WHY SCIENCE CANNOT AVOID PHILOSOPHY

Hilary Anayochukwu Eke and Lorretta Nneka Eke

Abstract

The effort to demarcate science from unscientific and non-scientific methods has proven to be largely unsuccessful due to the increasing understanding of the overall closeness of science to some other modes of acquiring knowledge. This awareness is not unconnected with philosophical reflections on the activities of science. The problem of demarcation in science treats issues of what constitutes science and how science is in contradistinction with, and preferable to, other modes of acquiring knowledge. Philosophy has often been contrasted against science to such an extent that some have conceived the relationship between philosophy and science as that of a thesis and antithesis. This paper argues that any science that must succeed has to hinge its foundation on metaphysical assumptions that are non-scientific, yet strive to demonstrate these assumptions by formulating testable theories. This study reveals that a relationship of complementarity, instead of dichotomy, exists between science and philosophy. Thus, science is not just an offspring of, but has continued to be nurtured and nourishedby, philosophy. Contrary to Wittgenstein's opinion that philosophy was a sui generis enterprise the paper observes that science in its investigative capacity has in turn provided materials for philosophical reflection.

Keywords: knowledge,philosophy, science, complementarity.

Introduction

There is a kind of disinterested interest in the intercourse involving any philosophical subject no matter the topic of discussion. Against this backdrop, Starks (2017) argues that no matter what may make any person lose interest in philosophy, "there is endless need for philosophical analysis, not only in the 'human sciences' of philosophy, sociology, anthropology, political science, psychology, history, literature, religion, etc., but in the 'hard sciences' of physics, mathematics, and biology." With this statement Starks can be interpreted to have suggested that the common denominator of science and philosophy is knowledge. The value of knowledge is inestimable. Thus, Aristotle began his *Metaphysics* with this famous remark: "All men desire from nature to know," (Aristotle, 1978: 980a, 21). Essentially, to know is to know the truth, or at least part of it. Just as Polanyi (1974) in what he calls the art of knowing says, "the effort of knowing is ... guided by a sense of obligation towards the truth: by an effort to submit to reality." Yet, the traditional philosophical doctrine that treats the perplexing issues of the nature, origin and extent or limits of human knowledge, epistemology (from the Greek *episteme* and *logos* meaning the study or science of knowledge) is, like science, value-free, (Nwigwe, 2006; Eke, 2008). Whereas the sole interest of epistemology is to fulfil the overall quest to know and to ensure the justification of all knowledge claims, any claims to offer knowledge by different disciplines of learning is a claim to offer knowledge of reality from some definite perspective, (Nwigwe, 2006). The claim of any discipline to have knowledge and the claim to have knowledge that is indubitable or certain are two different things. The reason may be both because there is no real measure of what is known and because we have no reliable information regarding new knowledge yet to be discovered, (Rescher, 1995). Despite the efforts of various fields of learning, cultures and traditions to compartmentalise knowledge, there remains wisdom in the assertion that *knowledge is one*, (Emedolu, 2011; Nwigwe, 2006).

Both philosophy and science are regarded as prominent repositories of unbiased knowledge notwithstanding the complexity and diversity of their various branches and methods of inquiry. Whereas science seems the prerogative of all and sundry, philosophy is rather largely misconstrued and misconceived. Long learned traditions seem to hold philosophy in high esteem more than the contemporary society which is relatively science intoxicated. Consequently philosophy does not enjoy the kind of popularity that greets science. In Nigeria the story is even worse. Ask a secondary school leaver in Nigeria what philosophy is and you will hear funny things ranging from a display of culpable ignorance to absurd speculations. The reason is not farfetched. While the subjects taught both at the primary and secondary levels of education included some level of introductory science, there are hardly any philosophical subjects, whether covertly or explicitly, that made the list of courses taught at the basic and intermediate levels of Nigerian education curriculum. It is equally unfortunate that some Nigerian tertiary institutions (including polytechnics) tend to jettisoning philosophy in pursuit of what may be rightly termed *dogmatic* pursuit of science and technology, (Eke, 2016). Is the claim correct that science can strictly be separated from philosophy? Does science absolutely need philosophy? To what extent is philosophy relevant to science? These are some of the questions with which this paper attempts to grapple. The concern of this article is to discuss the inevitability of philosophy with special attention to its relevance to science.

Explication of Terms

The key terms of this enquiry require as much understanding as the contentious issue that science needs philosophy. Following Voltaire'sfamous maxim: "If you wish to converse with me define your terms", (Durant, 1961: 48), we shall attempt some definition and clarification of the concepts of science, philosophy, and philosophy of science.

Science

The term 'science' has come to assume different meanings in the course of human history. The word science comes from the Latin word "scire" meaning "to know".In its generic and larger sense science (*Wissenschaft*) equates knowledge, meaning any systematic body of knowledge. At this level, any boundary line between philosophy and scientific thought is eroded. Science from a narrower sense designates what we today know as empirical science, comprising the natural and social sciences. It is of value then that the beginner should be reminded that empirical science is not all of science. So when we use the term science in this text, we mean empirical science, unless otherwise stated.

Several authors (Nwala, 1997; Nzie, 2012; Craig, 2002; Ogar & Asira, 2012, etc.) have identified science as an organised, objective and systematic body, process and product of knowledge which has assumed the status of trustworthiness owing solely to its success stories achieved ever since the scientific and industrial revolutions. This influence has made modern states, including Nigeria, to get so science intoxicated that at the mention of the word *science*, according to Nzie (2012), individuals immediately think of subjects like Chemistry, Biology, Physics, Mathematics, Geography, and the rest. Consequently, science discourses generally assume some relative comprehension of what science is, offering a unique characterisation of science as objective, systematic, orderly, consistent, value-free, cumulative and continuous, etc. These views may point to science but do not capture all there is about the nature of science, a whole complex world of possibilities.

Sanguinetti (1988) defines science as "the systematic knowledge of beings and their properties, from the point of view of causes," reiterating that science is organised, critical and systematic. The celebrated theoretical physicist who revolutionised physics in the

twentieth century, Albert Einstein, says that "science is the attempt to make the chaotic diversity of our sense-experience correspond to a logically uniform system of thought. In this system single experiences must be correlated with the theoretic structure in such a way that the resulting coordination is unique and convincing," (1953). This Einsteinian instance is more prescriptive than descriptive of science.

Nwala (1997) generally classifies science into three broad perspectives, namely: science as a body of knowledge, science as a method for acquiring knowledge and science as an institution.***Science as a body of knowledge*** consists of the bodies of knowledge we generally regard as science,like chemistry, physics, and biology, etc.***Science as a method for knowledge acquisition*** designates science as the process or procedure for obtaining reliable knowledge. Here theemphasises is on the scientific method, which involvesa feedback observation, problem statement, formulation of hypotheses, experimentation/testing of hypotheses, inference/conclusion and the process is repeated over and over again and a theory could be formulated from this repeated process over time as explanation of a phenomenon, or a physical event relatively understood. The scientific method is said to distinguish science from non-science.***Science as an institution***involves millions of experts and professionals all over the world who engage in the study of various aspects of the phenomenal world. The experts are scientists found in specialised institutions like education, industries, etc. (Nwala, 1997).

Philosophy:

There are so many (mis)conceptions of philosophy; even among the learned, philosophy is wrongly perceived as a fruitless inquiry, often depicted in the aphorism that philosophy bakes no bread, *philosophia panem non torrit*, (Eke, 2016). Some say philosophers are mad; others say they are dangerous, just like in the case of Socrates, his ideas were considered so dangerous that he had to be

put to death, (Lawhead, 2003); they monitor the sky and celestial bodies so closely that they cannot see what is on their feet, just like Thales, the first Greek philosopher was mocked. Others think of philosophers as magicians, sorcerers, soothsayers, palm readers, those who argue unnecessarily and people with supernatural abilities. These conceptions are weird and queer. But we don't blame anybody for it since the scandal of philosophy is that philosophers themselves are not united in their definition of philosophy. Thus the definition of philosophy has been a vexing issue as it has no generally accepted definition among philosophers. No wonder some philosophers believe that philosophy is difficult to define, (Uduigwomen, 2006). There may be many reasons for this which includes the fact that philosophy is "an extremely broad termcovering a very wide range of intellectual activities...Some think thatnothing is to be gained from trying to define it," (Craig, 2002: 5). Some others however think that the view about philosophy not being definable is not warranted since philosophy has been defined in many different ways, (Udoidem, 2002; Moore and Bruder, 2002).

Philosophy is a coinage from two Greek words "philos" (love) and "sophia" (wisdom).Thus, the meaning of philosophy derives from its etymological rootsgiving us the traditional rendering of philosophy as "love of wisdom" (knowledge).It is not unusual to consider the term philosophy in two senses; the layman (public) sense and the technical (professional) sense.

In the public sense, philosophy is used to characterize a person's or a group of person's attitude to life, general pattern or habitual way of responding to circumstances and events, world view (*Weltanschauung*) or the totality of their beliefs, attitudes, prejudices (inherited and acquired) in the process of living, that is, a general outlook on life, the individuals' philosophy of life, (Nwabuisi, 1986; Lawhead, 2002). Philosophy in the technical sense is an academic discipline usually taught in Universities,

Polytechnics and Colleges where scholars devote their time and intellectual energy. It is in this second sense that we refer to the definition of philosophy.

Philosophy has been traditionally defined as "*scientia rerum per ultima causa*" meaning the *science that studies nature or reality from their ultimate causes*. Here philosophy is seen as universal science (*Wissenschaft*) or knowledge in the full sense equating that kind of wisdom that is attainable only by human reason. "So, when an essential statement is made on reality as a whole...one takes a philosophical position," (Sanguinetti, 1988). If one says for instance, 'knowledge is possible', that is already a philosophical position. Or, another instance, the statement, 'philosophy is not practical' is also a philosophical position. Sanguinetti explicitly says "even those who support the idea of the impossibility of philosophy, by saying this, perform a philosophical discourse," (1988). According to this meaning, Windelband (1958) avers that philosophy in general is the methodical work of thought, through which we are to know that which "is".

Definition of philosophy, according to its tasks, may give rise to at least three modes of philosophizing, namely; analytic philosophy, speculative philosophy and prescriptive philosophy. Analytic philosophy focuses on words and their meaning, and so philosophy is concerned with the clarification of concepts by breaking them down into atomic units in order to understand the whole through the study of its component parts, we see it as a conceptual activity saddled with the function of analysing concepts. It focuses on words and meaning used for clarifying ideas through asking questions. Here the philosopher is not concerned with empirical knowledge, but with the ideas, concepts, assumptions and arguments advanced about their observations and experiments. Philosophy should be seen as an ally rather than an enemy of empirical study. Speculative philosophy is a synthetic attempt at finding coherence in the whole realm of thought and experience. It

is an effort to see how reality in its different appearances forms a meaningful whole. It is a quest for statements of order, logical coherence and wholeness. Prescriptive (normative) philosophy seeks to establish standards for deciding what actions and qualities are worthwhile and why they should be so. The hallmark of this mode of philosophizing lies with the principles of assessing values, judging conduct and appraising art.(Nwabuisi, 1986).

Philosophy can be defined in terms of what subject area its enquiry concentrates, giving rise to the four major branches of philosophy namely, metaphysics, epistemology, axiology and logic. *Metaphysics* – which comprises ontology (study of the nature of being and existence) and cosmology (studies the origin, nature and development of the universe) – is the speculation about the nature of reality. Epistemology is the theory of the nature, meaning, justification and limits of human knowledge. The epistemologist works on concepts rather than facts. Axiology is the theory of values, that is, ethics and aesthetics. It deals with the questions about all value judgments, the good or bad, the right or wrong, the beautiful or ugly, etc. Logic is the science (Wissenschaft) of right reasoning. It is the tool for systematic reasoning.

Philosophy of Science:

Nwabuisi (1986) significantly noted that "it is important to ask how philosophy is related to science especially in this age of great concern for science and technology. Otherwise, there is danger of negating the importance of philosophy, regarding it as idealistic, non-functional and merely academic." What then should properly define the relationship between science and philosophy? Should it be a relationship of distinction or that of complementarity, or, both?A proper understanding of this relationship can aid further scientific progress. We cannot understand this existing relationship without knowing the nature of philosophy, the nature of science, analysing their concepts and justifying their position.

Philosophy of Science is a special branch of philosophy charged with the function of analysing, synthesising and/or evaluating the basic assumptions, principles, theories, processes, claims and practices of particular sciences in the world of appearances.Philosophical questions about science cannot be answered in a totally precise way, and they "probably do not admit of final answers, but in grappling with them we learn much about the nature and limits of scientific knowledge." (Okasha, 2002: 39). Philosophy and science are related in so many ways. That would not mean that they are identical. At the most fundamental level they share a great deal in common. That is why philosophy is science (Wissenschaft) or systematic and orderly knowledge in its most generic form. One of the most prominently shared features is curiosity (or scientific wonder). A study in the relatedness of scientific wonder and philosophical wonder is part of the business of philosophy of science. Science, begins with the observation that the world is full of interesting objects and regularly recurring events, has a general nature that seeks ways of exploring and explaining the world. Guttman (1999) believes that the natural world inspires aesthetic and scientific wonder. The joy of encountering the remarkable and the beautiful inspire the experience of pure aesthetic wonder, while the natural world inspires scientific wonder, or curiosity, which makes humans ask questions in an effort to understand. The human sense of wonder is born out of the nature of the human species and the experiences surrounding that nature. Just like Aristotle said, philosophy begins with wonder. Science, like philosophy, begins with wonder, the kind of wonder natural to even children. The formation of scientific concepts, conjecturing of hypotheses and formulation of theories are results of scientific exploration and quest to offer explanation to our complex, beautiful and sometimes frightening world; "a world we must understand if we are to live comfortably and successfully," (Guttman, 1999).

Historically, there was no strict distinction between philosophy and science, especially before the seventeenth century. Topics bordering on what we know today as science (precisely particular sciences) were discussed under the aegis of 'natural philosophy', which opted to be separated from philosophy because it wants to specialize on particular aspects of reality. According to Kant (2004), subjects discussed under the umbrella of what we call *natural science* today appeared as topics under *natural philosophy* in the eighteenth century, Natural science according to Immanuel Kant, presupposes metaphysics of nature; for how can one manipulate, control, explain and predict nature without any metaphysical assumptions on the foundational principles of the nature one works with? This goes to show that the concept of science was subsumed under the broader discipline of philosophy (metaphysics). In the evolution of thought then, the particular sciences broke away from their parent discipline, philosophy. The modern enlightenment philosophers championed this separation due to the new awareness of the prospects of the methods of science. Enthused by Hume's sceptical conclusions, Kant raised an important question: 'How is scientific knowledge possible at all?' Kant showed how knowledge is possible in the difficult and painstaking conclusions of his two critical works, *Critique of Pure Reason* and *Critique of Practical Reason*. In his *Metaphysical Foundations of Natural Science*, Kant demonstrated the inevitability of philosophy to the scientific enquiry.

If *natural* science today was *natural* philosophy in the past, should we not assume that science was philosophy after all? The binding concept relating philosophy and science here is the concept of *nature*. The word "*natural*" is attached to both. Borrowing from Kant (2004), 'nature' has two meanings; the formal and the material meanings. We refer to the formal meaning of 'nature' when we mean the first principles of all that belongs to the existence of a thing, that is, the constitution of the peculiar inner principle of the determinations belonging to its existence. The

material conception of the term nature uses the term to designate the sum total of all things, insofar as they can be objects of our senses and experience, that is, the whole of the sensible world of appearances. Kant brings to bear the Cartesian *res cogitans* (the doctrine of the soul or the thinking nature) and *res extensa* (the doctrine of body or extended nature) as the two senses in which the material meaning of nature can be understood.

The Demarcation Problem and the relevance of philosophy to science:

Can scientific enquiries, *in stricto sensu*, be distinguished from unscientific or non-scientific enquiries? That is, can there be a strict distinction between science and other modes of enquiry? What criteria could be employed for such distinctions? The nineteenth to twenty-first century scientists' allegation that philosophy stands in opposition to science, or that philosophy lacks proper understanding of the basic principles, processes and practices of science, is not necessary.Popper (1959) was right to say there is no difference between the philosopher and the scientistin the pursuit of truth, but that does not mean that there is no difference between philosophical speculation and scientific theory. The problem this enquiry has been attempting to address is centred on the fact that several attempts have been made by scientists, as well as philosophers, to specify the nature of science as distinct from other human endeavours, for instance, religion, magic, philosophy, etc.with the bias of tolerating only the relationship of exclusion and distinction, whereas the proper conduct of human affairs as specified by Asouzu's (2011) *Ibuanyidanda* philosophy ought to consider a relationship of inclusion and complementarity. There is no strict distinction between science and philosophy since from the generic sense of science (Wissenschaft) both science and philosophy are the same, the only significant difference is that it is proper for science to engage in empirical knowledge while philosophy deals with concepts which are nonempirical. It is argued for instance that any

enquiries into the nature of science are not within the purview of the sciences, but rather, that of philosophy, functioning as a second order enquirer into the principles, techniques and methods of science. If this position has any merits then science needs philosophy to function properly.

A mathematician, for instance, works with numbers, but to answer the question, "what is number?" bordering around the nature and concept of numbers, is different from showing different instances of what we call numbers. The clarification of the concept of numbers becomes the concern of philosophy and not mathematics. The biologist is interested in instances of life and living things, say for instance to distinguish between a firm, green plant standing erect in the sunlight and a brown withered one, because biology is the science or study of life; yet, biology does not strive to state what life is, but that is the kind of knowledge philosophy seeks after. While the sciences are interested in measurement of units like length, mass, velocity, etc. The philosopher is interested in what measurement is. Whereas the sciences are concerned with empirical knowledge, philosophy deals with the clarification of concepts, discovery of their underlying assumptions and identification of principles behind the empirical knowledge and the justification of claims of the scientist. We understand from natural history that the influence of philosophy on science cannot be overemphasised since the breakthroughs of science in most cases are attributable to strong philosophical authority. The grand masters of science (Galileo Galilei, Isaac Newton, Rene Descartes, Francis Bacon, Albert Einstein, Max Plank, Thomas Kuhn, Imre Lakatos, Karl Popper, Gregor Mendel, Nicholas Copernicus, Aristotle, Pythagoras, etc.) not only did not joke with the discipline of philosophy but went further to attribute their scientific success to their philosophical background. No wonder why the highest degree of academic award given to any scholar of repute in any discipline is a Ph.D. (*Philosophae Doctor*), that is, Doctor of Philosophy, in one's discipline. One of the several implications of

this is to say that one cannot become an authority unless she philosophized in her area. Could it not also mean that the summit of the academia is philosophy? Science ought to borrow a leaf from Plato's idea of the philosopher kings in politics, so that, it is either the philosophers become authorities in the various scientific disciplines or the various sciences incorporate a philosophical attitude. In so doing, philosophy does not interfere as such with the disciplines involved. It only plays a second order role of scrutinizing and justifying the claims made in the various sciences. Philosophy is such a glorious discipline that could best be described as the dough that leavens the bread of knowledge. In fact, philosophy is the *gluten*, that is, the compound responsible for dough formation in the bread making process of knowledge (cf.Eke, 1998: 15). Philosophy is the gadfly that stings humans into consciousness. Philosophy calls human awareness into awareness. Contrary to a Wittgensteinian position, that philosophy was a *sui generis* enterprise and so had nothing to do with, and nothing to learn from, science, philosophy in the modern era has assumed a role of a second order discipline charged with the function of clarifying and analysing the concepts of its discipline and other disciplines. That is why we find interdisciplinary sub-branches of philosophy with the general formula of Philosophy of X, where X is any other independent subject or discipline. Accordingly, we have such disciplines as Jurisprudence or Philosophy of Law, Philosophy of Science, Philosophy of Religion, Philosophy of Mathematics, Philosophy of Technology and so on. In scrutinizing the claims and assumptions of other disciplines, philosophy draws its materials for philosophizing from them and there usually occurs a symbiotic relationship whereby each discipline at the borderline necessarily has something to learn one from the other.

Conclusion and recommendations:

If the essay has critically examined the relationship between science and philosophy, given a hint on the problem of demarcation in science, analysed some definitions of science, and

shown that the scientific hegemony is fuelled by the wisdom to incorporate into the business of science elements from other modes of knowledge, then it would have achieved its task. This essay also would have emphasized the point that science is the progeny of philosophy and that philosophy has not failed in its responsibility as a good parent to nurture and nourish science. We adopted the method of critical and textual analysis to achieve our purpose. This paper is not an empirical work given the scope of what it intends to achieve, namely conceptual clarifications and analysis. It should be noted however that the paper retains some empirical import in the sense that the valuation of a practicing scientist and that of professional philosopher have been harnessed for proper balancing of views. This essay is limited to a general consideration of the nature of science and the role of philosophy of science in that consideration. The paper submits that philosophy and science should play a complementary roleto each other. Where conceptual clarification is required, philosophy plays a role; but the observations and experimental results of science provide materials and concepts for new philosophizing. We may well be convinced that any science that must succeed must hinge its foundation on metaphysical assumptions that are non-scientific, showing how helpless science could be without such presuppositions. Scientific observation sentences stand on such presuppositions, since there is no presuppositionless proposition.

We have examinedhow the scientist is constantly in need of the subject of philosophy, in their academic and professional pursuits and conclude that science without philosophy is empty. In the intellectual domain, as well as in life, philosophy has proven to be inevitable. Philosophy may be understood as both *mmiri-nshị (*that which cannot be carelessly jettisoned or retained) and *Agbarụọ-nwangele e kuru ngele* □*ụọ* (the rejected stone that became the corner stone), meaning that philosophy is inevitable. The more effort to reject philosophy, the more we invite it. In the midst of wrong conceptions and marginalisation, philosophy is still

respected in highly scientific and technologically advanced societies like some parts of Asia, Europe and America. To advance a putative explanation of why there is a great divide in technological strength between significantly developed and underdeveloped countries may suggest a yet to be tested hypothesis that interest in, or lack thereof of, philosophical foundations significantly condition the status of a country's science and technology. Little wonder then countries that based their scientific enterprise on strong philosophical foundations seem to be the best in technology around the world. The United Kingdom, the United States of America, France, Russia, Germany, China, Japan, etc., are all products of strong philosophical history. Could the slow rate of educational and scientific attainment of Nigeria be due to indifference to strong philosophical roots? That will be an enquiry for another paper.

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