

ONTOLOGICAL BASIS OF SCIENCE CLASSIFICATION (Study on the Philosophy of Islamic Education)

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ABSTRACT

This paper aims to analyze the nature of science through scientific specifications. The focus of the discussion is the ontological basis of the classification of science in terms of studies in Islamic education philosophy. This research uses a qualitative approach with a literature study method. Scientific reference materials become the primary source in analyzing and testing the validity of research data. The results of this study indicate that the belief in the existence of an ontological status or the existence of objects of knowledge is what will become the ontological basis of the epistemology to be built. Which ontological basis is chosen will greatly influence and even determine the epistemological pattern it builds. For example, the distrust of some great Western scientists to the existence or ontological status of metaphysical entities, causing them to limit the subject matter of science (science) only to the empirical physical field which they call the positive world. Thus they also create a classification of science and scientific methods that match their ontological views. On the other hand, many Muslim scientists and philosophers (Al-Farabi, Al-Ghazali, and Ibn Khaldun) believe that what is real, is not only physical objects, but also non-physical entities (meta physical). In their view, metaphysical (immaterial) entities have an ontological status that is as strong or stronger as physical entities.

Keywords: Science, Classification, Ontology.

ABSTRAK

Tulisan ini bertujuan untuk menganalisa hakikat keilmuan melalui spesifikasi ilmu pengetahuan. Fokus pembahasan yaitu basis ontologism klasifikasi ilmu pengetahuan ditinjau dari kajian dalam filsafat pendidikan Islam. Penelitian ini menggunakan pendekatan kualitatif dengan metode studi kepustakaan. Bahan referensi ilmiah menjadi sumber primer dalam analisa dan uji keabsahan data penelitian. Hasil penelitian ini menunjukkan bahwa Keyakinan akan adanya status ontologis atau keberadaan objek-objek ilmu pengetahuan inilah yang akan menjadi basis ontologis dari epistemologi yang akan dibangun. Basis ontologis mana yang di pilih akan sangat mempengaruhi bahkan menentukan corak epistemologis yang dibangunnya. Sebagai contoh, ketidakpercayaan beberapa ilmuan besar Barat terhadap keberadaan atau status ontologis entitas-entitas metafisik, menyebabkan mereka membatasi subject matter ilmu (sains) hanya pada bidang fisik empiris yang mereka sebut dengan dunia positif. Dengan demikian merekapun menciptakan klasifikasi ilmu dan metode keilmuan yang cocok dengan pandangan ontologis mereka. Sebaliknya banyak diantara ilmuan dan filosof Muslim (Al-Farabi, Al-Ghazali, dan Ibnu Khaldun) percaya bahwa yang ada, yang riil, bukanlah hanya benda-benda fisik, melainkan juga entitas-entitas non fisik (meta fisik). Dalam pandangan mereka, entitas-entitas metafisik (immateriil) mempunyai status ontologis yang sama kuatnya atau lebih kuat seperti halnya entitas-entitas fisik.

Keywords: Science, Classification, Ontology.

A. PRELIMINARY

Every branch of science produced by an epistemology will not achieve a legitimate scientific status, unless the ontological status of its object is clear and recognized. Therefore, the ontological status of the objects of science will be very influential as the basis for the classification of science (Kartanegara, 2003: 42).

An exact science theory will try to identify the "subject matter", which will be the target (object) of research in the sciences it contains. Before the choice of science is dropped, a theorist must first ascertain the "ontological status" or the existence and reality of these objects. Before he feels certain about the existence of the objects he will study, it is impossible for him to create scientific disciplines that are suitable for these objects. This belief in the ontological status or the existence of objects of knowledge will become the ontological basis of the epistemology that will be used built (Kartanegara, 2005: 209).

Islamic epistemology compiled by Muslim scientists who have full belief in the metaphysical world, has created a theory of science that discusses not only sensory objects, as modern sciences, but also discusses metaphysical objects that are reflected in the classification of their knowledge (Salminawati & Assingkily, 2020: 55).

Although metaphysical objects cannot be seen by the senses, they are believed to have the same ontological status as physical objects. This division of scientific objects into material and immaterial can be seen, for example, in Al-Farabi's work entitled *Ihsha' al-Ulum*, Al-Ghazali in his *Maqasid al-Flasifah* and Ibn Khaldun in his *Muqaddimah*.

It is important to discuss this paper to get an overview of the classification of knowledge carried out by Muslim philosophers, especially Al-Farabi, Al-Ghazali and Ibn Khaldun and their relevance to the intellectual world.

B. METHOD

This research uses a qualitative approach with a literature study method. The objects of this research study are books, final assignments, scientific articles, and sources of scientific literacy related to the ontological basis of the classification of knowledge based on the study of Islamic education philosophy. Data analysis was carried out comprehensively by analyzing the nature of scientific classification through a review of the opinions of Muslim philosophers such as Al-Farabi, Al-Ghazali and Ibn Khaldun. Thus, this study can find that metaphysical (immaterial) entities have an ontological status that is as strong or stronger as physical entities. Therefore, checking the data in this study can be done using reference materials (Assingkily, 2021).

C. DISCUSSION RESULT

1. Philosophy of the Emergence of Classification Efforts

The classification of science on the one hand shows the development of science up to the time of its maker, on the other hand reflects the concept of the creator himself who lives in a certain cultural context about the nature of science. This applies, both in ontological-based classification (based on the object of science), as well as epistemological (based on sources and methods of scientific achievement), and functionalist axiology (based on the function and purpose of science) (Anwar, 2007: 311-312).

The classification of science compiled by Al-Farabi with certain sub-sections has the following objectives: First, the classification is intended as a general guide to various sciences, in such a way that the reviewers only choose to study subjects that really bring benefits to themselves. . Second, the classification allows one to learn about the hierarchy of knowledge. Third, the various sections and their subsections provide a useful means of determining the extent to which specialization can be legally defined. And fourth, the classification informs the reviewers of what should be studied before one can claim to be an expert in a particular science (Bakar, 1997: 148).

Like other Islamic philosophers, Ibn Khaldun also continued the traditional Muslim classification of science while adding his own contributions.

The most important innovation made by Ibn Khaldun when placing the *sya'riyyah* sciences proportionally with the philosophical sciences, he criticized the sociologically and pragmatically condemned sciences. Like Al-Ghazali, he made a selective denial of certain sciences. He shows the theoretical invalidity of the disciplines that create confusion because of the ambivalence between the Shari'a sciences and philosophy. These disciplines are dialectical metaphysics, radical Sufism and speculative theology. He also firmly rejected the false rational sciences: magic, amulets, numerology and astrology. The basic aim of Ibn Khaldun's innovative efforts was to preserve Islamic idealistic rationalism from the rise of irrationality and false religious obscurity. He tried to defend religion from the mistakes made by philosophers. He also defended the legitimacy of religion and philosophy in its proper fields (Walidin, 2003: 137-138).

The infinity of knowledge, the nobility of the responsibility to seek it, and the limitations of human life are three realities that Muslims learn from the Qur'an which naturally motivate Muslim scholars to divide and classify or categorize knowledge. The

desire for accuracy and order is characteristic of the Islamic intellectual tradition, as did the earlier Muslim philosophers (Daud, 2003: 153).

The contemporary view of Al-Attas in Daud (2003: 268-269) argues that the emergence of the classification of knowledge in Islam in several general categories depends on various considerations. According to him, among others; (1) based on the method of studying it, (2) based on empirical experience and reason.

Langgulung emphasized that the emergence of this philosophical classification of science is an attempt by a group of scientists to echo the various branches of science into certain groups so that they are easy to understand. The human brain is always looking for something that is easy to digest, easy to remember, easy to imagine, so when various phenomena are combined into simpler groups, the smaller the number of groups the better, because it is easier for the human brain to digest (Langgulung, 1992: 353).

2. Al-Farabi Klasifikasi Classification of Sciences

a. Al-Farabi Biography

Abu Nasr al-Farabi was born in 258 h/870 AD He was born in Wasij, a hamlet near Farab, in Transoxiana. His basic education was religion and language, he studied fiqh, hadith and interpretation of the Qur'an. Al-Farabi lived in Baghdad for twenty years and was then attracted by the cultural temples in Aleppo. He left behind a large number of important writings, one of which is the *Kitab Ihsha' al-'ulum* (Book of the sharing of knowledge) (Bakar, 1997: 38; Salminawati & Assingkily, 2020: 184).

b. Al-Farabi Klasifikasi Classification of Sciences

Muslim philosophers have put their best thoughts into their cosmological systems, one of which is Al-Farabi. In his cosmological theory, it is shown rationally how all existing beings are hierarchical and how the objects of this world arise from the First cause or God after going through a long series of immaterial beings, such as angels, reason and souls (Kartanegara, 2003: 46).

In another related classification scheme of existence, Al-Farabi divides existence into three types based on the number of causes. First, existence whose truth has absolutely no cause. Al-Farabi calls this existence the First form (*al-maujud al awwal*) or the First cause which is the highest principle of the existence of every other being. Of this supreme principle we have only the principles of

knowledge of it and not the principles of its being. Second, a being that has four Aristotelian causes, namely material, formal, efficient and final causes. This second type refers to the genera of sensed objects, including celestial bodies. Third, the existence that knows only three causes. Included in this type are beings that do not have a material cause. Forms of this type are forms that are completely immaterial-other than the First form and forms in which the essence is not things but resides in or occupies things. On the basis of these three closely related schemes of classification of existence, the ontological basis of Al-Farabi's hierarchy of knowledge can be drawn up (Bakar, 1997: 119-120).

c. Metaphysics Subject Material

Al-Farabi divides metaphysics into three parts. The first is ontology, that is, the science that deals with existence (*majudat*) and its properties, as long as they are forms. Second, classifying various types of existence with a view to determining the subject matter of theoretical sciences, namely demonstration principles (*mabadi' al-barahim*) in logic, mathematical sciences and natural sciences. Third, it deals with forms that are not things and are not in things (Bakar, 1997: 166).

d. Natural Science Subject Material

The lowest position in the philosophical sciences is the natural sciences (*al-'ilm al-thabi'i*) because the subject matter consists of earthly objects, which occupy the lowest degree in the hierarchy of existence. Precisely natural science is related to natural objects (Bakar, 1997: 121).

Al-Farabi describes these natural objects as "forms that are necessarily related to matter and motion", divided into five kinds: elements, minerals, plants, animals, and humans. Each part of these natural objects can certainly be used as a valid ontological basis for the branches of natural science. Therefore, the elementary elements require a special branch of science to study them, such as chemistry or material physics. Minerals require a special science, for example mineralogy or its sub-branches, metallurgy which deals with the manufacture of metal objects, including the manufacture of swords and others. Likewise, plants have become the ontological basis for a branch of science called botany, as non-rational animals become the ontological basis for the branch of life science

(biology) which is also called zoology. Humans as rational animals have a rather unique case in Islamic epistemology because apart from having unsubstantial elements, they also have non-material elements which are often called reason (soul and spirit). From this human, came the science of anatomy which studies humans from the point of view of their structure and physical content. Then there is also medical science which looks at humans from the point of health or not and finally psychology which studies humans from a psychological point of view (psychological). The science of anatomy emerged which studied humans from the point of view of their structure and physical content. Then there is also medical science which looks at humans from the point of health or not and finally psychology which studies humans from a psychological point of view (psychological). The science of anatomy emerged which studied humans from the point of view of their structure and physical content. Then there is also medical science which looks at humans from the point of health or not and finally psychology which studies humans from a psychological point of view (psychological). The science of anatomy emerged which studied humans from the point of view of their structure and physical content. Then there is also medical science which looks at humans from the point of health or not and finally psychology which studies humans from a psychological point of view (psychological) (Kartanegara, 2003: 49-50).

e. Math Subject Material

The mathematical sciences ('ulum al-ta'alim) and the political sciences (al-'ilm al-madani) seem to occupy a kind of position between that of metaphysics and the natural sciences. To understand the reason, it is necessary to identify the subject matter of each of these sciences and show that the subject matter is in the form of forms that ontologically exist between the forms studied by metaphysics and natural objects studied by the natural sciences (Bakar, 1997: 122).

Al-Farabi divides mathematics into seven parts, namely: (1) arithmetic or arithmetic ('ilm al 'adad) which consists of theoretical knowledge and practical knowledge of numbers; (2) geometry ('ilm al-handasah), which consists of theoretical geometry and practical geometry; (3) optics ('ilm al-manazhir) which includes the study of what is observed with the help of straight light and what is observed with the help of other light; (4) astrology ('ilm al-nujum) which is divided into judicial astrology ('ilm ahkam al-nujum) and astronomy ('science al-nujum al-ta'limi) which includes the study of mass forms and relative positions sky objects; the motion of the heavenly bodies and their conjunctions; and the earth's climate zones; (5) music ('ilm al-musiqa) consisting of practical music and

theoretical music; (6) knowledge of burdens ('ilm al-atsqal); (7) the technique or science of making tools ('ilm al-hiyal)' such as arithmetical devices, mechanics, astronomical instruments, and music. These tools are used in various practical arts, including weaponry and optical devices (Kartanegara, 2003: 48-49).

3. Classification of Science Al-Ghazali

a. Al-Ghazali Biography

Abu Hamid bin Muhammad bin Ahmad Al-Ghazali (better known as Al-Ghazali), was born in Tus (Khorasan region) in the year 450 Hijriyah/1058 AD. As a child he studied Fiqh from Ahmad ibn Muhammad al-Radzakani, then he went to Jurjan to study with Imam Abu Nusr al-Isma'ili (Salminawati & Assingkily, 2020: 185). After that he stayed again in Tus to repeat the lessons he had learned in Jurjan for three years, then he visited Naisabur to study with Abu al-Ma'ali al-Juwaini (Imam al-Haramain at the Nizamiyah Madrasa, studying the sciences of Fiqh). Usul Fiqh and Mantiq and Sufism to Abu Ali al-Faramadi until he died in 478 H. Seeing his intelligence and ability, al-Juwaini gave him the title Bahrun "muqhrig" (the drowning sea) (Moses, 2005: 3).

Among Al-Ghazali's thoughts on Islamic education are reflected in his three books, namely *fatihat al-kitab*, *ay-yuha*, *al-walad*, and *ihya 'ulum al-Din*. From his writings it is clear that he is a scholar figure who pays attention to the process of transinternalization of knowledge and education implementers. According to al-Ghazali, this process is the main means for broadcasting Islamic teachings, preserving the soul and taqorrub ila Allah. Therefore, education is worship and an effort to improve the quality of oneself and a way to get closer to Allah in order to get happiness in the world and the hereafter (Kartanegara, 2003: 86-87).

There are three thoughts of al-Ghazali about epistemology, namely:

1) Truth Seeker Classification

There are four groups of people in search of truth: the first is the *mutakallimun* (theologians), namely those who claim to be exponents of intellectual thinkers; second, the inner group consisting of teachers who have the authority (*ta'lim*) stated that they are the only ones who get the truth that comes from a teacher who has a perfect and hidden personality. The third group is referred to by al-Ghazali as a group of philosophers (thinkers) who

claim to be a group of logicians. The fourth group is the Sufi group which states that only those who can reach the level of truth with Allah through vision and understanding in a *bhathiniyah* manner. He concluded that the truth was impossible for anyone in the group to obtain (Amen, 1983).

In the field of philosophy, there are 6 fields, namely Mathematics, Logic, Physics, Metaphysics (Divine), Politics and Ethics. According to al-Ghazali; Religion does not prohibit or command the mathematical sciences, because this science is the result of proof of the mind that cannot be denied after being understood and known. In the field of logic, it contains proofs of proof, syllogism, the requirements of proof (*burhan* these definitions) (Hanafi, 1982: 210-211).

2) *Method Problem*

The methods used by the four groups of truth seekers above are: The *mutakallimun* group uses the debate method (*disputatio*) to gain knowledge of the inner group using a method called *ta'lum*, namely truth can be accepted if it comes from someone who can be trusted called a teacher. Logic groups simply base the truth on reasoning. The fourth group is a group of Sufis or mystics, the method used is Contemplation (*contemplation*) (Amen, 1983: 50-51).

3) *Reason and Revelation*

In the history of Islamic philosophy, Al-Ghazali is known as a person who doubts or doubts the truth obtained by reason. This feeling arises when studying the science of *kalam* or theology obtained from al-Juwaini. In this science there are several conflicting schools. If we observe al-Ghazali's explanation in his book *al-Munqis min Al-Dhalal* (savior from misguidance) (Mahmud, 1119:331-334), it appears to us that he wants to find the real truth, namely the truth that he believes is really the truth, such as the truth, for example: if you look at a star, it looks very small in size, then we examine the star with sophisticated tools, then we will find out, it turns out to be bigger than the earth. Then he explains, we often say that ten is more than three. If anyone were to say that three is more than ten with the argument that he can turn a stick into a snake, and that he really does, I would be amazed at his ability, but even so my belief that ten is greater than three would not waver. This is what al-Ghazali says is true knowledge.

At first, al-Ghazali found knowledge as in the exact sciences in things that were captured by the five senses, but for him later it turned out that the five senses also lie. For example; he said the shadow (the house) did not seem to move, but in the end it turned out to be moving. The stars in the sky may seem small, but calculations state that they are bigger than the earth.

Because al-Ghazali did not believe in the five senses anymore, he then put his trust in reason. But reason also turned out to be unreliable. "When dreaming", said al-Ghazali, "People see things that they really believe in, but when they wake up they realize that what they see is actually not true." mind, later if a deeper awareness arises it will turn out to be incorrect, as is the case with people who have woken up and are aware of their sleep (Prajā, 2003: 202-203).

Intuition according to Al-Ghazali is "sirr al-qalb" (the secret of the heart) and "'aql" (reason) as the "sixth sense" to which the pure nur ma'rifah (light of knowledge) emanates from the natural world. malacute. With another meaning is the existence of potential or other means above the mind in the sense of the mind, which can reach what is not reached by reason. This is revealed in his writings below:

"It is not far off, O man who is stuck in the mind, there is behind the mind another potential in which what appears not to the mind, just as it is easy to understand the existence of reason as another means behind tamyiz and the senses, in which strangeness and wonders are revealed. "Miracles that are beyond the reach of the senses and tamyiz. Therefore, do not make the peak of perfection limited to yourself." (Anwar, 2007: 192-193)

The hallmark of intuitive recognition is its continuity, in the sense of direct recognition of the object, without going through an intermediary. This happens because there is an identity between the knower and the known or between the subject and the object.

In its development, this mode of recognition has resulted in what we later know as hudhuri science ('ilm hudhuri) or presential knowledge because the object being studied is "present in one's soul". While the other mode of recognition is called "science of hushuli" (science of acquisition) because the object being studied is not present in a person, but is outside (unseen) so that to know it, an "intermediary" is needed, either in the form of concepts or representations. Therefore, such an introduction can be true if the concept and

external reality are positively correlated (corresponding) and false if it is negatively correlated.

The way for people to acquire *hudhuri* knowledge is by *isti'dad*, which is to prepare themselves to meet the illumination (lighting) directly from God. Not by sharpening the absorption of the senses or reasoning, but by cleansing ourselves (hearts) of all dirt or sin and stains. To be able to capture objects of intuitive recognition more perfectly, the lens of our heart must be kept clean and smooth. That is why the remembrance of which the point is to remove every dust of *shirk* from our hearts and *tazkiyah al-nufus* (self-cleaning especially from egocentrism) becomes very important in our efforts to get to know better the objects that are present in us. Thus, it is not the processing of the senses or reason that is important here, but the cultivation of the mind or spirituality (Kartanegara, 2005: 142-145).

b. Classification of Science Al-Ghazali

According to Al-Ghazali, the substance of a scientific discipline, which is a condition for its formation, both *syar'iyah* and *'aqliyah* sciences, must consist of four elements; (1) *Maudhu* (object of discussion) which is clear, such as body for medicine, measure for geometry, numbers for mathematics and so on; (2) *'Arad zatiyyah* (the nature of the object), such as a triangle for some measures, odd and even numbers for arithmetic, health and illness for the body and so on; (3) *Masail* (problem), namely the gathering of the second element with the first element. If it is questioned, it is called a "problem", if it is searched for, it is called "*matlub*" (which will be proven), and if it is a result or answer based on certain scientific methods it is called "*natijah*" (conclusion); (4) *Mabadi'* (fundamental principles, axioms, postulates or assumptions) (Anwar, 2007: 315).

Al-Ghazali proposed three models in the classification of his knowledge, namely: the ontological-substantial basis, the epistemological basis and the axiological basis. In this case, the author only describes the ontological basis as defined in this paper.

In the substantial-ontological classification, Al-Ghazali divides knowledge exactly as Ibn Sina, but with the term "science" like Al-Farabi. Here, he not only put forward his classification arguments, but also emphasized, "the production of

these sciences in our souls, in this world is a virtue, while in the hereafter is the cause of happiness". The objects of discussion are:

- 1) The object of tabi'yyat (physics) discussion is material natural objects from the point of view of their occurrence in motion, rest and change, with eight main disciplines and seven branch disciplines. The eight points are: (1) The study of something that accompanies the material from the material point of view, in the form of classification, division and analysis, motion and the things that accompany it, namely space and tempo; (2) Regarding the various elements of nature; (3) Concerning the realities of nature: decay, development, reproduction, and various impossible things; (4) The process of assimilation between the four elements of nature (earth, fire, water, and air) that causes celestial events, such as cloudiness, rain, lightning, lightning, wind, earthquakes, and so on; (5) Regarding metal objects (geodesy and metallurgy); (6) Plant science; (7) Veterinary science; (8) About the souls of animals and humans. Furthermore, as for the seven branch disciplines, namely: (1) medicine; (2) Astronomy; (3) hunch; (4) Ta'bir dream; (5) Tilsimat (combination of celestial potentials with the potentials of some earthly objects, to create new supernatural potentials; (6) Niranjat (combination of earthly objects to produce strange things, and (7) Chemistry), to change the properties of metal objects to produce gold and silver in a certain way (Anwar, 2007: 317).
- 2) The object of riyadiyyat (mathematics) is quantity with the main branches of arithmetic (reckoning), geometry (handasah), space (hay'at), algebra, and notation ('arud).
- 3) Divine objects (metaphysics) are absolute beings and related things from the point of view of their own existence which are not included in the objects of physics and mathematics.

4. Ibn Khaldun's Classification of Science

a. Biography of Ibn Khaldun

Ibn Khaldun's full name is Abu Zayd Abdurrahman Ibn Khaldun Al-Hadhrami. He was born in Tunis 1332 AD. Ibn Khaldun came from a middle class and respectable family from Andalusia. His family claimed to be from Hadramaut, a rather fertile agricultural land in the southern Arabian peninsula, and had come

to Spain in the early days of the occupation there (Ali, 1976: 2; Salminawati & Assingily, 2020: 194-197).

Ibn Khaldun received an upbringing as generally young people who were at the same level as him at that time. First he had to learn to memorize the Qur'an, then he studied grammar and poetry, after that he studied law. He began working at the age of 20, and became secretary to the Sultan of Fez in Morocco. In 1362 Ibn Khaldun went to Spain and worked for the king of Granada who sent him as an emissary to Pedro the Terrible, king of Castilla.

The next very important year in his life was 1375. At that time he left all official positions and with his family he settled in the palace of Qal'at Ibn Salamah near Oran, and for four whole years he wrote his *Muqaddimah* and the book of the History of the Universe (kitab al 'Ibar wa Diwan al Muqtada' wal Khabar fi Aiyam al 'Arab wal 'Ajam wal Barbar).

Muqaddimah Ibn Khaldun is a stand-alone book, which pays attention to humans in social and state life, as well as the aspects brought about by social and state life in the fields of culture, power, state, development, economy, science and technology. The content is so varied that it can be said that the book is encyclopedic, even though it was originally part of a larger work, namely the book 'Ibar (Suri Tauladan) which consists of three volumes. It was the introduction and the first volume of 'Ibar that became the *Muqaddimah* book we know today. While the second volume is specifically about the history of the Arabs and other nations during their time. The third volume which is the last volume specifically talks about the Barbarians who live in North Africa (Khaldun, nd: 6).

The book 'Ibar was written because he saw that history, which he considered a very noble branch of science, and made truth as its final goal, in its development had changed its form and mission so that it no longer corresponded to the truth. For Ibn Khaldun, history has two important aspects, namely the outer aspect and the inner aspect. When viewed from the external aspect, history is nothing more than stories and stories of past times and countries. But a deeper and more meaningful inner aspect, history is a reflection and research, where people think about the relationship between cause and effect, and try to formulate the rules that underlie every development that occurs (Zainuddin, 1992: 51-53).

At the end of this period he returned to Tunis, and finally Ibn Khaldun decided to go to Mecca to perform the pilgrimage. In October 1382, by ship he

sailed to Egypt on a merchant ship. He arrived at the port of Alexandria on Hari Raya Fitri in 784 H (November 1382 AD). In the month of Zulkaedah in 784 H, he continued his journey to Cairo. Once in Cairo, scholars, scholars, scientists and residents in particular accepted his presence with joy (Audah, nd: 37).

At that time Al-Azhar had become a leading University which was a place for the development of higher studies. He held a halaqoh which was attended by students and visitors who of course wanted to attend his lectures. At al-Azhar he gave lectures on Hadith, Maliki Fiqh, and explained the theories of science as outlined in the Muqaddimah book (Wafi, 1995: 55).

He spent the remainder of his life in Egypt as a University professor and administrator and reached the pinnacle of his career with the appointment of the influential and prestigious Maliki Judge. His religious experience increased during the pilgrimage to Mecca (1387-1388) and in particular his visits to the holy cities of Palestine (1400). He died in Cairo, Egypt in 1406 (Khaldun, 1981: 333-334).

b. Ibn Khaldun's Classification of Science

In his famous book, Al-Muqaddimah, he divides metaphysics into five parts, namely:

- 1) The section that studies being as a being (often called an ontology); The study of being as a being is considered important by Muslim philosophers because this field examines the most general categories of being, which can unite not only the things that we classify as creatures, but also khelik. This is the most general category of all that exists and is therefore also called the first philosophy (al-falsafah al-ula) (Kartanegara, 2005: 74-75).
- 2) This discussion of being as a being is important and has produced the best thoughts of Muslim philosophers and mystics so that two schools of thought in philosophy are known, namely the existentialists and the essentialists. The existentialists were represented by Ibn Sina and Mulla Sadra who believed that what was more principled was existence, a principle which came to be known as ashalah al-Manifest. The second is the essentialists who in this case are represented by Suhrawardi and his followers. Their stance is called ashalah al-mahiyah which states that essence is more principal than existence (Kartanegara, 2003: 44-45).

- 3) a section that studies general material affecting physical and spiritual things, such as caudity, unity, plurality, and possibility; It deals with philosophical and mathematical concepts, and has been widely used by philosophers in their debates about essence and existence.
- 4) The section that studies the origin of existing things and determines that they are spiritual entities (of course this has entered into cosmology); This clearly refers to the study of cosmology with the main problem of how the relationship between the One God and spiritual beings, such as angels, reason, and soul.
- 5) The section that studies how existing things arise from spiritual entities and studies their composition; When it comes to the origin of the world, modern physics tends not to talk about the spiritual origin of the universe. For them, the universe began with the big bang, which began with what is known as a singularity. The question of what came before the singularity is off limits. In contrast to modern physicists and astronomers, Muslim philosophers emphatically asserted that this physical universe had a spiritual origin.
- 6) The section that studies the state of the soul after its separation from the body and its return to origin or its beginning. The definition of this last field of course assumes the survival of the soul after death, and there is of course implied the belief of Ibn Khaldun like other Muslim philosophers in the soul as an immaterial substance, an understanding which at the time Modern technology, especially after psychology separated from philosophy, was rejected as unscientific (Kartanegara, 2005: 77-85).

c. Mathematics

Ibn Khaldun divides mathematics, which is essentially the study of measurement, which is second only to metaphysics into four subsidy:

- 1) Geometry (the science of measurement). The science that studies measurements in general; some are cut off, such as in the form of numbers; or continuous like geometric shapes. Geometry studies these measurements and all that is symptomatic, both in terms of the essence of the measurements themselves or in terms of their ratio to one another. The subsidies or branches of the geometric sciences are (a) the study of the geometry of spherical three-figures (spherical trigonometry) and conic sections (cones). (b) the study of

geometry on surveying. This discipline is indeed used to survey land, namely finding the measurements of a plot of land from the angle of span, pinch and other units. (c) optics. This science explains why errors occur in visual perception.

- 2) Arithmetic (al-aritmatiqy). Knowledge of the essential properties of discontinuous quantities, i.e. numbers. The subsidies from arithmetic are; (a) counting (calculation) related to addition; (b) algebra; (c) business arithmetic, in the form of commerce and so on; (d) fara'id (law of inheritance).
- 3) Musika (al-musiqqa). Knowledge of the size of sound and pitch and their measurement with numbers. The result is knowledge of musical notes.
- 4) Astronomy (the science of al-hai'ah). The science that determines the shape of space, the position and number of certain planets and stars. Through this science it is possible to learn all this from the movements of the heavenly bodies. Astronomy as a fourth field has one subdivision, namely astronomical lists. This discipline has to do with the flow of movements that are typical for stars and with the character of those movements, fast, slow, direct and so on (Kartanegara, 2005: 86-90; Walidin, 2003: 142-143).

d. Physical Sciences

Philosophers can study elemental substances that can be perceived by the senses, such as minerals, plants, animals, celestial bodies, natural movements and souls which are the origin of movement and so on (Walidin, 2003: 142).

Ibn Khaldun said that the branches of physics are medicine and agriculture. According to him, agricultural science is concerned with the study of processing and planting crops through irrigation, good maintenance and so on (Kartanegara, 2005: 94).

Ibn Khaldun grouped this knowledge into the philosophical sciences called *almaqдах bi al-zat* (sciences because of their actual benefits).

5. CONCLUSION

A theory of science must identify the subject matter that will be the object of research in the sciences it contains. The belief in the ontological status or the existence of objects of knowledge is what will become the ontological basis of the epistemology to be built. Which

ontological basis is chosen will greatly influence and even determine the epistemological pattern it builds. For example, the distrust of some great Western scientists to the existence or ontological status of metaphysical entities, causing them to limit the subject matter of science (science) only to the empirical physical field which they call the positive world. Thus they also create a classification of science and scientific methods that match their ontological views.

On the other hand, many Muslim scientists and philosophers (Al-Farabi, Al-Ghazali, and Ibn Khaldun) believe that what is real, is not only physical objects, but also non-physical entities (meta physical). In their view, metaphysical (immaterial) entities have an ontological status that is as strong or stronger as physical entities.

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