

**Topic: Meaning, scope, importance & limitations of
Statistics**

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ORIGIN AND DEVELOPMENT OF STATISTICS

The term 'Statistics has been derived from the Latin word Status', which means Political State. But Italian word 'Statistica' seems to be the origin of the term Statistics. This term was used in the 15th century for State. Germans have used this word in the same sense and they spelled it as 'Statistik'. These words mean Political State or the 'Statesman's Art. In this sense, this word is found used in the seventeenth century in the works of Shakespeare and Milton. Shakespeare used this word in famous dramas Hamlet (1602) and Cymbeline (1610), Milton used this word in his famous epic Paradise Regained' (1671), an English poet W. Wordsworth too used this word in the same sense.

In the early propounders of the discipline, the name of Gottfried Achenwall (1719-1772), who was professor of Law and Political Scin at Gottington, is worth mentioning.' He in 1749, recognised statistics, a specialised branch human knowledge.

In 1770, Baron J. F. Von Bielfield included a chapter on statistics in hi book The Elements of Universal Erudition' and he defined statistics in that book as, "Th Science that teaches us what is the political arrangement of all the modern states of the knou World."

A few years later in 1787, E. A. W. Zimmermann in the preface to his book 'A Politicoi Survey of the Present State of Europe' wrote: "this science, distinguished by the new coined name of Statistics, has become a favourite study in Germany" Sir John Sinclair wrote to tha clergy of the Church of Scotland in May 1790, saying that "Statistical inquiries have been carried to a very great extent." He explained that these statistical inquiries were inquiries respecting the population, the political circumstances, the productions of a country and other matters of state.

The gamblers of the seventeenth century were also responsible for the early of statistics, specially with those methods which help in inferring about the universe by observing samples. Some of the gamblers were noted mathematicians of their times come had friendship with mathematicians. They diverted the attention of such renowned thematicians of the time like Galileo, Blaise Pascal, De Mere, Farnet and Cardano. In fact, modern statistics, as it 1s known today, started as a tool of gamblers, who sought more precise estimates of odds at the gambling table.

For the past three-four decades, there has been remarkable and sustained growth in theoretical and applied field of statistics. Statistics has become now a universally applicable science. The fields in which application of statistics can be made are numerous and diverse. Statistics are required as a basis of action in all fields wherever information can be measured.

MEANING OF STATISTICS

A word have multiple meanings Statistics is one of them. For a common man, statistics means data, facts or measurements. Some people regard statistics as the study of figures. Statistics is also considered as analysis of figures for forecasting or drawing inferences. Diagrammatic or graphic representation of facts is also understood as statistics. Processing, analysis and application of quantitative facts generally regarded as statistics. In brief, there are three forms of statisticss:

- As a Product : Data
- As a Process : Statistical Methods;
- As an Application : Methods and theories that are used to mänge numerical data for infrential/decision purposes.

Statistics as a product refers to the data such as indicators of national income, unemployment, sales, production, etc. This is the use of the word statistics in plural. In Science of Statistics it is known by Data'.

'Statistics is used in singular sense too, in his sense, 'Statistics' may be referred as the whole field of study. On the other hand, Statistics' in the plural sense is subject-matter. The subject 'Statistics' is concerned with the collection, presentation, description and analysis of data which are measurable in the numerical terms.

Simply, 'Statistics refers to the principles and methods which have been developed for managing numerical data. These methods finally help in taking decision in uncertainty and testing hypothesis.

DEFINITIONS OF STATISTICS

Acording to J. M. Keynes, G. Achenwall of Germany is accereditd with, for giving Statiscs as a separate science.

DEFINITION OF STATISTICS AS SUBJECT

Traditional Approach

Dr A. L. Bowley suggested that, It will be better to define statistics as a method." These definitions are based on the conception that "Statistics is what statistics does," or "Statistics is what statisticians do."

Prof A. L. Boddington has also given a conservative definition is statistics as "Statistics is the science of estimates and probabilities."

Modern Approach

According to W. I. King, "The science of statistics is the method of judging collective, natural or social phenomena from the results obtained by the analysis of enumeration or collection of estimates."

According to Prof. M. G. Kendall, "Statistics is the branch of scientific method which deals with data obtained by counting or measuring properties of populations of natural phenomena."

In the words of Prof. Lovitt, "Statistics is the science which deals with the collection, classification and tabulation of numerical facts as the basis for explanation, description and comparison of phenomena."

Seligman defines Statistics as "Statistics is the science which deals with the methods of collecting, classifying presenting, comparing and interpreting numerical data collected to throw some light on any sphere of enquiry."

F.E. Croxton and D. J. Cowden describes, "Statistics or statistical methods may be defined as the collection, presentation, analysis and interpretation of numerical data."

G. U. Yule defined as, "Statistical methods are methods specially adopted to the elucidation of quantitative data affected by multiplicity of causes."

New Dimensions in the Definition

With more and more application of Mathematical Theory of Probability in statistics, the discipline is now regarded as an art and science of making decisions in uncertainty. Over the past couple of decades in the field of business and government there has been an expanding development of a body of quantitative techniques and procedures whose purpose is to aid and improve managerial decision-making. The field of statistics has provided many of the fruitful ideas and techniques in this development. This new dimension is reflected in the following definitions:

"Statistics is a body of methods for making wise decisions on the face of uncertainty."

..... A. Wallis and H.V. Roberts

"Statistics refers to the body of technique or methodology which has been developed for the collection, presentation and analysis of quantitative data and for the use of such data in decision making.

.... .Netter and Wasserman

"Statistics is concerned with scientific method for collecting, organising, summarising, presenting and analysing data, as well as drawing valid conclusions and making reasonable decisions on the basis of such analysis."

.....Spiegel

"Statistics has usually meant the science and art. concerned with the collection, presentation and analysis of quantitative data so that intelligent judgement may be formed upon them."

.....J. F. Kenney and E. S. Keeping

"Statistics may be defined as a science of numerical information which employs the processes of measurement and collection, classification, analysis, decision-making and communication of results in a manner understandable and verifiable by others."

.....Cecil H. Meyers

"The modern meaning of statistics is that of using data gathered about some situation involving uncertainty to draw some relevant conclusions about the situations."

.... G. Hadley

FEATURES OF STATISTICS

1. It is both science and arts.
2. It deals with masses of data. Conclusions derived can be applied as a whole.
3. It is heavily related with the numerical facts that includes collection, presentation, analysis and interpretation.
4. It is applicable in every field of knowledge hence, it's scope is wide.
5. It is aggregate of facts.

6. Expressed in mathematical form.

SCOPE OF STATISTICS

After industrialisation, Statistics are used in comprehensive way. As industrialisation necessitates the use of statistics in a great way. The scope of statistics can be understood by the division and importance of statistics:

Division of Statistics:

- 1) *Theoretical Statistics*
- 2) *Statistical Methods*
 - a. *Descriptive Statistics*
 - b. *Inferential Statistics*
- 3) *Applied Statistics*

Theoretical Statistics

Theoretical Statistics is based on probability theory includes the principles of mathematics.

Statistical Methods:

Statistical Methods may be defined as a system of analysing stats on the basis of analysis conclusions are made so that decision can be taken for the accomplishment of goal. It includes the following steps:

- I. ***Collection of Data*** : It is first step of statistical process by which information are gathered according to the task. Every tasks have their own nature so collected information must be particular in respect of goal.
- II. ***Classification of Data***: After collection of information, data should be segregated as per it's nature such as time, weight, length, results, use as so on.
- III. ***Tabulation of Data***: Tabulation of data is a process of posting of information in their respective class or group or level. Posting of information must be correct to achieve the result as much as possible.
- IV. ***Presentation***: Presentation of data is a graphical view of tabulated

information normally in form of pie chart, bar chart, line chart etc. so that a data can be understood easily.

V. **Analysis:** Analysis is a process of getting relationship among the factors of data using various techniques, such as, mean, media, mode, correlation etc.

VI. **Interpretation:** Interpretation is a way of explaining the analysis in words that shows the position of data as per parameters/standards.

VII. **Forecasting:** Forecasting is a step which is concerned with the decision making process on the basis of interpreted outcomes from data. It is a biggest task for a statistician as it recommends the decision for accepting a project or not so statistician must have sound knowledge and experience.

Descriptive Statistics

Descriptive statistics refers to the analysis of data where all the characteristics of data are explained. It is used for making surveys such as frequency of shoppings, preference of people, census etc..

Inferential Statistics

Inferential Statistics makes forecasting, estimation or judgments about a population or universe by analysing the sample, using probability theories, taken from that population/universe.

Applied Statistics

Applied Statistics seeks diagnosis or solution for a problem using statistical Methods. It is now a day's become very popular every field whether it is science, economics, finance or social issues.

IMPORTANCE OF STATISTICS

Now a days statistics become so important to do any task as it is indispensable for Business, State Policies, Education, Financial Planning, Economic Policy and such other various indicators of a Nation. Statistics play a significant role in decision making and problem solution need in uncertainty.

Importance of statistics to Economy

Prof. A. Marshall observed that "Statistics are the straw out of which I, like every other economist, have to make bricks." The study of economic condition depends heavily on the statistics and its applications. Economic indicators such as demand and supply, production scale, pricing, market conditions (Perfect, Monopolistic and Monopoly), Demography, Wealth and Income Distribution, International Market and Relations, Technology Upgradation, Credit Policy, Fiscal Policy, Taxation Policy and other indicators use the data and application of data management (Statistics Methods) to formulate policies and take decision accordingly. The prime objective of uses of statistics is to reduce the risk and arrive at feasible conclusion in the world of uncertainty.

Importance of statistics to State

Statistics are considered as glimmers for the administration. All governments keep record of its people, whether its social, economical or demographical, for formulating policies and executing them to benefit the people. ***Statistics word is derived from State and Science of Statistics is the art of Statecraft.*** Statistics such as crime, land, taxes, trade, wealth etc. aid State to administer smoothly. In the welfare concept of State, it is duty of the State to promote economic development, reduce maldistribution of wealth & income, generation of employment, gender balance, budget preparation & distribution, and maintain stability in the territory. To achieve these objectives State uses statistics and its application oftenly.

Importance of statistics in Planning

Planning seeks five W's: what to do, why to do, when to do, way to do and whom to do. All these tasks are completed with the help of records, either descriptive or numerical, and analysis & interpretation for planning. Planning is an advanced estimation of results that depends on how the data have been analysed and interpreted. Accuracy in the analysis resulting into better decision making leads to reduce the uncertainty and accomplishment of goals. So for better planning precise data are required after collecting data, various applications have been used as per needs for interpretation and taking feasible decision.

Importance of statistics in Business

Business, whatever the size, depends on the Statistics and its applications. Success of any business relies on that how statistics have been analysed and after analysis decisions are taken. Decisions such as market research, size of firm, structure of capital, costing methods, profit planning, financial health of firm, expansion of

business, divestment, closure of firm, manufacturing scale, economic condition, credit policy etc. requires data and its analysis & interpretation which can be done by the statistics and its methods. Therefore, Statistics aid the business in a great way from establishment to starting, starting to growth, growth to saturation and finally decline.

Importance of statistics in Academics

What we study in academics, whether it is numeric or concepts, both are records, and records are regarded as data or statistics. In the field of academics, we studies various concepts and applications to improve our knowledge and got degrees like graduation, post graduation and Ph.D or other special diplomas. Statistics plays a pivotal role in the completion of these degrees as it involve collection, segmentation, analysis, presentation and interpretation ultimately statistics application come into play. Now a days, without statistics an acamedician can't imagine a degree.

LIMITATIONS OF STATISTICS

Statistics have great importance in all aspects but there are some limitations too. Some of important limitations are as follows:

1. Statistics delays only quantitative aspects of a problem, problem characterised with qualitative aspects it makes forecasting or estimates.
2. It deals with overall results but in practice there are some variations in the results if one individual is analysed. It is based on average this can't be applied on a particular things.
3. Statistics doesn't deal each individuals. It deal mass individuals and inferences are based on totality rather than particular.
4. Statistics are only a means which gives an idea about the population or universe, findings are approximate.
5. Statistics analysis may be doubtful as many of the applications are based on probability than exact answer.