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The Triple Helix Theory as a Solution for the Unification of the Hijri Calendar in Indonesia

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ABSTRACT

The Islamic calendar system is an important element of Islamic civilization, but its uniform implementation across the Muslim world, including Indonesia, remains a challenge. Despite Indonesia's Muslim majority, differences persist in determining the start and end of months in the Hijri calendar. Various efforts to establish a unified Islamic calendar have not yet succeeded. This study, titled "The Triple Helix Theory as a Solution for the Unification of the Hijri Calendar in Indonesia," aims to explore Muslim perceptions regarding this unification and examine the role of the government using the Triple Helix theory. The research employs a mixed-method approach, combining quantitative and qualitative methods. The findings show that 77.44% of respondents believe the unification of the Hijri calendar is necessary, while 22.6% do not. Additionally, the study reveals that the Triple Helix theory can be applied as follows: (1) The government, particularly the Ministry of Religious Affairs, should act as a regulator and facilitator; (2) Academics should provide scholarly input consistent with Islamic principles; and (3) Islamic organizations should issue fatwas that unify Muslims in Indonesia, as their decisions are highly influential within the community.

Key Words: *Triple Helix Theory*, *Solution*, *Hijri Calendar*

INTRODUCTION

The issue of determining the beginning of the Qamariyah month, particularly the onset of the months of *Ramadan*, *Shawwal*, and *Dhul Hijjah*—which are utilized by Muslims to ascertain the time of worship—has evolved into a persistent challenge, a subject of profound debate, and a significant problem. It is regarded as a classical issue because since the advent of Islam and the evolution of Islamic jurisprudence among the companions, *the tabiin*, scholars, and experts in Islamic law have consistently engaged in discourse on the three early months.It is also regarded as a polemical issue because scholars and fiqh experts (those versed in Islamic law) have always thoroughly examined the chapter on fasting and the determination of the beginning of the months of *Ramadan*, *Shawwal*, and *Dhul Hijjah*, leading to the development of numerous divergent opinions. This discourse is of particular pertinence as it convenes scholars and experts in diverse fields, including hadith, rukyat, astronomy, and related disciplines, to deliberate and explore unifying perspectives on the determination of the three beginning months. Since

1966, this subject has been accorded significant prominence by Muslim scholars worldwide, encompassing jurists, experts in *hisab rukyat* and astronomy, and religious scholars from predominantly Muslim nations. These scholars have engaged in sustained discussion and have made concerted efforts to identify a consensus..

The determination of the beginning of the Hijri month in Indonesia is often subject to variation due to divergent perspectives on the methodology or criteria for its determination. Generally, two methods are employed to ascertain the onset of the Hijri month: the hisab method and the rukyat method. Initially, *the urfi hisab* system was implemented by Caliph Umar bin Khattab r.a., who developed a technique that calculated the average time required for the moon to orbit the earth. This calculation was based on traditional methods and was not based on scientific principles, suggesting that the moon takes 354 days to orbit the earth (Saksono, Tono, 2007).

The *Urfi* calculation is a static system; the age of the moon remains constant. Odd months are thirty days long, while even months are twenty-nine days long. Consequently, the month of *Ramadan*, being the ninth month (an odd month), will perpetually be thirty days long. Typically, for convenience and practical purposes, the calculations in making the Qamariah calendar are made in *Urfi*. In a year, the Hijri calendar is divided into twelve months based on the circulation of the moon orbiting around the earth. Consequently, the Hijri calendar is also referred to as the Qamariyah calendar in Arabic, signifying the lunar calendar (Hambali, Slamet 2019).

Additionally, *Hisab hakiki* is a calendar system that is predicated on the principle that the onset of a lunar month is determined by the calculation of the moon's position at maghrib, the time when the moon is observed to be above the horizon. Moreover, the Research on Muhamadiyah Hisab guidelines stipulate that *Hisab hakiki* is a method of determining the beginning of the Qamariah month, which is carried out by calculating the factual (real) motion of the Moon in the sky so that the beginning and end of the Qamariah month refer to the position or journey of the Moon (Majelis Tarjih, 2009).

Consequently, the duration between two successive *ijtima'* (one synodic month) is not uniform on a monthly basis, ranging from 29 days, 6 hours, and a few minutes to 29 days, 19 hours, and a few minutes. In this context, the age of the month, which is invariably determined in the '*urfi* hisab, remains unknown in this system. It may be 29 or 30 consecutive days.

A variety of methods of hisab have been developed in this system flow. In terms of accuracy, these methods are generally categorized into three: Taqribi, Tahqiqi, and Contemporary. The Taqribi method is a calculation system that determines the degree of height of the moon after *ijtima'* based on calculations that are "approximately," namely dividing the two time differences between the time of *ijtima'* and sunset. The *Sullamun an-Nayyiroin* hisab method, *Fathur Rauf al-Manan*, and the like are considered to fall into this category. In contrast, Tahqiqi utilizes the science of measuring the spherical triangle, a component of the hisab method known as *Badi'atu al-Mitsal*, *Khulashatu al-Wafiyah*, among others. Contemporary methods bear a resemblance to Tahqiqi in terms of determining the degree of height of the moon. The contemporary hisab, however, is distinguished by its reliance on updated astronomical data, which is regularly corrected to reflect the most recent discoveries. This approach incorporates the ephimeris

calculation system, Jean Meus, Nautical Almanac, and similar sources (Nawawi, Salam, A., 2014).

In practice, this system compiles a calendar by calculating the position of the moon, and therefore, the hakiki hisab system is widely adopted by the community for determining the times of worship. However, to determine the time of the moon's journey that can be declared the beginning of the new month, various criteria in the hakiki hisab system must be taken into account. Consequently, there are multiple forms of hakiki hisab, classified based on the criteria employed to ascertain the onset of the kamariah month.Two predominant schools of thought have emerged in the application of this hakiki hisab: the first relies exclusively on *ijtima'*, while the second focuses on the position of the new moon above the horizon.

The *Ijtima'* School is notable for its adherents' propensity to cite the adage "*Ijtima'u an-nayyiraini itsbatu bayna ash-syahraini*," which asserts that the convergence of two luminous celestial bodies (the sun and the moon) demarcates the transition between two months. The *ijtima'* school's criterion for the commencement of a month (new moon) does not take into account the visibility of the new moon, indicating that its determination is solely based on astronomical principles (Azhari, Susiknan, 2002).

In the discipline of astronomy, it is posited that the new moon is observed when the sun and moon are in a state of *ijtima'*. According to this school of thought, *ijtima'* signifies the separation between two consecutive Qamariyah months. The interval preceding *ijtima'* falls within the domain of the preceding month. The period subsequent to *ijtima'*, on the other hand, encompasses the new month. In the empirical realm, it is uncommon to encounter adherents who hold this criterion in its purest form. When *ijtima'* occurs, this school typically combines it with other natural phenomena, thereby developing and accommodating the aforementioned criteria. The natural phenomenon associated with the time of *ijtima'* is not only one, so *ijtima'* alone is divided into smaller sub-streams (Fitiryanti, Vivit, 2022).

An additional method is the *Imkan rukyat* (hilal visibility) technique. This method incorporates the potential for successful hilal rukyat, thereby anticipating a calculation of the beginning of the month based on actual hilal sightings. This calculation method is intricate and accompanied by a considerable degree of uncertainty, resulting in a calendar that lacks rigidity and must be amenable to adjustment in accordance with actual hilal sightings. A review of fiqh indicates that this system is particularly well-suited for reference purposes, particularly in determining times for worship (Purwanto, 1992).

According to this criterion, the new month commences at sunset on the 29th day of the current lunar month when the Moon is above the horizon at a sufficient height to be seen.Scholars diverge in their opinions on the precise height at which the Moon must be above the horizon to be visible, and this ambiguity is a significant weakness of the new moon criterion based on imkan rukyat.The hisab experts who endorse this criterion continue to diverge in their assessments of the criteria for the visibility of the new moon. Some focus exclusively on the height of the new moon, while others incorporate an additional criterion, namely the angular distance between the moon and the sun. These criteria are applied in a cumulative manner.

To ensure the acceptance of this system by all parties, it is imperative to identify a criterion for the visibility of the new moon that encompasses the beginning of the month in the area of uncertainty by a number of months of 59 days (one of which can change to 29 or 30 days).The International Conference on the Determination of the Beginning of the Qamariyah Month, held in Turkey in 1978, established two criteria for the visibility of the crescent. Specifically, the height of the hilal above the horizon must be at least 5° and the angular distance between the hilal and the sun must be between 7° and 8°.

Hisab hakiki with wujudul hilal criteria stipulates that the new Qamariah month commences if the following three conditions are met cumulatively on the 29th day of the current Kamariah month at sunset: (1) ijtimak has occurred, (2) ijtimak occurs before sunset, and (3) at sunset, the Moon (its upper disk) is still above the horizon. In the event that any of these criteria are not met, the current month is extended by thirty days, and the new month commences the day after.This criterion is employed by the organization known as Muhamadiyah, and it is also utilized by the contemporary Ummul Qura calendar, with the distinction that the marjak is the city of Mecca. In the context of formulating an international Islamic calendar, the Ummul Qura calendar with this criterion was put forth in the session of the "Second Expert Meeting for the Study of the Formulation of the Islamic Calendar" on October 15-16, 2008 as one of the calendar nominations to be selected from four proposed calendars to become the international Hijri calendar.

The term "Wujudul Hilal" is a criterion for determining the beginning of the Hijri month (calendar) using two principles: Ijtimak (conjunction) has occurred before sunset (*ijtima'* qablal ghurub), and the Moon sets after sunset (moonset after sunset); then the evening of that day is declared the beginning of the Hijriyah month (calendar), regardless of the angle of altitude of the Moon at sunset. This criterion is employed by the Indonesian organizations, Muhamadiyah and Persis, in determining the start of *Ramadan*, Eid al-Fitr, and Eid al-Adha on an annual basis.However, beginning in the year 2000, Persis has shifted from utilizing the Wujudul-Hilal criteria to employing the Imkanur-ruyat method.The primary objective of Hisab Wwujudul Hilal is not to ascertain or predict the visibility of the hilal. Instead, it serves as a foundation for determining the onset of the Hijriyah month, irrespective of the presence or absence of the new moon. This basis is rooted in the Qur'anic injunctions found in several surahs, specifically Surah Yunus [5], Surah Al Isra' [12], Surah Al An'am [96], and Surah Ar Rahman [5]. These verses are interpreted astronomically, providing a framework for understanding the celestial events associated with the beginning of each Hijriyah month. Yasin: 39- 40 (Majelis Tarjih, 2009).

As previously mentioned, the various criteria and methods employed for determining the beginning of the Hijri calendar month in Indonesia have been passed down through time. These differences in theory and method among adherents of Islam in determining the beginning of the Qomariyah month persist to the present day. This diversity in methodology persists annually, as evidenced by the varying calculations of the start of the Hijri month, including the determination of the Eid al-Fitr holiday in 1444 H by the Naqsabandiyah Tarekat Congregation, which employs the Munjid hisab method and adheres to the rukyat bil qolbi technique, marking Eid al-Fitr1444 H as occurring in

April. 2023 (Ahmad Fuad Al-Anshary, 2019), Conversely, the mass organization, Muhamadiyah, employing the Hisab Wujudul Hilal method, has proclaimed that the 1st of *Shawwal* 1444 H will occur on April 21, 2023. The Nahdlatul Ulama mass organization, in conjunction with the Indonesian government, has determined based on the outcomes of the Itsbat session On April 20, the Indonesian government, in conjunction with the NU mass organization, determined the first of *Shawwal* 1444 H to be on April 22, 2023, based on the Imkanurrukyah method. The Islamic Unity (Persis) mass organization, employing the Imkanurrukyah astronomical criteria, concluded that the first of *Shawwal* 1444 H would occur on April 22, 2023. Consequently, the observance of Eid al-Fitr in 1444 H in Indonesia spanned three days, namely April 20, April 21 and April 23.

The divergence in the determination of the calendar on the Hijriyah calendar among some Muslims engenders its own confusion, although this does not have an impact on conflict due to the prevailing tolerance between communities. The existence of other factors that contribute to unrest within Islam has the potential to escalate into riots (Widiana, Wahyu, 2005). The advancement of scientific knowledge in the field of phalac, or astronomy, can serve as a unifying reference point for the determination of the beginning and end of the Hijriyah month. This development has the capacity to mitigate religious, social, and even political discord arising from these differences. Historical records indicate the existence of endeavors to address issues related to the Hijri calendar in preceding eras. However, a definitive resolution has remained elusive, perpetuating ongoing confusion among the community.

Among the several theories of calendar unification that have been proposed by falak scientists in Indonesia are the Imkanur Rukyah criteria, which offer a combination of Hisab and Rukyah criteria. These criteria have been endorsed by members of the MABIMS (Malaysia-Brunei-Indonesia-Singapore) ministerial body, comprising ministers of religion from Malaysia, Brunei Darussalam, Indonesia, and Singapore since 201 0, and the Imkanur Rukyah criteria were updated again in 2017 with the provisions of Hilal Height 3o, Sun Elongation of 10o and Hisab Wwujudul Hilal criteria that seek to unify the Hijriyah calendar globally.

In light of these developments, the present study aims to contribute to the ongoing discourse on the unification of the Hijri calendar in Indonesia by adopting the Triple Helix theory as a unifying framework. It is anticipated that this theoretical framework, which has been successfully implemented in various international contexts, will facilitate the realization of a unified Hijri calendar that is widely accepted by all relevant parties. The ultimate objective of this study is to contribute to the unification of the Hijri calendar on a global scale. The ensuing discourse delineates these contemplations and propositions in a study designated "*Triple Helix Theory as a Solution for Unifying the Hijri Calendar in Indonesia*."

RESEARCH METHODS

The research method employed in this study is a mixed methods approach, which involves a deliberate, systematic, and structured process to integrate two distinct research methods: quantitative (Abdullah, K., 2022) and qualitative (Ratnaningtyas, 2023 his

integration is designed to leverage the strengths of each method while mitigating their respective limitations.The primary data sources for this study are obtained from original sources, comprising data and information directly from respondents. The acquisition of these data is carried out directly from respondents conducted by means of interview surveys.

Secondary data sources encompass information and data obtained from various original sources, including journals, books, and other literature pertinent to the study's objectives.The data collection techniques employed in this study include survey methods, focus group discussions (FGDs), in-depth interviews, and documentation.

RESULT AND DISCUSSION

The Triple Helix Concept in the Hijri Calendar

In the pursuit of organizational objectives, the implementation of strategies, innovations, and evaluations is typically an ongoing process. It is imperative to establish a system that can effectively accommodate and expedite the realization of these objectives and strategies. In a system that has been in operation, a relationship is established among the parties involved, thereby forming a pattern or concept that ultimately facilitates the achievement of goals by its users. One of the patterns that can be utilized is the concept or theory of Triple Helix.

The Triple Helix model, initially introduced by Etzkowitz and Leydesdorff in 1995, posits a collaborative interaction between industry, universities, and government. This model conceptualizes industry and universities as primary drivers of innovation and knowledge, respectively, while the government functions as the third sector. Through a top-down approach, these three entities collaborate to promote economic advancement in a country. The Triple Helix model is defined as an interaction between universities, industry, and government, characterized by a pattern or concept in which each entity maintains its independence while also accepting opportunities provided by the others.In its development, the Triple Helix theory is employed as a strategy to achieve a common goal, with each party assuming roles and responsibilities individually or collectively (Loet Leydesdorff, 2003)

In the context of strategic policy development, the triple helix concept integrates community, government, and academic entities. These three helixes function as primary catalysts for the generation of ideas, innovations, scientific pursuits, and technological advancements. These elements are instrumental in achieving collective objectives, particularly in the context of harmonizing the Hijri calendar in Indonesia. The determination of the Hijri calendar's beginning and end is contingent upon the close relationship, mutual support, and symbiotic mutualism between these three actors in relation to the foundation and pillars of a dynamic Hijri calendar model.

The triple helix model, as previously outlined, signifies a collaborative relationship among government, society, and academia, fostering a collaborative environment conducive to the formulation of policies and agreements. Within this paradigm, academics represent the scientific community, Islamic Community

Organizations serve as policy implementers within the community, and the Government functions as a facilitator for the execution of these agreements.

The triple helix theory is a conceptual framework employed in this research to elucidate the extant relationships in the field. The theory posits the development of an innovative, independent, and sustainable capacity that is expected to overcome various challenges in determining the beginning and end of the month in the Hjiryah calendar, which evolves in tandem with the advancement of science and human capabilities.According to the triple helix theory, universities can play an instrumental role in innovation in a knowledge-based society. In their traditional role of knowledge transfer, universities perform "knowledge capitalization" by orchestrating the transfer of technology to the private sector. According to Etzkowitz, the university is a core spiral that, in some situations, can replace its primary role as an advocate of innovation by firms and governments (Etzkowitz dan Leydesdorff., 2000).

In a knowledge-based society, knowledge-generating institutions assume a pivotal role in the innovation process, given the centrality of knowledge in product development and the formation of an organizational infrastructure that facilitates subsequent product development.The concept of innovation, when expanded, underscores the growing significance of governments and universities as key actors in the innovation process. This shift in the innovation landscape gives rise to novel roles for government, industry, and universities in both individual and collaborative innovation.

Etzkowitz further elucidates that the crux of the triple helix model of public and social relations is the enhancement of interaction between universities, the private sector, and government as equal partners. The triple helix functions as a platform for "institution building," that is, the establishment of novel organizational frameworks designed to foster innovation, including incubators, science parks, and venture capital firms.In the context of the classical innovation regime, universities, the private sector, and the government are conceptualized as an intertwined spiral, with each entity's relationship to the others being distinct. Leydesdorff and Ivanova observe that the triple helix model prioritizes the knowledge infrastructure of innovation that is engendered by university-private-government relations (Leydesdorff dan Ivanova., 2016).

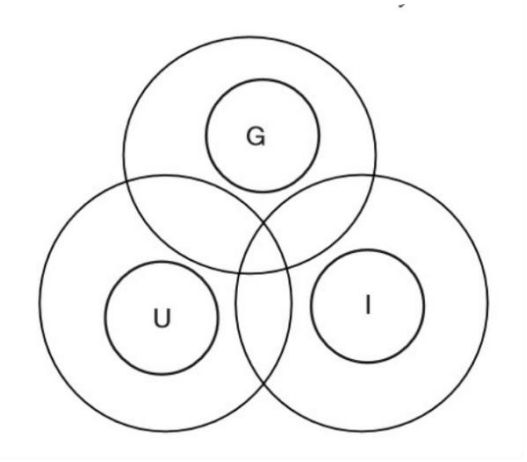


Figure 7 Triple helix interaction model

Definition of the Hijri Calendar

The Hijriyah calendar is a lunar calendar used by Muslims to track Islamic shari'a related to days, weeks, months, and years. It is based on the movement of the moon, also known as the Qamariyah calendar. This calendar utilizes calculations of the moon's cycle around Earth. The synodic month, as defined by the movement of the moon, is 12 x 29.53 days. Thus, a Qamariyah calendar year is 354.36707 days. This results in an approximate 11,256-day difference between the Islamic and Shamsiyah calendars. Consequently, the Islamic calendar is consistently shifted forward against the Gregorian Christian calendar (Tono Saksono, 2016)

The fundamental principle underlying any calendar system, be it a solar calendar (Solar), lunar calendar (Lunar), or solar-lunar calendar (Lunisolar), is the delineation of a day as the Earth's journey around the sun. This phenomenon is referred to as the sun's apparent circumference around the Earth.In the context of the Islamic month, it is noteworthy that the Hijriyah calendar, also known as the Islamic calendar, does not necessitate periodic recalibration. This is due to its reliance on lunar phases as the primary determinant of months.The Hijri calendar is comprised of twelve months, commencing with Muharram, followed by Safar, and culminating in Dhul-Hijjah. The eighth and ninth months are *Ramadan* and *Shawwal*, respectively.The number of days in each month is not constant; it can vary from 29 to 30 days.The number of days in a year can be 354 (a basithah year) or 355 (a leap year).

According to Thomas Djamaluddin, the Hijri calendar is characterized by its simplicity and ease of comprehension in relation to natural phenomena. The commencement of each month is determined by the sighting of the hilal (the crescent moon) after sunset (maghrib). The selection of the lunar calendar (Qamariyah) over other calendars, such as the solar or lunar-solar, is primarily attributed to its intuitive recognition of dates based on the moon's phases. This preference, however, remains unclarified within the scriptures of Islam, as neither the Qur'an nor the al-Hadith explicitly address the rationale behind this choice. This stands in contrast to the Shamsiyah calendar, which prioritizes consistency with seasonal changes while disregarding daily variations (Djamaluddin, Thomas, 2023)

Basit Wahid, who has also studied the Hijriyah Calendar, asserts that it is based exclusively on the Qamariyah system. One year is defined as 12 months, with the calculation of months based on the phases of the Moon or its manâzil (Wahid, Basit, 2023), Muhammad Bâshil at-Thâiy, in his research entitled "'Ilm al-Fal ak wa al-Taqâwîm", posits that the Hijriyah Calendar is a Qamariyah calendar that was initiated during the reign of Caliph 'Umar bin Khattab, following the migration of the Prophet Muhammad Salallahu 'alaihi wa sallam from Mecca to Medina.

Hendro Setyanto further elaborates on the nature of the Hijriyah calendar, classifying it as a calendar system that falls under the purview of the Astronomical Calendar. This categorization stems from the fact that the Hijriyah calendar is founded on astronomical realities.In contrast, the Gregorian calendar is solely dependent on numerical rules, often referred to as the arithmetic calendar, which are based on the average calculation of astronomical phenomena. Furthermore, Hendro Setyanto

expounded on the concept of the Hijriyah calendar's day, delineating that its commencement is determined by the sun's setting on the western horizon. The month's onset, on the other hand, is derived from the prophetic tradition of the Prophet Muhammad, Salallahu 'al. aihi wa sallam, based on the sighting of the hilal, the first crescent of the moon (hilal) which appears after the conjunction (*ijtima'* or new moon) (Hendro, Setyanto, 2018).

The Concept of the Arabic Calendar After the Advent of Islam

The Arabs and Muslims remained in this state (no specific calendar) after the advent of Islam. They established a system of timing significant events. Subsequent to the Arab community's adoption of Islam and unification under the guidance of the Prophet Muhammad SAW, Allah's directive emerged, stipulating the implementation of a pure Islamic Qamariyyah calendar, which involved the elimination of the month of Nasi'. This directive is recorded in the Quran, specifically in the sura at-Taubah, verse 36.

إِنَّ عِدَّةَ الشُّهُورِ عِنْدَ اللَّهِ اثْنَا عَشَرَ شَهْرًا فِي كِتَابِ اللَّهِ يَوْمَ خَلَقَ السَّمَاوَاتِ وَالأَرْضَ مِنْهَا أَرْبَعَةٌ حُرُمٌ ذَلِكَالدِّينُ الْقَيِّمُ فَلا تَظْلِمُوا فِيهِنَّ أَنْفُسَكُمْ وَقَاتِلُوا الْمُشْرِكِينَ كَافَّةً كَمَا يُقَاتِلُونَكُمْ كَافَّةً وَاعْلَمُوا أَنَّ اللَّهَ مَعَ الْمُتَّقِين

Meaning: Verily, the number of months with Allah is twelve months, (as) Allah decreed (in the Book of Memories) when He created the heavens and the earth, among which are four forbidden months. That is the straight religion, so do not wrong yourselves in them (the four months), and fight the polytheists all as they fight you all. Know that Allah is with those who fear.

The sacred text further confirms that the lunar calendar established by Allah comprises twelve months. Previously, the Arab community utilized additional months; however, this practice was subsequently abolished. The verse implicitly acknowledges the sanctity of four months, designated as haram months, within the Islamic lunar calendar.

The four sacred months, as outlined in Q.S. at-Taubah verse 36, are identified as: the first month of Muharram, the month of Rajab, the month of Dhulqa'dah, and the month of Z|ulhijjah. It is considered sacred and honored, and it is believed that no warfare should be initiated during these months. However, this established norm was transgressed by the Arab community prior to the advent of Islam, as evidenced by their engagement in warfare during the month of Muharram and their subsequent designation of the month of Safar as a replacement for Muharram. This transgression led to a state of disorder and disruption in trade activities within the Arabian Peninsula. (Sya'rani, 2010:2). This practice is further substantiated by a verse in the Qur'an, specifically Surah at-Taubah, verse 37, which addresses this issue:

إِنَّمَا النَّسِيءُ زِيَادَةٌ فِي الْكُفْرِ يُضَلُّ بِهِ الَّذِينَ كَفَرُوا يُحِلُّونَهُ عَامًا وَيُحَرِّمُونَهُ عَامًا لِيُوَاطِئُوا عِدَّةَ مَا حَرَّمَ اللَّهُ فَيُحِلُّوا مَا حَرَّمَ اللَّهُ زُيِّنَ لَهُمْ سُوءُ أَعْمَالِهِمْ وَاللَّهُ لا يَهْدِي الْقَوْمَ الْكَافِرِينَ

Meaning: Indeed, the postponement (of the month of haram) only increases disbelief. Those who disbelieve are misled by it; they make it lawful in one year and unlawful in another, that they may conform to the number which Allah has forbidden, and so they make lawful that which Allah has forbidden. (By Satan) they have made beautiful to them their evil deeds. Allah does not guide those who disbelieve.

This verse clearly states Allah's disapproval of the use of a calendar with intercalation, also referred to as an-Nasi'. The term an-Nasi' is defined as the act of postponing the month of haram, as mentioned by the Prophet in his hadith. Additionally, Allah asserts that augmenting the month is a misguided act perpetrated by the disbelievers, who occasionally permit it in one year and prohibit it in another. (Fatttah}, tt:129)

This deliberate act of manipulation enables them to align their actions with their personal desires. In the event that Allah prohibits a particular act, they establish its legality. Additionally, Allah elucidates that Shaytan has deceived them by asserting that their transgressions are virtuous. This verse conveys a direct warning from Allah Subhanahu wa ta'ala that He will not provide guidance to those who reject His teachings.

A significant number of calendars worldwide utilize a system of intercalation that is strictly prohibited by Allah, including the Jewish, Chinese, and Hindu calendars. The Gregorian calendar, for instance, incorporates day insertions into 30 and 31 days, along with a single day insertion on February 29 in leap years. In contrast, the Islamic calendar is the only system that does not employ intercalation, as it is in accordance with the commands of Allah Subhanahu wa ta'ala. (Djamaluddin.T., 2010:32)

In light of this verse, the Islamic calendar, under the guidance of Rasulullah Sallahu 'alaihi wa sallam, transitioned from a sun-based system to one independent of the sun's passage. Concurrently, the practice of using the month of nasi' was prohibited. The months' shift from season to season meant that *Ramadan*, which initially always fell in the summer and Jumadal Ula always fell in the winter, no longer corresponded to the passage of the sun after the Prophet eliminated the month of nasi'. The time shift in the Gregorian calendar meant that *Ramadan* could now fall in the winter, spring, fall, or summer. This shift was beneficial for Muslim communities who live in the four seasons. Subsequently, the Islamic calendar transitioned from utilizing the lunisolar system to the lunar system (Qamar). (Affandi, A., tt:72)

The nomenclature of the months in the Hijriyah calendar draws from the names of the months found in the pre-Islamic calendar, namely the month starting from the month of Muharram and ending with the month of Dhulhijjah. This practice persists due to its longstanding familiarity and the absence of any contradictions with Islamic teachings, particularly given the potential confusion it might cause among the populace regarding transactions and crucial documentation.The primary shortcoming of the Hijri calendar system during that period was the absence of a numerical sequence to denote

each year. Instead, significant events served as the primary markers for the years. For instance, the year of the Prophet's birth was designated as the year of the Elephant, a designation derived from the historical event of Abrahah, the Governor of Yemen, invading Makkah with an army of elephants. The significance of this event is underscored by the fact that it led to the year being recognized as the year of the Elephant under the leadership of King Abrahah, who hailed from South Yemen. (Nallino.C., 1993:231)

In addition to the year of the birth of the Prophet Muhammad, known as the year of the Elephant, there are several other years that use important events during the life of the Prophet Muhammad. For example, the time of the death of the Prophet Muhammad's wife, S The passing of Khadijah, the Prophet Muhammad's wife, and his uncle is regarded as the year of Huzn, signifying a year of profound sorrow. The initial year of the Prophet Muhammad's hijrah is designated as the year of Idzn, marking the year he was permitted to migrate. The subsequent year is referred to as the year of the Amr command, signifying the year he was commanded to engage in combat and other significant actions. Ultimately, the assembly, presided over by 'Umar bin Khatab, arrived at a consensus to adopt the proposal put forth by 'Ali, r.a., which stipulated that the commencement of the Islamic year should be anchored to the Hijri year of the Prophet Muhammad's migration from Mecca to Medina. Consequently, the Islamic calendar is designated as the Hijriyah calendar. The establishment of the Hijri year commenced under the leadership of Sayyidina Umar bin Khatab, who assumed the role of head of state after a five-year interval. Prior to this, there was no Hijri year, either during the lifetime of the Prophet or the time of the Companions.The Hijri calendar came into effect in the year 640 AD, coinciding with the Hijri year. After the Hijri year had elapsed for five years, the Companion 'Umar bin Khattab passed away.

The reasons for Umar bin Khattab's greater inclination toward the proposal of Sayyidina Ali r.a. can be traced back to the historical significance of the Hijrah of the Prophet Muhammad, which marks a pivotal moment in the formation of Islamic society. Following the hijrah, the verses of the Qur'an that were revealed underscored not only the primacy of faith, but also the significance of societal construction and the pursuit of jihad to uphold justice and truth through peaceful means or by armed conflict. The integrity of Islamic teachings became more apparent after the Prophet Muhammad SAW emigrated to Medina. The Arabian Peninsula had previously been under Islamic rule during the Prophet Muhammad's era, and subsequently, other regions outside the Arabian Peninsula also submitted to Islam. This pivotal moment in Islamic history, known as the Prophet Muhammad's hijrah, marked a significant turning point in the dissemination and development of Islamic teachings. Ali further elucidated that numerous verses in the Qur'an underscore Allah's profound appreciation for those who undertake hijrah, fostering the aspiration among Muslims to perpetually embody the spirit of migration, transcending entrenched traditions to seek continuous progression and spiritual enhancement. This notion is reflected in the adoption of the Hijriyah calendar, which is commonly referred to in English as the Hegira, Hejira, or Hejric. The latter term is also referred to as the Hijric Calendar.

The Hijri Calendar System

The Hijri calendar's year commences at sunset in the first month of Muharram. A year in the Hijri calendar comprises 12 months of 29 or 30 days.There exist multiple perspectives on the commencement of the Hijri calendar's calculations. Nevertheless, there is consensus that the Hijri year commenced when the Prophet Muhammad made the Hijrah to Medina. The nomenclature of months and days in the Hijri calendar remains consistent with that of the pre-Islamic Arabic calendar, with the month commencing in Muharram and concluding in Dhulhijjah.

According to the Ministry of Religious Affairs, the Prophet Muhammad's hijrah occurred on 2 Rab'ul Awwal, coinciding with September 14, 622 AD, and 1 Muharram that year coincided with July 16, 622 AD. According to the Ministry of Religious Affairs, for those who adhere to hisab, 1 Muharram fell on July 14 and 15, 622 because at that time the hilal height had reached 1o 52'41". (Kemenag RI., 2010)

Table 1: Comparison of Hilal Sighting Parameters for 1 Muharram 1 AH in Mecca

Parameters	**July 14, 622**	**July 15, 622**
Month height	+ 01^{o} 52’ 41”	+13^{o} 17’15”
Moon age	+12^{j} 15^{m} 59^{d}	+13^{j} 15^{m} 47^{d}
Moon quiescence time	+00^{j} 15^{m} 53^{d}	+ 01^{j} 08^{m} 13 ^{d}
Altitude difference	+03^{o} 19’ 35”	+14^{o} 44’ 09”
Azimut difference	-03^{o} 39’ 18”	-10^{o} 02’ 21”
Elongation	+04^{o} 56’ 30”	+17^{o} 47’ 04”
ΔT	3698^{d}, 48 = 01^{j} 01^{m} 38,48^{d}	
σAT	± 114 ^{d}, 8163 = ± 00^{j} 02^{m} 54^{d},8263	
• Calculations using Accurate Times V.5.1 software, by Muhammad Audah Jordan with an accuracy of 1 second . • VSOP87 and ELP2000 software calculation base • Topocentric calculation base • Time in UT		

In consideration of the lunar passive time and the variability of temperature uncertainty (ΔT, or σAT), adherents of hisab wujudul hilal can ascertain that 1 Muharram 622 corresponds to July 14–15 (the lunar passive time, minus the variability of temperature uncertainty (ΔT, or σAT), results in a moon height greater than 0°). For the imkanu ar-rukyah adherents, this corresponds to July 15–16. (Darsono.R., 2010).

Unification of the Hijri Calendar in Indonesia

This research was conducted using a survey method with a perception approach.The survey was administered to a total of 65 respondents, including members of the government (specifically, the Ministry of Religion), academics from various universities in Indonesia, and representatives of Islamic organizations such as Nahdhatul Ulama' (NU), Muhamadiyah, Islamic Unity (PERSIS), Hidayatullah, Indonesian Ulama

Council (MUI), Nahdhatul Wathan (NW), Modern Pondok Family Association (IKPM), Indonesian Mosque Council, and Al-Khairat Islamic Women. The data obtained in this study are as follows: (1) respondents' responses regarding the necessity of unifying the Hijriyah calendar in Indonesia; (2) respondents' responses identifying the primary cause of the Hijriyah calendar's non-uniformity in Indonesia as the utilization of Hisab and Rukyat criteria; and (3) respondents' responses to the government's efforts in unifying the Hijriyah calendar. Hijriyah calendar in Indonesia; (4) respondents' responses to the communication carried out between the government, mass organizations, and academics in an effort to realize the unification of the Hijriyah calendar; (5) respondents' responses regarding the obligation of the government in unifying the Hijriyah calendar in Indonesia; (6) respondents' responses to the Hisab method or criteria is the most effective method employed in Indonesia to achieve the unification of the Hijriyah calendar; (7) respondents' responses to the Rukyat method or criteria is the most effective method employed in Indonesia to achieve the unification of the Hijriyah calendar; (8) respondents' responses to the MABIMS Imkanur Ruk The MABIMS Imkanur Rukyat criteria are the most effective method in Indonesia to achieve the unification of the Hijriyah calendar. The respondents' responses to the necessity or absence of procurement of the Law or Regulation of the Minister of Religion regarding the determination of the beginning of the Qamariah month are essential for the realization of the unification of the Hijriyah calendar in Indonesia..

The survey results obtained in this study are as follows:

Table 2. Survey Result of Indonesian Muslim Community Perceptions of Unification of the Hijri Calendar in Indonesia

NO	INDIKATOR PERTANYAAN	SS	%	S	%	KS	%	TS	%	STS	%	Total %	Jumlah Responden
1	Perlu adanya penyatuan kalender Hijriyah di Indonesia	34	52,31	28	43,08	3	4,62	0	0	0	0	100	65
2	Faktor Utama penyebab tidak seragamnya kalender Hijriyah di Indonesia adalah adanya penggunaan kriteria Hisab dan Rukyat	20	30,77	36	55,38	7	10,8	2	3,08	0	0	100	65
3	Upaya yang telah dilakukan pemerintah dalam menyatukan kalender Hijryah di Indonesia sudah sangat maksimal	8	12,31	33	50,77	20	30,8	3	4,62	1	1,54	100	65
4	Komunikasi yang dilaksanakan antara pemerintah, ormas dan akademisi dalam upaya perwujudan penyatuan kalender Hijriyah sudah sangat baik	8	12,31	33	50,77	20	30,8	3	4,62	1	1,54	100	65
5	Menyatukan Kalender Hijriyah di Indonesia Kewajiban Pemarintah	28	43,08	26	40	6	9,23	5	7,69	0	0	100	65
6	Metode Hisab adalah metode terbaik digunakan di Indonesia agar tercapai penyatuan kalender Hijriyah di Indonesia	12	18,46	33	50,77	14	21,5	6	9,23	0	0	100	65
7	Metode Rukyat adalah metode terbaik digunakan di Indonesia agar tercapai penyatuan kalender Hijriyah di Indonesia	14	21,54	33	50,77	12	18,5	5	7,69	1	1,54	100	65
8	Kriteria Imkanur Rukyat adalah kriteria terbaik digunakan di Indonesia agar tercapai penyatuan kalender Hijriyah di Indonesia	15	23,08	36	55,38	10	15,4	4	6,15	0	0	100	65
9	Perlu adanya UU atau Peraturan Menteri Agama mengenai penetapan awal bulan Qamariah agar penyatuan kalender Hijriyah di Indonesia dapat terwujud	30	46,15	26	40	6	9,23	2	3,08	1	1,54	100	65
	Jumlah Porsentase tiap Indikator		28,89		48,55		16,8		5,13		0,68	100	
Keterangan : SS (Sangat Setuju) S (Setuju) KS (Kurang Setuju) TS (Tidak Setuju) STS (Sangat Tidak Setuju)													

Source : Processed Primary Data

The Perspesi index can be shown through the following explanation:

1. Respondents' responses regarding the necessity of the unification of the Hijriyah calendar in Indonesia yielded the following results: 34% of respondents strongly agree, 28% agree, and 4.6% disagree.

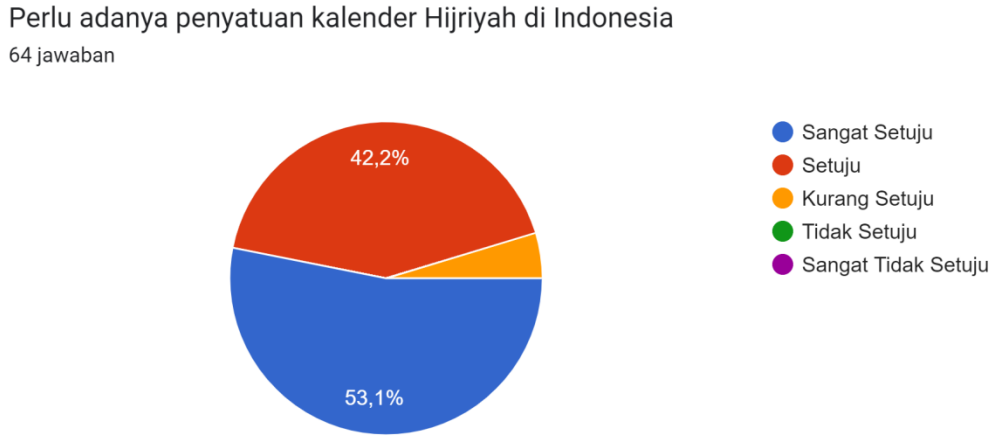
Table 3. The index on whether or not the unification of the Hijri calendar in Indonesia is necessary or not

No	Answer	Frequency	
		F	%

1	Strongly Agree	**34**	**53,3**
2	Agree	**28**	**43,1**
3	Slightly Disagree	**3**	**4,6**
4	Disagree	**0**	**0**
5	Strongly Disagree	**0**	**0**
Total		**65**	**100**

Based on the table above, it can be visually presented in the graph as follows:

Graphic 1



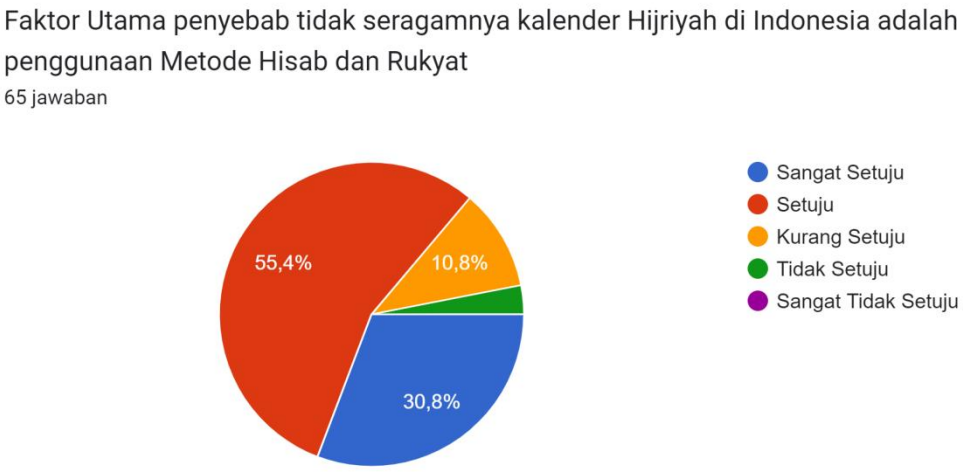
2. Respondents' responses regarding the primary factor contributing to the non-uniformity of the Hijriyah calendar in Indonesia are as follows: the utilization of Hisab and Rukyat criteria. The data obtained revealed that 30.8% of respondents strongly agree, 55.4% agree, 10.8% slightly disagree, and 3.1% disagree;

Table 4. Index on factors causing non-uniformity of the Hijri calendar in Indonesia

No	**Answer**	**Frequency**	
		F	**%**
1	Strongly Agree	**20**	**30,8**
2	Agree	**36**	**55,4**
3	Slightly Disagree	**7**	**10,8**
4	Disagree	**2**	**3,1**
5	Strongly Disagree	**0**	**0**
Total		**65**	**100**

Based on the table above, it can be visually presented in the graph as follows:

Graphic 2



3. Respondents' responses regarding the government's efforts in unifying the Hijri calendar in Indonesia have been thoroughly examined, and the following data were obtained: 12.3% strongly agree, 40% agree, 38.5% slightly disagree, 7.7% disagree, and 1.5% disagree.

Table 5. The index on the government's efforts in unifying the Hijri calendar in Indonesia has been maximized

No	Answer	Frequency	
		F	%
1	Strongly Agree	**8**	**12,3**
2	Agree	**26**	**40**
3	Slightly Disagree	**25**	**38,5**
4	Disagree	**5**	**7,7**
5	Strongly Disagree	**1**	**1,5**
Total		**65**	**100**

Based on the table above, it can be visually presented in the graph as follows:

Graphic 3

4. Respondents' responses regarding the communication efforts between the government, mass organizations, and academics to achieve the unification of the Hijriyah calendar

have been collected. The data obtained revealed that 12.3% of respondents strongly agree, 50.8% agree, 30.8% slightly disagree, 4.6% disagree, and 1.5% strongly disagree.

Table 6. The index of communication carried out between the government, mass organizations, and academics in an effort to realize the unification of the Hijri calendar, which has been running very well

No	Answer	Frequency	
		F	%
1	Strongly Agree	**8**	**12,3**
2	Agree	**33**	**50,8**
3	Slightly Disagree	**20**	**30,8**
4	Disagree	**3**	**4,6**
5	Strongly Disagree	**1**	**1,5**
Total		**65**	**100**

Based on the table above, it can be visually presented in the graph as follows:

Graphic 4

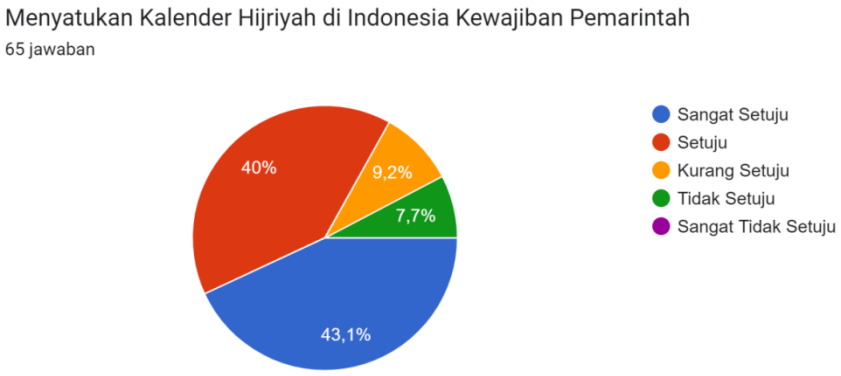
5. Respondents' answers about the government's obligation to unify the Hijri calendar in Indonesia obtained the following data: 43.1% strongly agree, 40% agree, 9.2% slightly disagree, and 7.7% disagree.

Table 7. Index on the Government's Obligation to Unify the Hijri Calendar in Indonesia

No	Answer	Frequency	
		F	%
1	Strongly Agree	**28**	**43,1**
2	Agree	**40**	**40**
3	Slightly Disagree	**6**	**9,2**
4	Disagree	**5**	**7,7**
5	Strongly Disagree	**0**	**0**
Total		**30**	**100**

Based on the table above, it can be visually presented in the graph as follows:

Graphic 5



6. Respondents' responses regarding the Hisab method or criteria indicate that it is the most effective method employed in Indonesia to achieve unification of the Hijriyah calendar. The data obtained revealed that 18.5% of respondents strongly agree, 50.8% agree, 21.5% slightly disagree, 9.2% disagree, and 18.5% strongly disagree,

Table 8. index on Hisab Method, which is the most effective method employed in Indonesia to achieve the unification of the Hijri calendar

No	Answer	Frequency	
		F	%
1	Strongly Agree	**12**	**18,5**
2	Agree	**33**	**50,8**
3	Slightly Disagree	**14**	**21,5**
4	Disagree	**6**	**9,2**
5	Strongly Disagree	**0**	**0**
Total		**65**	**100**

Based on the table above, it can be visually presented in the graph as follows:

Graphic 6

7. In regard to the Rukyat Method, respondents' responses yielded the following data: 21.5% strongly agreed, 50% agreed, 18.5% slightly disagreed, 7.7% disagreed, and 1.5% strongly disagreed.

Table 9. Index about Rukyat method or criteria is the best method used in Indonesia in order to achieve unification of the Hijri calendar in Indonesia

No	Answer	Frequency

		F	%
1	Strongly Agree	**19**	**21,5**
2	Agree	**5**	**50,8**
3	Slightly Disagree	**4**	**18,5**
4	Disagree	**2**	**7,7**
5	Strongly Disagree	**0**	**1,5**
Total		**65**	**100**

Based on the table above, it can be visually presented in the graph as follows:

Graphic 7

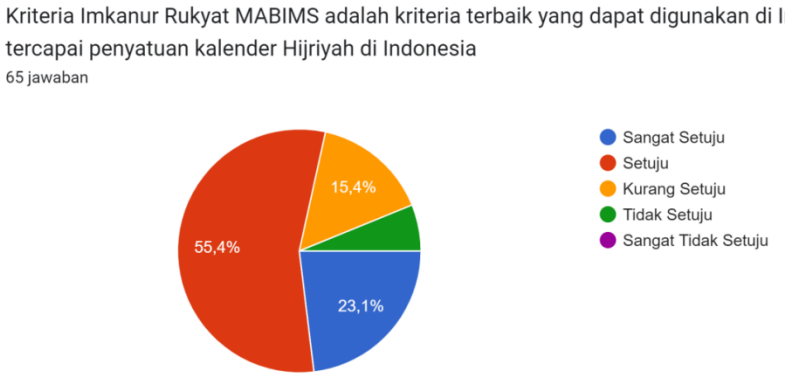
8. The responses pertaining to the MABIMS Imkanur Rukyat Criteria constitute the optimal criteria utilized in Indonesia for achieving unification of the Hijri calendar. The following data pertaining to respondents was obtained: 23.1% strongly agree, 55.4% agree, 15.4% slightly disagree, and 6.2% disagree.

Table 10. the index on MABIMS Imkanur Rukyat Criteria, which is regarded as the optimal criterion for unifying the Hijri calendar in Indonesia

No	**Answer**	**Frequency**	
		F	**%**
1	Strongly Agree	**15**	**23,1**
2	Agree	**36**	**55,4**
3	Slightly Disagree	**10**	**15,4**
4	Disagree	**4**	**6,2**
5	Strongly Disagree	**0**	**0**
Total		**65**	**100**

Based on the table above, it can be visually presented in the graph as follows:

Graphic 8



9. The responses of respondents to the question regarding the enactment of a Law or Regulation of the Minister of Religion concerning the determination of the beginning of the Qamariah month to facilitate the unification of the Hijriyah calendar in Indonesia yielded the following data: 30% strongly agree, 40% agree, 9.2% slightly disagree, 3.1% disagree, and 1.5% strongly disagree.

Table 11. The index on whether or not the enactment of the Law or Regulation of the Minister of Religious Affairs regarding the determination of the beginning of the Qamariah month so that the unification of the Hijriyah calendar in Indonesia can be realized

No	Answer	Frequency	
		F	%
1	Strongly Agree	**30**	**30**
2	Agree	**26**	**40**
3	Slightly Disagree	**2**	**9,2**
4	Disagree	**6**	**3,1**
5	Strongly Disagree	**1**	**1,5**
Total		**65**	**100**

Based on the table above, it can be visually presented in the graph as follows:

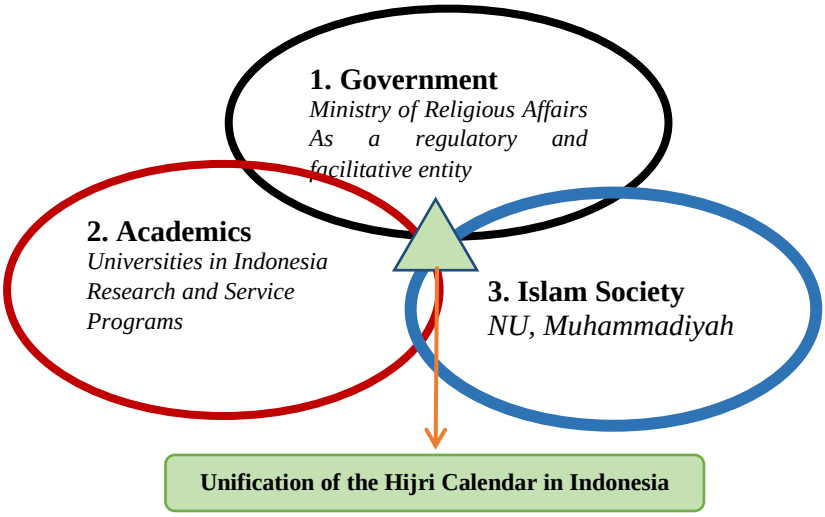
Graphic 9

Implementation of Triple Helix Theory in Unifying the Hijri Calendar

The Triple Helix Theory as a Solution

In the context of the unification of the Hijri calendar, the Triple Helix theory serves as a metaphor for the unique interaction between universities, Islamic organizations, and the government (represented by the Minister of Religious Affairs). In this metaphor, each entity maintains its distinct identity within the scope of its respective institution. The triple helix concept, when implemented as a strategy within the innovation framework, necessitates the collaborative engagement of three distinct entities: the government, academic institutions, and the community. These entities are expected to assume specific roles and responsibilities, both individually and collectively, with the overarching objective being the unification of the Hijri calendar.The implementation of the triple helix concept is tailored to align with the capabilities and capacities of each institution, ensuring a customized approach to achieving the desired outcome. The integration of civil society is further emphasized, underscoring the importance of a comprehensive and inclusive approach to achieving consensus and fostering collaboration among all involved parties. The proposed scheme is illustrated in the accompanying diagram:

Diagram 10
Triple Helix Theory in Unifying the Hijri Calendar in Indonesia



Within the "triple helix" model, the government functions as a regulator and facilitator in the pursuit of uniform determination of the beginning of the month in the lunar calendar. In its capacity as a regulator, the government establishes policies that safeguard and promote the interests of the Muslim community.The absence of regulatory frameworks or policies has led to concerns among Muslim communities, resulting in uncertainty regarding the execution of their religious practices, as well as potential for prolonged discourse both in person and through social media. In its capacity as a facilitator, the government has undertaken various initiatives, including the provision of training, guidance, and facilities, with the objective of eliminating disparities in the commencement of the qamariah month. In collaboration with diverse societal elements, the government has made considerable endeavors to foster unity within the Hijri calendar,

thereby contributing to the enhancement of social and religious stability within the Indonesian nation. In 2016, the Minister of Religious Affairs, Lukman Hakim Saifuddin, asserted that the unification of the lunar calendar is attainable, contingent on a collective aspiration for unity and the harmonization of perceptions. Furthermore, Minister Lukman highlighted the potential benefits of unification, emphasizing that the Hijri calendar's harmonization could yield substantial advantages across various domains. From a sociological perspective, this initiative is poised to reinforce the unity among Muslims. From a scientific standpoint, it serves as a catalyst for the advancement of falak science, fiqh, and technological developments in the fields of astronomy and telecommunications.

In the context of unifying the Hijri calendar in Indonesia, the triple helix model theory places academics in an intellectual role that is of significant importance to the process of unifying the Hijri calendar from the scientific perspective, particularly in the fields of astronomy, Islamic jurisprudence (fiqh), and other related disciplines.According to the opinion of a scholar named Thomas Djamaluddin, three primary parameters are necessary to achieve the unification of the Hijri calendar, including:

1. The existence of a single authority responsible for maintaining the calendar system in effect;
2. There is a single criterion that is mutually agreed upon;
3. The existence of a clear limit of validity.

The three aforementioned parameters are instrumental in ensuring the uniformity and stability of the Hijri calendar on both national and global scales.In the context of the triple helix concept, the role of the community, as embodied by Islamic community organizations in Indonesia, is of paramount significance. These organizations have a profound impact on community life, thereby influencing the adherence of their followers to the fatwas issued by Islamic organization leaders. Given the prominence and longstanding presence of the two largest and oldest Islamic organizations in Indonesia, namely Muhamadiyah and Nahdlatul Ulama, it is imperative for their leaders to identify common ground and establish a unified criterion.A meeting of experts and astronomers from these Islamic organizations should aim to formulate and collect criteria that can be agreed upon in unifying the Hijri calendar. The absence of a shared understanding among existing Islamic organizations suggests that the unification of the Hijri calendar is likely to persist as an independent process.

CONCLUSION

The results of the research indicate that the perspectives of the government, academics, and Islamic organizations on the unification of the Hijri calendar in Indonesia are of significant importance and necessity for fostering unity and ukhuwah Islamiyah among Muslims in Indonesia. The Islamic community's perception of the necessity for Hijri calendar unification in Indonesia is evident, as evidenced by the responses of 77.44% of respondents who expressed a need for such unification, while 22.6% indicated a lack of necessity. The triple helix theory has been identified as a potential framework for unifying the Hijri calendar in Indonesia. 1) The role of the Minister of Religious Affairs of the Republic of Indonesia is that of a Regulator and Facilitator. It is incumbent upon the government to establish a regulation that can be endorsed by various Muslim factions in

Indonesia. Moreover, the government must also assume the role of a facilitator to achieve the unification of the Hijriyah calendar in Indonesia. This unification has been a long-standing expectation.Secondly, academics play a pivotal role in scientific academic studies that do not contradict shar'i arguments related to determining the beginning and end of the lunar month. The ultimate objective of these studies is the unification of the lunar calendar in Indonesia.Thirdly, the community, in this case represented by the management of Islamic mass organizations in Indonesia, is to issue fatwas or organizational decisions regarding the determination of the beginning and end of the Hijriyah month, whose primary purpose is to serve as a unifier among Muslims in Indonesia. Given the close relationship between Islamic mass organizations in Indonesia and the community, the decisions of their leaders will be obeyed by their jamaa'ah.

REFERENCES

Abdullah, K., Jannah, M., Aiman, U., Hasda, S., Fadilla, Z., Taqwin, M., & Sari, M. E. (2022). Metodologi penelitian kuantitatif. Yayasan Penerbit Muhammad Zaini, 3(2).

Ahmad Fuad Al-Anshary, "Rukyah Bil Qalbi Perspektif Tarekat Naqsabandiyah Khalidiyah Al-Aliyah Jombang," Elfalaky : Jurnal Ilmu Falak 3, No. 1 (2019).

Azhari, Susiknan, 2002, Pembaharuan Pemikiran Hisab di Indonesia, Studi atas Pemikiran Saadoeddin Djambek, Yogyakarta: Pustaka Pelajar, hal. 26

Darsono, Ruswa, 2010, Penanggalan Islam, Tinjauan Sistem, Fiqih dan Hisab Penanggalan, Yogyakarta: LABDA Press

Djamaluddin, Thomas, Analisis Visibilitas Hilal Untuk Usulan Kriteria Tunggal Di Indonesia, diakses pada http://tdjamaluddin.wordpress.com.

Etzkowitz dan Leydesdorff., The dynamics of innovation : from National System and 'Mode 2' to a Triple helix of university-industry-government relations, Research Policy 29 (2000) 109-123, 2000.

Fitiryanti, Vivit, 2022, Kalender Hijriyah Dalam Kajian Syari'ah dan Astronomi, Palembang : Bening Media Publishing

Hambali, Slamet, 'Sistim *Hisab hakiki* Taqribi Dalam Kitab AlKhulashah Al-Wafiyah' disampaikan pada Seminar sehari, yang diselenggarakan oleh Program Pasca Sarjana UIN Walisongo semarang, hari Sabtu, 7 Nopember 2019.

Hendro, Setyanto, 2018, Membaca Langit, Jakarta Pusat : Al-Ghuraba.

Kemenag RI, 2010, Almanak Hisab Rukyat, Dirjen Bimas Islam: T.np. T.tp

Leydesdorff dan Ivanova., "Open Innovation" and 'Triple helix' Models of Innovation : Can Synergy in Innovation Systems be Measured ?, Journal of Open Innovation : Technology, Market, and Complexity" (Journal of Open Innovation : Technology, Market, and Complexity, 2016).

Loet Leydesdorff dan Loet Leydesdorff, "Triple Helix of University-Industry-Government Relations", (ResearchGate, Oktober 2003).

Majelis Tarjih dan Tajdid PP. Muhammadiyah, 2009, Pedoman Hisab Muhammadiyah, Yogyakarta Maskufa, 2009, Ilmu Falaq, Jakarta: GP Press.

Nawawi, Salam, A., 2014, Rukyat Hisab di Kalangan NU Muhammadiyah, Meredam KonflikDalam Menetapkan Hilal, Surabaya: Diantama.

Purwanto,1992, Visibilitas Hilal Sebagai Acuan Penyusunan Kalender Islam, Bandung : ITB.

Ratnaningtyas, E. M., Saputra, E., Suliwati, D., Nugroho, B. T. A., Aminy, M. H., Saputra, N., & Jahja, A. S. (2023). Metodologi Penelitian Kualitatif. No. Januari. Aceh: Yayasan Penerbit Muhammad Zaini.

Saksono, Tono, 2007, Mengompromikan Hisab Rukyat, Jakarta: Amythas Publicita, hal.32

Tono Saksono, "Kalender Islam Global: Perspektif Syariah, Ekonomi, Dan Politik," Jurnal Ilmu Syari'ah Vol 15, No 2 (2016), http://dx.doi.org/10.31958/juris.v15i2.

Wahid, Basit, Kalender Hijriyah Tiada Mitos di Dalamnyaʿ, dimuat dalam majalah Bakti, No. 13/Tahun II/Juli 2022.

Widiana, Wahyu, "Hisab Rukyat, Jembatan Menuju Pemersatu Umat", 2005, Yayasan as-Syakirin, Rajadatu Cineam Tasikmalaya, 2004.