CSCanada
Studies in Sociology of Science
Vol. 4, No. 2, 2013, pp. 19-30
DOI:10.3968/j.sss.1923018420130402.2617

ISSN 1923-0176 [Print]
ISSN 1923-0184 [Online]
www.cscanada.net
www.cscanada.org

Science and the Scientific Nature of Research in the Social Sciences

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Received 19 January 2013; accepted 5 April 2013

Abstract
There have been a lot of arguments regarding the scientific nature of the social science disciplines. While some argue that the social sciences are not scientific in nature due to their areas of operations and the nature of their subject matter, others, particularly the social scientists themselves, argue that despite the claims of the 'pure' sciences, they still abstract from the characteristics of science, involve themselves in rigorous scientific experimentation and investigations and adhere to the principles of scientific laid down rules of research processes. This paper on the scientific nature of the social sciences explores these schools of thought and evaluates the processes of social research and investigation to survey how scientific they are and how they apply as scientific. This paper also explores the aims of science, the characteristics of science, the principles of social sciences, the common tools of research of the social sciences, the social science research design and the stages of social research. The essence of the reviews is to examine their scientific nature and to argue if they conform to the logic of scientific research.

Key words: Science; Social sciences; Research; Positivism; Aims of science

Iheriohanma, E. B. J. (2013). Science and the Scientific Nature of Research in the Social Sciences. *Studies in Sociology of Science, 4*(2), 19-30. Available from: URL: http://www.cscanada.net/index.php/sss/article/view/j.sss.1923018420120402.2617
DOI: http://dx.doi.org/10.3968/j.sss.1923018420120402.2617

INTRODUCTION
The generic term, social sciences, covers most or all the disciplines that have, as their subject matter, the study of society, human behaviour and social relationships. These disciplines are designated social sciences mostly because of the implications and understanding among the proponents that they are variously and collectively comparable in important ways to the natural science disciplines (Marshall, 1998). All the social science disciplines, to various degrees and content, are engaged in debates concerning the concept and nature of science, the scientific nature of the social sciences and the application of science to the study of society and human relationships (Berger, 2010; Mertens, 2003). The scientific debate has carried the disciplines thus far to the extent that there is the controversy regarding their comparability with the natural sciences. In that case, an examination of the subject matter and objects of study of these sciences becomes relevant.

An issue of controversy is that, since the object of study of the social sciences is human being, an intractable object, the social sciences are likely to be different from the natural sciences. This has, however, occupied and carried the (classical) theorists onwards and, up to the present, in their investigative and classification efforts on the disciplines as regards which is scientific. The pre-occupation has also delved into the analyses of the methods and the general approaches of the social science disciplines to empirical research, their access to evidence decisions and conclusion about facts.

In an attempt to investigate into the scientific nature of the social sciences and research, this paper discusses what science is probably by looking at its distinct characteristics. The paper also aims at identifying this body of the social science discipline. It has the objective of exploring the aims and purpose of science as a method of inquiry in a bid to identifying how the social sciences

apply same in their process of knowledge building. It looks at the tenets and scope covered by the social science disciplines. The discussion knits the social sciences into a scientific enquiry with the understanding that the identified characteristics of science apply to or are shared by the social sciences in one way or the other. It discusses the common tools and methods of research and experiment in the social sciences, the research design and the stages of research. The essence of this organization is to establish a case for the classification of the social sciences as scientific endeavour and in knowledge building.

SCIENCE AND THE SCIENTIFIC ENQUIRY

Fundamentally, science is seen as an organized human approach, and enterprise and research towards the discovery of the unknown; a theoretical exposition that applies order and logical assessment aimed at developing a body of knowledge about a particular subject or phenomenon. Giddens (2006) sees science as the "use of systematic methods of empirical investigation, the analysis of data, theoretical thinking and logical assessment of arguments to develop a body of knowledge about a particular subject matter". Science, in its original sense, has its etymology from the Latin and Ancient Greek words *Scientia and episteme* which respectively, literally mean *Knowledge.* Science attempts to have an understanding of the world or the natural realm through an ordered systematic observation and knowledge that are based on empirical evidence, facts and explainable ideas. Wikipedia (2013) defines science as "a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe". Science is seen as a body of knowledge itself that can be rationally explicated and reliably applied. In other words, science is knowledge that is obtained or gained from an organized, ordered and systematically arranged manner through the processes of observation, verification and experimentation (Wilkins, 1979; McGee, 1980; Marshall, 1998; Giddens, 2006; Haralambos & Holborn, 2008). Science is therefore distinguished from 'convention' which implies the 'way' things are done or the 'way' of doing things among a particular group of people. Science therefore, connotes 'the knowledge of nature' and the things that are true, valid and universally acceptable for every group, be it a community, a polity, a social group with a peculiar perspective, etc. Impliedly, 'science' is a method, an activity and a body of knowledge. This paper therefore, defines science as a body of knowledge that seeks to understand the natural realm or the world by systematically constructing universal laws that operate independent of human will and conjecture through the instrumentality of observation, investigation, verification and experimentation. Implied in this definition are that science: (i) is a body of knowledge; (ii) has the pre-occupation of understanding the natural realm and the world in which the body of knowledge operates; (iii) systematically or in an ordered manner, constructs universally acceptable laws that can be rationally investigated, systematically proved, verified and applicable under conditions in all situations and places; (iv) has laws that operate irrespective of human will and predispositions; and, (v) operates through certain processes and instrumentalities that are empirical and verifiable.

Science has always been associated with a type of knowledge that continues to build up new ideas and knowledge. In classical connotation, it is usually used interchangeably with philosophy referring to the branches of study that preoccupy themselves with the explanation of phenomena of the material universe. Lately in the 19th century, the term, science, was associated with only the body of knowledge or branches of study that sought knowledge about nature, distinguishing it from those that sought other types of knowledge. Wikipedia (2013) informs that the term *scientist* was created by the naturalist-theologian William Whewell. In modern times, science has been used, in its broadened form, to refer to all branches of study involved in 'reliable, teacheable knowledge about a topic', whether in natural, physical, material, human, biological or social sciences.

Every research endeavour, natural or social, implies the dynamic duo of theory and research. Every research seeks to generate new information or knowledge. The new knowledge or information benefits human being in his search to solve problems, improve the quality of life, have a grip on the environment in which he lives, and which enables him to understand his conditions in life. Invariably, scientific knowledge is tentative, as every knowledge or information is needed to solve problems or to delve into the unknown. Solution to any problem creates a new one. This implies that, every solution to a problem brings forth another problem. Every answer leads to the exploration of answers to new questions. According to Isiugo-Abanihe and Alonge (2002), "every new fact, law or theory presents new problems, so that no matter the present state of scientific knowledge, there is always more to know". In some cases, theory precedes research. To Popper (1961), theorizing precedes research in the sense that theorizing precedes the selection of data. Research action starts with theory and not observation and experimentation. However, according to Nachmias and Nachmias (1991), it is the contention of Merton, that empirical research precedes and informs theory and suggests new problems for theory. It leads to new theoretical formulation while directing attention to the refinement of existing theory where necessary. It presents the foundation or basis for verification of proffered ideas.

AIMS OF SCIENCE

Science has three distinct aims that are characteristic of all scientific investigations (Rex, 1980). These aims explain the general pre-occupation and the major models of scientific investigation of the natural sciences (Rex, 1980; Horton and Hunt, 1980; Haralambos and Holborn, 2008). These major models, according to Rex (1980) see the aims of science as (a) primarily classificatory, (b) concerned with the search for universal laws, and (c) concerned with the establishment of causal relations and sequences.

The classificatory aim of science abstracts from the great tradition of thought in the philosophy of science in England since the Reformation. It is based on empiricism as clearly stated by Francis Bacon in the *Novum Organum* (1878). The essence was to contrast the methods of empirical science with those of scholastic thinkers. This contrast hinges on deductive and inductive methods.

The *deductive* method arrives at conclusive inference by deducing (inferring) from general instance to the particular, thus establishing the most general laws. The *inductive* method, on the other hand, searches for laws through induction from the simplest and particular instances to the general instance (Rex, 1980; Isiugo-Abanihe & Alonge, 2002). It is a process of reasoning in which the general principles are inferred or inducted from the specific cases. It starts from the individual cases to the general; a logical operation where what is assumed of on individual case is assumed to be true of the whole (Reber, 1995). The deductive method draws from the general to the specific.

In his attempt to explicate the 'true ways' towards an empiricist method in science, Durkheim (1970) outlines five stages of scientific investigation. These are: (i) the definition of the subject matter in terms of some observable characteristics. (ii) The description of normal (similar and different) types after a study of many cases. (iii) The classification of the investigated cases into species, genera, etc. (iv) The comparative and causal investigation regarding why there are variations, and (v) The attempt to discover any general law that might emerge in the course of these various stages (Durkheim, 1970; Rex, 1980).

Classification into species involves two separate tasks. The first deals with the definition of the total field of study, that is, the coverage of the field of study; the thematic scope or limitations and the geographical scope. The second is the definition of the expected things or characteristics to be found in this field. For instance, the field of biological sciences (studies) covers plants and animal life. There is the indication of the characteristics of each species. Through the process of designing and development of a body of knowledge, science continually investigates into the evolution, composition and structure of the physical world.

Science aims at the search for universal laws. This aims at the establishment of universally acceptable general formulae that are abstracted at the end of the process of enquiry and investigation. This hinges more on the empiricist tradition – definition, classification, investigation and verification of the general causes of variation of phenomena and things – which is the very essence of the positive or scientific stage (Iheriohanma, 2002). This tradition is well against the intuitive supernatural process of verification and reasoning of the metaphysical and theological stages of enquiry. In the positive stage, there is the abandonment of 'vain search after absolute notions, the origin and destination of the universe and the causes of phenomena' (Rex, 1980). In its stead, science applies itself to the study of the laws with regard to their invariable relations, succession and resemblance. A combination of reasoning, observation, logical argument, systematic and empirical investigation, and explanation remains a hallmark of this scientific knowledge. This is positivism – a positivist rule that states that every scientific study should be confined to observable or directly measurable phenomena. The theoretical questioning looks out for the underlying factor (s) to explain the phenomena.

Science aims at the search for causes of things. This is frequently a commonsense understanding of what science stands for. An onerous task of science therefore, is the quest for the causal analysis or synergic relationships between things. This deals with the problem of 'cause and effect', that is, the central task of philosophy of science. It explains the connection, the causal necessity, the causal links and relationships between related and different phenomena and things rather than mere repeated temporal uniformity. Following Hume's insistence on cause and effect, there is need to give a clear meaning to the notion of necessity, that is, the causal link (Rex, 1980). Essentially, science as a search for laws, insists on understanding and the explanation of the nature of the relationship between general laws and basic statements used in reporting empirical events. It is only then that the meaning of causal necessity of a relationship or correlation between two or more events is made obvious. Rex makes this explicit thus:

> When we say something happened necessarily, rather than accidentally, what we mean is that it was what we would have expected to happen in terms of our definitions from accepted or established laws. Thus, when we say that A caused B, rather than merely saying that B followed A, what we mean is that B followed A, and that this accorded with our expectations derived from accepted laws (Rex, 1980, pp.22).

This position on causation is further explained by Rex (1980, pp.24) and it accords with Popper's (1961) ideas about the necessary ingredients of a complete causal explanation and correlation in science, thus:

> To give a causal explanation of an event means to deduce a statement which describes it, using as premises of the deduction

> one or more universal laws, together with certain singular statements, the initial conditions…. The initial conditions described what is usually called the cause of the event in question…. And the prediction describes what is usually called the effect (Popper, 1961, pp.59-60).

It is observed that through the process of investigating the problems of causations, science discovers underlying laws about the physical world and phenomena, their applicability and trend, especially as they apply to observing, controlling and predicting reality (Iheriohanma, 2002). Essentially, all science is knowledge; and not just mere knowledge because a bunch of facts do not constitute knowledge. In summary, the need to acquire knowledge serves two major purposes; the need to understand and the need to cope with the environment in which we live. We acquire knowledge in order to predict the future and what is going to happen. We predict in order to control the environment we live in, and this is directive because it tells us what to do. Knowing entails understanding. This leads to the aim of identifying unique and isolated event that is a member of a group of events through the formulation of general laws. The process of formulation of general laws indicates the identification of uniformities in the groups. There emerges the theory that makes the identified uniformities intelligible as it clarifies the processes involved in the interaction between prediction, control and identification of uniformities and formulation of general laws. These are the focal concerns of science and scientific inquiry.

SOCIAL AND PHYSICAL / NATURAL SCIENCES

The founding father of sociology, Auguste Comte, divided science into two types. The first is the concrete that deals with the definite objects in all their different aspects. This type deals with the regular and practical unknown, with the technology of subduing nature. It uses a 'nomothethic' or generalizing method as far as it seeks to discover law – like and general relationships and properties (Marshall, 1998). This type of science is known as the *Natural or Physical Sciences*, or better still, what the empiricists call *Science of Positivism* (Cotgrove, 1978; Giddens, 2006). These physical sciences deal mainly with matter and inanimate objects and they include physics, chemistry, mathematics, biology, astronomy, mathematics, geology, theoretical and practical medicine, etc.

The other type of science is what is generally known as the social sciences. It is generally associated with the study of society and human relationships. In the German scientific tradition, the social sciences apply the 'ideographic' or individualizing procedure because their interest is in the non-recurring events in reality and the particular or unique aspects of any phenomenon (Marshall, 1998). The social sciences concentrate mainly on the study of social phenomena (social, political and economic organizations; human behaviour, social institutions, social relations, social events, attitude, etc.). The social sciences include sociology, psychology, economics, political science, anthropology, philosophy, business studies, geography, demography and social statistics (Ruch & Zimbardo, 1971; Peil, 1977; Horton and Hunt, 1980). These social sciences, though study human beings, involve themselves in systematic methods of empirical investigation. They analyze data in empirical studies. They assess, use and formulate theories based on the evidence and logical arguments from their investigations. Conclusion and recommendations are made there - from. The two groupings – *natural and social sciences* - are called *empirical sciences.* This implies that the knowledge that comes from them must be based on observable phenomena and must be capable of being subjected to tests and investigations for validity by other investigators and researchers operating under the same conditions (Popper, 2002; Wikipedia, 2013).

Auguste Comte, who coined the word 'sociology' and the term 'positive philosophy' (Comte, 1986) argued that there exists a hierarchy of scientific subjects (Giddens, 2006). He posited that sociology was the 'queen' of all scientific subjects and therefore at the pinnacle of that hierarchical structure. His argument is that there is always the possibility of scientific knowledge about society. Human existence and welfare can well be advanced and improved upon through the generated scientific knowledge in such a way that society can be run rationally without religion and superstition posing any hindrance to societal progress. Durkheim (1970), in his study on *Suicide* indirectly made the same submission on positivist research.

PRINCIPLES / TENETS OF SOCIAL SCIENCES

Fundamentally, it is difficult to exclude any area of human endearvour in the search for the subject matter or tenets of the social sciences. Human beings are the initiators, pivots and organizers of scientific endeavours, so there is hardly any field of life that the social sciences do not venture into. However, it is expedient to be specific in looking at the principles of the social sciences, irrespective of the social, economic and political aspects of man and society that generally constitute the domain.

- In a concise form, the tenets of the social sciences, according to Iheriohanma (2002) and Giddens (2006) include:
- All forms of human behaviour – attitude, perception, feelings, etc.
- All forms of social life – group, organization, community, society, etc.
- All issues relating to individual and group

differences – particularly in the area of structure, dynamics, cohesion, conformity, etc.

- All concerns about social structure – the forms, organization, structure and interrelationships between people and groups in a society.
- All forms of social relations – social, political, economic, inter-group, inter-personal, etc.
- All forms of social interactions – the relationships between people, group (s) and the interactions that go on.
- All the social institutions – structural forms relating to how the society meets some or all the requirements basic to the maintenance of organized social life (the social pre-requisites and functional imperatives). The family, economy, education, polity and law, religion, etc. are examples.

THE CHARACTERISTICS OF SCIENCE

The definition of science as a systematic knowledge with definite method of investigation implies some characteristics. These characteristics define the identity or the principles of science and they are stated succinctly below.

Theoretical Science uses theories which are a body of knowledge that encompasses empirical laws regarding regulations existing in objects, events and nature; both observed and posited (The Encyclopedia Britanica, 1978). A theory is a set of ideas that are used to provide explanations to something. A theory is a set of confirmed hypotheses or worded speculations that form a deductive system. Hypotheses are conjectures, imaginative leap or assumptions that make scientific theory powerful tools in man's efforts to understand the regulations and workings of nature. The proof of their claims elevates them to the status of theories where they are used to summarize facts in a logical reasoning. Since hypothesis is a statement of presumed or alleged fact, it is worded in a way to permit or invite test, and made for that purpose. The use of theory guides analytical and comparative study of social and natural phenomena. Theory summarizes existing knowledge and provides explanation for observed events and relationships based on the explanatory principles that are embodied in it. Theoretical explanation broadens and deepens our understanding of objects, events and nature (Giddens, 2006). Since a theory is a set of ideas that are used to explain something, then a social theory is used to explain society or social phenomenon. Theories explain facts about something, its existence, its workings and any other thing that surrounds it. Theories are not separated from the facts they explain. This gives the reason why every scientific endeavour applies theories in its process of explicating issues. This explains the functions of theories in investigations and in research.

Objectivity Scientific investigation involves objective selection and judgment of what constitutes a significant fact. It does not allow habit or subjectivity to influence scientific experiment. However, every experiment or investigation depends on the perspective from which external reality is being approached. This is true of all sciences because what a biologist looks for is quite different from what a chemist is looking for. Impliedly, what we observe is related to some intension or purpose on our part (Cotgrove, 1978; Haralambos and Holborn, 2008). The issue is that we approach reality and investigation with a set of problems, perspectives, explanatory frameworks, etc. irrespective of how personal these may be.

Non – ethical In science, there is a definite rule of conduct. The question of morality is not seen as a serious preoccupation. Rather, science preoccupies itself with the analysis of facts based on available reason for such action. For instance, scientific inquiry is not bothered about the religious or moral conduct in the procurement of abortion. Its interest is in the rationality and scientific consequences of the action.

Verifiability This implies the verification of the outcome of scientific inquiry. It indicates that this outcome of research should be verified by any body any time, any day, any where.

Replicability An outstanding characteristic of science is that any outcome should be able to be repeated or replicated any where, any time, with the provision that the same conditions apply.

Empirical Science has the characteristics and objective of discovering facts through scientific observation, experimentation, logical reasoning, systematic investigation, experience and deductive conclusion. Therefore, science abhors naïve empiricism, a philosophical objection that knowledge is derived from the accumulation of observations.

Experimentation In science, there is the demand for constant and series of experiments to verify the veracity of scientific outcomes and claims. The sound practical reasons for constant clarification of an inquiry, its theoretical and conceptual perspectives boost the accumulation of knowledge and the practical applications in relation to time and need. The essence of sufficient experimentation is for proper verification of scientific outcomes and to resist their frequent and strong attempts at refutation (Reber, 1995).

Cumulative In science, facts build upon one another. This is the purpose and intent for constant revalidation of knowledge. Facts and ideas are re-assessed and re-validated in line with new realities. That science continues to build up facts is the bedrock of scientific development and human survival. There are lots of unraveled facts in the universe waiting to be investigated. Facts are not arrived at through mere conjecture but through analyzed

evidence (McGregor & Murnana, 2010). Through cumulative theories, facts and ideas, science attempts to provide answers and solutions to problems, whether social or natural. Through the processes of replicability, explicability, verifiability and constant experimentation, knowledge and facts are accumulated and solutions to problems are made. Every solution to a problem ignites another problem that also seeks solution. This implies advancement and development.

Predictive A benefit derivable from scientific investigation is the opportunity that science offers in predicting the future based on findings and facts available.

THE SOCIAL SCIENCES AS SCIENCE

The corroborative evidence supporting the scientific nature of the social sciences depends on the identification of the characteristics of science. The identification then provides the leeway on the argument that the social sciences exhibit these characteristics. Some practitioners and researchers working in related fields of the philosophy of science and the history of science have rather addressed the argument on equal measures. In the case of science, they have defended the rational progress in science as against the relativist critique while critically viewing the contributions historical case studies make to the discussion and development of social science theory. Marshall (1998) sees the contrast as a heuristic device in which the investigators are allowed to discover solutions to problems themselves. The contrast however, may result from the methodology adopted in producing scientific knowledge.

In a related issue, the controversy makes a critique of the method of investigation. The scientific method adopts the systematic collection of data rather than just casual observation and use of interviews to investigate the scientific life and behaviour (Peil, 1977; Iheriohanma, 2002; Giddens, 2006). It is however, clear that merely following the rules for the conduct of proper science does not vindicate the outcome of research or how scientific controversies are resolved in practice (Rex, 1980; Marshall, 1998; Haralambos and Holborn, 2008). A way that has been advocated for both science and social sciences is the organization of data into (a) *independent variables,* the factors that indicate the cause(s) of the observed behaviour or attitude, their values are not controlled by changes in values of other variables; (b) the *dependent variables,* these are the results and their being are controlled by changes in the value of the independent variables; and, (c) the *intervening variables,* the unintended factors that modify the actions of the independent variables on the dependent variables (Peil, 1978; Iheriohanma, 2002). Variables help to assess the causal connections or correlates in social life (Giddens, 2006).

Another argument about the scientific nature of the social sciences is that scientists develop hypotheses that explain the relationships between the independent and intervening variables in the production of results. The investigation in the social sciences creates confusion regarding the variability and unpredictability of human nature (a veritable subject matter of the social sciences); confusion of terminology, and bias resulting from the values and subjective minds of the social scientists (Haralambos & Holborn, 2008) The proponents however, forget that values and subjectivity have remained problematic in any scientific investigation, be it physical or social, since none is value – free.

Generalization rather than subjecting the investigation to individual cases in the social sciences has been problematic. There is interdependence in society and in human life. Conformity to general rules and applications make a case for the test. This gives rise to generalization about average or normal behaviour rather than concentration on individuals. Even in 'proper science', concentration on individual cases or items is always rare. There is always a search for normative conformity to a pattern. The scientific method of investigation consists of stating the problem(s), the question(s), collection of data to corroborate evidence and drawing conclusion from the evidence, irrespective of the surprises that may emanate. In the social sciences, the classificatory method makes a case for the distinction between the normal and pathological. The scientific demand is that the general concept should be explicit and the exact implications defined. Accordingly, Rex (1980), in agreement with Durkheim, contends that the true scientific conclusion about what is normal is to discover the average of each of the main features of the resolved specimens and to construct a type to which processes all these average feature. It is then that the average type will be defined for scientific purposes on the normal.

In assessing the scientific nature of the social sciences, one is inclined to conclude that the above characteristics apply to the social sciences (Rex, 1980; Iheriohanma, 2002; Giddens 2006). In social science explanations and inquiries, theories still remain powerful tools in man's efforts to understand the regulations of nature, deepening man's understanding and prediction of the future (Isiugo-Abanihe & Alonge, 2002) and in the welfare and development of humanity and society.

The positivists, championed by Auguste Comte, insist that the study of society should be confined to the collection of information about phenomena. These can be objectively observed and classified. The social scientists and particularly the sociologists should not preoccupy themselves with the internal motives, meanings, subjective feelings and emotions of individuals because these are mental states that exist in the person's consciousness. As a result, these mental states cannot be objectively observed

and measured. Durkheim rather sees those things that stand above man and society as *social facts*. The study of social facts, according to Durkheim, should be from a positivist perspective. *Social Facts* are first and foremost considered as *'things'*. The implication is that "the belief systems, customs and institutions of the society – the facts of the social world – should be considered as things in the same way as the objects and events of the natural world" (Haralambos & Holborn, 2008). These social facts such as the belief systems, though not directly measurably and observable, exist in the consciousness of the individual; they are well and above the individual, the individual did not volitionally choose them, but they exist out there, externally constraining, limiting and influencing the behaviour and options of the individual. If these social facts are treated as *things, as objects* that are objectively measurably, observable and investigated empirically from the scientific method, then it could be inferred that the social sciences are sciences.

All sciences develop hypotheses on what combination of independent and intervening variables will produce what results. The hypotheses are tested based on data on the relationships between the variables while contending with any other variable that may affect the results. Theories are developed explaining the workability of human life, social facts and nature as well as the prediction of the future.

Regarding the aims of science, the social sciences are not exempted or shy away from being classificatory, concerned with the search for laws and with the establishment of causal relations and consequences. The social sciences make classifications in the definition of their field of study. They identify their coverage and look out for the characteristics of things to be found. The social sciences build up verifiable laws that are generally and universally applicable, laws that are 'true' and describe a people or group of things. These laws are outcomes of empirical investigations that have been subjected to rigorous scientific experimentations and refinements. They are rigorously involved with knowledge building and solution of human and societal problems, the ultimate of all scientific endeavours. The social sciences concern themselves with synergies and causal effects of relationships rather than mere conjectures in things and nature. That is the 'why and how' they involve themselves with predictions and concerns about the future.

As a scientific endeavour with the aim of systematic knowledge building resulting from definite methods of investigation, the social science disciplines have the characteristics of science as identified. For instance, the social sciences build and use theories, they are objective in their research processes, they are mindful of imputing or insisting on morality rather than rationality in their rule of conduct and their laws are verifiable any time, any day, any where, given same or related circumstances. They are conversant with the scientific demand for constant and series of experimentations to verify the authenticity of scientific outcomes and claims. Essentially, the characteristics of science apply to the social sciences. The concept of objects of preoccupation, which have been noted are no longer compartmentalized, are no more seen as a separating or dividing factor between the social and 'pure' sciences.

However, the social sciences face some problems which emanate from their subject matter. These deal with the problems of variability, unpredictability and intractability of human nature and social phenomena; confusion of terminology; and, value judgment (Peil, 1978). Human beings and society are the subject matter of the social sciences. Humans are self aware beings and input meanings, sense and purpose to whatever they do. Social life cannot be described accurately unless the meanings and concepts that people use are clearly deciphered. It will be absurd to equate the social sciences with sciences. While the notion has always been that the social sciences deal with social phenomena and sciences deal with atoms, it should be noted that their areas of operations are however, no longer compartmentalized. They are supportive of each other. All social and scientific endeavours are initiated and facilitated by man. Man remains the primary beneficiary of the scientific result outcomes. All in all, and based on our arguments at the earlier stages, the social sciences have the characteristic features of science as enumerated here in.

It must be stated *inter alia*, that all that science aims at is to build knowledge about the natural world. Scientific ideas are not absolute and unchanging. Knowledge is at all times subjected to questions and revision as new ideas emerge with discovered evidence(s). The fact that scientific outcomes are tested, the knowledge arising from there is reliable. All sciences focus on natural and social world. The aims of science which include classificatory, formulation of general laws, establishment of causal relations and sequences, prediction and control are meant to explain the natural and social world. All sciences use testable ideas that are the results from reliable evidence(s). These are the forces underlying all scientific procedures.

COMMON TOOLS IN SOCIAL RESEARCH

Various techniques are used as common tools in the conduct of social science research. These tools, according to Giddens (2006), Haralambos and Holborn (2008), and Clough and Nutbrown (2011) are outlined below:

Definition of a Problem This deals with defining exactly the agitating problem(s) to be investigated. It conceptualizes the problem of study, the gap which the present investigation wishes to fill, arguments for or against an already existing work, etc.

Hypothesis This is a statement of proposition or conjecture that assumes some relationship between variables and which is to be tested to prove such relationship. The test and proof of such a hypothesis lends credence to the agitated problem of study.

Theory This has to do with the choice of relevant and appropriate theory that explains the variables and the underlying relationships between social phenomena. Theory guides the formulation and testing of hypothesis, prediction and possible conclusion from the experiment or survey. In some situations, it is appropriate to have a theoretical review of related theories, out of which one or two, depending on the need, are chosen as the theoretical framework for the study. In each case, the principles, tenets, the advantages and disadvantages of such theories are reviewed to unfold their relevance to the present study.

Variable A variable is a criterion established as a standard against which others are evaluated. In the physical sciences, a variable is an aspect of the characteristics of an entity or substance that are physically manipulated. Marshall (1998) gives examples with the heat or volume of a substance. In the social sciences however, it is used to refer to certain attributes that appear constant or fixed for each individual person or social entity. The variables are observed to be present at different levels and quantities across samples of social entities. Variables reflect social constructs such as age, intelligence, race, ability, social class, income, etc. A variable is a phenomenon in a social survey that tends to vary in quantity or quality over time. The manipulation of a variable affects or influences other variables (Haralambos & Holborn, 2008). Variables include: (a) the independent variable which is the variable whose values are, in principle, independent of the changes in the values of the other variables. A change in value of the independent variable leads to change(s) in the value (s) of the other variable(s) or phenomena, (b) the dependent variable is the one whose values vary as a change in value occurs with the manipulation or changes in the independent variable, (c) the intervening variable is the unintended and internal variable that is not directly assessable, the properties of which are interpreted from the systematic manipulations in the independent variable as it influences the dependent variable in the process of investigation.

Interview This involves a face-to-face interaction and discussion between the interviewer and the interviewee. Through this process of social interaction, questions are asked and information on the subject matter is elicited. This is a data – gathering technique which applies to both literate and non-literate population in a social survey.

Focus Group Discussion (FGD) This is a qualitative research technique that involves interviews and discussions with a group of people of almost same age, sex, literacy level, etc. of between six and twelve people in number for the purpose of eliciting information from the focus group. It involves interactions between the focus group, the moderator, a note-taker, and the use of a tape recorder. According to Isiugo-Abanihe and Alonge (2002), the focus group discussion combines some elements of the better-known qualitative methods (in-depth interview and participant observation). The discussion, under the guidance of the moderator, focuses on topics that are of importance to the investigator (Isiugo-Abanihe, 1995). Transcription of the recorded interview is done almost the same day the interview is made to avoid forgetfulness and mis-interpretation.

Key Informant Interview (KII) A key informant interview involves interview with influential, notable and knowledgeable people in the community or survey area regarding information that is vital to the investigator. It is a one-on-one affair and it is a qualitative research technique. It is observed that the key informants are also knowledgeable about the issue at stake and, to an extent, can give most relevant information on the subject under discussion.

Interview Guide This contains a list of points, items or topical areas to be covered by the moderator in course of the interview session and discussion. This covers areas such as education, age, family size, ethnicity, religion, occupation, income, social events and issues, etc.

Interview Schedule This is a list of relevant questions to be asked by the interviewer during the interview. The interview schedule is relevant for interviews, focus group discussions and key informant interviews.

Case Studies This is an in-depth observation or intensive study of a given social phenomenon. It can be longitudinal or latitudinal. The commonest variants are the ideographic and the nomothetic studies. According to Marshall (1998), *ideographic study* refers to the method that highlights the unique elements of an individual phenomenon dealing with the individual's history and biography. It entails a life history approach that provides intensive account of a life, information of an individual gathered usually through unstructured interviewing, analysis of personal documents such as letters, photographs, diaries and an examination of autobiographies and biographies. The *nomothetic approach,* on the other hand, seeks to provide more general law-like statements about social life, usually by adopting and emulating the logic and methodology of the natural sciences rather than the use of individualizing approaches (see Panel Study in Marshall, 1998, pp. 475).

Questionnaire This is a booklet or a device which often times contains some open-ended, close-ended and pre-coded questions. It is administered to people for the purpose of supplying desired information to the researcher. The questionnaire could be mailed to the people or the people are guided to fill in their answers or responses as requested by the investigator. The mailed questionnaire is preferred with a literate population as a data – gathering device.

Sampling This involves the selection of a representative but reasonable proportion of the total population being studied. In social survey, it is difficult to sample the entire population like in census. What is normally done is the choice of a relative proportion with significant representative characteristics of the larger population. Care is taken not to introduce bias and errors in the selection. There are types of sampling which include: the simple random sampling, systematic sampling, quota sampling, probability and non-probability sampling, stratified random sampling, two-stage or multi-stage sampling, snowballing, non – representative and or cross – sectional, etc. Reference is made to Moser and Kalton (1979) and Marshall (1998) for more details and explanations.

Observation This involves systematic watching (observation) of a target social unit, group, etc., with a view to obtaining information about it. There are two major kinds of observation, viz: The participant observation and the non-participant observation. The *Participant Observation* refers to a major research technique that offers a close and intimate familiarity with the observed group through an intensive participatory involvement with people in their natural and cultural environment. This method not only offers insight into the life and activities of the observed social group, through active participation but demands a sensitive care about a methodological problem of balancing adequate subjectivity with adequate objectivity (Marshall, 1998). Participant observation aims at entering the subjective world of the studied with the intention of seeing this world from their point of view. Care is always taken to conceal the intentions of the participant observer. The *Non-Participant Observation* involves a research strategy where a researcher watches his subjects or target – studied group - without taking active part in the situation under scrutiny. The researcher's watch is with the knowledge of the group he is studying. This method is seen to distort facts as the observed would behave differently knowing fully well that they are being observed.

Analysis This involves a critical examination of the observed facts, the classification of the normal specimen or pathological cases, the differentiation of the average type with the "ideal" or "pure" types employed and with a view to arriving at a conclusive logical relation of one thing to another by abstracting from the main features. Drawing of inferences and deductions through interpretation of data allow for necessary ingredients of a complete causal explanation that leads to universal statements (laws) and or singular statements (initial conditions or causal factors or events). In this era of technology and development, the analyses are made possible with the aid of technological instruments, computers, soft wares, internet facilities, etc.

Information Dissemination Knowledge is cumulative. Social research is meaningless if it is not for consumption and human development. The results of researches and investigations are used for the advancement of knowledge and development policy formulation. These are feasible with information dissemination.

RESEARCH DESIGN AND COMPONENTS

A research design involves a strategic plan to be adhered to in a research project. It sets out the broad outline and key features to be adopted in the process of investigation. The design addresses the method(s) of data collection and analysis to be adopted, nature and use of research results (theoretical or policy-oriented), sources and availability of human and material resources for the investigation, choice of population and its relative representative size, time frame for the study and techniques and tools to be used in data collection and analyses.

According to Giddens (2006), the components of a research design are as follows. However, there is nothing sacred about the order of arrangement.

Title of Research This is formulated around a problem to be investigated. The phrasing of the title is done in a precise form in such a way that ambiguity is avoided.

Background Introduction This succinctly gives a background to what is to be investigated. It clearly defines the research problem and contains elements such as the statement of problem, the gaps which the research seeks to fill, research questions, research objectives and purpose, relevance or significance of the study, scope of research and limitations of the study. It is advisable to state both the general and specific objectives of the study. The significance can be done in three parts such as the theoretical, methodological and the practical significance. The scope can also identify the thematic and geographical scope which the research wishes to cover. While stating the challenges and limitations, it is advisable to indicate how such challenges can be overcome.

Review of Past Literature This involves a review of past work and related documents and literature to the topic and problem(s) under investigation. The review may be done generally or thematically, empirically and theoretically.

Theoretical Review and Framework This clearly reviews existing theories related to the research problem under investigation. A choice is made out of these reviewed theories or another one that may be appropriate to explain succinctly the issues under investigation. The theory for theoretical framework must be capable of explaining and analyzing the research problem clearly.

Methodology This refers to the choice, definition and selection of sample, sampling techniques, sampling frame, operationalization of concepts as they are used in the work; technique(s) for data collection (quantitative and qualitative) and analysis; identification of variables relating to the independent, dependent and intervening variables (there is need to identify the controlling variable); and

problems and challenges encountered in the process of the research, and how they were able to be tackled.

Organization of Data This deals with the presentation and interpretation of data. It involves collation, editing, cleaning, and tabulation of data; testing and validation of hypotheses; and, the presentation of data as they are elicited from the study.

Discussion of Findings This section deals with analytical discussions in relation to the data and information elicited from the study. The discussion concentrates on the findings and comparative analysis of data and expectations; and, deductive inferences. It corroborates or rejects earlier positions of literature reviewed, discusses how it has been able to fill the gap which the present research sets out to fill and the contributions it makes to knowledge and human development.

Summary, Conclusion and Recommendations This consists of a short summary of the whole work. It highlights the major findings, implications in the areas of existing situation and further research, policy formulations and implementation and theoretical implications. The conclusion is drawn from the findings of the study and this forms the theme of the policy recommendations and implications. Recommendations are often times made based on the findings, projections and predictions from the findings of the study.

Bibliography and References This contains a list of all the books and referred materials consulted in course of the research project. Bibliography refers to both consulted and related works and documents to the project work while references refer to the consulted works made in course of the present investigation. It is appropriate to list the references or consulted literature in alphabetical order, starting with the surnames of authors, then the initial(s) or full names depending on format and requirements, date of publication, etc. In some instances, the American Psychological Association (APA), the Chicago School, etc. formats are required and authors and researchers are advised to strictly adhere to the format. This makes the work academic and scholastic. It is advisable to arrange the books and literature in divisions of texts, journals, periodicals, dailies, etc. The arrangement depends on the specific formats and requirements of the examining body, institutions, publishers, etc.

Appendices This includes attachments and enclosures and which are put at the end of the project work. They include copies of questionnaires, interview schedule and guides, tables, photographs, maps, etc. In some publications, tables are inserted as they appear within the pages of the work.

STAGES IN SOCIAL RESEARCH

This paper identifies the steps or processes of research in the social sciences. Again, there is nothing sacrosanct about the order of arrangement or insistence that all the stages or steps must be strictly followed. This section of the paper is enriched from the works of Backstrom and Hursh-Cesar (1981), Isiugo-Abanihe and Alonge (2002), Giddens (2006), Berger (2010) and Clough and Nutbrown (2011). Accordingly, it is observed that the first step of a survey project largely determines the nature of the task. It is cautioned that if subsequent procedures are not taken into account in the early stages, serious difficulties may arise. The stages range from the conception of a theme through the exploration of the agitating problem(s) of study, the gathering of data to the production of report and application of findings. The stages or steps are extensions of the components of research design explained in the preceding subsection. These steps are identified and presented here in a summary form.

Defining Stage or Problem This decides exactly the construction of the agitating problem to be investigated. It explores, in perspective, the gap in literature and what the present research sets out to do to fill the existing gap or evaluate the position of an existing work, etc. The definition stage battles the mental construct and drafting of the challenges.

Background Stage This states, in a concise form, the background to the study; what is expected in the present study. The problem areas, the relevant questions to be investigated, the objectives, significance of study, etc. are clearly stated in this background.

Review of Relevant Literature This is the stage in which almost all the necessary literature related to the present work are reviewed. The researcher familiarizes himself with the existing research and literature on the topic.

Hypothesizing Stage This stage specifies the correlate and relationships between the variables to be tested. The researcher makes explicit the variables to be tested in the research.

Designing Stage This establishes the study principles and procedures, the research methods to be adopted such as the survey, observation, documentary and experiments and choice of existing materials and resources.

Organizing Stage This articulates the sources for staff, funds and materials, and assistance to prosecute the survey project.

Sampling Stage This involves the choice of sample population to be reached through questionnaire, interview, etc. to elicit information. It sets the background to the field work.

Drafting Stage This involves the framing of questions to be used in the field survey.

Construction Stage This deals with the shaping of the format of the questionnaire, interview guide, questions for the focus group discussion (FGD), in-depth interview (IDI), key informant interview (KII), etc.

Training Stage This is when the fieldworkers and interviewers are trained on good data gathering techniques.

Briefing Stage This stage is used to demonstrate to the fieldworkers how to use the questionnaires and interview guides. It demonstrates to the fieldworkers on the conduct and use of other data gathering instruments such as the FGD, IDI, KII, etc. This stage serves as a rehearsal or demonstration stage for the whole exercise. Fieldworkers are given ample opportunity to express themselves and ask questions on areas that are not clear to them.

Pre-testing Stage This is the stage when the questionnaires and other study methods such as the data collection techniques are pre-tested to discover if they are appropriate and adequate to elicit the desired data. If there are areas of difficulties, projections, un-intended or unforeseen, this stage of pre-testing helps to clarify issues.

Interviewing Stage This is the field work proper. It involves the administration of questionnaires and conduct of interviews, FGD, etc. to secure or elicit data from the respondents. Essentially, it is the stage for collection of data, recording of information, etc.

Cleaning Stage This involves ensuring that all the data collected are useable. Questionnaires that do not have complete or enough information are rejected.

Coding Stage This is when the researcher assigns numerical values, in a quantitative research, to responses for data entry.

Programming Stage This is the stage in which the computer and any other programming instrument(s) are instructed on how data are to be manipulated.

Organization and Compiling Stage This is when data are organized into tables; the classifications and categorizations are done at this stage.

Testing Stage This is the stage where hypotheses are tested. This applies measures of significance as it unveils the relationships between variables.

Analyzing Stage This is done to relate responses and information on two or more variables. Analysis is done in relation to the apparent information and evidence available. The analysis is always constructive, analytical, explorative, etc.

Reporting Stage This presents the findings of the study in an analytical way. The researcher attempts to highlight, with relevant evidence(s) that the analysis based on data has provided answers to the research problems, questions and the objectives. The result(s) may be positive or negative but the essential fact is that the findings have enabled the researcher to present the connections between the results of his analysis, existing theory or theories and the present research work. This discussion and interpretation stage of the findings remains the most difficult task that would determine the quality of the study. Conclusion is drawn, providing answers to the questions that were not clear at the introductory stage of the research. While the conclusion gives a broad overview of the entire investigation, it must be informative enough to indicate whether the gap established earlier is filled or the results confirm totally or partially the originally stated expectations. The recommendations to be made must be connected to the research problems, questions and objectives. Recommendations always include practical suggestions on the implementations of the result findings. The recommendations must be clear enough to ward off ambiguity. Suggestions on further research are also made at this stage.

Application and Use Stage This involves the application and implementation of the recommendations made in the report. Every research sets out to solve one problem or the other. The essence of research is for human development through solution of problem.

CONCLUSION

This paper has demonstrated that, though the social sciences have a special and unpredictable object as their main subject of preoccupation, they still insist on pure and rigorous scientific methods of investigation. They are characterized by the principles and tenets of science. It must be acknowledged that the social sciences are bedeviled with specific problems that emanate from their subject matter, such as variability, unpredictability and intractability of human nature and social phenomena, value judgment, terminology, etc., these are not the specific domains of the social sciences alone. These problems, in one way or the other, confront the pure sciences as well. In their methodology, the social sciences delve into the use of quantitative as well as qualitative data in investigations. These and more make it imperative to accept the scientific nature of the social sciences.

ACKNOWLEDGEMENTS

I sincerely acknowledge Professor Isiugo-Abanihe, Uche of the Department of Sociology, University of Ibadan, Ibadan, Oyo State, Nigeria, for his insistence on the scientific nature of sociological research and investigation. I also acknowledge all other authors whose works are referred to in this paper.

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