

Chapter:1

ORIGIN AND DEVELOPMENT OF STATISTICS

INTRODUCTION

The word 'statistics' derives from the Latin word *status* or Italian word *statista* or the German word *statistik* each of which means a statesman or political state. In olden days, the Government used this word to collect information about the population and wealth. In India, an efficient system of collecting official and administrative statistics existed during the period of Chandra Gupta Maurya (324 – 300 BC). It can be traced from Kautilya's *Artha Shastra*. During the reign of the Akbar (1556 – 1605) Raja Todarmal, the then revenue minister maintained records of land and agricultural statistics. Captain John Graunt of London (1620 – 1674) was the first man to study the statistics of birth and death. He is known as the father of Vital Statistics. Later on, the Theory of Statistics was developed by many statisticians like Pascal (1623 – 1662), Bernoulli (1654 – 1705), De Moivre (1667 – 1754), Laplace (1749 – 1827), Gauss (1777 – 1855), Sir Francis Galton (1822 – 1921), Karl Pearson (1857 – 1936), W.S. Gosset (1908), R.A. Fisher (1890 – 1962), E.S. Pearson (1930) and Prof. C.R. Rao.

Indian statisticians have also made notable contributions to the development of statistics in various diversified fields. The valuable contributions of P.C. Mahalanobis and P.V. Sukhatme (sample surveys), R.C. Bose, Panse, J.N. Srivastava (Design of Experiments in Agriculture), S.N. Roy (Multivariate Analysis), C.R. Rao (Statistical Inference), Parthasarthy (Theory of Probability), to mention only a few, who have earned a high position for India in the world map of Statistics.

Many of the contributions in the modern theory of Statistics are due to Prof. Ronald Aylmer Fisher, the Father of Statistics.

Statistics has been defined differently by various authors from time to time.

1. Statistics is a branch of Applied Mathematics—R.A. Fisher.
2. Statistics is a branch of Science, which deals with collection, classification, analysis and interpretation of numerical data—Croxtan and Cowden.
3. Statistics is numerical statements of facts in any department of enquiry placed in relation to each other—Bowley.
4. Statistics is a method of decision-making in the face of uncertainty on the basis of numerical data and calculated risks—Prof. Ya-Lun-Chou.

TYPES OF STATISTICS

The Theory of Statistics can be broadly classified into two types: Pure Statistics and Applied Statistics.

1. Pure statistics: It is further classified into four categories. They are: (i) Descriptive Statistics, (ii) Analytical Statistics, (iii) Inductive Statistics, and (iv) Statistical Inference.

(i) Descriptive Statistics: It includes methods like measures of central tendency, measures of variation, skewness, etc., which help in summarizing and describing the main features of the data. These methods reveal the characteristics of the data by reducing the complexity of data into measuring full summaries. Descriptive measures are basic statistics tools used for statistical analysis.

(ii) Analytical Statistics: It includes methods which help in establishing functional relationship between variables, for example, Association of Attributes, Correlation and Regression. The methods which help in making valid comparisons are all included in analytical statistics.

(iii) Inductive Statistics: It includes the methods which help in generating conclusions on the basis of random observations.

(iv) Inferential Statistics (or) Statistical Inference: It includes methods which help in drawing valid inferences on the characteristics of the population on the basis of sample observations.

2. Applied statistics: It includes some specialized statistical methods like Index Numbers, Time Series, Analysis, Statistical Quality Control, Vital Statistics which can be applied to analyse research problems in various fields of science.

SCOPE OF STATISTICS

Statistics can be used in almost all fields where quantitative analysis is applicable. We can observe its applications in various fields like Biology, Psychology, Commerce, Medicine, Agriculture, Economics, Planning, Business, Industry, Astronomy, Education and Anthropology, etc. Various new branches came into existence such as Agricultural Statistics, Econometrics, Biometrics, Psychometrics, Technometrics, and Anthropometrics.

Generally, mathematics is known as king of all sciences, and statistics is known as the prince of all sciences. Prof. Bowley has rightly said that “A knowledge of statistics is the knowledge of foreign language or algebra.

CHARACTERISTICS OF STATISTICS

1. Statistics is the aggregate of facts.
2. Statistics is numerically expressed.
3. Statistics is affected by multiplicity of causes and not by a single cause.
4. Statistics must be related to some field of inquiry.
5. Statistics should be capable of being related to each other, so that some cause and effect relationship can be established.
6. The reasonable standard of accuracy should be maintained in statistics.

IMPORTANCE AND USEFULNESS OF STATISTICS

1. Statistics helps in presenting large quantity of data in a simple and classified form.
2. It gives the methods of comparison of data.
3. It helps in finding the conditions of relationship between the variables.
4. It organises the data in such a way so as to serve as a guide in planning and shaping future policies and programmes.

LIMITATIONS OF STATISTICS

Statistics, with its wide applications in almost every sphere of human activity, has certain limitations, some of which are mentioned below.

1. Statistics is not suited to the study of qualitative phenomenon.
2. Statistical methods deal with a mass of data and not with smaller ones.
3. Statistical laws are not exact.
4. Statistics is liable to be measured.

Due to limitations of statistics, the science of statistics has come to be looked upon with suspicion. It is said that statistics can prove anything. But it is not the fault of statistics but of the people who handle statistical tools. When used by experts the statistical methods give rational and valid inferences.

Statistics is like clay of which one can make a god or devil as one pleases—KINGS

Statistical techniques should be used carefully and judiciously. Before adopting any statistical technique to analyse a situation one must verify whether all the conditions are met by the data or not. Improper and inefficient use of statistical methods may lead to wild inferences.

ROLE OF COMPUTERS IN SOLVING STATISTICAL PROBLEMS

Recent developments in the field of computer technology have enabled statistics to integrate its models into information systems and thus make statistics a part of decision-making procedures of many organisations.

Computer manufacturers like IBM, CDC, Honey Well, UNIVAC, ICL, etc., have invested substantial amounts in developing software programs for solving the design of experiments, forecasting, stimulation problems, etc.

During the past twenty years, the field of statistics has changed dramatically by the development of computer software specially developed for statistical analyses.

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