Statistics in Business and Management Science

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ABSTRACT:

The study brings out applications of statistics and its usefulness in managerial decision-making. The study is also discussed about Mathematical statistics and Applied statistics. Methods and applications of statistics in business and management science is an excellent reference for researchers, managers, consultants, and students.

In the fields of business, management science, operations research, supply chain management, mathematical finance, and economics who must understand statistical literature and carry out quantitative practices to make smart business decisions in their everyday work.

Key words:

Statistics, Mathematical statistics, Applied statistics.

INTODUCTION:

In the ancient times, statistics was regarded only as the science of statecraft and was used to collect information relating to crimes, military strength, population, wealth, etc., for devising military and fiscal policies. But today it embraces almost every sphere of natural and human activity. The word statistics means different things to different folks.

» To a football fan, statistics are rushing, passing and first down numbers.

» To the manager of a power station, statistics are the amounts of pollution being released into the atmosphere.

» To the Food and Drug Administrator, statistics is the likely percentage of undesirable effects in the general population using the new prostate drug.

» To the community Bank, statistics is the chance that Sarah will repay her loan on time.

» To the student, statistics are the grades and final exam in the course

» The word statistics refers to a special discipline or collection of procedures and principles useful as an aid in gathering and analyzing numerical information for the purpose of drawing conclusions and making decisions. There fore, Statistics is the study of the collection, analysis, interpretation and organization of data. It deals with all aspects of data including the planning of data collection in terms of the design of surveys and experiments.

LIMITATIONS OF THE STUDY:

» It does not study quantitative phenomenon.
» It does not study individuals.

STATISTICAL METHODS:

Methods adopted as aids in the collection and analysis of numerical information or statistical data for the purpose of drawing conclusions and making decisions are called statistical methods. There are two branches of statistics:

1. Mathematical statistics:

It is a branch of mathematics and is theoretical. It deals with basic theory about how a particular statistical method is developed.

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2.Applied statistics: It use statistical theory in formulating and solving problems in other subject areas such as economics, sociology, medicine, business, industry, education and psychology.

When analyzing data, it is possible to use the two statistics methodologies, they are:

1.Descriptive statistics: It consists of procedures used to summarize and describe the characteristics of a set of data.

2.Inferential statistics: It consists of procedures used to make inferences about population characteristics on the basis of results. .

HOW ARE STATISTICS APPLIED IN MARKETING:

Statistical techniques are an integral part of modern marketing research, which in turn provides the input to many marketing decisions of both profit and nonprofit organizations. These decisions include the generation, evaluation, and selection of marketing strategies. Stock market analysts also use statistics to forecast what is happening in the economy.

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

Statistics can help the marketer to achieve both of those goals as well as evaluate the success of the marketing effort and provide data on which to base changes to the market program. Statistics are applied in marketing in many ways, such as:

» To identify market trends
» To measure and evaluate the potential and success of marketing programs
» To identify the target market accurately
» To use effective marketing communications channels and tactics to reach it

» To measure customer satisfaction, brand loyalty and support.
» To assess the relationship of the marketer's company with its customers.
» To target buyers for customized promotions or cross-sell secondary products on household parameters.

HOW ARE STATISTICS APPLIED IN PRODUCTION:

In the field of production, statistical data 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. The manufacturing industry produces goods from raw materials or assembles products from components. It supplies the domestic and international markets and some specialist niche market. The powerful technique of control charts and inspection plans are very important aspect of statistical theory used in manufacturing industries. Statistics are applied in production as follows:

» To assist in designing, building, improving and ensuring the reliability of a wide variety of manufactured products such as appliances, plastic materials, aircraft engines and locomotives.

» To control the quality of the manufactured products so that it conforms to specifications.

» To provide information to economic indicators about sales, stock, salaries and wages, purchase of goods and services.

HOW ARE STATISTICS APPLIED IN FINANCE:

Statistical methods have played a critical role in the development of financial theory and its applications to the areas of corporate finance, security and portfolio analysis, and financial institutions and markets. The financial organizations discharging their finance function effectively depend very heavily on statistical analysis of peat and tigers. Statistics are applied in finance, such as:

» To estimate financial forecasts

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» For break-even analysis
» For investment decisions under certainty.

HOW ARE STATISTICS APPLIED IN ACCOUNTING AND AUDITING:

The ever increasing applications of the statistical data and the advanced statistical techniques in the Chartered Accounts and Cost and Works Accountants examinations curriculum. Statistics has innumerable applications in accountancy and auditing.

» For evaluation of the assets of the business concerns.

» Statistical data on some macro variables like income, expenditure, investment, profits, production, savings, etc.,

» Revaluating the accounting records based on historical costs of assets after adjusting for the changes in the purchasing power of money.

» Used in forecasting profits, determination of trends, computation of financial ratios.

HOW ARE STATISTICS APPLIED IN 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.

HOW ARE STATISTICS APPLIED IN 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 protects of yielding a good income. The investment statistics describe annual investments in fixed assets by companies. The statistics looks at the value of investments from various perspectives.

» The standard industrial classification of statistics

» Fixed assets acquired in ownership including financial lease and investments through operational lease or hire

» Type of asset.

» New or used asset.

» The value of sold assets is also considered.

HOW ARE STATISTICS APPLIED IN 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? The purpose of statistics in purchase department is,

» To obtain rates of currency conversion that eliminates the differences in price levels between countries and so permit volume comparisons.
» It shows the ratio of the prices in national currencies of the same good or service in different countries.

HOW ARE STATISTICS APPLIED IN HUMAN RESOURCE:

Statistical data used in personnel administration relating to wages, cost of living, incentive plans, effect of labor dispute/ unrest on the production, performance standards, etc,.

the demand and supply of staffs is always fluctuating in business, there fore statistics helps the HR team.

» In Recruiting and training of staff.

» To identify areas of weakness where improvement is needed.

» To identify compensation programs such as pension schemes.

» To identify areas where investment is needed.

» It may even help a potential problem from growing out of control.

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HOW ARE STATISTICS APPLIED IN INFORMATION TECHNOLOGY:

Statistics makes possible the prediction of particular outcomes, in a large general area of interest, inferred from the analysis of data gathered from a relatively small sample of that general area. Using inference, reliable information is indirectly obtained.

This method is important, not only in information technology, but many other areas as well. Statistics is a very efficient way to obtain and use information. Also Statistics helps in updating data related to local governments like

» Total revenue, capital transfers (paid) by functions in particular periods

» total expenditure in details by functions and by economic type

» financial assets and liabilities

» social security funds receipts, outlays and financial accounts

» social security funds operations

» detailed classification of social benefits

SOME APPLICATIONS OF STATISTICAL METHODS IN MANAGEMENT:

Statistical reports provide a summary of business activities which improves the capability of making more effective decisions regarding future activities.

• Time series analysis is used for studying the behavior of prices, production and consumption of commodities, money in circulation, and bank deposits and clearings.

» Multiple regressions used to study the measurement of consumer attitudes.

» Demand analysis is used to study the relationship between the price of a commodity and its output (supply).

» Analysis of variance and analysis of covariance are more methodological in nature includes all classes of experimental designs.

» Discriminant analysis (two groups and multi group) can applied to marketing problems in a priori selected groups including loyal customers versus switchers, buyers of different brands in a product class, good versus poor sales territories and so on.

» Factor analysis used to study the consumer's life styles, attitudes, interests, activities, and personality measures

» Trend analysis and correlation are common when making economic forecasts.

» Random sampling is frequently used by accounting firms when accounts like travel expenses are relatively small and inconsequential.

» Regression analysis is one of the most prevalent statistical techniques employed in finance.

» Serial correlation and analysis of residuals can apply to all areas of finance like security analysis, market efficiency studies, financial institutions, mergers, and capital market theory.

» Bayesian analysis can be used in the modeling of several notable financial decision problems like forecasting future security prices, portfolio selection, estimating security betas, and credit analysis.

» Analytical method is used for risk management.

» Statistical modeling is used for online auctions.

» Ranking and selection method is used in mutual funds.

» Data mining is used in prediction market

SOME APPLICATIONS OF MATHEMATICAL METHODS IN MANAGEMENT:

Mathematical statistics is the collection and analysis of facts about a country, its economy, land, military, population, and so forth. Mathematical techniques

which are used for this include mathematical analysis, linear algebra, stochastic analysis, differential equations, and measure-theoretic probability theory.

1.People in finance use linear, non-linear and integer programming, optimal control theory and dynamic programming, Markov decision theory, regression and time series to determine optimal resource allocation, multi period investments, and capital budgeting, investments and loan portfolio design to try to forecast market behavior.

2.People in marketing use regression and factor analysis, time series, game theory, Markov decision theory, location theory, mathematical programming, probability choice models and utility theory to study consumer preferences, determine optimal location in product space, allocate advertising resources, design distribution systems, forecast market behavior and study competitive strategy.

3.People in operations management use statistical sampling and estimation theory, linear and integer programming, network programming, dynamic programming and optimal control theory, questing theory, simulation, artificial intelligence techniques, and combinatorial optimization methods to solve problems in quality control, allocation of resources, logistics, project scheduling, labor and machine scheduling, job shop scheduling and assembly line balancing, and facility layout and location. The introduction of flexible manufacturing systems, robots and other automated devices has posed a whole new array of unsolved mathematical problems.

4.People in information systems and decision support systems use artificial intelligence techniques, propositional and quantified logic, Bayesian methods, probabilistic logic, data structures and other computer science techniques, mathematical programming, and statistical decision theory to design expert and other knowledge based systems, develop efficient inference and retrieval methods, and evaluate the economic and organizational effects of information systems.

CONCLUSION:

The collection and analysis of quantitative data drives some of the most important conclusion that drawn in today's business world, such as the preferences of a customer base, the quality of manufactured products, the marketing of products, and the availability of financial resources.

As a result, it is essential for individuals working in this environment to have the knowledge and skills to interpret and use statistical techniques in various scenarios.

Hence, Methods and applications of statistics in business finance and management science serves as a single, on of a kind resource that guides readers through the use of common statistical practices by presenting real world applications from the fields of business.

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