INTRODUCTION TO STATISTICS

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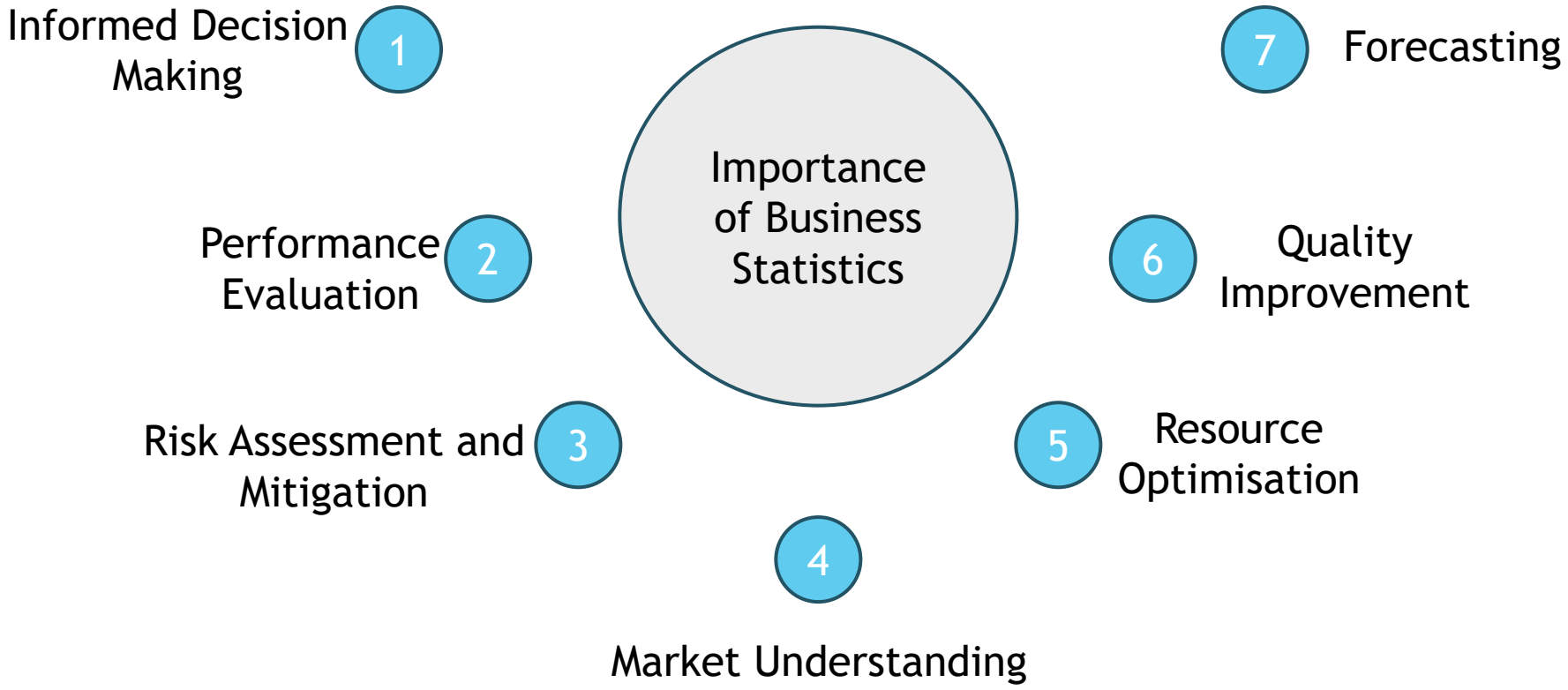
What is business statistics ?

- Business Statistics is defined as the systematic practice of collecting, analyzing, interpreting, and presenting data, relevant to business operations and decision-making. It serves as a critical tool for organizations to gain insights into their performance, market dynamics, and customer behavior. By applying various statistical methods and techniques, businesses can uncover patterns, trends, and relationships within their data, enabling them to make informed decisions, set goals, and optimize processes.


Informed Decision Making
1
Performance Evaluation
2
Risk Assessment and Mitigation
3
4
Market Understanding
5
Resource Optimisation
6
Quality Improvement
7
Forecasting
Importance of Business Statistics

Importance of Business Statistics ?

- The importance of business statistics cannot be overstated in today's data-driven business environment. Business statistics is essential for enhancing decision-making, optimizing operations, managing risks, and staying competitive in the business landscape. It empowers organizations to harness the power of data to achieve their objectives and drive long-term success. Here are several key reasons why business statistics is crucial for organizations

- 1. Informed Decision-Making: Business statistics provides the tools and techniques necessary to analyze data and extract valuable insights. This enables organizations to make informed decisions based on empirical evidence rather than relying on intuition or guesswork.

- 2. Performance Evaluation: It allows businesses to assess the performance of various aspects of their operations, such as sales, marketing, production, and finance. By measuring performance against established benchmarks and objectives, companies can identify areas for improvement.

- 3. Risk Assessment and Mitigation: Business statistics help in identifying and quantifying risks. By understanding the likelihood and potential impact of various risks, organizations can take proactive measures to mitigate them, enhancing their resilience and ability to adapt to changing circumstances.

- 4. Market Understanding: Companies can use statistics to gather and analyze data on market trends, consumer behavior, and competition. This information is vital for developing effective marketing strategies, launching new products, and staying competitive.

- 5. Resource Optimization: Statistics aids in optimizing resource allocation, including budgeting, manpower, and inventory management.

- 6. Quality Improvement: Statistical quality control techniques help businesses monitor and enhance the quality of their products or services. By reducing defects and variations, companies can improve customer satisfaction and reduce waste.

- 7. Forecasting: Business statistics is essential for making accurate forecasts, whether it is predicting sales, demand for products, or financial trends. These forecasts are instrumental in planning and resource allocation.

Scope of Business Statistics

Descrptive Statistical Analysis

Focused on using tools like measures of central tendency (mean, median) and dispersion (standard deviation) to describe, summarize and showcase data for insights into the past. Helps identify variances from normal.

- Descriptive analysis focuses on summarizing raw data about the company, customers, products etc.
- For example, calculating average sales per store, profit margin percentages, units produced per day etc.
- This describes what has happened without making predictions..

Scope of Business Statistics

Probability Distributions

Allow modeling randomness, unpredictability and uncertainty associated with the business environment using probability density functions. Supports forecasting of various outcomes.

- Probability helps estimate likelihoods of future events.
- For instance, based on last year only 5 in 100 deliveries were late during holidays. So, the probability of late
- delivery during holidays is 5%.
- This allows quantifying uncertainty and planning for various outcomes.

Statistical Inference

- Concerned with making data-informed choices, predictions, and generalizations about large populations based on smaller samples via methods like hypothesis testing and confidence intervals.
- It helps make projections for the full population based only on sample data.
- For example, predicting customer count next year for all stores by surveying only some sample stores.
- This technique is used when surveying the entire target group is difficult

Scope of Business Statistics

Correlation and Regression

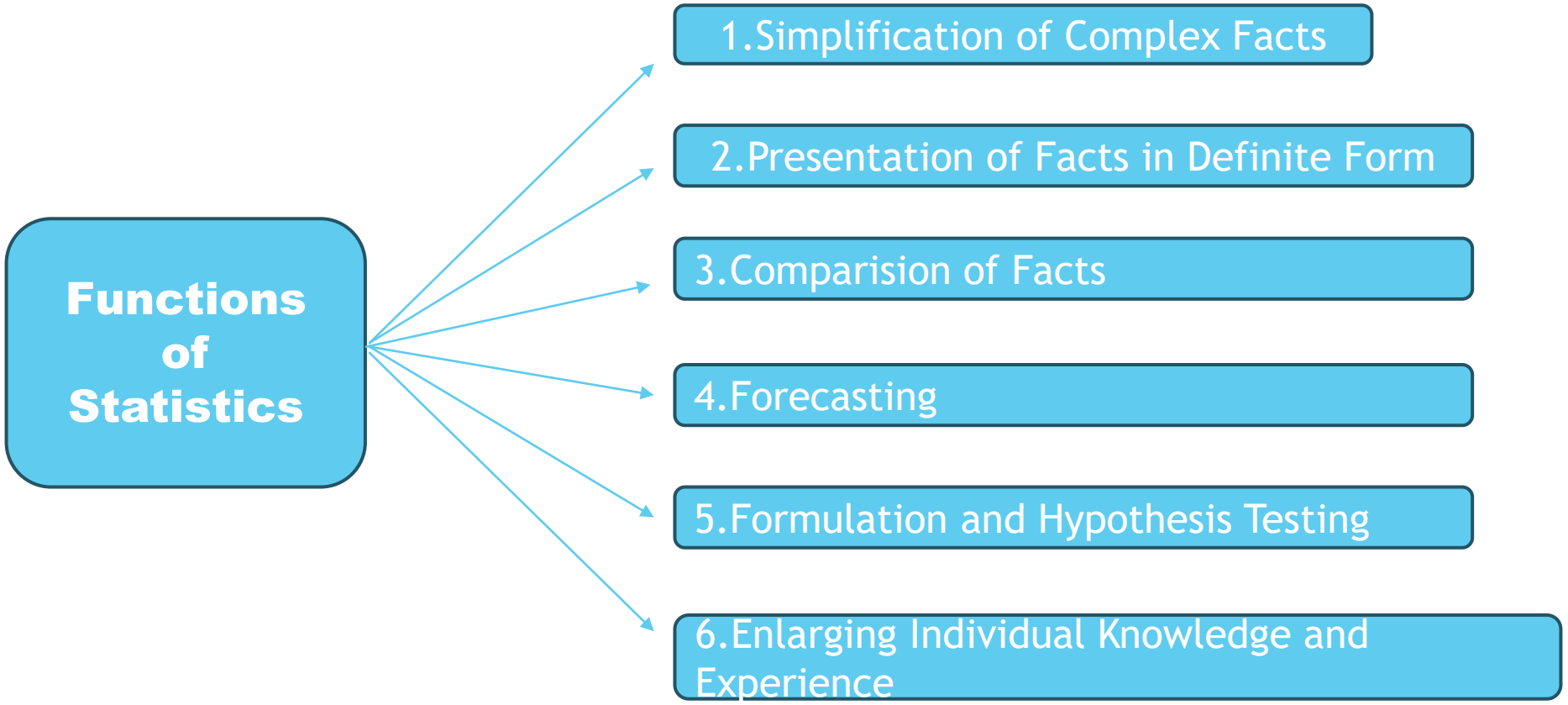
Used to determine and quantify strength of relationship between variables. Forms basis of predictive analysis forecasting effects of causal factors.

- Correlation helps identify trends between two variables, say sales and advertising spend.
- High correlation means when one increases, so does the other.
- Businesses can use this to understand drivers of different outcomes.

Time Series Forecasting

- Facilitates analysis of trends and cyclical patterns over time to enable reliable future predictions through models like ARIMA, Exponential Smoothing etc.
- Past data is used to make data models that forecast future events.
- For example, time series analysis can predict furniture demand for next month based on historical furniture sales data.

Functions of Statistics



Functions of Statistics

- Simplification of Complex Facts: The study of mass and complex data is difficult to understand. A layman cannot understand the complex terms and information presented in the analysis and results of the study. Therefore, different statistical methods help an economist or user in presenting complex data in an understandable and simple form.

- Presentation of Facts in the Definite Form: Statistics helps preset the facts of data using figures in their true form. Presenting qualitative facts about data instead of quantitative figures can not present the data effectively. For example, saying that the literacy rate has increased by 5% over the past two years is better than simply saying that the literacy rate is increasing.

- Comparisons of Facts: Comparing the facts and figures for the pre-determined purpose is an essential function of statistics. It is because absolute figures can not convey a better concrete meaning. Therefore, the relationship between two data sets or groups can be compared through different statistical methods such as ratios, averages, percentages, rates, etc.

Functions of Statistics

- Forecasting: Uncertainty and risk in business can be found in abundance. Therefore, organizations and the economy as well have to forecast the future to prepare themselves for any kind of change. Proper and accurate forecasting helps in reducing uncertainty. For this purpose. one can use different statistical tools such as time series analysis, interpolation, etc., as they can help make a projection of the future.

- Formulation and Hypothesis Testing: Testing a hypothesis means testing a fake scenario to understand the results of its formulation. Therefore, different statistical tools and methods help an economist in formulating and testing the hypothesis.

- Enlarging Individual Knowledge and Experience: An individual can widen their horizon using statistics while going through different procedures of statistics. Statistics also enlarge the thinking and reasoning power of an individual and ultimately help them reach a rational conclusion.

Limitations Of Statistics

- **Qualitative Aspect Ignored:** The statistical methods don't study the nature of phenomenon which cannot be expressed in quantitative terms. Such phenomena cannot be a part of the study of statistics. These include health, riches, intelligence etc. It needs conversion of qualitative data into quantitative data. So experiments are being undertaken to measure the reactions of a man. through data. Now a days statistics is used in all the aspects of the life as well as universal activities.

- **It does not deal with individual items:** It is clear from the definition given by Prof. Horace Sacrist, "By statistics we mean aggregates of facts.... and placed in relation to each other", that statistics deals with only aggregates of facts or items and it does not recognize any individual item. Thus, individual terms as death of 6 persons in a accident, 85% results of a class of a school in a particular year, will not amount to statistics as they are not placed in a group of similar items. It does not deal with the individual items, however, important they may be.

Limitations Of Statistics

- **It does not depict entire story of phenomenon:** When even phenomena happen, that is due to many causes, but all these causes cannot be expressed in terms of data. So we cannot reach at the correct conclusions. Development of a group depends upon many social factors like, parents' economic condition, education, culture, region, administration by government etc. But all these factors cannot be placed in data. So we analyse only that data we find quantitatively and not qualitatively. So results or conclusion are not 100% correct because many aspects are ignored.

- **It is liable to be misused:** As W.I. King points out, "One of the short-comings of statistics is that do not bear on their face the label of their quality." So we can say that we can check the data and procedures of its approaching to conclusions. But these data may have been collected by inexperienced persons or they may have been dishonest or biased. As it is a delicate science and can be easily misused by an unscrupulous person. So data must be used with a caution. Otherwise results may prove to be disastrous.

THANK YOU