**Introduction to Statistics**

**Origin of the term Statistics**: The word “statistics” seems to have been derived from-

The latin word- **Status**

The Italian word- **Statista**

The German word- **Statistik**

The French word- **Statistique**

Each of which means a “political state”.

**Meaning of Statistics:**

The word Statistics is used in three different senses:

1. Statistics as a singular.
2. Statistics as a plural.
3. Statistics as a plural of Statistic.

**Statistics:** The science of collecting, organizing, presenting, analyzing and interpreting data to assist in making more effective decisions.

**Types of statistics:**

**Descriptive Statistics:** Descriptive statistics refers to the use of representative or sample sets of data to derive a conclusion or finding. In descriptive statistics, the determinations reached are only applied to the population or data set being studied.

For example: We have marks of 1000 students and we may be interested in the overall performance of those students and the distribution as well as the spread of marks. Descriptive statistics provides us the tools to define our data in a most understandable and appropriate way.

**Inferential Statistics**

It is about using data from sample and then making inferences about the larger population from which the sample is drawn. The goal of the inferential statistics is to draw conclusions from a sample and generalize them to the population.

For example: Suppose we are interested in the exam marks of all the students in Bangladesh. But it is not feasible to measure the exam marks of all the students in Bangladesh. So now we will measure the marks of a smaller sample of students, for example 1000 students. This sample will now represent the large population of Bangladeshi students. We would consider this sample for our statistical study for studying the population from which it’s deduced.



**Functions of Statistics:**

Statistics as a discipline is considered indispensable in almost all spheres of human knowledge. There is hardly any branch of study which does not use statistics. Scientific, social and economic studies use statistics in one form or another. These disciplines make-use of observations, facts and figures, enquiries and experiments etc. using statistics and statistical methods. Statistics studies almost all aspects in an enquiry. It mainly aims at simplifying the complexity of information collected in an enquiry. It presents data in a simplified form as to make them intelligible. It analyses data and facilitates drawl of conclusions. Now let us briefly discuss some of the important functions of statistics.

**1. Presents facts in. simple form:**

Statistics presents facts and figures in a definite form. That makes the statement logical and convincing than mere description. It condenses the whole mass of figures into a single figure. This makes the problem intelligible.

**2. Reduces the Complexity of data:**

Statistics simplifies the complexity of data. The raw data are unintelligible. We make them simple and intelligible by using different statistical measures. Some such commonly used measures are graphs, averages, dispersions, skewness, kurtosis, correlation and regression etc. These measures help in interpretation and drawing inferences. Therefore, statistics enables to enlarge the horizon of one’s knowledge.

**3. Facilitates comparison:**

Comparison between different sets of observation is an important function of statistics. Comparison is necessary to draw conclusions as Professor Boddington rightly points out.” the object of statistics is to enable comparison between past and present results to ascertain the reasons for changes, which have taken place and the effect of such changes in future. So to determine the efficiency of any measure comparison is necessary. Statistical devices like averages, ratios, coefficients etc. are used for the purpose of comparison.

**4. Testing hypothesis:**

Formulating and testing of hypothesis is an important function of statistics. This helps in developing new theories. So statistics examines the truth and helps in innovating new ideas.

**5. Formulation of Policies:**

Statistics helps in formulating plans and policies in different fields. Statistical analysis of data forms the beginning of policy formulations. Hence, statistics is essential for planners, economists, scientists and administrators to prepare different plans and programmes.

**6. Forecasting:**

The future is uncertain. Statistics helps in forecasting the trend and tendencies. Statistical techniques are used for predicting the future values of a variable. For example a producer forecasts his future production on the basis of the present demand conditions and his past experiences. Similarly, the planners can forecast the future population etc. considering the present population trends.

**7. Derives valid inferences:**

Statistical methods mainly aim at deriving inferences from an enquiry. Statistical techniques are often used by scholars planners and scientists to evaluate different projects. These techniques are also used to draw inferences regarding population parameters on the basis of sample information.

**Scope and importance of Statistics:**

**1. Statistics and planning:** Statistics in indispensable into planning in the modern age which is termed as “the age of planning”. Almost all over the world the govt. are re-storing to planning for economic development.

**2. Statistics and economics:** Statistical data and techniques of statistical analysis have to immensely useful involving economical problem. Such as wages, price, time series analysis, demand analysis.

**3. Statistics and business:** Statistics is an irresponsible tool of production control. Business executive are relying more and more on statistical techniques for studying the much and desire of the valued customers.

**4. Statistics and industry:** In industry statistics is widely used inequality control. In production engineering to find out whether the product is confirming to the specifications or not. Statistical tools, such as inspection plan, control chart etc.

**5. Statistics and mathematics:** Statistics are intimately related recent advancements in statistical technique are the outcome of wide applications of mathematics.

**6. Statistics and modern science:** In medical science the statistical tools for collection, presentation and analysis of observed facts relating to causes and incidence of dieses and the result of application various drugs and medicine are of great importance.

**7. Statistics, psychology and education:** In education and physiology statistics has found wide application such as, determining or to determine the reliability and validity to a test, factor analysis etc.

**8. Statistics and war:** In war the theory of decision function can be a great assistance to the military and personal to plan “maximum destruction with minimum effort.”

**Statistics in business and management:**

**1. Marketing:** Statistical analysis are frequently used in providing information for making decision in the field of marketing it is necessary first to find out what can be sold and the to evolve suitable strategy, so that the goods which to the ultimate consumer. A skill full analysis of data on production purchasing power, man power, habits of compotators, habits of consumer, transportation cost should be consider to take any attempt to establish a new market.

**2. Production:** In the field of production statistical data and method play a very important role. The decision about what to produce? How to produce? When to produce? For whom to produce is based largely on statistical analysis.

**3. Finance:** The financial organization discharging their finance function effectively depend very heavily on statistical analysis of peat and tigers.

4**. Banking:** Banking institute have found if increasingly to establish research department within their organization for the purpose of gathering and analysis information, not only regarding their own business but also regarding general economic situation and every segment of business in which they may have interest.

**5. Investment:** Statistics greatly assists investors in making clear and valued judgment in his investment decision in selecting securities which are safe and have the best prospects of yielding a good income.

**5. Purchase:** the purchase department in discharging their function makes use of statistical data to frame suitable purchase policies such as what to buy? What quantity to buy? What time to buy? Where to buy? Whom to buy?

**6. Accounting:** statistical data are also employer in accounting particularly in auditing function, the technique of sampling and destination is frequently used.

**7. Control:** the management control process combines statistical and accounting method in making the overall budget for the coming year including sales, materials, labor and other costs and net profits and capital requirement.

**What are the Limitations of Statistics?**

Although there are so many applications of statistics in every field, it is not without limitations. The main **Limitations of Statistics** are the following:

1. **Statistics is unable to explain individual items**
2. **Statistics are unable to study qualitative characters**
3. **Results are true only on average**
4. **Statistics is liable to be misused**

**1. Statistics is unable to explain individual items**

Statistics always study a group of values instead of single observation studies the mass of phenomena and the conclusion on certain characteristics obtained.

**For example**, the study of income of one worker of a company is statistics, but the study of incomes of 50 workers of that company form statistics.

In other words, the monthly income of tk. 1,000 workers do not constitute statistics but the average income of tk. 1000 of a group of workers of that company forms statistics

**2. Statistics are unable to study qualitative characters**

In general, statistics studies only the quantitative characters of the given problems instead of qualitative characters.

The problems which cannot be studied quantitatively (i.e. in numerical form) such as poverty, leadership, beauty, intelligence, honesty, etc, are not directly studied in statistics.

**3. Results are true only on average**

As discussed above, here the results are interpolated for which time series or regression or probability can be used. These are not absolutely true.

If the average of two sections of students in statistics is the same, it does not mean that all the 50 students are section A has got the same marks as in B. There may be many variations between the two. So we get average results.

**4. Statistics is liable to be misused**

The greatest limitation of statistical science is that it can be misused.

The only one who has expert knowledge of statistical methods can scientifically handle statistical data.

Statistical methods, if misused by incompetent, unskilled and inexperienced persons, it may lead to false conclusions.

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| * R.A. Fisher is the father of modern statistics. * Biometrica is the first statistical journal published in 1901 by Karl Pearson. * The Institute of Statistical Research and Training (ISRT), University of Dhaka, is the leading institution for training and research in Applied Statistics in Bangladesh. It was founded in 1964 by the Late National Professor **Dr. Qazi Motahar Husain**, an eminent scientist, academician and a leading proponent of the statistical sciences in this country. * The Bangladesh Bureau of Statistics (BBS) is the centralized official bureau in Bangladesh for collecting statistics on demographics, the economy, and other facts about the country and disseminating the information. |