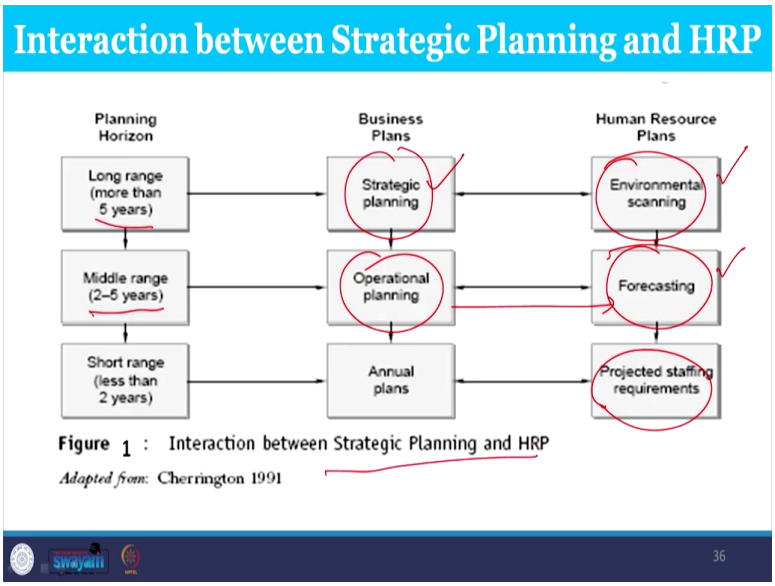
Principles of Management
Prof. Usha Lenka
Department of Management Studies
Indian Institute of Technology, Roorkee

Lecture – 15
Forecasting and Premising – II

In this lecture we will be discussing about applications of Forecasting in a particular context of human resource planning in organizations. In the previous lecture we have discussed about the forecasting, environmental scanning and how it plays a role in decision making.

So, taking a cue from the previous lecture I will discuss about the application in the context of human resource planning. How manpower can be planned? What type of when long range planning can be done? How a middle range planning can be done and a short term planning of manpower can be done.

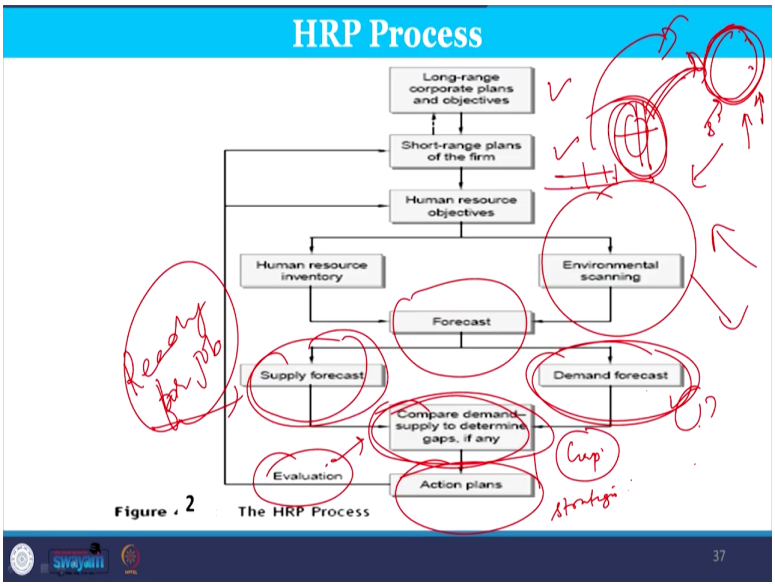
(Refer Slide Time: 01:08)



So, I will be discussing about the planning horizon like short range plan which is less than 2 years. And mostly the annual business plans are also decided, and in that 2 years period what is the projected staffing requirement of an organization. And in a middle range plan that is from 2 to 5 years, when an operational plan is decided how the forecasting is used in manpower decision making.

And in the long range plan which is generally more than 5 years it is mostly used in strategic decision making and the human resource plans, there is need for environmental scanning required. So, in this slide we will be discussing about interaction between strategic planning and human resource planning. How strategic plans that is a plan of action of an organization helps in guiding the decisions about manpower of an organization manpower required in the organization?

(Refer Slide Time: 02:15)



Human resource process, in this we discussed about the long and the short range plans and its impact on the forecasting methods, the supply forecasting and demand forecasting of an organization and then based on that we can compare demand supply gap and further an action can be taken based on the evaluation of the gap.

So, if you take an example of any industry with the technology upgradation with the advent of new technologies and the changing preferences of customers. So, the organization would not continue to work or function with the present manpower because there is a need for skill upgradation.

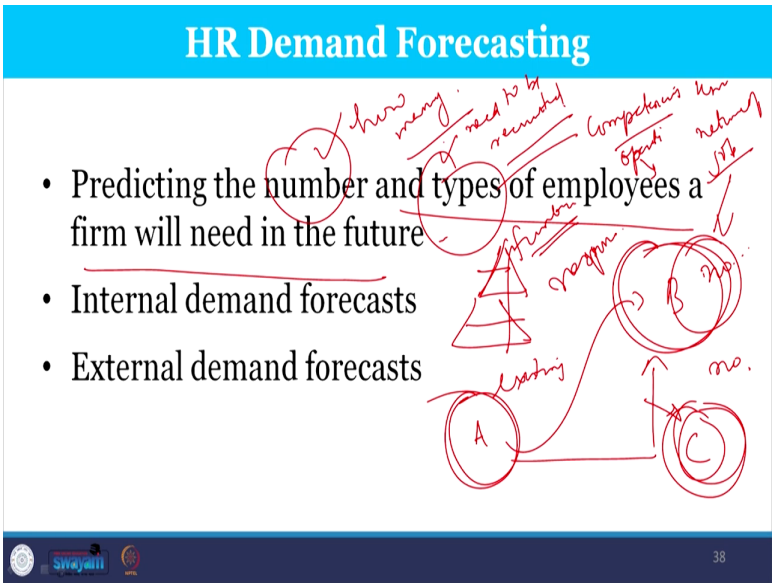
There is a need for updating the manpower by training. So, what is the demand? If an organization is expanding its business to a new market. It would not be possible for the organization to continue working or continue functioning with the manpower which is existing in the organization. There would be a requirement of more employees and provided there is a technology intervention there is a change in the structure.

So, structural changes, technological changes, changing for changing demand or changing needs of customers would all lead to add new workforce need. So, this forecasting method helps in assessing based on the past data trend, the organization can assess how many employees need to be recruited in the by the organization.

And so the gap can be assessed seeing the demand. What is the demand in the present situation and what is the supply of manpower? How many people are readily available in the job market and what is the demand of the organization?

So, matching the demand and supply the organization can take strategic plans or strategic human resource planning decisions can be taken. So, with this example you can know how forecasting can help organizations to take manpower decisions or plan for human resources in the organization. HR demand forecasting that is predicting the number and type of employees of a firm will need in the future.

(Refer Slide Time: 05:18)



How many employees need to be recruited by the organization? As I said if an organization is presently operating in a particular country and it intends to expand its business to several other places several other countries. So, it would not be adequate enough for the organization to continue working with the existing manpower.

So, existing manpower would not be sufficient for an organization to efficiently function in geographically different places. So, how can organization take decisions, how many

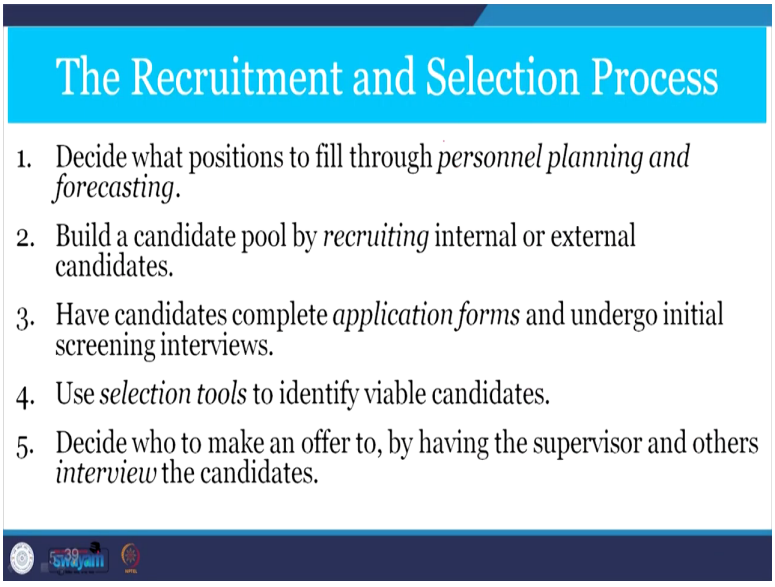
number how many employees are required in place B and in place C? Type: what is the nature of job which is being carried out, what are the responsibility roles and responsibility of an individual who is working in location B and location C of the organization.

What type of manpower, which level of managerial employees are required, what is the role their functions? What type of competency and skills are required? If they are knowledge professionals or their role is operational or there is any kind of different skill they need to be managers who need to have say proficiency in human skills, conceptual skills?

So, it will decide how many employees are required, what type of employees are required, what levels of employees are required managerial levels and what is their competency.

So, predicting the number of number and type of employees a firm will need in the future with the help of HR demand forecasting. Internal demand forecast external demand forecast. Internal demand means the organizations requirement for say what is the need for within the organization, what is the demand? So, internal and external demand forecasting can also be done.

(Refer Slide Time: 07:51)



So, it helps in recruitment and selection process. What does decide what positions to fill through personnel planning? What are the specific positions the organization need to fill through personnel planning and forecasting techniques?

Build a candidate pool by recruiting internal or external candidates. So, with forecasting an organization can build a candidate pool number and you can have a reservoir or reserve number of employees for it who can help in creating a candidate pool and which will be useful in recruitment.

Then have candidate complete application forms and undergo initial screening interviews and selection tools to identify viable candidate and decide who can be given an offer by having the supervisor interview the candidate.

(Refer Slide Time: 08:59)

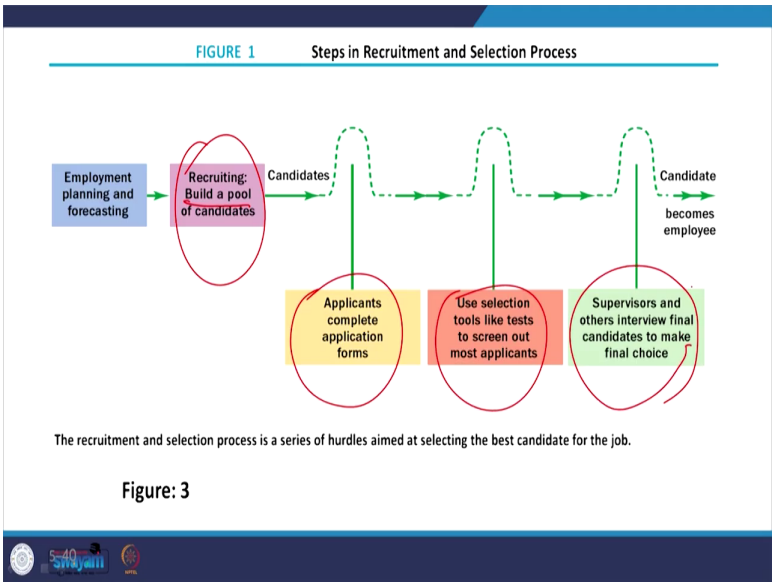
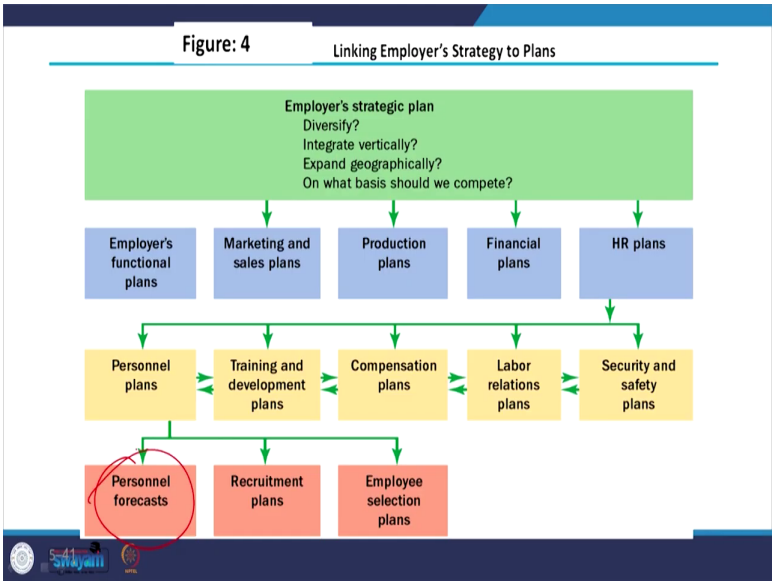


Figure: 3

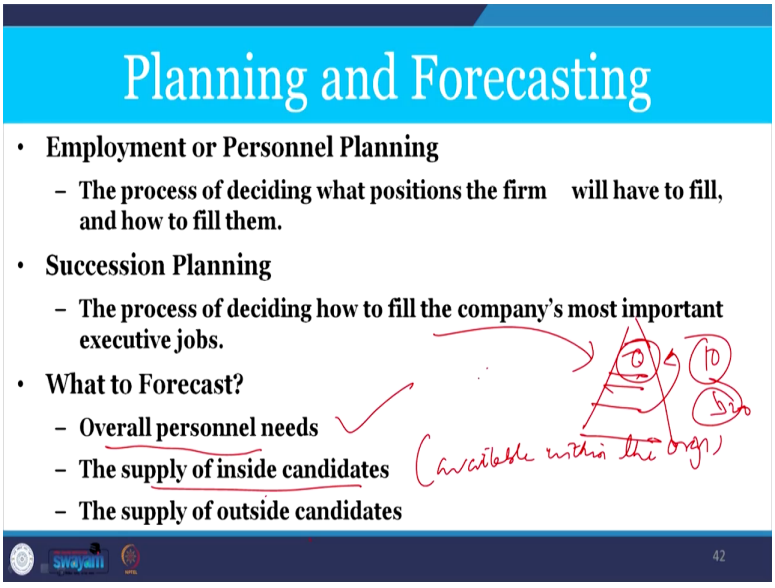
So, basically human resource planning process forecasting methods are used. And in the recruitment and selection process the employment planning and forecasting helps in the recruitment process by building a pool of candidates who can be acquired. And the applicants then further complete the process and use selection tools like selection tests and screening process then further the supervisors and other interviews interview panels finally, finalize the candidates to make a final choice.

(Refer Slide Time: 09:39)



So, what I wanted to conclude in this that human resource planning process forecasting is efficiently used. Similarly, it is also personnel forecast that is specifically it is used in personnel forecasts.

(Refer Slide Time: 09:53)



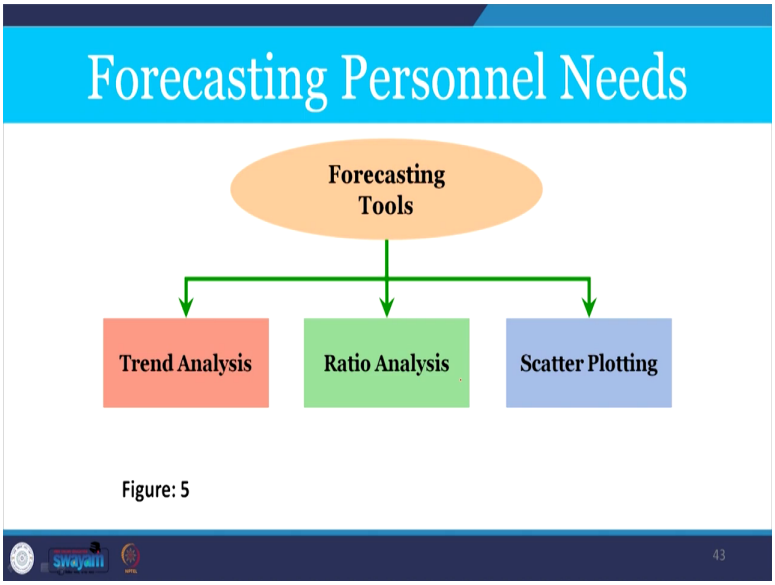
And so planning and forecasting employment or personnel planning is the process of deciding, what positions the firm will have to fill and how to fill them. Succession planning the process of deciding how to fill the company's most important executive positions, executive jobs. So, next we will decide what to forecast and overall personnel

needs. So, in this process the organization will need to find out, what is the overall personnel need?

The supply of inside candidates how many candidates are available within the organization. Like for example, say suppose there is one position vacant in the organization. First the organization will see how many employees personnel inside the organization are ready for that position.

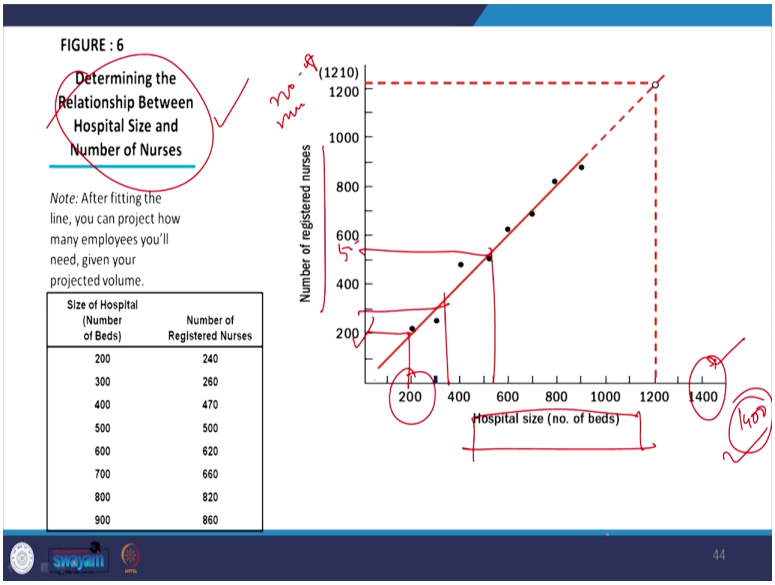
So, for one position 10 people will be ready. So, then for forecasting these overall personnel needs supply of inside candidates, supply of how many employees are available inside and how many are readily available outside the organization?

(Refer Slide Time: 11:26)



So, lastly what I would like to say that forecasting personnel needs uses the trend analysis, ratio analysis and scatter plotting methods.

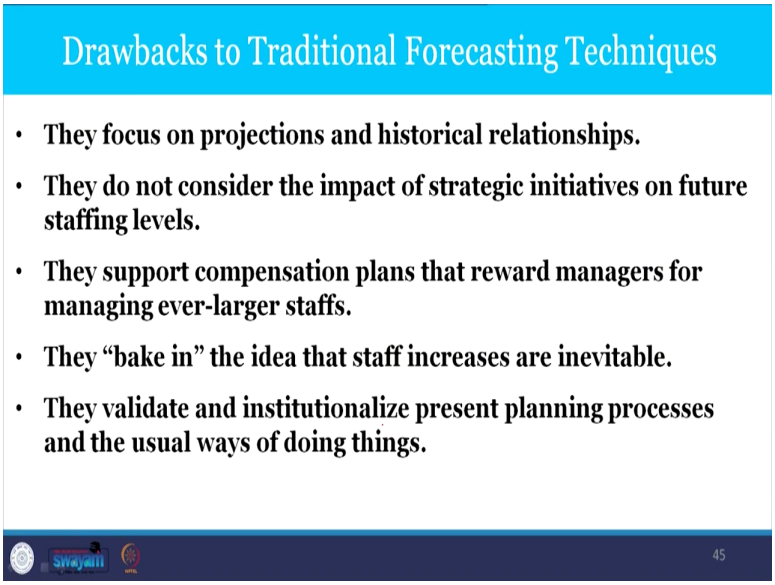
(Refer Slide Time: 11:42)



Let us look at this figure in which determining relationship between hospital size and number of nurses in this example. So, suppose there is a hospital and how to know exactly how many people or how many nurses or how many doctors are required to be given a position. So, that exactly the right manpower is recruited and there is no surplus.

So, this method can help in identifying the right manpower or assessing the right manpower need of the hospital, is human resource forecasting.

(Refer Slide Time: 12:34)



So, the drawback to traditional forecasting techniques, the focus is on projections and historical relationships. They do not consider the impact of strategic initiatives on future staffing levels. They support compensation plans that reward managers for managing ever larger staff. So, they validate and institutionalize present planning process and the usual way of doing things, using computers to forecast personnel requirement.

Nowadays, computerized forecasting is also done using software that estimate future staffing needs by projecting sales, volume of production and personnel required to maintain different volumes of output. Forecasting staffing levels for direct labour indirect staff and exempt staff creating matrices for direct labour hours and 3 sales projections scenario minimum maximum and probable.

Later on then we will discuss about the demand forecasting methods that is qualitative methods and quantitative methods. Qualitative methods like estimation, expert opinion, sales force estimates quantitative methods like trend analysis and projection, simulation, models, workload analysis and Markova analysis.

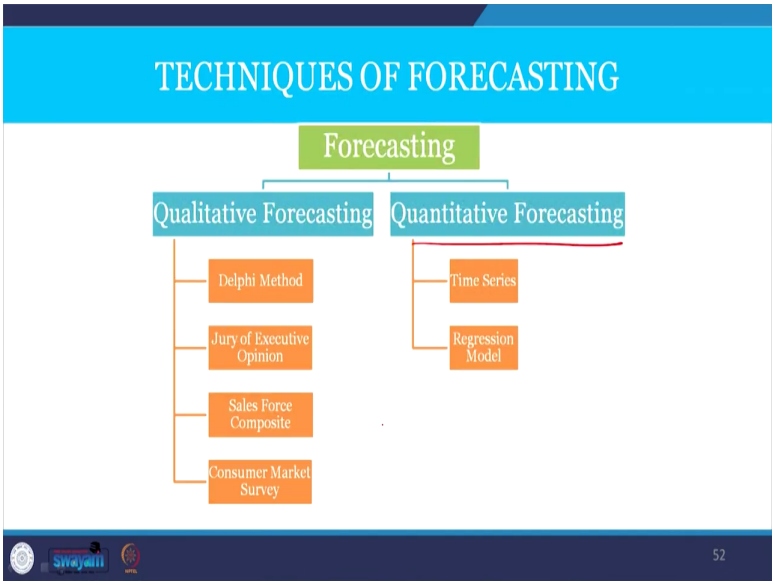
Further, we will discuss about HR supply forecasting determine the availability of employees' internal forecast and external supply forecast. What are the various methods of forecasting used in the context of in the external HR supply?

Human resource supply government estimates of population net migration into and out of the area number entering the workplace, number of employees leaving, the workplace that is attrition rate of employees, numbers graduating from schools and colleges changing workforce composition or diversity.

Then technological shifts and industrial shifts, industry trends, economic forecasts, government regulations, these are the methods of forecasting internal supply human resource inventory, succession analysis and planning labour wastage, absenteeism rate.

Now, moving on to the topic after we have discussed the application of forecasting techniques in a specific context of human resource planning. We move on to the next topic that is techniques of forecasting that the qualitative and quantitative techniques.

(Refer Slide Time: 15:25)



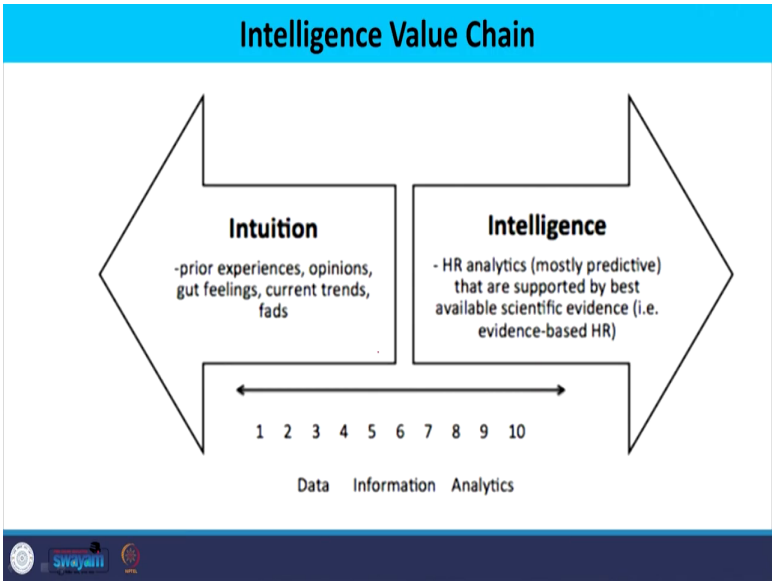
That as we discussed qualitative techniques are, Delphi method jury of opinion or jury of executive opinion, sales force composite and consumer market survey. Then further we will discuss about the quantitative data or quantitative forecasting that like time series and regression model.

So, there are techniques broadly used for forecasting. One is a qualitative data which believes on the opinion of experts the observations the cases or say the with the help of their experience they can give decisions.

And the other way that is quantitative data which is evidence based management method. Evidences can be garnered from the existing data the existing facts. So, the quantified which is the quantified number of quantity of data which can help in forecasting or which can help in decision making. So, why this trend is now in place and we will discuss about that earlier in the traditional management.

There was more emphasis on the qualitative data or the experience decisions mostly managerial decisions were based on the experts' opinion based on say observations, based on analyzing, based on their experience, observations and their intuition. But today when we look at management is getting smarter by using data or facts to take decisions.

(Refer Slide Time: 17:29)

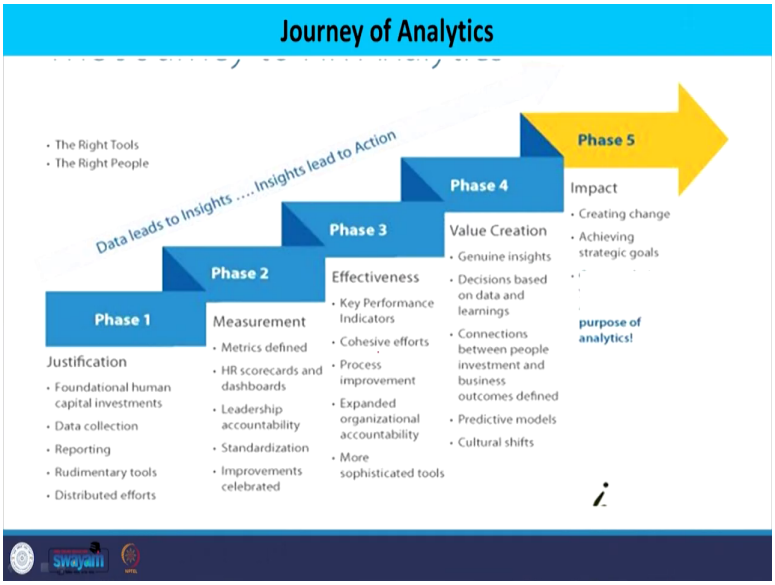


So, I will discuss about the movement towards evidence based management methods intelligence value chain; that means, intuition that prior experience opinion, gut feeling, current trends, fads have been replaced with intelligent decision making or analytical decision making models.

So, mostly they are predictive models, they are supported by the best available scientific evidence. So, it is not necessarily applicable in one domain of management, but it is applicable in every domain of management and with the help of and I will discuss about the wisdom hierarchy.

What is how the evidence based management helps managers to take decisions with the help of data? The available data discrete events and facts are converted into information, which becomes a meaningful information and the information is then converted into knowledge and which is converted into decision or say wisdom.

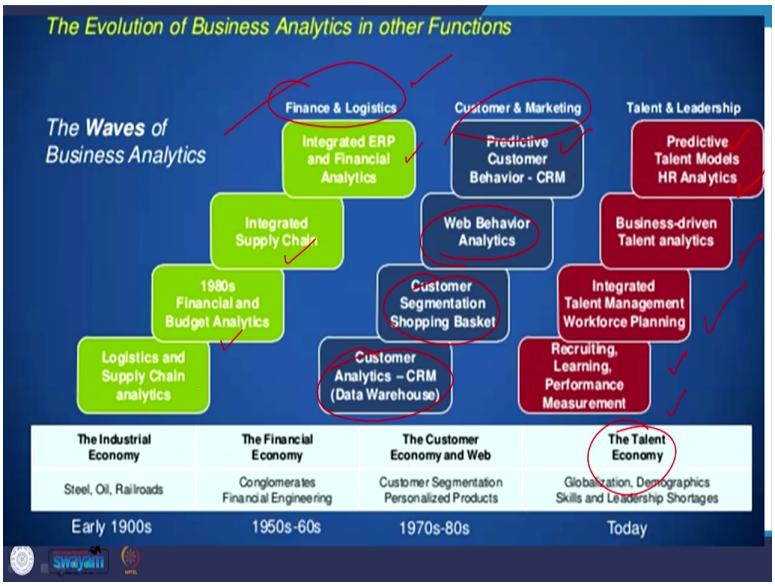
(Refer Slide Time: 18:38)



So, what is this? Justification the phase 1 how data leads to insight insights leads to action. I will be discussing about the phases of decision making. So, data is collected data helps in data or discrete facts.

They are converted into some meaningful matrices or meaningful concepts and those concepts are effectively converted into decision they are used into they are quantified and then decisions are being made. So, there are various predictive models being generated and which helps in taking decisions.

(Refer Slide Time: 19:25)

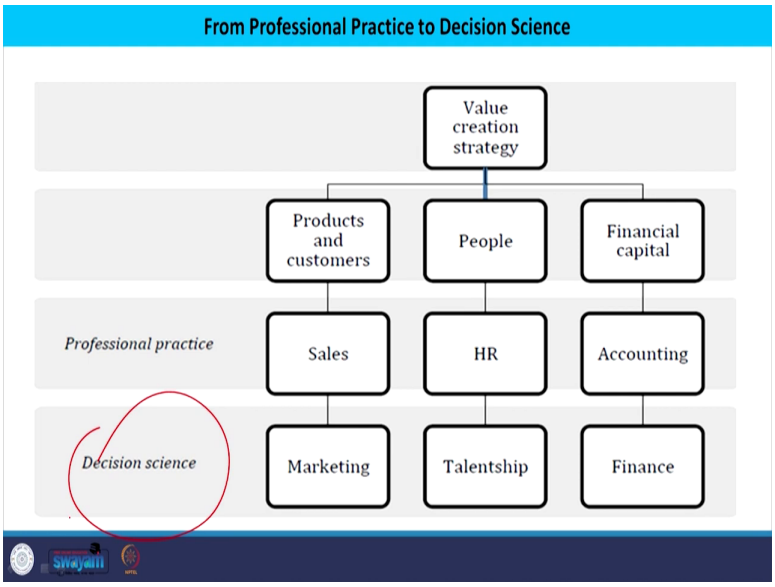


So, this the wave of business analytics there is an evolution which is happening, there is an evolution of business analytics in various functions of management. Not necessarily in one function, but it is used in talent assessment in human resource domain it is used in predicting talent models or HR analytical models, business driven talent analytics, integrated talent management or workforce planning. It is also used in recruitment performance measurement and so on.

And similarly it is also used in the analytics that is what I am talking about is a quantitative decision making models they are also which is based on the data which is based on the evidence. It is also used in customer decision making models predicting consumer's behavior that is customer relationship management, web behavior analytics, consumer customer segmentation, shopping behavior of the customers and overall to know the customer satisfaction customer loyalty and so on.

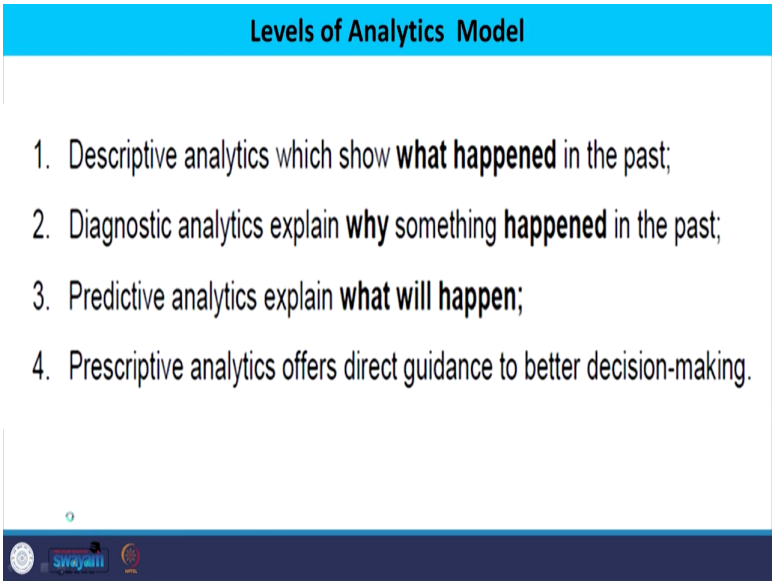
The trends through which a consumer buying behavior, it is also used in finance and logistics in the logistic management integrated enterprise resource planning, financial analytics and supply chain, then budget analytics, logistics and supply chain.

(Refer Slide Time: 20:53)

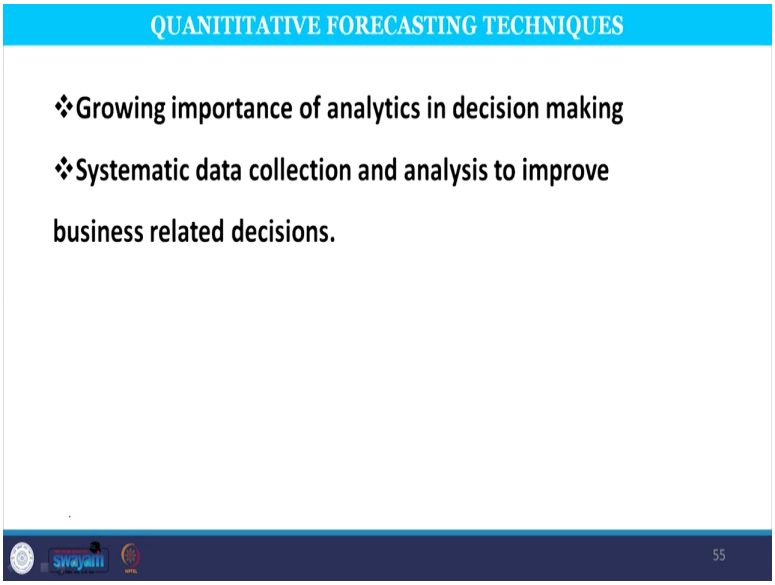


The available data helps in taking business decisions.

(Refer Slide Time: 21:02)



(Refer Slide Time: 21:03)

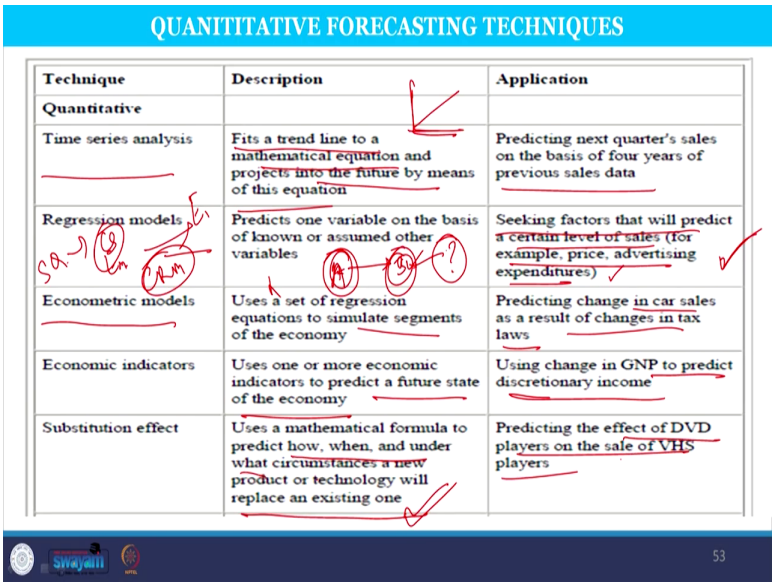


So, analytics like what we discussed earlier the quantitative models have helped in predicting, what has happened in the past and why something has happened in the past? Predictive analytics like what will happen in future and it will also give us direct guidance to take better decisions.

So, mostly we will be discussing about how data is the growing importance of analytics or growing importance of quantitative data in decision making systematic data collection and analysis to improve business related decisions.

So, coming back to the techniques that we have I have just discussed the techniques of forecasting there are qualitative and quantitative methods of forecasting. The quantitative method is Delphi, jury of executive opinion and sales force composite and consumer market survey. Quantitative method broadly the time series and regression models.

(Refer Slide Time: 22:06)



So, I will go by each one of them in more details first taking up the issue of quantitative forecasting techniques. We will learn about the time series analysis. What is it? Then further we will discuss about regression, econometric models, economic indicators, substitution effects these are few quantitative forecasting techniques.

So, time series analysis it fits a trend line in a mathematical equation and projects into future by means of this equation. That means, there is a trend line in time series analysis it predicts next quarter sales on the basis of four years of previous sales data.

So, it's a kind of like the trend line to a mathematical equation. And the projects like in future say suppose I discussed in case of human resource planning, how it a trend line is set? If there is a need for recruiting, say suppose hospital size number of beds say if you have 200 beds, so how many number of registered nurses is required?

And so for 200 beds you need this much number of nurses. For a 400 bed hospital this is the number required, for 600 this is the number say suppose a 550 or almost around 600 nurses required.

In future say suppose you want a hospital size is increasing, because of say you need to have 1400 bed hospital, what would be the number of nurses required for a hospital with a bed capacity of 1400? So, it helps in predicting number of nurses in this case which will be required by the hospital.

So, time series analysis fits a trend line to a mathematical equation. There is a mathematical equation and projects into future by means of this equation predicting next quarter sale, predicting the future manpower required on the basis of the previous data or the past data.

The next question next is the regression model. What is the regression model? Regression model basically predicts one variable on the basis of known or assumed other variable, you can say a cause and effect relationship between one variable on the other variable. So, what regression models do? They predict one variable that is a suppose we have two variables A and B.

So, regression model helps in analyzing the variable B on the basis of the assumed or known variable A. So, independent if A is an independent variable like if employee is satisfied, so based on employee satisfaction data we can assume what will be the level of their say commitment. If an employee is satisfied what will be their level of engagement so engagement is one variable.

Similarly, in the marketing context we can take if a customer is a repeat buyer. So, if he is a loyal customer, what is the probability of or what is the impact of customer loyalty on customer engagement? Or say customer satisfaction on customer relationship impact or customer relationship management on customer loyalty. So, the better the service personnel's quality of service more is its impact on customer satisfaction.

So, we are able to see the relationship between one variable based on the assumption on other known variable. So, selecting seeking factors that will predict a certain level of sales for example, price, advertising, expenses and expenditures etcetera. The impact of advertising on improving sales of a product. So, these trends can be analyzed these we can know about the impact of one variable on the other variable.

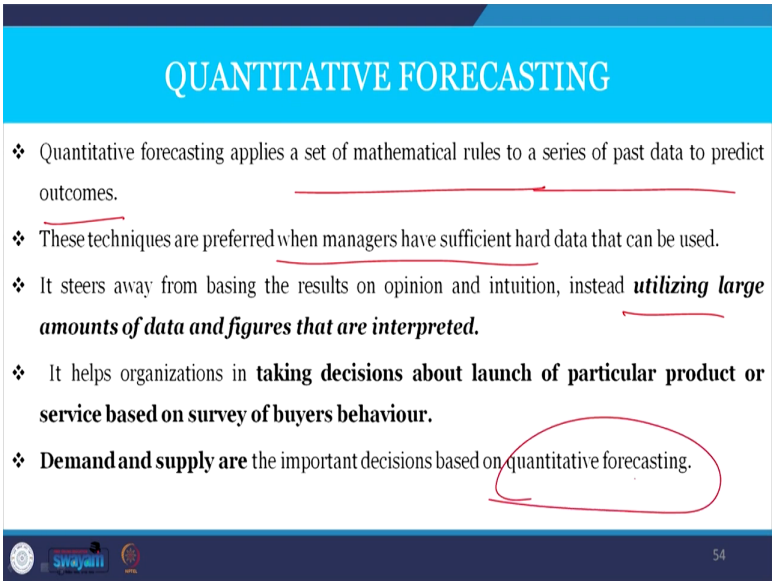
Econometric models use of a set of regression equations to stimulate segments of the economy. Predicting change in car sales as a result of change in tax laws, similarly I can

give you one example as because of the pandemic there is an impact on the economy and which has led to the sales going down.

So, we can predict the change in the sales of car as a result of change in tax laws, crisis change because of the economic downturn. So, this will have an impact in the economic models, we can assess econometric models. Economic indicators use one or more economic indicators to predict a future state of the economy. Using change in GNP to predict discretionary income.

Substitution effects similarly uses mathematical formula to predict how, when and under what conditions a new product or technology will replace the existing one. Predicting the effect of DVD players on the sale of VHS players. Predicting the like how one product will have an impact on substitute product.

(Refer Slide Time: 28:20)

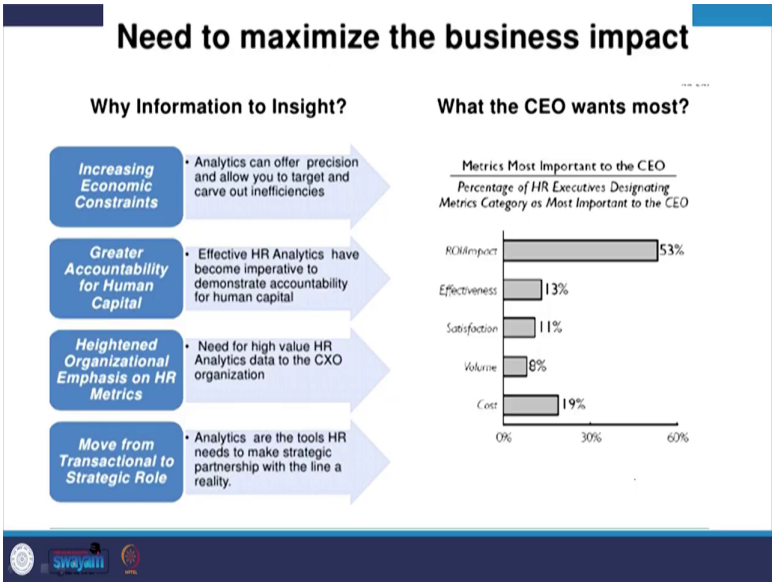


So, quantitative forecasting we will try to discuss in more details. Quantitative forecasting applies a set of mathematical rules to a series of past data to predict outcome. And these techniques are preferred when managers have sufficient hard data that can be used. It steers away from basing the results and opinion and intuition instead utilizing large amount of data and figure that are interpreted.

It helps organizations to take decisions about launch of a particular product or service based on survey of buyer's behavior. Demand and supply are the important decisions

based on quantitative forecasting. Quantitative forecasting techniques, growing importance of analytics and decision making.

(Refer Slide Time: 29:22)



Then we will be discussing about the need to maximize the business impact. So, why information is leading to insight? So, what we have discussed in this section we have discussed about the application of forecasting to a particular context of human resource planning decisions.

Then we discussed about the difference between the qualitative data and the quantitative data. Qualitative data is something which is based on qualitative decisions are based on experts' opinion, juries' opinion or based on experiences of people, observations and based on the cases which cases as observed by the experts.

And whereas, the quantitative data does not depend on experience or experts' decisions or opinion it is based on evidences garnered from that study area or it is based on the data or discrete facts which has been procured from the site. And so the quantitative data helps in taking decisions more accurately. And then we also discussed about what is data and how data can give you insights by using objective facts.

And then it will also help in taking decisions and why this quantitative data helps in taking decisions because there is more precision and it provides high value of

information heightened and it will have an impact on the business decisions. So, with this I would like to conclude this lecture here.

Thank you.