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Philosophy of quantum mechanics and its relevance to scientific and technological development in Africa

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Abstract

Objective: This paper discussed the philosophy of quantum mechanics and its relevance to scientific and technological development in Africa.
Methods: Quantum mechanics portrays the principles of uncertainty or indeterminacy which challenged the traditional understanding of classical physics.
Findings: Heisenberg, its theorist, explains that physical laws refer not to nature, but to our relation to it. Before the development of relativity theory and quantum mechanics, the nature and character of classical physics (Newtonian physics) presupposed that laws and theories were discovered, not invented and the truth physicists expressed was totally independent of the scientists who discovered them. But quantum mechanics (Atomic physics) contrary to this implies that at some fundamental levels there is no and can be no objective "Real" and deterministic universe for human to know. Quantum theory places emphasis on the inseparability of observer and observed, and reinforces the notions of relativity. By this, there is nothing absolute and "Sacrosanct" about scientific knowledge. This implies that scientific laws and theories are simply "Convention". Scientific theories have no more claims to truth than other fields (like metaphysics or theology). They are complimentary in the field of knowledge. As this is apparently the case there is nothing that makes Western scientific knowledge superior to other fields of knowledge. Given the implications of quantum physics to knowledge generally, it is my position that the so-called "Hegemonic" exponents of scientific knowledge should allow other fields of knowledge or traditions to mutually flourish. This calls for complimentarily of fields of knowledge, be it of African origin Oriental or Western. Applying the indeterminacy principle to the macro-social setting especially Africa, it could be said that the table has turned against the imperialists universal principles by demonstrating that energy radiates in discrete units or bundles.
Application: On this pedestal, every nation like units of energy should be allowed to choose and determine her destiny. In this light, the leadership of our nation should create an atmosphere for the development of creative ingenuity of her citizens which is targeted to meeting the needs and aspirations of the people instead of taking non-contextualized and exploitation-oriented prescriptions (especially sometime from the World Bank and IMF).
Keywords: Quantum mechanics, physics, technological development and Africa.

1. Introduction

The currency given to science in our contemporary time has made it possible for most of the human social endeavors to be given a scientific explanation based on modern scientific principles. The development of science over the years has proved that the method of doing science is not unidirectional and unimodal. There have been discoveries challenging conventional methods of understanding the operations of the universe.

In most cases, the unconventional methods, in the long run, become acceptable. This invariably indicates that there are different methods or ways of understanding and interpreting the universe. If this is the case, the issue of scientific and technological development of any country is not an exception. Scientific principles such as theory of relativity and quantum mechanics show that no method or road to knowledge is absolute. For any explanation, there is a frame of reference. Scientific laws, theories and methods of explanation do not consist of

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immutable principles, but of human conventions and creations. It is along this reasoning, that Bertrand Russell after summarizing Einsteins work remarked that the "Old glad certainty" of science was gone. Natural law did not consist of immutable principles but human conventions and statistical averages [1].

An excursion into quantum mechanics apparently confirms that there is no objective, absolute and deterministic universe for humans to know. The development of science over the years indicates that there is no "God-given" way to knowledge. This obviously tallies with the principle of quantum mechanics. The implication of this is that the issue of scientific and technological development for any country should be dependent on priorities embodying the economic and political programmers of such country, and should not be dictated by the so-called Western Monopolist of knowledge and development. This apparently shows that science and technology should be developed in Africa in line with their circumstances and conditions.

2. History and development of science

A perusal of the history and philosophy of science and technology indicates substantial impact of scientific theories on the Western culture. Before the Copernican revolution, Aristotelian (or Ptolemaic) mechanistic principle was the basis for both scientific and social explanations. The assumption was that all of natures constituted of were perfectly hard particles moving in void space which interacted only through impact with one another [2]. In the medieval times, many of the assumptions that had been made about nature since the days of the Greeks (Ancient period of philosophy-Aristotelian assumptions included), acquired the endorsement of the Latin Church. With this, came an impressive guarantee of the truth and reliability. Within this period, progress did not occur in natural science as much as it did in theology. That is, progress did not result from changing the fundamental assumptions on which the perception of nature was based as much as it did from refinement in theological reasoning.

With the Scientific Revolution of the seventeenth century the notion of progress in science and a concomitant progress in Western civilization, came into its own. New assumptions, with new grounds for justifying their truth, and a new ideal model for reasoning replaced the older appeals to the authority of the Church and Aristotelian logic. By mid-seventeenth century, Newtonian science effectively abandoned the "Mechanist" assumption, and became rife and as such, constituted the explanatory paradigm for reality. By the middle of the nineteenth century it was generally admitted that the ultimate nature of the smallest particles which aggregate to form observable bodies was not fully known; but it was clear that they had associated with them certain "Forces" of attraction and repulsion, including gravitational, chemical, and electromagnetic forces, which could be mathematically described. In account of this development, Richard Olson writes: Any physical phenomenon thus became intelligible when it could be accounted for in terms of bodies moving in space and time under the influence of well-understood forces. Certain forces, including gravity, were assumed to be permanently attached to particles and to be extended through space without any consideration of time (1987:236).

Progress was not left out in the other fields of science. However, events in physics in the twentieth century undermined the confident and progressive route to scientific certainty as much as any other single cause. At the time when evolutionary theory of biology seemed to overshadow other scientific theories in popular ideologies, new startling discoveries within physics occurred to recapture public interest and attraction. Those revolutionary developments were associated with the terms relativity and quantum theory. The theory of relativity was advanced by Albert Einstein while that of quantum mechanics was advanced by Max Planck, Niel Bohr and Werner Heisenberg. These developments first occurred in connection with sophisticated mathematical theories that could be understood only by the most highly trained physicists. And they seemed far removed from ordinary human needs and experiences. But with their development, the older meaning of rationality of science was thrown into question, and new practical consideration took its place. Consequently, their impact soon expanded throughout the intellectual communities of Europe and America. This is because; each seemed to demand a fundamental rethinking of the nature and limits of human knowledge which was as radical as that demanded by Newtonian physics and Locke on psychology in the Enlightenment [2]. In portraying the

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inconsistencies and contradictions between the former and the present meanings of rationality of science, Fredrick Gregory writes: Nature's rationality was preserved at the level of mathematical description, but the price for this consistency in explanation was that scientists had to remain content with the mathematics; that is, as soon as they began to ask what the mathematical description described they were enmeshed in inconsistency and contradiction (1987:264).

It has been observed that in spite of the radical revisions which relativity theory calls for in traditional physical ideas, it however, does not in any way challenge the fundamental lawfulness of physical phenomena, nor does it justify a belief in the subjectivity of physical experience. The theory of relativity is premised on the assumption that no preferred frame of reference exists from which absolute motion or rest can be determined, but this does not mean that physical phenomena as seen from various vantage points in space-time are in any sense, incompatible with one another or dependent on unspecifiable, personal aspects of the observer. In fact, the theory in its most general form clearly demands that all physical laws have an identical form for all frames of reference and thus, provides a way to discover precisely what the description of a physical event will be in any arbitrary frame of reference once it is described in one frame.

It has been pointed out that one of the most important cultural uses of relativity theory was made by historians and other social scientists to reinforce a trend away from the positivistic and scientific approaches to the study of historical and social phenomena, which had been popular during the nineteenth century [2]. It is in recognition of this that William Bennett Munro of Harvard in an address in 1927 announced that the revelation produced by relativity in the physical world "Must inevitably carry its echoes into other fields of human knowledge". Quantum mechanics has been no less important than Einstein's theory of relativity in calling into question important traditional beliefs. The more quantum theories developed, physicists began to doubt that their task was solely that of the discoverer. Before this development, the nature and character of classical physics (Newtonian physics) presupposed that laws and theories were discovered, not invented, and the truth physicists expressed was totally independent of the scientist who discovered them. But the development of relativity theory and quantum mechanics have played a very important role in giving modern intellectuals a sense of their own limitations and a sense — whether it be real or illusory of their own freedom to act and to control their destiny [2]. With these developments, physicists no longer resist the notion that they were at least in part, inventing the laws that governed scientific phenomena. Some even suggested that scientific theories were simply economies of thought, others that they represented conventions, still others that they were nothing more than the instruments scientists used to manipulate nature. The new physics of Einstein's theory of relativity recognized the anthropomorphic origin and nature of human knowledge. In other words, Einstein's science was skeptical of the objectivity and reality and thus, of knowledge itself. Frederick Gregory in line with the new rationality, points out: In none of the philosophies of science did careful observation of nature serve as a sufficient ultimate truth. Even philosophers who wished to preserve .the image of science as an eminently rational activity surrendered the old claim that there was gradual progress toward truth (1987:265).

The historical account given so far is to show the fluidity of rationality of scientific principles. Principles and theories for explanation and interpretation of nature and social activities keep on changing. This is why some contemporary philosophers like John Dewey and Paul Feyerabend have argued not only that history of science contains episodes which reveal the direct involvements of irrational factors in the formation and selection of scientific theories, but that the choices between competing theories must be irrational. Factors of value apparently play overwhelming role. In this regard, Beard holds that much of the speculation in higher physics was a result of "Subjective feelings rather than the outcome of objective observation". According to Beard, the scientific method was extremely limited and could never produce a science of history. The historian was not a detached, objective observer. In selecting and arranging his facts, the historian was guided "Inexorably by the frame of reference" in his mind. This frame of reference included "Things deemed necessary, things deemed possible, and things deemed desirable" [1]. At this juncture, we employ the principle of quantum mechanics to prove that African countries can attain scientific and technological development if they are not inhibited by the Western capitalist manipulatively (acclaimed) objective theory of development.

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3. The theory of quantum mechanics

The development of quantum mechanics challenged traditional understanding of classical physics in terms of the widely used concepts as "Time", "Space", "Matter" and "Cause". Quantum mechanics by its assumptions seems to imply that at some fundamental level there is and can be no objective "Real" and deterministic universe for human to know. Before the discovery of quantum mechanics it was thought and propagated that the motion of atoms and subatomic particles could be expressed in terms of classical mechanics. This classical mechanics as acclaimed could (1) predict a precise trajectory for particles within specific locations and moments at each instant and (2) allow the translational, rotational, and vibrational modes of motion to be excited to any energy simply by controlling the forces that are applied [2]. These conclusions agree with everyday experience. However, quantum mechanics shows that everyday experience does not extend to individual atoms, and careful experiments have shown that classical mechanics fails when applied to the transfer of very small quantities of energy and to objects of very small mass.

Contrary to classical physics (as indicated by experiments such as black-body radiation, heat capacities and atomic and molecular spectra) systems can take up energy only in discrete amounts. For instance, in black-body radiation energy output varies with wavelength at several temperatures. All these experiments show that rather than travelling along a definite path, a particle is distributed through space like a wave (specific experiments are found in [2]. The deduction in quantum mechanics is that particles position is completely unpredictable. If the momentum of particles is specified precisely, it is impossible to predict the location of the particle. Heisenberg has pointed out that physicists can reasonably (by experiment) predict the average reactions of great numbers of electrons (ensemble of electrons) in experiment, they cannot predict what a single electron will do [3]. In confirmation of this position, works of Bohr, Kramer and Slater contain the decisive concept that natural laws do not determine the occurrence of an event but only the probability of its occurrence and that this probability must be connected to a field that conforms to a wave equation that can be formulated mathematically. This is why Mario Bunge is of the view that "Basic quantum mechanics is not about an individual quantum but about a statistical ensemble of quantum's: no wonder, then, that the various components of an ensemble in a given quantum state have different positions and momentum values" [4]. This statistical or probabilistic aspect has some bearing with what is sometimes known as the Uncertainty Principle in physics.

This principle enunciated by Werner Heisenberg as a fundamental principle of quantum mechanics (like Einstein's theory of relativity) calls into question important traditional beliefs and gives hope to those who see deterministic and materialistic universe as unbearable and valueless. According to the most popularly held interpretation of quantum mechanics, the uncertainty principle challenges the very notion of cause and effect which underlies almost all classical science and much traditional, social and theological thought. Added to this, by guaranteeing our inability to stipulate perfectly the state of any isolated part of the universe, the uncertainty principle weakens the argument of determinists in all fields and seems to give a new support for speculation about free will [2]. The principle of uncertainty or indeterminacy, according to Heisenberg, asserts that there is a fundamental indeterminacy in our knowledge about physical particles. If the position and velocity of a particle are to be experimentally determined, it is found that all experimental methods of so doing will give us the position accurately at the expense of error in the velocity determination; or will give us the velocity accurately at the expense of error in determination of position. It is not possible to determine both quantities without uncertainty [5]. That is to say, it is impossible to specify simultaneously, with arbitrary precision, both the momentum and the position of a particle. The interpretation of this is, to any physical quantity Q which we investigate, corresponds another quantity P, such that we can never know the magnitude of both P and Q exactly. In fact, the product of the uncertainties in the measurements of P and Q can never be less than the so-called quantum of action. On the same plane, Max Planck holds that the trait of discontinuity of quantum of action and the existence of atom are seen to be common effects of a fundamental natural law which opens the way for the discovery of those principles governing the structure of matter. While classical laws contain constant which refers to the properties of things such as mass or force, Planck's quantum of action does not describe the properties of the things but a property of nature itself. Quantum of action is considered as a negligible quantity

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as in all phenomena of daily life, natural phenomena take a different course to that taken in cases where they are atomic magnitude, i.e. of the order of Planck's Quantum of action. As against this, Heisenberg points out that law of mechanics apply in exactly the same manner to all orders of magnitude. This, according to Heisenberg, indicates that Planck law of radiation shows that there are scales and standard in Nature; that phenomena are not simply alike in all orders of magnitudes (1987:253-4). The implications of this to science are of course, the limitations of measurement, of accuracy, of scientific predictability. All these suggest the collapse and eclipse of the classical, deterministic principle in mechanics and even in the world of matter.

Another interpretation of the uncertainty principle shows that statements from quantum theory can only be interpreted statistically. The statistical laws given by quantum theory may be perfectly determined, although the results of any single event cannot be known. Here it has been noted that our uncertainty may only be the result of ignorance which is unavoidable because of the nature of all physical techniques of measurement. In order to measure or observe an event, the observer must disturb the situation he or she seeks to study. For example, in measuring the position of a particle the observer inevitably changes its velocity. This position is in line with the "Copenhagen Doctrine" as worked out by Bohr, Heisenberg, Born, Dirac and von Neumann. The doctrine specifies that "There are no autonomous quantum events but only observer dependent quantum items: the observation or measurement operations generate the entities in given states" [4]. The implication of this uncertainty principle is drawn by Jacob Bronowski in the following manner. We know that we cannot ask the world to be exact. If an object (a familiar face, for example) had to be exactly the same before we recognize it, we would never recognize it from one day to the next. We recognize the object to be the same because it is much the same; it is never exactly like it was, it is tolerably like (1987:274). Bronowski says that in the act of recognition, a judgment is built in the area of tolerance of uncertainty.

This interpretation of quantum theory places an emphasis on the inseparability of observer and observed, and reinforces the notions of relativity. By this, there is nothing absolute and "Sacrosanct" about scientific knowledge. The analysis so far indicates that the scientists play a more crucial role within scientific theory and is used to justify the interposition of personal values and biases within social theory. The implication of this as pointed out by Robert F. Baum, is that scientific laws and theories are simply "Convention" accepted for reasons in the main esthetic. Scientific theories have no more claim to truth than metaphysics or theology, to which modern rationalists long had granted little claim at all. (1987:275) as this is apparently the case there is nothing that makes Western scientific knowledge superior to other fields of knowledge. This is why John Dewey argues that knowledge is interaction. For if knowledge is not interaction, neither observation nor mathematics is free of conventional uses. They prefer not to the independent object, but to the relation between the object as constituted by inquiry and the purposes for which inquiry is undertaken [6]. Also, natural science in Hobson's view was not concerned with the nature of reality or with schemes of causation and determination. Science like any other branches of knowledge was subjective. Its data were not absolute facts but consisted of conceptions of phenomena perceived by the senses [1].

The above deductions are the implication of [3] theory as he explains that physical laws refer not to "Nature", but to our relations to it. Facts, then, are theory, language, and technique laden, making relations, not things, the true object of inquiry in the contemporary science [6]. The same web of argument, [3] says, "There is no absolute knowledge. And those who claim it, whether they are scientists or dogmatists, open the door to tragedy. All information is imperfect. We have to treat it with humility. That is the human condition, and that is what quantum theory says". (1987:272) given the implications of quantum physics to knowledge generally, it is my position that the so-called "Hegemonic" exponents of scientific knowledge should allow other fields of knowledge or traditions to mutually flourish. This calls for complimentarily of fields of knowledge, be it of African origin, oriental or Western. All knowledge, all information between human beings can be exchanged within a play of tolerance. And that is true whether the exchange is in science, or in literature, or in religion, or in politics, or even in any form of thought that aspires to dogma.

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4. Quantum mechanics and its implicational relevance to the development of science and Technology in Africa

The alignment of the importance of the discontinuity principle of quantum mechanics to the international arena indicates that just as energy ultimately exists in discrete units, so states or countries of the world should be allowed their identity, independence and assertion, and not to be diminished, choked up and swallowed by the Western imperialist (globalization), "Omnipotently" imposed perspective and method of science and development. The acknowledgement of the discontinuity of energy radiation as against the linear or wave theory of energy radiation (as always employed by the orthodox Western writers to justify imperialism) has negated the argument which holds that, since they (the West) occupy the front position on the linear spectrum, it falls on them naturally to civilize and dictate the course of development of the Third World countries. In other words, these developing countries will follow the trail created by the super powers (in the name of globalization). Quantum theory has turned the table against the imperialist's universalistic principle by demonstrating that energy radiates in discrete units or bundles. The implication is that every nation like units of energy should be allowed to choose and determine her destiny. Following this, the leadership of our country should create an atmosphere for the development of the creative ingenuity of her citizens which is targeted to meeting the needs and aspirations of the people instead of taking non-contextualized and exploitation-oriented prescriptions from the West (World Bank and IMF). This position is in line with Henry Osborn Taylor, who defines knowledge as experience; each man has a different experience and therefore, different knowledge. According to Hugh L. Rodgers "This was the disturbing human equation which made the study of the facts dependent upon the observer's ability and bias [1]". Along this reasoning, it is incumbent on us to choose which kind of technology is appropriate and suitable for our circumstance. On this independent decision (informed by our peculiar circumstance), the Western tinted and colored advice and prescriptions on which way forward will be critically appraised.

Given the indeterminacy of particles or wave-packets in the micro world, it could be seen in contradiction that a new picture of the universe emerges. This implies that the universe is somehow fluid, indeterminate and relativistic. Agreeing with indeterminacy, Popper holds that in theoretical physics, particles behave the way they do because of their "Disposition or Propensity" under certain circumstances which are themselves continuity processes in the workshop of nature (1982:196). Applying the indeterminacy principle to the macro-social setting, it could be said that the nature and operation of World Bank and IMF (the agents of modern imperialism in the operation of globalization) are patently in opposition to natural ordination as indicated and proven (in quantum physics) in which physical processes assume free, indeterminate, evolutionary character. It must be said here that what applies to physical processes as nature witnesses, should also be allowed to apply to human social settings or relations which nature also witnesses. In the light of our freedom to determine our course of development, it could be said that the Western imperialists (and their agents World Bank and IMF) in Africa impose restrictions on African course of development. The constructivist, determinist and domineering mind-frame of the World Bank, IMF and other agencies of the West whose motive and goal are to keep the Third World countries underdeveloped in the area of science and technology and structurally dependent on the West, account for the cause of the present backwardness of Third World countries especially those of Africa. A good example of a country that accepted Western model in to and had a catastrophe is Zaire. From 1960s to 1990s, Zaire adopted the Western model and all-round co-operation with US and NATO countries. The result of this cooperation is the tragic collapse of the economy and under- development. In explanation to this, Anatoly Gromyko writes: As the situation in Zaire eloquently testifies, neo-colonialism brings African countries further aggravation of the problems born of the past. As a rule, local capital in Africa is unable to withstand competition from foreign monopolies; it develops mainly in the hot-house conditions of state-protectionism, or as a subordinate and junior partner to foreign monopoly capital, helping to maintain economic dependence. Capitalism has demonstrated its total inability to solve the most pressing problem facing African.

Experience has shown that social and economic backwardness cannot be overcome successfully by the adoption of Western developmental prescriptions unless the forces in power adopt an appropriate policy.

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Against this background, it is my position that international relations and interactions should be an open one where each state is allowed to determine here own fate and course of development, foreign aids and assistance notwithstanding. It is in this connection that Paul Feyerabend's view that any imposition without regard to circumstances may be a hindrance rather than a help, makes sense. According to Feyerabend, a person trying to solve a problem whether in science or elsewhere must be given complete freedom and cannot be restricted by any demands, norms, however plausible they may seem to the logician or the philosopher who thought them out in the privacy of his study. Norms and demands must be checked by research, not by appeal to theories of rationality (1981:117).

Complementarily in quantum mechanics point's out (as against the belief that physical objects have an existence completely independent of observation) that the phenomena ultimately constituting the stability of the material world cannot be separated from the instruments of observation. But the belief of classical physics is that what is in the macro world is also the same in the micro world (quantum physics). That is the belief that objectivity of science can be maintained only if the elementary particles of matter can be objectified in the usual way. Accordingly, Heisenberg has pointed out that in the new physics, much of the old conventional physics becomes lost. Not only the applicability of the concepts and laws of such physics, but also the entire concept of reality on which the exact natural sciences right down to our modern atomic physics were based. According to him, "the concept of reality is here meant to denote the idea that there are objective phenomena which take place in time and space in a certain manner, irrespective of whether they are observed or not. In atomic physics, observations can no longer be objectified in this simple manner, i.e. they can no longer be traced to an objective and describable course of events in time and space [3]. He, therefore, concludes that natural science is not concerned with Nature, but with Nature as man describes and understands it.

Concerning the relationship between classical physics and atomic physics (quantum physics), Heisenberg holds that classical physics forms the a priori basis for atomic physics and quantum theory, but it does not apply everywhere with equal validity, i.e. there are different types of phenomena which cannot be described in detail using the concepts of classical physics. In such cases, quantum physics becomes the explanatory schema. Hence, the complementarily of the two. The occurrence of complementarily as physical process has been rendering objective reality tenuous. The complementarily expresses the wholeness of the experimental situation in quantum physics. By this, any physical observation implies an interaction between an object and the instruments of observation. For instance, the direct, visual observation of a material particle implies that the particle emits or reflects light the particle has to interact with in electromagnetic field. This is why Heisenberg asserts that an accurate description of the elementary particle is impossible. The only thing which can be written down as description is a probability function. The particle exists only as a possibility, a possibility for being or a tendency for being [7]. Feyerabend, the probabilities are properties of "Blocks" called "Experimental arrangements". They are not properties, not even tendencies of individual physical systems. In conclusion, Feyerabend takes probabilities out of the individual physical systems and attributes them to the experimental arrangement. For him complementarily is inclusive of probabilities (of Popper) and in addition takes position, momentum, and all the other dynamical variables out of the individual physical system and attributes them to experimental arrangement. According to him "we shall say that complementarily asserts the relational character not only of probability but of all dynamical magnitudes". (1968:321-322).The implicational importance of philosophy of science especially the area of quantum mechanics is to show the original position of each state (or country) at the international level with the corollary co-equality amongst them and their individual right to self-identity and developmental priorities. Another implication of quantum mechanics is the fact that the West lack of knowledge of the cultural and historical circumstances in their prescriptions for the course of African development breeds, of necessity, anachronism and hermeneutic distortion. The reason is that there is no detachment and objectivity in their prescriptions as not only in time and place, but personal characteristics color such. In this regard, it could be said that every field of knowledge or prescription takes on significance when related to some frames of reference. Failure to recognize that cultural experiences differ from milieu to milieu leads to misinterpretation of reality and ideas, misidentification of errors and misattributions of insights and illusions alike. At this juncture, it must be acknowledged that the preference we make for fields of knowledge or prescriptions are dependent on the values of an individual, which obviously are affected by those of the society

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in which the individual lives. And those values play key role in determining how science or African tradition is understood and the importance it is assigned. While it is inappropriate to concluded that human beings are in no way dictated to by a nature that is beyond their reach, it is equally foolish not to acknowledge that to a substantial degree humans help create the very reality they understand.

Countries such as China, Cuba, India and North Korea are cited to have achieved the liberation from the manipulation of the West. In China, mass starvation has been abolished and a feudal social system overthrown. Elitism in rulers is systematically uprooted whenever it reappears. Today, China can be taken to be competing in the advanced technological world. Cuba, not withstanding its paucity in resource has long overcome its servile dependence on the United States and asserts itself even in the face of the collapse of Soviet Union whose former assistance was a big support to its independence. Cuba has long abolished illiteracy in sensational fashion, decentralized investment, and reduced the gap in living conditions between the country side and the cities. On the other hand, countries like Nigeria, Liberia, Cameroon and so on which strongly believe in the World Bank as the principal repository of today's conventional wisdom in development strategy are fraught with political and economic crises. Lack of confidence in forging out home grown alternative economic policies confuses the government, and makes it pursue disastrous policies (such as SAP, privatization and deregulation) with confident dogmatism and cannot be forced to change its policies even in the face of informed criticisms from intellectual experts, newspapers and pressure groups. This has worsened the poverty situation of the country.

5. Conclusion

Apparently, the idea of one method to the solution of problem at the exclusion of others has not promised well for individuals and countries that have such mentality. While this research analogically imports the independent but coordinate existence of energy quantum in the basic physical processes to the international relations and interactions of states (whether developed or underdeveloped), it does not suggest that states should not adopt and adapt from other states certain technological blueprints and social systems which are in tune with their circumstances and reality. In China for instance, the combination of Marxist and Confucian elements in Mao's thought provides not only a new and fascinating synthesis but also some of the key ingredients in the distinctively Chinese model of development [8]. Today, China with its 1.5 billion people can boast of a unique flourishing culture, which could not be a result of contact with the West. Japan on the other hand, has transformed into both a technological and economic power. This was due to her contact with the Western capitalism. The Japanese did not passively internalize Western capitalist structures and method but refined aspects of capitalism with features from its own culture. IbangaIkpe points out that cultural passion for efficiency both for instrument and technique contributed to the greatness of Japan. (1999:6). So it could be said that Japan achieved its economic greatness by borrowing, copying and synthesizing the technology and organizational models of the West and adapting these to historic and preferred Japanese forms, structures and ways of doing things.

Equally the transformation of America from rural backward area into the leader of the world followed the same pattern of cultural synthesis. In its case, America introduced the philosophy of pragmatism, where by every knowledge had to prove its worth in practice. Other countries like North Korea, India and Eastern Europe, adapted Marxism to local and home-grown institutions to be in the limelight in economic growth, which was ushered in by the development of science and technology. The questions are; why have Nigeria and other countries not developed like these other countries? Does it mean that these countries are richer than them? Could it be that Nigeria cannot synthesize its traditional values with related foreign ideas that could elevate her scientifically and technologically? In line with this opinion, it could authoritatively be said that the bane of Africa scientific development is the mis-matched and inappropriate marriage with the Western capitalist model of development. Capitalism does not reflect the experiences and aspirations of the people. The introduction of alien capitalist culture seen in the light of Marxism and (African communal system) has depersonalized mans sensuous life in that his sense of development is vitiated and becomes "Subservient to crude need." It is against

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the background of inherent evil in capitalism and its concomitant underdevelopment strategy that spurred people like Kwame Nkrumah, Julius Nyerere, Leopold Senghor and many others to agitate for a revisit of, but a refined African socialism. It is akin to Marxism because African cultural system emphasizes egalitarianism and centrality of community development. It presupposes the community of wealth, which is not different from what obtains from Marxist project According to these people; capitalism is irreconcilable with the egalitarianism and communalism of traditional African society. African nations should reject the inequality, individualism and capitalism brought into Africa by Western imperialism. All these are manifest in present terrain of Nigerian political and economic system in the name of "Privatization and deregulation of Nigeria cooperation yet Nigeria is moving backward instead of forward". It has been held that African countries would have developed more politically and economically but for its unholy marriage with the Western capitalism. The former Soviet Union was regarded as the most primitive part of Europe, but its adoption and marriage with Marxist ideology raised it more scientifically and technologically advanced than most capitalist countries that were formerly 200 years ahead.

African nations should adopt a developed form of its cultural system (African Socialism), which will take care of present day experiences and aspirations (modernization) without losing its humanistic and egalitarian function. By adopting socialism, (adoption and adaptation of Marxism to home grown institutions) African societies will not only be going back to their roots but will be adopting it in its developed form. It is never late to reverse from association with Western Capitalist model. China, North Korea and so on should be examples to Africa. I must point out that it is anthropologically fallacious to say that the Western values have destroyed the whole of African culture. This is practically, not possible. Western value system is in Europe and America and stays there. African cultural values are in Africa and are consciously present here. What come into contact are elements and products of cultures which in spite of their influence have left the fundamental values undiminished. It is on its basic cultural outlook that African Socialism is expected to thrive, and so the ground for rapid development of science and technology. Taking all in all, we therefore, say that the hallmark of any state is her leadership's ability to maintain appropriate social international relations which is not subjected to subordinate and dependent position in the (acclaimed) capitalist constructive world economy.

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