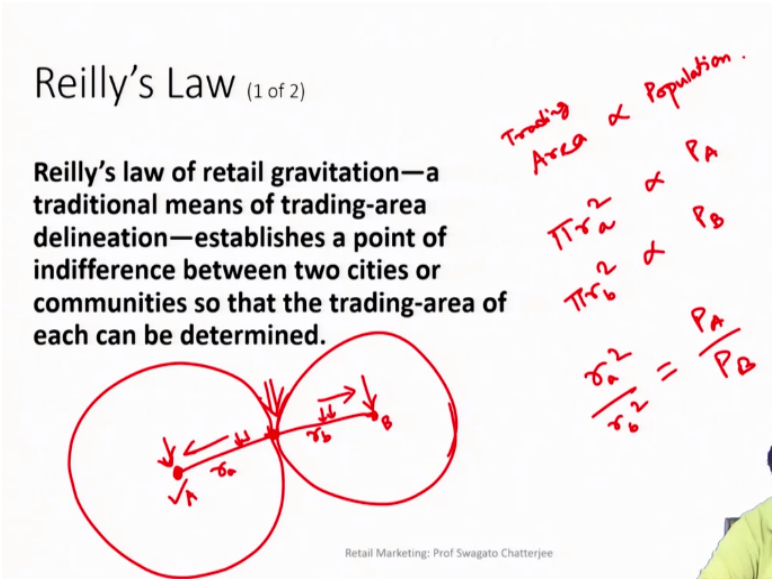

What are the gravity models? The first one is called Reilly's law. Reilly's law of retail gravitation, a traditional means of trading area delineation establishes a point of indifference between two cities or communities so that the trading area of each can be determined. So, it decides that every city has a city centre that is how they are decided that every city or every locality will have a city centre.

And if I put something in that city centre, the central district of the city if I put a store there, then that was store will have a trading area and the trading area basically is proportional to population. This is what there, so if this is one store and this is one store, then let us say these are the two trading areas, two have different kinds, so this is the centre let us say, I will erase this. Let us say this is the centre here, this is the centre here, I join them.

So you come up with this store here and another person comes up with a store here, the trading area that you get it is proportional to how much population of this city he has and how much population in this city he has. So depending on that, you can either decide whether to put a store here or you can basically decide whether to put a store in between this. So, this is called point of indifference.

If you put a store at this particular point or people up to this location up to this point, they will be indifferent in going to this place or that place. People in here and here will come to this place, people here and here will come to this place. We call also call this in economics term the linear city model. In a linear city model, the optimal place to put your retail stores are two different corners in a straight line.

So, if there are two cities and people are distributed along the straight line then it is better to put this thing at exactly two different corners that is the equilibrium points. So now, how to find out this point after which you will not say that so I have let us say in Bhubaneswar and there is Cuttack and in Bhubaneswar I have put up a store and there is a Cuttack city centre. If I am a big store in Bhubaneswar and I know that there is no other store which is like me in Bhubaneswar.

Let us say I come up with an IKEA store in Bhubaneswar, there is no other store of furniture which is of that size let us say. Then, if I put that in the city centre by any chance how much of in the Bhubaneswar to Cuttack that line. Similar can be talked about let us say Kanpur and Lucknow. Kanpur and Lucknow it says 100 kilometres let us say almost or in that 100 kilometres, how much up to that 100 kilometres will I consider that it is Lucknow's property, this Lucknow's trading area and what is Kanpur's trading area.

Similarly, Bhubaneswar and Cuttack how much is Bhubaneswar's trading area, how much is Cuttack's trading area. If the information is correct, there is I would say Mahanadi going in between that, so that creates an automatic geographical differentiation between these two places, assume that that is not there. Now to calculate that part what I told this trading area is proportional to population. Trading area is what? So, trading area is basically here it is pi r square.

So, pi r a square if it is a, then it will be proportional to population A, pi r b square will be proportional to population B. Then basically r a square and r b square will be P A by P B. So, if this is r a and this is r b, this r a square by r b square is proportional to A and B, how to solve the value of r a? Let us come to that.

Trading area $\propto$ Population

$$\pi r_a^2 \propto P_A$$

$$\pi r_b^2 \propto P_B$$

$$\frac{r_a^2}{r_b^2} = \frac{P_A}{P_B}$$

$$\frac{r_a}{r_b} = \sqrt{\frac{P_A}{P_B}}$$

$$\frac{r_a}{d - r_a} = \sqrt{\frac{P_A}{P_B}}$$

$$r_a + (1 + \sqrt{\frac{P_A}{P_B}}) = d\sqrt{\frac{P_A}{P_B}}$$

$$r_a = \left(\frac{d\sqrt{\frac{P_A}{P_B}}}{1 + \sqrt{\frac{P_A}{P_B}}}\right)$$

$$Dab = \frac{d}{1 + \sqrt{\frac{P_A}{P_B}}}$$

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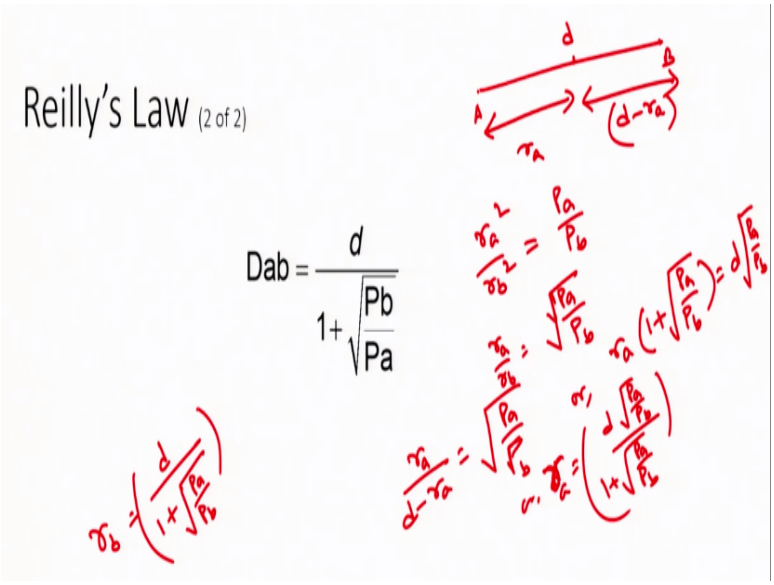

So, I say that the distance between the two A and B is d and r a is this much. So, this much is d – r a. So, just now I told r a square and r b square is equal to P a by P b and P a and P b are all positive numbers. So, I can say r a by r b = root P a by P b. Whereas If that is the case then r a by d – r a = P a by P b or r a 1, just check whether I am calculating correctly or not, P a by P b = d, so, d into P a by P b + r a into P a by P b or r a will be d into P a by P b divided by 1 + P a by P b. So, this can be one way.

Trading area $\propto$ Population

$$\pi r_a^2 \propto P_A$$

$$\pi r_b^2 \propto P_B$$

$$\frac{r_a^2}{r_b^2} = \frac{P_A}{P_B}$$

$$\frac{r_a}{r_b} = \sqrt{\frac{P_A}{P_B}}$$

$$\frac{r_a}{d - r_a} = \sqrt{\frac{P_A}{P_B}}$$

$$r_a + (1 + \sqrt{\frac{P_A}{P_B}}) = d\sqrt{\frac{P_A}{P_B}}$$

$$r_a = \left(\frac{d\sqrt{\frac{P_A}{P_B}}}{1 + \sqrt{\frac{P_A}{P_B}}}\right)$$

$$Dab = \frac{d}{1 + \sqrt{\frac{P_A}{P_B}}}$$

So, if this is r a, what is r b then, r b is 1 minus this. So, r b will be basically just d by 1 + P a by P b that will be r b. So, this is how I can try to find out the distance from a how much I will be approaching and distance from b how much I will be getting it and based on that I can do the maths. So, I can find out from a to b how much is the area and based on that I can calculate it and from b to a how much is the area and based on that I can calculate it.

And based on that decision, I can decide that how much is my trading area, whether the trading area is from here to here or the trading area is from somewhere else, so that I can easily find out. So, that is where I will stop this particular video here. I will discuss about the same thing, the Reilly's law in further details and I will solve certain problems in the next video. Thank you very much. I will see you in the next video.