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The Ontological Aspect of Ibn al-Haytham's Scientific Research Philosophy

Mohd Syahmir Alias[1] and Mohd Shukri Hanapi[2]

[1]Section of Philosophy and Civilization, School of Humanities, Universiti Sains Malaysia, 11800 Minden, Pulau Pinang, Malaysia.

[2]Centre for Islamic Development Management Studies (ISDEV), Universiti Sains Malaysia, 11800 Minden, Pulau Pinang, Malaysia.

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Abstract

This paper generally intends to obtain a scientific research concept based on Islamic understanding in order to carry out research on Islam. Specifically, the concept examined Ibn al-Haytham's roles in doing scientific research. This paper had explored the ontological aspect of Ibn al-Haytham's scientific research philosophy by using the content analysis method. The discussion is divided into three main sections. The first section discusses the concept of ontology. The second section identifies the roles of Ibn al-Haytham's scientific research, while the third section analyses the ontological aspect of Ibn al-Haytham's philosophy on scientific research. The findings showed that Ibn al-Haytham views scientific research have its own importance pertaining to metaphysical realm. Specifically, his *tawhid* and morality guide him in doing scientific research.

Keyword: *Ontology, Scientific Research, Ibn Al-Haytham, Research Philosophy*

1.0 Introduction

Scientific research method is closely related to the definition of science. Science is a research activity that use particular methods such as an experimental method that strongly emphasises on accuracy during observations. The outcome of the observation needs elaboration using theories that are understood by the most generalised characteristics (Medawar, 1984). This method must now be utilised to justify all the fields of knowledge if that field wishes to achieve universality and be accepted by the global community (Amir, Noor & Hilmi, 2012:52).

From a philosophical aspect, the scientific research method is pivoted on the logical positivism philosophy founded by the Vienna Circle group, which has three basis. The first basis is that knowledge is the core of experiments. The second basis is convention or the order of knowledge in this world must be explored and not involve the metaphysical factor. The third basis mentions that a theory must be inducted directly rather than experimented on (Betz, 2011:32-33). Hence, these basis gives the present scientific research the role to elaborate, predict and explain nature and human nature by using evidence from case studies (especially in the social science discipline) or experimental research (especially the natural science discipline)

(Neuman, 2011:38). Scientists are a group of people who are enthusiastic to contribute towards establishing facts, theories and certain methods (Kuhn, 1962:1; Bakar, 1991).

Among the scholars who have pioneered this aspect are Roger Bacon, Francis Bacon and René Descartes (Gower, 1997:8; Weathington, Cunningham & Pittenger 2010:9). However, according to Khaleefa (1999:3), Kennedy, Radach and Pynte (2000), Gorini (2003:55) and al-Khalili (2009), Ibn al-Haytham was a researcher during the heydays of Islam who used scientific methods in his research. Hence, during that time, scientific research was not considered as a secular activity (Mohd Yusof Othman, 2009). The questions is, what are the differences in the roles played by Ibn al-Haytham's scientific research at the present moment? In order to answer this question, this paper has three objectives. The first is to review the ontology concept; the second is to identify Ibn al-Haytham's scientific research roles; and the third is to analyse the ontological aspect of his scientific research philosophy.

2.0 Concept of Ontology

Ontology literally refers to theory about the reality. The term originates from Greek words *ontos* and *logos* (Idzam Fautanu, 2012:120). According to Abdul Rahman Abdullah (2005:19), discourse on ontology centers on the scope of the knowledge; whether it is limited to the physical realm or transverses the metaphysical realm. Thus, for a detail view, Mukhtar Latif (2014:187) stated that there are seven characteristics related to ontology. First, *being*; second, *reality*; third, *existence*; fourth, *essence*; fifth, *substance*; sixth, *change*; and seventh, *singularity* and *variety*.

The Islamic ontological concept encompassing and is associated with the existence of Allah SWT through the signs that portray His supreme qualities. According to Ghazali Basri (2012:22), Allah SWT portrays signs of His supreme qualities through the *Qur'aniyyah* and *al-kawniyyah* verses. The *Qur'aniyyah* verse explicitly shows the narrations of Allah SWT on matters contained in the Qur'an, while the *al-kawniyyah* verse is about Allah's creations in the universe that is visible and discernible by man.

Therefore, the knowledge obtained through *al-kawniyyah* verses, just as all the knowledge from the Qur'an, would eventually drive humankind to get acquainted with Allah SWT (Hassan, 2011:8). Moreover, Ghazali Basri (2012:24-25) emphasised that the concept of Islamic ontology always ensures every scientific explanation found in empirical research does not contradict with Islamic worldview or paradigm, which upholds *tawhid* (monotheism). Therefore, the principle of *tawhid* acts to unite the extreme views in order to understand nature (Abdul Rahman Abdullah, 2005).

3.0 Roles of Ibn al-Haytham's Scientific Research

Based on the data collected regarding Ibn al-Haytham, at least three roles were produced from the scientific research. The first was consolidating his belief (*'aqidah*) towards Allah SWT; the

second was fulfilling what was demanded in religious rituals (*'ibadah*); and thirdly, accomplishing morals values (*akhlaq*) befitting a Muslim researcher.

3.1 Consolidating Islamic Belief (*'Aqidah*)

Ibn al-Haytham believes in the concept of *al-hatmiyyah al-'ilmiyyah* (scientific determinism) (Ismail, 1997:122; Zain, 2008). It is a concept in which the allegiance of the universal phenomenon is anchored on the harmonious principle or otherwise called law of God or *sunnatullah*. This principle allows the researcher to carry out repeated observations. This is shown when Ibn al-Haytham (1989:103-104) admitted that the pre-arranged process of the human sight whereby the eyes quick movements when dust enters it is *sunnatullah*. Ibn al-Haytham in his Book of Optics said:

> "The characterization of the eye by this property is one of the things that show the wisdom of the Artificer, great be His glory, the skilfulness of His work and the successful and skilful manner in which nature has arranged the instruments of sight..." (Ibn al-Haytham, 1989:103).

In another study, Ibn al-Haytham had proven the authenticity of the Prophets sent by Allah SWT as written in his work, Book on the Confirmation of the Prophecy (Ibn Abi Usaybi'ah, 1965:558). This is because there are views from Muslim philosophers such as Abu Bakr al-Razi (865-925), who gave a controversial view on the issue of *'aqidah* (Islamic belief) by rejecting the virtues of Prophets (Long, 2008:188-189; Laming, 2006:292-293). Therefore, it is important for Ibn al-Haytham to correct and state his position of *'aqidah* with proof obtained through research.

3.2 Implementing the Demand of Religious Rituals (*'Ibadah*)

According to Ibn Abi Usaybi'ah (1965:553, 558 & 560), there are three papers on how to determine the direction of the *qibla* written by Ibn al-Haytham. They are entitled Treatise on Obtaining the Direction of the *Qibla* around the World, Discourse on Determining the Direction of the *Qibla* Using Calculations, and Treatise on the Direction of the *Qibla*. Ibn al-Haytham defined the direction facing the Ka'bah (*qibla*) in one of his treatise:

> "The *qibla* is the direction such that when a human observer faces it, it is as if he is looking at the diameter of the earth passing through the Ka'ba… And the ray coming out of his eye in that direction is in the plane of the great circle passing in the direction of his zenith and the point corresponding to (the zenith of) Mecca." (Abdali, 1997:15).

According to Dallal (1995), Ibn al-Haytham was the earliest researcher to determine the direction of the *qibla* by using the spherical trigonometry method before al-Kasyani (1380–1429). Besides the research on the *qibla*, Ibn al-Haytham also carried out research on optics, which was important when performing religious rituals. According to Ilyas (2003:23), the

contributions by Ibn al-Haytham towards optics and atmospheric light has an impact on calculating the prayers time calendar for Muslims.

Therefore, Ibn al-Haytham also carried out his duty as a mathematic scholar by carrying out research using the specfic knowledge in mathematics in fields related to implementing Islamic religious rituals. Rather more specifically, Ibn al-Haytham had written a treatise that inferred the relationship between *syari'ah* and the branch of mathematics known as geometry, which was entitled Treatise on the Crucial Elements Needed by *Syari'ah* that are Found in Geometry (Ibn Abi Usaybi'ah 1965:553).

3.3 Building Better Moral Values (*Akhlaq*)

Practically, after finishing writing his research, Ibn al-Haytham admitted to his limited knowledge. His *tawadu'* (humbleness) shows that all scientific information gathered is not the absolute truth; conversely, all absolute truth comes from Allah (Mohd Yusof Othman, 2009:141). As a Muslim researcher, Ibn al-Haytham ended Book of Optics by saying:

> "While all he knows about the subject is in his book, his knowledge is limited and there may even be errors in his work. Only Allah knows best (*wallahu a'lam*)." (Ilyas, 2003:21).

Besides that, Ibn al-Haytham always started his writings with the phrase '*basmalah*' (*bismillah al-rahman al-rahim*) as well as phrases that emulated and glorified Allah (Chaudhri, 1969:122). Moreover, he finishes his work by showering praises to Allah and expressing the *salawat* (invocation) to the Prophet Muhammad pbuh, his family and companions, such as:

> "All praises to upon Allah the Almighty, good tidings onto the Prophet Muhammad SAW, his family and companions" (Ibn al-Haytham, 1984:299).

Hence, the practice of morality is an important role in Ibn al-Haytham's scientific research role. This is because morality is the final product which beautifying the human soul and preparing oneself for eternal life through research (Sabra, 1994:240).

4.0 Ontological Aspect of Ibn al-Haytham's Scientific Research Philosophy

Based on the various roles of Ibn al-Haytham's scientific research, this article would analyse the ontological aspect found in it. This is important to form a scientific research concept based on Islamic understanding in order to carry out research on Islam.

Generally, Ibn al-Haytham is known as a skilful academician in various fields of knowledge (*polymath*) (Roshdi Rashed, 2002:773). In previous discussions, at least two fields were explored using the approach in order to consolidate his morals. The first field was natural science. The use of the scientific approach is not new to the teachings of the al-Qur'an because

Allah always called on his subjects to study and learn in depth the phenomenon of the natural worldThe commands was the exhortation of Allah, meaning:

> "Indeed, in the creation of the heavens and the earth and the alternation of the night and the day are signs for those of understanding. Who remember Allah while standing or sitting or [lying] on their sides and give thought to the creation of the heavens and the earth, [saying], 'Our Lord, You did not create this aimlessly; exalted are You [above such a thing]; then protect us from the punishment of the Fire." (Ali 'Imran, 3:190-191)

The verses of the al-Qur'an clearly show that there is not a single creation of Allah that is of no value to be studied and it would surely enhance the researcher's belief (Baba, 2009:34). Allah has given humans the ability to understand the natural world and appreciate its benefits (Ali, 1994:88; Açıkgenç, 2013:42-43). This philosophy is different from the current scientific paradigm that neglects the faith in God in all scientific aspects (Rothchild, 2006:4). The paradigm that pivots on this kind of positivistic philosophy could actually harm the Muslim researcher's morals (Salleh, 2008:138).

The second field analysed by Ibn al-Haytham that used the scientific approach was the field of religious knowledge. Actually, many of Ibn al-Haytham's works were destroyed and not found. Ibn al-Haytham had compiled almost 200 of his research findings. However, only 75 articles were found until now, which were in the fields of astronomy, mathematics and optics only (Hodgendijk, 1985:55).

As such, Ibn Abi Usaybi'ah (1965) found the biography and the list of titles of works by Ibn al-Haytham produced when he was still alive. Listed in the biography were several titles that were related to the field of religion, among them were "Rejecting the Views of Medical Practitioner, Abu Bakr al-Razi, on Divinity and Prophet-hood" and "Book about Verifying Prophet-hood, Explanations to the Group that Believes the Falsifications and a Remainder on the Difference between a Prophet and a False Prophet".

Ibn al-Haytham did not limit the role of scientific research to only questions on natural science (Salleh, 2011:9). Hence, it needs to be covered with a conceptual framework based on Divine revelation (*wahy*), such as the al-Qur'an and Hadith so that there is accurate platform (Safi, 1998:214). Similarly, for Islamic research in social science, the collected data and the social phenomenon studied conclusively points towards the glorifying Allah the Almighty (Reevany Bustami, Eleesya Nasruddin & Blaikie, 2006:146)

Scientific research used in Islamic thought also needs to be based on the understanding of knowledge that explains the existence of nature's orderliness by Allah and the main source of reference being Divine revelation. Therefore, it could be adduced that the importance of

understanding *tawhid* in forming the correct worldview for Islamic research is aimed towards becoming the policy for scientific research.

Ibn al-Haytham used his expertise in the field of geometry to help Muslims perform the obligated *'ibadah*. This is because research on Islam is not limited to the firmly religious group but also plays an important role for experts in other fields (Bakar, 1991:69-70). Performing the *'ibadah* during obligatory prayers does not only refer to specific rituals that contains the *kalimah* and certain practices. Rather, it contains genuine conditions that need to be adhered to and the fifth condition that validates a prayer is facing the direction of the *qibla*, which is the Kaabah (Din, 2007:31-35). According to the al-Qur'an, Allah commanded His subjects to direct their face towards Mecca (Masjid al-Haram), as shown in His exhortation, meaning:

> "…We have certainly seen the turning of your face, [O Muhammad], toward the heaven, and We will surely turn you to a qiblah with which you will be pleased. So turn your face toward al-Masjid al-Haram. And wherever you [believers] are, turn your faces toward it [in prayer]. Indeed, those who have been given the Scripture well know that it is the truth from their Lord. And Allah is not unaware of what they do…" (al-Baqarah, 2:144).

The contents of Ibn al-Haytham's scientific research that determines the direction of the *qibla* is in accordance with the conditions for performing the obligatory prayers by Muslims. Hence, this knowledge provides the researcher with a clear dimension for carrying out scientific research related to Islam.

Next, the role played by Ibn al-Haytham's scientific research is to practice Islamic moral values. Based on previous discussions, there were two aspects that could be analysed. The first aspect is about assimilating the concept of morality when appreciating knowledge, just as practiced by Ibn al-Haytham. According to Ahmad F. Yousif (2011:105), Islamic scientists in the past laid importance on the concept of blessings imparted by knowledge. Among the blessings was to begin work by professing "*basmalah*". This is in line with a Hadith by the Prophet SAW, meaning:

> "All matters that do not begin by adducing praise to Allah are futile." (Narrated by *Ibn Majah, Hadith No. 1884).*

Hence, for Ibn al-Haytham, there is no knowledge that is futile and no distance separating knowledge based on Divine revelation or knowledge based on scientific research (*'aqliyyah*) (Ahmad F. Yousif, 2011:105).

Meanwhile, in the second aspect, the concept of *tawadu'* is practiced by dedicating all the knowledge to Allah, the Absolute Owner of all knowledge (Mohd Yusof Othman, 2009:141). The *kalimah* (phrase) "*wallahu a'lam*" as mentioned by Ibn al-Haytham, was interpreted by

Hodgendijk (1985:350) to be a lack of confidence by Ibn al-Haytham about his own arguments. However, this actually shows his strong dependence on Allah for his arguments. This sense of humility proves that knowledge-based activities (research and writing) initiated by him is always surrounded by an Islamic system of morality (Thalia A. Arawi, 2010:114; Basir & Alias, 2012:53). The fact is, a sense of humility contradicts a sense of aloofness (*'ujub*) and the former is a characteristic of one who is God-fearing (*taqwa*). This is in accordance with the exhortations of the Prophet SAW, meaning:

> "Charity does not in any way decrease the wealth and the servant who forgives Allah adds to his respect, and the one who shows humility Allah elevates him in the estimation (of the people)." (Narrated by Muslim, Hadith No. 2588).

Although the scope of the third role is seen as based on the text of scientific works by Ibn al-Haytham, which is the practice of morals after he carried out the research, this does not mean that he does not practice admirable morals values before or during the implementation of the research. This is because he had underlined the way to practice knowledge, which is by implementing *amal ma'ruf* and *nahy munkar* in the laws of morality and its ethical code (Nasir, 1969:84). According to Din (2008:18), humans can form their own moral values based on their aims in life. Therefore, morals need to be assimilated into scientific research that is related to Islamic research in order to provide space for appreciation and a positive image within the researcher before, during and after the research.

5.0 Conclusion

As a conclusion, Ibn al-Haytham's scientific research has a different roles compared to the present scientific research. This is because the divine values always accompany him when carrying out scientific research. In applying this, for example, a researcher who is researching the issue of Muslim consumer behaviour needs to be fully dedicated because he should be confident that his research efforts would be evaluated by Allah, and not the assessor or one who gave him his research grant. Hence, scientific research must adhere to the dimensions of *'ibadah* such as obeying the commercial stipulations when dealing with the research subjects in an Islamic manner. Moreover, the research should be always surrounded with an admirable moral system such as the presumption of good intentions by the research subjects and portraying good moral values when communicating with them.

Corresponding Author
Mohd Syahmir Alias,
Section of Philosophy and Civilization,
School of Humanities,
Universiti Sains Malaysia, 11800 Minden, Pulau Pinang, Malaysia.
E-mail: syahmir@usm.my.

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