THE EPISTEMOLOGY OF VALUES AND SUSTAINABILITY

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Abstract

Science is a problem solving activity. Based on the assumption that science begins with problems, the process of macro creativity is outlined. Solutions created are preceded by intention and action. Out of the macro creative process, the dynamics of having a sustainable science, namely, the Cycle of Sustainability, is formulated. It is within this Cycle of Sustainability that innovation, i.e. the endless possibilities of micro creativity by way of mathematics is further examined as a subset of the macro creative process. It is argued that essentially the root of sustainability in science lies in having sustainable problems. Moreover, the author attempts to epistemologically argue on two issues of scientific realism: (i) the distinction between the observables and non-observables, and (ii) whether scientific claims are either true or false.

Keywords: Problems, reality, creativity, research priorities, observables

Introduction

Why do we need sustainability in science? In the euphoria of having sustainable models, we want solutions which can endure and require less continuous additional managerial input and intervention, be it in the form of space, time, funding, and human resources. The list, however, is not exhaustive. Yet a solution is an outcome of a problem, it is a consequence of having problems. We cannot have solutions in the absence of problems and more than anything else, scientists, to solve

problems. It is in this sense that we say science begins with problems. The quest for sustainability in science, then, is the quest for having the 'right' problems (Abdul Latif Samian, 1995). The problems should endure, have references, and are publishable with more sustainable solutions from their offshoots. In order to formulate the possibility of having sustainable science, we will now examine the process of problem solving which underlies scientific activity.

Process of Creativity

What defines man? According to Aristotle, "man is by nature a political animal". Among linguists, many would agree that what differentiates man from the other is the capacity of expression using language, '*makhluk yang berkata-kata*' (in Malay) in Aristotle's position would not be supported by today's research in animal behaviour (Abdul Latif Samian, 2005). If we believe in Darwin, chimpanzees are likewise a political animal. If we do not, the need for acceptability within the polity of the respective species domain is no less necessary in tandem with the survival of the species. In short, while we can agree that man is a political animal, being political is not what defines what he is. The quality of being political does not differentiate him from other creations, so to speak. However, rationality alone does not define man in terms of his owner capacities. If rationality is the essence of man, then the computer is always a better man, which obviously is not the case. The component of irrationality, which includes the affective domain, is no less important as recent studies have shown.

If we take into account the argument that only man has the proto ability to communicate by way of language, the counter arguments are two-fold; (i) that animals have a language of their own which is now experimentally verifiable due to the advances made in science, and (ii) other creations, for example, angels and devils, could likewise communicate by way of human language as explicated in the Scriptures. Accordingly, having language is not the primary factor that distinguishes man from other creations, including animals.

In view of the above positions, we have argued on another occasion (Abdul Latif Samian, 2008a) that the most important innate disposition that distinctly defines man from other beings is his primordial ability to create. It is due to this unique, innate ability that man can be made responsible and morally accountable for all his undertakings, including

scientific activities. In short, man is not just a political or rational being, in fact, the only creative being. Unlike other beings, he can create his physical self, his emotion, his knowledge, and turn icons into idols. There are no other beings that have this innate propensity. Thus in short, I have stated that (i) man is the only creative being and (ii) it is this intrinsic degree of creative ability that differentiates one man from another.

A scientist is, above all, a human being. What distinguishes him from another human being is that he solves problems scientifically, i.e., he creates solution in a scientific manner. The creative process begins when we encounter a problem. In the case of routine problems, to be creative implies to solve the same problem in different ways. We may or may not have the *intention* of solving the problem. The primacy of intention over action is self-evident. The scientist's creative disposition then results from the interplay of human consciousness, sensibility, emotionality and spirituality. Man is part of the circumference of the *creatio-matrix* of which "The Creator" is at the center. The Creator, the Divine, creates *ex-nihilo,* of which we are incapable. Granted that we have the intention to create, we will make the problem into a subject of contemplation (*theoria*). We possess will as the result of consciousness, and knowing that we do not know about the problem to the extent that we want to know. This state of necessity of prior knowledge spurs us into a physical action of problem solving, a creative process of knowing. An aggregate of actions moulds habit and character which transforms into personalities embedded with values. It is the conjunction of intention and action in the creative process that we produce solutions, namely, new knowledge or innovation, so to speak.

Cycle of Sustainability

The aforementioned process of scientific creativity at the macro level is not linear. If it is linear, then science will not be as open ended as we all know. The bending of light rays, the cyclical orientation of the cosmos, our ephemeral existence, the temporalness of beings, the planetary orbits, the finiteness of galaxies , the alternation of day and night, life and death, the wisdom of the Ancients, all of these point to the perennial fact that in everything created there is a seed of destruction. The quest for sustainability should not be confused with the quest for infallibility since no scientific theory is infallible. Scientific solution begets new scientific problems, albeit at a different level. Problem 1 entails Problem 2 which

entails Problem 3 *et cetera*. Accordingly, we have the Cycle of Sustainability as follows:

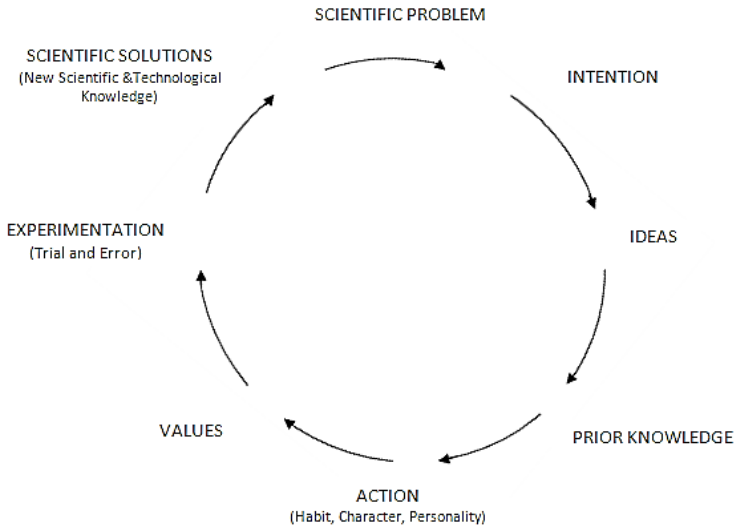

Fig. 1. Cycle of Sustainability (Abdul Latif Samian, 2010).

It is this progress to a different level of scientific problem that we should search for sustainability. Every scientific problem has its own lifetime. It is in this sense that we speak about degrees of sustainability. Sustainability is a matter of comparison. A more sustainable problem implies a longer lifetime. For instance, in the history of science, Newton's 'Force' is more sustainable than that of the Cartesian 'action at a distance' (Abdul Latif Samian, 2009b). Still, sustainable science consists of sustainable problems. It follows that in order to have a highly sustainable science we must have highly sustainable scientific problems. For example, at a more micro level, research on solar-powered car is more of a sustainable problem than that in fuel-powered car, given the increasing scarcity of fossil fuel. The former scientific problem produces more derivative problem than the latter, thus is deemed more sustainable.

Epistemological Issues

In this section, we would argue against both realist and instrumentalist views based on the belief that there are levels of reality and levels of truth which characterize phenomena. As succinctly explicated, for example, by Osman Bakar (1991), the levels of reality basically point to

the material, subtle and spiritual world. The world of sense experience, the observables, belongs to the material world whereas the non-observables, the world of electrons, ether and so forth can constitute the realm of the subtle domain.

Just as there are levels of reality, there are also levels of truth. Truth at the level of sense experience are susceptible to change. At the higher level, which is the subtle world, truth is more exact and the hierarchy continues. There is always a correspondence between the scientist the observer, who is the microcosm, and the whole cosmos or 'the observed', which is none other than the macrocosm (Abdul Latif Samian, 2007).

First, a word of caveat against the instrumentalist. We claim that in order to believe in the non-observables, we must accept that scientific laws can be applied to objects that occupy space and time. Scientific theories operating at the level of sense experience by and large inform us about both the material and the subtle world. To say that non-observables exist and laws do not apply to entities will entail us in a peculiar position. In addition to that, it is important to subscribe to the view that they have truth values. It could not be the case that there are two conflicting truths.

Instrumentalists concede that there are nonobservable entities. From this instrumentalist's point of view, science does not provide any reason for us to think that there are such entities and that science cannot give any information on them. In our opinion, such instrumentalist's position is based on the assumption that scientific laws do not refer to entities. Unless the instrumentalist provides arguments to support this assumption, the instrumentalist is in a difficult position. The main problem with the instrumentalist's position is: how can the epistemic community know about the non-observables if indeed scientific laws do apply to objects?

The instrumentalist also believes that it is not important for a scientist to pursue true theories. Let us consider the virus. This organism has true characteristics, existing objectively in the world of sense experience. Without having true laws, how can we know about its true characteristics? It is only by acquiring true laws that we can have correct knowledge about virus and are able to provide reasonable diagnosis concerning the symptoms of disease associated with it. It is obvious then that we can have progress in science only for striving for true laws.

We agree entirely with some realists that there exist non-observables. We maintain that non-observables exist objectively in the subtle and spiritual world. What we oppose is their position that the only way to know more about them is by way of causal reasoning. Clearly in Islamic science, there is more than a single mode of reasoning in deciphering nature in consonant with different levels of reality. In so far as such a realist position is concerned, we claim that nowhere in the causal reasoning that can we be sure that the relationship is that of true cause and effect.

According to Stove (1973), the ensuing argument is not a new argument in the sense that it has been used by Hume. In a nutshell, Hume argues that no reason could be given for the belief in the necessary connection between cause and effect and in the regularity of these causes without risking tautology. Let us say we have two consecutive events, A and B. In terms of the realist's 'causal reasoning', what can scientists do experimentally to find out that one of them is the cause and the other the effect? All that scientists can establish is that when the first happens, the second follows, and these events are "constant conjunctions". These realists do not answer the question of whether there is something else in addition to the "constant conjunctions" and whether it is this something else that they mean by cause. Unless they provide arguments that their 'cause and effect' is different from Hume's, then their 'cause and effect' is nothing more than a result of habit which produces the association. If it is the case that 'cause and effect' is produced by habit, there could be more than one cause (Stove, 1973). In view of this, these realists need also to marshal stronger arguments to justify their claims that there is only a single cause.

In addition to the above argument, our response to naïve inductivism is unequivocal. A series of events agreeing to a hypothesis never really verify it (the classical problem of induction). And to this effect, for example, Karl Popper (1959) has argued rather convincingly that although we can never prove the truth of a hypothesis, we can demonstrate its falsity.

Innovation

The difference between creativity and innovation is not so much a matter of kinds but rather a matter of degree. In the creative process and the Cycle of Sustainability which we have delineated, innovation is a micro process of creativity. We innovate when we add values to our creation. If

we accept that products of science exist in the material plenum due to its experimental aspect and the requirement of testability, then it is by way of mathematics that innovation is possible. We have defined mathematics on another occasion as '*the language of creativity based upon geometry and arithmetic*' (Abdul Latif Samian, 2008a; 2008b; 2009a). Geometry, which is about points and space, and arithmetic, which is about movement of points and therefore time, underlie creativity and likewise, innovation. The interplay of points and numbers, of space and time, in short, of "mathematization", results in the endless possibilities of innovation. Since innovation is a part of creativity, a micro process of differentiation of particular product in comparison to creativity *per se*, its propensity is related to the degrees of sustainability of the scientific problems in the Cycle of Sustainability. A more sustainable scientific problem, i.e. with higher degrees of sustainability, has more potential for innovations, especially at the nascent stage. For example, biotechnology has more potential for innovation than that of mere classical biology. In view of this example, I would state that a scientific problem which has a far reaching cross disciplinary impact is more sustainable than the one which has none. It follows that in order to have more innovations, we need to have more transdisciplinary scientific problems; sustainable scientific problem, by and large, is the integral factor of having sustainable science.

From an Islamic perspective, an ethical act is a Godly act. An act is virtuous if it is done with a noble intention and praiseworthy consequence. Therefore, the purity of intention which is further based on faith is a significant matter in Islam. In fact, those who are perceived to be good must be construed as having a superior moral character. Thus, from the religious point of view it is not possible to have an unethically good Muslim. In so far as professionalism is concerned, Prophet Muhammad (SAW) says that "God loves those who do their best when they perform any given duty." This is the 'right' or 'Godly' attitude so to speak. Therefore, we have the ethical concepts of goodness (*khayr*), righteousness (*birr*) and striving to achieve distinction (*itqan*). The Prophet (SAW) says that "success comes with patience, relief with affliction and ease with hardship."

In view of the interplay between the various domains of existence, there must be a primary link that connects sustainable problems with the spiritual realm. The Divine is the beginning and the end of all scientific problems. The evaluation of any sustainable problem is done at various

levels of realities. All the sustainable problems must have roots in the Divine. The doctrine of the levels of reality, the belief in the hierarchy of truths, the uncertainty of knowledge at the level of sense experience and so forth is, in the first place, not a result of having scientific knowledge alone. More important than that, it is a consequence of having knowledge in the ever encompassing, ever knowing God the Absolute Sustainer.

The quest for sustainability is concerned with practice, human decisions and conduct in solving scientific problems. Scientists have the responsibility to select the most important aspect for their research priority and identify projects worth pursuing or to be discarded. That problem solving acts done for the sake of The Sustainer is the only act that is sustainable and can be proved from the fact that no two events are necessarily consequential. Granted that our sustainable existence is contingent upon the existence of God, what is more than sustainable problems?

In order to avoid misunderstanding, I must reiterate that the Cycle of Sustainability framework formulated is not a reductionist kind. The unifying presence of the Divine as the center of the *creatio-matrix*, the common denominator, which in essence is The Absolute Sustainer, and the hierarchy of various levels of sustainability the Absolute Sustainer, remains as the Ultimate source of all degrees of sustainability for ultimately it is to Him and Him alone that all creations will return.

Conclusion

We have attempted in this paper to argue that the reasons given by both instrumentalists and realists to warrant belief in the non-observables are not sound from the epistemological aspect. They have to marshall stronger arguments in order to justify some of their claims (Hempel, 1966). We maintain that it is difficult indeed to believe in the non-observables or to believe that it is not important to strive for true theories while simultaneously taking a proper realist position in modern Western philosophy of science.

Indeed it is almost impossible to epistemologically place ourselves squarely either in the realist or anti-realist's camp without remainders. A realist negates the existence of the subtle and spiritual world. He believes that man by himself can know reality. An antirealist, on the other hand, is altogether indifferent. According to the anti-realist, the levels of

existence are irrelevant truth, an obscenity is relative. There is no such thing as a true scientific explanation corresponding to an objective reality.

As Muslim scientists, we believe that scientific truth in the domain of the material world is relative (Osman Bakar, 1991; Abdul Latif Samian, 2007). This belief alone does not amount to the rejection of the existence and the dominion of the Absolute Truth, which is none other than God Himself. In fact, the whole purpose of scientific problem solving to a Muslim scientist is to discover this pervasive Reality and its infinite consequences: most importantly the submission of his will to the Divine Will guided by the Holy *Qur'an* and the *Sunnah* of the Holy Prophet (SAW) in the most general sense of the word.

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