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Examining the Relationship between Knowledge and Metaphysics in Rene Descartes and the Development of Modern Science

DR. CHRISTIAN S. AGAMA[1], PROF. JUDE A. ONUOHA[2]

[1]*Directorate of General Studies Federal University of Technology, Owerri, Nigeria*
[2]*Directorate of General Studies Federal University of Technology, Owerri, Nigeria*

***Corresponding Author:** DR. CHRISTIAN S. AGAMA, Directorate of General Studies Federal University of Technology, Owerri, Nigeria*

ABSTRACT

The task of this essay is to make a critical study of Descartes philosophy on the relationship between his epistemology and metaphysics, and how both contributed to the scientific civilization of the modern era. For the purpose of this exercise, we have divided this essay into two parts. The first part will expose the tenets of Descartes' epistemology and metaphysics, and their relationship in him, while the second part will investigate its development in modern science.

Keywords: *Descartes, epistemology, metaphysics, science, method*

INTRODUCTION

Descartes (1596-1650), one of the founders of modern philosophy showed a remarkable impact of his thought in the midst of many of the problems and preoccupations of philosophers in the modern period. His major interest was to provide a rational foundation for knowledge. The rationality behind this foundation of knowledge according to him has to be established from self-evident premises through a sequential step that would demonstratively get to conclusion. Though this type of method can be found in mathematics but he claimed that man's quest for knowledge in any field, whether in metaphysics, or science can stand to the test of the same. He further upheld that only beliefs that are backed up by reason are sufficient enough to give us knowledge of the truth. In the course of achieving this truth which is highly needed in the domain of science, Descartes demonstrated a kind of epistemological and metaphysical revolution by asking himself how possible is it for human beings to know anything with certainty or to have a reliable, truthful and usable knowledge of the world? He undermined the previous beliefs and discarded the methods of the scholastics. He affirms that the medieval methods were obsolete and retrogressive; truth should not be postulated at the beginning and then explore in all its ramifications, it should rather be discovered or known at the end after a long process of experimentations, investigation or intermediate thought. Thus, Descartes provided a constructive method (which we shall see in details) for the acquisition of reliable knowledge through which he became the harbinger of scientific civilization.

However, Descartes being a pure rationalist was caught with both epistemology and metaphysics in trying to establish a method of acquiring a reliable knowledge. The peculiarity in his philosophy made it so difficult to differentiate the two. He started from the epistemological point of view and ended up his philosophy metaphysically. From cogito (I think) and reason (the only source of true knowledge), which is his epistemological stand point to the proof of God's existence- the core of his metaphysical thinking. Indeed, the most interesting part is how both epistemology and metaphysics are combined together to the development of modern science. A critical study of his philosophy herein will unfold the relationship in him and how he "announced the advent of a scientific civilization" (Palmer and Colton 272).

Descartes' Influence

The development of science and mathematics at the period of the Renaissance (a French word meaning rebirth) influenced the development of philosophy in modern time mainly on Rene

Descartes. The development of science has flourished fully with the development of mathematics. Mathematics here is the bedrock and the foundation of science because according to Omoregbe, "science cannot develop or flourish without mathematics" (79). Hence, the Renaissance was a period of great scientists and mathematicians, a period when important discoveries that marked the awakening of scientific thought dealt devastating blow to the Aristotelian physics. Aristotle's authority was condemned and replaced by a new method and a new view of the world. Changes that occurred in science during this period are popularly known as the Copernican Revolution. Prominent scientists then were Nicholas Copernicus (1473-1543), Galilio Galilee (1564-1642) and Isaac Newton. They established scientific observation and experimentation on a solid foundation. Meanwhile, the nature of science and mathematics at this period won his heart. Accordingly, Descartes proclaimed that:

Most of all was I delighted with mathematics because of the certainty of its demonstrations and the evidence of its reasoning…. I was astonished that, seeking how firm and solid was its basis, no loftier edifice had been reared thereupon (4).

He conceived the physical universe as a mathematically intelligible mechanisms of which his central vision was to have a single and encompassable science or mathematical physics that will make the physical universe an intelligible unity. For him, therefore:

'mathematics' means exactly the same thing as scientific study'… as I considered the matter carefully it gradually came to light all those matters only were referred to mathematics in which order and measurement are investigated, and that it makes no difference whether it be in numbers, figures, stars, sounds or any other object that question of measurement arises. I saw consequently that there must be some general science to explain that element as a whole which give rise to problems about order and measurement restricted as these are to no special subject matter. This, I perceived, was called 'universal mathematics…. (13) This, in sum, made him to go by the mathematical method in pursuing the true knowledge.

Descartes' Epistemological Points

In Descartes' epistemology, his aim was to reformulate philosophy on a solid foundation (i.e. to become firm and certain) such that skeptics would not found anything doubtful or critique in it. As a mathematician, he decided to lay a new philosophical foundation backed with mathematical method. He was deeply impressed by mathematics which he believed to be always distinct and clear in attaining its truth. The mathematical method he employed in his philosophy was only a way of moving step by step to what is clearly known for certain without any possibility of doubt to other truth that may come after it.

He rejected Aristotle's logic and adopted his own. Artistole's logic does not discover new facts or truth. It only explains and confirms those already known. Descartes based his own logic on intuition and deduction. The edifice located upon the foundation of intuition and deduction. These two methods are the most certain routes to knowledge. Every other approach to knowledge is for him dangerous and suspect to error. Intuition grasps truths in the light of reason while deduction makes influence and draws necessary implications from such truths. This leads to the discovery of new truths, thereby moving from the known to the unknown.

Moreover, Descartes further used the method of doubt in order to find an absolutely certain starting point for building up our knowledge. Thus, he said, "For I found myself embarrassed with so many doubts and errors that it seemed to me that effort to instruct myself had no effect other than the increasing discovery of my own ignorance" (Descartes: 3) Having known this, he started by doubting everything he had ever known, both mathematical axioms and even he himself that is doubting. On the process he discovered that he was thinking. Besides, he cannot doubt the possibility of him thinking. To doubt that one is thinking is impossible because the very act of doubting is a confirmation that one is really thinking. To doubt is to think, and to think is to exist. Therefore, he could not deny the possibility of his own existence. As a result of that, he called himself "a thinking being" or "a thinking substance" with which he made the foundation (the solid foundation) of his philosophical system. "Cogito ergo sum" (I think, therefore I am) is a clear, certain and indisputable truth. He affirmed:

... I noticed that whilst I thus wished to think all things false, it was absolutely essential that "I" who thought this should be somewhat, and

remarking that this truth "I" think, therefore I am" (Cogito, ergo sum"; ie pense, donc je sius") was so certain and so assured that all the most extravagant suppositions brought forward by the sceptics were incapable of shaking it, I came to the conclusion that I could receive it without scruple as the first principle of the philosophy for which I was seeking (Descartes:5).

What made the "Cogito" certain according to Descartes is because it is clear and distinct perception in the light of reason. This is the criterion of certainty which for him rests on reason. Reason becomes the formator or source of the certainty of knowledge. As a rationalist, he so much relied on reason and that reason cannot deceive because it comes from God, the infinite perfect Being.

Descartes' Metaphysical Points

Descartes making reason the certainty of knowledge had the intention of extending the vision of intelligibility and of a rational structure at the heart of reality beyond the purely physical world. He claimed that reason has the capacity to discover the truth concerning the whole range of man's intellectual interests. Reason could determine the truth not only in mathematical physics but even among the serious questions concerning the existence of God, how God relates to the world and to man. For him, it is only reason that remained the criterion of certainty. The criterion for achieving the truth rests on reason which according to him is clear and distinct perception in the light of reason. Consequently, he averred that it is reason that guarantees the certainty of what he knew. And when talked of perception in this context, he did not mean sense perception but intuitive, inner perception in the light of reason. As a rationalist he is, he so much relied on reason as if reason itself is infallible. He believed not only that reason cannot deceive but that God; the absolute perfect being gave him the reason. Or as Omoregbe put it:…God the absolute perfect being gave me reason. Such a perfect being cannot give me something that would be deceiving. I can therefore trust the reason he gave me because I trust him. I trust him because he is an infinitely perfect Being (82).

Notwithstanding, Descartes had to prove the existence of God first before he can then use him as the guarantor of the integrity of his reason. Thus, he argued that he had an innate idea of God as an infinite Being and that he cannot in any way be the source because he is a finite being and as such he cannot be the source of infinite idea. He also argued that God is infinitely perfect and that His existence alone is a perfection of which no one can deny the fact. In all, Descartes summarized his argument for the proof of God's existence as well as providing a kind of under pinning of his central thesis that the physical universe is a mathematically intelligible mechanics.

It is certain that I find in my mind the idea of God, of a supremely perfect Being, no less than that of any shape or number whatsoever: and recognize that an (actual and) external existence belongs to his nature no less clearly and distinctly than I recognize that all I can demonstrate about some figure or number actually belongs to the nature of that figure or number. Thus even if everything that I concluded in the preceding mediations were (by chance) not true, the existence of God should pass in my mind as at least as certain as I have hitherto considered all the truths of mathematics (Descartes 65-66).

Descartes also made use of scientific axioms on his ontological proof via mathematical demonstration. He made the following observation:

For to take an example, I saw very well that if we suppose a triangle to be given, the three angels must certainly be equally to two right angels; but for all that I saw no reason to be assured that there was any such triangle in existence, while on the contrary, on reverting to the examination of the idea which I had of a perfect Being, I found that in this case existence was implied in the idea of a triangle; or in the idea of a sphere, that all the points on its surface are equidistant from its centre, or even more evidently still. Consequently it is at least as certain that God, who is a Being, so perfect, is or exists, as any demonstration of geometry can possibly be (Descartes: 7).

He based his ontological proof mainly on the context of mathematical demonstration. Mathematics is for him certain, universal and true. This is for the fact that once one knows the definition of a triangle as a figure with three sides, one necessarily, universally and truly knows a triangle, whether one has ever seen or not. Its truth lies in its essence.

More so, Descartes found the knowledge of God within the indebt of his mind (Cogito), or self as he often called it. For instead of beginning

metaphyscis with God as Aquinas did, he began with self. After doubting everything, he could not doubt the Cogito that doubts. He found the idea of God in his mind. It is a certain idea. Their content is that God is a supremely perfect Being.

Above all, to think of God at all or talk of Him like that of triangle, shows that God not only exist but also is a perfect Being. Since in mathematics, one may not think of a triangle, but any time one conceives it, and to talk of it all entails three-sided figure. To think of a triangle or of a hill, is at the same time to think of the sides and of valleys. Likewise, to think of God at all, is to think of his existence and as a perfect being. Thereof, God as a perfect Being has rule of evidence of the necessary demonstration of mathematical truth.

The Relationship between Epistemology and Metaphysics in Descartes

From the foregoing so far, we can see that the relationship between knowledge and metaphysics in Rene Descartes is not farfetched. In metaphysics, the only thing he upheld to be a reality is the cogito- the thinking being. Cogito is the only thing he certainly believed to exist. Nothing else is necessarily true except the thinking thing.

This proclamation as stated in Summer thus read:

I am therefore, precisely speaking, only a thinking thing. That is a mind (mens sive animus), understanding, or reason, terms whose signification was before unknown to me I am, however, a real thing, and really existent; but what thing? the answer was a thinking thing (71).

One thing that should be noted from the above is that Descartes positioning himself as the reality is not inclusive with the physical body. He is strictly referring to that (mind) which is the embodiment of the body. What made him a reality or existence is that "thinking" (the self, the mind, or cogito) as at times referred, which for him is inseparable. What then is thinking? He called it a thinking thing or a thinking being and defines it as "a thing that doubts, understands (conceives), affirms, denies, wills, refuses that imagines also, and perceives" (Summer: 72). In other words, if it would be possible to change his name, Descartes to a thinking being, he would have done it but within himself, he knows himself to be a thinking being'. While in his epistemology, he maintained that the edifice of knowledge is found upon the foundation of intuition and deduction. It was via intuition (in the light of reason) that he was able to find the cogito as a reality. Hence he provided the certainty of the cogito deductively. With the use of intuition and deduction, said Descartes, leads thereby moving from the known to the unknown.

Secondly, he acclaimed reason as the only source of true knowledge. He discarded the senses as the source of knowledge which for him is deceiving, unreliable and confusing. Reason is clear and distinct in the approach of knowledge. And in his metaphysics, he used same reason to prove the existence of God for reason was given to him by God, and cannot deceive him but rather more reliable.

Thirdly, in his epistemology, he made it known that he wanted to make all knowledge a "universal mathematics'. Mathematical knowledge is for him certain, universal, clear and distinct. If we use mathematical method of thinking and apply it to other thing, we can still discover the true knowledge. For instance, the method we used in knowing the degree of other angles in triangle, the same method of reasoning can as well be used in other field. Though, mathematics itself is not the method but such method we used in attaining mathematical truth. Also in metaphysics, he proved God's existence through mathematical demonstration by citing a triangle. Hence, to think of a triangle is to think of its three-sided figure. Likewise, to think or talk of God at all is to think, not only of His existence but also as a perfect being.

Epistemology and Metaphysics as the Route of Development of Modern Science

Tracing the development of modern science will attract some questions which invariably will take us to the bottom i.e. the mother-cause which is epistemology and metaphysics. Epistemology as it "inquires into the reality of knowledge: its possibility, means, extent and forms. It assures us of certainty in our engagements as knowing and acting beings" (Iroegbu: 27). And metaphysics as the branch of philosophy studies reality as it is in its most comprehensive scope and fundamental principles, the science that tries to determine the real nature of things. Nevertheless, what really constitutes the proper objects of our knowledge, and metaphysics, its position not only as a

science but as the queen of the sciences? This question is the bone of contention which from answering will automatically place us at the apex level or rather the concluding part of the essay. Notwithstanding, this will take us back to the etymological meanings. Etymologically, the word metaphysics signifies what comes after physics. Its origin is traceable to Aristotle and his students in ancient Greece. Before his death, Aristotle left some treatise, which he named "first philosophy". Later on his students rearranged these in a systematically readable manner. At the compilation of this task one of them, Andronicus of Rhodes entitled it metaphysics. There are two possible reasons why this title was given to the treatise:

Either because it comes after the treatise on physics (meta ta phusika - that which comes after physics), or because the issue discussed in this treatise are about things that transcend the physical world. Yet the etymological meaning does not tell us much about metaphysics as the base of science.

Considering metaphysics as a discipline or science, there is no one commonly accepted definition among metaphysicians. But all the views boil down to the question or search for the ontology, ultimate reality, the world as a whole, the first principle etc., through a definite process. In the words of Copleston, metaphysics is "non-empirical science (or alleged science) which claims to transcend experience, attaining to knowledge of purely intelligible (non-sensible) realities by means of a priori concepts and principle" (9). A closer look, however, reveals that through the a priori concepts of the mind, which include necessity and contingence, and the natural light of reason, metaphysics is capable of discovering the first cause of the highest principles. Okoye affirmed this when he stated that:

Metaphysics, in its study of being or things in general way discovers "Laws of being" which are universally valid for all reality, obtains conclusions, applicable to all beings (although they apply to them in varying ways and degrees) in a direct manner: the spiritual beings and ultimately reaches God as the first cause of the being of all things (54-55).

Going by Descartes' philosophy, we shall still note his acclamation that all knowledge originated from God the perfect Being. And whatever is knowledge is knowledge of Being, which is the final cause to all other things. No wonder why philosophers both before and after Kant's devastating criticism of traditional metaphysics had seen true metaphysics as "the transcendental analysis of the contents of human mind" (Iroegbu: 22). They continue to understand metaphysics as transcendent. Thomas Aquinas for instance said that "it is the ultimate explanation of the mystery of being (causal and final) which is God" (22). Descartes affirmed that, "it is the knowledge of things which lie beyond sense experience" (22). On the other hand, Heidegger considered it to be "the ontological inquiry into the "Sein", "being" or "to be" of all there is: why there are essences (things) (22). In short, looking at the above mentioned philosophers, their descriptions, we discovered that they all considered metaphysics as study of the final cause.

Furthermore, in this investigation, the metaphysico-science, through the mathematical description of science that was adopted by the Renaissance scientist, Descartes copied their method to philosophy. Because he discovered that among all the truth of sciences, it is only mathematics that guarantees the certainty of scientific knowledge. He confirmed this when he said:

Considering also that, of all those who have hitherto sought for the truth in the sciences, it has been the mathematicians alone who have been able to succeed in making any demonstrations, that is to say producing reason which are evident and certain, I did not doubt that it had been by means of a similar kind that they carried on their investigations (Descartes: 3).

Therefore, since the use of mathematics emerged in the renaissance as the ingredients of the new method of scientific thought, it is as well, Descartes' new method of philosophical thought.

Descartes' new method of scientific thought is not like that of pure mathematics. It is rather a kind of quasi mathematical style, from sure and certain principles. He started by emphasizing the experimental method and regarded experiments as merely illustrating the ideas that had been deduced from the principles given by intuition. Descartes was primarily concerned with the deduction of the general scheme of things from first principles. Descartes distinguished between analysis and synthesis. 'Analysis' is the practical way things are discovered. While 'synthesis' is the theoretical way the same

things can be deduced from first principles. He said that synthesis alone was used by the ancient geometers in their writing, but it does not satisfy as does the other method, nor does it content the mind of those who desire to learn, for it does not show the way in which the thing was discovered.

The Pythagoreans had maintained that number is the essence of all things; that the perfect heavenly bodies must have the perfect form of a sphere, and that their motions must be circular and uniform. Descartes did not subscribe to this Pythagorean idea that mathematical considerations determined the structure of the world. Rather he was of the view that mechanical considerations determined the form and motions of the heavenly bodies, and all the operations of nature. For him mathematics was only a methodological device. According to Uzoma, Descartes criticized the attitude of pure mathematicians, saying that "there is nothing more futile than to busy oneself with bare numbers and imaginary figures (94).

Likewise, Descartes' rejection of traditional science made him to go by the tradition of Plato but created an important difference between Plato and himself. For Plato, mathematics yields rational knowledge of an independent domain of forms in which there is no admixture of anything material, changeful, or sensible. For Descartes, however, it is mathematical physics and not just pure mathematics that can give us rational, demonstrative knowledge. We can have mathematical knowledge of the material, sensible world-the world of bodies in motion. The concept of the physical universe as a mathematical intelligible mechanism is what distinguishes Descartes' rationalism from Plato's vision of human reason exploring a timeless and independent domain of forms.

Thus, Descartes was a creative mathematician. His discovery of the fundamental principles and techniques of analytic (coordinates) geometry marked an important milestone in the history of mathematics and science. Hitherto, geometry on the one hand, and the theory of number (arithmetic and algebra) on the other, were independent disciplines. Descartes showed how to unify these discipline; how to write algebraic equations for geometric curves and other spatial figures. The rich and powerful language of numbers could now be used to express the basic facts about spatial structure and geometric relationships. Descartes' approach to physics was dominated by the conviction that analytic geometry is the ideal mathematical language for describing physical phenomena. Descartes assumed that the entire domain of physical phenomena could ultimately be brought within the scope of the science of mechanics, that part of physics dealing with the motion of bodies.

Descartes also used this in discovering the reality. It must be noted; however that mathematical demonstration as used by Descartes is a science (search) of satisfactory explanations. It is a search for the ultimate reality, which metaphysics remains the bedrock. Thus, mathematics and metaphysics are referred to as formal sciences due to their formal and deductive character. Hence:

Science is said to be formal if its contents, arguments and procedures obey certain rules. The results and conclusions are valid and authentic only if they conform to those rules. For example in mathematics, we have rules of addition, substraction, multiplication and division. We have rules for solving certain equations and problems, theorems etc (Nwala 2).

We can from the above, note also that for us to make our thinking and reasoning scientific there are laws of thought. There are rules of reasoning and procedures for our general arguments, which is undoubtedly found in logical or mathematical logic.

In addition, Wallace, confirmed the inevitability of philosophy (i.e. metaphysics) when he identified and distinguished between two basic classifications of science. He said: Although science can be classified in various ways, one of the most basic divisions is that into speculative science, which concerned primarily with knowledge and not with doing and practical science, which is concerned with knowing as ordered to doing (1191).He went further to identify speculative sciences to include, natural sciences, mathematics and metaphysics - each with its own subject and its proper principles (1191). Due to the subject matter of metaphysics and its formal objects as identified above, the traditional metaphysicians have crowned it the queen of the science. As a matter of fact, it is the only science among all identified above which deals most intensively and extensively with that which lies beneath all scientific inquiry, speculative and practical-"Being". Ewelu concretized this view by saying that:

The concept of Being is so fundamental that we cannot think of anything whatever without first being aware of the fact that it exists. Being serves as the background of all inquiries. It is in this sense that metaphysics is said to be the most fundamental of all sciences. Before ever you carry out the science of anything at all, you have to establish that thing exists, that it is a reality. The natural scientists can presume its existence, but it is the duty of the metaphysicians to establish its reality (3).

In fact, while other sciences ask questions based on the nature of particular things, metaphysics, as the queen, ask far more general question; a question each science must ultimately take into account, namely, what does it mean to be anything whatsoever?

Above all, the discussions above have given an eloquent testimony to the fact that the seventeenth century brought unparallel advances in many areas of sciences. Scientific postulations, the interpretations of which were taken for granted in the ancient and the medieval period, hitherto have their scientific explanations clearly given. At least the spirit of the eighteenth century enlightenment was drawn from the scientific and intellectual revolution of the seventeenth century. The enlightenment accepted and popularized the ideas of Bacon and Descartes, of Boyle and Spinoza, and more importantly, of Locke and Newton. It emphasized the philosophy of natural law and natural right.

It relegated tradition and exalted the powers of human reason and of science, and was so strongly convinced the regularity and harmony of nature and equally so deeply imbued with the sense of civilization and progress (Uzoma: 98). It is therefore worthy to note that most of the natural philosophers of the seventeenth century especially Descartes who is a core rationalist, had shown great interest in the experimental, theoretical, and the applied aspects of science.

More so, the possibility of metaphysics as a science has its root from the metaphysical inquiry. That is, having a definite process of attaining knowledge beyond sensation. In this regard, metaphysics is therefore, a universal science because of its basic, fundamental and rational enquiries. It studies the ground, basis and foundation of all reality. It is also known as a first philosophy because it searches for the first causes of all things, what is common to the totality. Whatever is or has reality comes under the scope of metaphysics. And to cap it all, for Descartes, all knowledge is from God the perfect being. Therefore, whatever is knowledge is knowledge of Being. Meaning, the knowledge or wisdom which generates the development of modern science is from God - the absolute Being that makes all other beings.

Conclusion

The discussion above shows that there is a core relationship between Descartes' concept of metaphysics and epistemology. Both of them are inter-locked. And his metaphysical outstanding proves that metaphysics is possible as queen of science. Though, metaphysics is possible as science but a science of some special kind. We therefore conclude that metaphysics is not science when it regards with doing and practical, for there are those who believed that a science is something with a fixed and final stock of certainties.

The practical effect is their major concern. But for those who regard a science as a field of inquiry where research with certain, attitudes and methods, metaphysics is certainly a science because it concerned primarily with knowledge. Therefore, metaphysics (traditional) is not simply a mere empirical science as other sciences. It is rather a kind of science that deals most intensively with speculative inquiry. It lies beneath all scientific inquiry- to establish its reality via critical, methodic and systematic means.

Thus, for one to possess any scientific knowledge of any level, it is necessary that one must be in a position to give reasons for his affirmations. He should make the knowledge progress in an organized manner. These require a reflection and distinct knowledge of the motives which regulate one's proper affirmations and motives that have the characteristics of universality and necessity like that of mathematics.

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