Financial Accounting
Dr. Puran Singh
School of Humanities and Social Sciences
Indian Institute of Technology, Mandi

Lecture – 116
8.10 Case – Break Even Analysis

In this video, we are going to do a business case analysis. We have a start-up that is trying to decide, if they should get into a given business.

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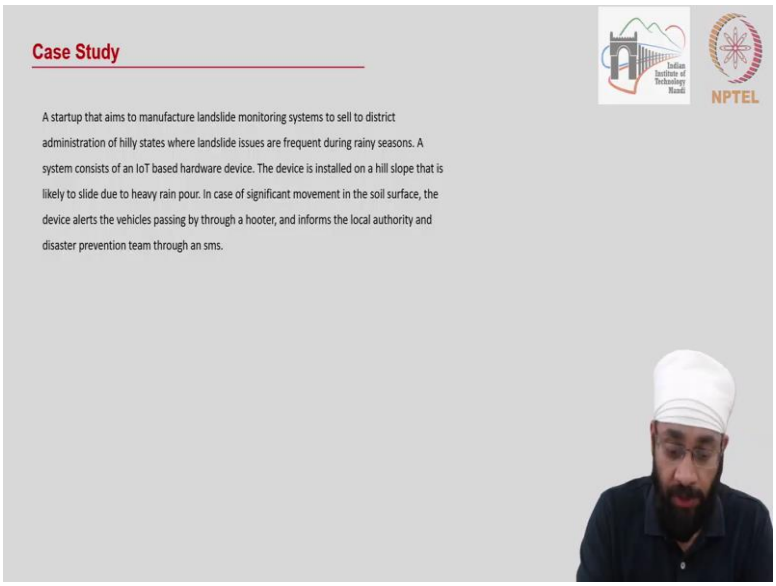

So, just read through the basic description, pause the video, and read through the description.

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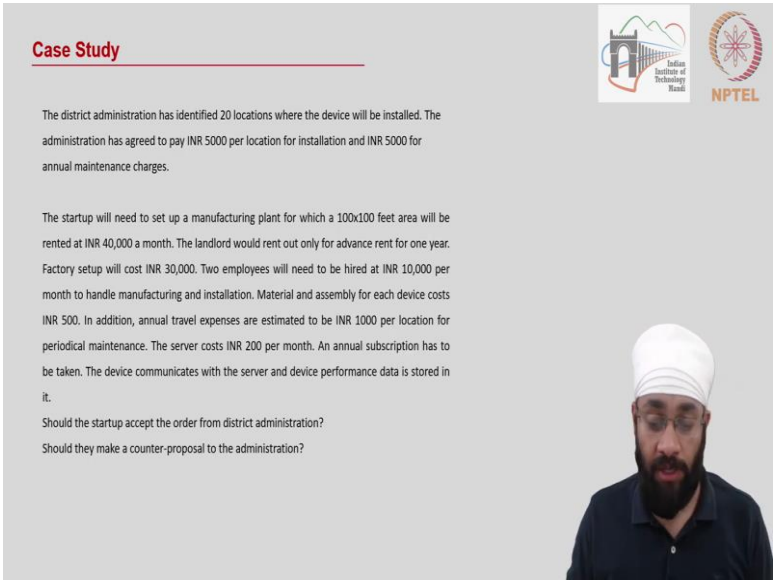

And then I have some more details about the price and various types of cost involved. I am going to use an excel sheet to illustrate this graphically. So, I am just going to jump to my excel sheet here. And I have all the details which are required.

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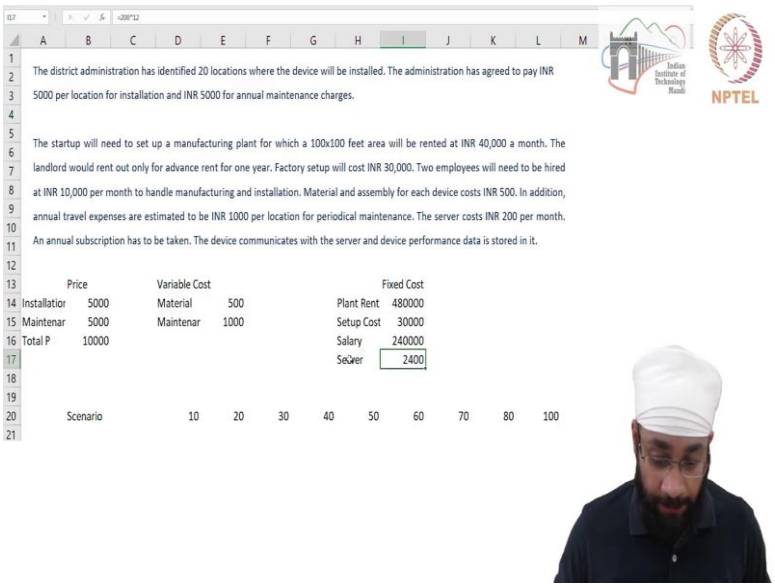

Now, I am assuming that you understand the basic description of what this business is trying to do. So, basic numbers that we always look through without reading all of this is number 1, we are interested in price per unit. We are interested in the variable cost per unit and we want

to know the fixed cost. If we know all of this then we can do the rest of the things, the basic model is in place.

The first thing now is to identify these three. So, I am going to read through: the district administration has identified 20 locations, where the device will be installed. So, one device per location means 20 devices and I am going to create a scenario as well. So, the scenario is that you sell 20 units to the administration, maybe you could sell 5 and then you could sell the 10 units, 20, 30, 40 you could go on basically. These are the number of units that if you sell then what happens.

The next information is the administration has agreed to pay 5000 per location for installation and 5000 for annual maintenance charges. So, the first 5,000 also includes the cost of the unit. So, there are two components to the variable cost, the first component is the price per installation. So, installation is 5,000 and you have maintenance let us say 5000. So, total price per unit comes out to be 10,000: sum of these two, this has to be moved to price here.

So, you have the basic information about the price. Now, let us look forward. The start-up will need to set up a manufacturing plant, some description and it has to be rented 40,000 a month. The landlord would rent out only for advance rent for 1 year; that means, that this start-up has to pay 40,000 into 12. Rent in advance and they cannot leave before 1 year, if they leave, they lose this money. So, this is kind of the fixed cost. So, let me write plant rent and the rent is 40,000 a month into 12. So, for 1 year I have to pay this, no questions asked, then you have the factory setup cost 30,000. So, I will say the setup cost is 30,000. Next step you have to hire two employees 10,000 a month to handle manufacturing and installation.

So, for all these installations you have to hire people, they go there then install and you have to pay to these people. This is also fixed, does not matter how many installations you do as this number is fixed on a monthly basis. In a month you do 1 installation, 10 installation does not matter. So, let me say salary is 10,000 for 2 people for 12 months, for 1 year, this is the cost. Now, I am bringing everything to a 1 year time frame because, if I take the plant on rent I have to pay for 1 year that is my minimum commitment. So, I am doing everything in 1 year perspective and I do not want to start this business if the time horizon of the business is less than 1 year, if this deal is going to be for less than 1 year.

So, using that basic understanding I am just starting out with these calculations. Next step we have material and assembly for each device costs 500. So, variable cost is given now so,

material cost is 500 let me move the fixed cost to the next column. In addition, annual travel expenses are estimated to be 1,000 per location for periodical maintenance. So, it is not that you install the device and then you forget about it, you have to continuously monitor the device as well. Because it is a landslide monitoring device, if there was a landslide that device is lost now, or there could be rain, there could be wild animals taking away the device. So, different issues could arise and you have to be basically ready for that as well.

So, there is an expense of 1,000 per location. So, these are, let us say maintenance expenses, 1,000 per location. So, for 1 location it costs you 1,500 to install and then maintain that for 1 year, and it varies by the location although this is an annual number. If you do more locations meaning more products this cost is going to go up, that is why I am using this as the variable cost not the fixed cost.

Then you have a server cost 200 per month and an annual subscription has to be taken and does not matter how many units you install; you have to take an annual subscription that money has to go in one go. Therefore, it is a fixed cost. So, the server cost is 200 per month for 12 months. So, this is also done and nothing else. So, now, we do not have to worry about the information, we just use this basic information and we do our scenario calculation.

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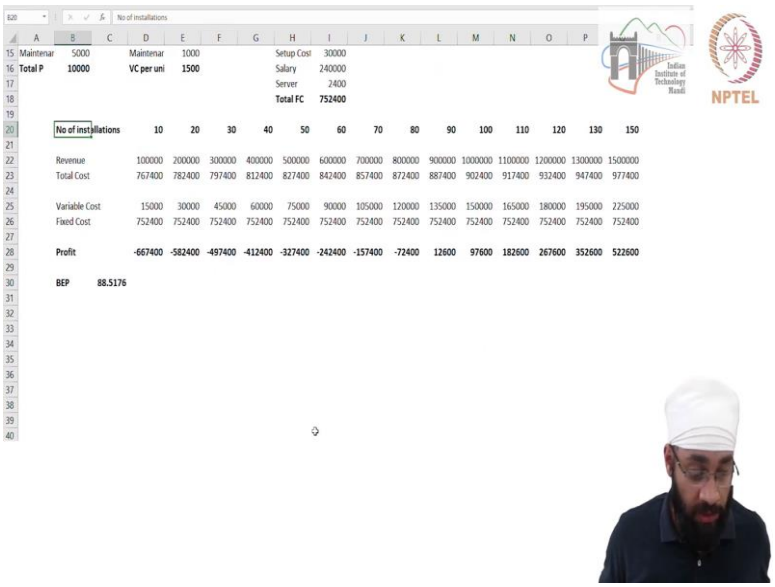

Maintenar	5000		Maintenar	1000			Setup Cost	30000							
Total P	**10000**		**VC per uni**	**1500**			Salary	240000							
							Server	2400							
							Total FC	**752400**							
No of installations		**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**	**130**	**150**
Revenue		100000	200000	300000	400000	500000	600000	700000	800000	900000	1000000	1100000	1200000	1300000	1500000
Total Cost		767400	782400	797400	812400	827400	842400	857400	872400	887400	902400	917400	932400	947400	977400
Variable Cost		15000	30000	45000	60000	75000	90000	105000	120000	135000	150000	165000	180000	195000	225000
Fixed Cost		752400	752400	752400	752400	752400	752400	752400	752400	752400	752400	752400	752400	752400	752400
Profit		**-667400**	**-582400**	**-497400**	**-412400**	**-327400**	**-242400**	**-157400**	**-72400**	**12600**	**97600**	**182600**	**267600**	**352600**	**522600**
BEP	**88.5176**														

So, total price. So, what is my variable cost per unit? My variable cost per unit comes out to be 1,500. What is the fixed cost? Total fixed cost is equal to the sum of all these numbers which

comes out to be this number. So, I am interested in this number, variable cost per unit and the price that I will make per unit.

Now, in these scenarios what is going to be my revenue? My revenue is going to be equal to the number of these installations. Let me write the number of installations and all these are scenarios basically. So, if 10 installations are done, then I make 10 times the total price that I have.

So, this is the amount of money I make and I am just going to copy and paste this formula here. So, I have revenue in different scenarios alright. So, if I do 100 installations, then 10,000 per installation, I am making 10 x that is right.

This is the revenue. What is my total cost? I will say total cost and then I will calculate variable cost. And then the fixed cost as well. Variable cost is equal to the number of installations times the variable cost per installation, which is 1500 and done. So, variable cost is equal to this much across different scenarios. The fixed cost of course, is fixed, it is not going to move, it is not dependent upon the number of units that you produce. Therefore, the total cost is going to be equal to the sum of these 2, this gives you this number. Now, you could very well do the profit calculation. What is the profit?

Profit is going to be equal to your revenue minus your cost and its negative number to begin with. So, we do not want to go with 20 installations, we certainly want to do more. And as you see as you go towards 100 units that is when you start making profit. So, clearly you do not want to go with this small order of 20 you have to do more. How many more?

Now, in order for us to have a better graph I am going to introduce more units here 120, 30, 50 and basically just copy and paste the rest of the formulas here. So, we have a nice graph when we plot it. So, let me zoom out a little bit. Now, you see it clearly. So, this is the scenario analysis and you could include more numbers as well. So, this is how it looks for the business; we cannot do only 20 units.

So, do you have a counter proposal for the administration? Well we have to tell them that you have to give us a minimum order of 100. Because, we are not going to break even unless we have 100 units. At 80 units I am still making a loss. What happened at 90? Let me just change it here at 90 I am breaking even. So, 90 is also fine. At 85 I am losing money, at 88, at 89... So, 89 is where I make some money.

So, the break even is at 88 point something, that is the idea. I have not done 90 by the way. So, maybe I could also include a 90 to get a better idea, so, there. So, what is the breakeven point? So, if we do the mathematical calculation, break even point is the fixed cost divided by the variable the contribution. So, this is the fixed cost minus the contribution, contribution is price minus the variable cost per unit. So, this comes out to be 7439. What did I do? I put a negative sign instead of divide there you go. So, break even point is 88.5 so, you have to do 89 installations. If you do 88 installations, you are losing money. So, 89 installations are a minimum that you want from the government. The next thing that you could do is now you could depict this on a graph.

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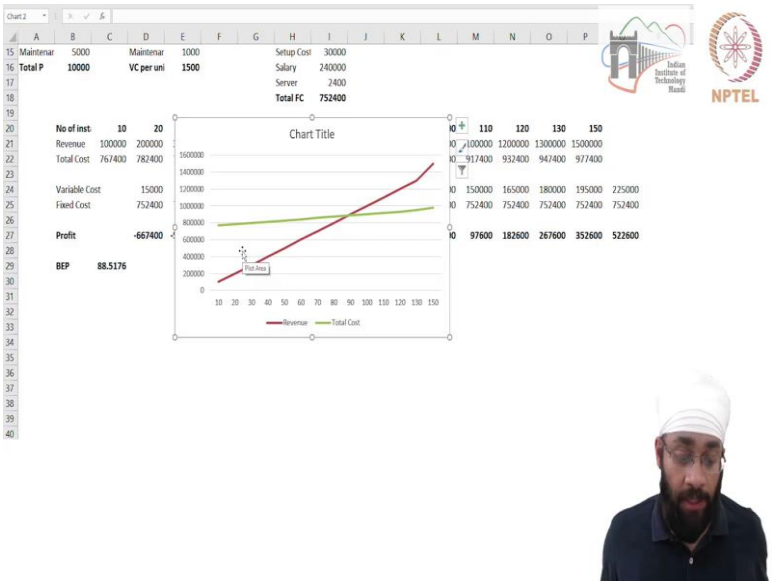

So, let us zoom out a little bit. In order for us to have a graph, these 3 rows are what is going to go into my graph. I go to insert or use a graph. And there is an empty cell here, I should also get rid of that. So, some adjustments, that this graph requires the number of units is this. So, let us select it. So, it now shows the x axis having 10 to 150, we want to show these three numbers of installations not this, the y axis. Alright let me press, now what do I have.

You have revenue and total cost shown here and the breakeven point is at 88, looks good. Here you have total revenue; revenue is about this much and this amount comes out to be 15 next this is about right. So, this is how this chart looks. You have a break even point here. And if you are operating at 10 units or 20 units which the government is right now proposing you are

in big loss, this is a big-big area and you do not want to be operating here. So, there you go we have answered the question.

So, the question was should the start-up accept the order from the district administration? No, should they make a counter proposal? Yes, they should take a minimum of 100, but then they should also say if you want to make some profit. So, there is a minimum scale of business that you need in order to start a business.

So, that is how this analysis can be done for any other business as well, if you have a business proposal. If you have any other business opportunity, you could use a simple excel sheet and do the numbers. Of course, digging out the numbers determining the numbers is another exercise.