

Islam's Response Towards Modern Science

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Abstract

Modern science was developed by Western since the 16th century and reach its peak in the 20th century through the presence of concrete results of scientific study in various modern technologies. Modern science in technology product and other scientific inventions diffusively spread to many countries. This spread led to encounter between science and Islam. Science as a product from the west were responded differently by Muslim theologian (*ulama*). This *ulama*'s attitude categorized into three groups; secular, reconstructive, and semi-conservative. Secular group assume that scientific study as a product of research methods should be accepted as it is. The reconstructives appraising science as a product of western culture that should be reformulated. Whereas the conservatives attempt to match scientific discovery with verses in Al-Qur'an. This grouping based on mindset similarity among the experts who has a tendency to each groups. This study explores the diversity of responses towards modern science that will be the main reference for the experts to develop the thought of science and religion encounter, particularly in Islam.

Keywords: Science and modern technology, Islamic world.

Introduction

Science and technology have reached its peak in the 21st century. Things that never thought before now can be known effortlessly. The headways in science and technology that generated by Western civilization are not only take place in the West itself but have spread throughout the world, including the Islamic world. The richness of Muslim civilization is then run into stagnant period in the 17th century, while the Western began to do study in science (Ofek, 2011). This opposite circumstance between Islam and Western lasts over centuries thus resulted different framing between the Western and Islam in modern era science. But still, Muslims realized their deterioration in science and strive to rise by responding the latest development in modern science and technology. Science and technology in the form of scientific inventions and writings that developed in the Islamic world was responded differently by Islamic. There are at least three different responses generated by Muslim experts (*ulama*); secular, semi-conservative and constructivist.

Previously, Pervez Hoodbhoy had defined these *ulama* responses toward modern science. There are restorianist, reconstructist, and pragmatist (Hoodbhoy, 1997: 65). These three groups have some similarities to this study: attempt to classify Islamic thought, but the classification made by Hoodbhoy is more about the Muslim responses in general like their involvement in

politics. Meanwhile this study talk about *ulama* responses related to religious and science issues.

Previous studies found that there are at least two similar studies, one from Moh Dahlan that describes the relations between modern science and Islamic science. He cited the categorization by Hoodbhoy to help him analyze the focus of his study which is trying to find a new paradigm in the relation between modern science and Islamic science. Furthermore, Nidhal Guessoum take up these *ulama* response toward modern science to his book "Islam dan Modern Science" but he doesn't attempt to categorize it. Sometimes he gives a naming but not explicitly explain it.

Other research related to the scientific issue of scientists' responses toward modern science mostly tends to be two things: directly on the concept of thinking that seeks to integrate or directly led to the thought of an expert who respond to modern science, like Osman Bakar who examines Gullen's thoughts, bin Amir and his friends focusing on An-Najar's thinking, Stefano Bigliardi who analyzed Maurice Bucaille's thinking, and Scott Morrison, who examined Ahmet Davutoglu's thought. Thus, this research seeks to reinforce the idea of the categorization of *ulama* in responding the science and technology that developed nowadays in the form of scientific invention and discourse of science that developed in the Islamic

world. This research will examine the similarity of *ulama* thought on each group.

Method

This is a descriptive study that will summarize the thoughts of Islamic experts on their response toward modern science that refers to the development of modern science, scientific inventions, and science discourses that is currently evolving in the Islamic world. This study is based on related articles and books, whether directly written by the author or the thoughts of experts that's rewritten by other.

Discussion

Definition of Science

There are many definitions of science according to Richard G. Olson in the introduction of Muzafar Iqbal's book. The definition stated depends on the political orientation, the background of scholarship, and their beliefs. According to Benjamin Farrington from The British Marxist Scholar, stated that "*Science is the system of behavior by which man has acquired mastery of his environment. it has its origins in technique ... in various activities by which man keeps the body and soul together. its source is its experience, its aim, practical, its only test, that it works*" (Iqbal, 2007: xi). According to 72 Nobel Laureates, 17 State Academic of Science and 7 other Scientific Organizations: "*Science is devoted to formulating and testing naturalistic explanations for natural phenomena. it is a process for systematically collecting and recording data about the physical world, then categorizing and studying the collected data in an effort to infer the principles of nature that best explain the observed phenomena. science is not equipped to evaluate supernatural explanations for our observations; without passing judgement on the truth or falsity of supernatural explanations, science leaves their consideration to the domain of religious faith*" (Iqbal, 2007: xii).

Based on the definitions above and in accordance to the Dictionary of Popular Science, science can be defined as "*Science is a science, used as a collective word to show the various knowledge of systematic and objective and can be examined the truth*" in order to avoid biases and make it could used generally (Partanto, 1994: 687).

Development of Modern Science and Modern Science Inventions

The development of modern science and technology has been at significant stage. Since the freedom of

thought in the West is celebrated by the scientists through producing various scientific inventions, the flow of scientific thinking has become more advanced. Since Auguste Comte (the father of sociology) proclaimed his positivistic philosophy in the 18th century, the scientists hold tight the values, and alsortational and empirical principles of science, thus implies technological advancement. At the same time, doubts on metaphysics things inspired by religion, then reduced to a superstitious belief.

Historically the development of science and technology has been elaborated comprehensively in a book entitled History of Science and Technology. Referring to the book, here is a brief explanation about the development of modern science and technology. The development of modern science and technology – based on time spans – began in the early 20th century. The growth of modern science in the 20th century is characterized by the presence of several aspects, including new philosophical concepts, quantum theory, the need for energy everywhere thus technology become an important part in industrial world. Developments in physics, radioactivity, subatomic particles, relativity, and quantum theory have led the revolution in how scientists see matter and energy. From the revolution of thought and theory it yields invention in almost all fields of science; Chemistry, Astronomy, Geology, Biology, Medicine and technology. Here are some achievements from various fields of science:

1. Anthropology
Physical anthropology obtains fossil discoveries and cave paintings that contribute to the development of historical studies.
2. Archeology
Discovery of the leftover of old civilization such as Minoan civilization in Crete, Machu picchu and Tutankhamen's grave.
3. Astronomy
Edwin Hubble found an observational base that shaped the expanding universe model and the Big Bang theory and the discovery of Pluto planet in 1930.
4. Biology
The fundamental research in heredity begins with the discovery by Mendel. Then also the discovery of Gene as a unit of inherited characteristic allows researchers to understand how these characteristics inherited through generation that ultimately leads to the discovery of DNA as the inherited substance.
5. Chemistry
The development of synthesis of silicon which became an important mixture in the industry after World War II.
6. Communication

The discovery of the Vacuum Tube Amplifier that makes phone signals go across thousands kilometers and radio communications can reach across continents.

7. Computer
Some of the operation of electronic computers based on military purposes and the first digital computer was pioneered in the 1930s.
8. Construction
Materials in the construction of buildings are still the same as the previous century; consists of iron and beton, but the way of application and design has been developed.
9. Earth Sciences
Beginning the pilot study of the internal structure of the earth.
10. Electronics
The rise of television, audio recording, film with sounds, scientific instruments and radar
11. Energy
12. Food and Agriculture
The development of tools to help speed up the process of production, especially by using tractor.
13. Material
14. Mathematics
15. Medicines and health
16. Physics
The fundamental change is due to two things, the introduction of relativity by Einstein and the peak of quantum mechanics
17. Equipment
18. Transportation
The development of science and technology above has accelerated rapidly because it all became necessity in war, such as radar, DDT, penicillin, nuclear, helicopter, ballistic missiles, and computers. After the war ended, the products of science and technology have quickly reached the public (Bunch, 2004: 459)

Modern Science Discourse in Islam

The discourse of modern science in the Middle East is actually diverse, but the most frequently discussed by *ulama* in the Islamic world is about the theory of Darwinian evolution and the development of modern cosmology. The following will be presented both discourses.

Darwin's theory of evolution

Charles Darwin (1809-1882) was born in Shrewsbury, England. He became a controversial naturalist after he published his book in 1859 under the title *On The Origin of Species by Means of Natural Selection*. A journey on the HMS Beagle ship has brought him to a new biological region. He collected data on plants and

animals there and the correlation to the environment. From the data Darwin collected, then he studied it based on the thought of a naturalist, who was none other than his own grandfather, Erasmus Zoonomia. From the results of his study, he found a hypothesis, which will trigger debates over centuries. As for the hypothesis according to John Maynard Smith in a nutshell:

- a. The population is a number of units or units of evolution with three traits, multiplication, variation and heredity.
- b. The existence of diversity in every unit of living things means that each living thing has a different level of toughness.
- c. The population will evolve in the presence of selective forces.
- d. The units will have characteristics that increase their toughness (Hawlett, 2006: 98).

The four hypotheses above implies human's perspective on nature, which further reinforces the value of science that is the nature of materialism. Science will pay attention only to the material aspects of the natural world and limiting itself to secondary causes and releasing considerations of the primary (divine or *ilahiyah*) cause as part of its explanatory structure.

The Development of Modern Cosmology

Simply put, cosmology is a scientific study about the whole universe and its attributes on a large scale. This discipline do emphasizes scientific accuracy (Guessoum, 2014: 345). Cosmology including astronomy in modern times is experiencing tremendous developments helped by the invention of advanced tools, resulting in the emerging of a lot of new theories. Of the many theories that are present, the theory that most attention to modern society is about the theory of creation, Big Bang.

The Big Bang theory tries to formulate the beginnings of the creation of the universe which according to this theory comes from the big bang event (Big Bang). Big bang begins from the state that the universe is extremely hot and solid and then expands continuously. The development of this universe lies in a precisely measured calculation, as Stephen Hawking states, "If the rate of expansion of one second after the Big Bang has been recollapsed before it reached its present size "(Barbour, 1990: 202). This statement implies that the universe is formed upon a clear calculation not a coincidence or by accident. This theory then gets various responses from all walks of life, including the clergy. Another interesting finding that changed the human view of the universe is the fact that the universe has expanded and appears to be accelerating. The theory is based on the invention of the Hubble telescope, which shows the expanding state of the universe (not static).

Ian G Barbour Typology in the Relation between Religion and Science

The concept of Ian G Barbour in mapping the relationship between religion and science comes from the object of his study on Protestant religion, although this mapping originated on a single object of religion, but the values that characterize each typology can be used to generally review the thinking of experts who see the issues in the relationship of religion and science, those typology consists conflict, independence, dialogue, and integration.

1. Conflict

This typology agreed the theory on man creation is as embodied in Bible about the creation of the human spirit (*ruh*), whereas the scientist with his self-confidence in the objective method of approaching the historical origin of man comes from a great evolutionary process based on the theory of Darwinian evolution (Barbour, 2002: 191).

2. Independence

One of the more advanced steps for Barbour to avoid a conflict between science and religion is to separate the two fields in two different areas. This can be seen through two things, namely as two separate domains, then review the differences in language and functionality respectively.

3. Dialogue

Dialogue types in comparing science and religion, dialogue emphasizes the likeness of pre-assumptions, methods, and concepts. Instead, Independence emphasizes the differences. Then there is the methodological and conceptual alignment, the science on the basis of the method is objectively assessed, whereas religion has subjective judgments (Barbour, 2002: 74).

4. Integration

There are three different versions in integration type; natural theology, theology of nature, and synthesis systematic. Natural theology stand from scientific data that is potential to reach an agreement between cultures and religions. This is the reason why natural theology have a point of interest in multi-religion scope. Furthermore, this type is consistent to personal admiration and fascination that is experienced by the scientist in their work. Theology of nature not comes from science as natural theology does, but it stands based on religious experience and historical revelation. Ian opine that traditional doctrine must be reformulated based on the latest standard in science. The next is synthetic systematic type. In this case, Ian used metaphysic as the symbol of reality aspect unity. Although science is out of religious scope and more philosophical, the expectation is it can be a reflection between science and religion. Process philosophy as its form sees

effort as a set of interplying field. This means God interpreted not only as transcendence, but also immanence.

Islam's Response toward Science and Modern Technology

The development of science, modern technology, and the discourse of scientific invention has changed human view of the reality of nature that gradually entered the Islamic world. This was responded in various ways, particularly in Islamic scholars, this response will be grouped into three categories; secular groups, conservatives, and reconstructive. These three groups will be divided into more detailed divisions.

1. Secular Group

In KBBI (The Great Dictionary of Indonesia Language), secular means mundane or material. The meaning of secular here gets an emphasis on the separation of science as a neutral domain and separated from the influence of outside things that can damage the objectivity. Here are some principle that exist in this secularist group:

- a. The belief that there are no serious metaphysic problem in modern science that require the reconstruction of modern science.
- b. This group consider that the progress made in the west is a result of positive effort that should be applied in other countries because of its universal character.
- c. The secular group here is also meant groups that support the method of knowledge that releases elements outside the physical as the object.
- d. The character that separate science and technology to religion does not mean that they ignore religion in life, but it means religion should provide a gap that cannot be reached by science in the metaphysical realm.

In their opinion, according to Barbour typology, this group is categorized to the interdependent group. Scientists are free to explain their work without intervention from theology, and vice versa. The reason is that the methode and the essentials problem between scienc and religion are different at all. Science were build based on observation and human's reasoning, while theology based on God's revelation.

The principles possessed by this group are seen in their attitudes when looking at the development of science and technology which has produced a variety of inventions that are neutral and provide many benefits for the convenience of human, discoveries in physics, astronomy to other high technology equipments is a neutral item and the good or bad of it is determined by the individual

himself. Various discourses that change human views about natural realities such as Darwin's theory of evolution and the universe that expands as an acceptable scientific finding are due to the fact those are scientifically tested. There were several Muslim leaders who supports this group, including Abdussalam and Pervez Hoodbhoy.

2. Reconstructive Group

The term reconstructive comes from the term *constructive* that means build up (Priyatna, 2014: 70). So that reconstructive means rebuild. Reconstructive is a group that consider science that has been developed in the west has reduced knowledge and the character of western science that doesn't contain spiritual values at all identified as secular. So that Islam should respond this by adding theistic concept to reconstruct science. Below are several principles of this group:

- a. Modern science and technology have some ideologies that comes from their materialist civilization.
- b. Science and technology in the form of inventions in physic, chemistry, drugs, and medicine are really help, but a Muslim need critical thinking to study them.
- c. Strive to remind that Islamic science is the identity of science in Islam's middle ages.
- d. The intellectuals of this group gave some thought about science that based on Islamic phylosophy. The offers of this phylosophy are diverse, depending on the phylosophical basis of the intellectuals.
- e. According to Barbour's typology, this group is included in the integration typology that try to integrates modern science with Islamic basic phylosophy so that formed an Islamic science construction.

This group firmly denied the Darwinian theory because in their opinion there are two mistakes in this theory. The mistake is caused by two things, it's in the process or the theory chain that not intact yet. And Darwin's theory about evolution that caused by natural selection affects the modern human's mindset about life that is materialistic and is a competition between each other.

The reconstructive group is divided again based on the difference in phylosophical approach they use to reconstruct modern science. There are phylosophical-metaphysic with Seyyed Hosseins Nasr as the figure, phylosophical-etic with Ziauddin Sardar as the figure, and phylosophical-metodologist with Ismail Raji Al-Faruqi as the figure (Guessoum, 2014: 211). Beside them, there are still another figures, i.e. Naquib Al-Attas, Mehdi Golshani, dll.

3. Conservative Group

Conservative group try to maintain the situation, habits, and tradition that ap lied there. This term comes from Latin word *conservare* that means conserve, keep, maintain, and practice (Priyatna, 2014: 37). As that definition, this term is used to see the figures that tried to maintan Quranic verses and hadith supported by scientific invention. Below are the principles that held by this group:

- a. Looking for *dalil* that related to scientific invention and then match them
- b. Scientific invention that used as a proof of Quran's miracle.
- c. Reject the scientific invention that not suitable to Islamic values.
- d. Believe that Al-Quran overtake the scientific inventions.
- e. Based on Barbour typology, this group is similar to the integration typology that makes modern science strengthen the faith to God through scientific invention. But when Nidhal Guessoum critics that thrown to l'jaz Al-Qur'an group included to this group, it seems that they mistaken the method in their effort to integrate them. So this group is quite hard to be included to Barbour's typology.

The conservative group in this paper is a group that defined by Nidhal Guessoum as tafsir ilmi group and l'jaz Al-Qur'an group. The l'jaz Al-Qur'an phenomenon in the development pattern of religion relation and science that developed in Islam world actually got some critics from the Islamic intellectuals who masters history and science phylosophy. They argue that the figures who intensely use l'jaz Al-Qur'an approach oftenly ignoring the methodological framework that should be build, not just simply match the existing invention with *dalil* (Guessoum, 2014: 289). The figures that can be included here i.e. Maurice Buccaile and Harun Yahya.

Conclusion

Advancement in modern science and technology since the 18th century produce various inventions from various disciplines, i.e. astronomy, anthropology, agriculture, chemistry, physic that obtained from the directed science paradigm in positivistic phylosophy. On the other hand, science advancement also supported by the parties of war. Lots of science invention that lead to weapon production, starting from guns, atom bombs, and military aircrafts. Modern science and technology oftenly misused as colonialism weaponry that spread over the countries.

For Islam world, modern science and technology is a new thing. This new thing is introduced in the form of colonialism. This introduction not always happen

smoothly, oftenly there are a lot of rejection towards science and technology as the west's product. Beside as a product of technology advancement, another thing that interested to see is the discourses of western science, like the Darwinian theory and cosmology theory that enters Islamic world, particularly to Islamic intellectuals.

When the discourses and products of science and technology presented, the Islamic intellectuals respond them in various ways. The response can be categorized into three groups; secular group, conservative group, and reconstructive group. These grouping enforced by Barbour's typology of religion and science relation i.e. conflict, independent, dialogue, and integration. This grouping doesn't formed to strictly limit the vision of the intellectuals, but trying to give a classification to make it easier to recognize their thoughts.

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