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Scientific enquiry and African culture: Exploring trajectories, nature and form

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ABSTRACT

Africa has rich cultural diversity, with indigenous knowledge at different levels serving as tools for its socio-economic development. While there seems to be some tension between scientific exploration and religio-cultural ontology, it is worth noting that science has long been part of African Culture, albeit indigenous in nature, making the African approach to science different from the Eurocentric approach. Therefore, this article examines African culture and traditions to showcase its appreciation of science, however, within its own worldview. Relying solely on secondary sources of data, it seeks to ascertain the relationship between African culture and scientific enquiry. This article contributes to the discourse on African epistemology by arguing that the African approach to science integrates what it observed in everyday life with broad philosophical ideas that can contribute to the global scientific discourse. It concludes that a well-developed outline for an African scientific approach is critical in Africa's effort to engage in scientific dialogue between its culture and global science.

Keywords: Culture, Science, Scientific Enquiry, African Culture.

INTRODUCTION

Over the years, the growth of science and technology has been at the forefront of human development, life, and pursuit. Many countries in Africa have sought to project their own scientific narratives despite the overarching discourse that seems to project that science has been a European phenomenon. Thus, researchers such as Kuhn and Harding have remarked that it is common to portray scientific research as a global, culturally neutral endeavour based on objectivity, reason, and empirical validation.[1] This presumption has been contested, however, by expanding research in the philosophy, history, and sociology of science, which shows how scientific knowledge is intricately entwined with particular cultural, historical, and social contexts. For instance, both Wiredu and Hountondji observed that African culture has often been marginalised or distorted in this broader discussion, with indigenous African knowledge systems being

[1] Thomas S Kuhn, *The Structure of Scientific Revolutions*, vol. 962 (University of Chicago press Chicago, 1997); Sandra Harding, *Is Science Multicultural?: Postcolonialisms, Feminisms, and Epistemologies* (Indiana University Press, 1998).

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disregarded as unscientific or excluded from prevailing scientific narratives.[2] As a result, there is now an epistemic hierarchy that undervalues the empirical underpinnings and intellectual rigour of African ways of knowing while elevating Western scientific traditions. This epistemic marginalisation seems to have affected scientific enquiry in African culture, leading to difficulty in recognizing the African Indigenous knowledge system by limiting the ability of its methodology to integrate with modern scientific processes.

It is imperative to note that throughout history, research into nature, health, agriculture, astronomy, and environmental management has been guided by the diverse worldviews, belief systems, customs, and values that constitute African culture. African societies have systematic techniques for monitoring, categorising, and interpreting natural phenomena long before colonial interactions. These techniques were frequently created through oral transmission, cumulative experimentation, and collective validations.[3] The fundamental components of scientific enquiry, such as observation, hypothesis generation, prediction, and practical application, are embodied by these practices, despite their formal differences from Eurocentric models of science. Therefore, the strict division between "science" and "culture," which is frequently made, obscures the pluralistic character of knowledge production and perpetuates colonial legacies in modern epistemology.

Wiredu argues that an alternative epistemological stance that prioritises relationality, spirituality, ethics, and collective responsibility is revealed by examining the character and format of scientific enquiry within African cultural contexts. African epistemologies usually place knowledge within moral, social, and cosmological frameworks, rejecting the rigid division between the knower and the known.[4] These viewpoints offer complementary approaches to understanding complex socio-ecological systems and challenge prevalent positivist assumptions, especially in fields such as climate adaptation, traditional medicine, and environmental conservation.[5] These methods encourage a rethinking of scientific enquiry as a culturally situated and heterogeneous process rather than pitting African culture against science. To make the case that African knowledge systems are valid and methodical forms of enquiry that may contribute to the advancement of international scientific discourse, this article examines the paths, characteristics, and forms of scientific enquiry within African culture. The article aims to promote a more inclusive understanding of science by critically examining historical developments, epistemological underpinnings, and modern applications. This understanding acknowledges African culture as an essential resource for knowledge production and innovation in the twenty-first century, rather than as a barrier to scientific advancement.

LITERATURE REVIEW

According to Akinnawonu and Bolarinwa, Karl Popper defines science as "a systematic subjection to testing of conjectured explanations of matters to be explained whereby objective proven knowledge of the physical, biological, and social worlds is advanced and or extended."[6] On the other hand, Idang opined that Taylor defines culture "as that complex whole which includes knowledge, belief, art, morals, law, customs or any other capabilities and habits acquired by man as a member of society."[7] When these two definitions are analysed together, they reveal a foundational intersection between the two concepts. Although Popper's definition positions science as an objective and systematic pursuit of verifiable truth that functions independently of human biases, Taylor's definition of culture reveals that everything about human existence, including the pursuit of science, constitutes culture. Therefore, science cannot be seen as an intellectual discourse separated from culture; it is a human activity that is basically nurtured and shaped by the cultural matrix of the society that is pursuing it. This realization allows for a departure from the idea of a separation

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[2] Kwasi Wiredu, *Cultural Universals and Particulars: An African Perspective* (Indiana University Press, 1996); Paulin J Hountondji, *African Philosophy: Myth and Reality* (Indiana University Press, 1996).

[3] George J Sefa Dei, "Rethinking the Role of Indigenous Knowledges in the Academy," *International Journal of Inclusive Education* 4, no. 2 (2000): 111–32; Wiredu, *Cultural Universals and Particulars: An African Perspective*.

[4] Francis B Nyamnjoh, "Blinded by Sight: Divining the Future of Anthropology in Africa," *Africa Spectrum* 47, no. 2–3 (2012): 63–92.

[5] Nyamnjoh, "Blinded by Sight: Divining the Future of Anthropology in Africa."

[6] Benson Monehin Akinnawonu and O F Bolarinwa, "Science, Technology and Change: Implications to African Cultural Development," n.d.

[7] Gabriel E Idang, "African Culture and Values," *Phronimon* 16, no. 2 (2015): 98.

of the two, and instead, validates the idea that what a society identifies as objective knowledge is fundamentally bound within its shared way of life and interaction with the environment. It is within this realization that the concept of "nature" as perceived by humans is shaped and defined by cultural frameworks through data.[8] Undeniably, there exists a natural world that continuously influences us and of which humans are biological constituents; however, our understanding of "nature," especially as shared and communicated knowledge, is always mediated and constructed through cultural contexts.[9]

It is worth noting that culture recognizes the important role of humans as both observers and active participants in the world around them. It involves the care and development of both non-living and living things, such as plants, animals, and natural phenomena, as well as the nurturing of the inner life.[10] This inner cultivation forms the foundation for organizing societies and communities. Although science may seem neutral at its core, culture cannot exist, thrive, or decline without being connected to societies.[11] Therefore, in essence, social scientists focus on culture, encompassing human creations expressed through language and manual activities through which culture evolves and is communicated and transmitted.[12] Hence, an attempt to theoretically reduce culture solely to biological, chemical, or physical processes will result in a significant loss of its capacity for prediction and explanation.[13] It can therefore be argued that the natural world and scientific phenomena serve as foundational frameworks for the development of cultural systems and worldviews. Across different cultures, the relationship between humans and nature varies; in some places, it is viewed as fundamental and harmonious, while in others, humans are seen as dominant beings whose role is to subdue and manage nature.[14] These views generally affect how humans behave and develop their environment. This shows that the relationship between culture and science is mutual, implying that culture is developed based on a perceived phenomenon of the environment in which it finds itself. However, this mutual relationship does not mean that culture and science operate identically, especially within the African context.

The Difference Between Scientific Enquiry and African Culture

Africa is a continent with diverse cultural backgrounds, but despite this distinctiveness, it is bound by great similarities, which can be seen in its shared cultural values and beliefs.[15] These shared values for the African include community solidarity among members, community support that emerges especially during challenging times, and tolerance for diverse beliefs among them.[16] This differentiates the African culture from other cultures around the world. For example, certain cultural aspects of Nigerian society may align more closely with those of Ghana than with Eastern or Western cultures, and as such, those found in Asia or Europe.[17] This shows the shared cultural traits within the African continent that create a sense of common identity. Idang rightly argued that culture is at the heart of African daily life.[18] As a result, Ezedike views African culture as "the total of shared attitudinal inclinations and capabilities, art, beliefs, moral codes and practices that characterize Africans."[19] When these shared cultural identities are critically evaluated against scientific enquiry, it becomes clear that the difference between scientific enquiry and Africa's cultural belief

[8] Howard Becker, "Science, Culture, and Society," *Philosophy of Science* 19, no. 4 (1952): 273–87.
[9] Becker, "Science, Culture, and Society," 281.
[10] Kapila Vatsyayan, "Science and Culture. World Affairs," *The Journal of International Issues* 14, no. 4 (2010): 149.
[11] Vatsyayan, "Science and Culture. World Affairs," 149.
[12] Becker, "Science, Culture, and Society," 281.
[13] Becker, "Science, Culture, and Society," 281.
[14] Vatsyayan, "Science and Culture. World Affairs," 156.
[15] Amadou-Mahtar M'Bow, "Culture, Integration and African Renaissance," *International Journal of African Renaissance Studies - Multi-, Inter- and Transdisciplinarity* 2, no. 1 (July 2007): 101–6, https://doi.org/10.1080/18186870701384293.
[16] M'Bow, "Culture, Integration and African Renaissance," 103.
[17] Idang, "African Culture and Values," 100.
[18] Idang, "African Culture and Values," 100.
[19] E.O. Ezedike, "African Culture and the African Personality: From Footmarks to Landmarks on African Philosophy," *Somolu: Obaroh and Ogbinaka Publishers* 455 (2009), 455.

systems can be seen through the analysis of their different frameworks.[20] Scientific enquiry relies on systematic methods, empirical observation, and experimentation to ascertain factual knowledge.[21] However, the cultural belief systems of Africa do not always agree with these processes. It often presents claims that cannot be easily tested and checked more objectively.[22] The African cultural beliefs, for example, are fundamentally grounded in experience, which is usually interpreted based on personal and communal experiences. These experiences are linked to the community lifestyle, including their daily activities as they interact within the society.[23] Unlike scientific data, these cultural experiences fall short of the generally observable factors that characterize empirical study.[24] However, these experiences occur within a community, meaning they are not independent of social context. It is important to note that, over time, communities sometimes undergo changes that can prompt them to adapt their practices and beliefs, which sometimes happens without any scientific enquiry. This dynamic underscores the complexity of defining the boundaries between scientific inquiry and cultures. One common approach to differentiating science from culture is to assert that science focuses on explaining phenomena within the natural world, while culture addresses matters related to the everyday lifestyle of people and their connection to the natural world.[25] Ultimately, scientific enquiry does not concern itself with supernatural beings, such as deities, angels, and non-natural forces, in its explanations. This metaphysical phenomenon highlights the major point of divergence between scientific enquiry and African culture.

METHODOLOGY

This study used a qualitative research design, based on a hermeneutic approach, to analyze and understand how culture and science relate within the African context. Hermeneutics was used as the framework for interpreting the meaning of African cultural practices and the concepts as historically situated expressions of the knowledge required for contextual understanding. The study grounds this approach in the perspective of Tsenay Serequebehan, cited by Chukwuka, who explains that in the "African context hermeneutics is a situated critical and systematic interpretative exploration of our lived historico-cultural actuality."[26]

Therefore, instead of examining empirical primary data, this article applied Serequebehan's framework as an interpretative lens to engage with the secondary source of data as a living philosophical expression of indigenous knowledge rather than static historical data. This approach allowed the study to proceed through successive stages, interpreting from a specific claim to a broader African cultural worldview for deeper understanding. The secondary sources of data included books, journals, unpublished theses, and internet sources. According to Creswell, purposive sampling is important in qualitative research to select materials that best help the researcher address the problem of the research study.[27]

The secondary sources of data were therefore selected through a purposive sampling procedure guided by the relevance of the scholarly work to African indigenous knowledge and science, with priorities given to African-based scholars with comparative Western perspectives. The analysis and discussions involved reading the selected literature and identifying recurring concepts from across the sources. These concepts were synthesised into themes for interrogation and interpretation according to the internal coherence and comparative resonance within the African cultural and scientific inquiry framework. This approach

[20] Petteri Nieminen et al., "Nature of Evidence in Religion and Natural Science," *Theology and Science* 18, no. 3 (July 2, 2020): 448–74, https://doi.org/10.1080/14746700.2020.1786221.
[21] Aderajew Alem, "African Systems of Thought and Scientific Knowledge" (Addis Ababa University, 2016).
[22] Nieminen et al., "Nature of Evidence in Religion and Natural Science," 462.
[23] Ian G. Barbour, "Experiencing and Interpreting Nature in Science and Religion," *Zygon* 29, no. 4 (1994): 459.
[24] Barbour, "Experiencing and Interpreting Nature in Science and Religion."
[25] Stanford Encyclopedia of Philosophy, "'Religion and Science.' ," 2022.
[26] Ebele C. Chukwuka, "African Contextual Hermeneutics," *Verbum et Ecclesia* 43, no. 1 (April 19, 2022), https://doi.org/10.4102/ve.v43i1.2406.
[27] John W. Creswell and J David Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Sage publications, 2017).

allowed the researchers to engage African Knowledge on its own terms instead of measuring solely against Western scientific criteria.

PRESENTATION OF FINDINGS AND DISCUSSION

According to Cheikh Diop, cited by Ijekeye, the origins of African science trace back to ancient civilizations, especially those along the Nile Valley, such as Egypt.[28] In many African societies, scientific practices are closely linked to communal values and priorities, which emphasize collective well-being over individual achievements, with scientific efforts directed towards addressing the needs and challenges the community faces.[29] For this reason, Hallen and Wiredu argue that "African culture is very hospitable to scientific inquiry."[30] However, some challenges inevitably arise in integrating diverse world cultures into a unified global knowledge system, largely because not all cultures have cultivated the critical enquiry skills essential for scientific exploration.[31]

Consequently, African science adopts a different approach from that of the West; it instead focuses on how everything within the culture and society is connected.[32] This approach is embedded in its indigenous knowledge and cultural norms, which help to add to the growing global discourse on scientific inquiry. For this reason, Chris Akpan, cited by Ijekeye, highlighted that Africans have been using empirical methods long before the dawn of contemporary science.[33] A typical example is the use of fermented palm wine to produce gin through a method now called distillation,[34] which demonstrates the relevance of African science beyond the role of merely supplementing modern science.

Despite its emphasis on a community approach, African Science enriches rather than stalls the ability to explain natural occurrences.[35] Through the inclusion of indigenous knowledge and observation, African science contributes significantly to global scientific knowledge. Hallen and Wiredu posit that the Akans developed simple technologies that were important to their cultural setting, reinforcing the view that scientific enquiry has very deep roots in African cultural history.[36] It can be argued that Africans have the potential to achieve scientific literacy, particularly if science is understood as a human endeavor embedded within human culture. This perspective is notably supported by Harding, cited by Alem, who contends that all scientific knowledge is inherently local or culturally situated knowledge.[37] According to Alem, Harding further argued that the emergence of Western science established the dominant framework of scientific knowledge, which she termed the eternalist epistemology.[38] Although there seems to be a connection between African culture and indigenous scientific thought, certain challenges arise when categorizing some traditional African beliefs as scientific.

The apparent incompatibility between African spirituality and Western empirical study should not be interpreted as a deficiency of the former but as a challenge to the generalization of the assumptions of the latter. This difficulty comes from the fact that certain elements within African culture appear to be difficult to comprehend or apply to tangible progress within the continent.[39] For example, spiritual forces are central to many African worldviews, contradictsing Western science, which is particularly focused on empirical verifiability and physical evidence. Nonetheless, it is important to recognize that various scientific practices in Africa may have their origins in religious and cultural contexts, reflecting the complexities between

[28] Julius Ijekeye, "The Future of African Science in a Global Context: A Philosophical Analysis," in *Leadership, Education and Innovation: Shaping Africa's Role in Global Stability and Development Proceedings of the 2024 International Conference of APAS*, 2024, 68.
[29] Ijekeye, "The Future of African Science in a Global Context: A Philosophical Analysis," 69.
[30] Barry Hallen and Kwasi Wiredu, "Science and African Culture," in *Princeton Workshop Papers. Available Online: Https://Citeseerx. Ist. Psu. Edu/Document*, 2013.
[31] Adebayo Anthony Ogungbure, "African Indigenous Knowledge: Scientific or Unscientific?," *Inkanyiso* 5, no. 1 (2013): 12–20.
[32] Ijekeye, "The Future of African Science in a Global Context: A Philosophical Analysis," 80.
[33] Ijekeye, "The Future of African Science in a Global Context: A Philosophical Analysis," 70.
[34] Ijekeye, "The Future of African Science in a Global Context: A Philosophical Analysis," 70.
[35] Ijekeye, "The Future of African Science in a Global Context: A Philosophical Analysis," 70.
[36] Hallen and Wiredu, "Science and African Culture."
[37] Alem, "African Systems of Thought and Scientific Knowledge," 45.
[38] Alem, "African Systems of Thought and Scientific Knowledge," 45.
[39] Alem, "African Systems of Thought and Scientific Knowledge," 46.

African culture and scientific enquiry. The task, therefore, should not be to render the African indigenous knowledge as empirically unverifiable but to determine the appropriate standards in measuring its variables. Determining these standards requires a proper investigation into the core values, which must be informed by how nature is basically conceptualised and contextualised within the African worldview.

African View of Nature and Science

To the African, nature is deeply rooted in their spiritual world, and as a result, it is given a great deal of reverence because it is considered sacred.[40] A careful look at the importance attached to nature in the African cosmology is visible in the various practices, thereby placing significant credence on the key role nature plays in connecting the natural world to the spiritual world.[41] This is because the African recognizes that natural elements such as animals, trees, rivers, and mountains possess spirit life.[42] As a result, traditional rituals and customs are usually performed for these elements to show their importance and to allow for a peaceful harmony between nature and humanity. For example, rainmaking rituals are used to call on the spirits that are connected with water to make the land fertile, while harvest festivals are used to give thanks for the abundance the earth has provided.[43]

These rituals underpin the essential connection between man and nature within the African belief system, which shows how deep nature and the spiritual realm are linked within the African Cosmology. Through such beliefs and practices, most African cultures collectively foster a harmonious relationship between society and the natural environment. This worldview basically causes the African to deify nature, a term derived from the Latin word "deus" (God), which means the belief that Nature has a godly status. [44] The treatment of culture as divine within African cosmology fundamentally diverts from scientific enquiry, which aims to help understand nature through the application of scientific methods such as observation, measurement, experimentation, and empirical testing.[45] For instance, communities that regard trees, rivers, and/or mountains as abodes of the spirits face a genuine conflict when demands are made to the effect that those places must be sampled or tested for scientific enquiry. This resonates with Nieminen et al., citing the theory of Gaia, which portrays Earth as a living entity that can regulate itself within the African cosmology.[46] Therefore, the difficulty is not ignorance but the understanding that some elements of the earth are held with much reverence within the African community, a distinction that is essential for any productive dialogue between the African cultural worldview and empirical scientific process. This is because the reverence for nature is directly shaped by the way nature operates within the framework of causality, which covers the physical and the metaphysical worlds.

African Causality and Science

According to Unah, the African understanding of causality is shaped by a broader worldview characterized by a profound sense of extraordinary harmony that reflects an integrated unity among all things.[47] Events are interpreted as outcomes influenced by spiritual forces, natural laws, activities of humans and animals, all occurring within a certain systematic sequence.[48] Thus, the African worldview significantly encompasses

[40] Samuel Alifa, "African Traditional Religion and Its Relationship with Nature," *Njiko: A Multi-Disciplinary Journal of Humanities, Law, Education and Social Sciences* 1, no. 1 (2023): 82.
[41] Joseph Omosade Awolalu, "What Is African Traditional Religion," *Studies in Comparative Religion* 10, no. 2 (1976): 1–10.
[42] Alifa, "African Traditional Religion and Its Relationship with Nature,"83.
[43] Alifa, "African Traditional Religion and Its Relationship with Nature,"83.
[44] Mbih Jerome Tosam and Kizitor Mbuwir, "Peter Singer and the Deification of Modern Science: An Ethical Exploration," *Open Journal of Philosophy* 5, no. 01 (2015): 93.
[45] Nieminen et al., "Nature of Evidence in Religion and Natural Science."
[46] Nieminen et al., "Nature of Evidence in Religion and Natural Science."
[47] Jim Unah, "'Ontologico–Epistemological Background to Authentic African Socio-Economic and Political Institutions," *Footmarks on African Philosophy*, 1995, 107–23.
[48] Ikpe Justice Akpan et al., "A Comparative Analysis of Virtual Education Technology, e-Learning Systems Research Advances, and Digital Divide in the Global South," in *Informatics*, vol. 11 (MDPI, 2024), 53.

both the physical and spiritual dimensions of existence in its causal explanations.[49] For example, in the case where an individual accidentally injures himself with a knife as a result of carelessness, it may be attributed to natural causes within the African context.[50] However, when such injuries become severe, the explanations for such are often related to supernatural factors alongside natural causes.[51]

In African thought, nearly all occurrences are attributed to spiritual causes, even ordinary events such as a pregnant woman who accidentally falls and loses her pregnancy. Such incidents are often interpreted through the lens of spirits, who may be perceived as angry and hence responsible for these outcomes. Proponents against the notion of causality for explanation, instead of science, argue that the predominant tendency among Africans to interpret events spiritually can be seen as a key factor contributing to the lower development of science in Africa relative to the Western world. This is because of the basic reliance on the explanation of cause and effect that depends on the metaphysical, which creates a basic division between what is empirically accessible and what remains humanly inaccessible from the outset.[52] When causation is attributed to spiritual entities, scientific enquiry often diminishes, as the spiritual realm is considered beyond human understanding, thereby limiting the search to pursue further empirical investigation.[53] On the contrary, Akpan argued that the African view of causality offers some level of explanation where science ends.[54] This happens because certain phenomena challenge natural explanations, thereby inviting the consideration of extraordinary causes. For instance, Akpan noted that there are documented cases, such as a woman experiencing persistent headaches who, contrary to medical expectations, was reportedly discovered to have a key lodged in her head, and therefore, when such mysterious occurrences elude conventional medical explanation, they are often interpreted within African traditional contexts through spiritual or supernatural lenses.[55] Consequently, a critical analysis of these accounts suggests that the aim is not to position African causation as a direct replacement for scientific enquiry, but to recognize that such instances reveal the culturally embedded nature of all explanation within Africa, demonstrating how even Western scientific prescriptions operate within a cultural context when applied. Therefore, rather than functioning as an obstacle to scientific inquiry, African causation represents a framework that produces an alternative way for the African to make sense of the unresolvable complexities of life.

A study into the African Indigenous Knowledge system will therefore be of utmost importance if the gap between the African view of causality and scientific enquiry is to be bridged. For that reason, Ijekeye argues that African science presents a unique perspective on the natural environment, rooted in a variety of indigenous knowledge systems and worldviews that both question prevailing scientific paradigms and introduce novel pathways for enquiry and understanding.[56] This shows that the causal reasoning of the African is not merely a version of science waiting to be investigated; it poses different questions about how it should be explained, which means that global science will have to engage with Africa's own framework to be able to reveal an empirical scientific process in Africa. These distinct threads of cosmic reverence and causal reasoning, when woven together, demonstrate a systematic way by which reality is processed. This can be described as an epistemological architecture of African science, which is a system that allows African science to function within its own rules and mechanisms.

The Epistemological Architecture of African Science

From the foregoing, African scientific pursuits are deeply intertwined with the surrounding cultural context, which influences both the methodologies employed and the scientists themselves. This implies that the

[49] E. Asira and P Bisong, "Western and African Conception of Cause and Effect: Impact on Scientific Development," *International Journal of Research in Arts and Social Sciences* 8, no. 1 (2015): 24–29.
[50] Asira Enya Asira and Peter Bisong Bisong, "Western and African Conception of Cause and Effect: Impact on Scientific Development," 26.
[51] Asira and Bisong, "Western and African Conception of Cause and Effect: Impact on Scientific Development," 26.
[52] Asira and Bisong, "Western and African Conception of Cause and Effect: Impact on Scientific Development," 28.
[53] Asira and Bisong, "Western and African Conception of Cause and Effect: Impact on Scientific Development," 28.
[54] Akpan, "A Comparative Analysis of Causality in Buddhism and African Philosophy," 729.
[55] Akpan, "A Comparative Analysis of Causality in Buddhism and African Philosophy," 729.
[56] Ijekeye, "The Future of African Science in a Global Context: A Philosophical Analysis," 80.

unique experiences within the environment play a key role in developing different scientific processes that capture and reflect the philosophical and cultural view of nature in African societies.[57] This uniqueness lends credence to the fact that scientific approaches within African society are not all the same.[58] Therefore, the methods involved in undertaking scientific enquiry in Africa may differ from culture to culture. This orientation finds roots in African science, which produces communal specialisation in which one culture has developed expertise in food preservation, another has mastered the craft of metalwork, yet another has deep knowledge specific to its local ecosystem. The point is not merely a case of disconnected diversity, but a distribution of knowledge across communities in a way that mirrors the systematic processes that Western science only tries to formalise. Although scientific practices in the developed world, such as Europe, are advancing rapidly due to improved scientific methods and sustained infrastructure that are focused on the growth of human development, that of Africa continues to evolve along its own trajectory.[59] However, its uniqueness in the global world is that African science within the African context constitutes a structured body of knowledge that addresses various dimensions of reality.[60] Unlike conventional scientific enquiry, which is confined primarily to empirical studies, African science encompasses a broader scope without such limitations. As Afisi noted, this intuitive approach that characterizes African science is innately metaphysical, which may include mystical, religious, and magical elements that integrate spiritual cosmologies with natural phenomena.[61] Consequently, this metaphysical orientation is not structural but philosophical because the system of knowledge is validated through deities, ancestors, supernatural forces, and communal realities rather than falsifiability, making African science operate with an entirely different logic. Yet this does not make it less rigorous; it only means that integrating it into the global scientific discourse will require its own standard of translation and not just incorporation.

RECOMMENDATIONS

This article postulates the need to have an African scientific enquiry that proves that African culture is not against global science. We recommend, firstly, that it is important for African scientists to generate their own scientific language to communicate their scientific enquiry. Therefore, we agree with Ijekeye when he argued that using African Indigenous Languages (AILs) in science communication is of utmost importance within African society in order to advance the understanding of its scientific concepts.[62] This is because advancing scientific knowledge through AILs enables African scientists to effectively bridge the gap between general scientific enquiry and African culture, fostering an appreciation of science across the African continent.[63] This allows for proper contextualised scientific enquiry for local research. Second, given the diversified nature of African cultures, extensive collaboration that develops a framework for conducting scientific enquiry within African cultures is needed. The reason is that when scientists from different cultures interact, they can share ideas that will help in the scientific discourse around the world, and Africa must be able to present its own voice in scientific discourse. Consequently, scientists conducting scientific enquiry in African Culture must find a way to demonstrate the impact of African Culture on broader scientific fields around the world. Fostering a science that is well developed to address the complexities of the African culture and society will therefore require the development of a scientific methodology that appreciates the African culture and its challenges.

CONCLUSION

[57] Alem, "African Systems of Thought: Whether They Fit Scientific Knowledge," 23.
[58] Alem, "African systems of thought: Whether they Fit scientific knowledge," 24.
[59] Ogungbure, "African indigenous knowledge: scientific or unscientific?," 6.
[60] Oseni Taiwo Afisi, "Is African Science True Science? Reflections on the Methods of African Science," *Filosofia Theoretica: Journal of African Philosophy, Culture and Religions* 5, no. 1 (2016): 64.
[61] Afisi, "Is African Science True Science? Reflections on the Methods of African Science," 64.
[62] Ijekeye, "The Future of African Science in A Global Context: A Philosophical Analysis," 75.
[63] Ijekeye, "The Future of African Science in A Global Context: A Philosophical Analysis," 75.

Ultimately, Chimakonam, cited by Afisi, is of the view that African science addresses three distinct entities in the universe, namely: matter, antimatter, and non-matter, and so it should not be considered lacking in methodological process, as this tripartite cosmological framework demonstrates a complexity that includes physical substances and metaphysical dimensions.[64] This system integrates empirical observation with ontological categories that Western science has only recently begun to explore through quantum physics and consciousness studies. The limitations of scientific enquiry in African culture can be addressed by translating and incorporating local knowledge systems already in the diverse cultures, as these cultures serve as a storage of such knowledge. The recognition of the African culture as a legitimate knowledge system is therefore not peripheral to science but a foundation through which global scientific endeavor can be undertaken.

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