

The positive research paradigm



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A paradigm can be defined as a set of shared assumptions about some aspect of the world. A research paradigm directs our approach towards research by defining the ontology and epistemology of our research. That is, a paradigm denotes its members shared premise regarding the nature of reality, the purpose of research and the form of knowledge it provides.

(OATES, 2007: 282; LEE, 2004: 5)

Lee (2004: 5-6) notes that research paradigms can be separated by their various ontologies and epistemologies. A paradigm's ontology encapsulates the researcher's view of what the real world is. An ontology flows to one or more epistemology. Epistemology is the over-arching process by which a school of thought performs its logical and empirical work. Epistemologies are usually labeled to be either quantitative or qualitative. Again, and epistemology is divided into several lower levels of methodology which is he more specific manner in which research is conducted. The devices defined in each methodology are called methods.

The positivistic research paradigm, or scientific method, is an approach towards research founded on the premise that our world is defined by a set of regular laws or patterns, and that we can investigate these laws objectively (OATES, 2007: 283). Lee (2004: 8) defines the positivism paradigm as one in which theory is typically provided as a set of related variables express by some form of formal logic, proven empirically to be significant.

Positivism is term used to characterize a specific research position in which scientific theory is grounded on objective empirical observation. Positivism

offers predictions based on the knowledge of laws that connect specific outcomes with specific initial conditions. (ROMM, 1991: 1).

2. Comte and Popper on positivism

The positivistic school of thought can be found in early work of such as Bacon, Galileo and Newton (OATES, 1992: 283). Auguste Comte and Karl Popper contributed significantly towards systematizing, clarifying and formalizing the arguments posed by earlier authors (ROMM, 1991: 1; LEE, 1992: 8).

Comte was born in 1798, just after the French revolution which characterized a period of social and political revolt against aristocratic rule in Europe. At this time positivistic philosophy has already filtered down to the physical sciences but it was yet to reach the social sciences. Comte became concerned with finding theoretical and practical solutions to the social anarchy of the period. He argued that the social research will only be able to serve as moral compass if it was to become a science. (ROMM, 1992: 10-11)

Popper, born in 1902, grew up in a socialist pre-Viennese society which was characterized by doctrinistic views as opposed to critical thinking. Popper was intrigued by Einstein's approach to theorizing. Einstein regarded his own theory as plausible only if it failed critical tests. Popper became convinced that the only way to build strong theory was to define critical test that could refute the theory but never verify it. (ROMM, 1992: 28-29)

ROMM (1992: 9-97) defines positivism with reference to the original writings of Comte (1975) and Popper (1992). He discusses this philosophy on the

grounds of its definition of knowledge, the logic that governs its investigation, the methods used in investigation and the practical utility of knowledge:

2. 1. The definition of knowledge.

Comte criticized theological and metaphysical view of the world. According to the theological view all abnormalities in the universe is the direct and conscious intervention of a supernatural agent, while the metaphysical view describes all phenomena as the reaction of some abstract forces, real entity or personified abstraction being invoked. Comte regarded this as untrue and incompatible with science. Comte defined phenomena as being governed by set natural laws which, if known, can be used to predict the outcomes.

These natural laws state under which circumstance we can expect to encounter a certain outcome. We can learn these laws by analyzing the circumstances that produce an outcome and drawing inference to its succession. Only by asking questions about these natural laws can we create knowledge. Asking questions about first-and-final truths is futile, because this is beyond the reach of human comprehension.

Popper agrees with Comte that a natural law is an unvarying regularity that defines the outcome that flows from a certain set of circumstances.

Knowledge is added by uncovering theses laws operating in the respective fields of enquiry. According to Popper, scientist should not be sidetracked by the essentialist meaning of things (first-and-final truths) but rather in observing occurrences in the world in order to find true theories and descriptions of the world. Popper also adds that even the formulation and

falsification of untrue theories advances knowledge, such that by discovering mistakes we better approximate truths.

2. 2. Logic that governs its investigation.

Comte argues that observed facts are the only basis for speculation. We should observe and reason about facts to form knowledge, rather than sterile empiricism. Sound theorizing should guide our observations; science therefore is a cycle of theorizing, observing and building theories. The process of building knowledge starts by deducing or inducing a hypothesis from general theory or specialized theory respectively.

Induction is the logical formation of generalized theory from specialized consequences. For example, every life form we know of depends on liquid water to exist; all life depends on liquid water to exist. Deduction is the logical formation of specialized consequences from generalized theory. A popular example, all men are mortal; Socrates is a man; therefore, Socrates is mortal.

Comte (1975) describes a hypothesis as the 'provisional supposition, altogether conjectural in the first instance with regards to some of the notions which are the object of enquiry'. Simply put, a hypothesis states the anticipated result for undertaking a scientific enquiry. A hypothesis is valid if it is able to accurately predict what it is proposing given the initial set of circumstances.

Science therefore is the activity of observing and disclosing the new observable consequences that confirms or invalidates our primitive

supposition. We constantly incorporate new knowledge by making new observations or more profound meditations that either refute or confirm our hypothesis. Through repeated scientific endeavors knowledge comes to approximate reality.

Popper's definition of a hypothesis is similar to that of Comte, but he differs in his approach of validation a hypothesis. Popper criticize Comte arguing that our experience can only falsify our theories not validate them. He postulates that a statement can only be verified as not being untrue as opposed to being true. He argues that theories can never be validated, but only corroborated. A theory is corroborated if we are, based on experience to date, unable to falsify a theory. The strength of a hypothesis lies in its openness to be tested on observations made. Popper describes science then to be the formulation of testable theories which cannot be falsified through experience.

Poppers work also introduces an additional idea of probability statements which is hypothesis with some form of probability of outcome attached. Logically these statements can never be proven to be untrue. Popper argues that this hypothesis can be corroborated if they reasonably present all possible outcomes and if they cannot be falsified given reasonable and fair samples.

Unlike Comte, Popper does not follow the notion that theories can be induced from specialized facts. With reference to the work of David Hume (1748), Popper argues that induction cannot be justified rationally. We should not go from fact to theory, but rather deduce our hypothesis into lower level

statements which are individually testable hypothesis, which when falsified proving our original hypothesis wrong.

Popper argues that we should ensure purity and objectivity in our research by subjecting our decision (on whether our most basic lower level statements should be accepted) to peer criticism. Through criticism science will become unbiased and detached from individuals.

2. 3. The methods used in investigation.

Compete argues that we should test our hypothesis by observing how they hold in reality. Direct observation is when we look at phenomena before our eyes. As example, in astronomy we observed that planets are elliptical with flat ends on both sides. Observation by experiments is when we observe how phenomena react to artificially modified circumstance. As example, in physics we experiment with gravity by having different particles fall to the ground. Comparison is when we observe a series of analogous cases in which the phenomena is more and more simplified. As example, imagine the comparison of the same chemical fluid under different combinations of pressure and temperature.

Popper also distinguishes between experiments and observations as the two main positivistic methods of research. He does however disagree that comparison is a methods on its own, but argues that it is inherent to the other two methods. In an experiment, as example, a researcher compares the artificially induced results with the results under normal conditions.

Both Popper and Comte both (referencing Francis Bacon) argue that empirical methods are superior as they provide objectivity to researchers that untimely removes bias from the science. They do however mention that observation should take place in all five senses, and though it might be possible to objectively measure an observed distance, it might be less possible to objectively measure smell. Qualifying these abstract observations should be done in a way that is unambiguous. For example, the distinct rotten-egg smell of H₂S is widely cited in modern scientific literature.

2. 4. Practical utility of knowledge.

Comte theorized that once we know a certain outcome will always occur given conditions presented we are able to produce the outcomes we want. Theories formed for truly scientific purposes will result in knowledge to be acquired, and eventually lead to practical uses. If science is able to furnish the theoretical basis for practical action, Comte hoped, we will be able to direct social outcomes. We are able to use the knowledge of the laws that govern society to correct the negative externalities in the world.

Popper argues that knowledge allow us to predict on the basis of engineering the initial conditions. With the knowledge that science provide we can plan to make their society a better and more reasonable one. We should use piece-tinkering (as termed by Popper for policy that is aimed at singular results) to mitigate unavoidable results of change rather than striving towards ideal.

3. Discussion of positivism

Ramm (1991: 55) defines positivism as the belief in 'logico-deductive theory as the idealized conception of scientific theory.' Many researchers do accept the principles of the positivistic approach without explicitly noting positivism as their ontology. Positivistic research tries to find cause and effect relationships between dependent and independent variables in order to make predictions about our reality.

According to the positivistic paradigm science should seek to find all the regular laws or patterns in our universe. These laws and patterns in our world exist independently of any individual cognition. We can carry out experiments or observe reality to determine cause and effect relationships and test hypotheses regarding these relationships. Aim of science is to explain the variation in the dependent variable with reference to the variation in the independent variable. (Ramm, 1992: 57; Lee, 2004: 8; Oates, 2007: 284)

Our hypotheses can either be refuted by empirical investigation or corroborated. Some hypothesis will seem to be true for all observations made, and after reasonable peer review we can accept them to be true. If something is found to be false just once, it is false. In the positivistic ontology theories and explanations should be seen as the best knowledge that approximates reality at the current time. (Ramm, 1992: 52; Oates, 2007: 285)

Modern positivism is seen as the cycle between induction and deduction (Ramm, 1992: 61).

o Derive hypothesis from more general statements

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- o Test these hypothesis through observation

- o Generate empirical generalizations

- o Induce theoretical principles which should again be tested.

Our observations should be tested empirically. Ramm (1992: 60) notes that data collected should not be treated as formless mass; neither should theoretical categories be imposed on the data a priori. Theoretical notions become grounded in empirical observation, and data is offered theoretical treatment. Oates (2007: 288) refers to this in terms of internal validity external validity. The data generated should be designed to provide the necessary insight into the research topic under observation as well as be applicable in a more general context.

According to Oates (2007: 285) the techniques that lie at the center of positivistic research are:

- Reductionism: breaking complex things into smaller things that are more easy to be studies

- Repeatability: researcher don't rely on the results of just one experiment, they repeat the experiments many times to be sure that their first set of results was not just a fluke

- Refutation: If other researchers can't repeat an experiment and get the same results as the original researchers they refute they hypothesis. The more a hypothesis can stand up to test designed to refute it, the stronger it is

Oates (2007: 33) lists the following possible research strategies: survey, design and creation, experiment, case study, action research, ethnography and interviews. Ramm (1992: 67) suggest that the experiment and the survey are the favored methods to observe within the positivistic epistemology. The research paradigm in question is not determined by the research strategy used but rather on the shared assumptions about how to view the world. Oates (1992: 286) names five characteristics of the positivistic research ontology:

- The world exists independently of humans: Physical and social world exist independently from individual how the world works.
- Measurement and modeling: Researcher discovers this world by making observations and measurements and producing models of how it works
- Objectivity: the researcher is neutral and objective and impartial to observer
- Hypothesis testing: Research is based on the empirical testing of theories and hypotheses lead to confirmation or refutation of them
- Quantitative data analysis: Research often have a strong preference for mathematical modeling and proofs and statistical analysis
- Universal laws: A researcher looks for generalizations universal laws patterns or irrefutable facts that can be shown to be true regardless of the researcher and the occasions.

Furthermore Oates (2007: 287) characterizes quality positivistic research as being,

- Objective: Research needs to be free of bias and individual preferences.
- Reliable: The research instruments used need to be neutral, accurate and reliable. Repeated use of the same instrument should yield the same results.
- Internally valid: The research methods well chosen and designed to provide the necessary insight into the research topic under observation.
- Externally valid: The research should be applicable in a more general context.

Positivism should not be confused with qualitative research, it does tend to follow apply quantitative research methods; but it should be distinguished on the grounds of its ontology (Oates, 2007: 287). The Oxford (2010: 1198) dictionary distinguishes quantitative research as being characterized by assigning values, measures or numbers to variables representing the entity under observation, whereas qualitative research describe entities in terms of adjectives. Both Popper (1992) and Comte (1975) mentions that empirical methods provide objectivity to researchers. Qualitative methods are not excluded from positivistic research though; they can be included in positivistic research if they are done in an objective, neutral and repeatable fashion.

Furthermore, Oates (1992) distinguishes between four data generation data generation methods: observation, interviews, questionnaires and documents.

These methods fall under the ontology of positivism when they meet the characteristics listed above.

In most cases interviews are not objective and repeatable, but this research method can be applied in the framework of positivistic research. As example, physiological ink blob tests/interviews are conducted in an objective and repeatable fashion and responses modeled and evaluated empirically.

Documents can fall inside or outside the positivistic ontology as well. They can directly provide quantified facts and measures or they can be analyzed objectively. For example, Google search engines use heuristic measures to objectively measure the relevance of internet pages.

Observation and questionnaires can also fall within or outside the scope of the positivistic ontology depending on how the research approaches are designed. Questionnaires with open ended questions falls under the interpretive approach, while questionnaires that require respondents to rate options or provide short true-false yes-no responses are positivistic. Whether observation falls within the scope of positivistic research again depends on whether this research instrument is objective and repeatable.

4. Conclusion

The essence of the positivistic approach is systematic skepticism. The proper approach is to disprove that which researcher believe is actually true.

Empirical testing can never proof without a doubt a hypothesis. Science is a method by which theories are formulated and tested repeatedly and

objectively against appropriate observations. It is therefore the continuous process of deciding how to observe, code and analyses our observations, and in the light of these observations we decide to temporally accept or reject the postulated hypothesis.

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