

An Analysis of the Scientific Research Mould Based on Fardu ‘Ayn Knowledge from Ibn Al-Haytham’s Thought

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Abstract: The knowledge on fardu ‘ayn (personally obligatory knowledge) lends basic understanding about Islam. Hence, this study generally intends to obtain a scientific research mould based on Islamic understanding in order to carry out research on Islam. Specifically, the mould would be examined based on Ibn al-Haytham’s role in scientific research and the analysis carried out from the fardu ‘ayn perspective. This study had explored the congruency between the role of Ibn al-Haytham’s scientific research and the fardu ‘ayn concept by using the content analysis method. The discussion is divided into three main studies. The first study discusses the fardu ‘ayn concept and its application. The second study examines the role of Ibn al-Haytham’s scientific research while the third study analyses the congruence of the two previous discussions to build a scientific research mould for studying Islam. The findings showed that three scientific research moulds could be built for conducting research on Islam. The first is tawhid as the core of the scientific research. The second is fiqh which creates a scientific research dimension while the third is morality or akhlaq which gives life or a positive image to scientific research.

Key words: Mould, research, scientific, knowledge, fardu ‘ayn, morality

INTRODUCTION

According to Goldhaber and Nieto (2010), the scientific research method is defined as a technique for researching a natural phenomenon in order to obtain new knowledge and to combine or amend previous knowledge. More specifically, the scientific research method is closely related to the definition of science. Science is a research activity that uses a particular method such as an experimental method that strongly emphasises on accuracy during observations. Next, 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.

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 (2010). 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). According to Kuhn (1996), scientists are a group of people who are enthusiastic to contribute towards establishing facts, theories and certain methods (Othman, 2009).

Among the scholars who have pioneered this aspect are Roger Bacon, Francis Bacon and Rene Descartes. However, according to Khaleefa (1999), Marsuki *et al.* (2000), Gorini (2003) and al-Khalili, 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. The questions is what are the differences in the roles played by Ibn al-Haytham’s scientific research at the present moment. What form of consistency or congruence is found in Ibn al-Haytham’s scientific research that is based on Islamic understanding?

The basic concept in Islamic understanding is found in fardu ‘ayn. This is because, according to al-Ghazali, knowledge is divided into fardu ‘ayn (tawhid, fiqh and

akhlaq) and fardu kifayah (medicine, economy, engineering, etc.) (Hasan, 2011). Hence, understanding fardu 'ayn is an important start for scientific research involving the study of Islam. More specifically, the study of Islamic in this study refers to research on the subject of Islam or Muslims that includes the field of social science, natural science or research that involves subjects in the current context such as nutritional science and economy. For example in the field of development, Salleh (2003) stated that fardu 'ayn is a framework for creating Development Based on Islam (IBD). This is a form of harmonization between fardu 'ayn and fardu kifayah. Therefore, one important question that emerges is will Ibn al-Haytham's scientific research be able to form a scientific research mould based on fardu 'ayn that would be used in the study of Islam.

In order to answer these emerging questions, this study has three important objectives. The first is to review the fardu 'ayn concept as well as the examples of its application; the second is to identify the role of Ibn al-Haytham's scientific research and the third is to analyse the consonance between both the earlier discussions in order to be synthesised as a mould for scientific research used in Islamic research. Based on the three objectives, the discussions in this study are divided into the three studies.

Literature review: According to Salleh (2003), every academic discipline needs a conceptual framework. He stated that the developmental knowledge discipline based on Islam should be based on the fardu 'ayn framework. This is because the role of fardu 'ayn is to build a relationship between humans and the Creator (*habl min Allah*) and among humans and as well as nature (*habl min al-nas*) (Othman, 2009). Moreover, fardu 'ayn is one form of knowledge that is mandatory for every Muslim to learn because without Islam and impiety a Muslim is invalid (Daud, 1995). There are three categories of knowledge that are important in fardu 'ayn which are monotheism (*tawhid*), Islamic jurisprudence (*fiqh*) and morality (*akhlaq*) (Palimbani and Abdul, 2009).

Monotheism (*tawhid*) is related to 'aqidah and it contains the pillars of Islam and the iman (impiety). It acts as the anchor for all the knowledge and impiety (Salleh, 2008, 2001, 2011). *Fiqh* (Islamic jurisprudence) is related to physical practices or specifically the understanding or knowledge about laws associated with actions of adult and matured human (*mukallaf*) that are taken from religious references in the *syarak* (Rachmat, 2001). It is divided into four studies comprising 'ibadah (religious practices), *mu'amalat* (social and economic elements), *munakahat* (marriage or

family laws) and *jinayat* (criminal law) (Lubis, 1976). Meanwhile, *tasawuf* is related to cleansing of the soul with morality which is an important basis in this cleansing (Atjeh, 1977). It drives humans to recognise the despised characteristics (*mazmumah*) found within oneself and offers a way to eradicate these characteristics and substitute it with admirable characteristics (*mahmudah*).

The legality covers morality towards Allah SWT and morality towards beings. Morality towards Allah SWT covers elements such as loyalty, trust in Allah SWT (*tawakkal*), belief (*taqwa*), sincerity and patience. Meanwhile, morality towards beings is divided into two studies. The first is morality towards humans which covers justice, honesty, cooperation, kinship, interdependence (*takaful*) and courtesy (*ihsan*). The second is morality towards non-human elements such as blessings (*rahmat*), non-destructive behaviour, justice (*adil*) and courtesy (*ihsan*). These aspects would help bring a human nearer to Allah SWT (Salleh, 2008, 2001, 2011, 2003).

According to Salleh (2003), this does not mean that fardu kifayah is not given any consideration. In addition, development is actually one form of fardu kifayah. Fardu 'ayn and kifayah at a glance looks separated but actually, both complement each other and are inseparable. Although, development belongs in the fardu kifayah category, it cannot be called Islamic-Based Development (IBD) if it is not based on fardu 'ayn and implemented according to the fardu 'ayn framework. IBD must be anchored on *tawhid* and implemented according to the elements outlined in *fiqh* (Islamic jurisprudence) and *akhlaq* (morality).

The arguments by Salleh (2003) coincide with the views of Ibrahim who said that fardu 'ayn and fardu kifayah are two forms of knowledge that are inseparable. Both are closely related with the concept of servitude and development management on Allah SWT's earth. It is compulsory for humans to learn and command fardu 'ayn knowledge such as 'aqidah or *tawhid*, *fiqh* and morality in order to able to become a good and loyal subject of Allah SWT. It is also compulsory for humans to obtain knowledge about fardu kifayah such as engineering, medicine and development in order to equip themselves to manage and develop Allah SWT's earth.

The compulsion on every individual to acquire knowledge on fardu 'ayn indicates the importance of the knowledge for individuals whereas knowledge on fardu kifayah is not compulsory on every individual but on a study of them due to its wide scope. Hence, every Muslim needs to acquire knowledge on fardu kifayah needed to manage and develop Allah SWT's earth. However,

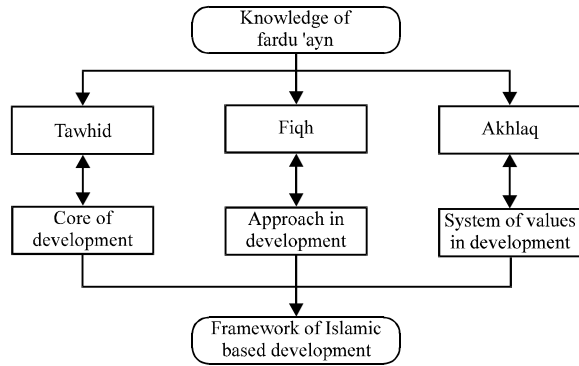


Fig. 1: Applying fardu 'ayn knowledge in IBD

knowledge about fardu kifayah would be meaningless if it is not anchored on tawhid and not implemented according to the fardu 'ayn framework.

Hence, if a particular development that is implemented were not anchored on tawhid, then obviously its implementation would not be according to the guidelines of fiqh and morality. Therefore, how can development be implemented according to the guidelines of fiqh and morality if it is not anchored on tawhid. Similarly, if the core is weak and feeble, then surely development could not be implemented well according to the guidelines of fiqh and morality.

The IBD conceptual framework according to the three categories of fardu 'ayn as previously discussed is summarised in Fig. 1. Based on Fig. 1, fardu 'ayn consists of main categories of knowledge, namely tawhid (monotheism), fiqh (Islamic jurisprudence) and akhlaq (morality). It could be explained here that the core of IBD is based on tawhid whereas the approach in IBD is based on fiqh while akhlaq is the system that evaluates the implementers of IBD. The practice of morality by the implementers of IBD would produce some exemplary values when implementing development.

MATERIALS AND METHODS

The data collection method used in this research was library research. Specifically, the sources for the data in this study were grouped accordingly and detailed into four studies. The group of data from the first and main source was the al-Qur'an and Hadith. The second group was Ibn al-Haytham's autobiography that was edited by an authoritative writer named (Usaybiah, 1965). The third group was the works of Ibn al-Haytham, among them was his famous work entitled Kitab al-Manazir. Lastly, the fourth group was systematic studies like thesis and journal articles as well as seminar studies produced by

previous researchers. Since, the data collected was from divine revelation, thesis, books and journals; hence, the data was analysed using the content analysis method.

RESULTS

Based on the data collected regarding Ibn al-Haytham, at least three roles were produced from the scientific research. The first was consolidating his faith (iman); the second was fulfilling what was demanded by Islamic syari'ah and thirdly, accomplishing morals values befitting a Muslim researcher.

Firstly, to consolidate self-impiety towards Allah SWT, Ibn al-Haytham in his Kitab al-Manazir 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 skillfulness of his research and the successful and skilful manner in which nature has arranged the instruments of sight" (Haytham and Hassan, 1984).

Ibn al-Haytham believes in the concept of al-hatmiyyah al-'Ilmiyyah (scientific determinism). It is a concept in which the allegiance of the universal phenomenon is anchored on the harmonious principle or otherwise called sunnatullah. This principle allows the researcher to carry out repeated observations. Even Haytham (1984) admitted that the pre-arranged process of the human sight whereby the eyes quick movements when dust enters it is Sunnatu-Llah.

In another study, Ibn al-Haytham had proven the authenticity of the other Prophets sent by Allah SWT as written in his research Kitab Lahu fi Ithbat al-Nubuwwat (The Book on the Authenticity of the Prophets) (Usaybiah, 1965). This is because there are views from Muslim philosophers such as Abu Bakr al-Razi (865-925) who gave a controversial view on the question of aqidah by rejecting the prophet-like virtues of Prophets (Long, 2008; Laming, 2006). Therefore, it is important for Ibn al-Haytham to correct and state the position of aqidah with proof obtained through research.

Second, in order to implement the demand of syariat Islam, Ibn al-Haytham defined the direction facing the Ka'bah (Qibla) in one of his studies: "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".

According to Usaybiah (1965), there are three studies on how to determine the direction of the qiblat written by

Ibn al-Haytham. They are entitled *Maqalah fi Istikhraj Samt al-Qiblah fi Jami' al-Maskunah* (Study on obtaining the Direction of the Qibla Around the World), *Qawl fi Samt al-Qiblah bi al-Hisab* (A Discourse in Determining the Direction of the Qibla Using Calculations) and *Maqalah Mukhtasarah fi Samt al-Qiblah* (Study on the Direction of the Qibla). Hence, according to Dallal (1995), Ibn al-Haytham was the earliest researcher to determine the direction of the qiblat by using the spherical trigonometry method before al-Kasyani.

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), 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 specialist knowledge in mathematics in fields related to implementing Islamic syari'ah. Rather more specifically, Ibn al-Haytham had written a study that inferred the relationship between syari'ah and the branch of mathematics known as geometry which was entitled *Maqalah fi ma Tad'u ilayhi Hajah al-Umur al-Syar'iyyah min al-Umur al-Handasiyyah wa la Yastaghni 'anhu bi Syay' Siwahu* (Study on the Crucial Elements Needed by Syari'ah that are Found in Geometry) (Usaybiah, 1965).

Third, in order to build better moral values as a Muslim researcher, Ibn al-Haytham ended *Kitab al-Manazir* 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 research. Only Allah knows best (wallahu a'lam)" (Ilyas, 2003).

After finishing writing his research, Ibn al-Haytham admitted to his limited knowledge. His humbleness or *tawadu'* shows that all scientific information gathered is not the absolute truth; conversely, all absolute truth comes from Allah SWT.

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 SWT. Moreover, he finishes his research by showering praises to Allah SWT and expressing the *salawat* to the Prophet Muhammad SAW, his family and companions such as: "all praises to upon Allah the Almighty, good tidings onto the Prophet Muhammad SAW, his family and companions" (Haytham, 1984).

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).

DISCUSSION

Based on the various roles of Ibn al-Haytham's scientific research and the review of the three categories of *fardu 'ayn* and its application in IBD, this study would analyse its congruency. This is important to form a scientific research mould for Islamic research based on *fardu 'ayn*. This analysis is discussed in three sub-studies as follows.

The mould related to tawhid: Generally, Ibn al-Haytham is known as a skilful academician in various fields of knowledge (polymath). 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 SWT always called on his subjects to study and learn in depth the phenomenon of the natural world. Among the commands was the exhortation of Allah SWT, 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".

"Indeed, in the alternation of the night and the day and (in) what Allah has created in the heavens and the earth are signs for a people who fear Allah".

The verses of the al-Qur'an clearly show that there is not a single creation of Allah SWT that is of no value to be studied and it would surely enhance the researcher's impiety (*iman*). Allah SWT has given humans the ability to understand the natural world and appreciate its benefits (Ali, 1994). This philosophy is different from the current scientific paradigm that neglects the faith in God in all scientific aspects. The paradigm that pivots on this kind of positivistic philosophy could actually harm the Muslim researcher's morals (Salleh, 2008).

Next, 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 studies were found until now which were in the fields of astronomy, mathematics and optics only (Hodgendijk, 1985). As such, Usaybia (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 *Naqd 'ala Abu Bakr al-Razi*

al-Mutatabib Ra'yahu fi al-Ilahiyyat wa al-Nubu'at (rejecting the views of medical practitioner, Abu Bakr al-Razi on divinity and Prophet-hood) and kitab lahu fi Ithbat al-Nubuwwat wa Idah Fasad Ra'iy alladhina Ya'taqidun Butlaniha wa Dhakara al-Firq Bayna al-Nabi wa al-Mutanabi (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).

Hence, Ibn al-Haytham did not limit the role of scientific research to only questions on natural science (Salleh, 2011). Hence, it needs to be covered with a conceptual framework based on divine deliverance such as the al-Qur'an and Hadith so that there is accurate platform. Similarly, for Islamic research in social science, the collected data and the social phenomenon studied conclusively points towards the glorifying Allah SWT the Almighty (Bustami *et al.*, 2006).

Just as the IBD discipline, scientific research used in Islamic research also needs to be based on the understanding of knowledge that explains the existence of nature's orderliness by Allah SWT and the main source of reference being divine deliverance (wahyu). Therefore, it could be adduced that the importance of understanding tawhid in forming the correct tasawwur for Islamic research is aimed towards becoming the policy for scientific research.

The mould related to fiqh: Next, Ibn al-Haytham used his expertise in the field of geometry to help Muslims perform the obligated religious rituals ('ibadah). This is because research in syari'ah is not limited to the firmly religious group but also plays an important role for experts in other fields (Bakar, 1991).

From the perspective of Islamic syari'ah, performing the 'ibadah during obligatory prayers does not only refer to specific 'ibadah 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. According to the al-Qur'an, Allah SWT 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".

Based on the understanding of fiqh regarding the mandatory performance of prayers, the contents of Ibn al-Haytham's scientific research that determines the direction of the qiblat is in accordance with the conditions for performing the obligatory prayers by Muslims. However, if the role of fiqh in the IBD discipline is a method for development; hence in scientific research related to Islam this knowledge provides the researcher with a clear dimension for carrying out scientific research. This is because fiqh plays a role in determining the limits or boundaries needed for carrying out scientific research to ensure the researcher in on the correct track according to Islam (Abdullah, 1995).

The mould related to morality: Next, the role played by Ibn al-Haytham's scientific research is to practice the revered 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 Yousif (2011), 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 SWT are futile" (Ibn Majah).

Hence, for Ibn al-Haytham, there is no knowledge that is futile and no distance separating knowledge based on divine deliverance (wahyu naqliyyah) or knowledge based on scientific research ('aqliyyah) (Yousif, 2011).

Meanwhile, in the second aspect, the tawadu' concept is practiced by dedicating all the knowledge to Allah SWT, the absolute owner of all knowledge. The kalimah (phrase) "wallahu a'lam" as mentioned by Ibn al-Haytham was interpreted by Hodgendijk (1985) to be a lack of confidence by Ibn al-Haytham about his own arguments. However, this actually shows his strong dependence on Allah SWT 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. 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)".

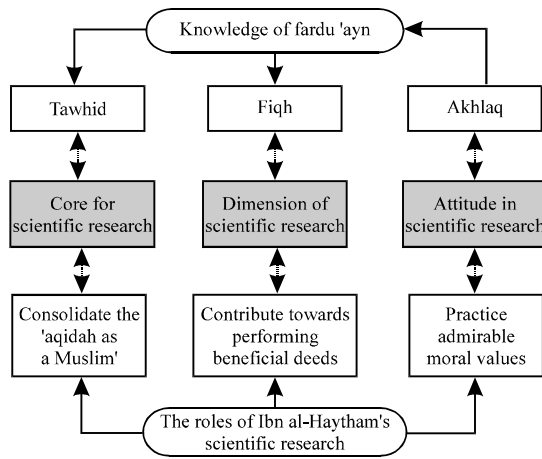


Fig. 2: The relationship between fardu ‘ayn and the role of Ibn al-Haytham’s scientific research

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 moral 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 nahi munkar* in the laws of morality and its ethical code (Nasir, 1969).

According to Haron, humans can form their own moral values based on their aims in life. As a researcher, the value system is inseparable from the researcher. Although, the present research method discusses code of ethics for research; hence, it does not cover the aspects discussed in Islam such as the core aspect (tawhid) and the dimensions of limits (fiqh) in scientific research. The current dominant scientific paradigm is positivism and it rejects any form of values (value-free) during the research (Neuman, 2011). Therefore as applied in IBD, 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.

Overall, the analysis found a mould that connects fardu ‘ayn which is the basic knowledge in Islam with the role played by Ibn al-Haytham’s scientific research which is shown in Fig. 2.

Figure 2 shows the relationship between fardu ‘ayn and the role played by Ibn al-Haytham’s scientific research that synthesizes a mould. This mould is useful in carrying out scientific research according to an Islamic approach. For tawhid, it becomes the core for scientific research in efforts to consolidate a researcher’s ‘aqidah in Islam. Then, fiqh provides a dimension so that a Muslim

researcher could contribute towards performing good, specific or general religious rituals (‘ibadah). Meanwhile, morality portrays an image about Ibn al-Haytham’s scientific research, so that he could practice admirable moral values before, during and after carrying out the research. Hence, this is the mould that was able to be synthesised from the two subjects.

CONCLUSION

As a conclusion, Ibn al-Haytham’s scientific research has a different role compared to the present scientific research. This is because the basic knowledge in Islam or fardu ‘ayn comprises knowledge on tawhid (monotheism), fiqh (Islamic jurisprudence) and akhlaq (morality) which has become his incisive scientific research mould. Moreover, divine values always accompany him when carrying out scientific research. Based on the analysis of the role played by his scientific research in fardu ‘ayn, it could form three scientific research moulds for Islamic research. First, tawhid becomes the basis for scientific research. Second, fiqh affords a dimension for scientific research. Third, morality gives scientific research its own image. 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 SWT and not the assessor or one who gave him his research grant. Hence, scientific research must adhere to the dimensions of fiqh 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. Therefore, researchers carrying out Islamic research need to be familiar with the understanding of fardu ‘ayn so that the research is holistic and fulfils Islamic syari’ah.

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