

DPBS (PG) COLLEGE, ANOOPSHAHR

BUSINESS STATISTICS (C – 102)

INTRODUCTION

At the micro level, individual firms, howsoever small or large, produce extensive

Statistics on their operations. The annual reports of companies contain variety of data on sales, production, expenditure, inventories, capital employed, and other activities. These data are often field data, collected by employing scientific survey techniques. Unless regularly updated, such data are the product of a one-time effort and have limited use beyond the situation that may have called for their collection. A student knows statistics more intimately as a subject of study like economics, mathematics, chemistry, physics, and others. It is a discipline, which scientifically deals with data, and is often described as the science of data. In dealing with statistics as data, statistics has developed appropriate methods of collecting, presenting, summarizing, and analysing data, and thus consists of a body of these methods.

MEANING AND DEFINITIONS OF STATISTICS

In the beginning, it may be noted that the word 'statistics' is used rather curiously in two senses plural and singular. In the plural sense, it refers to a set of figures or data. In the singular sense, statistics refers to the whole body of tools that are used to collect data, organise and interpret them and, finally, to draw conclusions from them. It should be noted that both the aspects of statistics are important if the quantitative data are to serve their purpose. If statistics, as a subject, is inadequate and consists of poor methodology, we could not know the right procedure to extract from the data the information they contain. Similarly, if our data are defective or that they are inadequate or inaccurate, we could not reach the right conclusions even though our subject is well developed.

A.L. Bowley has defined statistics as: (i) statistics is the science of counting, (ii)

Statistics may rightly be called the science of averages, and (iii) statistics is the

science of measurement of social organism regarded as a whole in all its manifestations. *Boddington* defined as: Statistics is the science of estimates and

probabilities. Further, *W.I. King* has defined Statistics in a wider context, the science of Statistics is the method of judging collective, natural or social phenomena from the results obtained by the analysis or enumeration or collection of estimates. *Seligman* explored that statistics



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is a science that deals with the methods of collecting, classifying, presenting, comparing and interpreting numerical data collected to throw some light on any sphere of enquiry. *Spiegel* defines statistics highlighting its role in decision-making particularly under uncertainty, as follows: statistics is concerned with scientific method for collecting, organising, summa rising, presenting and analyzing data as well as

drawing valid conclusions and making reasonable decisions on the basis of such analysis. According to *Prof. Horace Secrist*, Statistics is the aggregate of facts, affected to a marked extent by multiplicity of causes, numerically expressed, enumerated or estimated according to reasonable standards of accuracy, collected in a systematic manner for a pre-determined purpose, and placed in relation to each other. From the above definitions, we can highlight the major characteristics of statistics as follows:

(i) *Statistics are the aggregates of facts.* It means a single figure is not statistics.

For example, national income of a country for a single year is not statistics but

the same for two or more years is statistics.

(ii) *Statistics are affected by a number of factors.* For example, sale of a product

depends on a number of factors such as its price, quality, competition, the Income of the consumers, and so on.

(iii) *Statistics must be reasonably accurate.* Wrong figures, if analysed, will lead to erroneous conclusions. Hence, it is necessary that conclusions must be based on accurate figures.

(iv) *Statistics must be collected in a systematic manner.* If data are collected in a

haphazard manner, they will not be reliable and will lead to misleading conclusions.

(v) *Collected in a systematic manner for a pre-determined purpose*

(vi) Lastly, Statistics should be placed in relation to each other. If one collects data unrelated to each other, then such data will be confusing and will not lead to

any logical conclusions. Data should be comparable over time and over space.

TYPES OF DATA AND DATA SOURCES

Statistical data are the basic raw material of statistics. Data may relate to an activity of our interest, a phenomenon, or a problem situation under



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study. They derive as a result of the process of measuring, counting and/or observing. Statistical data, therefore, refer to those aspects of a problem situation that can be measured, quantified, counted, or classified. Any object subject phenomenon, or activity that generates data through this process is termed as a variable. In other words, a variable is one that shows a degree of variability when successive measurements are recorded. In statistics, data are classified into two broad categories: quantitative data and qualitative data. This classification is based on the kind of characteristics that are measured.

Quantitative data are those that can be quantified in definite units of measurement. These refer to characteristics whose successive measurements yield quantifiable observations. Depending on the nature of the variable observed for measurement, quantitative data can be further categorized as continuous and

Discrete data. Obviously, a variable may be a continuous variable or a discrete variable.

(i) Continuous data represent the numerical values of a continuous variable. A

continuous variable is the one that can assume any value between any two

points on a line segment, thus representing an interval of values. The values

are quite precise and close to each other, yet distinguishably different. All characteristics such as weight, length, height, thickness, velocity, temperature,

tensile strength, etc., represent continuous variables. Thus, the data recorded

on these and similar other characteristics are called continuous data. It may be

noted that a continuous variable assumes the finest unit of measurement.

Finest in the sense that it enables measurements to the maximum degree of

precision.

(ii) Discrete data are the values assumed by a discrete variable. A discrete variable is the one whose outcomes are measured in fixed numbers. Such data

are essentially count data. These are derived from a process of counting, such

as the number of items possessing or not possessing a certain characteristic.



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The number of customers visiting a departmental store everyday, the incoming flights at an airport, and the defective items in a consignment received for sale, are all examples of discrete data.

Qualitative data refer to qualitative characteristics of a subject or an object. A

Characteristic is qualitative in nature when its observations are defined and noted in terms of the presence or absence of a certain attribute in discrete numbers. These data are further classified as nominal and rank data.

(i) **Nominal data** are the outcome of classification into two or more categories of

Items or units comprising a sample or a population according to some quality characteristic. Classification of students according to sex (as males and females), of workers according to skill (as skilled, semi-skilled, and unskilled), and of employees according to the level of education (as matriculates, undergraduates, and post-graduates), all result into nominal data. Given any such basis of classification, it is always possible to assign each item to a particular class and make a summation of items belonging to each class. The count data so obtained are called nominal data.

(ii) **Rank data**, on the other hand, are the result of assigning ranks to specify order in terms of the integers 1,2,3, ..., n. Ranks may be assigned according to the

level of performance in a test, a contest, a competition, an interview, or a show. The candidates appearing in an interview, for example, may be assigned ranks in integers ranging from 1 to n, depending on their performance in the interview. Ranks so assigned can be viewed as the continuous values of a variable involving performance as the quality characteristic. Data sources could be seen as of two types, viz., secondary and primary. The two can be defined as under:

(i) **Secondary data**: They already exist in some form: published or unpublished -

in an identifiable secondary source. They are, generally, available from published source(s), though not necessarily in the form actually required.

(ii) **Primary data**: Those data which do not already exist in any form, and thus have to be collected for the first time from the primary source(s). By their very nature, these data require fresh and first-time collection covering the whole population or a sample drawn from it.

