

Henry Johnson has stated following four characteristics of scientific research (see, Black and Champion, 1960: 5-6):

1. *It is empirical*, i.e., it is based on observation and reasoning and not on speculation.
2. *It is theoretical*, i.e., it summarises data precisely giving logical relationship between propositions which explain causal relationship.
3. *It is cumulative*, i.e., generalisations/theories are corrected, rejected and newly developed theories are built upon one another.
4. *It is non-ethical*, i.e., scientists do not say whether particular things /events/phenomena/institutions/systems/structures are good or bad. They only explain them.

Robert B. Burns (2000:5-7) has discussed four characteristics of scientific approach: control, operational definition, replication and hypothesis testing.

Control is necessary to eliminate the simultaneous influence of many variables to isolate the cause of an effect. Control provides unambiguous answers to why something happens, what causes some event or under what conditions an event does occur.

Operational definition means that the terms must be defined in terms of steps to measure them; e.g., economic class may be defined by family income, and social class by father's occupation or both parents' educational level.

Replication means that for repeated study, the data obtained must be reliable. If observations are not repeatable, our descriptions and explanations are unreliable and useless.

Hypothesis testing means that the researcher systematically creates a hypothesis and subjects it to empirical test.

AIMS OF SOCIAL RESEARCH

The aims of social research coincide with the type of research, i.e., whether it is exploratory research or explanatory research or descriptive research. In other words, it depends upon the general goals (understanding for its own sake), the academic goals, the theoretical goals and the pragmatic goals of research. Broadly speaking, the important aims of social research are:

- To understand the functioning of society.
- To study individual behaviour and social action.

- To evaluate social problems, their effects on society, and to find out possible solutions.
- To explore social reality and explain social life.
- To develop theories.

Becker (1989) and Sarantakos (1998:16) have referred to the following goals of social research:

- *General goals*: Understanding for its own sake.
- *Theoretical goals*: Verification, falsification, modification or discovery of a theory.
- *Pragmatic goals*: Solution of social problems.
- *Political goals*: Development of social policy, evaluation of programmes, planning of reconstruction, empowerment and liberation.

Sometimes the aims of social research coincide with the motives of social research but not always. The motives can be *intrinsic* (i.e., related to personal interests of the researcher) or *extrinsic* (i.e., related to the interests of those contracting the research). Mahr (1995:84) has outlined the following *motives* of social research:

- *Educational*: to educate and inform the public.
- *Personal*: to promote the academic status of the researcher.
- *Institutional*: to enhance the research quantum of the institutions for which the researcher works.
- *Political*: to provide support to political plans and programmes.
- *Tactical*: to delay decision or action for as long as the investigation is under way.

STEPS IN SCIENTIFIC RESEARCH

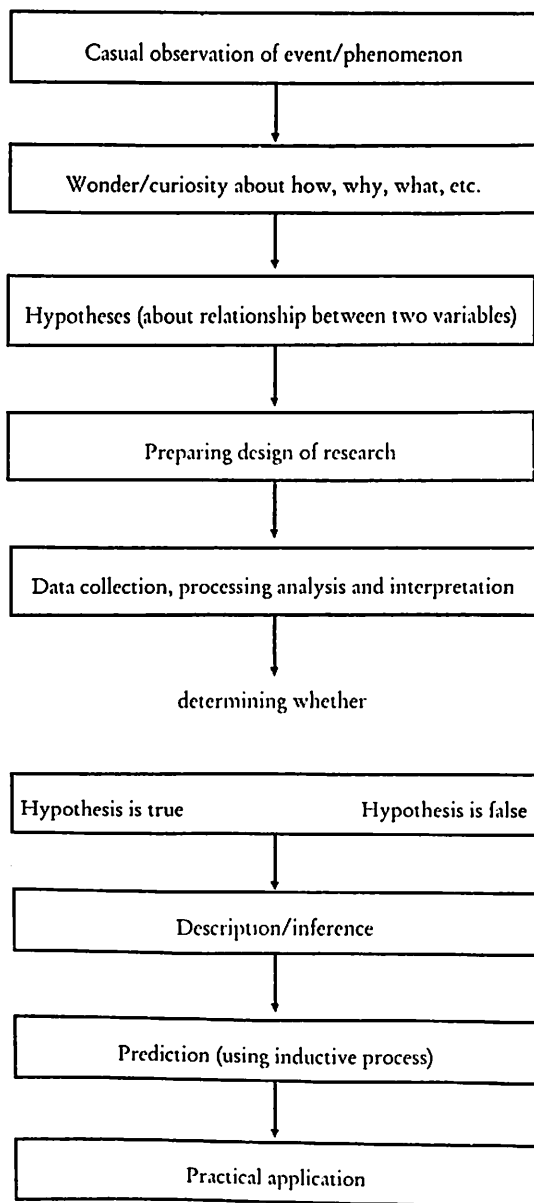
According to Theodorson and Theodorson (1969:370-371), scientific method involves the following steps: *First*, the problem is defined. *Second*, the problem is stated in terms of a particular theoretical framework and related to relevant findings of previous research. *Third*, a hypothesis (or hypotheses) relating to the problem is devised, utilising previously accepted theoretical principles. *Fourth*, the procedure to be used in gathering data to test the hypothesis is determined. *Fifth*, the data are gathered. *Sixth*, the data are analysed to determine if the hypothesis is verified or rejected. *Finally*, the conclusions of the study are related to the original body of theory, which is modified in accordance with the new findings.

Kenneth D. Bailey (*Methods of Social Research*, 2nd ed., 1982:9) has delineated five stages of social research: (1) choosing the research problem and stating the hypotheses; (2) formulating the research design; (3) gathering the data; (4) analysing the data; and (5) interpreting the results so as to test the hypotheses. We concede Bailey's view that each research problem has a goal but is it necessary that the goal be stated in terms of hypotheses? Many researches have no hypotheses to test but the findings provide knowledge to the researchers to throw some hypotheses to be tested and generalised, or to revise the hypotheses propounded on the basis of some earlier work done by some other researcher.

A problem cannot be formulated in a vacuum. It is either based upon past research or on relationship observed/conceived between two variables, say, relationship between origin of a communal riot and polarisation of two religious communities or sects (see, V.V. Singh, *Communal Riots*, 1992). The researcher has only to measure two variables of (a) polarisation of communities, and (b) hatred as a negative social effect of polarisation. The researcher has, of course, to focus upon the nature of polarisation, causes of polarisation, conflicts arisen because of mutual hatred on different occasions, the precipitating factor in the riot, role of leader in instigation/suppression of hostile feelings, and so on. Of course, the researcher has to control the extraneous factors that might interfere with the finding, e.g., conflict which cannot be attributed to religious hatred, etc. The hypothesis that "hatred caused by religious polarisation causes aggression" will be supported if people show or do not show dislike for strangers from different religions. The tool for collecting data would depend upon the nature of relationship to be examined between two variables and the type of people involved in the study. Data analysis may sometimes be complicated because more variables may be involved and many confounding factors might affect the relationship between the two given variables, which may not have been properly controlled. Interpreting the results many a time requires replicating the study either with a new sample or a larger sample to make sure that the finding was not a fluke.

Henry Manheim (1980:80) has suggested nine steps in scientific research which may be shown diagrammatically in the following way:

Diagram Showing Steps in Scientific Research



Thus, this is a never-ending aspect of science, with the process constantly being repeated with increasing refinement.

Earl Babbie (*The Practice of Social Research*, 8th ed., 1998:112) has proposed the following six elements of a research proposal:

- *Problem or objective*, i.e., stating what is to be studied, its worth and practical significance, and its contribution to the construction of social theories.
- *Literature review*, i.e., what others have said about this topic, what theories have been addressed to it and what are the flaws in the existing research that can be remedied.
- *Subjects for study*, i.e., from whom is the data to be collected, how to reach persons who are available for study, whether selecting sample will be appropriate, and if yes, how to select this sample and how to insure that research that is being conducted will not harm the respondents.
- *Measurement*, i.e., determining key variables for the study, how will these variables be defined and measured, how will these definitions and measurements differ from previous researches on the topic.
- *Data collection methods*, i.e., determining methods to be used for collecting data-survey or experiment, etc., statistics to be used or not.
- *Analysis*, i.e., spell out the logic of analysis whether variations in some quality are to be accounted or not, and the possible explanatory variables to be analysed.

Horton and Hunt (1984:10) have pointed out eight steps in scientific research or scientific method of investigation:

1. *Define the problem*, which is worth studying through the methods of science.
2. *Review literature*, so that errors of other research scholars may not be repeated.
3. *Formulate the hypotheses*, i.e., propositions which can be tested.
4. *Plan the research design*, i.e., outlining the process as to how, what and where the data is to be collected, processed and analysed.
5. *Collect the data*, i.e., actual collection of facts and information in accordance with the research design. Sometimes it may become necessary to change the design to meet some unforeseen difficulty.

6. *Analyse the data*, i.e., classify, tabulate and compare the data, making whatever tests are necessary to get the results.
7. *Draw conclusions*, i.e., whether the original hypothesis is found true or false and is confirmed or rejected, or are the results inconclusive? What has the research added to our knowledge? What implications has it for sociological theory? What new questions have been posed for further research?
8. *Replicate the study*. Though the above-mentioned seven steps complete a single research study but research findings are confirmed by replication. Only after several researches can the research conclusions be accepted as generally true.

These steps help us in summarising the so-called scientific approach to inquiry. First, there is doubt whether an indeterminate situation can be made determinate. The scientist experiences vague doubts and is emotionally disturbed. He struggles to formulate the problem, even if inadequately. He studies the literature and scans his own experience and the experiences of others. With the problem formulated, with the basic questions properly asked, he constructs the hypotheses mainly on experimented lines. By collecting the required data, he tests the hypotheses which he may ultimately accept, change, abandon, broaden or narrow down. In this process, sometimes one phase may be expanded, other may be skimmed and there may be fewer or more steps involved. These things are not important. What is important is a controlled rational process of reflective inquiry.

Example of a research problem indicating steps

We may take one example to understand the steps in social research as suggested by various scholars. As a *first step*, we need a research problem. Suppose our problem is "Role Adjustment of Working Women", i.e., how do working women face conflict between the role of a householder and that of a wage-earner and how do they adjust themselves in family and office? In fact, this problem covers too many aspects. We need *a limited and a specific aspect for research*. For this we take the aspect of assessing: "Do working women suffer professionally by not devoting much time to their work? The review of the literature—the *second step*—may not provide us much information; yet it is necessary to check whether this theme has been studied by other scholars and what are their findings? One can check from books and journals, in-

cluding *Sociological Abstracts*. This search of literature is extremely important. The *third step* is to formulate one or more hypotheses. One might be: "Married working women get less promotions than single (unmarried, divorcee) working women." Other might be: "The reputation of childless married women of being dedicated and committed workers is much higher than women with two or more children." Planning research design is the *fourth step*. All categories must be designed and the variables to be controlled must be decided. We must be sure that the two groups we compare are similar in all important respects except marital status or number of children. We must select sources of data, kinds of data sought, and procedures for collecting and processing them. One possibility is that the research is confined to female lecturers in a university, the other possibility is to study female clerks in some office (say secretariat) and so forth. The *fifth step* is actual collection of data and classifying and processing it. In this age of research, the data are generally made "computer sensible" (prepared for computer processing by assigning codes to various response categories, etc.). The computer gives the desired computations and comparisons including data for statistical tests. The *sixth step* is to analyse data for finding out contrast between the two groups. In this process, sometimes unexpectedly, even some additional hypotheses may be developed. The *seventh step* is drawing conclusions. Are our hypotheses true or false? What further study is suggested by our research? *Finally*, other researchers will undertake replication studies.

The basic procedure is the same for all scientific inquiries and researches. Only techniques may vary according to the problem under study. However, one thing that needs to be remembered is that hypotheses are not involved in all researches. Some researches may only collect the data and develop hypotheses from the analysis of data. Thus, "anything involving careful objective collecting of verifiable evidence in search for knowledge is scientific research" (Horton and Hunt, op.cit.:12).

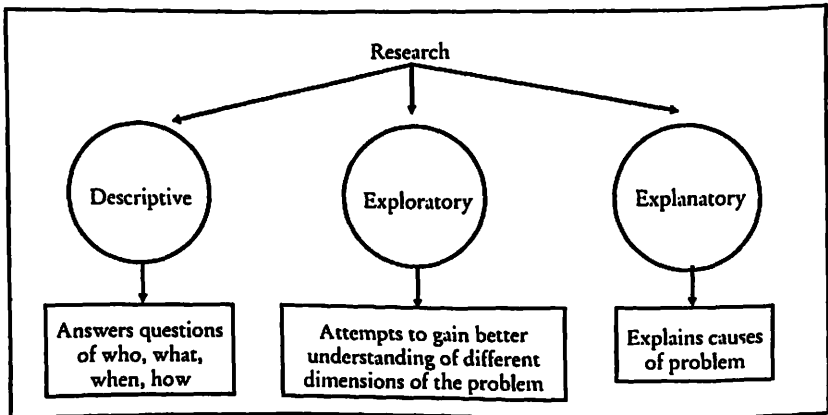
DIFFERENCE BETWEEN SCIENTIFIC AND NORMATIVE RESEARCH

The main difference between two types of inquiry is that while normative inquiry *implies* conclusion, scientific inquiry *draws* conclusion. In other words, while the scientific method proceeds from evidence to

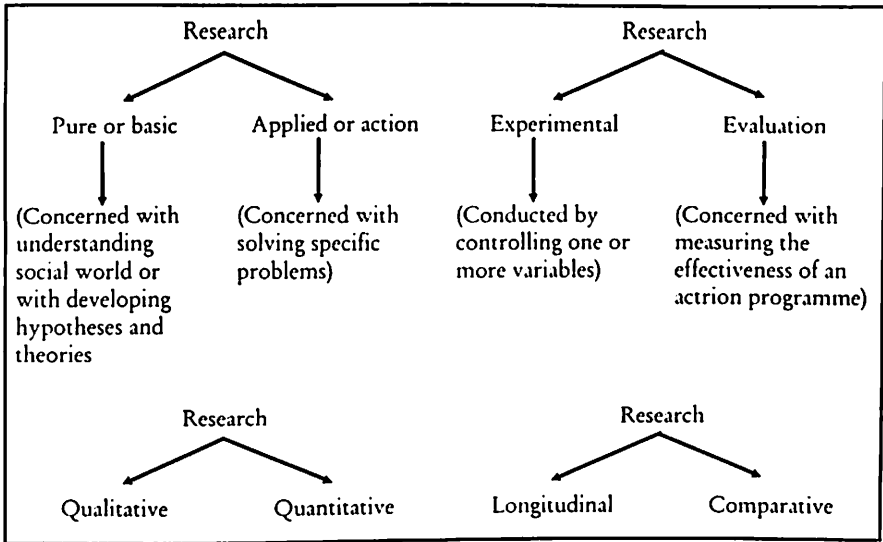
conclusion, the normative method stands with a conclusion and hunts for evidence to support it (Horton and Hunt, op.cit.:12). The scientific method of inquiry consists of posing a question or raising an issue, collecting evidence, and drawing conclusions from the evidence. By contrast, the normative method of investigation raises the issue in such a way that the conclusion is implied, and then looks for evidence to support it. For example, the questions, "How does a traditional family thwart family planning?" or "Why does an alcoholic or a drug addict commit crime?" in fact state conclusions and ask for evidence to support it. A good deal of scientific research is normative, for it is a search for evidence to support a conclusion already assumed. No wonder many scholars hold that much Marxism scholarship is normative because it begins with the conclusion that class oppression is the cause of most social ills. In sociology and criminology also many researches are based on normative methods of investigation, e.g., studies suggesting "crime is the result of personality disorder", or "rural poverty is caused by lack of infrastructure", or "woman's exploitation is caused by her feeling of helplessness or inferiority complex or resourcelessness". All these studies are normative for they begin with a conclusion and look for the data to support it. But this also does not mean that the findings of all normative researches are necessarily wrong. At the most, they may be described as incomplete.

TYPES OF SCIENTIFIC RESEARCH

The main purposes of social research are: to explore, to describe and to explain. On this basis, we may illustrate three types of research:



The other types of research are: (a) pure and applied, (b) experimental and evaluation, (c) qualitative and quantitative, and (d) longitudinal and comparative.



We will now describe all these types separately.

Exploratory research

This research studies subject about which either no information or little information is available. Generally, this type of research is qualitative which becomes useful in formulating hypotheses or testing hypotheses and theories. In this research, the assumption is that the researcher has little or no knowledge about the problem or situation under study, or he is unfamiliar with the structure of the group he is studying (say, prison, industry, university, village, and so on). As an example, in an exploratory study of a prison, the researcher points out how a prison is divided in barracks and wards; what type of work is assigned to different types of prison officers; what recreational, medical, educational, etc., facilities are provided to prisoners; what rules they have to follow in interacting with other inmates or with officials; how are they to maintain contacts with the outside world; and so on. The researcher also comes to explore how prisoners reject the prison norms and come to follow the norms of the inmate world, say, always keep grumbling about the food, work and the facilities provided, al-

ways work less, do not reveal the secrets of inmates to prison officials, and so forth.

Or, suppose a researcher is interested in exploring students' unrest in a university campus. He will study dissatisfaction of students regarding various problems they point out, administrators' apathy to these problems, students organising under a leader for demonstration, gherao, strike, etc., type of students who become active, the support they seek and get from outside agencies, how widespread the unrest becomes, how it is suppressed by the police, how leaders are arrested, and how authorities are pressurised to concede some demands.

Exploratory studies are also appropriate for some persistent phenomenon like deficiencies in functioning of educational system, corruption among political elite, harassment by police, rural poverty, and so on. We can give one example. The researcher wants to find out the changing popularity of two main political parties among people in India. He collects information about seats won and percentage of votes secured by the BJP and the Congress in thirteenth Lok Sabha elections. He gets the following information:

Year	BJP		Congress	
	Seats won	% of votes secured	Seats won	% of votes secured
1952	3	3.1	364	45.0
1957	4	5.9	371	47.8
1962	14	6.4	361	44.7
1967	35	9.5	283	40.8
1971	22	7.4	352	43.7
1977	-	-	154	34.5
1980	-	-	353	42.7
1984	2	7.4	415	48.1
1989	86	11.5	197	39.5
1991	120	20.1	232	36.5
1996	161	20.3	140	28.8
1998	182	25.6	141	25.8
1999	182	27.5	112	23.8

Source: *India Today*, September 20, 2000:43

He thus points out the increasing popularity of the BJP and the decreasing popularity of the Congress from 1989 onwards. No wonder, in recent opinion poll also conducted by TNS-MODE (for *The Hindustan Times*) in four metros—Delhi, Calcutta, Mumbai and Chennai—with 8,251 respondents in 18-50 age group to gauge the public perception of BJP's one year in office (October, 1999 to October, 2000), 11 per cent described it excellent, 37 per cent good, 39 per cent average, 6 per cent poor and 7 per cent very poor (*The Hindustan Times*, October 15, 2000). The Congress is now perceived as a corrupt, faction-ridden and a leaderless party, while the BJP is perceived as a party interested in solving Kashmir problem (31%), having economic policy of raising living standard (25% good, 35% average, 40% poor) and handling foreign policy and internal security in a much better way (57% good, 31% average, 12% poor) (*The Hindustan Times*, October 15, 2000).

Zikmund (1988:17) has pointed out the following areas of exploratory research in business:

1. General Business Research
 - (i) Business trends
 - (ii) Short/long range studies
 - (iii) Import/export studies
 - (iv) Acquisition studies
2. Financial and Accounting Research
 - (i) Impact of taxes
 - (ii) Loans and credit-risk studies
 - (iii) Return-risk studies
 - (iv) Research on financial institutions
3. Management Research
 - (i) Leadership style
 - (ii) Structural studies
 - (iii) Physical environment studies
 - (iv) Job satisfaction
 - (v) Employee morale
4. Sales and Marketing
 - (i) Measuring market potential
 - (ii) Sales analysis
 - (iii) Advertising research
 - (iv) Buyer behaviour research

5. Corporate Responsibility Research

- (i) Ecological impact
- (ii) Legal constraints
- (iii) Social values

We can point out some other examples also for exploratory research:

- A manager notices that workers' grievances are increasing and production is decreasing. He wishes to investigate the reasons.
- The manufacturer of dish washing machine wishes to forecast sales volume for the next five years.
- A publisher wishes to identify the demographic characteristics of teachers who wish to spend more than Rs. 2,000 per year on books.
- A financial analyst wishes to investigate whether monthly income scheme or cumulative scheme or mutual fund scheme has a higher yield.
- An academic researcher wishes to investigate if India is losing its competitive edge in carpet trade.

Exploratory studies are quite valuable in social sciences. They are essential wherever a researcher is breaking new ground. But, the chief shortcoming of the exploratory studies is that they seldom provide satisfactory answers to research questions, though they can give insights into the research methods that could provide definite answers. Failure to give definite answers is because this type of research lacks representativeness.

Descriptive research

This type of research describes social situations, social events, social systems, social structures, etc. The researcher observes/studies and then describes what did he find? Take, for example, the research on drug abuse. The Ministry of Social Welfare, Government of India assigned this study in 1976, 1986 and 1996 to teams of scholars (doctors, sociologists, criminologists) to study the extent of drug abuse among college students, nature of drugs taken, causes of taking drugs, sources of getting drugs, effects of taking drugs, and so on. Since collecting data on scientific basis for descriptive studies is careful and deliberate, scientific descriptions are typically more accurate and precise than casual ones.

We can point out one more example. The researcher wants to describe the increasing political participation of women in India. He collects information about the number of women candidates elected in 13 Lok Sabha elections from 1952 to 1999. He finds that out of 499-543 seats (varying in different elections), women got 22 seats in 1952, 27 in 1957, 34 in 1962, 31 in 1967, 22 in 1971, 19 in 1977, 28 in 1980, 44 in 1984, 27 in 1989, 39 in 1991, 40 in 1996, 43 in 1998 and 46 in 1999 (*India Today*, September 13, 1999:24) He thus describes the increase in women's political participation from 1984 onwards. However, comparing women's rank in India in four different areas with those of six other countries, he finds that women's ranking in India is not high.

Country	Seats in Parliament	Administrators and Managers	Professional and Technical Workers	Central Ministers (in 1998)
India	8.8	2.3	20.5	9.0
U.S.	11.2	42.0	52.0	21.1
Japan	7.7	8.5	41.8	6.7
Sweden	40.4	38.9	64.4	47.8
Iran	4.0	3.5	32.6	0.0
Bangladesh	9.1	5.1	23.1	5.0
Pakistan	3.4	3.4	20.1	4.0

Source: *India Today*, July 27, 1998.

Another example of descriptive study is the census in India. The census data describe accurately and precisely a wide variety of characteristics of the population as well as the population of different states and different communities. The 2001 census, started from February 8, 2001 also aims at this description.

The voting forecast given on the basis of survey conducted by different organisations/TV channels before and after the parliamentary elections (including the exit poll in the 13th Lok Sabha elections) described the voting pattern of the electorate. The productive marketing survey also describes people who use or would use a particular product. Social anthropologists give details of particular culture of some tribal society.

Explanatory or causal research

This research explains the causes of social phenomena. Describing the magnitude and nature of crimes committed by females in India is one aspect of female crime but why do they commit crime is its explanatory aspect. Similarly, why is rural poverty not being eliminated, why do some states (like Rajasthan, Gujarat, Andhra Pradesh, etc.) face frequent droughts, why and how communal riots take place, why do students agitate—all these are the explanatory studies. In simple terms, explanatory research aims at establishing a relationship between variables, i.e., how one is the cause of other or how when one variable occurs the other will also occur. Explaining relationship between broken families and juvenile delinquency, or between drug abuse and lack of family control or between students' strike in the college and apathy to solving students' grievances are some examples of explanatory or causal research.

Although it is useful to distinguish between the three types or three purposes of research, it must be stated that some studies may have all the three elements.

Pure research

This research, also called basic research, is concerned with quest for knowledge and knowing more about the phenomenon without concern for its practical use and also with developing and testing hypotheses and theories. It is said, there is nothing so practical as a good theory. For example, developing a theory pertaining to the functioning of group mind (collective behaviour) or group dynamics. This type of research is also used to reject or support the existing theories about social phenomena.

Applied research

This research is concerned with search for ways of using scientific knowledge to solve practical problems. It focuses on analysing and solving social and real-life problems. The findings become basis of framing programmes and policies, based on principles of pure research. According to Horton and Hunt (op. cit.: 37), this research is an investigation for ways of using scientific knowledge to solve practical problems. Because this research is generally conducted on large-scale basis, it is expensive. As such, it is often conducted with the

support of some financing agency like government, public corporation, World Bank, UNICEF, UGC, ICSSR, etc. Many a time, this type of research is conducted on interdisciplinary basis also.

A sociologist who seeks to find out why crime is committed or how a person becomes a criminal is working for a *pure* research. If this sociologist then tries to find out how a criminal can be rehabilitated and his deviant behaviour can be controlled is doing *applied* research. A sociologist making a study of nature and extent of drug abuse among truck and auto-rikshaw drivers or among industrial workers is working for pure research. If this is followed by a study of how to reduce drug abuse among these people, it will be applied research. Thus, practical application of sociological knowledge is becoming common as it is believed that on many social questions, there is considerable scientific knowledge within the social sciences.

Research can also be of following types:

- *Experimental research*: which is conducted by controlling one or more variables and comparing control and experimental groups.
- *Evaluation research*: which is a study measuring the effectiveness of an action programme, e.g., research conducted by this author in 1988-89 on the evaluation of the working of voluntary organisations in Rajasthan getting financial assistance from the Ministry of Welfare, Government of India for the rehabilitation of physically handicapped persons.

In past one or two decades, many organisations, industrial corporations and even government bodies have started employing sociologists in evaluation research. Some recent examples are associating sociologists with studies of evaluating rural poverty for sustainable development (in Rajasthan by World Bank), for studying management of canal water for irrigation, purposes through people's associations (in Rajasthan by the World Bank), for studying impact of cyclones and rehabilitation of affected people in coastal areas (in Andhra Pradesh and Orissa by the World Bank), drug abuse, slums, alcoholism, slum areas, inter-caste and inter-communal conflicts and evaluation of organisations getting funds from the government.

Quantitative research

This research employs quantitative measurement and the use of statistical analysis. For example, what percentage of medical engineering, law, arts, science and commerce students take drugs or use alcohol?