Economics plays an important role in many other disciplines, such as political science, public policy, demographics, finance, banking, law, management, agriculture & environmental studies, and anthropology.

In academics

In a globalised world, the role of research in an academic institution is significant for its sustainability and development, and it is imperative to have knowledge-driven growth based on innovation. The quest for knowledge is the basic principle behind research. The quality of research work directly translates to the quality of teaching and learning in the classroom, thereby benefiting the students, the society and the country. The promotion of research in a huge and diverse country like India will help the nation evolve as a knowledge reservoir in the international arena.

Positive vs. Normative Economics: An Overview

Positive economics and normative economics are two standard branches of modern economics. Positive economics describes and explains various economic phenomena, while normative economics focuses on the value of economic fairness or what the economy should be.

- Positive economics describes and explains various economic phenomena or the "what is" scenario.
- Normative economics focuses on the value of economic fairness, or what the economy "should be" or "ought to be."
- While positive economics is based on fact and cannot be approved or disapproved, normative economics is based on value judgments.
- Most public policy is based on a combination of both positive and normative economics.

Positive Economics

Positive economics is a stream of economics that focuses on the description, quantification, and explanation of economic developments, expectations, and associated phenomena. It relies on objective data analysis, relevant facts, and associated figures. It attempts to establish any cause-and-effect relationships or behavioral associations which can help ascertain and test the development of economics theories.

Positive economics is objective and fact-based where the statements are precise, descriptive, and clearly measurable. These statements can be measured against tangible evidence or historical instances. There are no instances of approval-disapproval in positive economics.

Here's an example of a positive economic statement: "Government-provided healthcare increases public expenditures." This statement is fact-based and has no value judgment

(i) Observation.

(ii) Formation of hypothesis.

(iii) Generalization.

(iv) Verification.

Merits of Inductive Method:

(i) It is based on facts as such the method is realistic.

(ii) In order to test the economic principles, method makes statistical techniques. The inductive method is, therefore, more reliable.

(iii) Inductive method is dynamic. The changing economic phenomenon are analyzed and on the basis of collected data, conclusions and solutions are drawn from them.

(iv) Induction method also helps in future investigations.

Demerits of Inductive Method:

The main weaknesses of this method are as under:

(i) If conclusions drawn from insufficient data, the generalizations obtained may be faulty.

(ii) The collection of data itself is not an easy task. The sources and methods employed in the collection of data differ from investigator to investigator. The results, therefore, may differ even with the same problem.

(iii) The inductive method is time-consuming and expensive.

Conclusion:

The above analysis reveals that both the methods have weaknesses. We cannot rely exclusively on any one of them. Modern economists are of the view that both these methods are complimentary. They partners and not rivals. **Alfred Marshall** has rightly remarked:

"***Inductive and Deductive methods*** are both needed for scientific thought, as the right and left foot are both needed for walking".

We can apply any of them or both as the situation demands.

Verification

Verification is an important characteristic of every research. Research methods and findings are presented to the professional community for other researchers to analyse, confirm or reject them. Research is a social enterprise and its information is open for public scrutiny. This characteristic of research, i.e. verifiability, is related to the criteria of objectivity and precision. Only through further investigation or replication of studies can the results of a single study be confirmed or revised. Through this process, a body of new knowledge is developed and new questions identified.

Verification is the process of checking, confirming, making sure, and being certain. In qualitative **research**, **verification** refers to the mechanisms used during the process of **research** to incrementally contribute to ensuring reliability and validity and, thus, the rigor of a study. In economics, independent verification could be done on all the assumptions, hypothetical as well as factual, and perhaps in even of each intermediate step in the analysis. Verification has a positivist tradition. According to Professor Machlup it is significant to distinguish between two schools of thought on the subject of verification of which he describes as "A Priori" and "Ultra Empiricist".

Verifiability is achieved primarily through two different approaches: first, analyzing the same data on the same sample **through alternative analytical tools** (statistical methods), second, **replicating** the study on a different sample.

Replication

Replication is a term referring to the repetition of a **research study**, generally with different situations and different subjects, to determine if the basic findings of the original **study** can be applied to other participants and circumstances.

Replication studies infer the same method and methodology being adopted as close to the original as possible. The main reason for replication is to test if, over time, if the same study was conducted again (using as close to the original parameters as possible) would things have changed because changing social, economic, political conditions might impose a different outcome. They serve to 'bring the original study up-to-date'.

Replication is one of the most **important** tools for the verification of facts within the empirical sciences. Any piece of **research** must be repeated by other investigators before its findings can be considered as reasonably well established. [Replicability] gives credibility to the conclusions of scientific **research**.

The importance and prevalence of replication research varies greatly depending on the discipline and research area. In the so-called hard or pure sciences , for example, replication studies are common, and play an integral role in the process of testing and

the methods of analysis used should be appropriate. The validity and reliability of the data should be checked carefully.

6. Conclusions should be confined to those justified by the data of the research and limited to those for which the data provide an adequate basis.

7. Greater confidence in research is warranted if the researcher is experienced, has a good reputation in research and is a person of integrity.

Qualities of a Good Research

On the basis of the above criteria we can easily state some qualities of a good research as under:

1. **Good research is Systematic:** It means that research is structured with specified steps to be taken in a specified sequence in accordance with the well defined set of rules. Systematic characteristic of the research does not rule out creative thinking but it certainly does reject the use of guessing in arriving at conclusions.

2. **Good Research is Logical:** This implies that research is guided by the rules of logical reasoning and the logical process of induction and deduction are of great value in carrying out research. Induction is the process of reasoning from a part to the whole whereas deduction is the process of reasoning from the whole to a part. In fact, logical reasoning makes research more meaningful in the context of decision making.

3. **Good Research is Empirical:** It implies that research is related basically to one or more aspects of a real situation and deals with concrete data that provides a basis for external validity to research results.

4. **Good Research is Replicable:** This characteristic allows research results to be verified by replicating the study and thereby building a sound basis for decisions.

Evaluation of Good Research

A good scientific research has to satisfy several requisites. For example the Advisory Committee on Economics and Social Research in Agriculture of the Social Science Research Council summarized the essentials of good scientific research as follows:

i. Careful logical analysis of the problem, isolating it from other problems and separating its elements. This means, in some cases the formulation of a hypothesis, in the proper meaning of this expression- a trial hypothesis that will point the investigation.

ii. Unequivocal definition of terms and concepts and statistical units and measures, so that others will understand exactly, and be able to repeat the analysis and test the generalizations.

iii. Collection of cases and data pertinent to the subject on hand.

iv. Classification of cases and phenomena and data.

5. Read Bain does not consider the case data as significant scientific data since they do not provide knowledge of the "impersonal, universal, non-ethical, non-practical, repetitive aspects of phenomena." Real information is often not collected because the subjectivity of the researcher does enter in the collection of information in a case study.
6. The danger of false generalisation is always there in view of the fact that no set rules are followed in collection of the information and only few units are studied.
7. It consumes more time and requires lot of expenditure. More time is needed under case study method since one studies the natural history cycles of social units and that too minutely.
8. The case data are often vitiated because the subject, according to Read Bain, may write what he thinks the investigator wants; and the greater the rapport, the more subjective the whole process is.
9. Case study method is based on several assumptions which may not be very realistic at times, and as such the usefulness of case data is always subject to doubt.
10. Case study method can be used only in a limited sphere, it is not possible to use it in case of a big society. Sampling is also not possible under a case study method.
11. Response of the investigator is an important limitation of the case study method. He often thinks that he has full knowledge of the unit and can himself answer about it. In case the same is not true, then consequences follow. In fact, this is more the fault of the researcher rather than that of the case method.

Conclusion: Despite the above stated limitations, we find that case studies are being undertaken in several disciplines, particularly in sociology, as a tool of scientific research in view of the several advantages indicated earlier. Most of the limitations can be removed if researchers are always conscious of these and are well trained in the modern methods of collecting case data and in the scientific techniques of assembling, classifying and processing the same. Besides, case studies, in modern times, can be conducted in such a manner that the data are amenable to quantification and statistical treatment. Possibly, this is also the reason why case studies are becoming popular day by day.

Social Surveys

Social Surveys are a quantitative, positivist research method consisting of structured questionnaires and interviews. This post considers the theoretical, practical and ethical advantages and disadvantages of using social surveys in social research. A Social Survey involves obtaining information in a standardised from large groups of people. The main survey methods are questionnaires and structured interviews.

Surveys are carried out by a wide range of organisations such as government departments, schools and colleges, businesses, charities, and market research and consumer groups. You may well have been stopped in a high street by a market researcher asking your opinion about a new design of chocolate bar wrapper, or phoned by an independent polling company such as Mori asking you to do a brief survey on any number of social issues.

It is well known that the quantitative methods in the discipline of Economics are being extensively used to examine the economic relationships among variables [Functional Relationships]. The combination of the theory of Economics, Methods of Statistics and Mathematics is referred to as Econometrics [Measurement in Economics]. Application of Econometric Methods to various economic problems is known as Applied Econometrics.

This provides an empirical content [numerical estimates] to various economic relationships. Estimates of these economic relationships help in understanding whether the sign and size of the estimates of parameters are in line with the economic theory or not.

The goal of an applied econometric study might be to test a hypothesis – for example, to determine how much of the 'gender pay gap' can be explained by differences in education and experience. Alternatively, a study could estimate a key parameter, such as the price elasticity of demand for oil. Or econometric techniques could be used to generate forecasts, like the Bank of England uses to determine the level that the base interest rate should be set each month.

GOALS OF ECONOMETRICS

Ref: Theory of Econometrics by P. Koutsoyiannis

We can distinguish three main goals of econometrics:

1) **Analysis i.e. testing of economic theory**
2) **Policy making** i. e. supplying numerical estimates of coefficients of economic relationships, which may be then used for decision making
3) **Forecasting**, i.e. using numerical estimates of the coefficients in order to forecast the future values of the economic magnitudes.

Of course, these goals are not mutually exclusive. Successful econometric applications should really include **some combinations of all three aims**.

1) **Analysis: testing economic theory**
   Earlier economic theories started from a set of observations concerning the behavior of individuals as consumers or producers. Some basic assumptions were set regarding the motivation of individual economic units. No attempts were made to examine whether the theories explained adequately the economic behavior of individuals.
   Econometrics aims primarily at the verification of economic theories. In this case we say that the purpose of the research is analysis, i. e. obtaining empirical evidence to test the explanatory power of economic theories, to decide how well they *explain* the observed behavior of the economic units. Today any theory, regardless of its elegance in exposition or its sound logical consistency, cannot be established and generally accepted without some empirical testing.

Only one group of carefully selected subjects are considered in this research, making it a pre-experimental research design example. We will also notice that tests are only carried out at the end of the semester, and not at the beginning.

Further making it easy for us to conclude that it is a one-shot case study research.

Employee Skill Evaluation

Before employing a job seeker, organizations conduct tests that are used to screen out less qualified candidates from the pool of qualified applicants. This way, organizations can determine an employee's skill set at the point of employment.

In the course of employment, organizations also carry out employee training to improve employee productivity and generally grow the organization. Further evaluation is carried out at the end of each training to test the impact of the training on employee skills, and test for improvement.

Here, the subject is the employee, while the treatment is the training conducted. This is a pretest-posttest control group experimental research example.

Evaluation of Teaching Method

Let us consider an academic institution that wants to evaluate the teaching method of 2 teachers to determine which is best. Imagine a case whereby the students assigned to each teacher is carefully selected probably due to personal request by parents or due to stubbornness and smartness.

This is a no equivalent group design example because the samples are not equal. By evaluating the effectiveness of each teacher's teaching method this way, we may conclude after a post-test has been carried out.

However, this may be influenced by factors like the natural sweetness of a student. For example, a very smart student will grab more easily than his or her peers irrespective of the method of teaching.

What are the Characteristics of Experimental Research?

- **Variables**

Experimental research contains dependent, independent and extraneous variables. The dependent variables are the variables being treated or manipulated and are sometimes called the subject of the research.

The independent variables are the experimental treatment being exerted on the dependent variables. Extraneous variables, on the other hand, are other factors affecting the experiment that may also contribute to the change.

techniques refer to the practical aspects of collecting data and the way the information/data obtained/collected is organized and analysed. **Tools** are the instruments that are used for data collection and its analysis. It includes questionnaire/schedules, dairies, check lists, maps, photos, drawings etc. Census and survey methods are mainly used to collect quantitative data. In qualitative research, data is generated/complied by way of participant observation, semi structured interviews, life histories, experiments, pilot studies, scenarios etc. Data analysis involves a set of statistical techniques used in establishing relationships between the different variables and in evaluating the accuracy of the results.

Thus, methodology, methods and tools/techniques are three distinct elements of the research process. Any one of these three elements by itself may not be adequate in many situations. For instance, no data can be systematically collected without adequate knowledge of techniques of data collection. Similarly, data can not be explained without comprehending the philosophy or perspective behind the characteristics underlying the variables to which the data relates. A sound knowledge of statistical techniques is also necessary to analyse the data efficiently.

Importance of Theory

Theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and expand existing knowledge within the limits of critical bounding assumptions. The theoretical framework is the structure that can hold or support a theory or a research study. The theoretical framework introduces and describes the theory that explains why the research problem under study exists.

A theoretical framework consists of concepts and, together with their definitions and reference to relevant scholarly literature, existing theory that is used for your particular study. The theoretical framework must demonstrate an understanding of theories and concepts that are relevant to the topic of your research paper and that relate to the broader areas of knowledge being considered.

The theoretical framework is most often not something readily found within the literature. You must review course readings and pertinent research studies for theories and analytic models that are relevant to the research problem you are investigating. The selection of a theory should depend on its appropriateness, ease of application, and explanatory power.

The theoretical framework strengthens the study in the following ways:

- A logical hypothesis is a planned explanation holding limited evidence.

7. Statistical Hypothesis:

- A statistical hypothesis, sometimes called confirmatory data analysis, is an assumption about a population parameter.

Although there are different types of hypothesis, the most commonly and used hypothesis are Null hypothesis and alternate hypothesis.

RESEARCH DESIGN

Research Design is a logical structure of an enquiry and its formulation is guided and determined by the research questions raised in the problem under investigation. Apart from specifying the logical structure of data, research design also test and eliminate alternative explanation. Broadly, the observational design sampling design and statistical design are covered in Research Design. The various attributes of people, objects or concepts are being increasingly included in explanation of human behaviour in Economics.

Decisions regarding what, where, when, how much, by what means concerning an inquiry or a research study constitute a research design. "A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure."1
In fact, the research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. As such the design includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data. More explicitly, the design decisions happen to be in respect of:
(i) What is the study about?
(ii) Why is the study being made?
(iii) Where will the study be carried out?
(iv) What type of data is required?
(v) Where can the required data be found?
(vi) What periods of time will the study include?
(vii) What will be the sample design?
(viii) What techniques of data collection will be used?
(ix) How will the data be analysed?
(x) In what style will the report be prepared?
Keeping in view the above stated design decisions, one may split the overall research design into the following parts:
(a) *the sampling design* which deals with the method of selecting items to be observed for the given study;

• Impossibility to separate the researcher from the research subject.
• Heavy role of context in research process.
• The impossibility to generalize research findings beyond the limits of the immediate context.
• Non-separation of cause and effect.
• The explicit focus on inductive, exploratory research approaches.
• The tendency to work with small and purposely chosen sampling.
• Analyses holistic system.

Conceptual and Empirical Research

Conceptual research is related to abstract ideas or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret the existing theories. Empirical research relies on experience or observation. It is data based. It is subject to verification by observation and experiment. This type of research is particularly useful when validation or verification of an aspect is required.

Other Types of Research

Research may be exploratory or formalized. **Exploratory** research aims at developing the hypothesis rather than testing a pre-conceived hypothetical contention or notion. **Formalised** research studies deal with a definitive structure within which specific hypotheses are tested. **Historical research** utilizes existing documents to study events of the past. Research can also be experimental or evaluative. **Experimental research** aims at identifying the causal factors by means of experiments. In **evaluative research**, the cost effectiveness of a programme is examined. Such research addresses the question of the efficiency of a programme and are useful in taking policy decisions on issues like whether the programme is effective and/or needs modification or re-orientation? Whether it should be continued?

The Researcher can design his research depends upon the nature of the research being conducted.

Thus, a Research design is a logical structure of an enquiry. Given the research question or theory, what type of evidence is needed to answer the question (or to test the theory) in a convincing way – constitutes the essence of the research design. Let us use an analogy to understand the term 'research design'. While constructing a building, the first decision to be arrived at is: whether we need a high rise office building, a factory, a school or a residential apartment etc.? Until this is decided, we cannot sketch a plan and order material or setting critical dates for completion of the project dates. Similarly, a social researcher needs to be clear about the research questions and then the research design will flow from the research questions. The function of a research design is to ensure that the evidence obtained enables us to answer the initial research questions as unambiguously as possible. Obtaining relevant evidence entails specifying the type of evidence we need to answer the research question, to test a theory, to evaluate programme or to accurately describe some phenomenon. The issues of sampling, method of data collection (e.g. questionnaire, observation, document analysis), design of questionnaire etc. are all

naturalistic settings. He allows interview topics to emerge during conversation and listens to others' interpretation and perspectives.
Under qualitative method, open-end questionnaire, key informants, group discussion and unstructured interviews, documents, interview transcripts etc. are used as tools to collect data. Content analysis, Case study, Action research participatory method, Cluster analysis, Factor analysis, Correspondence analysis, Context analysis, are used in analyzing qualitative data.

Mixed Methods

The combination of at least one qualitative and at least one quantitative component related to measurement scale, tools of data collection or data analysis technique in a single research study/project is known as mixed methods research. For example it can be in the following forms:

• Employment of more than one measurement procedure in different kind of situations such as different ways of measuring levels of job satisfaction.
• Employment of two or more methods of data collection. For example we may employ observation, interview and questionnaire to collect the data about decent work.
• Employment of two or more data analysis techniques for example, content analysis and factor analysis.

Mixed methods research has gained a tremendous popularity in social, behavioural and related sciences in recent years. The rationale for mixed method design research is to take the best of qualitative (QL) and quantitative methods (QN) and combine them. However, many debates on mixed method research designs are based on methodological arguments due to the ways QN method is linked to positivist paradigm and QL method to Interpretative and critical theory paradigm.

In order to avoid misconceptions and mistakes while deciding the research design issues, the following points need to be kept in mind.

a) We refrain ourselves from making specific argument for or against the QL and QN method for a specific research project. We need to focus our efforts more explicitly on embedding and justifying our selected methods according to our research questions, data needs, theoretical grounding and research design.
b) Data collection methods (i.e. unstructured narrative interview, survey research based on closed-ended questions) and data analysis methods (qualitative content analysis, discourse analysis, quantitative content analysis) should be differentiated.
c) We ought to be more aware of the actual inductive and deductive analytic phases of our research projects.

CONCLUSION

There are several research designs and the researcher must decide in advance of collection and analysis of data as to which design would prove to be more appropriate for his research project. He must give due weight to various points such as the type of universe

THE NATURE, SOURCES AND TYPES OF DATA

For undertaking any meaningful research in terms of situational assessment, testing of models, development of theory, evaluation of economic policy, data is essential. The availability of data therefore, determines the scope of analysis. In any research, the researcher is expected to state the sources of the data used in the analysis, their definitions, and methods of collection.

The data may be of three types; Time series, Cross-section and Pooled.

1) **Time Series Data:** It is a set of observations on the values that a variable takes at different times. Such data may be collected at regular time intervals such as daily (i.e. prices, whether reports etc.), weekly (like money supply figures), monthly (i.e. consumer price index etc.) quarterly (i.e. GDP), annually (i.e. government budget etc.).

2) **Cross Section Data:** Cross-section data are data on one or more variables collected at the same point of time. For example the data on the census of population collected by the Registrar General of India.

3) **Pooled Data:** In pooled data, the elements of both time series and cross section are clubbed. For example, over a period of time say from 2000 to 2013, we have data on saving, investment and GDP across Indian states.

Panel, Longitudinal or Micro Panel Data: This is a special type of pooled data in which the same cross-sectional (say a family or firm) is surveyed overtime.

The Sources of Data: The data used in empirical analysis may be collected by a governmental agency (e.g. CSO, NSSO, RBI, Labour Bureau etc.), an international agency (e.g. International Monetary Fund (IMF) or a private organization. Such data is called secondary data because these are collected from secondary sources.

The data collected by the investigator or researcher through field work is termed primary data. Such data is collected by using different tools like questionnaire, schedule, interview etc. under quantitative approach and participant observation, open ended interview, group discussion, key information etc.

REPORT WRITING

MEANING AND SIGNIFICANCE OF A RESEARCH REPORT

1. Meaning:

Writing the research report is the final and very important step in the process of research work. The research report is a means for communicating one's research experiences to others. Of course, it requires different type of skills. *Research report is a narrative but authoritative document on the outcome of a research work.* It presents highly specific information for a clearly targeted audience. A well written research report is a means of presenting the studied problem, the methods of data collection and analysis, findings,

agency or individual conducting the research. The manner in which the research findings are expressed i.e. style of writing, is also equally important.

2. **The identification of target audience:** The form and type of reporting and other aspects depend upon the type of reader or the user of the report. The identification of the target audience depends on who is the researcher and what is his intention. The target audience can be academic community, the sponsor of the researcher or the general public. The communication characteristics, i.e. the level of knowledge, the type of language that is understood and appreciated, the expectation form the report are not identical for different groups of audiences.

3. **Logical analysis of the subject matter:** The subject matter can be developed logically or chronologically. This is because logical analysis implies development of the subject from simple matter to the complex. It is also based on logical connections or associations between different factors. Therefore, planning for logical presentation is important.

4. **Preparation of the final outline:** Outline is a framework on which the long written report is constructed. It is an aid to decide the logical arrangement of the material to be included in the report and the relative importance of various points. Outline is drawn after preparation of the format of the report. It gives cohesiveness and direction to report writing. The outline can be according to topic or sentence. In the topic outline, the topic headings and the sub-topic headings are noted and the points to be discussed under each head are noted in short forms or with key words. In case of sentence outline, it gives more details about the points to be included in the report.

5. **Preparation of the rough draft and final draft:** The rough draft follows the outline and the research should write down the broad findings and generalizations. The rough draft can also include various suggestions which help in improving the final writing. A rough draft is essential to avoid mistakes or omission in the final draft. It is possible to polish the language of the rough draft in the final draft. Final draft is written after a careful scrutiny of the rough draft.

6. **Preparation of Bibliography and Webliography:** Bibliography is a list of books which provide references to the work undertaken and webliography is a list of website addresses where the researcher visited for references and consultancy. Both are appended to research report in a systematic manner. The bibliography should be arranged alphabetically and may be divided into three parts. Fist part may consist of books, second part may contain magazines, periodical and newspaper articles and the third part may contain web-addresses. The entries in the bibliography should be according to a certain order like name of the author, title of the book in *italics*, place, publisher and date of publication, edition, page number if required, etc. For example, see

certain principles of standard practices which should be observed in writing a research report. Those principles comprise organization, style of research report and essentially some precaution in writing a research report.

1. Organization of Report:

In the organization of research report, following points are essentially be considered:

a. **Size and physical design:** Accordingly prescribed size of the paper and the given general instructions are to be maintained throughout the writing of report. Ofcourse, writing should be in double-space and on one side of the page.

b. **Procedure:** Various steps in writing the report which are explained before in previous unit should be strictly followed.

c. **Layout:** Keeping in view the objective and nature of the problem, the layout of the report should be suitable according to the type of research report.

d. **Treatment of quotations:** Quotations should be placed in quotation marks and double-spaced, forming an immediate part of the text. But if a quotation is of a considerable length then it should be single-spaced and indented at least half an inch to the right of the normal text margin.

e. **Footnotes:** Regarding footnotes one should keep in view the following things:

i) It should provide proper cross references, data sources.

ii) It should be written at the bottom of the page and separate from the main text.

iii) It should be numbered consecutively beginning with 1 in each chapter separately and such number should be typed a little above the line at its end.

iv) It is always be typed in single space and make separate form one another by double space.

f. **Documentation Style:** Regarding documentation, the first footnote reference to any given work should be complete with all its essential facts about the edition used.

g. **Punctuation and Abbreviations:** The punctuation marks should be proper for meaningful reading and the abbreviations used should be most familiar with all.

h. **Use of Statistics, Charts and Graphs:** For the more clarification and

- Offers a specific path of inquiry that avoids eliciting generalizations about the problem.

NOTE: Questions of how and why concerning a research problem often require more analysis than questions about who, what, where, and when. You should still ask yourself these latter questions, however. Thinking introspectively about the who, what, where, and when of a research problem can help ensure that you have thoroughly considered all aspects of the problem under investigation and helps define the scope of the study in relation to the problem.

SOME EXTRA NOTES IN SMALLER FONT

WHAT IS A RESEARCH PROBLEM?

A research problem, in general, refers to some difficulty which a researcher experiences in the context of either a theoretical or practical situation and wants to obtain a solution for the same.
Usually we say that a research problem does exist if the following conditions are met with:
(i) There must be an individual (or a group or an organisation), let us call it '*I*,' to whom the problem can be attributed. The individual or the organisation, as the case may be, occupies an environment, say '*N*', which is defined by values of the uncontrolled variables, *Yj*.
(ii) There must be at least two courses of action, say *C*1 and *C*2, to be pursued. A course of action is defined by one or more values of the controlled variables. For example, the number of items purchased at a specified time is said to be one course of action.
(iii) There must be at least two possible outcomes, say *O*1 and *O*2, of the course of action, of which one should be preferable to the other. In other words, this means that there must be at least one outcome that the researcher wants, i.e., an objective.
(iv) The courses of action available must provide some chance of obtaining the objective, but they cannot provide the same chance, otherwise the choice would not matter. Thus if $P(Oj \mid I, Cj, N)$ represents the probability that an outcome *Oj* will occur, if *I* select *Ci* in *N*, then $P(O1 \mid I, C1, N) \neq P(O1 \mid I, C2, N)$. In simple words, we can say that the choices must have unequal efficiencies for the desired outcomes.

Defining the Research Problem

Over and above these conditions, the individual or the organisation can be said to have the problem only if '*I*' does not know what course of action is best, i.e., '*I*', must be in doubt about the solution. Thus, an individual or a group of persons can be said to have a problem which can be technically described as a research problem, if they (individual or the group), having one or more desired outcomes, are confronted with two or more courses of action that have some but not equal efficiency for the desired objective(s) and are in doubt about which course of action is best.
We can, thus, state the components1 of a research problem as under:
(i) There must be an individual or a group which has some difficulty or the problem.
(ii) There must be some objective(s) to be attained at. If one wants nothing, one cannot have a problem.
(iii) There must be alternative means (or the courses of action) for obtaining the objective(s) one wishes to attain. This means that there must be *at least two means* available to a researcher for if he has no choice of means, he cannot have a problem.
(iv) There must remain some doubt in the mind of a researcher with regard to the selection of alternatives. This means that research must answer the question concerning the relative efficiency of the possible alternatives.
(v) There must be some environment(s) to which the difficulty pertains.
Thus, a research problem is one which requires a researcher to find out the best solution for the given problem, i.e., to find out by which course of action the objective can be attained optimally in the context of a given environment. There are several factors which may result in making the problem complicated. For instance, the environment may change affecting the efficiencies of the courses of action or the values of the outcomes; the number of alternative courses of action may be very large; persons not involved in making the decision may be affected by it and react to it favourably or unfavourably,

confined to the formulation of the specific problem at hand, but should also be concerned with the general approach to the given problem, techniques that might be used, possible solutions, etc.

(v) Rephrasing the research problem: Finally, the researcher must sit to rephrase the research problem into a working proposition. Once the nature of the problem has been clearly understood, the environment (within which the problem has got to be studied) has been defined, discussions over the problem have taken place and the available literature has been surveyed and examined, rephrasing the problem into analytical or operational terms is not a difficult task. Through rephrasing, the researcher puts the research problem in as specific terms as possible so that it may become operationally viable and may help in the development of working hypotheses.* In addition to what has been stated above, the following points must also be observed while defining a research problem:

(a) Technical terms and words or phrases, with special meanings used in the statement of the problem, should be clearly defined.
(b) Basic assumptions or postulates (if any) relating to the research problem should be clearly stated.
(c) A straight forward statement of the value of the investigation (i.e., the criteria for the selection of the problem) should be provided.
(d) The suitability of the time-period and the sources of data available must also be considered by the researcher in defining the problem.
(e) The scope of the investigation or the limits within which the problem is to be studied must be mentioned explicitly in defining a research problem.

CONCLUSION
We may conclude by saying that the task of defining a research problem, very often, follows a sequential pattern—the problem is stated in a general way, the ambiguities are resolved, thinking and rethinking process results in a more specific formulation of the problem so that it may be a realistic one in terms of the available data and resources and is also analytically meaningful. All this results in a well defined research problem that is not only meaningful from an operational point of view, but is equally capable of paving the way for the development of working hypotheses and for means of solving the problem itself.

HYPOTHESIS FORMATION- REFER EARLIER SECTION ON HYPOTHESIS

Module III

Academic Report Writing: Preparation of Synopsis; Explaining the Research Problem and Preparation of Bibliography; Notations and Symbols; Techniques for Referencing; importance of footnotes, bibliography and references, Preparation of Articles for Journals; Books; Preparation of Abstracts.

Ethics in Research: Scientific integrity, Plagiarism (definition of Plagiarism, consequences of plagiarism- unintentional plagiarism- forms of plagiarism), good reference practice, Verification and subsequent use of research material.

ACADEMIC REPORT WRITING

and page number. When the citation appears at the end of a sentence, the period comes outside the parentheses. If you need to put the citation before the end of the sentence (in cases where you have more than one citation in a sentence), place any punctuation after the citation as well.

Instructions and examples in this MLA guide are based on more detailed information in: *MLA Handbook. 8th ed.*, Modern Language Association of America, 2016. Also refer to the MLA Style Center.

In-text citations - General points

- If the author's name is mentioned in the sentence, only cite the page number.
- If the author's name is not mentioned in the sentence, cite both the name and the page number.
- Font and capitalisation must match that in the reference list.
- Long quotations (more than four lines) should be indented.
- If you are citing more than one reference at the same point in a document, separate the references with a semicolon e.g. (Smith 150; Jackson 41).
- If the work has no author, use the title.
- If you are citing two works by the same author, put a comma after the author's name and add title words. eg (Smyth, "Memories of Motherhood" 77) to distinguish between them in the in-text citation. Do this when citing each of the sources throughout the piece of writing.
- If two authors have the same surname, use their first initial e.g. (G. Brown 26).

Works Cited list - General points

- The recommended heading for the reference list is Works Cited, which should be centred.
- Each reference should be formatted with double-spacing and a hanging indent.
- Capitalise the first word of the title or subtitle, and all other significant words.
- Author's names should be listed with full forenames if known.
- The name of the first author is inverted to list the family name first. If there are additional authors their names are not inverted (e.g. Smith, Adam, and Laura Childs).
- If you cite more than one work by the same author, give the name in the first entry only. Thereafter, use three hyphens instead of the name, e.g. ---.
- If a reference does not have an author, list it by title. Ignore the leading article (A, The etc.) when inserting the reference into the alphabetical works cited list.
- If you cannot validate a reference's authorship, date of publication or its authoritativeness, especially if it is an online resource, consider using another similar reference that is more authoritative instead.
- For a journal article in an online database (e.g. via the Library website) include the name of the database (*italicised*).

Researchers have a responsibility to prevent research subjects from being submitted to harm or other suffering.

8. The obligation to inform research subjects

Research subjects are to be given all the information they require to gain a reasonable understanding of the field of research in question, of the consequences of participating in the research project, and of the purpose of the research. Subjects shall also be informed about who is funding the research.

9. The obligation to obtain free and informed consent

As a general rule, research projects that include individuals can be initiated only after securing participants' free and informed consent. The informants have the right to withdraw from participation at any time, without this entailing any negative consequences for them.

Free consent means that the consent has been obtained without outside pressure or constraints on individual freedom of action. Being informed means that the informant is given information about his or her participation in the research project.

10. Research licences and the obligation to report

All research and student projects that involve the processing of personal data must be reported.

11. Regard for third parties

Researchers should consider and anticipate effects on third parties that are not directly included in the research.

12. Children's right to protection

C. REGARD FOR GROUPS AND INSTITUTIONS

20. Regard for private interests

Researchers shall respect the legitimate reasons that private businesses, special interest organisations, etc. may have for not wanting information about themselves, their members or their plans to be published.

21. Regard for the public administration

Public agencies should make themselves available for research into their activities.

Mosaic plagiarism	If you copy bits and pieces from a source (or several sources), changing a few words here and there without either adequately paraphrasing or quoting directly, the result is *mosaic plagiarism*. Even if you don't intend to copy the source, you may end up committing this type of plagiarism as a result of careless note-taking and confusion over where your source's ideas end and your own ideas begin. You may think that you've paraphrased sufficiently, or quoted relevant passages, but if you haven't taken careful notes along the way, or if you've cut and pasted from your sources, you can lose track of the boundaries between your own ideas and those of your sources. It's not enough to have good intentions and to cite some of the material you use. You are responsible for making clear distinctions between your ideas and the ideas of the scholars who have informed your work. If you keep track of the ideas that come from your sources and have a clear understanding of how your own ideas differ from those ideas, and you follow the correct citation style, you will avoid mosaic plagiarism.
Collusion	Presenting work as independent work when it has been produced in whole or part in collusion with other people. Collusion includes: • students providing their work to another student before the due date, or for the purpose of them plagiarising at any time • paying another person to perform an academic task and passing it off as your own • stealing or acquiring another person's academic work and copying it • offering to complete another person's work or seeking payment for completing academic work. This should not be confused with academic collaboration where there has been general group discussion about a project or question but where each student writes his/her own answer.
Inappropriate citation	Citing sources which have not been read without acknowledging the 'secondary' source from which knowledge of them has been obtained.
Self-plagiarism	'Self-plagiarism' occurs where an author republishes their own previously written work and presents it as new findings

Convenience sampling. Also called accidental or opportunity sampling, this is a technique in which a sample is drawn from that part of the population that is close to hand, readily available, or convenient. For instance, if you stand outside a shopping center and hand out questionnaire surveys to people or interview them as they walk in, the sample of respondents you will obtain will be a convenience sample. This is a non-probability sample because you are systematically excluding all people who shop at other shopping centers. The opinions that you would get from your chosen sample may reflect the unique characteristics of this shopping center such as the nature of its stores (e.g., high end-stores will attract a more affluent people), the demographic profile of its patrons, or its location (e.g., a shopping center close to a university will attract primarily university students with unique purchase habits), and therefore may not be representative of the opinions of the shopper population at large. Hence, the scientific generalizability of such observations will be very limited. Other examples of convenience sampling are sampling students registered in a certain class or sampling patients arriving at a certain medical clinic. This type of sampling is most useful for pilot testing, where the goal is instrument testing or measurement validation rather than obtaining generalizable inferences.

Quota sampling. In this technique, the population is segmented into mutually-exclusive subgroups (just as in stratified sampling), and then a non-random set of observations is chosen from each subgroup to meet a predefined quota. In proportional quota sampling , the proportion of respondents in each subgroup should match that of the population. For instance, if the American population consists of 70% Caucasians, 15% Hispanic-Americans, and 13% African-Americans, and you wish to understand their voting preferences in a sample of 98 people, you can stand outside a shopping center and ask people their voting preferences. But you will have to stop asking Hispanic-looking people when you have 15 responses from that subgroup (or African-Americans when you have 13 responses) even as you continue sampling other ethnic groups, so that the ethnic composition of your sample matches that of the general American population. Non-proportional quota sampling is less restrictive in that you don't have to achieve a proportional representation, but perhaps meet a minimum size in each subgroup. In this case, you may decide to have 50 respondents from each of the three ethnic subgroups (Caucasians, Hispanic-Americans, and African- Americans), and stop when your quota for each subgroup is reached. Neither type of quota sampling will be representative of the American population, since depending on whether your study was conducted in a shopping center in New York or Kansas, your results may be entirely different. The non-proportional technique is even less representative of the population but may be useful in that it allows capturing the opinions of small and underrepresented groups through oversampling.

Expert sampling. This is a technique where respondents are chosen in a **non-random** manner based on their expertise on the phenomenon being studied. For instance, in order to understand the impacts of a new governmental policy, you can sample a group of experts in this area. The advantage of this approach is that since experts tend to be more familiar with the subject matter than non-experts, opinions from a sample of experts are more credible than a sample that includes both experts and non-experts, although the findings are still not generalizable to the overall population at large.

The Central Statistics Office coordinates the statistical activities in the country and evolves statistical standards. It is headed by a Director General assisted by 5 Additional Director Generals. CSO has the following Divisions:

a.National Accounts Division (NAD)

b.Social Statistics Division (SSD)

c.Economic Statistics Division (ESD)

d.Training Division

e.Coordination and Publications Division (CAP)

DBIE: DATA BASE ON INDIAN ECONOMY is the data portal of RBI. The Reserve Bank of India (RBI) has rich traditions of publishing data on various aspects of the Indian Economy through several of its publications. Through this website (DBIE), data are mainly presented through time-series formatted reports. These reports have been organized under sectors and sub-sectors according to their periodicities. Reports can be saved as excel sheets for further analysis.

NOTES ON VARIABLES AND KEY CONCEPTS.

A **function** tries to define these relationsips. It tries to give the relationship a mathematical form. An equation is a mathematical way of looking at the relationship between concepts or items. These concepts or items ar represented by what are called variables.

A **variable** represents a concept or an item whose magnitude can be represented by a number, i.e. measured quantitatively. Variables are called variables because they vary, i.e. they can have a variety of values. Thus a variable can be considered as a quantity which assumes a variety of values in a particular problem. Many items in economics can take on different values. Mathematics usually uses letters from the end of the alphabet to represent variables. Economics however often uses the first letter of the item which varies to represent variables. Thus p is used for the variable price and q is used for the variable quantity.

INDEPENDENT VARIABLES AND DEPENDENT VARIABLES

Independent variables are those which do not depend on other variables. Dependent variables are those which are changed by the independent variables. The change is caused by the independent variable. Here there are two variables: your salary and the amount you spend. In our example salary is the independent variable and the amount you spend is the dependent variable.