

## Role of Statistics on Business Research

### AUTHORS:

1. **Ms. Radha K.** , M. Sc ( Mathematics ), M. Tech ( CSE )  
Assistant Prof, KKC Institute of PG studies, Puttur

2. **Sri. BALAJI G.** , M. Sc ( Mathematics ), M. C. A, M. Sc ( Psychology )  
Assistant Prof, KKC Institute of PG studies, Puttur

### ABSTRACT:

Statistics play a vital role in nearly all businesses and form the backbone for all future development Strategies. Business closely analyze data and statistics to work out what they are doing right and what is working for the company while also determining what needs immediate attention or changing if things are not going well .Every business plan starts with extensive research and this is all compiled into statistics that can influence a final decision .Almost all businesses need to apply for bank loans when they are starting out or when growth is initiated. The bank will only grant a loan if they can see extensive statistics to indicate the business will make the money they claim and thus will be able to repay the loan. If a business went to a bank without any statistical evidence, it is extremely unlikely the bank would approve the loan request.

Many businesses need to pay income tax for the government based on the entire profit or loss of company and that will be find by using statistical methods either parametric or nonparametric methods. By using that statistical evidence company will pay the income tax and give increments to employees working in their company .Statistics aid development and learning, so their role in business should never be underestimated .The traditional business model would simply not work without access to detailed statistical reporting as any direction would be lost and keeping track of finances would be almost impossible. In this paper I discuss the total role of different statistical tools in Business.

**Keywords:** Statistical tool, Mean, Mode, Time series, Correlation,

## INTRODUCTION:

The word statistics is used in two different senses

(1) In **plural** sense statistics means data.

(2) In **singular** sense statistics is science which deals with the collection, presentation, analysis, and interpretation of some numerical data.

Statistics is a particularly useful branch of mathematics that is not only studied theoretically by advanced mathematicians but one that is used by researches in many fields to organize analyzes and summarized data. Statistical methods and analyses are often used to communicate research findings and to support hypotheses and give reliability to conclusions. It is important for researchers and also consumers of research to understand statistics so that they can be informed evaluate the credibility and usefulness of information and make appropriate decisions in business research.

## OBJECTIVES:

1. To facilitate comparison by measures of central tendency of different companies profits in a year
2. To enhance by the Correlation statistical tool, the managers decided there is any tie flanked by different variables.
3. Correlation analysis enables the executive to estimates costs, sales price and other variables on the basis of some other series with which these costs sales prices may be functionally related.
4. Establishing the cause and effect relation by correlation in the area of sales and demand in business
5. It highlights, the Time series plays a role in calculating trend of different products and predict the values of that product. The company analyzes the turnover of products in a year based on demand of those products.

**RESEARCH METHODOLOGY:**

**Sources of Data:** The study is based on secondary data .the data were collected from the magazines and journals on statistics and some published papers collected from websites have also been used as sources of data.

**SAMPLING PROCEDURE:**

The role of statistics in business consists of random sampling procedure for collecting the samples.

**FRAME WORK OF THE ANALYSIS:**

The secondary data collected from different sources are analyzed using some examples which are grouped under 4 categories .Calculations were made to test the role of statistics in business research and the tools like Mean ,Mode, Correlation, Time series are used.

**STATISTICS IN BUSINESS:**

It means it is every day transactions and it is either profit or loss will be gained by the owners. Some gentle man's interested to do a good business and some well or non well educated people also do a good business in profit way.

Statistics play a imperative role in business. A successful businessman must be very quick and accurate in all situations and take decisions properly based on situations. Statistics helps businessman to plan production according to the taste of costumers, the quality of the products can also be checked more efficiently by using statistical methods .So all the activities of the businessman based on statistical information. He can make correct decision about the location of business and improves the different products manufacturing based on trends of statistics data.

**SOME STATISTICAL METHODS PLAYS A ROLE IN BUSINESS:**

There are lot of methods in statistics .Different methods are used in different research works. Here iam denoted some methods which play different roles in different business researches.

**Measures of central tendency:**

One of the powerful tools of analysis is to calculate a single average value that represents the entire mass of data. By using only one value we denote total behavior of data. So measures of central tendency reduce some criticality to study the data. The central measures are three types

- 1) Mean
- 2) Median
- 3) Mode

Here we study two models Mean, Mode.

**Mean:** The most popular and widely used measure for representing the entire data by one value is called an average or mean. By using this average value identifies the data nature and estimate the value of data.

Measures of central value by reducing the mass of data in one single figure, enable comparisons to be made comparison can be made either at a point of time. Some examples of mean is

**Examples:**

1. The figure of average sales for December may be compared with the sales figure of previous months or with the sales figure of another competitive firm.
2. Performance of employees in a year of a company.
3. The travel bus owner decide the cars to travel between the areas, based on average people went every day for which place.

Here average plays a important role in take plan to improve his travelling business.

**Problem ;**In a certain factory a unit of work is completed by A in 5 minutes ,by B in 6 minutes ,by C in 4 minutes Then what is the average no of units of work completed per minute.

**Sol:** In the problem we find the average completed time for the work.

Given that work completed A=5 minutes

$$B=6$$

$$C=4$$

$$\text{Average} = \frac{5+6+4}{3}$$

$$=5$$

Hence the average completed time for those units of work is 5minutes

Here average plays a role to allocate number of persons to complete the work in certain time. Mainly this tool is used to find average for any type of values.

So the statistical tool Mean plays an important role in business research for identifying employees work performance and then given increments by using the average of employee performance. The statistics tools play different roles in different business research.

Another statistical tool Mode considered in business side as,

**Mode:** The observation which occurs maximum number of times is called the mode of the given data. Statistics has many applications in business, such as in manager's role in performance management. A manager collects data about employee productivity, such as the number of tasks completed or the number of units produced. He must analyze data to find ways in which an employee should improve to achieve maximum productivity. The Statistical tool, Mode is used to identify the more repetitions in the data. Here one of example related to the role of statistics in business research by using the statistical tool Mode is,

For example: If a manager finds that an employees' number of finished outputs drops by 20 percent every Friday. He should communicate with the employee setting the expectations that her output will remain above a minimum level every day of the work week.

**Example:** The index of employee's in a factory is

The year 2013, the presents of 250 employee's in a January, February month is

Week Month	Mon day	Tue day	Wednes day	Thurs day	Fri day	Saturday
January	235	240	225	200	195	156
Feb	220	239	215	245	210	160

Here every Saturday least number of employees coming to the factory compare to normal days. So the repeated least employee's day is Saturday. The manager understands the employees come leastly on Saturday compare to other days. By the statistical tool Mode, to find the repeated value in the data here the repeated value is Saturday. So to improve the employees not absent in the Saturdays. Hence the Statics tools play an important role in business research.

### CORRELATION:

Correlation is another most useful statistical method. These belongs to the most common useful statistical tools to compare effects and performances of variables. Correlation analysis is applied to independent factors: If X is increases, what will Y do. In Regression analysis Changes in X results Changes in Y but Changes in Y do not results in changes in X.

To discover whether there is a relationship between variables. To find out the direction of the relationship-whether it is positive negative or zero. This measure varies from 0 to 1 and 0 to -1. The test statistic correlation coefficient measures the strength of the relationship between the two variables. If positive sign is occur then the relationship is positive otherwise negative. The correlation is denoted by 'r' or ' $\rho$ '.

The calculation formula for,  $r = \frac{N \sum XY - \sum X \sum Y}{\sqrt{(N \sum X^2 - (\sum X)^2)(N \sum Y^2 - (\sum Y)^2)}}$

Ex: 1) Find the relationship between the net profit and cash flow

2) What is relationship between sales persons and number of sales?

3) Relationship between price and supply, income and expenditure.

4) Advertising expenditure and sales.

In business correlation analysis enables the executive to estimates costs ,sales price and other variables on the basis of some other series with which these costs sales prices may be functionally related.

**Problem:** The following are the monthly figures of advertising expenditure and sales of a firm .It is generally found that advertising expenditure has its impact on sales. We now check there is any relationship between advertising expenditure and sales

Month	Jan	Feb	March	April	May
Advertising expenditure	50	60	70	90	120
Sales in thousands	1200	1500	1600	2000	2200

**Solution:**

Month	Advertising expenditure X	Sales in thousands Y	$X^2$	$Y^2$	XY
Jan	50	12	2500	144	600
Feb	60	15	3600	225	900
Mar	70	16	4900	256	1120
Apr	90	20	8100	400	1800
May	120	22	14400	484	2640
Total	$\sum X = 390$	$\sum Y = 85$	$\sum X^2 = 33500$	$\sum Y^2 = 1509$	$\sum XY = 7060$

$$\text{The correlation } r = \frac{N \sum XY - \sum X \sum Y}{\sqrt{(N \sum X^2 - (\sum X)^2)(N \sum Y^2 - (\sum Y)^2)}}$$

$$= \frac{5(7060) - 390 * 85}{\sqrt{(5(33500) - (390)^2)(5(1509) - (85)^2)}}$$

$$= 2150 / 15080$$

$$= 0.1425$$

Here we see the  $r=0.1425$

The correlation is positively correlated and we say the sales will depend by advertising expenditure

Hence we observe that the sales will increase by advertising expenditure because lot of people see the television for relax nest in that time they see some advertising.

Here we see the relationship of sales and advertising by the method correlation so we precise the correlation plays a role to identify the relationship and then we give the best conclusion for any type of problems. The statistical tool correlation plays an important role in cause and effective relationship of variables in business research. Here the statistical tool correlation plays an important role in business research.

### TIME SERIES:

The time series analysis is a very important statistical tool which is used in business for the study of

Trend in order to obtain the estimates of the probable demand of the goods.

Seasonal and cyclical movements in the phenomenon for determining the business cycle.

Season	Ice creams	Sweaters	Cool drinks
Summer	12	3	20
Winter	24	15	2



We see different season's different products are more sales and less sales.

By sales we identify the trend of products in different seasons company improves the turnover of products in seasons.

By the seasons we observe the sales of items here time series component season plays a role to identify the demand of items in seasons. The statistical tool time series plays role in business research to identify the demand of products in the seasons.

### **CONCLUSION:**

In this paper we perceive every statistical tool plays a role in business research for improving the business in different departments. For the reason that by Mean we calculate average number of employees work in a company and the average time for complete the work in certain time period. The statistical tool Mode plays the role where the repeated problem occurs in the business and the cycle of business in a year of the company. The tool Correlation plays to find the links in any type of independent and dependent variables. The statistical tool Time series plays to identify the demand of variable products in different seasons. Every Statistical tool plays an important role in business research

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