

The Objectives and References of *Mi'yar al-'Ilm fi Fann al-Mantiq*¹

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ABSTRACT

Mi'yar al-'Ilm fi Fann al-Mantiq of al-Ghazali is the first book written specifically on Muslim logic. But the comprehensive and exclusive study on the essence of its scientific contents of the book and its significance in developing scientific thinking has never been done. Thus this study investigates the objectives and referral sources of Mi'yar writing. This qualitative study uses content analysis method. The data which were collected using the documentation has been analyzed using the inductive, deductive, and comparative methods. The process of analysis of logic in Mi'yar be done using textual analysis or textual content analysis and constant comparison method. It is because of this study is a textual study. This study found that Mi'yar written by two objectives. Firstly; to provide an understanding on the methodologies of thinking and researching, and explain the rules of constructing syllogisms and analogies. Secondly; to review the matters which have been written in Tahafut. The study also found that al-Ghazali wrote Mi'yar based on three books, a book of his own, namely Maqasid, and two books of Ibn Sina, namely al-Isharat and al-Risalah fi al-Hudud. Therefore Mi'yar should be a fundamental source of learning logic and methods of thinking of Muslims either at high school or university. Hence the constant and deep study on the content of Mi'yar is very significant and has high impact. But the dissemination of the findings of this study is the next action that should be realized.

Keywords: Aristotelian logic, al-Ghazali, Islamic philosophy, logic, Mi'yar al-'Ilm

This study was conducted to investigate, analyze and describe the identity of *Mi'yar al-'Ilm fi Fann al-Mantiq* work of al-Ghazali. This study also aims to disclose and highlight the importance of *Mi'yar* in the development of logic in the Islamic world of science. This is due to the book has not been studied specifically, comprehensively and exclusively. Hence this study is an attempt to uplift the status and to gain the benefit from the efforts of the earlier scholars, especially al-Ghazali in the field of logic.

Mi'yar full title is *Mi'yar al-'Ilm fi Fann al-Mantiq (The Criterion or Standard Measure of Knowledge in Logic)*. *Mi'yar* was written by al-Imam Zayn al-Din Hujjat al-Islam Muhijjat al-Din Abu Hamid Muhammad b. Muhammad b. Muhammad b. Ahmad al-Ghazali al-Tusi (Ibn Khallikan 1978, 4: 216). He was born in Dhu al-Qa'dah 450/ December 1058 at the village of al-Ghazalah in the area of al-Tabaran, in the region of Tus (nowadays: Meshed, Iran) (Ibn Khallikan 1978, 4: 216; al-Zabidi 1989, 1: 7; Kahhalah 1960, 11: 266; Corbin 1983: 271). Al-Ghazali died and buried at al-Tabaran on Monday morning, Jumada al-Akhirah 14, 505/ December 18, 1111, at the age of 55 Hegira years or 53 Christian years (Ibn Khallikan 1978, 4: 216; al Safadi 1961: 277;

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Ibn 'Asakir 1979: 296). Lazarus-Yafeh described al-Ghazali as the greatest Islamic thinkers (1975: 3), the most influential Islamic thinkers (1966: 111), and the most prolific Islamic writer (1975: 9). This is due to the ideas of al-Ghazali which were always looked very modern and expressed in a manner that is very convincing which is able to transcend the limitations of time and religion, and is able to incorporate deeper notions on any research into his writings.

Al-Ghazali's prominence and knowledge were proved by the production of many works. Al-Subki (1999, 3: 434-435) has listed 58 works of al-Ghazali, al-Wasiti (1981: 180-186) has listed of 98, Tashkubra Zadah (1980, 2: 341-342) has listed of 80, al-Zabidi (1989, 1: 37 & 56-60) has listed of 82 and Badawi (1961: 1-238) has listed of 457. Some examples of the works of al-Ghazali are *al-Mankhul min Ta'liqat al-Usul* (jurisprudence), *al-Wasit fi al-Madhhab* (Islamic law), *Ma'akhidh al-Khilaf* (difference of opinion), *al-Muntahil fi 'Ilm al-Jadal* (debate), *Ijam al-'Awamm 'an 'Ilm al-Kalam* (theology), *Tahafut al-Falasifah* (philosophy), *Ihya' 'Ulum al-Din* (sufism), and *Mi'yar al-'Ilm fi Fann al-Mantiq* (logic) (al-Mahdali 1999: 14-19). Thus a relatively large amount of his works had attracted many researchers to study them from different angles.

Research Background

The works of al-Ghazali are in various fields such as philosophy, politics, theology, Islamic law, jurisprudence, Sufism, ethics and logic. In the diversity of scientific fields, researcher had purposely and intentionally chose logic as a domain of study, logic of al-Ghazali as a subject or field of study, and *Mi'yar* as the focus of analytical study.

In the field of logic, al-Ghazali wrote three forms of works. Firstly; the logic work which is a book of pure logic in the manner of Aristotle, namely *Maqasid al-Falasifah* (The Aims of the Philosophers), which was completed in 487/1094 (Badawi 1961: 10; Jihami 1993: 9; Bouyges 1999: 261). He wrote this book in order to understand the sciences known by the philosophers, namely mathematics, logic, physics, and metaphysics, before he criticized their ideas, opinions and theories through his work of *Tahafut al-Falasifah* which was completed on 488/1095 (Hourani 1959: 227; Fakhri 1962: 10; Bello 1989: 9). Secondly; the logic work which is a book of Islamic pure logic, such as *Mi'yar al-'Ilm fi Fann al-Mantiq* (The Criterion or Standard Measure of Knowledge in Technologic), *Mihakk al-Nazar fi al-Mantiq* (The Touchstone of Proof in Logic), and *al-Qistas al-Mustaqim* (The Just Balance). *Mi'yar* was completed in 488/1095, *Mihakk* in 488/1095, and *al-Qistas* in 497/1103 (Jihami 1993: 9; Bouyges 1999: 261-262). Thirdly; the logic work which is also a book of other fields of Islamic sciences that included and synthesized with elements of logic. The examples for this type of logic books are *al-Mustasfa min 'Ilm al-Usul* (The Essentials of Islamic Legal Theory) and *al-Iqtisad fi al-'Itiqad* (The Middle of Theology). *Al-Mustasfa* which was completed in 503/1109 is a book of jurisprudence (Jihami 1993: 10; Bouyges 1999: 262; Mohd Fauzi 2000: 128). Whileas *al-Iqtisad* which was completed in 489/1095 is a book of theology (Bouyges 1999: 262). Al-Za'bī (2000: 43) explained that al-Ghazali wrote logic works targeting the particular class or group of thinker. *Mi'yar* was wrote specifically to the philosophers, *Mihakk* and preamble of *Mustasfa* to the jurists, *al-Qistas* to the Batinites (*Batiniyyah*), and *al-Iqtisad* to the theologians.

Among so many logic works of al-Ghazali, the researcher has chose *Mi'yar* to be the focus of analytical study. This selection of *Mi'yar* is for three reasons. This is, firstly, because *Mi'yar* is the first corpus of al-Ghazali in the field of Islamic pure logic. This is related to the fact that *Mi'yar* focuses on the discussion of the theories and methods of logic in the Islamic perspective and presents the applicative examples of each methods of logic from the fields of Islamic sciences such as jurisprudence and theology. This kind of approach has made the theories and methods of logic having Islamic elements and values, and of pragmatic, dynamic and practical or functional. Secondly; because the integration in the content of *Mi'yar*. After writing *Mi'yar*, al-Ghazali wrote another book of Islamic pure logic, namely *Mihakk*, but this book is not to be used as a focus of study for *Mi'yar*'s content is more detailed, more comprehensive and deeper than

the content of *Mihakk*. Thirdly; because *Mi'yar* has become a mode or medium for the development of the methodology and thought of logic, which has a chain of logic books, and even can be called "a genealogy of logic books" or "a study of genealogy of logic books." This is proved by the writing of books such as *Mihakk* (488/1095), *al-Iqtisad* (489/1095), *al-Qistas* (497/1103), and *al-Mustasfa* (503/1109) after the writing of *Mi'yar*. Hence after this study, it is advisable to do a thorough study on "the genealogy of al-Ghazali's books on logic".

Problem of Study

In the field of logic, al-Ghazali studied with al-Juwayni (419-478/ 1028-1085) at Naysabur during 473-478/ 1080-1085 (al-Subki 1999, 3: 418; Za'bub 1980: 13; al-Rafa'i 1988: 21; Amin 1963: 3 & 9-10). However, the biographers of al-Ghazali do not stated whose logical books be his learning sources. But at that time, the books of logic wrote by al-Farabi and Ibn Sina spread widely. Based on his study and research during his being lecturer in Madrasah Nizamiyyah (Nizamiyyah University), he had managed to write a couple of books of logic. Among those books are *Maqasid*, *Mi'yar*, and *Mihakk*. In addition, among other works related to logic are *al-Qistas*, *al-Mustasfa*, *Asas al-Qiyas* and *al-Iqtisad*.

In this study, *Mi'yar al-'Ilm* of al-Ghazali has been chosen purposely and intentionally as the focus of analytical study. This is because *Mi'yar* is the logic work of al-Ghazali that incorporated the elements of Islam in its content. Before writing *Mi'yar*, al-Ghazali already wrote another logic works in the manner of Aristotle entitled *Maqasid al-Falasifah* in order to understand the science of logic. Only then that he wrote successfully a book of Islamic pure logic entitled *Mi'yar al-'Ilm fi Fann al-Mantiq*. According to Bisri (2003: 188-189), nowadays, the study on "the thought of the figure" through his work had become one of the interested fields of study that attracted the academicians in various institutions of higher education. Likewise, it is necessary to distinguish "the study on the figure" with "the study on the thought of the figure" so that the study will be more focused.

Although *Mi'yar* is the earliest book of Islamic pure logic and is a model for logical thinking, logical theory, and curriculum of logic that are very relevant to be learned and applied, but its essence has not been analyzed and indeed need to be analyzed specifically, comprehensively, and exclusively, and then featured in contemporary yet simple Malay terms.

Research Questions

This study was conducted by one issue. The issue is *Mi'yar* has never been studied, analyzed and described specifically, comprehensively and exclusively. Based on this issue and based on the problem statement of the study, the researcher formulated two research questions.

Firstly; the question of the writing objectives or purposes of *Mi'yar*. Jihami (1993: 10-11) stated that the trilogical work of al-Ghazali, namely *Tahafut*, *Maqasid* ("Preamble to *Tahafut*") and *Mi'yar* ("Logical science of *Tahafut*") are interlinked triad. This is because the content and the meaning of the terminologies in *Tahafut* will be understood only by reading it together with *Maqasid* and *Mi'yar*. Therefore, to understand *Tahafut* must be with *Maqasid* and *Mi'yar* as asserted by al-Ghazali himself (1927: 45, 1958: 83). *Mi'yar* has never been analyzed specifically, comprehensively and exclusively. While as *Maqasid* was reviewed by Chertoff (1952) and *Tahafut*, of course, was always been the focus of study by many scholars. This fact shows the relevancy, urgency and significance of analysis on logic in al-Ghazali's *Mi'yar*. However, the question arises: what is the objective of *Mi'yar* writing? Are those objectives consistent with the scope of *Mi'yar* content? How do they affect the structure of *Mi'yar* content? These are some of the questions that will be searched for the answer in this study. Secondly; the question of the writing sources of *Mi'yar*. Dunya (1961: 23) pointed out that the debate in the science of logic is usually a rigid and uninteresting debate, even dull, just like debate in mathematics. But the

debate on logic in *Mi'yar* is a lively, rich and enjoyable debate. Therefore, the questions arise here: what is the source of *Mi'yar* writing? What is so special about *Mi'yar*? What is the nature of debate and elaboration of logic in *Mi'yar*? Furthermore, none of the scholars who are suddenly managed to write a work without studying, referring or getting any information from the works of previous scholars. These are among the questions that will be searched for the answer in this study.

The problems and issues described above show that there are still many gaps of knowledge about al-Ghazali's logic that requires study and elaboration. It is recognized by Suriasumantri (1998: 43) who explained that the assessment of a matter that has been studied, including logic of al-Ghazali, can still be studied further because there is no perfect product of human thought and a product of human thought in a particular period may not be appropriate at other times. Lazarus-Yafeh (1966: 111) has also explained that while many researches have been done on the thoughts and works of al-Ghazali, but some aspects of his thoughts and works remain unanswered. In conclusion, among the questions that need clarification in this study were, firstly; what are the objectives of *Mi'yar* writing? Secondly; what are the writing sources or references of *Mi'yar*?

Research Objectives and Methodology

Based on the research problems that have been described, this study is generally carried out to investigate, analyze, and describe the identity and the essential content of *Mi'yar* wrote by al-Ghazali. Based on this general objective of the study, this research is targeting two objectives as: to review the writing objectives of *Mi'yar al-'Ilm*, and to analyze the writing sources or references of *Mi'yar al-'Ilm*.

This qualitative study used content analysis. The data which were collected using the method of documentation have been analyzed using the inductive, deductive, and constant comparative methods. The process of analysis on logic in *Mi'yar* also has done using textual analysis or textual content analysis because this study is a textual study.

Literature Review

In this study, the researcher has reviewed the literatures and have identified two main themes as the domain of study, i.e. "al-Ghazali" as a figure of study and "*Mi'yar*" as a subject of study. Through these two themes, the researcher reviewed the relevant literatures and made some notes and a brief summary accordingly.

The studies on the works of al-Ghazali were made by Gosche (1858), Macdonald (1899), Goldziher (1903), and Gairdner (1914) (Badawi 1961: 9-10). Whileas the studies on the efficacy of the works associated with al-Ghazali were done for the first time by Palacios in 1934-1941 and then followed by Watt in 1952 (Badawi 1961: 11). The chronology of the works of al-Ghazali have been compiled for the first time by Massignon in 1929 (Badawi 1961: 10) and followed by Palacios (1934), Watt (1952), Hourani (1959 & 1984), and Goldziher (1961) (Hourani 1959: 225-233, 1984: 289-302). Besides that, the list of works of al-Ghazali also been compiled in a book that prepared by Badawi and published in 1961 (Badawi 1961: 3-550).

Besides that, the international website developed specially in conjunction with the commemoration of "the 900th Anniversary of Imam al-Ghazali's Death (1111-2011)" has listed 84 doctoral studies on al-Ghazali. But only two studies related to the logic of al-Ghazali. Those studies are the study of al-Sayyed Ahmad (1981) concerning *al-Ghazali's Views on Logic*, and the study Chertoff (1952) on *The Logical Part of al-Ghazali's Maqasid al-Falasifa, in Anonymous Hebrew Translation with the Hebrew commentary of Moses of Narbonne, Edited and Translated with an Introduction and Notes and Translated into English*. However, both studies do not investigated specifically and comprehensively on *Mi'yar* (Anon. 2011a).

In the period of 1983 to 2012, there were 291 doctoral studies been done at the Academy of Islamic Studies, University of Malaya, Malaysia. However, only 4 studies related to al-Ghazali. Those studies were conducted by Azmil (2011) on the *rububiyah Allah*, Laludin (2006) on the concept of *maslahah*, Esa (2004) on the philosophy of science, and Mohd Fauzi (2002) on the prominence of al-Ghazali in the field of logic. Those studies did not examine *Mi'yar* specifically, comprehensively and exclusively (Anon. 2011b; 2012; 2013).

However, the qualitative study of Mohd Fauzi (2002: iv-vi) entitled *Ketokohan al-Ghazzali dalam Bidang Mantik: Suatu Analisis terhadap Muqaddimah al-Kitab dalam Kitab al-Mustasfa min 'Ilm al-Usul* (The Prominence of al-Ghazzali in the Field of Logic: An Analysis of *Muqaddimah al-Kitab* in *Kitab al-Mustasfa min 'Ilm al-Usul*) has been analyzed and interpreted the data using the method of documentation. The discussion in this study focused on the contribution of al-Ghazali in the field of logic in connection with the jurisprudence through his book of *al-Mustasfa*. This study described the reasons that prompted al-Ghazali to put the discussion of logic as a preamble to the discussion on jurisprudence in *al-Mustasfa*. Although *al-Mustasfa* is essentially a work of jurisprudence, but it is contributed greatly to the field of logic and recognized highly as conclusive evidence of al-Ghazali's prominence and excellence in the field of logic. Thus his work of pure logic, namely *Mi'yar*, also necessary and should be investigated to prove his prominence, capability and knowledgeability in the field of pure logic.

While as at the Faculty of Islamic Studies, Universiti Kebangsaan Malaysia, according to Siti Rugayah *et al.* (2008), in the period of 1979 to 2006, a total of 90 doctoral studies were conducted. However, there is only one study that examined on al-Ghazali, namely a study of Kadar (2005) on the influence of the spiritual dimension. This study also did not investigate on *Mi'yar*. Thus the gap of knowledge about *Mi'yar* is still existed and need an assessment and an elaboration.

Findings and Discussion

In the study of the objectives and the references or referral sources of *Mi'yar al-'Ilm fi Fann al-Mantiq* of al-Ghazali, the researcher discussed his findings in two discussions. First; the background and the objectives of *Mi'yar* writing. Second; *Mi'yar* writing references. In this subheading the researcher focused his discussion on two issues, namely the writing background of *Mi'yar*, and the writing purposes or objectives of *Mi'yar*.

The Writing Background of Mi'yar

Al-Ghazali had finished writing *Mi'yar* while he was at Baghdad in 488/1095, that is after writing *Tahafut* in 488/1095 but before traveling to Damascus at the end of 488/1095 (Jihami 1993: 9; Bouyges 1999: 261-262; Za'bub 1980: 38; Hourani 1959: 227). However, al-Ghazali actually started writing *Mi'yar* much earlier than *Mihakk* but *Mi'yar* still unresolved and is still under revision and correction during finishing the writing of *Mihakk* (al-Ghazali 1994: 162).

Al-Ghazali wrote *Mi'yar* while doing his own reading and reviewing seriously and actively books on philosophy, including logic, in his spare time as a lecturer at Madrasah Nizamiyyah, Baghdad within 484-488/ 1091-1095. At first, al-Ghazali planed to write *Mi'yar* as a part or the last part of *Tahafut*, but eventually he made it as a separate book as he had stated it in *Tahafut* (al-Ghazali 1958: 83 & 85).

The study of al-Mahdali (1999: 35-38) found that al-Ghazali wrote his works for four reasons. Firstly; answering questions and responding to the requests of certain individuals. Secondly; discussing the nature of certain school of thought and refuting it. Thirdly; correcting, teaching and advising. Fourthly; formulating, developing or designing certain methodology and its application. In this case, *Mi'yar* written for the fourth reason, which is to formulate, develop or design certain methodology and its application.

In this regard, al-Ghazali (1990: 25) explained in *Mi'yar* that the targeted reader of *Mi'yar* is the one who is limited of determination and desire to acquire knowledge, high ambition to unravel the mysteries of the mental facts, who working with hard work and vigorous to discard the despised adornment and enjoyment of the world, and who still stand in the determination and resolve to achieve happiness with the knowledge and worship. The target of *Mi'yar* is also described by al-Ghazali (1958: 83) in *Tahafut*. He said that a person who do not understand anything in his words of objections against the philosophers in *Tahafut* should start firstly reading the book of *Mi'yar al-'Ilm*, which called "logic" in the eyes of the philosophers. Therefore, the target of *Mi'yar* are those who have problems to understand the content of *Tahafut*. This means that al-Ghazali had developed and established that *Tahafut* must be read together with *Mi'yar*.

The Objectives of Mi'yar

Before starting the discussion on logic in *Mi'yar* one by one, al-Ghazali described the objectives or purposes of writing *Mi'yar* in the section of author's preface. In this regard, al-Ghazali (1990: 25-27) stated that "Those impetuses to the writing of the so-called "*Mi'yar al-'Ilm*" are two important goals. The first impetus is to provide an understanding the methodologies of thinking and researching, and explain the rules of constructing syllogisms and analogies. While as the second impetus is to review the matters which have been written in *Tahafut*." This is because al-Ghazali have been debated against the philosophers in terminological language and regulative terminologies which have been integrated into the logic. Thus the reader will be able to understand the meaning of the terminologies through *Mi'yar* because *Mi'yar* discuss the sources of knowledge, syllogisms and the types of syllogisms (al-Ghazali 1990: 25-27).

References of Mi'yar

To trace down the referral sources of *Mi'yar* writing, researcher had used the approach of genealogical study on logic book. Genealogy comes from the Greek words "*genea*" which means "descent", and "*logos*" which means "knowledge". Thus, genealogy is the study and tracing of the family lineage and history. However, in this study the researcher used this term to mean the study of genealogical search or tracking the origins of the development of Islamic logical views and Islamic logical schools of thought, in form of books of logic. In this case, *Mi'yar* has become a medium for the development of Islamic logical views and Islamic logical schools of thought that has a chain of Islamic logic books, or the genealogy of Islamic logic books (Bisri 2003: 290).

In this regard, al-Mahdali (1999: 26-35) stated that the referral sources of *Mi'yar* writing generally are the Qur'an, the Hadith of the Prophet, books of Islamic jurisprudence, books of theology, and books of logic which were in the Library of Nizamiyyah in Baghdad at that time. While as the referral sources of *Mi'yar* writing means the main books of reference used in the process of preparing and composing the new book, namely *Mi'yar*. However, referral sources of *Mi'yar* writing, in particular, are not shown clearly in its structure as in the books of today which can usually be obtained list of reference books at the last section of the book or in the form of footnotes or endnotes. This fact does not mean that the preparation and composition of this *Mi'yar* was done without any reference because one of the practices of the ancient scholars in writing their book was to acknowledge, recognise and give credit to others even though they do not attach specifically reference list to their books. Almost all of them do not mention in their writing the name of the outstanding figure or the book of reference they quoted. If they do mentioned it in their writing, they mentioned the name of the outstanding figure only or the book of reference only without mentioning the page which they quoted.

In this regard, al-Ghazali (1993: 27-47) explained in the *al-Munqidh* that he had studied the books of the theologians, philosophers, and sufists in less than three years, and then revised his study in nearly a year. In relation to this fact, he had explained the works and scholars who became his references in the field of sufism. On the contrary, he did not mention the works of scholars which became his references in theology and philosophy, including logic. But he did mention a few information on the philosophical thought of Greek philosophers such as Socrates, Plato and Aristotle, and Islamic philosophers such as al-Farabi and Ibn Sina. Based on this fact, the researcher have studied genealogically the knowledge of logic of Socrates, Plato, Aristotle, al-Farabi and Ibn Sina. Socrates was the teacher of Plato. Plato was the teacher of Aristotle. Socrates and Plato did not produce any work of philosophy but their philosophical opinions and thoughts were written by Aristotle. Meanwhile, al-Farabi and Ibn Sina adapted those opinions and thoughts into Arabic and developed them creatively in their own works. Thus, researcher have been studied the possibility of al-Ghazali referencing logic works of al-Farabi and Ibn Sina. In this regard, Aristotle's footprint in al-Farabi's ideas was most strongly felt in the view of al-Farabi's logic and classification of sciences. This is because al-Farabi has adapted and interpreted creatively the views of Aristotle (M. Ibrahim Subhi 2012: 31).

In the field of logic, al-Farabi has wrote several works of logic such as *al-Tauti'ah*, *al-Fusul al-khamsah*, *Kitab Isaghaji*, *Kitab qataghuriyas*, *Kitab al-qiyas*, and *Kitab al-tahlil* (al-'Ajam 1985, 1: 4-5, 21-25; 1986a, 2: 4-5; 1986b, 3: 4-7, Fakhri 1987: 3-4; Jabr *et al.* 1996: xiii; Rescher 1962: 42; Hammond 1947: ix). Whileas Ibn Sina has wrote many works of logic such as (1) *al-Isharat wa al-Tanbihat: al-Qism al-Awwal (Guidances and Warnings: Part One)*, (2) *al-Shifa' (The Healing)*, (3) *al-Najat [min al-Jahl] (The Deliverance [from Ignorance])*, (4) *al-Risalah fi al-Hudud (Treatise on Definitions)*, (5) *al-Mukhtasar al-Asghar fi al-Mantiq (The Shorter Summary on Logic)*, (6) *Al-Mukhtasar al-Awsat fi al-Mantiq (The Middle Summary on Logic)*, (7) *Mantiq al-Mashriqiyyin (A Logic of Eastern)*, (8) *al-Mujaz al-Kabir (The Large Epitome)*, (9) *al-Mujaz al-Saghir (The Small Epitome)*, (10) *'Uyun al-Hikmah (Eyes on Philosophy)* and (11) *Danish Namah 'Alla'i (Book of Knowledge for 'Alla')* (al-'Iraqi 1971: 43-54; Ibn Abi 'Usaybi'ah 1965: 437-459; Dunya 1971: 89-90; Afnan 2009: 19-67; Khalif 1974: 28-36; Kennedy-Day 2006: 304-309; Zabeeh 1971: 3-4; Jihami 2000: 43-51 & 77-95).

Although al-Ghazali did not mention the book of reference in *Mi'yar* writing, whether in *Mi'yar* itself or in his other books, but by using the content analysis method and the constant comparative method, researcher found that al-Ghazali wrote *Mi'yar* based on three books, i.e. a book of his own, namely *Maqasid*, and two books of Ibn Sina, namely *al-Isharat* and *al-Risalah fi al-Hudud*.

From the aspect of the theoretical framework of the debate, the theoretical framework of *Mi'yar* was designed from the theoretical framework of *Maqasid*. *Maqasid* is al-Ghazali's finding from his research on *al-Isharat* of Ibn Sina. However, the theoretical framework of *Mi'yar* was developed furthermore but compatible with the objectives of its writing. Thus *Mi'yar* written by two important goals. The first goal is to provide an understanding the methodologies of thinking and researching, and explain the rules of constructing syllogisms and analogies. Whileas the second goal is to review the matters which have been written in *Tahafut* (al-Ghazali 1990: 25-27). Therefore, the framework of *Mi'yar* also formed from these two goals. This is shown in *Figure 1*. In this regard, the researcher found that the first goal established the theoretical framework of the Book 1 (*muqaddamat al-qiyas*) and Book 2 (*al-qiyas*). It also based on the theoretical framework of Part 1 in *Maqasid*, i.e. logic. Whileas the second goal established the theoretical framework of the Book 3 (*al-hadd*) and Book 4 (*aqşam al-wujud wa ahkamuh*). Book 3 is based on *al-Risalah fi al-Hudud*. Meanwhile, Book 4 is based on Discourse 1 of Part 2 in *Maqasid*, i.e. metaphysics (*ilahiyat*). To narrow down the search on the referral sources of *Mi'yar* writing, the researcher divided his discussion into two subtopics based on the objectives of writing *Mi'yar*.

References Based on First Objective

The first purpose or objective of writing *Mi'yar* is to provide an understanding on the methodologies of thinking and researching, and explain the rules of constructing syllogisms and analogies (al-Ghazali 1990: 25-26). Based on this first objective, al-Ghazali had allocated two of the four parts in *Mi'yar* named as "book" (*kitab*) to discuss it, i.e. Book 1 and Book 2. Book 1 is a discussion on the premises of the syllogism (*muqaddamat al-qiyas*). Whileas Book 2 is a discussion on the syllogism (*al-qiyas*). Both books are based on Part 1 of *Maqasid*, i.e. on logic which is before this based on Part 1 of *al-Isharat*, i.e. on logic. This fact is also shown in *Table 1*.

Table 1: Referral sources of *Mi'yār* (al-Ghazali 1960 & 1990; Ibn Sina 1908, 1960 & 1971).

No.	<i>Al-Isharat</i>	<i>Maqasid</i>	<i>Al-Risalah fi al-Hudud</i>	<i>Mi'yar</i>
1	<i>Part 1: Method 2</i>	<i>Techno 1.1</i>	-	Book 1 (1.1)
	<i>Part 1: Method 3</i>	<i>Techno 1.2</i>	-	Book 1 (1.2)
	<i>Part 1: Method 4-6</i>	<i>Techno 1.3</i>	-	Book 1 (1.3)
2	<i>Part 1: Method 7-8</i>	<i>Techno 1.4</i>	-	Book 2 (2.1-2.2)
	<i>Part 1: Method 9-10</i>	<i>Techno 1.5</i>	-	Book 2 (2.3-2.4)
3	-	-	1	Book 3
4	<i>Part 3: Method 1</i>	<i>Techno 2.1</i>	-	Book 4

Besides that, al-Ghazali's reference to *Maqasid* which before that to *al-Isharat* is proved by the similarities in the essence of discussion in *Mi'yar*, as in subheading 1.1.1 on the indication of terms (*dilalat al-alfaz*) towards the meanings (al-Ghazali 1990: 43-44) with the essence of the discussion in *Maqasid*, as in subheading 1.1.1 on *Isaghuji* (Esagoge) (al-Ghazali 1960: 39). The essence of both discussions is actually an understanding of al-Ghazali after studying *al-Isharat* of Ibn Sina in connection with the subheading 1.1.5 on the indication of term towards the meaning (*dilalat al-lafz 'ala al-ma'na*) (Ibn Sina 1971: 139).

References Based on Second Objective

The second objective or purpose of writing *Mi'yar* is to review the matters which have been written in *Tahafut* (al-Ghazali 1990: 27). Based on this second objective, al-Ghazali had allocated another two parts in *Mi'yar* called "book" to discuss it, i.e. Book 3 and Book 4. Book 3 is a discussion on the definition (*al-hadd*). Whileas Book 4 is a discussion on the classifications and the laws of the existence (*aqsam al-wujud wa ahkamuh*). Book 3, i.e. the book of definition (*al-hadd*) is based on *al-Risalah fi al-Hudud* of Ibn Sina (Ibn Sina 1908: 78-102). Meanwhile, Book 4, i.e. the book of the classifications and the laws of the existence, is based on the discourse (*maqalah*) 1 in Part 2 of *Maqasid*, namely metaphysics (*ilahiyyat*). Discourse 1 in Part 2 of *Maqasid* (metaphysics) is the discourse on the classifications and the laws of existence (*aqsam al-wujud wa ahkamuh*) (al-Ghazali 1960: 140-209). It was actually before that was based on Mode (*Namat*) 4 in Part 3 of *al-Isharat* (metaphysics) with subheading "the existence and its reasons" (*al-wujud wa 'ilaluh*) (Ibn Sina 1960, 3: 7-55).

Al-Ghazali reference to *al-Risalah fi al-Hudud* involved Book 3 only. This book discusses about two things, namely the laws or regulations of constructing the definitions, and the glossary of terms and their definitions in detail. However, all words or terms and definitions contained in that book is quoted directly, almost one hundred percents, word by word, from *al-Risalah fi al-Hudud*, including their arrangement, because there is a few terms which is not included in the glossary but replaced by other terms. Al-Ghazali only quoted or reproduced the terms and their definitions based on the classification or category which he had determined. The difference that al-Ghazali done was the establishment of a classification or category of fields

only. Ibn Sīnā listed the terms with their definitions without expressing their fields, while as al-Ghazali listed them based on their fields. The classification or category to which it is referred are the categories of metaphysics (*ilahiyat*), physics (*tabi'iyat*) and mathematics (*riyadhiyyat*). Overall, al-Ghazali listed 76 terms which are of 15 terms used in metaphysics, 55 terms of physics, and 6 terms of mathematics (al-Ghazali 1990: 273-300; Ibn Sina 1908: 78-102). Al-Ghazali reference to *al-Risalah fi al-Hudud* can be proved by the list as shown in Table 2.

Table 2: List of terms in *Mi'yar* which their definitions referred in *al-Risalah fi al-Hudud* (al-Ghazali 1990: 275-300; Ibn Sina 1908: 78-102)

No.	Term	Field	Mi'yar	al-Risalah fi al-Hudud
1	<i>Al-Bari AWJ (The One and Only God; Allah)</i>	Metaphysics	275	78
2	<i>Al-Mabda' al-Awwal (Prime Principle)</i>	Metaphysics	275	Nil
3	<i>al-'aql (intellect or reason)</i>	Metaphysics	275	79
4	<i>al-nafs (soul)</i>	Metaphysics	280	81
5	<i>al-'aql al-kulli (universal intellect)</i>	Metaphysics	281	Nil
6	<i>'aql al-kull (intellect of universality)</i>	Metaphysics	282	Nil
7	<i>al-nafs al-kulliyah (universal soul)</i>	Metaphysics	283	Nil
8	<i>nafs al-kull (soul of universality)</i>	Metaphysics	283	Nil
9	<i>al-malak (angel)</i>	Metaphysics	283	89
10	<i>al-'illah (cause or reason)</i>	Metaphysics	283	100
11	<i>al-ma'lul (effect or consequence)</i>	Metaphysics	283	100
12	<i>al-ibda' (creativity)</i>	Metaphysics	284	101
13	<i>al-khalq (creation or creatures)</i>	Metaphysics	284	101
14	<i>al-ihdath (creation)</i>	Metaphysics	284	102
15	<i>al-qadim (ancient or eternal)</i>	Metaphysics	284	102
16	<i>al-surah; (form)</i>	Physics	286	82
17	<i>al-hayula (hyle or matter)</i>	Physics	287	83
18	<i>al-mawdu' (topic or subject)</i>	Physics	288	84
19	<i>al-mahmul (predicate)</i>	Physics	288	Nil
20	<i>al-maddah (substance or material)</i>	Physics	288	84
21	<i>al-'unsur (element)</i>	Physics	288	84
22	<i>al-istaqis (element or origin)</i>	Physics	288	85
23	<i>al-rukn (element)</i>	Physics	289	85
24	<i>al-tabi'ah (nature)</i>	Physics	289	86
25	<i>al-tab' (character)</i>	Physics	290	86
26	<i>al-jism (body)</i>	Physics	290	87
27	<i>al-jawhar (substance or quiddity or essence)</i>	Physics	291	87
28	<i>al-'arad (accident)</i>	Physics	292	88
29	<i>al-falak (star or celestial sphere) (generally)</i>	Physics	293	89
30	<i>al-kawkab (star or planet; bintang) (specifically)</i>	Physics	293	90
31	<i>al-shams; (sun)</i>	Physics	293	90
32	<i>al-qamar (moon)</i>	Physics	293	90
33	<i>al-nar (fire)</i>	Physics	293	90
34	<i>al-hawa' (air)</i>	Physics	293	91
35	<i>al-ma' (water)</i>	Physics	293	91
36	<i>al-ard (earth)</i>	Physics	293	91
37	<i>al-'alam (world or universe)</i>	Physics	293	91
38	<i>al-harakah (movement;)</i>	Physics	293	91
39	<i>al-dahr (eternity)</i>	Physics	294	92
40	<i>al-zaman (time)</i>	Physics	294	92
41	<i>al-an (now or instant or moment)</i>	Physics	294	92
42	<i>al-makan (place or surface)</i>	Physics	294	94

43	<i>al-khala'</i> (emptiness, vacuity, or vacuum)	Physics	295	94
44	<i>al-mala'</i> (fullness)	Physics	295	94
45	<i>al-'adam</i> (nothingness or nonexistence)	Physics	295	94
46	<i>al-sukun</i> (stillness or immobility)	Physics	295	95
47	<i>al-sur'ah</i> (speed or velocity)	Physics	295	95
48	<i>al-but'</i> (slowness)	Physics	295	95
49	<i>al-i'timad</i> (reliance)	Physics	295	95
50	<i>al-mayl</i> (tendency)	Physics	295	95
51	<i>al-khiffah</i> (lightness)	Physics	295	95
52	<i>al-thiql</i> (heaviness)	Physics	295	95
53	<i>al-hararah</i> (heat)	Physics	296	95
54	<i>al-burudah</i> (coldness)	Physics	296	96
55	<i>al-rutubah</i> (humidity)	Physics	296	96
56	<i>al-yabusah</i> (dryness)	Physics	296	96
57	<i>al-khashin</i> (rough)	Physics	296	96
58	<i>al-amlas</i> (smooth)	Physics	296	97
59	<i>al-sulb</i> (hard)	Physics	296	97
60	<i>al-layyin</i> (soft)	Physics	296	97
61	<i>al-rakhw</i> (loose)	Physics	296	97
62	<i>al-mashaff</i> (transparent)	Physics	296	97
63	<i>al-takhalkhul</i> (rarefaction or rarity)	Physics	296	97
64	<i>al-ijtimaa'</i> (meeting)	Physics	297	98
65	<i>al-mutajanisan</i> (homogeneous)	Physics	297	Nil
				[other term]
66	<i>al-mudakhil</i> (overlapping)	Physics	297	98
67	<i>a-muttasil</i> (continuous)	Physics	297	98
68	<i>al-ittihad</i> (union)	Physics	298	99
69	<i>al-tatali</i> (sequence or consecution)	Physics	298	100
70	<i>al-tawali</i> (alternation or rotation)	Physics	298	100
71	<i>al-nihayah</i> (end)	Mathematics	299	92
72	<i>ma la nihayah</i> (eternal or infinite)	Mathematics	299	92
73	<i>al-nuqtah</i> (geometric point)	Mathematics	299	92
74	<i>al-khatt</i> (line)	Mathematics	299	92
75	<i>al-sath</i> (surface or area)	Mathematics	299	93
76	<i>al-bu'd</i> (dimension)	Mathematics	300	93

Whereas Book 4 of *Mi'yar*, i.e. Book of the classifications and the laws of the existence (*Kitab aqşam al-wujud wa ahkāmih*) (al-Ghazali 1990: 303-334) is based on and referred to Discourse 1, i.e. classifications and laws of the existence (*aqşam al-wujud wa ahkamuh*) in Part 2 (metaphysics) in *Maqasid* (al-Ghazali 1960: 140-209). This Discourse 1 consists of eight categories. This eight categories then were detailed by al-Ghazali in *Mi'yar* with the same meaning but in different composition of words and more detail than in *Maqasid*. The detail is as shown in Table 3.

Table 3: Reference of Book 4 in *Mi'yar* to Discourse 1 of Part 2 in *Maqasid* (al-Ghazali 1960 & 1990).

No.	Essence of Discussion	<i>Maqasid, Pt.2: Disc.1</i>		<i>Mi'yar</i>	
		Title	Page	Title	Page
1	<i>Jawhar</i> and <i>'arad</i> (<i>kamm, kayf, mudaf, ayna, mata, wad', milk, an yaf'al, and an yanfa'il</i>)	Pt. 1	140-174	4.1.1- 4.1.10	304-318
2	<i>'Illah</i> and <i>ma'lul</i>	Pt. 5	189-192	4.2.1	319-321
3	<i>Bi al-quwwah</i> and <i>bi al-fi'l</i>	Pt. 7	200-203	4.2.2	321-323
4	<i>Mutaqaddim</i> and <i>muta'akhhir</i>	Pt. 4	187-189	4.2.3	323-325

5	<i>Kulli</i> and <i>juz'i</i>	Pt. 2	174-183	4.2.4	325-328
6	<i>Wahid</i> and <i>kathir</i>	Pt. 3	183-187	4.2.5	328-330
7	<i>Wajib</i> and <i>mumkin</i>	Pt. 8	203-209	4.2.6	330-334
8	<i>Mutanahi</i> and <i>ghayr Mutanahi</i>	Pt. 6	193-200	-	-

Al-Ghazali reference to Discourse 1 in Part 2 (metaphysics) of *Maqasid* in Book 4 of *Mi'yar* can be proved by the similarities of the essence of the discussion in *Mi'yar* (al-Ghazali 1990: 315) with the essence of the discussion in *Maqasid* (al-Ghazali 1960: 164-165). Based on the above discussion, the researcher found three books that would be the references of al-Ghazali in writing *Mi'yar*. These three books are as follow:

Maqasid al-Falasifah by al-Ghazali (1960)

The full title of *Maqasid* is *Maqasid al-Falasifah* (The Aims of the Philosophers or The Intentions of the Philosophers or The Goals of the Philosophers). This title stated clearly in the preface of *Maqasid*. Al-Ghazali (1960: 31) stated that "The purpose of writing the book of *Maqasid al-Falasifah* is to tell the goals of the philosophers (*Maqasid al-Falasifah*). That is also the name or title [of this book]." Another name is *al-Bayan fi Maqasid I'tiqad al-Awa'il* (The Explanation towards the goals of the Believe among the Previous Peoples) (Muhammad 'Ali 2007: 45). Badawi (1961: 53) placed this book in 16th place out of 72 works in the list of the works that confirmed their validity as the works of al-Ghazali.

Al-Ghazali had finished writing *Maqasid* while he was a teacher or lecturer (*ustadh*) in Madrasah Nizamiyyah (Nizamiyyah University), Baghdad in 487/1094 (Badawi 1961: 10; Jihami 1993: 9; Bouyges 1999: 261). This book is his finding from his reading and research on the sciences of philosophy in the books of al-Farabi (259-339/ 870-950) and Ibn Sina (370-428/ 980-1037) (al-Subki 1999, 3: 419 & 424; al-Rafa'i 1988: 22; Za'bub 1980: 36-37; Farrukh 1970: 188; Sulaiman 1986: 766). The aim of writing this book is to tell the truth or describe the goals of the philosophers (*maqasid al-falasifah*). It is also the title of the book (al-Ghazali 1960: 31). *Maqasid* consists of the thoughts of philosophers in the fields of logic, physics and metaphysics. It is regarded as a prelude to *Tahafut* that containing al-Ghazali's refutation against philosophers' allegations without blaming or objecting its problems of logic (al-'Ajam 1994: 22). His thoughts in this book are submitted deeply, detailly and clearly as they can be found in the works of philosophers such as al-Farabi and Ibn Sina, even in line with the thoughts of both philosophers without any criticism. This fact rised a suspicion or concern that al-Ghazali stick with those thoughts, so that he tried to explain them before criticizing them or fighting against them (al-'Ajam 1994: 22). Al-Ghazali (1960: 31) had explained to his companions that the passion to allege the mistakes of some other people's opinions before understanding them deeply will make one like the blind and misguided about them.

As usual in the works of al-Ghazali, he divides the content of his work into specific techno or technical skills (*fann*). *Maqasid* content is divided into three technos, i.e. techno of logic (*fann al-mantiq*), techno of divine or metaphysics (*fann al-ilahiyyat*), and techno of natural sciences or physics (*fann al-tabi'iyat*). Therefore, the content of the book is divided into three sections that cover the three sciences to understand theoretically and practically, i.e. logic, metaphysics, and physics.

However, in this study, the researcher produced only logical section of the *Maqasid* content. In *Maqasid*, al-Ghazali considers logic as a part (*qisim*). This part of logic consists of three sections, namely the preliminary (*muqaddimah*), the discussion that contains five technos (*fann*), and the conclusion or closing (*khatimah*). Preliminary section contains the explanations about three things, namely, the introduction of logic as a science, the description of the benefits of logic, and classification of logic. Whereas the discussions section contains five technos (*fann*). Techno 1 is about the indications of words (*dilalat al-alfaz*). Techno 2 is on the universal meanings (*al-ma'ani al-kulliyah*). Techno 3 is on the construction of words and the

classifications of propositions (*tarkib al-mufradat wa aqşam al-qadaya*). Techno 4 is on the construction of propositions and the classifications of syllogism (*tarkib al-qadaya wa aqşam al-qiyas*). Techno 5 is on appendages of syllogism and proof (*lawahiq al-qiyas wa al-burhan*). While as in the conclusion or closing section, al-Ghazali (1960: 129) stated that the goals have been reached. The goal, as it has been declared in the preliminary section, is to explain and tell the truth about logic (al-Ghazali 1960: 32).

Al-Isharat wa al-Tanbihat by Ibn Sina (1971)

Al-Isharat wa al-Tanbihat was translated by Inati (Ibn Sina 1984: 1) as "The Book of Remarks and Admonitions." While as the researcher translate this title as "The Book of Guidances and Warnings". This translation of Inati affects only the logic. *Al-Isharat* consists of four parts (*qisim*). Firstly; part of logic (*qisim al-mantiq*). Secondly; part of physics (*qisim al-tabi'iyat*). Thirdly; part of metaphysics (*qisim al-ilahiyyat*). Fourthly; part of sufism (*qisim al-tasawwuf*). This fact shows that the logic is only a part of the content of *al-Isharat*. The topic or heading on each clause (*fasal*) for all 10 methods of description (*nahaj*) in the logic part of this book initiated either by the word "*isharah*" (guidance), the word "*tanbih*" (warning), or the word "*wahm wa tanbih*" (illusion and warning). Similarly, it is also the methodology of writing in its three other parts (*qisim*) subsequently. Therefore, this book was named as "*al-Isharat wa al-Tanbihat*".

Part of logic in *al-Isharat* consists of ten methods of description (*nahaj*). Firstly; purpose of logic (*gharad al-mantiq*) which contains of an introduction and 16 clauses (*fasal*). Secondly; five singular words, definition and description (*al-alfaz al-khamsah al-mufradah wa al-hadd wa al-rasam*) which contains 11 clauses. Thirdly; construction of predicate (*al-tarkib al-khabari*) which contains 10 clauses. Fourthly; component of propositions and its branches (*mawadd al-qadaya wa jihatiha*) which contains 10 clauses. Fifthly; contradictory and inverse of propositions (*tanaqud al-qadaya wa 'aksiha*) which contains an introduction and five clauses. Sixthly; [the title was not stated, but possibly on the types of propositions (*asnaf al-qadaya*)] which contains two clauses. Seventhly; construction of arguments' proofs (*al-shuru' fi al-tarkib al-thani li al-hujaj*) which contains six clauses. Eighthly; the conditional syllogisms and the subsequences of syllogism (*al-qiyasat al-shartiyyah wa tawabi' al-qiyas*) which contains four clauses. Ninthly; short explanation on the knowledge of proof (*al-'ulum al-burhanah*) which consists of six clauses. Tenthly; the fallacious syllogisms (*al-qiyasat al-maghalitiyyah*) which contains one clause.

Al-Risalah fi al-Hudud by Ibn Sina (1908)

Al-Risalah fi al-Hudud (Treatise on the definitions) of Ibn Sina was published firstly as part of *Tis'u Rasa'il fi al-Hikmah wa al-Tabi'iyat* in 1908 in al-Qahirah by Matba'ah Hindiyyah bi al-Musiki bi al-Misr (Ibn Sina 1908: 1). It was translated into France by A. M. Goichon as "*Introduction à Avicenna, Son épître des définitions*" with preface by M. Asin Palacios and published by Dar al-Kutub in Paris. Then it was reprinted in 1963 with its France translation by al-Matba'ah al-'Alami (al-'Iraqi 1971: 63-64). Then it was reprinted for the second time in 1999 as a part of the content of *Islamic Philosophy: 42* which edited by Fuat Sezgin and published by the Institute for the History of Arabic-Islamic Science at the Johann Wolfgang Goethe University, Frankfurt (Sezgin 1999, 42: 81-112). Ibn Sina stated that this treatise was wrote as a response to the request of a group of his friends to point out the fallacies in constructing the definition (al-'Iraqi 1971: 63-64). This treatise is a form of Islamic philosophical inovations in introducing the Islamic philosophical concepts to the Arabs. This effort consists of essential and concise definitions of basic terminologies in physics and mathematics written for the new students who are not familiar with these philosophical concepts (Yavuz 2006: 306; Kennedy-Day 2006: 306).

The treatise that consists of 32 pages contains 72 terms with their definitions. This treatise can be considered as a glossary of philosophical terms and an example for constructing definitions (Ibn Sina 1908: i, 1-3 & 71-102; Sezgin 1999: 1-5 & 81-112).

As a conclusion, *Mi'yār* is a genuine work of al-Ghazali in the field of Islamic pure logic. Its writing methodology is in line with the methodology of modern scientific writing. Its content is compiled systematically. The essence of *Mi'yar* content can give an understanding upon the thinking and research methodology, and explain the rules of constructing syllogisms and analogies. The existence of various scientific editions of *Mi'yar* signifies the importance of the theory and application of pure logic in the development of scientific thought. Specifically, this study was able to make an impact and new knowledge to the study of logic in Islamic world which can definitely be applied in all fields of knowledge.

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