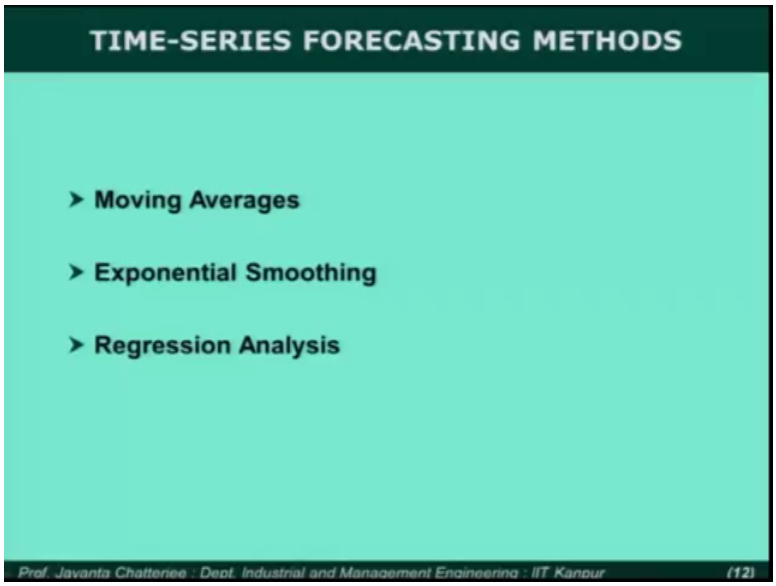
**Management of New Products and Services (MNPS)**
**Prof. Jayanta Chatterjee**
**Department of Industrial and Management Engineering**
**Indian Institute of Technology, Kanpur**

**Lecture - 14**
**NPNSM - Introduction to New Product Forecasting Techniques**

Hello I am Jayanta Chatterjee and we are discussing managing new products new services and currently we are discussing estimating the market potential and making a forecast of the new product initial foray. And after yesterday session and now I am going to discuss some of the simple statistical techniques that we use for this kind of ah. And so, if you want to read up a little bit more, there are many more detailed methods that we are not discussing ah, but I am just going to lead you to this time series forecasting which is more the most often used.

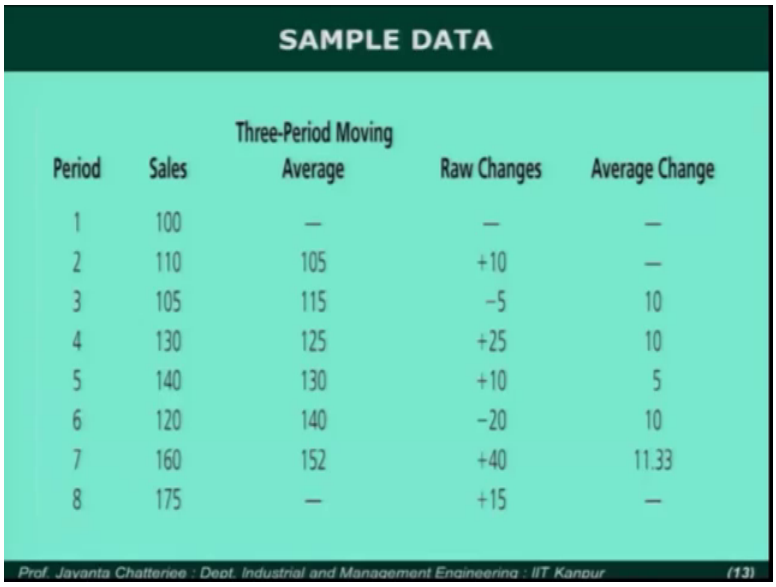
(Refer Slide Time: 01:04)




But obviously, you can see because it is a time series; that means, you have some past data available. And as I discussed you may be new to the product ah, but there may be some competing product that are available; that means, it may be new to your organization, but there are other products available in the market. That means, it is not new to the world. So, therefore, some data is available or as we were discussing in the last session about this mosquito repellent.

Now, you are going to address market where a substitution product like you are creating a mosquito absorber or mosquito killer, but the mosquito repellent products are already available in the market of different varieties. Therefore, you have that data how many are sold how many that data is secondary data is available.

(Refer Slide Time: 02:04)




So, if you have that data then we can apply these different approaches. For example, this is the moving average method you see. This is where you have say 8 period data available in the period 1 which can be first month or year or whatever is the most appropriate unit you have to consider here week or month or year whatever and. So, period one for the time being let us say we will take months.

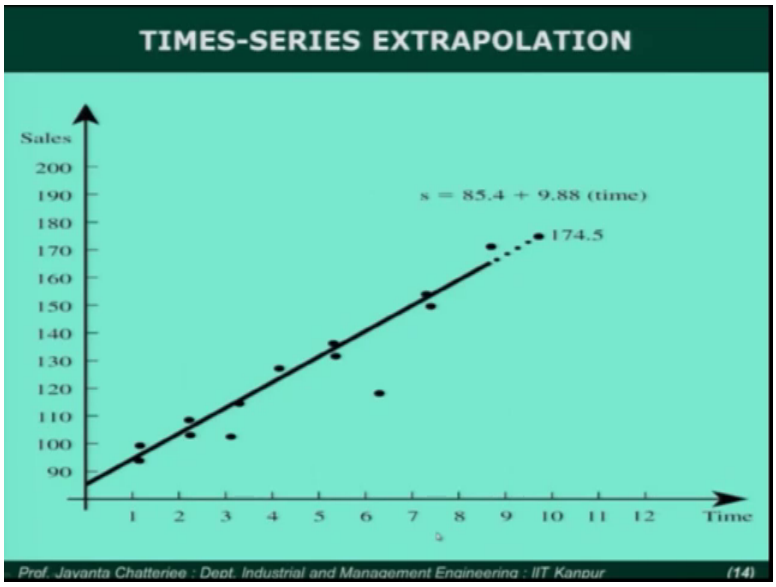
So, you have in your area after asking the different people who sell mosquito repellents, you found that actually 100 were sold. Then in the next period you found that 110 were sold, and then in the third period. So, you see 100, 110, 105, 130, 140, 120, 160, 175 these are the. So, the moving average is the three period moving average. So, you see the first of the second column you see here second column you look at. So, 100 plus 110 divided by 2 that average is 105.

In the next one we add these and then make the average divided by three, that gives us this particular number and. So, sometimes we also create this plus this and then and then come up with the number, and that these are ah. But in three period we will basically take

these numbers and divide and come. So, the preceding three periods based average will be then calculated.

And then you can see accordingly the average changes etcetera. And what can happen is you can if you have this data this gives you the average forecast, and then you may have some actual subsequently you can actually apply this method and see how much error you are creating.

(Refer Slide Time: 04:10)




And then actually you can create something like this; that means, this can be your real data these are the real data points based on that this particular tabulation has been done, then you can actually your most of the software will allow you to what we call creating this approximate line the linear method.

Thereby you can actually say if up to the ninth period these where my numbers, then likely numbers in the coming periods will be something like this. Obviously, you can see here the assumption is that in general the market is in the growth mode. If the market is in general in the decline mode then also this can be applied buts until and unless there is a clear trend then this is very difficult to use.

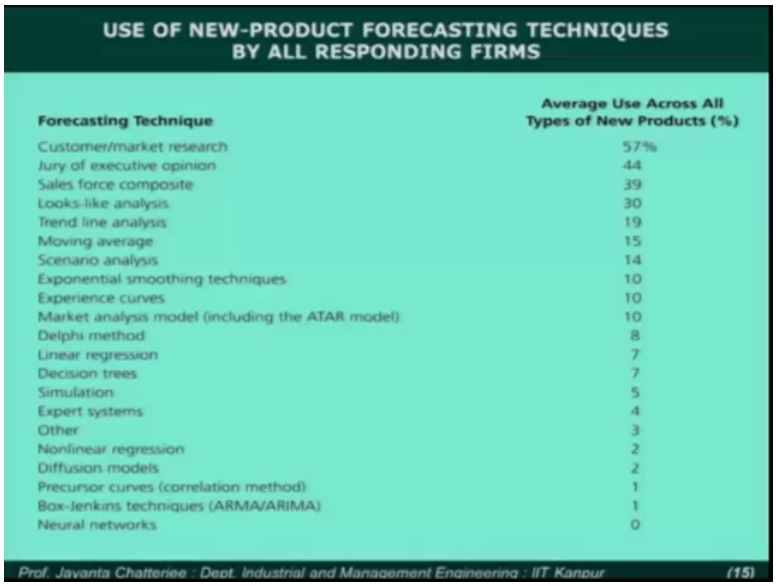
As you see here we are looking at a market which is generally the overall trend is up; that means, from 100 over a pan span of eight periods it has gone to 175, in between it

might have dropped from 110 to 105, but then again it jumped to 130, then it jumped to 140 dropped to 120 again it jumped to 160.

So, on the whole its actually kind of a going up, then you can actually use this kind of time series what we call extrapolation. That means, you draw a graph of with existing numbers, do this kind of line fitting and then extend the line to give you a rough number that will be used for the 12 13th, but here as you can see we are looking at a continuous growth, and you know that this period of continuous growth does not happen at the initial exploration stage or later stage.

So, this is the a kind of the middle part of the product life cycle graph we will which we will discuss in a subsequent session, where the market behavior is kind of linear of linear growth.

(Refer Slide Time: 06:22)




This actually gives you that what kind of different techniques this is for my research paper, that different companies use different methods to do this new product forecasting.

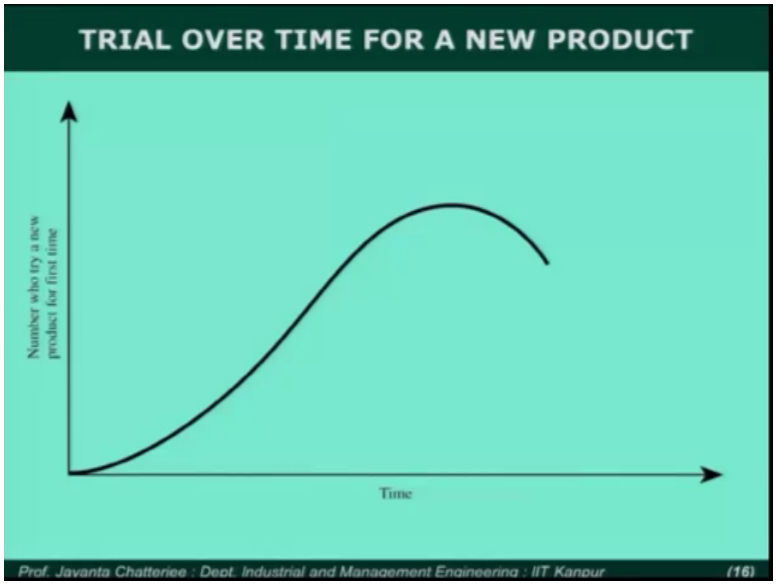
So, you can see here this customer market research is the most common method used, and then jury of executive opinion; that means, people in the business who are in that business, who have lot of prior experience they are intuitive feeling and here intuition or guess is not to be ignored. Because that is actually coming out from prepared mind people who are in the business from their long experience.

So, suppose this new type of mosquito killer that you have come up with, and if the people in your business have already been involved earlier in selling the existing type of mosquito repellents. Then you see they have a fairly good idea how this market moves how more of those products are demanded during summer or during the monsoon and how actually mosquito basically are in the very deep winter they are the sale goes down, and all these things they know.

There by their opinion can be a very good indicator and the other one which is also very similar which is the sales force composite that is also you see 39 percent people, 39 percent of the companies rely on that. So, between these three methods you can see most of the estimates are made; that means, when the product is new then rather than you know this what you call a lot of data based analysis, people rely initially on this kind of thumb rule or experience based forecasts.

Of course, later on you will see there are numbers for trend line moving average the one which we just now discussed or scenario analysis, but as you see 14 10 percent people are using it. Because you need to have expertise and tools etcetera, and at least some amount of data you need good set of data you need of similar products sales trend or the products that you are going to substitute and so on.

(Refer Slide Time: 09:04)




I am going to end with this particular graph and in a subsequent session, we are going to pick up deeply the different forecasting processes that will apply to this graph as you

know this is time and on this side we have number of number of people who buy this is. So, this is kind of a cumulative sales buildup it; the cumulative profit buildup also derives from here we have already introduced this graph the so, famous graph of product life cycle or PLC as we call it.

Now, I want at this stage, because we have been discussing the statistical techniques or mathematical approaches, I want to point out to you one thing. You see if you closely observe this graph actually this is also often called the bell shaped graph or normal distribution. So that means, as you know that this will actually be like a bell it goes it, it starts like this then goes up and then goes down and its kind of a symmetrical on both sides.

So, this distribution can then be mathematically analyzed; and its very interesting that this is a very powerful model that it in a way you can see the entire nature even we as human beings you know, we are born and then we grow, and then we grow old and then we die. So, this cycle this normal distribution cycle is a very powerful natural model, it applies in so many a parts of nature and very interestingly in most business areas for most products this normal distribution works.

This graph may look a little different for different classes of products which we will discuss, but the general shape remains. So, there may not be a perfect bell shaped graph or the what we call perfect normal distribution available for many products, but roughly this shape has been seen to work through a large number of studies we have seen that, this is actually a good depiction.

Of course what is happening is now some products or rather many products many high tech products they just they are born and die very sharply. So, this graph instead of taking this shape, we will discuss that you know it will just quickly rise and then fall.

So, like for example, a movie you know if it is a movie, if it is a hit then it in the first four weeks it will do all the business today over these hundreds of screens through various multiplexes around the country, but within 3-4 weeks the movie then disappears thats the general trend gone other days when you know mugaliasm or some other movie ran for you know 5 years in the same auditorium those days are gone.

Nowadays therefore, we do not have this long some industries show, but most industries are now becoming like the movie industry. The products are launched if they are successful and they die within the first two weeks or if they are successful then they rise to its peak within the next 6-8 weeks and then they pitter out.

What is interesting here to point out statistically? You know we were discussing this kind of linear graph that we were showing, and I want to point you try to understand that this part of the graph the early part of the graph is actually non-linear ah. This is actually you can see it some kind of a concave curve. So, its a kind of exponential growth.

So, which means that the early stage if you have hooked on to some customers and you have had some specific and strong appeal to certain types of early adopters, then you can see very rapid growth. But then this rapid growth gives way to a period which is linear where actually; that means, at this stage for a little bit of sales effort intelligent sales effort, and if your product has truly good features and attractive features then you can see some very rapid growth.

But here at this stage what we call the early majority and the late majority stage, that is the growth stage you see from this point to this point. Here in this range it is almost linear; that means, inputs and outputs will be related in a linear fashion. So, y is equal to mx plus c sort of equation for. So, if y is the result that you are expecting sales, you are expecting.

Then it will be equal to mx which means the inputs efforts that you are doing by way of promotion by way of number of people selling door to door by way of number of distributors who have agreed, to you all those factors the number of trials that you have conducted; which basically we say effort. So, your result your sales will be proportional to your effort at this stage.

So, that is when actually that moving average type of thing the linear method of trend forecasting can actually work. But then when we are declining then again it is another way it is the reverse of this graph. So, you have here actually kind of a convex graph and again it will be an e to the power x sort of relationship. So, therefore e to the power minus x here. So, it may actually be a very rapid decline or at least it will no longer be a linear method.

So, the question that I am trying to you to understand is that, some of the statistical techniques work very well at this stage, but it may not work very well at this stage, and it may not work very well at this stage. And then we will further see in the subsequent two lectures that even this graph actually is not continuous there are actually gaps that develop in this or what we call chasms, but that is the topic for another discussion. So, this is where we end our short session today.

Thank you very much.