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The Scientific Thinking in Islam: *Factors of Flourishing and Decline*

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Abstract

The role played by science and technology for the development of human society is crucial in the modern age. Contemporary Muslim societies, without scientific thinking, have little chance to progress. The quality of live, in the globalized world, is based on the intellectual value of the mind. The Holy Qur`an launched its glorious mission by "Iqra" due to the fact that the quality of thought directly affects the quality of action; and both of them affect the quality of live. At the opening of its golden age around the eighth century, and nearly for a thousand years, the Islamic civilization remained creative in science, technology and arts. The achievements of Muslim scientists surpassed all their contemporaries. The scientific worldview of Islam was the inspiring force of their inquiry and pursuit of knowledge. At that time the Muslim world was ranged from Spain and Morocco, through Damascus, Cairo and Baghdad, to Persia and North India. However, starting around the sixteenth century, the Islamic civilization began to wane; losing ground to other nations. Today, Muslim communities are struggling for development within the global challenges, especially scientific and technological challenges. There are many questions that need to be addressed by modern Muslim intellectuals: (1) What were the main factors behind the flourishing of science and technology in the early history of Islamic civilization? (2) What were the main causes of decadence of the scientific thinking? (3) How could Muslims restore their creative thinking again? The main objective of this work is to shed some light upon these questions.

Keywords: Intellectual, scientific, factors, rise, decline

Abstrak

Peranan yang dimainkan oleh sains dan teknologi dalam perkembangan komuniti manusia amat penting dalam zaman moden. Tanpa pemikiran saintifik, adalah sukar bagi masyarakat Islam kontemporari mencapai kemajuan. Kualiti hidup dalam dunia global adalah berasaskan nilai intelektual minda. Kitab al-Quran melancarkan misi agungnya yakni 'Iqra' kerana hakikatnya kualiti pemikiran akan mempengaruhi kualiti tindakan dan kedua-dua kualiti tersebut mendatangkan kesan kepada kualiti hidup. Pada zaman keagungan Islam yang bermula sekitar kurun ke-8 dan selama hampir seribu tahun

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tamadun Islam mempamerkan kreativiti dari segi sains, teknologi dan kesenian. Kejayaan yang dicapai oleh saintis Islam mengatasi saintis-saintis lain. Pandangan hidup sains dalam Islam telah menjadi daya pendorong kepada sifat ingin tahu dan usaha mengejar ilmu. Pada masa itu, dunia Islam merentasi negara Sepanyol dan Morocco meliputi Damascus, Cairo dan Baghdad hingga ke Persia dan Utara India. Berbanding dengan negara lain, tamadun Islam lebih makmur, produktif dan berbudaya tinggi. Namun begitu, sejak kurun ke-16 tamadun Islam mula merosot dan diatasi oleh negara bangsa lain. Hari ini, komuniti Islam berjuang untuk mengejar kemajuan dalam dunia global yang serba mencabar terutamanya bidang sains dan teknologi. Terdapat banyak persoalan yang perlu dijawab oleh intelektual Muslim moden. Pertamanya ialah apakah faktor-faktor utama yang menggalakkan pembangunan sains dan teknologi pada awal tamadun Islam? Kedua ialah apakah punca-punca utama yang menyebabkan kemerosotan pemikiran saintifik dalam Islam? Ketiga ialah bagaimana orang Muslim dapat mengembalikan pemikiran saintifik seperti dahulu? Objektif utama kertas kajian ini adalah untuk menjawab beberapa persoalan itu.

Katakunci : Intelektual, saintifik, faktor, kebangkitan, kemerosotan

The genesis of scientific thinking in Islam

The main feature that characterizes scientific thinking is the disciplined manner of inquiry which is founded firmly on objective methods to facilitate and generate new knowledge. Scientific thinking is an organized mode of inquiry that is inspired by reflective thoughts and guided by eagerness to engage in careful observation of the natural / human phenomena. The foundation of scientific thinking is constructed on various aspects of intellectuality such as inductive & deductive reasoning; creative and critical analysis of ideas / data. The worldview, the disciplined manner of inquiry, and proper modes of reasoning are the major factors which contribute to formulate the genesis of scientific thinking. Based on these factors, the thinking styles will remain flourished and productive throughout the various phases of scientific progress. Lack of scientific thinking or decadence of the creative mind, on the other hand, is due to ineffectiveness of the above factors.

The scientific revaluations in the course of history take place not only to develop new knowledge of existing phenomena; but most importantly to reformulate the prevailing ideas and dominating thinking styles. For instance, when the geocentric model; which assumed earth as the centre of the universe, dominated the scientific mind of the medieval Western world created unnecessary tension between science and religion which led to secularization of the scientific enterprise. However, the modern science, which began with the reassertion of heliocentric model of the universe in the fifteenth century, made fundamental changes in the ideas and direction of Western thought. The remarkable shift in the way of understanding the universe; which made by Copernicus, Kepler, Galileo, and other astronomers of that time contributed to establish a new worldview of scientific thinking and created crucial turn in the conceptual and methodological aspects of exploration of nature.

For inspiration of scientific thinking, Muslim intellectuals of today need to revisit their past, when Muslim scientists and technologist were the main reference in the world. The rise of Islamic civilization to its zenith, within a considerable

period of time, was due to the scientific spirit of early Muslim intellectuals who regarded pursuit of knowledge and investigation of nature as a religious duty. Unfortunately, early Muslim scientists were not given due acknowledgement by modern historians of science. Many of their works are yet to be studied. Their achievements in various scientific disciplines, such as Astronomy, Physics, Biology, Medicine, Chemistry and Mathematics are attributed to other scientists[1]. Their integrated approach of knowledge inquiry is yet to be considered. There are many factors behind the scientific thinking in Islam, the most considerable of which was the holy Qur`an.

The Qur'anic inspiration for knowledge inquiry

Great ideas and creative thinking modes are production of the intellectual power which is inspired and guided by Divine Wisdom. Therefore, the holy Qur`an initiated the Islamic mission by invitation for reconstruction of the worldview as follows: [*Read by the name of your Lord who created* (96:1)]. This opening verse of the Qur`anic revelation obviously announces that reading and studying of nature, and the entire created world, is a basic method to appreciate the Creator. This new Islamic vision on nature, which is founded on pure *Tawhid* 'unity of God', provided the community of believers the innovative power of thinking and creative insights on exploration of nature. The *Tawhidic* worldview also created new enthusiastic spirit on Muslim scholarship and motivated scientific research and development of society. Thus, the holy Qur`an and Sunnah of the Prophet (S.A.S) have been the main sources of inspiration for scientific thinking in Islamic scholarship.

The holy Qur`an; as a final mode of Divine scripture; provides the general principles of scientific thinking and inspires human intellect to gain deep insights on the natural phenomena. The Qur`an also provides various thinking styles and different modes of reasoning. From the Qur`anic point of view, nature is a clear sign of God '*Ayah*' which presents the systematic order of the Creator. There are numerous verses in the Qur`an which call for scientific thinking and emphasize investigation of nature. For example the Qur`an says: [*Behold! in the creation of the heavens and the earth; in the alternation of the night and the day; in the sailing of the ships through the ocean for the profit of mankind; in the rain which Allah sends down from the skies, and the life which He gives therewith to an earth that is dead; in the beasts of all kinds that He scatters through the earth; in the change of the winds, and the clouds which shown between the sky and the earth; all these are indeed Signs for people of thought* (2:164)]

The Qur`an also motivates human intellect towards creative and critical thinking as follows: [*Are the blind man and who sees are equal? You don't think*?" (6:50)], [*You request others to conduct rightly while you forget to practice it yourselves and yet you are studding the Scripture? Do you not understand*? (2:44)], [*Do they not look at the Camel how it is made? and at the Sky how it is raised up? and at the Mountains how they are fixed firm? and at the Earth how it is spread out*? (88: 17-20)]

The holy Qur`an frequently raises such thought provocative questions to human intellect not to seek simple answers but for creative and critical thinking. Qur`an encourages people not to follow views of others blindly without valid

evidences. In the Qur`an, Allah invites people to scrutinize ideas and assumptions that the society takes for granted and imposes upon them. The Qur`an liberates man even from his own desires which act as hindrances to the discovery of the truth. It asks people to avoid their prejudices and constraints. Man must think about how he came into being, what is the purpose of his life? why he will die and what is after death? He must question how man himself and the whole universe came into being and how they continue to exist? By thinking, man should eventually perceive that the entire universe, including his own self, is created by Allah Almighty. Even when he examines his own body or any other creature, he will see an impressive harmonious plan, wisdom, and great design at work. Therefore, freedom of intellect in the Islamic worldview exists within the framework of faith (*Iman*), to follow its course into the entire scientific endeavour.

Motivated by the Qur`anic revelation and guided by Sunnah of the Prophet (S.A.S), the Muslim intellectuals of early history of Islamic civilization engaged themselves in various scientific disciplines of higher learning. By the turn of the eighth century, the foundation of Islamic sciences was already established and numerous scholars excelled in different branches of scientific knowledge. Contemporary Muslim scholars are generally agree that the rise and the flourishing of science in early history of Islamic civilization was mainly due to Qur`anic emphasis on knowledge inquiry. The Qur`an and the traditions of the Prophet are saturated with references to learning, education, observation, and the use of intellect[2]. Beside the positive attitude of the Qur`an and Sunnah toward Knowledge inquiry, there are many other factors behind development and flourishing of scientific thinking in Islam.

The scientific spirit

The curiosity created by the Qur`anic revelation made the early Muslim intellectuals practice creative thinking in its true sense. This is obviously reflected in their original works and their contributions in translation and preservation of the scientific heritage of ancient sciences, such as Greek, Indian, and Persian. With great insights and critical methods, they inspected works of ancient nations and introduced it to the new generations. In fact, works of Muslim intellectuals progressed through spirit of creative insights, meticulous rechecking of facts, figures and data. Their practices contributed to both new data with original quality, as well as saving the scientific heritage, which was scattered within various languages of ancient nations. Their works have resulted into an account of two creative processes: invention of advanced technologies and providing insights to creative and analytical minds.

Both processes have contributed to introduce the minds that were behind it. To determine the direction of Makkah for prayer, for instance; Muslim scholars were involved in profound investigation and developed new technologies. They contributed to the discovery of numerous astronomical instruments and devices, such as Astrolabe, Sundials, Geographical tables, and World-maps. As noted by Iqbal, the physical cosmos studied by Muslim scientists was a cosmos borne out of a unique world view that was steeped in a transcendent vision of reality in which all constituting parts were connected to each other and to the Ultimate Reality through the unifying principle of Tawhid[3].

The assimilation capacity of Islam

The history of Islamic science is history of scientific cosmopolitanism in which the positive and creative contributions of all nations, ethnics, and cultures were welcomed and appreciated; then critically examined and integrated into the framework of Islamic worldview. Phillip Hitti in his "*History of the Arabs*" noted that "The Islamic ability to reconcile monotheism and science proofs to be a first time in human thought that theology, philosophy, and science were finally harmonized in a unified whole. Thus, their contribution was one of the first magnitudes, considering its effect upon scientific and philosophic thought and upon the theology of later times. One of the reasons for such development of science is probably due to Gods commandment to explore the laws of nature"[4]. Actually, knowledge in Islam is part of faith; when you know more, you'll see more evidences of God. Thus, when foreign currents were introduced into the Islamic scientific tradition, they were assimilated through the process of transformation. However, whatsoever could not become Islamic remained outside the domain of Islamic epistemology as a foreign entity[5].

The successful progress of scientific thinking in Islam was, therefore, due to this assimilation capacity of the Islamic worldview, which transcends nations, races and cultural diversities. This is the main source that led Muslim scientists to their comprehensive involvement in studying, translating and preserving the scientific legacy of classical nations, especially, Greek, Indian and Persian. This knowledge transferred later to other nations, especially Europe, and became the vital raw material for the modern "Scientific Revolution". John L. Perkins emphasizes this point by saying that "The works of the ancient Greeks were lost in Europe; meanwhile the teachings of the Greek philosophers were preserved in the East and were continued, enhanced and developed by Muslim philosophers. The philosophy of the ancient Greeks was rediscovered via the Muslim world"[6]. Muslims not only preserved classical works but also introduced new scientific theories, without which the European Renaissance would not be possible. Even though many of the Islamic contributions go unacknowledged, they played a vital role in the transformation of ancient sciences to modern technology.

The Islamic worldview constitutes a grand unity of mankind in the field of scientific quest. Thus, the proper understanding of Islamic worldview, with its great assimilation capacity and integration, will result into scientific progress and development.

The common ground of Islamic scholarship

Historians of science have noted various platforms and common grounds that led Islamic scholarship to success. Beside unity of their worldview, epistemology, and their source of knowledge, Muslim scientists share other significant elements of knowledge inquiry, such as unity of scientific terms which offered by unity of language (Arabic); and unity of moral code which constitutes their research ethics provided by Islamic *Shariah*. Muslim scientists and scholars of today might not be aware of the crucial role that these factors play in scientific progress, but it was obviously noted by some historians of science. They especially pointed out the following aspects of common grounds in Islamic scholarship:

1. Unity of scientific terms: Using a single scientific language which was Arabic, allowed communication among Muslim intellectuals, who were from different culture and ethnicities; without need for translators and led to the unity of scientific terms in the scientific enterprise.
2. The Common Worldview: The Islamic worldview equipped Islamic scholarship with unity of philosophy of science; the epistemological framework, and unity of the final objectives. These aspects have provided a firm base of knowledge inquiry on which they build upon. Due to emphasis of Islamic worldview in pursuit of knowledge, the Muslim scholars gained access to the scientific legacy of other civilizations, such as Greek and Roman texts from the Byzantine along with Indian sources of learning.
3. The Hajj: the annual pilgrimage to *Makkah* is considered as an annual conference which facilitated scholarly collaboration by bringing together scholars and new ideas from all over the Islamic world. In fact, the holy Qur`an emphasized on various benefits of this annual event other than the religious objectives.
4. Common moral code: Research ethics is a crucial factor of scientific progress. On the other hand, the rapid progress and development in sciences and technologies produces new ethical questions. Therefore, ethics and science in Islam work together for human progress. According to John Perkins, success of scientific thinking in Islam was also due to its provision of a common moral code which provided a great advance over tribal culture, assisting commercial relations, trade and trust between traders[7].

Due to all these factors, and based on the inspiration from Qur`an and Sunnah, Muslim intellectuals developed moral code of scientific research and sense of respect to authority of knowledge disciplines, and tolerance to other views. Based on knowledge aspect, Muslim intellectuals became references to the world. For more than five centuries, the Islamic civilization remained the basic source of science, technology and prosperity.

Decadence of scientific thinking

The most crucial step towards revival and reconstruction of scientific thinking in Islam is awareness about major causes of its decline. By the 10th century, the enthusiasm for learning in Islam resulted enormous works. All essential works and scientific writings of other nations, especially Greek and Persians, were translated into Arabic by the knowledge centres of Islamic civilization. Arabic became the main language for scientific learning and international relations. During this period, Muslim scientists contributed vastly in development of arts, science and cultural growth of mankind. However, starting around the sixteenth century the Islamic scientific enterprise began to wane, losing ground to other nations. The Islamic civilization; which had been a major source of knowledge and morality; and given birth to a great nation that brought peace, prosperity and development to the humankind; has lost the leadership of the world and many modern Muslim communities seem to have lost their creative thinking; What happened? Nobody knows for

certain, but decadence of Islamic civilization was certainly a great lost for many aspects of scientific tradition.

Enormous efforts have been made in the modern history of science to address the above question; and various suggestions have been made for recovery and revival. Some historians attribute the decline to external factors[8], such as Mongol devastations, the Crusades, and other warfare which subsequently led to the fall of Islamic civilization. However, the majority of scholars believe that external causes do not provide the full explanation to the situation. They feel that the internal problems of Islamic empire, such as political conspiracies, conflict over power and civil wars amongst Muslims themselves and aliening with others against their fellow citizens, were the most relevant factors behind the deterioration and decay of Islamic civilization and its creative mind.

The eternal causes, however, can be categorized into two groups: direct and indirect causes. Direct causes are those related to the epistemological parameters and principles of inquiry, such as negligence of Qur`anic directives on creative thinking and investigation of nature, dual system of Islamic education, and irrelevant classification of knowledge into religious and non-religious sciences. Indirect factors, on the other hand, are many; the most relevant are those related to socio-cultural forces, such as habituation of easy gain and luxurious life or "*Taraf*" according to Ibn Khaldun's term. And others are related to the religious traditions such as static vision on creativity and deterministic outlook.

These are the major factors which are considered by the modern scholars as causes of decline. We may highlight some of them as follows:

Lack of tendency for scientific quest

Crises of scientific mind in the Muslim world, according to many scholars, are deeply rooted into the Muslim sociology of religion[9]. One of the major factors behind decay of hard science in Islamic civilization, according to this view, was due to the attitude of Muslim societies towards the scientific quest and cultivation of knowledge. This attitude was constituted by deterministic outlook which characterized the main stream of Muslim community. Free thinking and freedom of research are essential for scientific progress and development of human community. However, due to controversial views among various groups of Islamic sectarians, freedom of thought and efficient exercise of reason were controlled, and the door of *Ijtihad* was closed. Therefore, the deterministic outlook became the main character of Islamic intellect. Many works have been written by modern Muslim intellectuals, with titles such as "*Reconstruction of Religious Thought in Islam*", "*Stagnation of Muslim Mind*" and "*Reconstruction of Muslim Mind*", to address this basic problem. The major implications of restriction of the freedom were blind imitation, stagnation of mind and lack of tendency for scientific quest.

Habituation of easy gain and luxurious life (*Taraf*)

According Ibn Khaldun's theory of *Taraf,* which means to enjoy luxurious life without real productivity, Muslim communities, after their early progress and triumphant success, they took to the enjoyment of the riches and luxuries brought about by their forefathers. This habit of an easy gain and luxurious life became a culture and

made them averse to any intellectual or physical efforts to gain knowledge. According to Ibn Khaldun, all scientific endeavour requires prolonged research concentration and hard work, without any prospect of immediate gain. Therefore, the scientific inquiry could not survive in a society which dominated by such spirit of easy gain or *Taraf*[10].

Static view on creativity

All modern scholars and scientists agree that creative thinking is the foundation of knowledge and scientific progress. However, according to many historians of science, Islamic theology was used to hold more conservative positions towards any initiative ideas through the course of time. Professor Abdus Salam holds the view that the demise of living sciences in the Islamic civilization was mainly due to isolation of scientific enterprise and discouragement of innovation or *Taqlid*[11]. According to this view the Islamic theology was getting more static and seems to be against modernity, with severe orthodoxy towards any initiative and dissent in the society. For example, printing presses were forbidden so that dangerous material could not be published in Muslim territory[12].

It is a fact that the creative mind of Islam is still need revivalism and reactivation. It is also true that the attitude of isolation described above might be one of the causes of decline. However, all these features should not attributed to Islam but to some theologians; due to the fact that the holy Qur`an frequently requests Muslims to travel for knowledge and to communicate with other cultures. Also, the Prophet (S.A.S) urged Muslims to travel as far as they can, even to China, for the sake of knowledge. Therefore, the culture of isolation cannot be attached to Islam but to the practices of certain communities. However, such attitude is not possible today within the prevailing culture of globalization.

Irrelevant classification of sciences

The relevant classification of sciences is that which causes scientific progress and appreciation of the wisdom of God. Based on this standard, some classifications of knowledge in Islamic history of science are considered irrelevant, such as division of knowledge into religious (*Ukhrawi*) and non-religious (*Dunyawi*). This kind of classification totally detaches this world from the hereafter. Thus, it not only contradicts with the Qur`anic verses which consider the study of nature as religious duty, and see the entire world as sign of God (*Ayah*), but also has grave consequences on Muslim mind. Some scholars explain that the growth of natural sciences was constrained because they were simply classified under philosophy and evaluated from theological perspective as non-religious sciences[13]. That is, why the natural sciences always remained foreign and outside the circle of acquired knowledge. Meanwhile, the Qur`an insists that study of natural phenomena is the main path to the knowledge of God. As a consequence of this attitude, natural sciences, philosophy, and other relevant disciplines could not be taught in Islamic learning institutions for several centuries.

Lack of financial support

In the golden era of Islamic civilization, scientists were financially sponsored mainly by rulers of the Islamic empire and also the by the public sector through *Waqaf* system. That was clearly illustrated by the establishment of institutions of advanced

learning, such as *baitul Hikmah* (House of Wisdom), *al-Nazzamiyyah* Schools of Baghdad, and other institutions and centers of higher learning. Such financial support faded away with the course of time. Those at the helm of affairs became more interested in music and building of palaces; no funds were allocated for scientific pursuits. Contrary to this was the case with other nations, especially in Europe where the governments and rulers started to provide any possible help to support science and scientific programmes and to encourage scientists to work hard[14]. Historians of science have reported that, a remarkable decline in the value of science and scientists occurred in the last few centuries of the Islamic empire. Even today, the situation is not much better. The financial factors have forced Muslim intellectuals to migrate outside the Islamic land. A negative picture of scientific situation in the modern Muslim world was drawn by Michael Woods as follows: "The region is, for the most part, a scientific desert. In some states, oil wealth has allowed the construction of fabulous cities, magnificent mosques and sumptuous shopping malls. But little scientific infrastructure has emerged. Collectively, the Arab nations spend only 0.15 percent of their gross domestic product on research and development, below the world average of 1.4 percent. Muslims account for 20 percent of the world's population, but less than one percent of its scientists"[15].

This gloomy picture of science might not be the correct representation of the current situation of scientific progress in the Muslim world; but sometime it might be necessary to see our faces in the mirror of others.

Restoring creative thinking of Islam

The reformation and revivalism discourse in Islamic civilization is original and deeply rooted in Islamic tradition. It is reported that the Prophet had said: "Allah rises up at the opening of every century, someone who revives the religious matter"; therefore, the reformation process in Islamic history have been considered as a religious duty in the Muslim community. The famous Scholar of Islam, Imam al-Suyuti made considerable efforts to identify reformers of every century up to his time in his book "*Itqan fi Ulum al Qur`an*". This evidently suggests that reactivation of scientific thinking among the Muslim intellectuals has been a continuous process since "*Revival of Religious Sciences*" of Imam al-Ghazali, and through "*Reconstruction of Religious Thought*" of Mohammad Iqbal, up to modern reformation efforts of Muslim thinkers.

However, the reformation and revival process in Islam has taken a crucial turn when the Muslim world came into contact with technologies and scientific advancements of the western world at the opening of the twentieth century. The major implication of the technological progress achieved by the West was the collapse of the last Islamic caliphate and occupation of the entire Muslim land. This situation created two problematic questions in the Muslim mind. The first was related to the causes of decline; while the other was addressing the possible means to restore the creative thinking in Islam. The deep concerns of the Muslim intellectuals about these two questions were expressed perfectly in a letter sent by Shaikh Muhammad Bisyuony Umran from Java, Indonesia, to Rashid Rida, the chive editor of journal "*al-Manar*" in 1928. Shaikh Umran was quoting from the Qur'an when he raised

questions about the Muslim situation at that time. The Qur`an says: [*The honour and the glory are belong to God, His Apostle and the Believers* (63:8)] The Qur`an also says: [*You are the best nation raised among nations* (3:110)].

Shaikh Bisyuony laments, about these verses, as following: "Where is the honour of the believers today, while all Muslim countries have become a subject of colonization and a Muslim is degraded and possesses nothing that entitles him the honour and glory promised by Allah!? What are the causes which have led to the weakness and decline of all Muslims in both religious and worldly affairs?" Bisyouny had also reflected upon the material prosperity attained by other nations, he asks: "What are the causes of the tremendous progress of the Europeans, Americans and Japanese? Is it possible for Muslims to be like them in terms of material progress if they follow them in acquiring its means, while they are preserving their religion Islam?"[16]

To face the challenges posted by these questions, the Muslim intellectuals at that time had to work simultaneously in two dimensions: first, to preserve the distinct cultural identity of the Muslim community; and second to work for reformation and material progress. However, the answer to the above questions was provided by Amir Shakib Arsalan (1869-1946) in his famous work entitled "*Our decline: its Causes and Remedies*". Shakib stresses that backwardness of Muslims was mainly due to ignorance, not because of Islam in any way. He believed that while Islam guarantees good life for mankind, the religion itself is not enough reason for progress without conscious efforts towards understanding of the material world. According to him, being Muslim is insufficient reason to ensure prosperity and material progress. Shakib considered that the external factors might be the minor causes of backwardness; but Muslims should put the blame on their own selves for the catastrophe that had befallen them[17].

Arslan's answers were specifically designed to face challenges of Muslim community about seventy years ago, at the first half of the twentieth century; but they still seem to be relevant today.

Conclusion

Revival of Islamic science is receiving more attention in the mean time, both in its historical and contemporary aspects. This is because of growing consciousness in Muslim societies of their traditional heritage and distinct cultural identity. The modern Muslim intellectuals have played a major role in the revival of Islamic spirit, as evidenced by the debate on the nature and characteristics of contemporary Islamic science[18]. Muslim scholars agree that the holy Qur`an was the dynamic force behind the development of sciences in the early history of Islamic civilization. The Qur`an depicted the relationship of God, nature and man as central worldview which inspired for study of the natural phenomena. The early Muslim scientists motivated by the revealed knowledge studied nature in the context of the Qur`anic worldview. Guided by the divine sources they were able to make great achievements in science, technology and civilization. Today, Muslim communities are facing many challenges in science, technology and development However, according to Toynbee's theory of "Challenge and Respond"; this is a great chance for Islamic civilization to reclaim its glory and prove itself again as a global civilization. To

regain their status, the contemporary Muslim intellectuals need to go beyond the mere admiring of their historical glory; or writing the profiles of celebrated Muslim scientists of the past. They need to look at Islamic science in history from three crucial dimensions: (1) worldview, (2) epistemology; and (3) methodology.

For a creative recovery that would benefit from both the historical glory of the Islamic civilization and advancements of the modern sciences and technologies; the Muslim intellectuals need to study the following factors:

Articulation of Islamic View on Nature

Flourishing of sciences requires autonomy of mind, freedom to inquire, and inspiring force. The recovery of scientific thinking in Muslim communities will not be effective without articulation of the Islamic worldview; i.e. relationship of God and the created world, which provides the proper answers to the cosmic questions. This process would produce deep understanding of the Islamic worldview on nature as provided by the holy Qur`an; and reactivate the concept of *khilafah* which is necessary to understand role of man on the earth.

Understanding the Structure of Islamic Epistemology and Method

The study and understanding of foundation structure of Islamic epistemology comparatively with modern philosophy of science is a necessary step towards reactivation of the creative mind. To develop parameters of Islamic epistemology, Muslim intellectuals must avoid involvement in the classical issues of theological debates, such the nature of Heaven and Hell, free will and predestination[19].

Removal of the socio-cultural barriers of scientific thinking

According to Gary Davis, the cultural barriers are amount to social influence, expectations, and conformity pressures which are based on social and institutional norms. They include conforming to the ways we think others expect us to behave and fear of being different. The result of this fear is loss of individuality and creativity[20]. This attitude, according to Jamal Badi, will lead to formation of "Risk Fearing Culture" which blocks any initiative on creative thinking. He notes that in many Muslim cultures, mistakes, no matter what type, are looked upon as impermissible and therefore unacceptable; especially if it is committed in public. This phenomenon became a promoted culture in families, schools, and even institutions. Therefore, it became a hindrance to creativity and creative thinking[21].

The above analysis shows that the key to the solution is always in our own hands. To address the issue of reconstruction of our mind, Muslims should be inspired by the Qur`anic revelation and guided by Islamic tradition of science to set up the necessary epistemological parameters that will lead to the reconstruction of scientific thinking in Islam.

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[10] See the full idea about theory of "Taraf) Ibn Khaldun in his "*al-Muqadimah*"

[11] Abdus Salam, *Islam and Science*. A reproduced version from Review of Religions March 1995.

[12] Kenndy Paul (1987), *The Rise and fall of Great Power*: *Economic Change and Military Conflict* 1500-2000. (Random House)

[13] Mehboob Ahmad, in his "*Rise and Fall of Scientific Activities in the Islamic World*", P.58.

[14] Mehboob Ahmad, Ibid. P. 59.

[15] Michael Woods, Pittsburgh Post-Gazette

[16] These questions were sent as letter by Muhammad Bisyuony Umran, form West Borneo, Indonesia, to Rashid Rida, the chive editor of "al-Manar" on 21st Rabi al-Akhir 1348 H. The questions also found in the answer of Amir Shakib Arslan, the book entitled "Our Decline: Its Causes and Remedies"; the translated English version was published in 2004 by Islamic Book Trust K.L.

[17] Shakib Arslan (2004), Our Decline: Its Causes and Remedies (translated version). Islamic Book Trust – Kuala Lumpur, Pxii-xiii.

[18] Sardar, Ziauddin (1989), *Explorations in Islamic Science*, Mansell Publishing- London. O. 9

[19] Muzaffar Iqbal. *Science in Islamic Civilization*: http://www.cis-ca.org/confs/KL-Conf/kl-key~1.pdf (PP.9-10)

[20] Gary Davis (1999), *Barriers to Creativity and Creative Attitude*, *Encyclopedia of Creativity*, (Academic Press) vol. 1, p 168. Also, see: Badi, Jamal Ahmed (2005), *Teaching Creative Thinking Skill: Challenges, Strategies and Future Implications*, (Proceedings of National Conference on Creative /Critical Thinking from Islamic Perspective, organized by Department of General Studies- IIUM, 14- 15 December 2005) P.6

[20] Badi, Jamal Ahmed (2005), *Teaching Creative Thinking Skill: Challenges, Strategies and Future Implications*, (Proceedings of National Conference on Creative /Critical Thinking from Islamic Perspective, organized by Department of General Studies- IIUM, 14- 15 December 2005) P.7

[21] Badi, Jamal Ahmed (2005), *Teaching Creative Thinking Skill: Challenges, Strategies and Future Implications*, (Proceedings of National Conference on Creative /Critical Thinking from Islamic Perspective, organized by Department of General Studies- IIUM, 14- 15 December 2005) P.7