Jurnal Eura Asian Inculcation of Values Into Technology

by Hamid Fahmi Zarkasyi

Submission date: 04-Mar-2020 02:02PM (UTC+0530)
Submission ID: 1269040569
File name: 5._Jurnal_Eura_Asian_Inculcation_of_Values_Into_Technology.pdf (385.59K)
Word count: 10905
Character count: 60074

Afro Eurasian Studies Journal Volume 5, Issues 1&2 and Spring & Fall 2016, pp. 90-118

Inculcation of Values Into Technology An Islamic Perspective

Hamid Fahmy ZARKASYI[1]

The rapid development of science and technology, with all the advantages and benefits has brought for man a negative effect on moral and human values in society. The age of technology has caused a type of mechanization of human life and human behavior. It has caused people to drift far away from virtues and the accepted traditional values of society. The main reason for this is the industrial development of most of the countries without adequate attention to the values dominating that society. Therefore it is the appropriate time, if it is not too late, to discuss and propose the inculcation of values into modern science and technology. However, this is not simply cosmetic addition of religious values and terminology to modern sciences and applied technology, neither is this an attempt to lend a sort of religious legitimacy to technology by grafting of relevant Qur'anic verses on technology as well as science. On the contrary, it is holistic approach involving in the first place the evaluation of modern science and technology that emerged out of Western philosophy of science which diametrically incongruent with the Islamic one, traceable from the worldview that Islam and the West have.

Moreover, since technology is the product of creative mind of technologists, the value inculcation should be through them as the producer, yet the society that needs technology also have rights to demand from technologist certain requirement for solving their problem of life including religious one. In order to discern the *rationale* of value inculcation in technology it is worth discussing the sources of the problem namely the modern science and technology. Subsequently the value inculcation that will be proposed here are three *first* shifting worldview of scientist or technologist, *second* by infusing the principle of *maslaḥah* in technological works by referring to the social expectation or demand to technology and third through knowledge transformation at university education.

1 Darussalam University, Gontor, Indonesia / hfzark@yahoo.co.uk

I. Modern Science and Its Problems

Before dealing with the process of how to inculcate values into technology from Islamic perspective, it is imperative that we define the meaning of sciences. There are disagreements among scholars regarding the status of modern science, whether it is neutral or value laden. Some believe that science is cognitive in attitude and aiming to obtain "objective" knowledge, therefore there is little room for morality or in other words it is neutral. Others argue that that natural objects and physical laws are considered neither "good" nor "bad" and science is pursued to discover the natural laws and therefore no value in this objective of knowledge.[2] However, others argue that science in the West is problematic, for it is no longer associated with religion, the source of moral values. So it is neutral from religion but it is not free of secular values. So it is said that "Religion and science are separate and mutually exclusive realms of human thought and consequently it leads to "misunderstanding of both scientific theory and religious belief".[3] Due to its separation from religion it is called "science without God" to borrow the term of Arnold E Loen.[4]

Historically, the separation of science from religion is back to the conflict between science and religion as early as the 17th century, when Galileo (1632) was persecuted by the Roman Catholic Church for his view that the earth went round the sun. He also asserted that physical science must be separated from theological studies. This is because, he argues, the goal and the job of the two disciplines are totally different. The job of scientist is to examine nature, while the business of theologian is to make sure that the Bible agrees with it. In the same century Bacon also emphasized that religion is not a means of establishing physical truths, because it does not rely on practical experimentation. He also suggests that since

2 Susan Ella George. *Religion and Technology in the 21st Century: Faith in the E-World* (London-Melbourne: Information Science Publishing, 2006), 7, 187.

3 National Academy of Sciences. *Science and Creationism: A View from the National Academy of Sciences* (Washington, D.C.: National Academy of Sciences Publications, 1984), 6.

4 See Arnold E Loen. *Secularization, Science without God?* (London: SCM Press Ltd., 1967).

the Bible was written centuries ago, it lacks the information of scientists established from natural experiments. This means using it to explain the natural phenomena is not appropriate.[5] This separation was also driven by Renaissance of the Western civilization (14th-17th centuries) with its new spirit of inquiry and discovery that opened the gates to new scientific and technological developments. This separation was affirmed rigidly by the French Revolution (1789–1799). From these historical facts, it is clear that modern science is separated from religion from its early inception.[6]

The above separation has resulted in the rise of the principle of duality between "fact" and "value", by which science is regarded as neutral or having no values. This duality is based on the myth of ethical neutrality in a value-free social science discussed by G. E. Moore in his *Principia Ethica* (1903), where he argues that science is restricted to what can be empirically proven. This means, only facts in the empirical sense are considered to be capable of being known *scientifically*. In this viewpoint the truth is measured only from objective facts separated from values.

The dual vision that separate fact from value led to another epistemological dichotomy of "subjective truth" and "objective truth"[7] Not only has science been limited to empirical phenomena that everyone could analyze and evaluate quantitatively without interference of the subject but could also be assumed as fully independent of time.[8] What they mean by the objective refers to two modes: *first* is a specific characteristic of scientific methodology, which is systematic, empirical of nature that leads to truthful generalization that could be empirically verified by repeating the experiment. *Second* is characteristic of the orientation and practice of

5 George Bugliarello. "Science, Technology, and Society—The Tightening Circle" in Glenn Schweitzer (ed.), *Science and Technology and the Future Development of Societies, International Workshop Proceeding* (Washington, D.C.: National Academy Press, 2008), 106.

6 Douglas G Long divided the period separation of science from religion into three: *first* is a period when the philosophy of science is a branch of theology, and scientific inquiry arrive at truth or certainty by confirming religious truth; *second* is a period when science has been secularized in a negative sense: confined to the realm of the secular, cut off from ultimate truth, having lost the capacity for unmitigated certainty as believer might lose the capacity for faith. The last period is a period when science has really been secularized. See Douglas G Long, "Science and Secularization in Hume, Smith and Bentham" in James E Crimmins (ed.), *Religion, Secularization and Political Thought, Thomas Hobbes to J. S. Mill* (London and New York: Routledge, 1990), 96.

7 Peter R Senn. *Social Sciences and Its Method* (Boston: Holbrook Press, 1971), 55.

8 Alanc Isaak. *Scope and Method of Political Science: Introduction to the Methodology of Political Inquiry* (New York: The Dorsey Press, 1969), 24.

scientists. In other words, is the behavior of researchers and practitioners of science objective?[9]

However, what is claimed as objectivity in science is not really objective in the real sense of the word. For we only make up our vision of reality and our perception of the world in general according to its reflection in our subjective natures. In this sense, there is no purely objective world which we are bound to regard as representing reality. The world is the interaction between the human selves reflecting upon multiple meanings and then imposing them over things. So, we cannot separate the thinker from his thought and the scientist from his responsibility. More generally, we cannot separate man from the reality he studies with this approach because reality is very complex and the world's elements are shaped according to our perspectives and interpretation. The more we examine the element of reality from a different perspective the more aspects we can see.[10] Therefore, the perception we gain is totally different from the actual reality.[11]

Science is not practiced within a cultural or societal vacuum. It is not only the product of logic, but is an integrated part within this impure world in which we live. Science, is thus subject to the economic and political power that abuse science for political, commercial or military interests. So there is no empirical proof for the claim concerning the objectivity of scientific research. In the mid-70s, for example, excessive writings on sciences suggests that works of scientists in various fields including medicine and technology were not really neutral. It was because those works had been influenced by politically dominating power, especially in their job of formulating a certain perspective for science and technology.[12] Even in certain cases, science depends on government, institutional and organizational funding, and that scientists interact with and are dominated by the interest of various economic, political and military powers.[13]

9 Helen E Longino. *Science as Social Knowledge: Value and Objectivity in Scientific Inquiry* (New Jersey: Princeton University Press, 1990), 66; see also Nasr Arif, "Science, Objectivity and Ethic in Research Methodology", *The American Journal of Islamic Social Science*, 15: 1 (1998).

10 David Halbrook. *Education and Philosophical Anthropology* (London Associated University Press, 1987), 150-151.

11 Harold Brown. *Observation and Objectivity* (New York: Oxford University Press, 1987), v.

12 Les Levidow, ed. *Science as Politic* (London: Free Association Books, 1986), 3.

13 Steward Richards. *Philosophy and Sociology of Science* (Oxford, Basil, Blackwell, 1987), 127-128.

In addition, the principle of duality brought about a dichotomy between physical and metaphysical reality that can hardly be reconciled. This is exactly what has been asserted by Silver that "the polarization between science and religion weakens societies and continues to be unresolved."[14] Seyyed Hossein Nasr criticized this by asserting that sensualist and empirical epistemology that dominated the horizon of Western people in this modern era, has successfully reduced the reality of the world of experience into sense perception. This has limited the meaning of reality and eliminated the concept of God's reality.[15] Human domination of searching the truth implies that the Ultimate reality i.e. God is forgotten or left behind. There is no principle higher than human being. More fundamentally modern science was founded on Western worldview which was colored with Western culture and psychological perception. At least there are five characteristics of Western civilization:

First, relying merely on reason to guide the life of human being;
Second, following the validity of dualistic view about reality and truth;
Third justify the aspect of temporal Being that project secular worldview;
Fourth advocate the doctrine of humanism.[16]
Fifth so, modern science is value laden and not neutral at all.

A.Technology and Its Problems

Having delineated so far the problem of value in modern sciences, we shall now elaborate such a problem in technology since the former related closely with the latter. Technology is a complex phenomenon and therefore it has no single meaning. There had been much effort devoted to work out precise definition of technology but it finally failed. Be that as it may, there are still some definitions that can be used for basic understanding of technology. Etymologically, the word "technology" comes from the Greek word "*techne*" meaning a systematic treatment of an art or craft and

14 L. M. Silver. *Challenging Nature: The Clash of Science and Spirituality at the New Frontiers of Life* (New York: Ecco, Harper Collins 2006), ix.

15 Seyyed Hossein Nasr. *The Need for a Sacred Science* (New York, SUNY Press, 1993), 7 & 20.

16 Syed Muhammad Naquib al-Attas. *Islam and Secularism* (Kuala Lumpur: Angkatan Belia Islam Malaysia (ABIM), 1978), 127– 132. See also by the same author *The Concept of Education in Islam* (Kuala Lumpur: Muslim Youth Movement of Malaysia, 1980), 45.

suggests craftsmanship. Other definitions summarized from *Answers.com* (n.d.) show that there are at least five definitions of technology:

1) The application of science, especially to industrial or commercial objectives.
2) "Applying a systematic technique, method or approach to solve a problem" (Computer Desktop Encyclopedia).
3) "The discipline dealing with the art or science of applying scientific knowledge to practical problems".
4) "The creation of products and processes for the purpose of improving human chances for survival, comfort level, and quality of life".[17]
5) "The practical application of knowledge, especially in a particular area such as engineering"[18]

It was these senses, in which 'technology' is used to refer to a body of knowledge about the useful arts that prevailed from Renaissance times well into the industrial era.[19] However, when technology is defined from other discipline of knowledge it appears somewhat different. In relation to economic discipline 'technology is simply anything that is important in constraining the feasible combinations of certain inputs to produce certain outputs'.[20] In the Standards for Technological Literacy, technology is also defined as: "… the diverse collection of processes and knowledge that people use to extend human abilities and to satisfy human needs and wants."[21] Another definition that emphasis social and environmental factors in technology is this:

The use of knowledge, skills and resources to meet people's needs and wants by developing practical solutions to problems, taking social and environmental factors into consideration.[22]

17 www.geog.ouc.bc.ca/conted/online courses/enviroglos/t.html.

18 www.projectauditors.com/Dictionary/T.html. See also Susan Ella George, *Religion and Technology*, 7.

19 T. J. Misa. "The compelling tangle of modernity and technology" in T. J. Misa, P. Brey & A. Feenberg (eds.), *Modernity and technology* (Cambridge, MA: The MIT Press, 2003), 1-30.

20 Sonja Vandeleur. "Indigenous Technology and Culture in the Technology Curriculum: Starting the Conversation: A Case Study", unpublished Ph. D. thesis, Rhodes University, January 2010, 12.

21 International Technology Education Association. *The Standard for Technological Literacy* (2002), 2.

22 The National Curriculum Statement: Technology, South Africa, Department of Education (2002), 4.

All those meanings show that technology understood as practical application, creation, method, technique, approach of scientific knowledge. In this sense technology applies the finding of scientific research or in other words science "come before" technology and enabling advances in technology. It could also be assumed that technology come first before the next scientific breakthrough can be made. It is through technology that science is enabled to advance. So in fact, there is a reciprocal relationship between science and technology.

Those diversified definitions of technology can be simplified into its types. Foucault, for instance, proposed four types of technology:

1) Technologies of production, is technology that allow us to produce, transform or manipulate things;
2) Technologies of sign systems, is technology that permit us to use symbols, signs or meanings;
3) Technologies of power is that which determine individual behavior and;
4) Technologies of the self is an approach to study the ethics of the individual.[23]

According to Foucault, these four types of technologies always function together but they are not reducible to one another as each type is associated with a certain domination. It is a framework that enables researchers to better identify patterns, structures and relationships in a socio-technical system.

Be that as it may, technology is related closely to sciences in at least three points. *First* science (*episteme*) is about the unchangeable, while technology (*techne*) is about the changeable. *Second*, science starts from sensations of concrete things, whereas technology goes one step further and applies general knowledge back to concrete things. *Third*, scientists look for theoretical knowledge (*theoria*), that is, an activity having an end in itself; technicians produce new things (*poiesis*), and such an activity has always an end in something else.[24] In this sense technology has been seen as "flowing from" science.

23 M. Foucault. "Technologies of the self" in L. H. Martin, H. Gutman & P. H. Hutton (eds.), *Technologies of the Self: A Seminar with Michel Foucault* (Cambridge, MA: MIT Press, 1988), 16-49.

24 Susan Ella George, *Religion and Technology*, 6.

Just as it is proven that science is not neutral, while technology has reciprocal relation with science, it can be inferred that technology cannot be "neutral" too. Technology is applied and it cannot escape the question of whether its use is moral and ethical or not. Technology should answer the question of what is done with the "product." Hence, we have the situation where machines and technological products are developed with no moral guidelines on their use.[25] In technology, there are questions of what applications are made and what is done with the technological product.

B. Evaluating Technology

In the situation where technology is not "neutral" and is not developed with moral guidelines on their use, one of the most poignant questions is the extent to which technology is "under the control" of society versus the extent to which it controls society. In most of the cases the change and innovation of technology is so rapid that society cannot control it and even could be trapped on using certain machine. Instead of looking at root causes problem, people continue to apply one technology after another to solve their problems, making them dependent on new machines. For example, too much of the rich food and a life of physical ease means people need new anti-obesity technologies or machine to enhance the "natural" diet. This means that each time we create a technology it has both positive and negative implications. The next time technology is created it is to correct the negative aspects of the previous one in so rapid way that creates a never-ending cycle of increased complexity. Similarly in society with certain lifestyle and culture that depend their life on technology, machines demand machines, people no longer have much say in determining direction, let alone values. So it can be inferred that human being in certain case cannot control the advancement of technology as well as the technological product. On the contrary technology even can change the ways the society live and thus requires examination in the question of technology's impact upon society. The presence of television at home, for example, could destroy the tradition of family gathering in an extended family where the relationships are primary and everyone feel as part of it. Let alone the present of game technology (like play station) that practically waste the time of students.

25 Ibid, 187.

In such situations where technology cannot be controlled by human beings there is an attempt to evaluate it. The issue raised by Dreyfus and Spinosa regarding the role of technology in humanity and the way it should be evaluated.[26] In this issue the pivotal point is that to evaluate one would depend on a worldview by which all merit of technology such as efficiency, ease, freedom, pleasure, usefulness for social and cultural life, and even religion can be measured. The issue was then advanced to the problem of philosophy of technology. The renowned figure who began developing the field of philosophy of technology was Martin Heidegger. In his essay entitled *The Question Concerning Technology* he analyzes the true nature of technology and criticizes modern technology. However, he is also interested to find the way how to have free relationship to modern technology but under the condition that technology should be perceived as an instrument that we can retain it in the hand in will to master it.[27]

One who started classifying and bridging two philosophical approach to technology was Carl Mitcham. He categorizes the approach into two: "engineering" approach and the "humanities" approach.[28] Engineering philosophy of technology – posits that technology is central in human life as the philosophical project aimed at understanding the phenomenon of technology as instantiated in the practices of engineers and others working in technological professions. Here technology is approached as tool and machine experienced in everyday life as material objects (from kitchenware to computers). Humanities philosophy of technology, on the other hand, consists of more general philosophical projects in which technology *per se* is not principal subject of concern. Technology is approached as a case study by examining how technology affects human life especially within the moral and cultural boundary. In other words technology is discussed as knowledge (including recipes, rules, theories, and intuitive "knowhow"), as activity (design, construction, and use), and as volition (knowing how to use technology and understanding its consequences). By elucidating these multiple aspects, Mitcham establishes criteria for a more comprehensive analysis of ethical issues in applications of science and technology.

However Mitcham finds that using the approach of engineering philosophy of technology is more successful where the engineers are requested to think about their works and to distinguish technology from science as the object of evaluation. However, unlike Heidegger's position who criticizes modern technology, engineering approach praise modern technology uncritically and thus failed to deal with its problem. In contrast, the "humanities" philosophy of technology is regarded as not an effective instrument for evaluation and it is unnecessarily obscure and not easily comprehensible. In fact, the critique of humanities philosophy of technology is plausible, because there is growing hegemony of technology with the orientation of temporality and efficiency that constitutes a threat to meaning in life.[29] In other words, technology removes "meaning" from the world.

In addition to the above approaches to technology there are another attempt that introduce new name of technology, that is meta-technology, hyper-technology, virtual technology, or post technology.[30] Meta-technology has the mission of a re-contextualization of technology, which in turn become a technology that form a new culture of its own, and it is named trans-cultural culture or technoculture that transcends traditional particular culture and become global culture. The term which was coined by Mitcham, intended not only to distinguish meta-technology from modern and premodern technology,[31] but also to capture the progressive development

26 H. L. Dreyfus & C. Spinosa (1997). "Highway Bridges and Feasts: Heidegger and Borgmann on how to affirm technology". Retrieved from http://www.focusing.org/dreyfus.html.

27 Martin Heidegger. *The Question Concerning Technology and Other Essays*, trans. by William Lovitt (New York: Harper and Row, 1977), 50.

28 The explanation of these two approaches are as follows: 1) Engineering philosophy of technology: Uses technological thought and action as a model for understanding even non-technological thought and action; 2) humanities philosophy of technology, this approach regards technological thought and action as only one aspect of human thought and action; delimits the technological thought within a larger framework such as life world or culture. C. Mitcham, "Notes toward a philosophy of meta-technology" in D. Baird (ed.), *Society for Philosophy and Technology* 1 (1-2). Retrieved from http://scholar.lib.vt.edu/ejournals/SPT/v1_n1n2/ mitcham.html.

29 Susan Ella George, *Religion and Technology*, 31.

30 C. Mitcham and R. Mackey, eds. *Philosophy and Technology: Readings in the Philosophical Problems of Technology* (New York: The Free Press, 1983), 254; see also C. Mitcham, *Thinking through Technology: The Path between Engineering and Philosophy* (Chicago: University of Chicago Press, 1995), 58.

31 Pre-modern technology or *technics* is technology where *technics* is embedded in a life world or culture that can be examined by general philosophy. Modern technology or autonomous technology: is a technology which is decontextualize or disembodied from society, in which its instrumentality was studied separate from culture. Susan Ella George, *Religion and Technology,* op. cit., 4-5.

of a global electro-media infrastructure and its culture. It is because science depends on technology as much as technology has been reputed to depend on science. This "inter-connecting of the realms" is applicable to economics and politics and vice versa; politics and religion and vice versa; art and economics and vice versa. The best instance of this meta-technology, according to Mitcham is the World Wide Web. It is from this latest type of technology that the inculcation of values is possible.

The foregoing discussion suggests that there were attempts among scholars to inculcate values into technology albeit the values meant therein are more cultural, social and moral in humanistic sense rather than religious. Moreover, from anthropomorphic approach we can use technology as a vehicle to understand humanity, or some other aspect which technology impacts. From sociological approach we examine whether technology is compatible with the need of society. Using philosophical approach we examine the underlying worldview within which technology is produced. With reference to economic approach we examine whether technology is instrumental for the process of production and distribution. This implies that technology opens its gate to be discussed from religious perspective or to be infused with religious values.

II. Inculcation of Values Into Technology

From the above discussion of sciences and technology, it is obvious that despite their secular orientation and application there are still spaces to inculcate value into technology. We would like to argue that there are at least three mediums of value inculcation into technology. I shall try to evaluate these means of value inculcation: through shifting worldview or paradigm; introducing objectives of *sharî'ah* and public goods; and modifying university curriculum.

A. Shifting Worldview

The basic problem of science and technology is dualistic worldview adhered by most of Western scientists, which in turn bring about various epistemological implication as has been alluded above. Therefore inculcation of Islamic values into Western science and technology requires a shift of paradigm or worldview revolution. In other words, in order to

infuse Islamic values in technology we have to liberate the worldview of Muslim scientist and technologist from Western influence and infuse them with the worldview of Islam.

The worldview of Islam projected by the revelation is a conceptual edifice that consists of seminal concepts that are subject to further interpretation and explanation with the support of prophetic tradition, reason, experiences and intuition in order to be instrumental for understanding reality as a whole. This explanation, demonstrate the structure of metaphysical foundation of Islam which is the basis of epistemology.[32] The definition of this worldview according to al-Attas "...the vision of reality and truth that appear before our mind's eye revealing what existence is all about". This vision is not only limited to the vision of human reason towards physical world or the world of sensible experience, but encompasses both the worldly aspect (*al-dunyā*) and that of the hereafter (*al-ākhirah*). The former must be related profoundly to the latter and even the latter has ultimate and final significance.[33]

The vision of two aspects of reality in an integrative fashion in Islam is manifest in analogous depiction of the Qur'an that is composed of symbolic form (*āyāt*) and the world of nature that consist of symbolic form (*āyāt*) like words in a book.[34] Certain people call the symbolic form of the Qur'an as linguistic symbol (*āyāt qawliyyah*), while the symbolic form in the world of nature is named symbol of the nature (*āyāt kawniyyah*). Since the Holy Qur'an and the nature have both ambiguous and clear or established symbolic forms one need to employ allegorical interpretation (*ta'wīl*) to detect, discover and reveal the concealed meaning of the ambiguous sign and symbols, yet it should be based on the interpretation of those that are apparent (*tafsīr*). Based on this method of interpretation al-Attas define Islamic science as:

> ..ultimately a kind of *ta'wīl* or allegorical interpretation of the empirical things that constitute the world of nature. As such science must base itself firmly upon the *tafsīr* of interpretation of the apparent or obvious meanings of the things in nature.[35]

32 Syed Muhammad Naquib al-Attas, *A Commentary on the Ḥujjat al-Ṣiddīq of Nūr al-Dīn al-Rānirī* (Kuala Lumpur: Ministry of Education and Culture, 1986), 464-465.

33 Syed Muhammad Naquib al-Attas. *Prolegomena to the Metaphysics of Islam: An Exposition of the Fundamental Element of the Worldview of Islam* (Kuala Lumpur, ISTAC, 1995), 1.

34 Ibid, 133.

35 Ibid, 137.

From other viewpoint the neutrality of science can be repudiated from the theory of worldview. The connection between worldview and sciences is traceable from the relation between worldview and epistemology. Scientific activity is within the domain of epistemology, while epistemology is developed within certain worldview and even influenced by it and vice versa in vicious circle. A belief in God, for example, could influence the way someone comprehend the nature of knowledge. It is because God and other non-empirical reality is regarded as the source of knowledge. On the contrary, if the existence of God is denied in a certain worldview all non-empirical reality is excluded from sciences. The statement of Thomas F. Wall below regarding this notion is interesting:

It (belief in God's existence) is very important, perhaps the most important element in any worldview. First if we do believe that God exists, ... we will have to believe that knowledge can be of more than what is observable and that there is a higher reality – the supernatural world. ... if on the other hand, we believe that there is NO GOD and that there is just this one world, what would we then be likely to believe about the meaning of life, the nature of ourselves, and after life, the origin of moral standards, freedom and responsibility and so on.[36]

The foregoing quotation suggests that belief, either in the existence or in the nonexistence of God, related closely to the way the human being comprehend the nature of reality and knowledge, including the method to attain and utilize them in their life. The connection between worldview and science as well as technology is clearly defined by Professor Alparslan Açıkgenç, who asserts that "worldview is the foundation of all human conduct, including scientific and technological activities. Every human activity is ultimately traceable to its worldview, and as such it is reducible to that worldview."[37] This implies that scientific and technological activities are carried out within the ambit of worldview. Thomas Kuhn who was well known as one who coined the term "scientific paradigm" connected conceptually the

36 Thomas F. Wall. *Thinking Critically About Philosophical Problem: A Modern Introduction* (Belmont, CA.: Wadsworth, Thomson Learning, 2001), 126-127, 532.

37 Alparslan Açıkgenç. *Islamic Science: Towards Definition* (Kuala Lumpur: ISTAC, 1996), 29; see also Alparslan Açıkgenç, "The Framework for a History of Islamic Philosophy", *Al-Shajarah*, *Journal of The International Institute of Islamic Thought and Civilization*, 1: 1&2 (1996), 6.

term "paradigm" with worldview,[38] as he asserts that *paradigm shift* can be deemed *weltanschauung Revolution* (worldview revolution). Paradigm consists of values, standards and methodologies which are the very meaning of worldview, but at the same time it is also conceptual framework required by scientific studies,[39] and that paradigm "determines the way science should be practiced".[40] Therefore it is quite plausible when Garry Gutting asserts that "to accept a paradigm is to accept a comprehensive scientific, metaphysical and methodological worldview".[41] From the preceding delineation it is clear that the basis of scientific and technological activities is worldview or paradigm. So, to inculcate values into technology one has to change the way he looks at sciences and technology in the real sense of the words.

As the matter of fact, employing worldview perspective for looking at technological issues is rarely considered by scholars.[42] From this perspective technology might be more than just the material artifacts or conditions of our lives, more than just mean to accomplish end. Infusing worldview requires more holistic approach for it based on an integrality of spiritual-rational view of the Qur'an and the *Sunnah* (the Prophet's sayings and practices). Such an approach provides a better alternative of philosophical framework for a person's interaction with nature and his/her fellow human beings.[43] It is the Qur'an that has such an approach, since according to al-Shāṭibī, the criteria whether something is beneficial and

38 Kuhn states: "scientific research are directed towards the articulation of phenomena and theories where the paradigm is already provided." Thomas S Kuhn, *The Structure of Scientific Revolutions*, International Encyclopedia of Unified Science, vol.2, no 2 (Chicago: University of Chicago Press, 1970), 24.

39 See Edwin Hung, *The Nature of Science: Problem and Perspectives* (Belmont, California: Wardsworth, 1997), 340, 355, 368, 370.

40 Ibid, 368.

41 Gary Gutting, "Introduction" in *Paradigm and Revolution: Appraisal and Application of Thomas Kuhn's Philosophy of Science,* (ed.) (Notre Dame, Ind.: University of Notre Dame Press, 1980), V, 1.

42 Commenting on this matter James P Buchanan asserts that "None consider that technology is a profound worldview and ontological shift that changes not only the way we are in the world but also the ways in which we should reflect upon it". James P. Buchanan, "Critical Literacy: Technology and Cultural Values (Comparative Philosophy and Philosophy of Technology in Conversation)" in Peter D Hershock, et. al., *Technology and Cultural Values, On the Edge of the Third Millennium* (Honolulu: University of Hawaii Press, and East West Philosopher Conference, 2003), 583.

43 Khaliq Ahmad. "Islamic Ethics in a Changing Environment for Managers" in *Ethics in Business and Management: Islamic and Mainstream Approaches* (London: Asean Academic Press, 2002), 97-109.

harmful cannot be left to human reasoning alone, like the social contract theory and the normative stakeholder theory advocated by most Western theorists. Human reasoning plays a role only in a framework guided by the Sharī'ah.[44] Islam recognizes the role of reason and experience in theorizing the affairs of worldly life only in a manner that embraces the transcendental aspect of human existence, because human beings' have inherent limitations that requires divine guidance, especially to ascertain what is right and what is wrong."[45] Hence, our rational faculties can – and should only – be used to complement, support, and strengthen ethics and morality as defined by the *sharī'ah*. Now, we shall elaborate the objectives of *sharī'ah* and the public good (*maslaḥah*).

B. Applying Objectives Of Sharī'ah

The values that are to be inculcated in technology are derived from understanding *sharī'ah*. *Sharī'ah*, as one of the most fundamental elements of Islamic worldview, cannot be separated or isolated from basic belief and values. It is also a system of ethic and values covering all aspect of life such as individual, social, political, economic and intellectual.[46] In other words, it reflects the holistic view of Islam, which is a complete and integrated code of life encompassing all aspect of life, be they individual or social. In Islam, all activities in life including technology cannot be isolated from moral and spiritual aspect and vice versa. The relevance of *sharī'ah* in relation to technology can be discerned from the objectives defined al-Ghazzali in the following:

The objective of the *sharī'ah* (*Maqāsid al-Sharī'ah*) is to promote the wellbeing of all mankind, which lies in safeguarding their faith (*din*), their human self (*nafs*), their intellect ('*aql*), their posterity (*nasl*) and their wealth (*mal*) whatever ensures the safeguard of these five serves public interest and is desirable.[47]

44 Cited in Imran Ahsan Khan Nyazee, *Islamic Jurispudence (Usul al-Fiqh)* (Islamabad: Islamic Research Institute Press, 2000), 65.

45 Nyazee's argument is supported by a number of Qur'anic verses, among them 23: 71.

46 Muhammad Hashim Kamali. "Sources, Nature and Objectives of Shari`ah" *The Islamic Quarterly*, 35 (1989), 215.

47 M. Umer Chapra. *The Future of Economics: An Islamic Perspective* (Leicester: The Islamic Foundation, 2000), 118. Since the Arabic words are known to the experts we shall not always follow the standard transliteration in order to make it easier for the general reader to pronounce them.

The foregoing Shari'ah objectives listed by al-Ghazzali are approved by al-Shatibi thereby indicating that they are the most preferable in terms of their harmony with the Shari'ah's essence.[48] Generally, the Shari'ah is predicated on benefiting the individual and the community, and its laws are designed to protect these benefits and facilitate the improvement and perfection of human life in this world which corresponds to the purposes of the Hereafter. In other words, each of its five worldly purposes (viz., preserving faith, life, posterity, intellect, and wealth) is meant to serve the single religious purpose of the Hereafter.

The ultimate objective of Shari'ah rest within the concepts of compassion and guidance,[49] which seek to establish justice, eliminate prejudice, and alleviate hardship by promoting cooperation and mutual support within the family and society at large. Both of these concepts are manifested by realizing the public good that Islamic scholars have generally considered to be the *Shari'ah's* all-pervasive value and objective that is, for all intents and purposes, synonymous with compassion. The objectives of the *Shari'ah* (*Maqasid al-Shari'ah*) sometimes connotes the same meaning as public good (*Maslaḥah*), and scholars have used these two terms almost interchangeably.[50]

Maslaḥah (pl: *masâliḥ*) is etymologically "welfare, interest, or benefit. Literally, means seeking benefit and repelling harm. It is defined as a juristic device used in Islamic legal theory to promote the public good and prevent social evil or corruption. *Maslaḥah* and *manfa'ah* (benefit or utility) are treated as synonyms. However, *manfa'ah* is not a technical meaning of *maslahah* , which Muslim jurists define as seeking benefit and repelling harm, as directed by God or the Shari`ah.[51] Al-Ghazzali defines *maslahah* as follows:

48 Nyazee, *Islamic Jurispudence*, 121.

49 These attributes correspond to Qur'an 21:107 and 10:57.

50 Many classical-era Islamic legal scholars advocated the principle of the public good (*maslahah*) and the Shari'ah's objectives (*maqasid al-Shari'ah*) in Islamic legal thought (*fiqh*): e.g., al-Juwayni (d. 1085), al-Ghazzali (d. 1111), al-Razi (d. 1209), al-Umidi (d. 1233), al-Salmi (d. 1261), al-Qarafi (d. 1285), Ibn Taymiyyah (d. 1327), al-Shatibi (d. 1388), Ibn al-Qayyim al-Jawziyah (d.1350), and al-Tûfi (1316). Cited in Deina AbdelKader, "Modernity, the Principles of Public Welfare (*Maslahah*), and the End Goals of the Shari`ah (*Maqasid*) in Muslim Legal Thought," *Islam and Christian-Muslim Relations*, 14: 2 (2003), 164-74.

51 Cited in Nyazee, *Islamic Jurispudence*, 161.

Maslahah is essentially an expression for the acquisition of benefit or the repulsion of injury or harm, but that is not what we mean by it, because acquisition of benefits and the repulsion of harm represent human goals, that is, the welfare of humans through the attainment of these goals. What we mean by *maslahah*, however, is the preservation of the *Shari'ah's* objectives.[52]

Since *maslahah* is synonymous with *maqasid*, al-Ghazzali emphasizes the importance of preserving the *Shari`ah's* objectives as *maslahah's* fundamental meaning. By preserving those objectives we may gain flexibility, dynamic and creativity in policy, in economics, science, technology, environment and politic.[53] Al-Shatibi, closely following al-Ghazzali's taxonomy, defines *maslahah* in his *al-Muwafaqat* as a principle that concerns the subsistence of human life, the completion of one's livelihood, and the acquisition of what his emotional and intellectual qualities require of him in an absolute sense. He further classifies *maslahah* into three categories: *daruriyat* (the essentials), *hâjiyât* (the complementary), and *tahsîniyât* (the embellishments).[54] These categories are briefly discussed below:

Darûriyat (The essentials): these are the self-interests upon which people essentially depend, such as faith, life, intellect, posterity, and wealth. These elements are, by definition, absolutely necessary for the proper functioning of a person's religious and mundane affairs, to the extent that their destruction and collapse would precipitate chaos and the collapse of society's normal order. Thus, protecting them reflects the effective way of preserving the *Shari'ah*, as outlined in its objectives.[55]

Ḥājiyāt (The complementary): these category is complementary to the essentials and refer to those interests that, if neglected, would lead

52 Al-Ghazzali, *al-Mustasfā Min 'Ilm al-Usûl*, (edited by M. Sulayman al-Ahqar), vol. I, Mu'assat al-Risalah, Beyrut, 1997), 416-417; see also Ahmad al-Raysuni, *Nazariyat al-Maqasid `inda al-Imam al-Shatibi* (Riyadh: Dar al`Alamiyyah Kitab al-Islami, 1992), 41-45.

53 Wael B. Hallaq. *A History of Islamic Legal Theories: An Introduction to Sunni Usul al-Fiqh* (Cambridge: Cambridge University Press, 2004).

54 Abu Ishaq al-Shatibi. *Al-Muwafaqat fi Usul al-Shari'ah*, (ed.), Abdullah Draz (Beirut: Dar al-Ma'rifah, 1996), 2: 25; see also Hallaq, *History*, 168.

55 According to Hallaq, the essentials are maintained by two means: on the one hand, they are enhanced and strengthened, while on the other, all potential harm that may arise to affect them is averted. For example, protecting life and intellect are examples of important elements of the essentials that can be enhanced by providing proper food, shelter, clothing, education, and so on. On the other hand, any potential harm that might threaten these essentials may be averted by means of a penal law or punishment that prohibits alcohol or dumping toxic waste that may cause harm to one's intellect and life, respectively. Cited in Hallaq, *History*, 168.

to hardship but not to the total disruption of life's normal order. In other words, they are needed to alleviate hardship so that life may be free from distress and predicament. An example is seen in the sphere of economic transactions, where the Shari'ah validates such contracts as forward buying (*sallam*) and lease and hire (*ijarah*), because people need them, notwithstanding a certain anomaly attendant in both.

Taḥsiniyyât: The embellishments refer to those interests that, if realized, would lead to refinement and perfection in the customs and conduct of people at all levels of achievement. For example, the Shari`ah encourages charity (beyond the level of zakat) to those in need and, in customary matters and relations among people, urges gentleness, pleasant speech and manner, and fair dealing.

Relevance to the three principle of public good (*maslahah*) there are three groups of technologies to support national development: a) technologies for basic needs equal to first principle, essential (*darûriyyât*)); b) technologies for the improvement of quality of life, equal to complementary (*hâjjiyât*) and c) technologies for wealth creation, which is the same as the embellishment (*tahsiniyyât*). Science and technology strategy must therefore be holistic and comprehensive, addressing the role and needs of the main players in a nation, which are government, industry, the science and technology community and society at large.[56]

The above classification is not only to seek of benefit and to repel harm as directed by the lawgiver (Allah and His messenger), but also to ensure that society's interests are preserved in the best fashion both in this world and in the Hereafter. The above principles of public good and theories of objectives (*maqâsid*) tend to be concerned only with individual rather than society and human in general. Those principles also exclude the most universal and basic values such as justice and freedom. It is therefore quite reasonable that contemporary thinkers such as Ibn Ashur (d.1907), Rashid Rida (d.1935), Muhammad al-Ghazali (d.1996), Yusuf al-Qaradawi (b. 1926) and Taha al-Alwani (b. 1935) proposed new additional principle of public good and objectives of Shari'ah.[57] Some of the

56 George Bugliarello. "Science, Technology, and Society: The Tightening Circle" in Glenn Schweitzer (ed.), *Science and technology*, op. cit., 104-5.

57 Jasser Auda. *Maqasid al-Shriah as Philosophy of Islamic Law, A System Approach* (London, Washington: The International Institute of Islamic Thought, 2008), 5-7.

new principles of public good are knowledge, wisdom, freedom, social-political and economic reform and women rights, preservation of natural disposition (*fitrah*), justice, human dignity and right, purifying the soul, restoring moral values, and developing civilization on earth. So, when those principles are elaborated further in so comprehensive manner we could provide a framework for making decision and a mechanism for adapting change and producing as well as utilizing technology.

Before applying the principle of *maslahah*, it is imperative that we delineate the reciprocal relation between society and technology. The society (through social organization) may exploit or expect technology in order to meet their objectives and needs, whereas technologists diffuse their technological products to support the advancement of social wellbeing. Eliezer Geisler categorizes the expectation of society to technology in his work *Creating Values with Science and Technology* into three categories: mission and objective, internal functioning and intangible factors. The detail can be clarified below:

1. Mission and objectives: this is the expectation to accomplish the mission of social institution within budgetary constraints, and also to perform maximum satisfaction of recipients of services, expectation of constituencies, meeting performance standard of higher order of national and social goal. This is more ideal in nature rather than practical.
2. Internal functioning: this is related to the social expectation for technology to provide efficiencies in administration and management, procedure and methods, cost-saving and cost cutting, also efficiencies in empowering inter-organizational coordination and cooperation. This expectation is more practical in relation to the operation of organization or institution.
3. Intangible factor: such as prestige, maintaining traditions, and recognition by funding bodies and public at large are important expectation. So technology is expected to assist in maintaining the high level of these factors through.[58] This is concerning about some factors that are more practical.

58 Eliezer Geisler, *Creating Values with Science and Technology* (London: Quorum Book, 2001), 245-246.

Obviously, the foregoing categories refer to modern secular society of the West, where their ideal expectation to technology are limited only to develop the materialistic society. Therefore that social norm, ethics and morality are regarded as insubstantial factor, whereas in Islamic society ethic and morality is part of the essential element of *maslahah*. However, in order to inculcate values to technology, we shall accomplish the expectation of Western society to technology with principle of *maslahah* discussed previously.

The first expectation to technology to accomplish the mission and objective of social institution could be infused with factors mentioned in *maslahah* as *darûriyyât* (The essentials). In this category, technology is expected to enhance the protection or the preservation of five essential factors namely: faith, life, intellect, progeny and wealth. It is not the matter of engineering technological product but about the worldview of technologist. It is because the preservation or protection of five objectives of Shari'ah is affirming one's worldview. The protection of faith or religion means the betterment of man-God relation, by which the mode of his relationship with his fellow human being would consequently be better. This would bring about the good relationship between staff and his manager in a social organization. In this situation there will be no conflict of interest, since everyone has a unity of purpose in his life that is to serve Allah. This also would inevitably lead to formation of a society whereby every member will cooperate with each other rather than compete, to obtain the ultimate happiness (*falāh*). If the whole member of society including the producer and procurer of technology were guided by proper relationship with God, the working ethic of every person would be inspired by the values of truthfulness, firmness, fairness, and respect for the law, kindness, forbearance, tolerance and uprightness, instead of deceit, haughtiness, class consciousness, ostentation, insubordination, envy, jealousy, backbiting and the like.[59] This should naturally be manifested in individuals' involvement in producing and procuring technology.

In terms of technological product the technologists are expected to produce technologies that are conveniently protect man essential need ac-

59 See M. K. Hasan, "Worldview Orientation and Ethics: A Muslim Perspective" in A. M. Sadeq, *Ethics in Business and Management: Islamic and Mainstream Approaches* (London: Asean Academic Press, 2002), 67.

cording to dictate of Shari'ah i.e. faith or religion, life, intellect, progeny and wealth, in all walk of life. The technologists, for example, are expected to create safety and health facilities in the working places in order to save the human life; the technologist in the field of communication had created a product of cell phone by embedding compass in it, in order to help Muslims in looking for direction of Mecca to perform their prayer whenever they need it.

However, in the field of architecture or in urban planning certain aspect of "essentials" are not taken into consideration. In designing modern building, such shopping complex, airport, hospital and others, Muslim architect used to forget to provide adequate prayer room. Seyyed Hossein Nasr, for example depict the criteria of Muslim architect as the following:

> The heart of many Islamic cities today still display this remarkable unity of space and function within the mosque, *madrasah*, bazaar, private home and the like. Needless to say, secularism destroys this vision of unity and the integration of all human activity within a divine norm and pattern. [60]

So, in Muslim society or other society where religious rituals need a space to perform, architect or urban design technologists should take so seriously into their consideration that all necessary or essentials aspect of social life are to be provided adequately in their urban design.

The *second* expectation to provide efficiencies in administration and management of organization could be practical in nature, but it is still related to the first expectation i.e. to accomplish mission and objective or the essential needs. If the expectation to accomplish mission and objective can be infused with the essential needs (*darûriyyât*), we could also infuse this second expectation with the accomplishment of complementary needs (*the hâjiyyât*). The complementary needs are the whole supplementary to the five essential values especially on protecting life and intellect. However, this complementary principle focuses on avoiding hardship in the life of the community and giving convenience to human life including efficiencies demanded by modern secular society.

The Internal functioning as the expectation of society to technologist can be accomplish by creating technology that can avoid hardship in working places, in school, in the mosque, in the airport and the like. Also for the purpose of efficiencies computer and communication technology are appropriate product, yet it should be controlled by the goal to accomplish the essential needs. Technology of producing alcohol should be directed only for the purpose of medication; also technology of printing should be directed not to trade with or manufacture or sell of pornographic magazine that promote indecent behavior of the society. The principle that should be held by producer and user of technology is that self-interest should be linked to the overall concept of public goodness and justice. Technology should be protected in order not to create social disruption or violation of the norm of Islamic justice.

60 Seyyed Hossein Nasr. *Traditional Islam in the Modern World* (Lahore: Suhail Academy, 1987), 232.

The *third* expectation to technology is to create positive image of social institution including in this is making the success of institution in its program as traditions. This point has been accomplished by the second principle of *maslahah* discussed above. This third principle is beyond the discussion of Eliezer Geisler's expectation of society to technology. In the principle of embellishments (*tahsiniyyât*) the corporations are expected to discharge their social responsibilities by engaging in activities or programs that may lead to improvements and attainments of perfections of public life conditions. Involving in charity or giving donations to the poor and needy; providing scholarships to the less fortunate students and providing sufficient, correct and clear information or advertisement regarding products offered to customers are some of the examples of commitment with respect to achieving the embellishments for society. In the light of this principle, technology is expected to fulfill the duty of embellishing the quality of life or the improvement and attainment of perfection of public life condition. For example technology is expected to create transportation with free air pollution, technology for water purification and the like.

To integrate the social expectation to technology proposed by Eliezer Geisler above and three principle of *maslahah* proposed by Muslim scholars we may infer generally that both *maslahah* and Western expectation need common good or public good by having peace, economic prosperity, justice and mechanism to keep and perpetuate them. However, there should be in accordance with different levels of importance and severity of consequences. In other words priority should be given to the accomplishment of the essential needs (*darûriyyât*). Therefore one must not focus on attaining embellishments while jeopardizing the essentials. Similarly, one

must not obsess with the attainment of benefits to the extent of creating harm or inflicting injury to others. So the duty of science and technology can be simplified into two: 1) related to common good of social life such as maintenance of system of government, economic prosperity, civil stability, national defense, environment protection, national prestige, justice, exploration etc. 2) related to public benefit in relation to everybody's business such as healthcare, transportation, social service, taxation and redistribution of resources, full employment, housing, law enforcement, education, administration of justice, administration of national and local affairs and the likes.

In short Islamic guidance, enshrined by its principle of justice, brings about a balance between individuals' rights and their duties and responsibilities toward others, and between self-interest and altruism. Islam recognizes self-interest as a natural motivating force in all human life, but it has to be linked to the overall concepts of goodness and justice.[61] Therefore, social responsibility is not solely a duty of the government, rather, it is a duty of all members of the community, including scientist, technologist, corporations, social organization and institution. Thus, individuals and society as a whole are encouraged to sacrifice, and protect the faith, the life, then intellect, the progeny and wealth of the society. This sense of duty, responsibility, and spirit of sacrifice, which Islam nurtures, actually helps remove self-centeredness and greediness and promotes compassion, caring, cooperation, and harmony among people.

Thus, political system of a society, culture, and organizations are the essential ingredients for the creation and enhancement of science and technology. Only well-organized societies are able to build large public works and logistic networks. Today global corporations, financial institutions, and venture capital have become key enablers of discoveries and technological development. In general, the culture of the nineteenth century encouraged a great flourishing of science and technology, which in turn led to the modernistic culture of the twentieth century. However, society is not a monolith. Scientific and technological developments may impact certain aspects or parts of society faster or differently from others, whether one considers laws, the attitudes of leaders, military prowess, commerce, health, or education.[62]

61 Syed Nawab Haider Naqvi. *Perspective of Morality and Well-Being: A Contribution to Islamic Economics* (Leicester: The Islamic Foundation, 2003), 99-110.

62 George Bugliarello, "Science, Technology, and Society: The Tightening Circle" in Glenn Schweitzer (editor), *Science and technology and the Future Development of Societies, International Workshop Proceeding* (Washington, D.C.: National Academy Press, 2008), 120.

Moreover, technologist must possess certain characteristics in order to play its pivotal role as a connecting link between society and the industrial sectors. The general belief is that an engineer must possess broad information skills that transcend his technical and technological skills. A good engineer, over and above being skilled in analyzing theories and their practical applications, must possess an analytical mind in critical situations. He must possess the ability to cope with prevailing work conditions, managerial skills, and the capacity to learn and to teach in the long run. He must also possess virtuous moral qualities.[63]

C. Modifying University Curriculum

Since university is the very place where various technologies are studied and applied, it is the most proper place to inculcate moral, social and environmental values to technology. The good start is to inculcate Islamic ethic to student of sciences and technology or students studying in the faculty of engineering and other related faculties of applied technology.[64] This has to be under the supervision of a professor experienced in engineering, who has close connections with industry on the one hand and technical innovation on a world scale on the other. The other subjects might include the following:

1. The worldview of Islam,
2. History of technology in Islam and in the West,
3. Working relations and industrial laws,
4. Islamic economic and production relations,
5. Standards of design and productivity,
6. Professional ethics,
7. Human values and ethical engineering,
8. Environmental protection and sustainable development,
9. Relation of industry and university.

63 This has been experienced by certain university in Iran. See Mehdi Bahadori and Mahmood Yaghoubi, "Ethical Engineering as a Prerequisite for Technological Development of Societies" in Glenn Schweitzer (ed.), *Science and technology and the Future Development of Societies, International Workshop Proceeding* (Washington, D.C.: National Academy Press, 2008), 120.

64 The courses of engineering ethics were conducted for the first time in the United States in the 1960s. In the present Iran the subject is also taught to students at engineering department.

Moreover, each student should present a seminar on any of the topics listed above. Students trained not only in engineering subjects but also in ethics can lead the way to developing a profession that responds to societal interests in a rapidly changing world. By teaching them such subject we will help the future technologists to build a well-integrated character.

In addition to curriculum the university should provide centers relating to ethics where student can consult in matters pertaining to ethics in technology and engineering, make a research in order to write articles and books about ethics in science and engineering that can be published. To enrich the concept of ethic in relation to technology the university could manage scientific and technical cooperation with other university, so that students at the undergraduate, graduate, and postdoctoral levels could study abroad or trained by other professional professors. Another form of cooperation is the undertaking of joint projects between two university laboratories, with exchanges of personnel and ideas and joint publication of results.[65] This is in order to improve student awareness of this responsibility. Finally, the commitment of the student to apply Islamic values in their profession should be proven during their graduation, in which they have to sign text of oath mentioning their future responsibility to take into account the importance of protecting and safeguarding welfare of human beings throughout the world based on the above principle public good (*maslaḥah*) or the five objectives of Sharī'ah.[66]

A Concluding Note

I would like to conclude that inculcation of values into technology is not so simple, for it involves understanding the worldview that underlines the sciences as the source of technology. The worldview upon which Western science and technology refer to, is secular. This secular worldview is the main problem of modern sciences and technology that should be liberated and Islamized. One of the problems of modern sciences and technology is that they are separated from religion. This problem should be resolved by the process of worldview revolution and the shift of paradigm, by which science is integrated with religion and technology. Technology that relies on religious values could be invented or created based on objective of sharī'ah or public good, which is exactly the same as trilogy of fulfilling human basic needs, improving quality of life and creating the wealth. The final task to be done is to enforce this concept of value inculcation in university education, the place where the forthcoming generation of scientists and technologists are prepared.

65 Norman Neureiter. "The Role of International Scientific and Technical Cooperation in National Economic Development", in Glenn Schweitzer (ed.), Science and technology and the Future Development of Societies, International Workshop Proceeding (Washington, D.C.: National Academy Press, 2008), 55-56.

66 This has been experienced by certain university in Iran. See Bahadori and Yaghoubi, "Ethics in Engineering as a Prerequisite for Technological Development of Societies", op. cit., 118.

References

Abu Ishaq al-Shatibi. *Al-Muwafaqat fi Usul al-Shari'ah*, (ed.), Abdullah Draz (Beirut: Dar al-Ma'rifah, 1996)

Alanc Isaak. *Scope and Method of Political Science: Introduction to the Methodology of Political Inquiry* (New York: The Dorsey Press, 1969)

Al-Ghazzali, *al-Mustasfā Min 'Ilm al-Usûl*, (edited by M. Sulayman al-Ahqar), vol. I, Mu'assat al-Risalah, Beyrut, 1997)

Alparslan Açıkgenç. *Islamic Science: Towards Definition* (Kuala Lumpur: ISTAC, 1996)

Arnold E Loen. *Secularization, Science without God?* (London: SCM Press Ltd, 1967).

C. Mitcham and R. Mackey, eds. *Philosophy and Technology: Readings in the Philosophical Problems of Technology* (New York: The Free Press, 1983)

Cited in Imran Ahsan Khan Nyazee, *Islamic Jurispudence (Usul al-Fiqh)* (Islamabad: Islamic Research Institute Press, 2000), 65.

David Halbrook. *Education and Philosophical Anthropology* (London Associated University Press, 1987)

Edwin Hung, *The Nature of Science: Problem and Perspectives* (Belmont, California: Wardsworth, 1997)

Eliezer Geisler, *Creating Values with Science and Technology* (London: Quorum Book, 2001,

Gary Gutting, "Introduction" in *Paradigm and Revolution: Appraisal and Application of Thomas Kuhn's Philosophy of Science,* (ed.) (Notre Dame, Ind.: University of Notre Dame Press, 1980), V, 1.

George Bugliarello. "Science, Technology, and Society: The Tightening Circle" in Glenn Schweitzer (ed.), *Science and technology*, op. cit., 104-5.

_____ "Science, Technology, and Society—The Tightening Circle" in Glenn Schweitzer (ed.), *Science and Technology and the Future Development of Societies, International Workshop Proceeding* (Washington, D.C.: National Academy Press, 2008)

H. L. Dreyfus & C. Spinosa (1997). "Highway Bridges and Feasts: Heidegger and Borgmann on how to affirm technology".

Harold Brown. *Observation and Objectivity* (New York: Oxford University Press, 1987)

Helen E Longino. *Science as Social Knowledge: Value and Objectivity in Scientific Inquiry* (New Jersey: Princeton University Press, 1990)

International Technology Education Association. *The Standard for Technological Literacy* (2002)

Jasser Auda. *Maqasid al-Shriah as Philosophy of Islamic Law, A System Approach* (London, Washington: The International Institute of Islamic Thought, 2008

Khaliq Ahmad. "Islamic Ethics in a Changing Environment for Managers" in *Ethics in Business and Management: Islamic and Mainstream Approaches* (London: Asean Academic Press, 2002),

Thomas S Kuhn, *The Structure of Scientific Revolutions*, International Encyclopedia of Unified Science, vol.2, no 2 (Chicago: University of Chicago Press, 1970)

L. M. Silver. *Challenging Nature: The Clash of Science and Spirituality at the New Frontiers of Life* (New York: Ecco, Harper Collins 2006)

Les Levidow, ed. *Science as Politic* (London: Free Association Books, 1986)

M. K. Hasan, "Worldview Orientation and Ethics: A Muslim Perspective" in A. M. Sadeq, *Ethics in Business and Management: Islamic and Mainstream Approaches* (London: Asean Academic Press, 2002)

M. Foucault. "Technologies of the self" in L. H. Martin, H. Gutman & P. H. Hutton (eds.), *Technologies of the Self: A Seminar with Michel Foucault* (Cambridge, MA: MIT Press, 1988),

Martin Heidegger. *The Question Concerning Technology and Other Essays*, trans. by William Lovitt (New York: Harper and Row, 1977)

Mehdi Bahadori and Mahmood Yaghoubi, "Ethics in Engineering as a Prerequisite for Technological Development of Societies" in Glenn Schweitzer (ed.), *Science and technology and the Future Development of Societies, International Workshop Proceeding* (Washington, D.C.: National Academy Press, 2008)

Muhammad Hashim Kamali. "Sources, Nature and Objectives of Shari`ah" *The Islamic Quarterly*, 35 (1989),

National Academy of Sciences. *Science and Creationism: A View from the National Academy of Sciences* (Washington, D.C.: National Academy of Sciences Publications, 1984)

Norman Neureiter. "The Role of International Scientific and Technical Cooperation in National Economic Development", in Glenn Schweitzer (ed.), Science and technology and the Future Development of Societies, International Workshop Proceeding (Washington, D.C.: National Academy Press, 2008)

Peter R Senn. *Social Sciences and Its Method* (Boston: Holbrook Press, 1971)

Seyyed Hossein Nasr. *The Need for a Sacred Science* (New York, SUNY Press, 1993)

_____. *Traditional Islam in the Modern World* (Lahore: Suhail Academy, 1987), 232.

Sonja Vandeleur. "Indigenous Technology and Culture in the Technology Curriculum: Starting the Conversation: A Case Study", unpublished Ph. D. thesis, Rhodes University, January 2010

Steward Richards. *Philosophy and Sociology of Science* (Oxford, Basil, Blackwell, 1987)

Susan Ella George. *Religion and Technology in the 21st Century: Faith in the E-World* (London-Melbourne: Information Science Publishing, 2006)

Syed Muhammad Naquib al-Attas, *A Commentary on the Ḥujjat al-*Ṣiddīq *of Nūr al-Dīn al-Rānirī* (Kuala Lumpur: Ministry of Education and Culture, 1986)

_____. *Islam and Secularism* (Kuala Lumpur: Angkatan Belia Islam Malaysia (ABIM), 1978), 127– 132. See also by the same author *The Concept of*

Education in Islam (Kuala Lumpur: Muslim Youth Movement of Malaysia, 1980)

_____. *Prolegomena to the Metaphysics of Islam: An Exposition of the Fundamental Element of the Worldview of Islam* (Kuala Lumpur, ISTAC, 1995)

Syed Nawab Haider Naqvi. *Perspective of Morality and Well-Being: A Contribution to Islamic Economics* (Leicester: The Islamic Foundation, 2003)

T. J. Misa. "The compelling tangle of modernity and technology" in T. J. Misa, P. Brey & A. Feenberg (eds.), *Modernity and technology* (Cambridge, MA: The MIT Press, 2003)

The National Curriculum Statement: Technology, South Africa, Department of Education (2002),

Thomas F. Wall. *Thinking Critically About Philosophical Problem*: *A Modern Introduction* (Belmont, CA.: Wadsworth, Thomson Learning, 2001)

Wael B. Hallaq. *A History of Islamic Legal Theories: An Introduction to Sunni Usul al-Fiqh* (Cambridge: Cambridge University Press, 2004).

Jurnal Eura Asian Inculcation of Values Into Technology

ORIGINALITY REPORT

20%	19%	8%	15%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.isra.my Internet Source	7%
2	Susan Ella George. "chapter 2 The Philosophy of Technology", IGI Global, 2006 Publication	2%
3	Submitted to International Islamic University Malaysia Student Paper	2%
4	www.saide.org.za Internet Source	2%
5	es.scribd.com Internet Source	1%
6	isra.my Internet Source	1%

7	Submitted to Brown Mackie College Student Paper	1%
8	studentsrepo.um.edu.my Internet Source	1%
9	www.customessaymeister.com Internet Source	1%
10	dspace.lboro.ac.uk Internet Source	1%
11	www.scribd.com Internet Source	1%
12	Submitted to Institute of Graduate Studies, UiTM Student Paper	1%
13	philpapers.org Internet Source	1%

Exclude quotes	On	Exclude matches	< 1%

Exclude bibliography On