Sydenham College of Commerce & Economics

*** Dr. Sunil S. Shete**

* Associate Professor

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Abstract

This paper review Popper's epistemology stance with new perspective, it relooks what is strong theory, what is considered as science from popper's perspective, how hypothesis testing can have stronger verifiability, it describes what is strong theory from popper's perspective further its argue what are the possible logical fallacy one can commit in research, the main aim of this paper is how business research can draw from Karl popper's concept to make solid business theories.

Introduction

Since the time of David Hume, philosophy has struggled with the problem of drawing inferences from a finite set of instances. Making generalizations is the work of inductive method. Science is concerned with 'truth', which means providing proven explanations of the way reality works based on the discovery of 'facts'. In other words, a scientist will regard her/his hypothesis proven by citing evidences that confirm it. The problem is that inferences or hypotheses may differ even though they base themselves on commonly observed facts (evidences). This is known as the problem of induction or the problem of the logic of verification.

To explain further, the individual may perceive and interpret the world according to the particular practical interest he or she may have. Ways of 'seeing' the world are not simply a result of the physical act of 'looking at' the world. The selective perception of the world also occurs in response to an individual's attempt to understand and explain the world. The 'facts' of perception are meaningful as facts only because they have been identified and understood in terms of an explanatory model of the world. For many people another feature that marks science off from other type of explanation is the methods it uses. Controlled laboratory experimentation is perhaps the one method most would associate with science, though for some sciences, such as astronomy, direct experimentation with the raw data- the stars- is clearly technically impossible. Few challenged the scientific status of astronomy because of its practical problem.

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Logical Positivism:

Criterion of meaning:

Ayer (1946) explains that the principle of verifiability may be used as a criterion to determine whether a statement is meaningful. To be meaningful, a statement must be either analytic (i.e. a tautology) or capable of being verified.

According to Ayer, analytic statements are tautologies. A tautology is a statement that is necessarily true, true by definition, and true under any conditions. A tautology is a repetition of the meaning of a statement, using different words or symbols. According to Ayer, the statements of logic and mathematics are tautologies. Tautologies are true by definition, and thus their validity does not depend on empirical testing.

Synthetic statements, or empirical propositions, assert or deny something about the real world. The validity of synthetic statements is not established merely by the definition of the words or symbols they contain. According to Ayer, if a statement expresses an empirical proposition, then the validity of the proposition is established by its empirical verifiability.

Propositions are statements that have conditions under which they can be verified. By the verification principle, meaningful statements have conditions under which their validity can be affirmed or denied.

Statements that are not meaningful cannot be expressed as propositions. Every verifiable proposition is meaningful, although it may be either true or false. Every proposition asserts or denies something, and thus is either true or false.

Verification

Confirmation or Verification is the philosophical theory proposed by the logical positivists of the Vienna circle. Logical positivists combine empiricism and rationalism i.e. the idea that observational evidence is essential for knowledge of the world with incorporating mathematical and logico-linguistic constructs. In simple terms, this theory states that the propositions, which cannot be empirically verified, are meaningless.

'Verificationists' argue that one can use empirical evidence to provide a varying degree of positive support for the truth of scientific theories. For example, the larger the number of instances, which are in accordance with the predictions that can be deduced from a theory or the more, varied the circumstances in which these instances occur, the more strongly confirmed as to their relative degrees of empirical support. And many 'verificationists' have tried to formalize these relationships of evidential support for a theory, and to construct 'logic of verification'

Positivism | Rationalism | Verification/Verifiability | Induction	Critical rationalism | Falsifiability | Hypothetico deductive

(Diagram for purpose of simplification)

Social scientists begin constructing a theory through the inductive method by observing aspects of social life, and then seeking to discover patterns that may point to more or less universal principles.

Verificationists start with observation in order to come to conclusion. In order to find out the relationship between wages and pieces of production at the end of the day by home based worker. We may simply arrange relevant information and data. Then one can look for a pattern that best represented. Different patterns can be seen by different researchers between wages and piece of production. One can see that wage increases with the increase in the amount of piece produced. Whereas, one can see that wage not only depends on the basis of production but also on the time that has been spent on producing the no. of pieces.

What is science & Non-science?

This leads us to believe that scientific knowledge can never be "proven" knowledge. Recognizing the problem involved in scientific enquiry, Karl Popper holds the view that the scientist should not devote his attention to proving the correctness of his position but rather must try to specify the conditions under which she would be willing to give up or change her position.

At the heart of the verification versus falsification debate lays the problem, in Karl Popper's own word, how "to distinguish between science and pseudo science" (Popper, 1963). According to him, though science is distinguished from pseudoscience by its empirical method, which is essentially inductive, the real problem relates to one of distinguishing between a genuinely empirical method and a non-empirical method or even a pseudo-empirical method. Popper gives example of astrology which collects stupendous amount of empirical evidence based on observation (on horoscopes and on biographies) but does not come up to scientific standards.

Theories such as those of Karl Marx, Freud and Alfred Adler can be credited for their great explanatory power. They appeared to be capable of explaining almost everything within their own field. However, irrespective of their meaningfulness or significance in terms of adding to our knowledge say in terms of human history or human behaviour, their theories also appeared to be incompatible with certain results of observation. Example can be given of Marxist theory of history, which predicted coming revolution in advanced capitalist countries. The actual turn of history proved otherwise.

Verification & Falsification with respect to Inductive & Deductive controversy:

In the following pages I would try to explain the nature and substance of the debate that centers round the two logics of inquiry – verification and falsification.

Karl popper moved from verification to falsification- through Induction & Deduction controversy & Demarcation principle-i.e. what is science & what is non –science?

Logic of Procedure

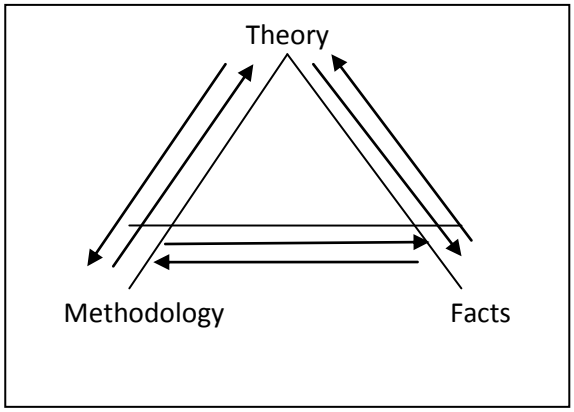
Logic of procedure, this is divided in two parts i.e. Deduction and Induction. This logic of procedure is also known as Methodology.

a) Deduction is the generalized body of knowledge, it is the knowledge based on ideas and the ideas deduced from existing body of knowledge. This methodology is also known as hypothetico-deductive.

b) Induction is the methodology in which hypothesis is developed in the field as one goes on in the field.

Methods/Techniques/Tools- issues of method concern the technique for collecting data- i.e. which specific techniques do one uses to get at evidence, which will support the propositions.

All these four aspects of understanding are closely tied to one another. i.e. neither methodologies nor methods are constructed or chosen in isolation from ontological and epistemological positions.



(Diagram for the purpose of simplification)

So the way one gets the knowledge and the techniques one uses to collect evidence are directly related to ones image of reality and the way one think. There are **three main elements** in the traditional model of **science**. They are **theory, operationalization and observation.**

Theory – According to the traditional model of science, the scientists begins with an interest in some aspect of the real world.

Operationalization – It refers simply to the specification of the steps, procedures, or operations that one will go through in actually measuring and identifying the variables one wants to observe.

Observation – the final step in the traditional model of science involves actual observation, looking at the world and making measurement of what is seen. Sometimes this step involves conducting experiments, sometimes interviewing people. Sometimes the observations are structures around the testing of specific hypotheses; sometimes the inquiry is less structured observation in social science can take many forms other than simply looking at events with one's eyes.

Inductive Controversy:

Using inductive method, researcher ends up with a tentative conclusion about the pattern of the relationship between two variables. The conclusion is tentative because the observations one has made cannot be taken as a test of the pattern-those observations are the source of the pattern's one has created.

Induction begins from the particular observations from which empirical generalizations are made. These generalizations then from the basis for theory building. So called analytic induction is common in qualitative studies within sociology. This method requires that every case examined in a piece of research substantiates a 'hypothesis'. The researcher formulates a general hypothesis from observation of initial cases; investigate subsequent cases in the search for a negative instance, and reformulate the hypothesis to cope with those confusing cases that are encountered.

Falsification

According to Karl Popper (1963), the scientific status of a theory is its falsifiability, or refutability, or testability. His formulation of falsification, to quote directly from "Conjectures and Refutations", is as follows:

1) It is easy to obtain confirmations, or verifications, for nearly every theory — if we look for confirmations.
2) Confirmations should count only if they are the result of risky predictions; that is to say, if, unenlightened by the theory in question, we should have expected an event which was incompatible with the theory — an event which would have refuted the theory.
3) Every "good" scientific theory is a prohibition: it forbids certain things to happen. The more a theory forbids, the better it is.
4) A theory, which is not refutable by any conceivable event is non-scientific. Irrefutability is not a virtue of a theory (as people often think) but a vice.
5) Every genuine test of a theory is an attempt to falsify it, or to refute it. Testability is falsifiability; but there are degrees of testability: some theories are more testable, more exposed to refutation, than others; they take, as it were, greater risks.
6) Confirming evidence should not count except when it is the result of a genuine test of the theory; and this means that it can be presented as a serious but unsuccessful attempt to falsify the theory. (I now speak in such cases of "corroborating evidence.")
7) Some genuinely testable theories, when found to be false, are still upheld by their admirers — for example by introducing ad hoc some auxiliary assumption, or by reinterpreting the theory ad hoc in such a way that it escapes refutation. Such a procedure is always possible, but it rescues the theory from refutation only at the price of destroying, or at least lowering, its scientific status.

Thus for Popper, there is no logic of confirmation, only of falsification. Observations should be used solely to show that purative theories are false. If one deduce from a theory a prediction that turns out to be incorrect. Deduction is the use of logical rules to arrive at a set of premises from which certain conclusions must follow. Deduction begins with 'theory', moves to hypothesis via prediction and observations. This approach to testing and theory is often referred to as the hypothetico-deductive method, and since it emphasizes hypothesis prediction, and testing, is sometimes held to be the method par excellence of science.

Unlike the verificationist, the falsificationist restricts the concept of valid argument to that of deductive argument and insists that the only kind of deductive relationship that can be established between theory and observation is that in which the falsity of a theory follows from the falsity of the predictions derived from it. Thus, in evaluating scientific theories by means of observations, one can only use the latter to falsify, and not to confirm, the former. The falsificationist position is often associated with a more general view of the process of theory formulation and evaluation, the 'hypothetico-deductive method', particularly in the work of Karl Popper.

Popper argues that one does not first make observations, arrive at a theory by induction from these, and then seek to confirm the theory by further observations. Instead, the scientist begins by formulating a theory, or hypothesis, and proceeds to test the hypothesis by making potentially falsifying observations. If the theory is falsified it must be abandoned, and another one formulated to replace it. This formulation of hypothesis is purely a matter of conjecture: there is no 'logic of discovery' by which we can arrive at theories from observations. Indeed, Popper claims that it makes no sense simply to 'observe', without reference to any hypothesis, which is being tested. For without such a theory, one does not know what to look for.

Thus, the hypothetico- deductive method provides an account both of the way in which the scientist is to arrive at theories, and of the way these hypothesis are to be evaluated by empirical evidence.

However, it is important to realize that there is no inconsistency in accepting only one part of this account, whilst rejecting the other. Popper points out that the positivistic dogma of meaning- is equivalent to the requirement that all the statements of empirical science must be capable of being fully decided with respect to their truth and falsity; all the statements must be 'conclusively decidable'. This means that their form must be such that to verify them and to falsify them must both be logically possible.

Thus Schlick says: a genuine statements must be capable of conclusive verification, and Waismann says: if there is no possible way to determine whether a statement is true then that statement has no meaning whatsoever. **According to Popper there is no such thing as induction. According to him inferences to theories, from singular statement which are 'verified by experience', is logically unacceptable.**

Although **Popper was primarily concerned with the specific problem of demarcation**, he argued that his solutions could be extended to the wider philosophical problems of epistemology, which 'should be identified with the theory of scientific method'. Popper later testified, the problem of the growth of knowledge was 'the central problem of epistemology', and this could best be studied 'by studying the growth of scientific knowledge'. His specific goal was, 'to establish the rules, or to establish the norms, by which the scientist is guided when he is engaged in research or in discovery.

Popper's epistemology aimed to dispense with induction, subjectivism and the quest for certainty, while remaining empirical. The methodology was to be normative in that it sets a series of standards, not only for the appraisal of already formulated theories, but also for the construction of such theories. Central among these was the requirement that scientific statements be constructed in such a way that they were falsifiable. Falsifiability derives its methodological virtue from the logical principle of modus tollens and provides the core of Popper's epistemology and methodology. Whereas it is impossible to verify universal statements based on past singular statements, the deductive inference of modus tollens allows universal statements to be refuted by the acceptance of a basic or singular statement. There is therefore an essential asymmetry between verifiability and falsifiability. Popper's epistemology is based upon a distinction between 'analytic' statement, like the rules of logic that are true by definition and independent of matters of fact, and 'synthetic' statements whose truths are grounded in fact. Once a statement has been put into falsifiable form, it can only be rejected if its empirical or 'synthetic' claims are shown to be false.

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