

[AUDIO LOGO]

RICHARD DE NEUFVILLE: And so we have basically two topics for today. And the first one is the concept of the value of information. And we're going to end up with two ways of thinking about it. I am going to present in some detail the procedure for the definition of the upper bound on the value of information, the EVPI, which stands for Expected Value of Perfect Information.

At the end is a supplement for your interest if you want to is the calculation of the exact value of EVSI, which is a interesting, probabilistic exercise. But I personally don't think that it's very valuable in practice. But it's part of standard curricula, and it's there if you want to go for it. It will not be part of a quiz or anything like that. I think you should know about it, so you can appreciate the other aspect I will be focusing on, so methods. And then I want to stand back from this and talk about information gathering as a basis for having a flexible strategy.

So there is this notion that, before you commit to almost anything, you can reduce your uncertainty, or you can hope to reduce your uncertainty by inserting some kind of information gathering, which from a jargon point of view is called a test. It's not an examination. But it's a short way of referring to whatever you do to get information before your decision problem.

So in this diagram at the bottom of the page, I have given you-- you have your decision problem. Do this thing or not. And you say, OK. I'm going to go through a process of collecting some relevant information or information I think is relevant, get that information, and then consider my decision problem.

So, in principle, that's always available to you, if only to say, OK, let me stop for a minute and think about it and remind myself from the back of my brains. And so what should I do? Now, of course, at some point, you've got to do something. You've got to react right away. But, in general, you have the opportunity to do something. And this has a have an important effect on your value of your decision in your procedure.

So what does a test do? So as a starting point, any decision problem, even though you might not think about it quite this way, you're driving a car. You turn left. You may not think at all in terms of the probabilities. But you have some uncertainties and some assessment of them in principle. And these are known as prior probabilities.

Why prior? Because we want to distinguish them from what you might have after a test. So it assumes that these are your starting probabilities or assessment. For example, you're running a business, or your group is running a business. And you have some measure of the cost of production of unit. You have some measure of the likelihood of sales and whatever other features that you might have.

So what does a test do? Well, there are various forms of it. But, in general, it gets information on these issues. For example, you could say, well, I think I know how it's going to produce in this plant. I've run several of them back in the States. But now I'm doing one in South Africa say, and situations might be different. So you can run a test plant. See how it works with the local materials. See how it works with the local engineers. It might work better. They know things you didn't know. whatever. So you can run a test plant. Get more information.

Or, for example, you can run a market analysis. You can say I'm going to take my new product, and I'm going to test it in St Louis, see how it picks up. Maybe I'll go for a different demographic and also test it in San Francisco. Whatever you want. But there are things that you can do individually as a company, as an organization to get more information about something before you make a commit to a decision.

So the operation of test is basically you get new information, or you get the information from the thing that you're doing-- the test plant or the market survey or the test marketing or whatever. And it says, ah, I got the idea that this-- I thought I knew what was happening. But gee, This test market showed me that the product really stinks. So maybe it isn't so good. So maybe my probabilities are wrong.

Or it says, wow. It really took off like gangbusters. It's going to be wonderful. So whatever it is, you have the chance to give the new information to revise your prior probabilities known as posterior probability. Has nothing to do with your tush or your posterior but just that they come afterwards. It's sort of a mouthful, but it's the after probabilities.

And then you have new values for the decision. So, in general, then you've had the original decision that had a certain value that you could calculate, as we've done before. And then having with new probabilities, you have a different value.

So the consequence of the test is that you have an expected value after the test. And, in general, the expected value of the test is greater than without the test. Why? Because you can avoid bad choices. You say, oh, well, I found out that my sales estimate wasn't as good as I expected. So really, I shouldn't be so aggressive in the production. And I won't have all this stock that I didn't use, so I don't lose that money.

On the other hand, you can see, oh, it sold out really well. Maybe I should increase my production and do much better than I thought. So the general idea that the expected value after the test is greater than the expected value without the test, in other words, that you can do better by having some proper amount of information available to you.

Now, we'll take that as a given. And that's a useful starting point. The question really is, since the test has a cost, is it worthwhile? I mean, it has a cost because, if you're going to test marketing or set up a pilot plan, you have to spend some money on it. You also have to spend some time. The time you spend on that exercise may mean that you missed a market that you could have been making money instead of just delaying.

So the ultimate question is, what is the value of the information? And does this value-- is it greater than the cost of the test? Or more precisely, is it significantly greater than the cost of the test? Is it really worthwhile to do? If it's \$10 better, doesn't seem like such a good deal. But is it really a significant value? That's the idea.