

# Importance of Statistics and Mathematical Models in the Field of Social Sciences Research

Dr. Mrs. I. Annapurna,  
Associate Prof. P.G. Dept. of Economics,  
Ch. S. D. St. Theresa's College for Women,  
Eluru, Andhra Pradesh.

---

**Abstract:** *Statistics play a pivotal role in the field of analytical and scientific research of all academic areas because they deal with reliable and appropriate quantified data. In the fields of Biological and Physical sciences or Medical Sciences for any research Innovation or discovery trials are needed, and experimental data has to be collected and analyzed. The study of statistics enables researchers to collect large scale of data and condense it into random size based on meaningful information.*

*The main aspects of statistics include findings averages/means, hypothesis testing with the application of suitable selected mathematical and statistical tools and methods in research studies. Also, statisticians make use of random samples with proportionate demographics to determine factors that could represent a whole population. For example, a researcher might look for the average percentage of people who buy a particular product, then compare it to people who reported adverse result after using the product. This would be used to determine the likelihood of suffering financial loss.*

*In addition to collecting and analyzing data, researchers use their scientific research skills in statistics and/or primary collection of present data in such a way as to elicit a specific response from the intended respondents. The use of different types of graphical presentation of collected information analysed in the form of facts and figures from reliable sources are easily acceptable and understandable for laypeople and professionals alike.*

*Mathematical modeling of Social Sciences is the basis for scientific and technical experiments applied by researchers and policy makers in political administration and in all scientific fields will help in innovating and discovering new theories which are more authentic and appropriate in present scenario reaching out at Global and International standards resulting Socio – Political and Economic stability of Nation is the need of hour. The mathematical model helps the research scholars logically analyze and evaluate complicated problems of cause and effect and influence between the numerous problems in*

*an economy. Through the use of a model, the researchers can experiment different scenarios, attempting to evaluate the effect of alternative policy options, or weighing the logical integrity of arguments presented in existing theories of all study areas.*

**Key words:** *Analytical and scientific research, quantified data, condense, hypothesis testing, mathematical and statistical tools, demographics, policy makers, respondents, logical integrity, authentic, cause and effect.*

## **Introduction**

Statistics as a form of scientific discipline plays an important role in research because it enables the researcher to develop accurate and reasonable inferences from relevant data collections. In this way, the researcher is able to make justified and firm reliable decisions with authenticity rather than facing uncertainties. This is mainly applicable in the field of Social Sciences, Biological and Mathematical Sciences and specifically Medical research which can help to prevent or minimize biases and errors in research studies.

Researchers must often generalize from the micro to the macro in their work. The incorporation of statistics into their methods enables them to use empirical evidence in the formulation of their theories. To better establish the hypothesis, a researcher can compare previous proven research and scientific theories with the statistical evidence for the new innovative and expected hypothesis. Statistics can also be applied to different aspects of a scientific or academic inquiry including the planning, sampling and interpretation stages of a research plan.

The applications of statistics were in 17th-century inquiries into games of chance and gave rise to probability theory. Modern concepts of statistics began to develop in the late 19th century when its use in Political administration, Public administration and Industry and Scientific fields transformed the Research and development fields into a calculated, analytical and result oriented mathematical discipline. The incorporation of

modern computer systems with use of SPSS into statistical studies has enabled the data collection and interpretation to be performed on a scale that was previously impossible.

#### **Functions or Uses of Statistics**

- 1) Statistics helps in providing a logical understanding and exact description of a phenomenon of nature
- 2) Statistical tools help researchers to make efficient planning of a statistical inquiry regarding collection of information and reliable data in any field of study.
- 3) Statistical helps in collecting an appropriate quantitative data and qualitative data with authentic sources.
- 4) Statistics helps in presenting complex data in a suitable tabular, diagrammatic and graphic form for an easy and clear comprehension of the data.
- 5) Statistics helps in understanding the nature and pattern of variability of a phenomenon through quantitative and reliable observations.
- 6) Statistics helps in drawing valid inference, along with a measure of their reliability about the population parameters from the sample data.
- 7) Scientists frequently use statistics to analyze their results. The researchers use statistics which will help them to understand a phenomenon in all scientific experiments by accepting or rejecting a hypothesis.

#### **Significance of Research Data**

The results and findings of any research field study investigation carried out by scholars often collect research scientist and scholars organizes and summarizes the collected data into a relatively consistency maximum data or information than the researcher needs. This collection of data-material or information is known as primary or secondary data. To be able to analyze the data sensibly, the directly collected data is processed into "output data". There are many methods to formulate and process the data, but basically the scientific data. Any type of organized transparent reliable information may be called a "data set". Researchers may apply different statistical and mathematical methods to analyze and understand the data better (and more accurately). Depending on the research study, the researcher may also want to use statistics descriptively or for exploratory research. The importance of Random or Non – Random sampling data is that if researcher finds any in appropriation in findings can go back and check data or applicable methods if researcher finds that the results are against their expectations. This happens

after the scholars have analyzed the meaning of the results.

The first hand collected information data can give you innovative ideas for new hypotheses, since we get a better view of what is going on. The researchers can also control the variables which might influence the conclusion (e.g. third variables). In statistics, a parameter is any numerical quantity that characterizes a given population or some aspect of it. Statistics are figures, which show relationships among phenomena. Statistics pull together a great number of examples so that many individual items can be dealt with as a collective whole.

Whenever you use statistics, ask yourself:

1. How accurate are the facts and figures?
2. Who collected the data?
3. Was the collected data is objective or subjective?
4. How relevant are the facts and figures?

The celebration of Statistics Day will strengthen public awareness of the important work that statisticians carry out each day. Through collecting accurate, objective and comparable data they support a wide range of national and international research activities, including development efforts that improve the lives of the poor and the vulnerable.

The celebrations of Statistics Day every year right from 2007 were aimed at creating public awareness among the people specially the younger generation for drawing inspiration from the works of Prof. Mahalanobis about the role of statistics in Socio-Economic Planning and Policy Formulation. India has been observing the 29<sup>th</sup> June, the birth anniversary of the late Prof. Prasanta Chandra Mahalanobis, as the National Statistics Day, effective from 29<sup>th</sup> June of the year 2007.

This is in recognition of the vast contribution made by him in the field of statistics, in particular in the realm of planning and social development. He pioneered singularly for setting up Indian Statistical Institute at Calcutta to initiate wider application of statistical methodologies in solving social and economic problems, furthered the cause of critical investigations through rigorous innovative technique and analysis of issues in quantitative economics.

He succeeded in motivating a galaxy of young and great academic brains and mind on research fields to develop a sound decision making in the society is the need of the hour for many economic problems can be solved based on objective statistical evidence. He is regarded as

one who had paved the foundations of the modern statistical systems in our country.

This day commemorates his invaluable contributions the field of statistics and to the development of the Indian statistical system. Professor Mahalanobis was a great institution builder can truly be called the father of the Indian statistical system. The Indian Statistical Institute (ISI), the Central Statistical Organization (CSO) and the National Sample Survey Organization (NSSO) bear testimony to this.

Professor Mahalanobis's technical contributions in the field of theoretical and applied statistics were no less. These include, the famous Mahalanobis  $D^2$  (D-square) - a multivariate distance function for classification of populations - and the methodology for design of large scale sample surveys.

Commenting on his contributions to sampling techniques, Harold Hotelling wrote, "No technique of random sample has, so far as I can find, been developed in the United States or elsewhere, which can compare in accuracy with that described by Professor Mahalanobis".

His contribution to public policy, particularly the Second Five-Year Plan of Industry-led growth is highly commendable. In modern management studies, Professor Mahalanobis was an "out of the box" thinker. While many of his research findings primarily arose from the Need to solve applied statistical problems; the solutions straddled both applied and theoretical statistics.

***Relevance and importance of Statistics in Public Administration is the need of hour:***

It is important for the Public Administration. Only when they get a overall picture of the statistics of the people living in that area, they can develop policies and plans for the upliftment of the standard of living of every kind of people. For example: In a particular area if the illiteracy rate is higher than the unemployment ratio then maximum financial assistance can be allocated for the education Institutions.

Statistics constitute a key device by which public decision-makers and policy advocates understand reality, assess needs, focus their resources, calculate risks, liabilities, or probably of success or completion of projects, communicate their understanding, and campaign to change it.

Statistics are used to validate proposals, evaluate costs and determine priorities and standards. Decision makers must have the ability to analyze data and the capacities to identify/critique good and bad statistical practice to effectively set polices and avoid mismanagement of funds or projects.

Statistical analysis of a representative group can provide a reasonably accurate, cost-effective snapshot of the public at large with faster and cheaper statistics than attempting a census of the population.

The statistics afford leadership an unbiased outlook of the public need. Public funds and quality of service and care are constantly under scrutiny, thus public administrators must avoid building strategy on uncorroborated presumptions to maintain credibility and confidence.

Statistics can provide objective goals with stand-alone figures and the hard evidence necessary to substantiate positions or provide a level of confidence and trust in the policies and leadership of the public administrator. Finally, statistics measure and control resources and needs by minimizing variations, (causing error or waste) thereby ensuring compliance with regulations, policies and mission of the agency. Public administrators comfortable in the evaluation of statistics are more confident in shifting through mountains of available data, more capable of recognizing the relevant data, enabling more definitive and smarter decisions. In short, the public administrator cannot effectively discharge his duties without having working knowledge of statistics. This knowledge is the singular most important tool any public administrator in order to educate and provide for the public he serves.

In present research fields statistics applications has become mandatory in almost every research and innovative field like Industry, Commerce, Trade, Biological Sciences, Physical Sciences, Social Sciences, etc..., to get accurate and authentic findings and results.. The following are some of the important fields in which statistics is applied in their research areas.

***(1)Business:***

Statistics play a pivotal role in business arena. A successful businessman must be very alert, prompt, quick and accurate in decision making. He should be always aware of what his customers wants, he should have clarity on what to produce and supply what quantities based on market demand. Statistics helps businessman to plan production according to the taste of the costumers, the quality of the products can also be checked more efficiently by using statistical methods. So all the activities of the businessman based on statistical information. He can make correct decision about the location of business, marketing of the products, financial resources etc...

**(2) In Economics:**

Statistics play an important role in economics. Economics largely depends upon statistics. National income accounts are multipurpose indicators for the economists and administrators. Statistical methods are used for preparation of these accounts. In economics research statistical methods are used for collecting and analysis the data and testing hypothesis. The relationship between supply and demands is studied by statistical methods, the imports and exports, the inflation rate, the per capita income are the problems which require good knowledge of statistics.

**(3) In Mathematics:**

Statistics plays a central role in almost all natural and social sciences. The methods of natural sciences are most reliable but conclusions drawn from them are only probable because they are based on incomplete evidence. Statistics helps in describing these measurements more precisely. Statistics is a branch of applied mathematics. The large number of statistical methods like probability averages, dispersions, estimation etc... is used in mathematics and different techniques of pure mathematics like integration, differentiation and algebra are used in statistics.

**(4) In Banking:**

Statistics play an important role in banking. The banks make use of statistics for a number of purposes. The banks work on the principle that all the people who deposit their money with the banks do not withdraw it at the same time. The bank earns profits out of these deposits by lending different types of loans to others on interest. The bankers use statistical approaches based on probability to estimate the numbers of depositors and their claims for a certain day.

**(5) In State Management (Administration):**

Statistics is essential for an economic analysis of a country. Different welfare and development policies implemented by the government are based on statistics. Statistical data are now widely used in taking all administrative decisions. Suppose if the government wants to revise the pay scales of employees in view of an increase in the living cost, statistical methods will be used to determine the rise in the cost of living. Preparation of government budgets mainly depends upon statistics because it helps in estimating the expected expenditures and revenue from different sources. So statistics are the vision of administration of the state.

**(6) In Accounting and Auditing:**

Accounting is impossible without exactness. But for decision making purpose, so much precision is not essential the decision may be taken on the basis of approximation, known as statistics. The correction of the values of current financial estimations is made on the basis of the purchasing power of money or the current value of it. In auditing sampling techniques are commonly used. An auditor determines the sample size of the book to be audited on the basis of error.

**(7) In Natural and Social Sciences:**

Statistics plays a vital role in almost all the natural and social sciences. Statistical methods are commonly used for analyzing the experiments results, testing their significance in Biological and Physical Sciences, Meteorology, Research fields of Commerce & Management studies including Marketing, Sociology, Business, Public Administration, Communication and Information Technology etc...

**Services sector Statistics:**

Among fast growing developing countries, India is distinctive for the role of the service sector. However, skeptics have raised doubts about both the quality and sustainability of the increase in service sector activity and its implications for economic development. Using National Accounts Statistics and cross-country data, we show that the growth of services has been broad-based. We show that the growth of service sector employment is not simply disguised manufacturing activity.

We also find that the skilled-unskilled mix of labour in the two sectors is becoming increasingly similar. Hence, it is no longer obvious that manufacturing is the main destination for the vast majority of Indian labour moving into the modern sector and that modern services are only a viable destination for the highly skilled few. To the extent that the expansion of both modern manufacturing and modern services is constrained by the availability of skilled labour, this just underscores the importance for India of continuing to invest in labour skills. We conclude that sustaining economic growth and rising living standards will require shifting labour out of agriculture into both manufacturing and services and not just into one or the other.

The changes in prices over a period of time can be studied with the statistical device of Index Numbers of prices; Wholesale Price Index (WPI), for instance; helps in understanding fluctuations of prices relating to bulk transactions. A number of Government of India departments, in particular, the Planning Commission, the Central Statistical Organisation, the Reserve Bank of India etc base their schemes and to modify their monetary and fiscal policies in the light of the price trends.

Price statistics would be required for framing pricing policy, trading policy, fiscal and

monitory policy, and foreign exchange policy, coefficients of percentage of unit price index of export to unit price index of imports; income elasticity of import and export; propensity of import, parity of purchasing power of currency to mention a few.

In a country of India's geographical vastness, coupled with the topographical disparities with acute inadequacy of transport and communication infrastructures, regional disparities in prices are on considerable concern in adopting a unified index. There would therefore be anxiety regarding possible similarity or otherwise of price movements in remote regions, and whether there could be any casual relationship between movements of prices and other economic variables, the imperatives of the observed price fluctuations.

For instance, agricultural prices are subject to significant seasonal and even regional fluctuations, and this is one sector of the economy which contributes around 50% of the National or the State income and therefore there may be aberrations in the price index unless these factors are taken care of. An authentic price index is handy for the Indian cultivators are responsive to the price changes of commodities.

The following are some of the projections of Statistical figures and facts concerning the growth of India's service sectors

1. The software services in Indian Economy increased by 33% which registered revenue by USD 31.4 billion.
2. Business services grew by 82.4%.
3. Engineering services & product exports grew by 23% and earned revenue of USD 4.9 billion.
4. Services concerning personal, cultural and recreational had a growth of 96%.
5. Financial services had a rise of 88.5%.
6. Travel, transport & insurance grew by 23%.

These figures show that there is a tremendous growth achieved by the Indian Economy in services sector. The excess growth achieved in services sector may temporarily benefit the economy by providing employment opportunities to millions of people.

But, experts opine that high growth rate in services sectors at the drastic fall of growth rates in agriculture and industry is not good enough in the long run.

We are living in "Service Imperative Era". The enormous growth potential in the services sector has lead to the great visualization of "Developed India — 2020" by the majority Indians.

#### *Application of SPSS*

**SPSS Statistics** is a software package used for statistical analysis. Long produced by SPSS Inc., it was acquired by IBM in 2009. The current versions (2014) are officially named **IBM SPSS Statistics**. Companion products in the same family are used for survey authoring and deployment (IBM SPSS Data Collection), data mining (IBM SPSS Modeler), text analytics, and collaboration and deployment (batch and automated scoring services).

The software name stands for **Statistical Package for the Social Sciences (SPSS)**, reflecting the original market, **although** the software is now popular in other fields as well, including the health sciences and marketing.

SPSS is a widely used program for statistical analysis in social science. It is also used **by market researchers, health researchers, survey** companies, government, education researchers, marketing organizations, data miners, and others.

In addition to statistical analysis, data management (case selection, file reshaping, creating derived data) and data documentation (a metadata dictionary is stored in the data file) are features of the base software.

Statistics included in the base software:

- Descriptive statistics: Cross tabulation, Frequencies, Descriptive, Explore, Descriptive Ratio Statistics
- Bivariate statistics: Means, t-test, ANOVA, Correlation (bivariate, partial, distances), Nonparametric tests
- Prediction for numerical outcomes: Linear regression
- Prediction for identifying groups: Factor analysis, cluster analysis

SPSS Statistics places constraints on internal file structure, data types, data processing, and matching files, which together considerably simplify programming. SPSS datasets have a two-dimensional table structure, where the rows typically represent cases (such as individuals or households) and the columns represent measurements (such as age, sex, or household income). Only two data types are defined: numeric and text (or "string"). All data processing occurs sequentially case-by-

case through the file. Files can be matched one-to-one and one-to-many, but not many-to-many.

PSPP is a free software application for analysis of sampled data, intended as a free alternative for IBM SPSS Statistics. It has a graphical user interface and conventional command-line interface. It is written in C and uses GNU Scientific Library for its mathematical routines. The name has "no official acronymic expansion"

### ***Higher Education Solutions***

For decades, IBM SPSS software has been helping educational institutions achieve these goals. IBM SPSS Statistics, for example, is widely used in monitoring the progress of primary and secondary school students; and IBM SPSS Modeler, our data and text mining workbench, is used to discover patterns and trends in student and institutional data. And IBM SPSS Data Collection is used both in research and in assessing student, faculty, staff and community concerns. Recognizing the importance of solutions that link data to the personal interactions that occur every day, we are designing a number of solutions based on IBM SPSS Decision Management software that specifically target the needs of academic institutions. These will help institutions in areas such as:

- Improving student performance
- Increasing student retention
- Managing enrollment more effectively
- Supporting institutional advancement
- Improving financial aid management
- Enhancing campus security

### ***Importance of SPSS in Data Presentation for Dissertation***

Data presentation is one of the most crucial steps in a dissertation. An effective presentation of the data not only allows the researcher to analyze the data but it also helps the user of the dissertation to understand the data. In this context, there are a number of different measures are adopted by the researcher for presenting the data. SPSS (Statistical Package for the Social Sciences) is one of the most preferred tools adopted by different researchers to present data in their research work.

In addition to this, SPSS software can also be proved quite useful for the purpose of graphical representation of the raw data. With the help of the SPSS application, different graphs based on different complex data can be

drawn easily and effectively. It reduces the time and efforts of the researcher employed in the process of drawing the graphs based on the data.

Along with this, the SPSS software also plays a significant role in the process of interpreting and analyzing of the data retrieved from various methods. DHU offers the use of SPSS in data presentation as per the student requirements.

An article Wilson wrote in 1887 in which he advocated four concepts:

- Separation of politics and administration
- Comparative analysis of political and private organizations
- Improving efficiency with business-like practices and attitudes toward daily
- Improving the effectiveness of public service through management and by training civil servants, merit-based assessment
- To demonstrate the use of SPSS in public administration discipline we will use the sample dataset Employee\_data.sav provided by SPSS. In this data, the variable labels are gender of the employee, educational level, employment category, current salary, beginning salary, hiring months, previous experience and minority classification. The administration may wonder if there is any racial discrimination in getting salaries in the institution. To do that they can use the linear regression model having the salary level as dependent variable and the rest as independent variables. From SPSS we have the following output:
  - Table: Multiple regression output assuming current salary is affected by education, experience, starting salary, and experience and minority identity.
  - From the SPSS output we also found the coefficient of determination is more than 80%. And from the regression output table we found that all the variables except race affects the salary level of the employees significantly. That means race doesn't matter in salary level

The following description example highlights how mathematical modelings with the application of Statistical tools play a vital role in the research field of Economics:

### ***Mathematical Modeling of Economics***

Mathematical modeling of Economics is the basis of economic theory. The mathematical model helps the economist logically analyze and evaluate complicated problems of cause and effect and influence between the numerous Monetary & Fiscal problems in an economy. Through the use of a model, the economist can experiment different scenarios, attempting to evaluate the effect of alternative policy options, or weighing the logical integrity of arguments presented in theories. The following types of models are extremely useful for presenting visually the essence of economic arguments.

#### **Types of Models**

There are four types of models used in economic analysis: visual models, mathematical models, empirical models, and simulation models.

##### **a) Visual Models**

Visual models are simply pictures of an abstract economy; graphs with lines and curves that explain an economic theory. Some visual models are merely diagrammatic, such as those which show the flow of income through the economy from one sector to another. In other words, they use a visual device to present a very general economic concept. Most visual models, though, are visual extensions of mathematical models; implicit in their structure is an underlying mathematical model. Sometimes when they are presented the mathematics are explained, sometimes they are not. The economic models do not normally require knowledge of mathematics, but still allow the presentation of complex relationships between economic variables.

##### **b) Mathematical Models**

The most formal and abstract of the economic models are the purely mathematical models. These are systems of simultaneous equations with an equal or greater number of economic variables. Some of these models can be quite large. Even the smallest will have five or six equations and as many unknown variables. The manipulation and use of these models require a good knowledge of algebra or calculus. Variables can usually be classified as endogenous or exogenous. An endogenous variable is one that is determined within the model, or by the model's solution. Its value becomes known when the model is solved. For example, if the final level of demand is determined by the model's solution, demand is an endogenous variable.

On the other hand, if the value of a variable comes from outside the model, if its value is present, it is an exogenous variable. In macroeconomics, many policy variables, such as the income tax rate or money supply growth rate, are treated as exogenous. For example, the money supply growth rate is regarded as exogenous because it is set by policy-makers rather than

determined by the dynamics of the model. Ex: Log Inverse, Log-Log Inverse, Semi log Inverse, Simultaneous equations and so on. In the case of Operations research the Optimization models are used to test the hypothesis of any research problem or field basically depends on accurate selection of relevant Mathematical methods. In Economics High powered money derived by the derivatives with the help of numerical values,

Today in this scientific world no subject can exist on its own to draw conclusions without the integration of relevant methods to estimate the accurate experimental results. Either it can be social sciences / natural sciences / physical sciences directly depending on research innovations to deal with the multiple problems of the society.

##### **c) Empirical Models**

Empirical models are mathematical models designed to be used with data. The fundamental model is mathematical, exactly as described above. With an empirical model, however, data is gathered for the variables, and using accepted statistical techniques, the data are used to provide estimates of the model's values. For example, suppose in an economic study the following question is asked: "What will happen to investment if income rises one percent?" The purely mathematical model might only allow the analyst to say, "Logically, it should rise." The user of the empirical model, on the other hand, using actual historical data for investment, income, Empirical models produce only estimates, refined guesses, and the language that evaluates the likely accuracy of the estimate is much more precise and technical than is suggested here. This technique is taught in the specialized field of economics called econometrics.

##### **d) Simulation Models**

Simulation models, which must be used computers by applying the best features of mathematical models, without requiring that the user be proficient in mathematics. The models are fundamentally mathematical (the equations of the model are programmed in a programming language like Pascal or C++) but the mathematical complexity is transparent to the user. The simulation model usually starts with initial or "default" values assigned by the program or the user, then certain variables are changed or initialized, then a computer simulation is done. The simulation, of course, is a solution of the mathematical equations. The user can manipulate a whole range of variables at will. The computerized simulation model can show the interaction of numerous variables all at once, including hidden feedback and secondary effects that are not so apparent in purely mathematical or visual models. Mathematical economic models may be

constructed to analyze various areas and principles of an economic theory, to provide logical conclusions of observed economic patterns, or to process and systematize empirical data. Their applications include the practical estimations, planning, and evaluation management of the national economy and the improvement of planning and management of the economic mechanism as a whole and of other aspects of society's economic activity.

According to the purpose, models may be classified as Descriptive and Constructive. Descriptive models are used to help explain various existing economic phenomena and processes. Classic examples are models of economic growth and models of competitive economic equilibrium. The latter may be regarded as the first mathematical economic models in history. Descriptive models include economic growth models designed to forecast the basic aggregate indicators of development of the national economy and forecasting models for various parts of the economy. The subsequent models, which are based on mathematical statistics, particularly on correlation analysis, are used to study and forecast the behaviour of multifactor economic processes, such as the dynamics of prices on the world market or of stock exchange indexes. But, classified as descriptive models are models that merely simulate the behaviour of various parts of the economy, for example: models that simulate the development of an enterprise or firm.

The constructive approach to the modeling of economic phenomena is inherent in the socialist economy, in which economic construction can be carried out on a scientific methods. The discovery of linear programming, a mathematical discipline for analyzing and solving extreme problems with constraints, in the late 1930's stimulated the rapid development of constructive models. In terms of their basic premises, optimal economic growth models may be classified as optimal planning models. They are used to investigate the potential development of an economic system over time and to define the optimum of economic growth and the factors that influence the maximum growth rate. Mathematical methods are being developed for the purpose of solving problems relating to the coordination of the solutions of individual models. As economic factors are incorporated into models with increasing precision, the models becomes more complicated, and their subsequent analysis and, in some measure become more difficult. For this reason, computers have been increasingly used in the construction, analysis, and practical application of mathematical models.

The division of mathematical economic models into descriptive and constructive types is somewhat arbitrary. For example, the report inter

sector balance is a purely descriptive model, but the planning inter sector balance has both descriptive and constructive properties. The construction of integrated models of the functioning of economic systems is one of the basic trends in the development of mathematical economic models. The models of functioning reflect not some isolated economic process, such as the planning process, but the aggregate of all basic processes, including planning, production activity, material and technical supply, management of plan fulfillment, coordination of the interests of different agencies, and pricing.

#### **Conclusion:**

Statistics plays a vital role in every fields of human activity. Statistical methods are important tools in determining the existing estimations of agricultural production, industrial growth, poverty, illiteracy, unemployment, per capita income, population growth rate, urban and rural housing, school dropouts, medical facilities etc. in a country. For this reason, the research studies, economic entity consists of building blocks that use advanced mathematical formulae. The analysis of such integrated studies involves initially numerical experiments using computers and appropriate statistical tools and processing.

#### **Karl Popper's Basic Scientific Principle**

**Falsification**, as defined by the philosopher Karl Popper, that the inherent testability of any hypothesis in Scientific Science and philosophy have always worked together to try to uncover truths about the world and the universe around us. Both are a necessary element for the advancement of knowledge and the development of human society.

Scientists design experiments and try to obtain results verifying the acceptance and rejection of a hypothesis testing based on calculated figures comparing with statistical table values, but philosophers are the driving force in determining what factors determine the validity of scientific results.

#### **Suggestions**

1. In India police generally don't register FIR, the petitions of victims generally until they confirmed themselves that the case can be proved. So that they can show better % of detection.
2. Regarding all the Government Institutions & Departments information's —Statistical Information Libraries/ Digital libraries must be maintained in triplicate i.e Mandal, District and State with digital catalogues, may be protected with passwords and tamper proof



3. Whether they are Government or private hospitals should maintain records of case history and results whether they are successful, satisfactory or failures. So that these histories can help researchers for better guidance. The cases must be categorized and digitized and kept for ready reference.

-----  
**Reference:**

1. <http://palmislandtraders.com/books/macro/macrotext.htm> : Chapter 1- Economic Models, Page No: 1 – 20.
2. Resnik, D. (2000): Statistics, ethics, and research: an agenda for education and reform. *Accountability in Research. Journal of Statistical Methodology*— Elsevier, [WWW.Journals.elsevier.com/statisticalMethodology](http://WWW.Journals.elsevier.com/statisticalMethodology)
3. The Importance of Statistical Tools in Research Work \*Dr. Kousar Jaha Begum<sup>1</sup> Lecturer in Statistics, Department of Statistics, PVKN College, Chittoor, Andhra Pradesh, India [begum.kousar@yahoo.com](mailto:begum.kousar@yahoo.com) Dr. Azeez Ahmed<sup>2</sup> , *International Journal of Scientific and Innovative Mathematical Research (IJSIMR)* Volume 3, Issue 12, December 2015, PP 50-58 ISSN 2347-307X (Print) & ISSN 2347-3142 (Online) [www.arcjournals.org](http://www.arcjournals.org) ©ARC Page | 50
4. Science as Falsification ( Karl Popper, *Conjectures and Refutations*, London: Routledge and Keagan Paul, 1963, pp. 33-39; from Theodore Schick, ed., *Readings in the Philosophy of Science*, Mountain View, CA: Mayfield Publishing Company, 2000, pp. 9-13. )
5. JOBNAME: McGraw-Taylor Harris: Chapter – 1: Why you need to use statistics in your research – Page Nos: 1 – 10, SESS: 20 OUTPUT: Thu Oct 4 13:50:42 2007 SUM: 355503E1 /production/mcgraw-hill/booksxml/brown Saunders/ch1
6. Strengths and Weaknesses of Quantitative and Qualitative Research Insights from Research Walking in your customers' shoes A column by Demetrius Madrigal and Bryan McClain, September 3, 2012
7. Why Most Published Research Findings Are False - John P. A. Ioannidis - Published: August 30, 2005 <http://dx.doi.org/10.1371/journal.pmed.0020124>.