

Management of Field Sales
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Lecture - 19
Forecasting Sales and Developing Budgets

So, Management of Field Sales is our overall topic for discussion. This is our 19th session and in this session and the next session in these two last two sessions, I will be focusing on certain quantitative information technology oriented requirements of the sales management function field sales management function.

The first topic that I am going to take up in today's session is relating to forecasting of sales and developing budgets. This is something that needs to be done by the sales team at various levels, forecasting needs to be done by individual sales persons and it needs to be aggregated and further improved by the sales manager and that is a regular on going activity.

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Sales Forecasting Methods			
Methods	Advantages	Disadvantages	Best Used
Executive Opinion	Quick, easy, and simple	Subjective Lacks analytical rigor	For new products
Sales force composite	Relatively simple Usually fairly accurate Involves those people who are responsible for the results	Salespeople are sometimes overly optimistic Salespeople may sandbag (estimate low) to look better Time consuming	When reps are of a high caliber When each rep has a small number of customers
Survey of buyers intentions	Done by those who will buy the product, so accuracy should be good.	Time consuming High cost Customer may not cooperate	For new products When there are a small number of customers
Trend projections: -moving average -exponential smoothing -regression analysis	Objective and inexpensive Use historical data	No consideration for major product or market changes Require some statistical analysis	For established products When market factors are predictable For aggregate company forecasts
Analysis of market factors	Objective Fairly accurate and simple	Unforeseen changes in the market can lead to inaccuracy	When market factors are stable and predictable
Test markets	Very accurate	Time consuming Cost	For new products which do not require large investments

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Now, sales forecasting can be done by different methods. This in itself is a you know a 20 hour topic, but I am going to point to you the key approaches the key methods and then you can study a little bit more from the book on your own and perhaps the topics that I am taking up in these last two sessions will be elaborated in another course that we

will announce for a later transmission, which will be like an advanced techniques in sales management or something like that.

So, as you see on your chart there are 5 or 6 different approaches to sales forecasting given here. The first one is a qualitative one executive opinion. Executive opinion means, that the people who are involved in that particular sales activity it will it could be the vice president, it could be the general manager, it could be the manager all the people who are at the upper level of the sales activity their opinion can be quite valuable. Because these people are living the dream, they are living the ambition day in and day out and that creates that focused thinking focused concern creates someone intuitive capabilities.

Now, intuition is not focus pocus intuition is actually meditated studied opinion. This is actually a thinking that is stimulated by deep concentration and very useful in case of say for example, new products. Because for new products which is new to the world there may not be any existing record there cannot be an existing sales history. So, there actually you need to think like Steve jobs that the customer may not know what the customer needs and I will show them what they need. So, this is the kind of thing where you will have to imagine that what could be as opposed to what is and often you have to alternate between what is and what if and that will give you the clue to what could be and. So, it is quick it is easy and it is simple, but; obviously, it is very subjective.

So, if you have highly skilled executives, their perceptions, their meditated studied opinion we will have a high degree of reliability and often will actually come true. And otherwise you know one will have to do lot of analysis, but it has been found as you as you know the famous saying the garbage in garbage out for most analytical technical systems. So, until and unless you have very good sensible inputs from the field, it is difficult to come up with any good workable output. So, executive opinion because it is opinion of deeply involved people can often be quite valuable.

Similarly, the sales force composite. This is actually the inputs taken from all the sales people are kind of combined and to create an aggregated picture of what could be the next period sale, next 1 year, 2 year, 3 year sale. It is relatively simple therefore, to combine because you are combining different opinion and, but the good thing is that it is coming from people who are actually responsible and going to deliver that result. Of

course, that leads to some disadvantage also that people may deliberately downplay the possibility so, that they can easily achieve their targets or quotas. So, that is often called in the trade as sandbagging. So, you actually can create therefore, artificially deflated target. Or in sometimes if the performance for the last few quarters have been bad, the salespersons are often in that acoustic mode they may feel in the next two quarters I am going to make up all the losses. So, it will be like what we call overly optimistic.

It is best used these sales force composite, when you have a high performing highly motivated and well skilled sales force, then the sales force composite can be very good forecast. And also when there are this is this works very well in industrial selling, because there often the sales representatives are focused on certain specific types of customers or fewer number of customers. So, they have a much deeper knowledge of what the customers requirement will be, and I will show you an example just now and then you will see how that can work. And then comes the in the last four are four quantitative it needs more data collection and data interpretation.

The first one is the survey of buyers intentions this again can be a widespread inputs coming from the field sales and those all can be aggregated, but here instead of figures plucked from the imagination or mind of the sales person, you are actually asking the customers a series of questions you are compiling the answers to those questions and interpreting them. This is quite good for a new product or a new variant or a new model, and it can work well when there are that market factors are more predictable.

So, for established products this can work better, but survey of buyers intentions work better for newer products and trend projections work better for existing products. It is the same thing both are based on inputs from the customers either intending customers or existing customers.

So, in the first case for new products you use, buyers intentions survey of buyers intentions and in trend projections you use the techniques like some quantitative techniques like moving average, exponential smoothing, regression analysis etcetera. I will see if we can find some time at that towards the end of this session to show you some of the examples of these quantitative techniques. And then of course, you have test marketing, where actually you go out to the targeted segments and do sell some actual products and then analyze the results.

So, the test marketing is often used in high volume consumer goods situation and you choose a certain area, where you will do test marketing and you choose that area carefully so, that even if there is some failure or some problem it does not affect the entire market. Yet that small chosen market which will not create ripples across the whole market should be such that it is kind of representative. I am told that in fast moving consumer goods often the first launch or test marketing is done in a place like Nagpur because it has a good cosmopolitan population; yet it is not like failing in Calcutta or failing in Bombay because there actually it can impact the larger market.

So, test market is can be very accurate, but it is time consuming and it has; obviously, a lot of cost involved, because you are actually trying to market products which have already been made and therefore, if there is some flaw in the product itself or some problem, then you will have to go back into the design phase or to the manufacturing phase.

So, new products test marketing particularly fast moving consumer goods where you are looking at finally, a high volume target, a large number of units to be sold. Test marketing is a good way of building the forecast and there it may be not that prohibitive in terms of cost when you compare to the actual volume that can come from a successful product.

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Market Factor Forecast : Baby Diaper		
	Next Year	Second Year
Projected population, ages 0-18 months	4,850,000	4,800,000
Percentage using diapers	100	100
Number using diapers	4,850,000	4,800,000
Average daily diapers per child	2.55	2.55
Diapers daily, ages 0-18 months	12,367,500	12,240,000
Projected population, ages 19-30 months	3,300,000	3,200,000
Percentage using diapers	80	80
Number using diapers	2,640,000	2,560,000
Average daily diapers per child	2.19	2.19
Diapers daily, ages 19-30 months	5,781,600	5,606,400
Projected population, ages 31-42 months	3,500,000	3,300,000
Percentage using diapers	40	40
Number using diapers	1,400,000	1,320,000
Average daily diapers per child	1.10	1.10
Diapers daily, ages 31-42 months	1,540,000	1,452,000
Total daily diapers, all ages	19,689,100	19,298,400
Percentage disposable diapers	95	95
Number disposables daily	18,704,645	18,298,400
Dryer market share percentage	20	20
Expected daily sales (units)	3,740,929	3,666,696
Wholesale price per diaper	0.07	0.07
Annual sales forecast in dollars	95,580,736	93,684,083

So, these are an overview of the various forecasting methods I was going to tell you about how you can do this is often done for existing products, this is a kind of a market survey based forecasting. So, as you see here the next year you one can say there is a total market of 48.5 million and all of the market segment in the 0 to 18 months. This is for baby diapers 0 to 18 months almost 100 percent of the market will use the diapers.

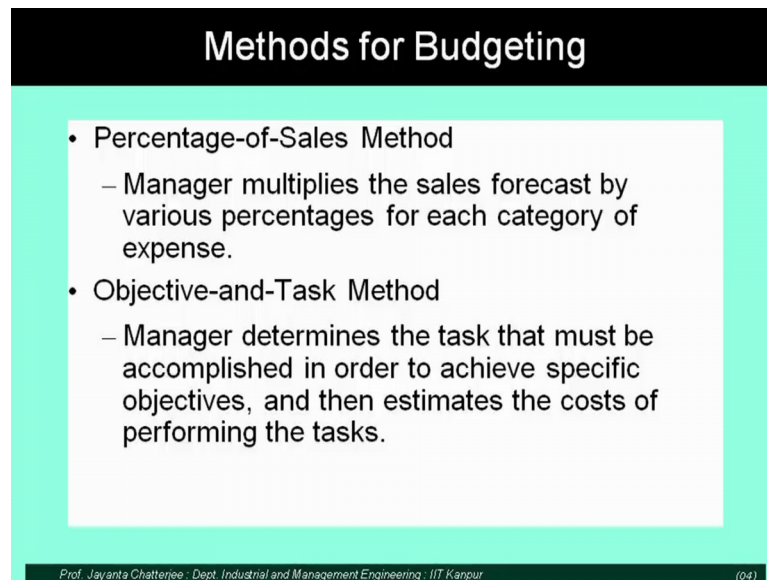
So, the number of people who will be using the diapers will be 48.5 million, average daily diapers per child will be 2.55 and that will give you this kind of 12 million number for projected sales.

Now, here as you see there are a number of survey issues involved, you have to first of all study a different types of sample customers, and come up with this number of average daily diapers per child ok. And that is a number which we will carry through to the other year projection as well. So, this number determination needs customer survey lot of data collection and interpretation. And then also that how the diaper usage declines from 0 to 18 months to 19 to 30 months; that means, say drops from 100 percent usage to 80 percent usage and 31 to 42 months; that means, the child is kind of grownup it drops to 40 percent. This is something that will be important to determine.

And it is also you can see here that the total number drops from four 4.8 million to 3.3 million in the next age group. It drops to 3.5 million in the next age group and so, this determination is also important and that gives you; if you now aggregate all of these then you will be able to kind of come to a sales forecast in dollars rupees and so, on for the total number of diapers. I mean first you get the number of diapers and then multiplied by unit sales price you can also get some forecasts in dollars or rupees.

So, this is one of the methods I will discuss some of the other methods shortly.

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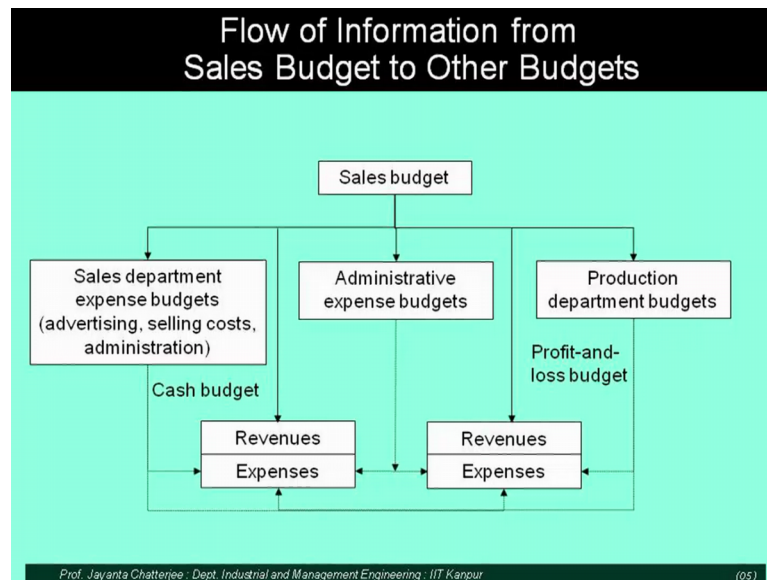
Methods for Budgeting

- Percentage-of-Sales Method
 - Manager multiplies the sales forecast by various percentages for each category of expense.
- Objective-and-Task Method
 - Manager determines the task that must be accomplished in order to achieve specific objectives, and then estimates the costs of performing the tasks.

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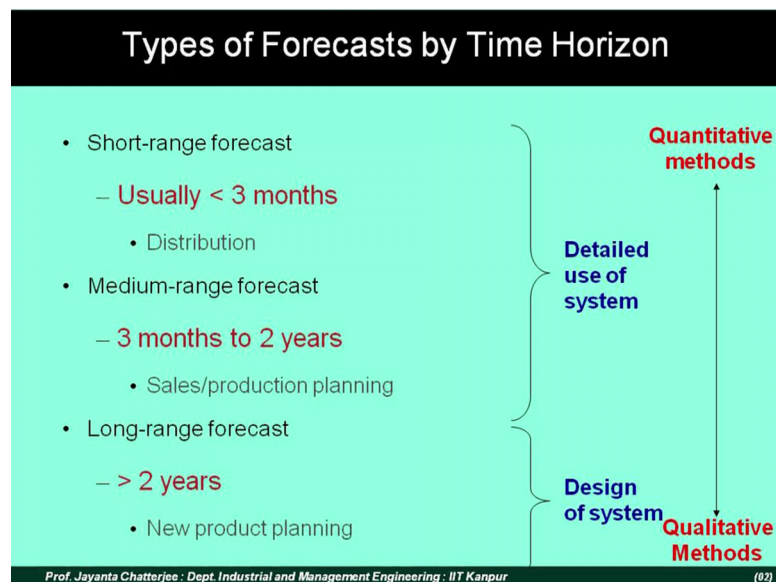
I will also highlight at this stage just as an interlude methods of budgeting; that means, if you have a target, then correspondingly you will have expenses sales expenses marketing expenses. So, budgeting for sales is done usually by the percentage of sales method take 3 percent of sales targeted or 5 percent of sales targeted and allocate that as the sales budget; that means, that is the outside boundary of what can be spent by way of promotion, by way of trade discounts, by way of point of sale promotion and so on. And also sometimes there can be some budget allocated to a particular target, it also very important for new products to get that kind of budgetary support or if you are trying to change from one product usage to other product usage, then this objective and task method of budgeting will be important.

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So, this is the sort of concluding slide of this part which is the sales budget we will have different types of expenses and so out of that one can have a cash budget revenue to expenses and profit and loss budget revenue to expenses and the expenses can be set by a percentage of sales method or objective and task method.

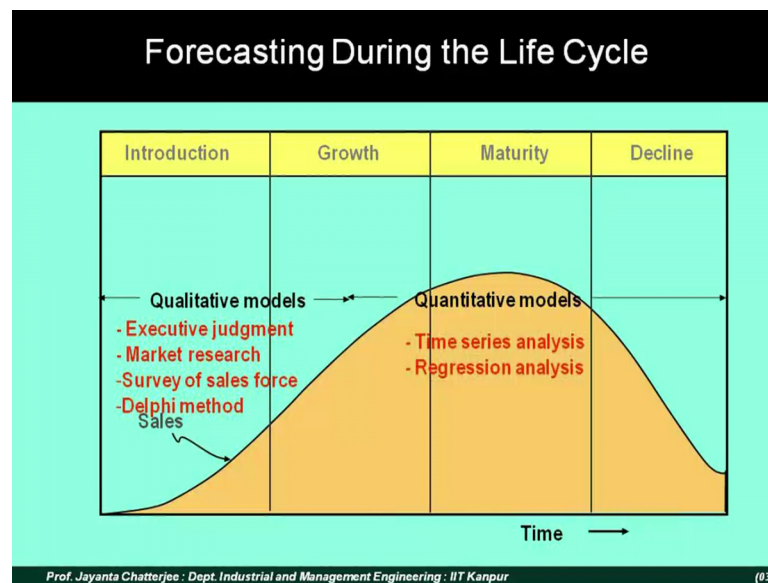
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I am going to discuss quickly some typical types of forecasting methods. So, this is the first stage, which is or based on time horizon. The time horizon can be a short range; that means, usually less than 3 months; obviously, the accuracy of forecasts goes down as

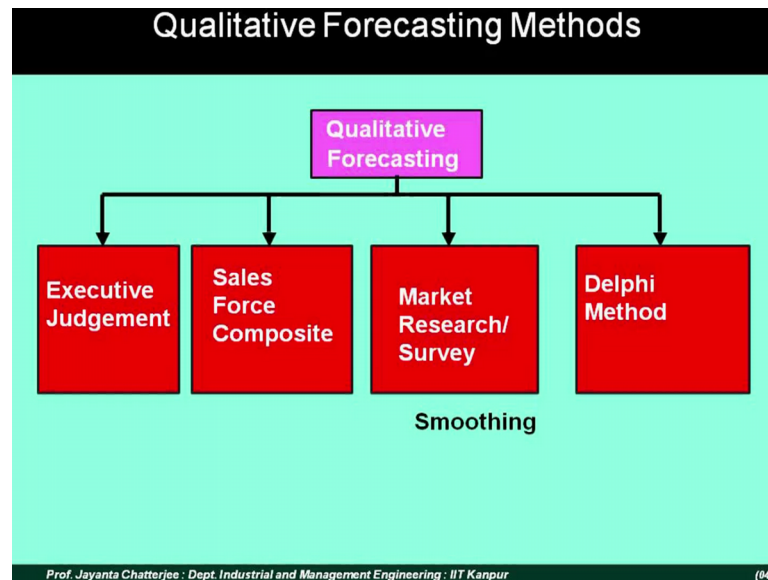
you go longer and longer because the future is unknown. So, you can see the next 3 months sales more clearly, as opposed to something that is going to happen 2 years or 3 years later so, many things can change in today's fast moving world. And this time horizon based sales approach is important for new for established products.

(Refer Slide Time: 17:10)



So, if you look at this diagram, then you can see this is a very interesting slide that in the early stage of lifecycle product lifecycle, because there is no track record you do not have any trend analysis database. So, there the qualitative forecasting techniques like executive judgment or market research, survey of sales force their opinion composite of sales opinion, these will be the more prevalent forecasting methods in the early stage. As you go across the product life cycle which means you have more and more sales data to analyze, then you will actually use more and more of the time series analysis or regression analysis type of forecasting techniques.

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So, qualitative forecasting are these four types we have discussed this.

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Qualitative Methods

Briefly, the qualitative methods are:

Executive Judgment: Opinion of a group of high level experts or managers is pooled

Sales Force Composite: Each regional salesperson provides his/her sales estimates. Those forecasts are then reviewed to make sure they are realistic. All regional forecasts are then pooled at the district and national levels to obtain an overall forecast.

Market Research/Survey: Solicits input from customers pertaining to their future purchasing plans. It involves the use of questionnaires, consumer panels and tests of new products and services.

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I out of those I think I am not I have not mentioned it that much is this Delphi method.

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Qualitative Methods

Delphi Method: As opposed to regular panels where the individuals involved are in direct communication, this method eliminates the effects of group potential dominance of the most vocal members. The group involves individuals from inside as well as outside the organization.

Typically, the procedure consists of the following steps:

- Each expert in the group makes his/her own forecasts in form of statements
- The coordinator collects all group statements and summarizes them
- The coordinator provides this summary and gives another set of questions to each
- Group member including feedback as to the input of other experts.
- The above steps are repeated until a consensus is reached.

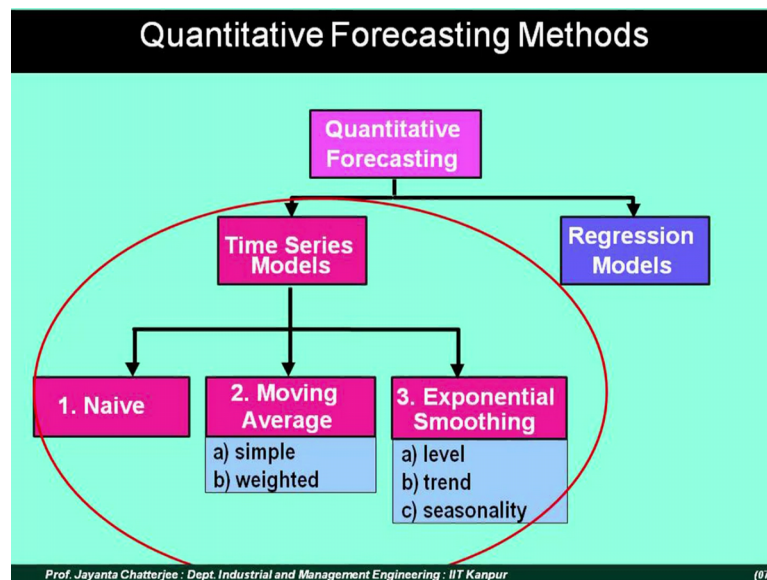
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And the Delphi method is where you take a new product, and describe or expose the new product with by text, by graphics sometimes by prototypes to a group of experts. And take their opinion that what could be for example, the sales over the next 5 years of say a robotic floor cleaner right. It is a new product in for the Indian market and you do not have any previous record, lot of change of users habits will be involved users allocation of family budget will be involved and so on.

So, here one can actually go to experts and go to 15 experts and take their opinion what they say, and it is very seldom that all the experts will say the same thing there will be differences, there will be different numbers coming up from the different experts. Then you put it all together and then you can actually feed it back to the group again for them to look at that what is the composite of the expert inputs.

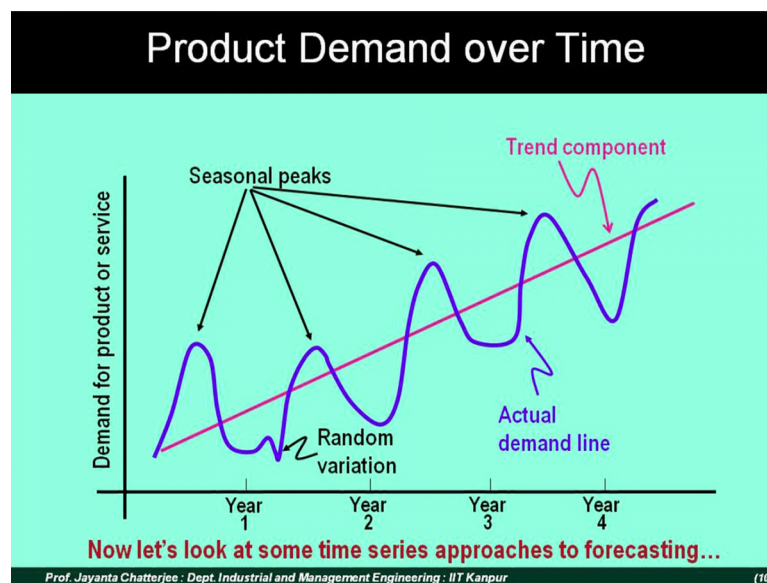
And then you can actually another set of questions can be created and this process can be done a couple of times and that can also give a very good. So, you can see this is actually an input towards the executive opinion building. So, a Delphi method combined with an executive opinion session, and some interaction with the key salespeople can give a fairly good forecast for a very new type of product. So, paradigm shifting products will need this kind of or high tech products not seen before new to the market type of products can often use this Delphi method.

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Now, I am going to discuss the most prominent quantitative forecasting techniques.

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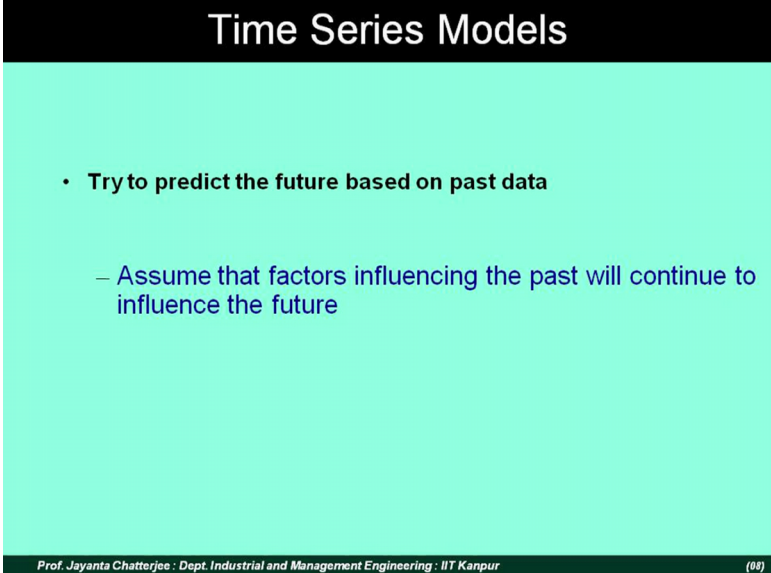


First is the time series model. The time series model can be the knife type where actually you can take the record of the last 4 years, you are trying to forecast the next 5th 6th 7th year sale, then one can actually build a sort of a this can be done very easily through software these days, what we call curve fitting. And so, you actually have a straight line that kind of summarizes takes care of these peaks and troughs and come up with some

kind of an average out of these trends, and that if you extrapolate that then you get that what could be the 5th what could be the 6th that sort of thing.

And then of course, you can also look at the alternative nature of these peaks and you can see that actually the first year, second year is a little depressed than the third year and these are actually there are reasons why this happens. I am not discussing, but these variations can be looked at and then when you come to the 5th year forecast or 6th year forecast, you can also look at these trends and the nature of the peaks and you can further improve upon the demand projection.

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Time Series Models

- **Try to predict the future based on past data**
 - Assume that factors influencing the past will continue to influence the future

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So, this is the kind of what we call the time series model where you are trying to predict the future based on past data ok and then we discuss moving average.

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2a. Simple Moving Average

- Assumes an average is a good estimator of future behavior
 - Used if *little or no trend*
 - Used for smoothing

$$F_{t+1} = \frac{A_t + A_{t-1} + A_{t-2} + \dots + A_{t-n+1}}{n}$$

F_{t+1} = Forecast for the upcoming period, $t+1$
 n = Number of periods to be averaged
 A_t = Actual occurrence in period t

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(12)

Moving average simply this is the kind of you know there are actual occurrence in period t . So, you have actual occurrence of a t ; t minus 1, t minus 2 t minus n minus. So, if this is the current year achievement, then you actually are going to the previous here and the year before and so on and here there is we are assuming that there is not much of a trend there are not much of variations.

(Refer Slide Time: 23:12)

2a. Simple Moving Average

$$F_{t+1} = \frac{A_t + A_{t-1} + A_{t-2} + \dots + A_{t-n+1}}{n}$$

You're manager in Amazon's electronics department. You want to forecast ipod sales for months 4-6 using a 3-period moving average.

Month	Sales (000)
1	4
2	6
3	5
4	?
5	?
6	?



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(13)

So, then we can say something like this, that if the month 1 sale is 4, the month 2 has been 6, the month 3 has been 5, then you take an average of a 4000 6000 5000 and this is

one is looking at the sale of ipod for example, and then if the average of these 15 is 5, then one can say ok.

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2a. Simple Moving Average

$$F_{t+1} = \frac{A_t + A_{t-1} + A_{t-2} + \dots + A_{t-n+1}}{n}$$

You're manager in Amazon's electronics department. You want to forecast ipod sales for months 4-6 using a 3-period moving average.

Month	Sales (000)	Moving Average (n=3)
1	4	NA
2	6	NA
3	5	NA
4	?	(4+6+5)/3=5
5	?	
6	?	

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The next sale item will be the next forecast will be 5 6 plus 4 plus 5 divided by 3 5 will be the forecast for period 4.

(Refer Slide Time: 23:54)

2a. Simple Moving Average

What if ipod sales were actually 3 in month 4

Month	Sales (000)	Moving Average (n=3)
1	4	NA
2	6	NA
3	5	NA
4	3	5
5	?	
6	?	

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And then what can one can do is, this is what we do is the next forecast will actually focus more ignore the very first and focus now on 6 5 and 5 and thereby will be.

(Refer Slide Time: 24:10)

2a. Simple Moving Average		
Forecast for Month 5?		
Month	Sales (000)	Moving Average (n=3)
1	4	NA
2	6	NA
3	5	NA
4	3	5
5	?	$(6+5+3)/3=4.667$
6	?	

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So, this is actually a little bit of a moving average as we call it simple moving average; that means, we take always the last 3 or the last 12 or whatever, you choose that number depends on the product you are looking at and its cycle and the speed of sale and you actually say every time I am going to look at the last 6 months of or 6 periods it could be even weeks or. So, last 6 weeks of sales and I will use that data to forecast my possibility of the 7th week.

So, for some overall planning like say inventory planning or logistics planning this could not be useful, but this is useful where the pattern is relatively stable and not variable through too many troughs and peaks.

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2a. Simple Moving Average		
Actual Demand for Month 5 = 7		
Month	Sales (000)	Moving Average (n=3)
1	4	NA
2	6	NA
3	5	NA
4	3	5
5	7	4.667
6	?	

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So, then it this kind of usage can be done this and then actually every time we can look at the actual versus what we had projected, because we are operating in a very short range of periods.

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2a. Simple Moving Average		
Forecast for Month 6?		
Month	Sales (000)	Moving Average (n=3)
1	4	NA
2	6	NA
3	5	NA
4	3	5
5	7	4.667
6	?	$(5+3+7)/3=5$

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And every time we have an error we can actually put that error into the calculation and improve our forecasting technique.

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2b. Weighted Moving Average

- Gives more emphasis to recent data

$$F_{t+1} = w_1 A_t + w_2 A_{t-1} + w_3 A_{t-2} + \dots + w_n A_{t-n+1}$$

- Weights
 - decrease for older data
 - sum to 1.0

**Simple moving
average models
weight all previous
periods equally**

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And the other thing is here we had taken that all the periods will have equal weights the last period of the period before the last and the period before that, we have taken all of equal weight, but we can suppose give more weightage to certain seasons knowing that our product sells more suppose you are actually trying to do some forecast of umbrellas. Then you know that it sells more during the monsoon season, rainy season and then the second best sales are the summer period when people may use umbrellas to shield against the sun. And if the sale will be lower in the lowest in the winter period, because then people do want to expose themselves to the sun and there are no usually no rains.

So, you take these kind of seasonal inputs and create different weights. So, if you want to make a forecast for the next rainy season, then you will give a higher weightage to the sale during the rainy season of this year and not the winter season of this year. So, if these weights are variable then; that means, you decrease it for a older data or decrease it for a certain season, and all of that should be the weights should be some up to 100 percent or 1.0, and then with these different weights you can come up with the forecasts for different periods.

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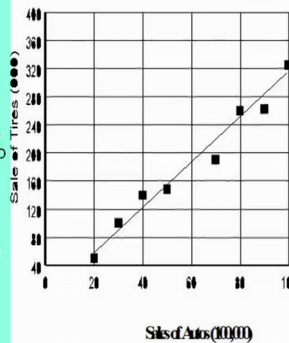
Regression Analysis as a Method for Forecasting

Regression analysis takes advantage of the relationship between two variables. Demand is then forecasted based on the knowledge of this relationship and for the given value of the related variable.

Ex: Sale of Tires (Y), Sale of Autos (X) are obviously related

If we analyze the past data of these two variables and establish a relationship between them, we may use that relationship to forecast the sales of tires given the sales of automobiles.

The simplest form of the relationship is, of course, linear, hence it is referred to as a regression line.



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(20)

And lastly this is regression analysis. This is where we are able to find something we are trying to forecast depending on the factors right. So, for example, if there are more cars are sold, then more tires will be demanded with a time gap. So, there will be tire sold to the oems that mean car manufacturers; obviously, will be directly related to the every car will need 4 car 4 tires. So, the number of tires could be here and depending on that, you know multiplied by that number and with some shift that can actually give us a projection for the number of tires demanded.

Then again actually you do a time shift and say 5 years later, they may need or 1 year later or 2 years later different types of cars may need tire replacement. So, domestic you know, personal usage cars may need tire replacement every third year and the taxis many tire replacement every year. So, looking into all of that, you can build into that and you can then create this what we call regression analysis of tire forecasts, depending on different types of sale for the later part of the year.

So, the first one which is the OEM sale of tires is directly related to the number of cars planned to be manufactured. So, if you have the forecast for the cars from the from your customer companies, then as a tire manufacturer your sales forecast will be directly related to those numbers. And then if you are now trying to forecast the number of tires demanded from the market for replacement, that is slightly more complicated because there you will have to look at different types of cars in usage you know the number of

taxis in usage, number of personal cars in usage, number of corporate cars in usage and different will be having different correlation. And so, you will have to forecast more number of tires for the taxis for the coming for the third year of from today, but you will have to forecast more numbers for personal cars in usage 5 years from now. So, like that you can this is a very simple explanation I gave of regression analysis.

Some of those which are some of those of you who are interested to study these detail explanations are given in most of the text books, you can also find detailed understanding of time series analysis and regression analysis in fundamental statistics books. And also there are large number of excellent lectures sales forecasting techniques, using quantitative tools on YouTube, and you can listen to those. And as I said most probably in a later course like advanced techniques in sales management, we will take up these forecasting, budgeting and such things in more detail.

Thank you.