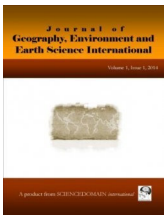

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Is Positivism Inevitable in Geography?

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The sole author designed, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

This question appears to be anachronistic in the sense that, as at today, Geography – both physical and human - has fully embraced and adopted Positivism as a philosophy and methodology of acquiring valid knowledge. Therefore, it is no longer a question of inevitability but rather its suitability and sustainability. Nevertheless, this paper attempts to describe Positivism as a philosophical and methodological approach, traces the history of its introduction into geographic inquiry, evaluates its contributions and criticisms, and finally examines what it portends for the future.

Keywords: Geography; positivism; science; philosophy; methodology.

1. INTRODUCTION

1.1 What is Positivism?

Positivism has been described by [1] as a philosophical system recognizing only that which can be scientifically verified or which is capable of logical or mathematical proof, and therefore rejecting metaphysics. Positivist approaches involves making of empirical generalizations, statements of a law-like character which relate to phenomena that can be empirically recognized. As such, these approaches are basic to what is widely known as the scientific method, and are

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central to the methodology and philosophy of natural science, physical geography inclusive.

Positivism or positive science comprises of two broad subdivisions namely; logical positivism and critical rationalism. Logical positivism has been credited to a group of philosophers working at the University of Vienna in the 1920s and 1930s [2]. It is a philosophy concerned with acquisition of knowledge in the form of general statements, obtained by accepted procedures, about observable phenomena. Such statements can then be used in the manipulation of the phenomena. According to [3] key elements of logical positivism are:

1. **Scientism:** The claim that the positivist method is the only true method of obtaining knowledge, other non-positivist or non-scientific methods produce meaningless knowledge because they are not verified knowledge.
2. **Value Freedom:** The doctrine that scientific judgments are objective, independent of political or moral commitments.
3. **Elimination of Metaphysics:** Metaphysics defined as those questions that arise out of, but go beyond factual or scientific questions about the world [4]. This includes experiences, beliefs and meanings which cannot be subjected to positive analysis. This establishes positivism as the study of the empirical knowable.
4. **Verification Principle:** This is perhaps the most distinguishing element of logical positivism. It dictates that all empirical propositions or hypotheses must be tested, and all statements within science must be verified to be deemed genuine and therefore acceptable.

Critical rationalism on the other hand, a variant of positivism, can be traced to the work of Carl Popper [5] who argued against the use of verification principle and proffered it should be replaced by falsification principle. This principle is hinged on the challenge of complete verification, that is, although a proposition may not be conclusively verifiable, it can be conclusively falsifiable. It therefore proceeds by conduct of critical experiments designed to refute propositions. By his logic, if a proposition is not falsified, the experiment has corroborated it, but not confirmed its validity.

[6] outlined the norms of positive science as:

1. **Originality:** Advancement of knowledge through discovery of new material.
2. **Communality:** All knowledge is shared.
3. **Disinterestedness:** Scientists are interested in knowledge for its own sake, and their only reward is satisfaction that they have advanced knowledge.
4. **Universalism:** Judgments are on academic grounds only and incorporates no reflections on the individual concerned.
5. **Organized skepticism:** Knowledge is advanced by constructive criticism.

We can therefore conclude that positive conception of science is built around empirical hypothesis, that is, proposition with factual content, and development of verified statements.

In geography, there have been several arguments that application of positivistic philosophies and methodologies should be greatly limited since the post quantitative revolution era to date. This is reflected in the emerging strands and streams that now emphasize uniqueness, peculiarity, particularity, perceptual constructs, individuality, pluralism etc. above grand theories and overarching systems. This paper therefore seeks to ascertain the justification for this trend or establish whether it is simply misplaced by carefully examining the historical relationship between geography and positivism, how it influenced various philosophical shifts and epochs in the evolution of geographic thought, current role and future relevance.

2. DEVELOPMENTS IN GEOGRAPHIC THOUGHT

Geography is generally regarded as the study of spatial variation of phenomena on earth's surface. According to [7] Geography asks and answers questions concerning location, spatial structure and spatial process and this is what distinguishes the discipline from other sciences. Geographers are concerned with two broad categories of phenomena; physical/natural and human created ones. This is the basis for categorization of the discipline into physical and human geography respectively with the former being a natural or pure science and latter a social science.

Given the nature of geography and its categorization surmised above, positivist

philosophy and methodology was mainstreamed into physical geography much earlier than human geography because of its closeness to natural sciences such as chemistry, physics, etc. Human geography on the other hand was one of the last social sciences to adopt positivist approaches on a wide scale partly because of its relatively weak links to other social sciences until recently and in part due to its main link to natural science, through physical geography with geology, in which positivism was not dominant. Rather, empiricism was the main stay [8].

There is no precise date for the introduction of positivism into geography but estimates can be derived from some isolated literatures that describe various philosophical and methodological transitions witnessed in geography over the years. [9] opined that emphasis in geography around 1800s was on man environment relations. Davis's view of environmental control or more popularly, environmental determinism gradually gave way to ecological view championed by Barrow. Beginning from 1920s, man-land view shifted to an emphasis on area studies or areal differentiation. Major protagonists of this era include Hartshorne, Sauer and Platt among others. This change was essentially definitional and not really philosophical in nature as emphasis was still on environmental influence or factors.

In other words, in the early 20th century, the description of regions or regional studies became a central concern in geography. Okafor went further to state that "what this approach did was to demarcate regions which are more or less internally homogenous and provide comprehensive account of the physical and human geography of the regions". This approach now referred to as traditional regional geography contributed significantly to knowledge about the character of places, geographical differences in the patterns of human activities etc.

However, the regional treatises associated with this era were aptly described as being long on fact but short on theory. Traditional regional geography was thus regarded by Jonhston [9] as "an attempt at generalization, but at generalization without structured explanation".

3. INEVITABILITY OF POSITIVISM IN GEOGRAPHY

At this point, Geography was essentially idiographic in nature based on the philosophy of exceptionalism. This gave rise to widespread dissatisfaction of the descriptive and empiricist nature of geography and consequently the need to move beyond idiographic inquiry to a nomothetic approach. The scientific method became very attractive and was eventually first adopted by physical geographers (via geologists) such as Schaefer and Strahler. Also, during this time, science was academically and socially respectable, and so was social science. It was useful, and geographers perceive that they, by becoming more scientific, could also become useful too, thereby serving a dual purpose of advancing disciplinary and personal esteem.

4. POSITIVISM AND GEOGRAPHY

The introduction of the scientific method into geography marked the beginning of the logical positivist era in the field. Since scientific method is based on formulation and testing of hypotheses, it ushered in the quantitative revolution in geography. Statistics and mathematics were extensively used for testing of hypothesis and building of models respectively. Use of scientific terms such as law, model, theory and hypothesis became fashionable and were widely used.

This development birthed major changes in the definitional, methodological and philosophical direction of geographic research and education. Definitionally, emphasis shifted from regional study to the study of spatial patterns, linkages and interactions. Methodologically, more geographers began to employ the scientific method as the means of inquiry in spatial analysis. Philosophically, the emphasis on scientific method and model building meant an emphasis on a more deductive form of enquiry [10,11].

[12] aptly captured the impact of positivism on geography when they stated that it took "geography as a subject away from its earlier concern with description of unique places into attempts at uncovering universal spatial laws governing the way in which the world worked". Since formulation and testing of hypothesis as well as development of laws and theories of spatial organization became central, geography was defined as a spatial science and "was therefore no longer to be content with simply describing, but like a strict science, should be able to formulate predictive laws of spatial behavior as well as uncover rules governing observable spatial regularities" [13]. However,

[14] argues that geography is not a strict science but rather straddles between sciences, social sciences and humanities and have benefitted from its position at the intersection, a significant aspect of which is its quantitative component.

Introduction and subsequent adoption of positivism brought about significant improvements in geographic inquiry and training. The added rigor and focus elevated the discipline into a more respectable height. Several models and theories were imported from other disciplines such as economics, physics, sociology, psychology etc. and modified to explain and support various spatial analytics endeavors. For instance, it has played significant role in geospatial analysis through the use of GIS technologies and more recently in the emergence of big data – data extensive studies – that some refer to as the fourth paradigm [15] as well as analysis of complex networks [16].

Expectedly, at some point, bandwagon rolled on as quantification was gradually becoming an end in itself rather than a means to an end. Expression of research results in mathematical and statistical expressions was taken to excess by some proponents thereby trivializing their works which appeared to be occasioned by availability of data and consequently testing of hypotheses that were weakly linked to any well-articulated theory or model. This unfortunately, is still rampant today particularly among young bourgeoning geographers.

5. CRITICISMS

Most of the challenges with geographical application of the scientific method stem from the twin facts that "geography as a whole deals with multi-variable open systems" [8]. This was recognized by [17] when he submitted that geography deals with unique events, and generalization in the form of laws and theories is doomed to failure. Also, the sheer size of geographical systems e.g. atmosphere, river basin etc. makes laboratory experiment difficult as scaling down the system alter its properties in unknown ways.

In human geography, by 1970s, criticisms of the positivist approach started pouring in, particularly, the 'objective' scientific methods that conceptualized people as rationalized actors. Rather geographers began to embrace the humanistic approaches and argued that human behavior is in fact subjective, complex, messy, irrational and contradictory. As such, human geographers began to draw on methods that would allow them to explain the meanings, emotions, intentions and the values that make up our taken for granted world [18]. At the same time Marxist geographer criticized the apolitical nature of positivism and more recently feminists, poststructuralists / postmodernists criticized positivism and Marxism for their failure to recognize people's multiple subjectivities.

[19] encapsulated the influence of positivism though rather harshly as distracting geographers from the "possibilities of creative, rigorous, critically engaged activist scholarship" and concluded that "a genealogy of positivism shows that the movement was never as philosophically coherent, or as politically conservative, or as well-defined a research program as portrayed in our intellectual histories", as such we have never been a true positivist.

New areas with so much promising possibilities are net left out in the barrage of criticisms, one of such is the geospatial and big data solutions. They have been criticized as reinforcing inequity and in some cases subverting environmental, social and economic justice [20].

Nevertheless, as well articulated on [21], these criticisms are in fact constructive and have strengthened geographic research through its expansion, improvement and refinement over time as well as the complementary role it now plays to non-positivist approaches thereby providing a much more robust platform for the conduct of geographic investigations.

6. CONCLUSION

As argued by Hay, despite the shortcomings of positivism, it will be retained in both human and physical geography because; first, it does have the ability to provide coherent and testable theories about nature of geographical phenomena; second, it is in many respects a codified and logically connected extension of thought structures developed in everyday life including the willingness to correct theories or hypothesis in the light of experience; lastly, and partly as a consequence of the first two points, scientific knowledge is required to manage social and natural systems and if geography fails to provide such knowledge, some other disciplines will develop to fill the gaps.

Therefore, positivism remains important in geographic inquiry though in a circumscribed form. Although current emphasis is now on diversity and difference culminating in what is now described as philosophical and methodological heterodoxy, the place of positivism in geography is however guaranteed as without it, geography may cease to offer a convincing interpretation of earth's surface and activities of humans upon it.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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