

'IGWEBUIKE' PHILOSOPHY OF SCIENCE AND TECHNOLOGY

Ikechukwu Anthony KANU

Department of Philosophy and Religious Studies

Tansian University Umunya, Anambra State

ikee_mario@yahoo.com

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Abstract

Contrary to the opinion of some scholars which holds that science is independent of particular worldviews in its presuppositions and method, this paper argues that although the presuppositions of science have no worldview content, science may provide evidence that has a bearing on a certain worldview. This dependence on a worldview is what gives science some level of political autonomy; that is, some kind of scientific citizenship in philosophy that gives credence to a form of local knowledge, and thus, gives voice to a group of people. This is very important as science and technology is not just about doing or making by hand; it involves not only human activities, but also the skills of the craftsman or woman, which does not leave out the art of the human mind that does the manufacturing. It is on this basis that this paper studies Igwebuike as the basis for science and technology in Africa. Igwebuike falls within the parameters of the art of the African mind. It shapes the African thinking as it is the basis of the African logic. At this point, science and technology become a revelation of the Igwebuike framework. This piece, therefore, studied how Igwebuike impacts on science and technology through its determination of the logic (nka) employed in science and technology. It discovered that the African worldview conceptualized in Igwebuike is capable of a science that is anchored on the structure of the African world. For the purpose of this study, the Igwebuike complementary method of inquiry was employed.

Keywords: *Igwebuike, Science, Technology, Pillar, Logic, Worldview, Complementarity*

Introduction

Scholars like Cherry (1965) and Okonkwo (2012) observe the importance of a people's language and worldview in the shaping of their thoughts, including thoughts and developments in the areas of religion, philosophy, science, technology, among others. He writes:

The language of a people largely constrains their thoughts. Its words, concepts and syntax, out of all the signs that people use, are the most important determinant of what they are free and able to think. It makes their particular epistemology, their special view of the world, and what they notice or do not notice, (p. 73).

It is in this regard that Fuller (cited in Okonkwo, 2012) speaks of a scientific citizenship in philosophy that should be “designed to give credence to a form of local knowledge... to retain a certain level of political autonomy” (p. 73). The implication of this is that every language community has its own science and technology, which should be integrated into what is now known as technology. This, according to Okonkwo (2012), would deepen ordinary democratic franchise by giving voice to a group of people.

Moreover, if science is understood as “an organized, systematic enterprise that gathers knowledge about the world and condenses the knowledge into testable laws and principles” (Wilson 1998, p. 58), and in the perspective of Afisi (2016) “as the concerted human effort to have a clear understanding of the history of the natural world, and how the natural world works, with observable physical evidence as a basis for that understanding” (p. 59), it then implies that peoples and societies, both local and advanced rational and intellectually open societies, are capable of science, even if it might not be in full accord with what the West has developed as science. Beyond the reality of pluralism in the world, science has a social character that makes it part of social and cultural traditions, and it is at this point that we can speak of particular worldviews as characterising different sciences. It is also within this context that *Igwebuike* philosophy of science and technology is discussed.

An understanding of technology makes profound the idea of the social character of science and technology. Technology is not just about doing or making by hand, it involves the skills of the crafts-man or woman, which involves the art of the human mind. The art of the human mind is shaped by particular worldviews, and, therefore, the source of the influence of the worldview on science and technology. To understand the power of worldview on a particular science and technology, there is the need to go back to the definition of technology. Etymologically, it stems from the Greek *techné*, which designates “skill,” “art,” and “craft,” a mode of doing or making. It is in this spirit that Plato understood politics as fundamentally belonging to the domain of *techné*, politics as first and foremost a political skill to be learned, an art or, better yet, a kind of technology of the *polis*. *Techné*, in the original Greek usage, refers to both the skill or power of doing/making and that which is performed, produced, or fabricated—in other words, *techné* designates both art and artifice. From this perspective, *techné* (art/artifice) is opposed to *physis* (nature), most fundamentally in terms of causality. Thus, *techné* implies a mediation by an external agent (Reason) to an

object in order to bring about change in it, which means that the principle of change is here foreign to the object (Nadal 2012).

Technology is a product and performance of man's dealings with *physis* through *techné*, the bridge is the materialization or actualization of an intended, desired end (Jean-Luc 2000). Thus, Heidegger (1977) writes that: "The manufacture and utilization of equipment, tools, and machines, the manufactured and used things themselves, and the [social] needs and ends that they serve, all belong to what technology is" (p. 288). It can be, therefore, said that science and technology only become a revelation or the bringing forth of what the art of the mind conceals.

It is from the context of the dynamics of 'the art of man' and the 'artifice' that this work studies *Igwebuike* (which conceptualizes a worldview) as the basis for science and technology in Africa. *Igwebuike* falls within the parameters of the art of the African mind. It shapes the African thinking as it is the basis for African logic. From the forgoing, science and technology become a revelation of the *Igwebuike* framework. This piece would, therefore, study how *Igwebuike* impacts on science and technology through its determination of the logic (*nka*) of the scientific and technological. It argues that the African worldview conceptualized in *Igwebuike* is capable of a science, notwithstanding that it is a predominantly religious worldview. What a worldview provides is the framework capable of responding to several questions at the same time, be it in the area of science, religion, politics, economics, etc. It is in this regard that worldview would be understood as a world of possibilities.

Worldview as a Framework for Science/Technology

Gauch (2007) outlines seven pillars that define and hold science. These pillars include:

1. **Realism:** It holds that the world is real. If it were not real, then it cannot be studied or analyzed
2. **Presuppositions:** It holds that the world is orderly and comprehensible. If it were not comprehensible, then it wouldn't be studied by science.
3. **Evidence:** This means that science requires empirical, public evidence for its conclusions.
4. **Logic:** It holds that scientific thinking employs standard logic.
5. **Limits:** It holds that science has limits; it cannot explain everything.
6. **Universality:** This holds that science is open to all people from all cultures; in principle, anybody can engage in scientific activity.
7. **Worldview:** This states that science contributes to a meaningful worldview.

Developing his thesis further, Gauch (2007) argues that science is independent of particular worldviews in its presuppositions and method. This notwithstanding, he avers that science can have worldview import. Interpreting the position of Gauch, Irzik and Nola (2009) write:

We understand this as follows. Gauch believes that although the presuppositions of science and scientific method/reasoning have no worldview content, science may provide evidence that has bearing on a certain worldview belief, say *p*. Such evidence can be employed as a premise in an argument. Then using scientific reasoning (that includes standard logic), *p* is reached as a conclusion. Gauch seems to think that this is the only way science is relevant to worldview beliefs—if, that is, they can be obtained as the conclusion of an argument that contains evidence as one of its premises. Let us call this the argument–argument. (p. 735).

Reacting to the position of Gauch, Irzik and Nola (2009) argue that science does have worldview content, even in its presuppositions and method. In other words, the scientific method is not worldview-independent. Thus, science, in the quite minimal sense, has worldview content in other respects as well.

This content derives from its presuppositions that include its criticizability, logic, the orderliness and the comprehensibility of the world, from its method of inquiry and mode of explanation. Of course, science is also relevant to worldviews by also providing empirical evidence and then reaching conclusions that have worldview content. This is not to say that science can answer every worldview question, but it is a rich and powerful source of worldview beliefs. Furthermore, by challenging, confronting and conflicting with other worldviews, it forces their defendants to improve upon them. Natural theology, for instance, owes as much to science as it does to religion (p. 744).

This position is based on the fact that the history of science reveals how it emerged from mythological and religious worldviews; using a remarkable episodes in the history of human kind, they made reference to the Scientific Revolution in the 16th and 17th centuries, which was highly influenced by philosophical and religious beliefs. Thus, from the above perspectives, it can be said that science, as a universal enterprise, is independent of worldview; however, in relation to the person who does the science and the influence of his or her background, science can be said to have a worldview.

African Worldview (Logic) and Science in Africa

Like the discussion on whether there is an African philosophy or not, there has been a debate on whether there is an African science or not. This section of this paper joins the position of scholars who have argued for an African science, and the basis which this piece provides for the possibility of an African science is the African logic. It is the African logic that shapes what Ezeabasili (1977) refers to as the “African account of nature and how it works” (p. xi), or what in the contention of Murfin (1992) is Africa’s attempt to unfold the truth in nature. The idea of an African attempt to unfold the truth in nature or give an account of the workings of their universe points to the pluralism in science, involving the inquiries of systematic cultures.

One of the pillars on which science stands, as seen in the work of Gauch (2007), is logic. It is also logic that gives and directs the scientific process and findings. It is at the point of logic which is embedded in the African worldview that the African worldview makes its distinctive impact on science in Africa. Speaking of African logic, the focus is on the structure of African thought. Every culture or people have their own peculiar way of thinking or reasoning, and it is the African pattern of reasoning that has led to an investigation into the African logic. Speaking on the diversity of logic, Momoh (1989) relates logic to human language which differs from culture to culture:

In everyday usage of natural language we talk of a person as being logical if he is reasonable, sensible and intelligent; if he can unemotionally and critically evaluate evidence or a situation; if he can avoid contradictions, inconsistency and incoherence, or if he can hold a point of view argue for and from it, summon counter-examples and answer objections. (p. 174).

The adjective ‘African’ attached to the word ‘logic’ speaks of the context or the *locus* of logicity. It is the application of reason to the world and culture of the African people (Kanu, 2017). There are two implications to this:

First, it sees logic as a universal phenomenon. This is very important, since logic is a fundamental ingredient of the human person whose thoughts and thinking are organized, analyzed and sustained by some intrinsic structures that make the way for a systematic conception of reality. This being the case, it can be said that logic is thus a necessary element of every culture. There is no culture that does not accommodate a good argument, especially as it concerns their conclusions. Whether in Africa or in Europe or in America or in Asia, if the assumption of an

argument is true, the conclusion of the argument would always be true. For instance:

If Njoku is an African philosopher,
then Njoku is a great African thinker,
Njoku is an African philosopher,
Therefore, Njoku is a great African thinker

If Kanu is shorter than Emeka,
then Kanu should be taller than Usman
Kanu is taller than Emeka
Therefore, Kanu is taller than Usman

These are arguments that are logical and cannot be accepted in one culture and rejected in another culture. Their conclusions are all acceptable as their assumptions are true. Thus, the principles of logic are universal principles that could be generally applied to diverse situations, no matter where. They are, thus, topic-neutral and con-contingent, in the sense that they do not depend on any accidental features of the world.

Second, there is the particularity of logic, by which is meant the context in which logic is applied. It speaks of the worldview which differs from one place to another; this bears on the universal application of logic. While logic is universal, it is clear knowledge that the cultural experiences of people are meaningful within the context of an organized language that points to a logical ability- it is a people's language that communicates their logical world. It is in this regard that Kuhn (1962), in his incommensurability theory, speaks of competing paradigms without a common measure, and Feyerabend (1981) holds that there does not exist a single scientific method that we can agree on as the "events, procedures and results that constitute the sciences have no common structure" (p. 1).

Following from the construct of the African ontology which is complementary, African logic in general is complementary and integral in character, accepting the co-existence of opposing realities as complementary. It is based on its capacity for complementarity and openness to co-existence of opposing realities that it is described within the context of *Igwebuiké*. *Igwebuiké* is the modality of being in African philosophy. It is from the Igbo composite word and metaphor *Igwebuiké*, a combination of three words. Therefore, it can be employed as a word or used as a sentence: as a word, it is written as *Igwebuiké*, and as a sentence, it is written as, *Igwe bu ike*, with the component words enjoying some independence in terms of

space (2018a). The three words involved are: *Igwe* is a noun which means 'number' or 'population,' usually a huge number or population. *Bu* is a verb, which means *is*. *Ike* is a noun, which means *strength* or *power* (Kanu, 2018b). Thus, put together, it literally means 'number is strength' or 'number is power'. Beyond the literal sense, it speaks of *otu obi* (one mind and one heart), asserting that when human beings come together in solidarity and complementarity, they are powerful or can constitute an insurmountable force or strength, and at this level, withstand the probabilities of life. *Igwebuike* is, therefore, an African philosophy of harmonization and complementation. It understands the world immanent realities to be related to one another in the most natural, mutual, harmonious and compatible ways possible (Kanu, 2016a&b). Thus, 'to be' is 'to be with the other', in a community of beings (Kanu, 2017a).

The African worldview, therefore, is ruled by the spirit of complementarity, which seeks the conglomeration, unification, summation of fragmented thoughts, opinions and other individualized and fragmented thoughts and ideas. It understands reality within the context of the whole being greater than the corresponding parts. It is also a view that maintains that by the coming together of the individuals or parts, a viable and sustainable whole will emerge (Kanu, 2017b). Because *Igwebuike* captures the dialectical character of African thought, it is referred to as African logic. And by dialectics, it is meant a method of philosophical argument that involves some sort of contradictory process between opposing sides. In African logic, there is the reliance on the contradictory process of opposing sides, though in a unique manner. For instance, day is vivified and complemented by night, and good by evil. The adage that "*Abasi obot mbat, abot udara ikpat,*" meaning "the God who creates mud made available something to wash off the mud", explains this fact of the complementarity of contradictory realities. The two realities - "mud" and "water" - are mutually opposed, but are two sides of the same coin. Anyanwu (1981) describes this contradictory dialectics as the "inner curve of reciprocity" (p. 87) that makes African epistemology to avoid the dualism of subjectivism and objectivism. The contradictory dialectics is not negative but affirms the functionality of differences as essential and incomplete dimensions of the whole.

The Openness of African Science

The Nri hegemony and its influence on Igbo history cannot be over-emphasized. Thus, Madubuko (1994) observes that the story of the Igbo, no matter how briefly considered, would be incomplete if one omits the Eri-Nri contribution. Afigbo (1981) shows Eri clan as originating from the regions of Anambra River, at Aguleri; from there they fanned eastward and established various communities.

In a discourse of this kind on African science and technology, knowing full well the place that Nri myth occupies in Igbo history, religion and culture, it would not be out of place to search beyond the surface of the mythology of Nri to discover profound 'senses' of African science and technology.

The myth has it that Eri is the father of all Nri; and tradition says that he came from *Chukwu*. It is reported that the earth was not firm when he came to the world. To solve the problem of flood, he employed blacksmiths from Awka to use their bellows to dry the flooded land (Uzukwu, 1988). That Eri, the father of all Nri who came from *Chukwu*, needed blacksmiths from Awka to use their bellows to dry the earth already shows the dialogue between philosophy, religion and science. In spite of the fact that *Chukwu*, with all His wisdom and knowledge, would allow for his son to employ the help of these traditional scientists and technologists, the fact is established that science and technology are also part of His divine arrangement for the human person achieving his purpose in life, and thus, does not contradict the divine purpose, if employed in proper perspective. Within the context of *Igwebuiké* philosophy of science, in spite of the fact that philosophy religion and science deal with different aspects of human life and the existence of the universe, these areas of study achieve their full potentials only when they collaborate with other areas of study.

This notwithstanding, there are two major implications that can be drawn from this myth in relation to the African concept of science.

1. Science as an independent dependent Worldview

There is a seeming categorization of worldviews into different types. Freud (1933) categorized worldview into religious or philosophical and rational or scientific worldviews and understands the categories are completely independent from each other. Irzik and Nola (2009) made categorization of worldviews into religious, philosophical, political, cultural, scientific, etc. These categorizations are done in a manner that poses that these worldviews are antagonistic to one another. Obviously, science is a special cognitive activity aimed at objective and systematic knowledge about reality, different from religion which is based on faith or mystical experience, and also different from philosophy which studies the fundamental characteristics and principles of reality. In spite of their uniqueness as areas of study with different interests, there is always a meeting point, where an aspect of one influences or flows from the other.

The categorization of religious worldview that is differentiated from others on the basis of the predominance of the belief in a universal spirit: God, deity or divine entity, in which the divine entity has established a moral order which is known to human beings, and human beings have a moral duty to obey it as it has future consequences in relation to life after death, with a comprehensive perception of the world. Under this categorization, you find the mythological worldview, especially when it uses myths, folklore or legends believed to be supernatural and true for the interpretation of nature, universe, events and humanity. The distinction between religious and mythological worldviews, notwithstanding, a mythological worldview can also be a religious worldview. Non-religious worldviews also include the philosophical worldview, which uses logical reasoning, mathematics and speculation to interpret and provide answers to fundamental questions about reality. The third is the scientific worldview, which uses the premises and findings of science in explaining the meaning of life, morality, creation, etc. Although it is more exact and authentic, it does not provide meaning to existence as it is limited to the material realm.

The researcher's argument is that a scientific worldview can still have elements of religious beliefs. The fact that a person is a scientist does not necessarily mean that the person ceases to have a religion. One can be a Christian or a Muslim and still be a scientist. More so, science can still emerge from a worldview that is dominated by religious perspectives. This is very important because the African worldview is highly considered to be a religious worldview. If understood purely as a religious worldview, then it would be incapable of science and technology. And yet science emerges from the African worldview. It is on this basis that the researcher argues that worldviews are not independent but dependent. Science itself is not an independent field of human inquiry as it requires other perspectives in the search for the meaning of life. It is, therefore, understood as an independent dependent worldview. This explains why Eri, the son of *Chukwu*, in spite of his rich religious and philosophical background, implored the help of Awka traditional scientists; in this, he showed that science complements philosophy and religion, and vice versa.

2. The Human Person is Central to Science

What compelled Heidegger to write on technology lies in his observation that "everywhere, man remains un-free and chained to technology" (p.287), a situation in which the more technology advances, the more it "threatens to slip from human control" (p. 289). This adversely has affected the ordering of the world - in fact, disordering the world. As a result, a questioning of technology became necessary and urgent for Heidegger. Balancing his critique of technology

further, Heidegger (1966) thinks that there is the possibility of the use of technology in such a way that it would further the being of man:

We can use technical devices, and yet with the proper use also keep ourselves so free of them, that we may let go of them at any time.... We can affirm the unavoidable use of technical devices, and also deny them the right to dominate us, and so to warp, confuse, and lay waste our nature.... I would call this comportment toward technology which expresses "yes" and at the same time "no," by an old word, releasement toward things (p. 54).

From the myth of Nri, when Eri called the blacksmith to come and help him move the water away with their scientific and technological expertise, the myth only resounds that science and technology is relevant only to the extent that it helps the human person to advance and preserve his life. This is based on the fact that the *Igwebuike* worldview is anthropocentric. Man is at the centre of the universe. Mbiti (1970) asserts that "Man is at the very centre of existence and African people see everything else in its relation to this central position of man... it is as if God exists for the sake of man" (p. 92). Corroborating Mbiti's assertion, Metuh (1991), avers that "Everything else in African worldview seems to get its bearing and significance from the position, meaning and end of man" (p. 109). The idea of God, divinities, ancestors, rituals, sacrifices etc., is only useful to the extent that they serve the needs of the human person. Science is, therefore, meant for man and not man for science and technology.

Heidegger's argument against modern technology is that it looks at realities that do not conform to the standard of calculability and utility with suspicion, and addresses such as mere myth or superstition (Adorno and Horkheimer, 2002). Heidegger (1977) describes this as a challenge that "puts to nature an unreasonable demand that it supply energy, which can [then] be extracted and stored" (p. 296).

The work of the peasant does not challenge the soil of the field. In the sowing of the grain it places the seed in the keeping of the forces of growth and watches over its increase. But meanwhile even the cultivation of the field has come under the grip of another kind of setting-in-order, which sets upon nature. It sets upon it in the sense of challenging it. Agriculture is now the mechanised food industry. Air is now set upon to yield nitrogen, the earth to yield ore, ore to yield uranium, for example; uranium is set upon to yield atomic energy, which can be released either for destruction or for peaceful use (p. 15).

He argues that modern technology 'enframes' nature only to capture it; that is, it sees nature merely as a valuable material resource to be extracted, expropriated, and used-up for whatever man desires or wills of it. Under conditions of modern technology, "the earth," as Heidegger (1977) notes, "reveals itself as [only] a coal mining district, [its] soil as a mineral deposit" (p. 296). He believes that modern technology sees the world as an energy resource, a thing to be used, what he describes as a "standing-reserve" (p. 309).

Taking from the African complementary perspective of reality, nature is not just as a thing to be exploited; nature is part of a whole to which we belong as human beings. The exploitation of nature by science and technology is the exploitation of oneself because one belongs to nature as one is a part of nature. Thus, to treat nature with respect is to treat oneself with respect, and to treat nature without respect is to treat oneself without consideration and respect. More so, science and technology is meant to advance the freedom and humanity of the human person, and not to bring about human slavery.

Conclusion

Ozumba (2004) observes that every society has its own stock of epistemological thoughts, methods and worldviews. This assertion is fundamental to epistemology as the quest for knowledge is part of human nature; and thus, it is the prerogative of every culture or tradition. Like every other people, the African has his/her own method or means of acquiring knowledge, which is based on what Bacon (1952) calls the alphabets or forms of the world around him/her. Nature consists of alphabets or forms, and the discovery of these alphabets or forms of nature helps us to understand the multifarious complexities of the universe in which we live. Beneath the surface, *Igwebuiké* philosophy of science understands science and technology as a collective achievement of the 'art of the human mind' and the 'artifice' involved with the purpose of generating a new order upon nature. The understanding of the dynamics of the alphabets or forms of nature involved in the process equips us better in the transformation of bodies, as these forms (the art of the mind and the artifice) are the determinants of the fundamental structure of the world.

A basic form or alphabet within the parameters of science and technology is the 'art of the mind' which flows from the worldview of the scientist and the technologist. It is from the worldview that the artifice of the scientist or technologist emerges (that is, the pragmatic side of science and technology). The artifice, therefore, reveals the art of the mind. It is on the basis of the discovery of these forms that the discourse on *Igwebuiké* philosophy of science and technology

is possible. The understanding of the nature of the forms involved in science and technology in Africa would help us understand the secret motions in the scientific and technological enterprise in Africa. In this, we see science and technology in partnership with nature to provide human needs in an environment in which they must survive by sustaining the existential grid in a cooperative fashion.

In discovering the forms of nature and the utilization of these forms for the betterment of human life, *Igwebuiké* philosophy of science understands this pursuit or enterprise as a collaborative effort tailored towards the needs of the human person in a challenging universe. Since it is a collaborative effort, *Igwebuiké* philosophy of science and technology does not in any way see science and technology as independent fields of human inquiry, but in a spirit of complementarity with other fields of human inquiry work towards the achievement of a balanced solution to human needs or problems. This is the complementarity that produces a scientific citizenship in philosophy, which gives credence to a form of local knowledge. It is only within this context that we are able to speak of an *Igwebuiké* philosophy of science and technology.

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