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UNIFIED GLOBAL HIJRI CALENDAR (KHGT) FROM THE PERSPECTIVES OF MAQĀSID AL-SHARI ‘AH AND ASTRONOMY: A SOLUTION FOR UNIFYING THE TIMING OF ACTS OF WORSHIP AND SOCIAL TRANSACTIONS FOR THE MUSLIM UMMAH

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Abstract: *The Hijri calendar holds a significant place in the lives of Muslims, serving as the basis for determining the timing of various acts of worship, such as Ramadan, Eid al-Fitr, Eid al-Adha, and themWuquf (standing) at Arafat. However, differences in methods, crescent moon visibility criteria, the concept of matla‘(local sighting horizons), and the authority to determine the start of the month have prevented the realization of a universally applicable Hijri calendar. This situation has spurred the proposal of a Unified Global Hijri Calendar (KHGT) as an effort to establish a calendar system that is uniform, predictive, and globally usable. This study aims to analyze the KHGT from the perspectives of maqāṣid al-syari‘ah (the objectives of Islamic law) and astronomy, specifically examining its scientific basis, the public interest (maṣlaḥah) it serves, and the challenges and prospects of its implementation as an instrument to unify the timing of worship and social affairs (mu‘āmalāt) among Muslims. The study employs a qualitative approach using library research methods. Data were analyzed through a descriptive-analytical review of Islamic sources, literature on maqāṣid al-syari‘ah, ‘ilm al-falak (traditional Islamic astronomy) and modern astronomy, as well as documents and literature related to KHGT development. The results indicate that the KHGT possesses an astronomical foundation enabling the creation of an accurate and predictive calendar through calculations of ijtimā‘ (conjunction), the positions of the Moon and Sun, and crescent visibility criteria. From the perspective of maqāṣid al-syari‘ah, the KHGT offers benefits such as certainty regarding the timing of worship, social order, a reduction in potential conflicts arising from date discrepancies, and the strengthening of Muslim brotherhood and unity. Nevertheless, its implementation still faces challenges regarding fiqh (Islamic jurisprudence), astronomy, institutional authority, the International Date Line, and social acceptance. Therefore, the adoption of the KHGT requires the integration of ‘ilm al-falak, modern astronomy, fiqh, public policy, and dialogue among stakeholders to establish a global calendar system that is accurate, legitimate, and oriented toward the well-being of the Muslim community.*

Keywords: *Unified Global Hijri Calendar, Maqasid al-Syari‘ah, Astronomy, Crescent Moon Visibility, Calendar Unification, Times of Worship*

Introduction

Calendar systems are fundamental instruments in the history of human civilization, serving to regulate the rhythms of social, economic, cultural, and religious life. Within the Islamic tradition, the Hijri calendar holds a position of great importance; it serves not merely as a reference for administration and timekeeping but also as a shari instrument that determines the timing of various acts of formal worship (ibadah mahdhah). Key acts of worship such as the Ramadan fast, Eid al-Fitr, Eid al-Adha, the Wukuf at Arafah, and the payment of zakat rely heavily on the accuracy of the lunar (qamariah) calendar. Consequently, the existence of a valid, uniform, and globally applicable Hijri calendar is an urgent necessity, particularly in the modern era characterized by globalization, transnational connectivity, and the increasingly complex socio-economic dynamics of the Muslim community (Ritonga, Marataon, Arwin Juli Rakhmadi, Muhammad Hidayat, 2023).

However, the reality remains that Muslims still face serious challenges regarding the absence of a universally accepted Hijri calendar system. Discrepancies in determining the start of lunar months particularly Ramadan, Shawwal, and Dhu al-Hijjah remain widespread, occurring both between nations and among Islamic organizations within the same country. These differences not only lead to a lack of uniformity in the observance of worship but also result in social disharmony, a weakening of Islamic brotherhood (ukhuwah Islamiyah), and diminished public confidence in religious authorities and the credibility of the science of Islamic astronomy (ilmu falak). Furthermore, the absence of a unified calendar complicates the coordination of transnational muamalah (social and economic interactions) such as the scheduling of Islamic holidays, international organizational agendas, and Sharia-based economic activities.

In response to this issue, the concept of a Unified Global Hijri Calendar (KHGT) emerged as an integrative solution (Rakhmadi, 2021). The KHGT advocates the principle of "one day, one date worldwide," grounded in calculations of global crescent moon visibility and the fiqh approach of wihdatul mathla‘ (unity of the sighting horizon) (Anwar, 2016). Unlike zonal calendar concepts such as tri-zonal or bi-zonal models which still result in date disparities across regions, the KHGT emphasizes temporal unity as a reflection of the principle of Ummah (community) unity. From the perspective of maqāṣid al-shari‘ah (the objectives of Islamic law), the KHGT concept aligns with efforts to safeguard religion (ḥifẓ al-dīn) through the uniform observance of acts of worship, as well as to preserve unity (ḥifẓ al-ummah) and social harmony. Astronomically, the KHGT relies on advancements in modern calculation technology, crescent moon visibility, and a global date line system that allows for consistent, scientifically verifiable results (Suwarno, 2016).

The KHGT concept has garnered academic legitimacy and international support. Muhammadiyah, a prominent Islamic organization in Indonesia, has pioneered the formulation and implementation of the KHGT, particularly following its 47th Congress in Makassar in 2015 (Supriatna, 2022). This support was further bolstered by the 2016 International Congress on the Unification of the Hijri Calendar in Istanbul, which recommended the establishment of an international Islamic calendar based on astronomical calculation, global crescent visibility, and a unified day (The Islamic Fiqh Academy, 2017). More concretely, the Muhammadiyah Central Board through its document on the Development of Calculation Guidelines (Tanfidz Pengembangan Pedoman Hisab) has decreed that the KHGT will be officially implemented starting June 26, 2025 CE, coinciding with 1 Muharram 1447 AH (Majelis Tarjih dan Tajdid PP Muhammadiyah, 2023) (Majelis Tarjih dan Tajdid Pimpinan Pusat Muhammadiyah, 2024).

Nevertheless, the KHGT concept still faces a number of objections. Debates encompass issues regarding its fiqh (Islamic jurisprudence) basis, the authority for its determination, the validity of the hisab (astronomical calculation) method, and the practical consequences of

implementing a global calendar that eliminates local time zones (Saifullah, 2018). Consequently, academic studies examining KHGT through the perspectives of maqāṣid al-syari'ah (the objectives of Islamic law) and astronomy are crucial. Such studies are expected to elucidate the maslahah (public interest) and maqasid values inherent in KHGT, while also demonstrating the reliability of the modern astronomical methods underpinning it. Ultimately, this research aims to make a tangible contribution to efforts to unify the timing of acts of worship and muamalah (social and economic interactions) for Muslims worldwide, paving the way for a valid, systematic, and operational international Islamic calendar.

Literature Review

Discourse regarding the Unified Global Hijri Calendar (KHGT) has evolved at the intersection of ilm falak (traditional Islamic timekeeping), modern astronomy, fiqh (Islamic jurisprudence), and the social needs of the Muslim community. The literature indicates that the issue of the Hijri calendar is not merely about determining the beginning of the month; it also encompasses the need for certainty regarding the timing of acts of worship, the standardization of the dating system, and the coordination of Muslim social life within a global context. The concept of a global Islamic calendar has been developed by a number of thinkers, including Mohammad Ilyas, Jamaluddin 'Abd al-Raziq, and Syamsul Anwar. A pivotal moment in the discussion of a global Islamic calendar was the 2016 International Congress on the Unification of the Hijri Calendar in Istanbul, which brought together astronomical and fiqh based considerations in an effort to establish a universally applicable calendar system (Budiwati, 2017).

Method

This study employs a qualitative approach utilizing a library research method. Primary data sources include the Qur'an, Hadith, and the works of classical and contemporary maqāṣid al-shari'ah scholars such as al-Shāṭibī, Ibn 'Āshūr, and Jasser Auda as well as official documents like the Muhammadiyah Congress resolutions, the 2016 Istanbul Congress proceedings, and the executive decrees (Tanfidz) of the Muhammadiyah Central Board. Secondary data were obtained from scholarly journals, books on falak (Islamic astronomy), international conference proceedings, and publications by modern falak institutions relevant to the study of the global Hijri calendar (Anwar, 2014).

Data analysis was conducted using a descriptive-analytical approach, examining the concept of the Unified Global Hijri Calendar (KHGT) from two primary perspectives: maqāṣid al-sharī'ah and astronomy. The maqāṣid analysis was used to evaluate the values of public interest (maṣlaḥa), justice, and unity inherent in the KHGT, while the astronomical analysis was employed to assess the validity of global ḥisāb (astronomical calculation), crescent visibility criteria, and the consistency of its application within an international calendar framework. Data validity was ensured through source triangulation specifically by comparing findings from fiqh, maqāṣid, and astronomical studies with official documents from Islamic organizations and international academic publications (Pimpinan Pusat Muhammadiyah, 2015).

Result and Discusion

History and Issues of the Hijri Calendar

Since the dawn of civilization, calendar systems have served as fundamental instruments for regulating the rhythms of human life, encompassing social, economic, cultural, and religious activities. Virtually all nations have devised their own calendars ranging from the Ancient Egyptian, Babylonian, and Julian calendars to the Gregorian calendar, which is widely used

today. In the Islamic tradition, the Hijri calendar serves not merely as an administrative tool but also holds a significant status under Sharia law, functioning to determine the timing of acts of worship. Observances such as the Ramadan fast, Eid al-Fitr, Eid al-Adha, the Day of Arafah, and the payment of zakat (obligatory almsgiving) rely heavily on the accuracy of the lunar (qamari) dating system, which is based on the moon's cycles.

The formal implementation of the Hijri calendar began during the caliphate of Umar bin al-Khattab (in 17 H/638 M). Umar designated the year of Prophet Muhammad's Hijrah (migration) from Mecca to Medina (622 M) as the starting point of the Islamic calendar a decision carrying both historical and spiritual significance, as the Hijrah marked the Muslim community's transition from a phase of persecuted outreach to the establishment of a sovereign society. The Hijri calendar was subsequently adopted as the official timekeeping system for Islamic government administration and as the reference for the observance of Sharia. Since then, the Hijri calendar has become an integral part of Muslim identity.

Nevertheless, the calculation of the Hijri calendar has faced challenges from the outset. It is a lunar (qamari) calendar, distinct from solar (shamsi) calendars like the Gregorian system. A month in the Hijri calendar begins at sunset when the hilal (the slender crescent moon) is sighted following the ijtima (conjunction). However, the visibility of the hilal is not always easily predicted, as it is influenced by both astronomical factors (such as elongation, lunar altitude, and the moon's age) and atmospheric conditions (including weather, light pollution, and horizon visibility). As a result, discrepancies arise in the determination of the beginning of the lunar month across countries, regions, and even religious authorities within a single country.

The primary issue arising is the absence of a universal Hijri calendar system that can be applied uniformly across the Islamic world. The most noticeable discrepancies usually occur around the start of Ramadan, Shawwal, and Dhu al-Hijjah. For instance, there are instances where some Muslims are celebrating the festival while others are still fasting. This phenomenon is not merely a technical matter; it also touches upon the aspect of ukhuwwah Islamiyah (Islamic brotherhood). Such differences cause public confusion, diminish the sense of communal unity in worship, and even have the potential to spark social tension. Historically, these differences stem from the methods used to determine the beginning of the month. Some scholars employ rukyat (direct visual observation of the new crescent moon), while others prefer hisab (astronomical calculation) as the basis for establishing the start of the Hijri month. In practice, many countries combine both methods, albeit with varying criteria. Indonesia, for example, utilizes criteria such as imkan al-ru'yah (the possibility of sighting), requiring a minimum altitude of 3 degrees and an elongation of 6.4 degrees, while other approaches advocate for a global matla' (a unified date across the globe).

Saudi Arabia, on the other hand, often announces the start of the month based on local rukyat testimony, despite frequent criticism from astronomers regarding instances where the crescent moon would be scientifically impossible to sight under specific conditions. This lack of uniformity has far-reaching consequences. First, it erodes public trust in religious authorities and the credibility of ilmu falak (Islamic astronomy). Second, it creates social disharmony when members of the same city or even the same family observe acts of worship on different days. Third, it hinders the coordination of global Islamic agendas, ranging from the scheduling of religious holidays and the organization of the Hajj pilgrimage to the management of cross-border Sharia economic systems. In the modern context, as the world becomes increasingly interconnected through technology and cross-border mobility, the issue of a non-uniform calendar becomes even more problematic. Efforts to unify the calendar have, in fact, been underway for a long time. Among the figures who persistently advocated for calendar unification was Muhammad Ilyas (1989), who introduced the concept of an International Islamic Calendar

based on astronomical calculation (hisab) and the principle of a unified day. He argued that the Islamic calendar must be global rather than zonal, adhering to the principle of "one day, one date for the entire world." This concept subsequently gained broader legitimacy through various international forums, such as the Hijri Calendar Unification Conferences in Kuwait (1988) and Rabat (2007), culminating in the most monumental gathering in Istanbul (2016). The Istanbul Congress produced a scholarly-juridical consensus regarding the importance of a Unified Global Hijri Calendar (KHGT), defined by key parameters: (1) the determination of the start of the month is based on global imkan al-ru'yah (visibility potential) calculations; (2) it applies universally without zonal divisions; and (3) it maintains a single date worldwide.

In Indonesia, Muhammadiyah has emerged as a pioneer in the implementation of the Unified Hijri Calendar (KHGT). Since its 47th Congress in Makassar (2015), Muhammadiyah has affirmed its commitment to adopting the KHGT and integrating the outcomes of the 2016 Istanbul Congress. Ultimately, through the Tanfidz (executive decree) on the Development of Hisab (astronomical calculation) Guidelines, Muhammadiyah established that the KHGT would be officially implemented on June 26, 2025, coinciding with 1 Muharram 1447 AH. This marks a significant milestone in the modern history of the Muslim community and represents a concrete step toward global calendar unification. However, the KHGT concept has not been without criticism. Some argue that implementing a global calendar disregards the principle of locality (ikhtilāf al-maṭāliʿ), which has long served as the basis for rukyat (visual sighting of the moon) in many countries. There are also concerns that relying on astronomical calculation (hisab) might marginalize the spiritual dimension of rukyat a practice inherited from the Prophet Muhammad. Furthermore, differing authorities for determination (governments, organizations, and astronomical bodies) often hinder the practical implementation of the KHGT. Thus, the history and challenges surrounding the Hijri calendar demonstrate an increasingly urgent need for a valid, uniform, and global calendar system. The absence of a unified calendar is not merely a technical astronomical issue but a matter of religious, social, and civilizational significance for the Muslim community. Consequently, in-depth academic study of the KHGT from both maqāṣid al-syarīʻah (objectives of Islamic law) and astronomical perspectives is crucial to establishing both the Sharia legitimacy and the scientific reliability of the proposed calendar system.

Unified Global Hijri Calendar (KHGT): An Astronomical Perspective

One of the key pillars of the Unified Global Hijri Calendar (KHGT) concept is a robust astronomical foundation. Lunar calendars differ fundamentally from solar calendars because they are based on the Moon's orbit around the Earth. Determining the start of a Hijri month is closely linked to astronomical phenomena: specifically, ijtimāʻ (conjunction) and the rukyat (sighting) of the hilal (new crescent moon). Historically, differing scholarly views regarding the validity of hisab (astronomical calculation) and rukyat led to fragmented calendrical practices. However, advancements in modern astronomy have enabled the reconstruction of hisab methods with high precision, allowing for the development of a scientifically grounded and operationally viable international calendar based on the global hilal.

Astronomically, ijtimāʻ is the event where the Moon and the Sun share the same ecliptic longitude. This event can be calculated with great precision using modern astronomical models. However, the occurrence of ijtimāʻ does not automatically mean the hilal is visible from Earth's surface. The likelihood of sighting the hilal depends on several parameters, such as the Moon's altitude above the horizon, elongation (the angular distance between the Moon and the Sun), the Moon's age since ijtimāʻ, the azimuth difference, atmospheric conditions, and sky brightness.

Therefore, a distinction must be made between the concept of the "new moon" as an astronomical conjunction event and the "first visibility of the crescent" as the potential sighting of the hilal after sunset. This distinction is crucial because the Hijri calendar concerns not only the astronomical birth of the new moon but also the determination of the month's start, which serves as the basis for the religious observances and social activities of the Muslim community.

Modern astronomical advancements have contributed significantly to the creation of predictive Hijri calendars. By utilizing astronomical data and algorithms to calculate the positions of celestial bodies, it is possible to predict the timing of ijtimā‘, the positions of the Moon and Sun, and the probability of hilal visibility over very long periods. This predictive capability is a key advantage of astronomical hisab in the context of calendar formulation. The calendar no longer needs to await the results of observations at the end of each month; instead, it can be designed and established in advance based on consistent and verifiable astronomical parameters. that has been agreed upon. Consequently, the new crescent moon (hilal) does not need to be actually sighted in every country or region. It suffices for there to be a probability of visibility meeting specific parameters at any point on Earth; this information then serves as the basis for determining the start of the month globally (Adib Rofiuddin, 2019).

This approach has significant implications for the concept of maṭla‘ (the specific location or horizon from which the moon is sighted). In local calendar systems, differences in geographical location result in variations in sunset times and crescent visibility conditions. As a result, one region may begin the new month earlier than another. In contrast, the KHGT seeks to overcome this fragmentation by developing the principle of a unified calendar. This principle treats the phenomenon of the moon's birth and its potential visibility as astronomical events that can serve as the foundation for determining the start of the month for the global Muslim community.

This concept aligns with advancements in astronomical technology and global communication. In the classical era, limitations in transportation and communication made it difficult to rapidly disseminate sighting information from one region to another. Geographical conditions and communication constraints reinforced the practice of determining the start of the month locally. However, modern scientific and technological progress has fundamentally altered this situation. Astronomical data can be obtained quickly, lunar positions can be calculated with high precision, and observational results can be verified via global communication networks. Thus, the practical obstacles that previously hindered calendar unification are increasingly being overcome (Azhari, 2021).

From an astronomical perspective, the KHGT also seeks to resolve uncertainties associated with compiling the lunar calendar. A system relying entirely on successful actual sighting (rukyat) faces potential obstacles when weather conditions, light pollution, or atmospheric disturbances obstruct the observation of the new crescent moon (hilal). Under such conditions, the determination of the month's start might vary, even if the Moon's actual astronomical position meets specific parameters. Conversely, a calculation-based system (hisab) allows the start of the month to be determined based on the objective state of celestial bodies, thereby avoiding total reliance on the success of visual observations in the field.

However, the use of hisab within the KHGT framework does not mean disregarding the empirical experience of rukyat. Observational data remains crucial for developing and evaluating hilal visibility criteria. Various visibility models developed in modern astronomy are constructed by combining observational data with mathematical calculations. Thus, the relationship between rukyat and hisab should not be viewed as a dichotomy. Rukyat provides an empirical basis regarding the phenomenon of hilal visibility, while hisab offers the capability to calculate, predict, and systematically structure the calendar.

A key issue in developing the KHGT is establishing hilal visibility criteria that are scientifically acceptable and universally applicable. These criteria must define the minimum astronomical conditions required for the hilal to be visible after sunset. Parameters such as the hilal's altitude and elongation serve as critical variables in determining this possibility. Criteria that are too lenient risk declaring the start of the month when the hilal is astronomically impossible to observe, whereas overly strict criteria could lead to delays in commencing the new month.

The International Congress on the Unification of the Hijri Calendar, held in Istanbul in 2016, marked a pivotal moment in the evolution of the KHGT concept. The congress brought together experts in fiqh (Islamic jurisprudence) and astronomy to discuss the feasibility of establishing an international Islamic calendar. Key principles that emerged included the use of global criteria for the visibility of the new crescent moon (hilal) and the application of a unified date concept. This initiative sought to integrate Sharia considerations with modern astronomical advancements, ensuring that calendar determination rested on both normative foundations and scientific applicability.

The calendar model resulting from this global approach differs from those relying solely on zonal or regional principles. In zonal systems, the world is divided into distinct regions based on varying astronomical conditions and time zones. Consequently, two different regions might observe different Hijri dates at the same moment. The KHGT aims to minimize or even eliminate such discrepancies by championing the "one day, one date" principle. This principle treats the calendar as a social and administrative system requiring consistency, certainty, and uniformity in its implementation (Ritonga et al., 2024).

From an astronomical perspective, implementing the "one day, one date" principle necessitates addressing the issue of the date line. This requirement arises from the Earth's rotation and the time differences between eastern and western regions. A global calendar system requires a boundary or line to serve as the reference point for the change of the Hijri date. Establishing an international Hijri date line is a critical technical challenge, as it must be formulated based on astronomical and geographical considerations alongside the functional needs of the calendar system. Thus, the development of the KHGT involves not only determining the start of the month but also constructing a global time system capable of ensuring date consistency across all regions.

The astronomical advantage of the KHGT lies in its ability to generate a calendar that can be predicted well in advance of its actual use. Such certainty holds significant value in modern life. Schedules for education, government operations, economic transactions, international travel, organizational activities, and religious observances can all be planned based on a pre-established calendar. In this context, the calendar is understood not merely as an instrument for determining days of worship, but also as a temporal infrastructure for the social and transactional lives of the Muslim community (Majelis Tarjih dan Tajidid Pimpinan Pusat Muhammadiyah, 2015).

Furthermore, the implementation of the Unified Global Hijri Calendar (KHGT) can foster greater integration between traditional Islamic timekeeping (‘ilm al-falak) and contemporary astronomical advancements. Current calculations of lunar and solar positions are supported by increasingly accurate astronomical data, specialized software, telescopes, astronomical cameras, and automated observation systems. These advancements enable a more objective verification of the parameters governing the visibility of the new crescent moon (hilal). Consequently, the development of a global Hijri calendar holds significant potential for continuous refinement based on scientific progress and observational data.

Nevertheless, astronomical considerations are not the sole issue involved in implementing the KHGT. Accurate calculations of the moon's position do not automatically

resolve differences in fiqh (Islamic jurisprudence) perspectives. A fundamental point of debate remains whether the visibility of the hilal in one region should apply globally or if each region possesses its own distinct maṭla‘ (point of moonrise/sighting). Therefore, the development of the KHGT requires dialogue between two disciplines: fiqh and astronomy. Astronomy elucidates the objective realities of celestial movements, while fiqh provides the normative framework for utilizing these realities as a basis for legal rulings.

Thus, the astronomical perspective demonstrates that the concept of a Unified Global Hijri Calendar rests on a scientific foundation viable for modern life. Astronomical calculations can accurately determine the ijtimā‘ (conjunction), the position of the hilal, and the probability of its visibility. Technological advancements also allow this data to be accessed and verified on a global scale. However, the success of the KHGT as a universal calendar system depends not only on the precision of astronomical parameters but also on the acceptance of its underlying fiqh principles and the values of public interest (maṣlaḥah) it serves. It is at this juncture that the perspective of maqāṣid al-sharī‘ah (the objectives of Islamic law) becomes crucial; it clarifies that calendar unification is not merely a technical or astronomical matter but is also linked to realizing the public good, ensuring certainty regarding the timing of acts of worship, fostering social order, and promoting the unity of the Muslim community.

Astronomical Basis of the Lunar Calendar

The lunar calendar is a timekeeping system based on the Moon's orbital cycle around the Earth. Unlike the solar calendar, which uses the Earth's orbit around the Sun as the basis for calculating the year, the lunar calendar relies on the changing phases of the Moon as the primary reference for defining the month. Consequently, understanding the lunar calendar is inseparable from the astronomical study of the Moon's position, motion, and phases.

Astronomically, a synodic month lasts an average of 29 days, 12 hours, 44 minutes, and 2.9 seconds. This period is measured from one conjunction to the next. Since this duration does not amount to exactly 29 or 30 days, the lunar calendar alternates between months of 29 and 30 days. This arrangement is necessary to keep the calendar aligned with the actual cycle of the Moon's phases.

The primary basis for determining the start of a lunar month is the occurrence of ijtimā‘, or conjunction. Ijtimā‘ is the event where the Sun and the Moon share the same ecliptic longitude when observed from the center of the Earth. At this moment, the Moon is positioned between the Earth and the Sun. The side of the Moon facing Earth does not receive direct sunlight, rendering the Moon invisible from Earth. Therefore, ijtimā‘itself cannot serve as an immediate indicator that a new month has begun.

Ijtimā serves as the astronomical boundary between one lunar cycle and the next. Following ijtimā‘, the Moon begins to move away from the conjunction position. Shortly thereafter, the portion of the Moon's surface facing Earth begins to receive sunlight, forming a very thin crescent of light. This crescent is known as the hilal. Thus, the hilal represents the initial phase of the Moon following ijtimā‘ and preceding the first-quarter phase.

In practice, the hilal only becomes potentially visible after sunset. This is due to the crescent's position remaining close to the Sun. If the crescent moon is positioned too close to the Sun, the Sun's intense light will overpower the Moon's faint light, making the crescent difficult or even impossible to observe. Therefore, the occurrence of ijtimā‘ (conjunction) alone is not sufficient to guarantee that the crescent moon can be sighted; a certain time interval and angular separation between the Moon and the Sun are required for there to be a chance of observing it.

The likelihood of sighting the hilal (new crescent moon) is influenced by several astronomical parameters. The first parameter is the hilal's altitude the angular distance between

the hilal's position and the horizon at sunset. The higher the hilal's position above the horizon, the greater the chance of sighting it. Conversely, a hilal positioned very low near the horizon is more likely to be obscured by clouds, haze, dust, or other atmospheric disturbances.

The second parameter is elongation the angular distance between the center of the Moon and the center of the Sun as observed from Earth. Elongation indicates how far the Moon has moved away from the Sun's position following ijtimā‘ (conjunction). A greater elongation means a larger portion of the Moon is illuminated by sunlight, thereby increasing the likelihood of a visible hilal.

The third parameter is the Moon's age the time elapsed between ijtimā‘ and the moment of observation. The Moon's age cannot serve as the sole metric for visibility, as a hilal of the same age may not present identical viewing conditions across different locations. Nevertheless, the Moon's age remains important for estimating whether the Moon has achieved sufficient separation from the Sun following conjunction.

The next parameter is the azimuth difference between the Moon and the Sun. Azimuth indicates the position of a celestial body relative to cardinal directions. The azimuth difference is necessary to determine the Moon's position relative to the Sun when both are near the horizon. If the Moon is positioned too close horizontally to the Sun, observation can be difficult, even if its altitude and elongation meet specific thresholds.

In addition to astronomical parameters, hilal visibility is also influenced by atmospheric and environmental conditions. Clouds, humidity, dust, pollution, haze, and light from urban areas can reduce the likelihood of sighting the hilal. Consequently, hilal observation depends not only on the geometric positions of the Moon and the Sun but also on sky quality and the observer's ability to identify an extremely thin and faint object.

Based on this explanation, a distinction must be made between the "new moon" and the hilal. "New moon" is an astronomical term referring to the geometric phase of the new moon specifically, the moment of conjunction between the Moon and the Sun. In contrast, the hilal refers to the lunar light that becomes visible after conjunction, once specific conditions for observation from Earth have been met. This distinction is significant because the lunar calendar relates not only to the astronomical birth of the moon but also to determining the start of the new month.

In the field of ilm falak (Islamic astronomy), there are two primary approaches to determining the beginning of a lunar month: rukyat and hisab. Rukyat involves the direct observation of the hilal after sunset; this method emphasizes empirical experience and the testimony of observers in the field. Hisab, on the other hand, involves astronomical calculations regarding the positions of the Moon and the Sun to determine the time of ijtimā‘ (conjunction), the position of the hilal, and the likelihood of its visibility.

Rukyat offers the advantage of being directly linked to the hilal phenomenon itself the very object used to determine the start of the month. However, it also has limitations, as its success depends on factors such as weather conditions, atmospheric quality, the observation site, the observer's capabilities, and sky brightness. Meanwhile, hisab excels in providing temporal certainty and allowing for predictions to be made well in advance of actual observations. Consequently, hisab is crucial for creating calendars that are structured and sustainable.

With the advancement of modern astronomy, hisab is no longer conducted using merely simple geometric approaches. Calculations of lunar and solar positions now utilize complex astronomical models, observational data, and high-precision software. Through these calculations, parameters such as the time of ijtimā‘, sunset and moonset times, hilal altitude, elongation, azimuth, and other metrics can be determined with great accuracy.

Nevertheless, a distinction must be made between the calculated certainty of ijtimā‘ (conjunction) and the probability of sighting the hilal (new crescent moon). While the time of ijtimā‘ can be calculated precisely, hilal visibility is probabilistic in nature. In other words, astronomical calculations may indicate a potential for the hilal to be sighted, yet the success of the observation remains subject to atmospheric and environmental conditions. Therefore, hilal visibility criteria are essential to bridge astronomical calculations with the decision to determine the start of the month.

Hilal visibility criteria serve as astronomical benchmarks used to determine whether the hilal is theoretically likely to be sighted. These criteria typically take into account the hilal's altitude, elongation, the Moon's age, the azimuth difference, and observational conditions. The established criteria must be grounded in sufficient observational data to ensure they possess an empirical basis rather than being merely theoretical.

In the context of the lunar calendar, hilal visibility criteria play a crucial role. First, they provide a tool for objectively assessing the likelihood of sighting the hilal. Second, they reduce reliance on individual testimonies, which are not always easily verifiable. Third, they enable the creation of a predictable calendar suitable for various religious and social purposes. Variations in geographical conditions mean that hilal visibility differs across the Earth's surface. In one region, the hilal might meet visibility criteria, whereas in another, it may still be below the horizon or fail to meet the requirements for sighting. This variation relates to the concept of maṭla‘ the geographical boundary defining the applicability of a hilal sighting. In local calendar systems, differences in maṭla‘ can lead to discrepancies regarding the start of the month between different regions.

These differences are also influenced by the Earth's rotation. Regions located further west typically experience sunset later than those in the east. Consequently, western regions have a greater chance of sighting the hilal, as the Moon has moved further away from the Sun in terms of both angular distance and time. This phenomenon serves as one of the astronomical foundations for discussions regarding a global calendar.

The lunar calendar is also linked to the concept of the astronomical day. In Islamic tradition, the day begins at sunset, rather than at midnight as in the modern civil calendar. Consequently, the start of a lunar month is practically tied to the time of sunset after the hilal (new crescent moon) meets specific criteria. Understanding this transition of days is crucial for determining the relationship between the time of hilal observation and the Hijri date.

In the formulation of a Unified Global Hijri Calendar, the astronomical basis of the lunar calendar is utilized to construct a more widely applicable dating system. The underlying principle is that the start of the month can be established based on the potential visibility of the hilal in a specific region on Earth's surface. Thus, the hilal need not be directly sighted in every country. If the hilal meets visibility criteria in one of the reference regions, that result can serve as the basis for globally establishing the start of the month, in accordance with the agreed-upon calendar principles.

This global approach differs from local and zonal approaches. The local approach uses observation results from a specific region to determine the date for that region. The zonal approach divides the world into several zones based on shared astronomical conditions and time. In contrast, the global approach seeks to treat the entire world as a single calendar unit, ensuring that Muslims observe the same Hijri date.

Implementing a global calendar requires establishing a Hijri date line. This date line serves as the boundary for date changes resulting from time differences and Earth's rotation. In a global lunar calendar, the date line relates not only to time zones but also to the potential

visibility of the hilal. Therefore, establishing the Hijri date line must take into account astronomical and geographical aspects, as well as the practical needs of the Muslim community.

The astronomical basis of the lunar calendar demonstrates that determining the start of the month involves the interplay of the Moon's motion, the Sun's position, Earth's rotation, atmospheric conditions, and the observation location. Ijtimā‘ (conjunction) marks the beginning of the Moon's astronomical cycle, while the hilal serves as the visual indicator associated with the start of the new month. Hisab serves to calculate and predict the phenomenon, while rukyat serves to test and confirm the potential visibility of the new crescent moon (hilal).

Thus, the lunar calendar rests on a solid scientific basis, as it is constructed upon astronomical phenomena that can be calculated and observed. Technological advancements enable the positions of the Moon and Sun to be calculated with a high degree of accuracy. However, applying these calculations to establish the calendar still requires clear criteria, consistent methods, and a consensus regarding the validity of observational data.

In the context of the Unified Global Hijri Calendar (KHGT), the astronomical basis of the lunar calendar serves as a crucial foundation for creating a calendar that is definitive, predictive, and globally applicable. Astronomy provides objective data regarding ijtimā‘ (conjunction), the position of the hilal (new crescent moon), and the likelihood of its visibility. Meanwhile, decisions on using this data to determine the start of the month require fiqh (Islamic jurisprudence) considerations and community consensus. Therefore, the formulation of a global Hijri calendar should ideally be achieved through the integration of astronomy, ‘ilm al-falak (traditional Islamic astronomical science), fiqh, and the social needs of the Muslim community.

The Values of Maqasid al-Shari'ah in the Unified Global Hijri Calendar

The Unified Global Hijri Calendar embodies the values of maqāṣid al-sharī‘ah (the objectives of Islamic law) by striving to realize the welfare of the Muslim community through certainty regarding the timing of acts of worship, calendar uniformity, the reduction of discrepancies, and the strengthening of Muslim unity. Implementing this calendar supports the objective of ḥifẓ al-dīn (preservation of religion) by providing clear guidelines for determining the start of Ramadan, Shawwal, and Dhu al-Hijjah. Such certainty is crucial for enabling Muslims to perform acts of worship in an organized and planned manner, free from the confusion caused by differing determinations of timing. In this context, the calendar serves not merely as a tool for counting days but as a vital instrument for maintaining order in the observance of religious teachings. Date certainty allows the community to better prepare for acts of worship both individually and collectively thereby avoiding situations where observance is constantly subject to waiting for or debating the outcome of the new moon determination.

Beyond the preservation of religion, the Unified Global Hijri Calendar also reflects principles of ease, orderliness, justice, and legal certainty in both religious and social life. Uniformity in dates can mitigate potential conflicts arising from differing determinations of major Islamic observances, whether at the local community level or between nations. Discrepancies regarding the start of Ramadan, Eid al-Fitr, and Eid al-Adha often cause confusion among the public, particularly when such differences occur within the same administrative region or social environment. A unified calendar provides Muslims with a shared reference point for determining the timing of worship and various religious activities. This aligns with the objectives of Sharia, which prioritize ease and seek to spare the community from unnecessary hardship.

From the perspective of maqāṣid al-sharī‘ah (the objectives of Islamic law), public interest (maṣlaḥah) is measured not only by direct benefits to the individual but also by the impact on social life as a whole. The Unified Hijri Calendar (KHGT) can yield collective

benefits by fostering a shared temporal orientation among Muslims across the globe. This shared alignment holds strategic value in building a sense of togetherness and a unified identity for the Ummah (Muslim community). When Muslims observe Ramadan, Eid al-Fitr, or the Hajj pilgrimage based on a single calendar, a consciousness emerges that they belong to a global community bound by shared religious and temporal ties. Thus, a unified calendar serves as both a symbol and a means of strengthening Islamic brotherhood (ukhuwwah Islāmiyyah).

In the context of globalization, a unified calendar also facilitates the coordination of educational, governmental, economic, travel, and communication activities among Muslim nations. Establishing dates well in advance allows educational institutions to draft academic calendars, governments to designate national holidays, economic bodies to organize trade agendas, and the public to plan travel and family activities. Such certainty is increasingly vital as Muslims today inhabit an interconnected social space. Cross-border human mobility is intense, while economic activities and communication are no longer constrained by geographical boundaries. Consequently, a global calendar can enhance efficiency and mitigate administrative complications arising from date discrepancies.

The KHGT can also be analyzed through the principle of ḥifẓ al-‘aql the preservation of the intellect and the advancement of knowledge. The use of astronomical calculation (ḥisāb) demonstrates that calendar determination relies on scientific knowledge, rational computation, and verifiable data. Islam does not shun scientific progress; rather, it encourages its followers to employ their intellect to understand natural phenomena. Provided the methods used do not conflict with Sharia principles, the application of modern astronomy can contribute to realizing the public good. In this regard, the KHGT illustrates the interplay between divine revelation, human reason, and empirical reality.

The use of astronomical calculation (hisab) within the Unified Hijri Calendar System (KHGT) can also reduce reliance on local and situational observational conditions. Visual sighting (rukyat) can be influenced by weather, cloud cover, air pollution, equipment quality, and the observer's proficiency. In contrast, hisab allows for the accurate calculation and long-term prediction of the Moon and Sun's positions. Nevertheless, the use of hisab should not be interpreted as a rejection of rukyat. Rukyat retains its value as a means of empirical verification, while hisab serves as the foundation for planning and calendar compilation. Integrating the two can yield a calendar system that is more robust, objective, and accountable.

In terms of equity, the KHGT seeks to provide all Muslims with equal access to a unified timekeeping system. Disparate calendars can lead to disparities in the observance of religious and social activities, particularly for Muslims living as minorities or in regions with close ties to other nations. A global calendar offers Muslims across different locations a shared reference point, eliminating the need to rely entirely on potentially conflicting local decisions. Equity in this context does not entail erasing all differences in fiqh (Islamic jurisprudence) perspectives; rather, it involves establishing a system that serves as a common meeting point.

However, implementing the KHGT requires a process of dialogue and consensus involving religious scholars (ulama), experts in Islamic astronomy (ahli falak), astronomers, government bodies, and Islamic organizations. This is crucial because the Hijri calendar involves not only technical matters but also touches upon aspects of faith, tradition, religious authority, and social practices. The maqāṣid al-sharī‘ah (objectives of Islamic law) approach dictates that any change or unification of the calendar system must be carried out gradually, based on sound arguments, and with due regard for the community's circumstances. Thus, the KHGT is not imposed unilaterally but is developed through a scientific process and consultation that prioritizes the common good.

Thus, the KHGT functions not merely as a calendrical system but also as a means to realize the public interest, avert hardship, strengthen unity, and establish order in the lives of Muslims worldwide. The values of maqāṣid al-sharī'ah (the objectives of Islamic law) are evident in the KHGT's efforts to ensure the orderly observance of acts of worship, mitigate conflict, provide certainty, leverage scientific knowledge, and support the community's social and administrative needs. Its successful implementation hinges largely on the Muslim community's ability to forge consensus, integrate jurisprudential and astronomical approaches, and prioritize unity and the public interest as primary objectives.

Challenges and Prospects of Implementing the Unified Global Hijri Calendar (KHGT)

The implementation of a Unified Global Hijri Calendar (KHGT) faces complex challenges because the Hijri calendar involves not only astronomical issues but also touches upon aspects of fiqh (Islamic jurisprudence), religious authority, state policy, societal traditions, and the social interests of the Muslim community. Discrepancies in the methods used to determine the start of the month specifically between rukyat (visual sighting of the moon) and hisab (astronomical calculation) remain a primary, unresolved issue. Some groups prioritize rukyat as the fundamental basis for determining the start of the month, while others view astronomical hisab as a method better suited to providing certainty and long-term predictability.

These differing approaches often result in inconsistent decisions, particularly regarding the determination of Ramadan, Shawwal, and Dhu al-Hijjah. Consequently, implementing the KHGT requires open scholarly and religious dialogue to ensure that methodological differences do not escalate into social conflict. Reaching a consensus on astronomical criteria and the underlying fiqh principles is crucial for the success of a global calendar. Without such mutual understanding, the KHGT will struggle to gain widespread acceptance among Muslim communities across different nations. These challenges demonstrate that unifying the calendar requires a process that is gradual, inclusive, and oriented toward the collective well-being of the Muslim community (maslahah).

A further challenge concerns the diversity of authorities involved in determining the start of Hijri months. In many countries, decisions regarding the beginning of Ramadan and religious holidays fall under the jurisdiction of the government or official religious bodies. Meanwhile, certain Islamic organizations and Muslim communities maintain their own methods and decision-making processes, which do not always align with state policies. Such disparities in authority can lead to multiple, conflicting decisions within a single region. In the context of the KHGT, this issue is further complicated by the fact that a global calendar requires cross-border recognition and coordination. Each nation possesses distinct legal systems, institutional structures, and religious traditions. Therefore, implementing the KHGT cannot rely solely on astronomical calculations; it also requires institutional mechanisms capable of coordinating decisions at an international level. A joint body or forum possessing both religious and scientific legitimacy is essential to formulate, adopt, and disseminate the global calendar. The institution must be representative and involve various schools of thought, organizations, and Muslim nations. In this way, decisions regarding the calendar would not be viewed as serving the interests of a specific group, but rather as the outcome of a collective consensus among the Muslim community.

Beyond the issue of authority, differing fiqh (Islamic jurisprudence) understandings regarding the concept of maṭla' (the moon-sighting horizon) pose a significant challenge to the implementation of the Unified Hijri Global Calendar (KHGT). Some scholars argue that each region has its own specific limits for crescent moon visibility, meaning that a sighting in one area does not automatically apply to another. This view stems from geographical variations and

differences in sunset times across regions. Conversely, the KHGT concept seeks to establish a principle of global applicability by using the potential for crescent visibility in a single location as the basis for the entire Muslim community. These differences highlight interpretive issues regarding the scriptural evidence concerning moon sighting and the start of the month. Consequently, implementing the KHGT requires in-depth fiqh analysis that takes into account changing social and technological conditions. Advances in global communication allow for the rapid dissemination of sighting reports and astronomical data worldwide a stark contrast to the past, when communication limitations necessitated local determination of the month's start. In light of these changes, the concept of maṭla‘ needs to be re-examined contextually, without disregarding fundamental Sharia principles.

Technical challenges also cannot be overlooked in the formulation of the KHGT. A global calendar requires crescent visibility criteria that can be applied consistently across all regions of the world. These criteria must define the minimum thresholds for crescent altitude, elongation, lunar age, and other astronomical parameters necessary for visibility. If the criteria are too lenient, the start of the month might be declared before the crescent is astronomically observable; conversely, overly strict criteria could delay the determination of the month's start. Furthermore, the issue of an international Hijri date line requires special attention. Time differences between eastern and western regions mean that date changes do not occur simultaneously across the globe. Therefore, the KHGT must incorporate a clear date-line system to avoid inconsistencies in its application. Developing such a system requires collaboration among experts in astronomy, geography, ‘ilm al-falak (Islamic astronomy), and Islamic law. Technical precision is crucial, as even minor calculation errors can impact the observance of acts of worship and the community's social agenda. Therefore, the KHGT must be established based on accurate, transparent, and verifiable astronomical data.

Another challenge arises from the social and cultural factors within Muslim communities. Some segments of society are accustomed to using local calendars or following the rulings of specific religious organizations. A shift toward a global calendar may raise concerns that local traditions and authorities could lose their relevance. In certain communities, rukyat (visual sighting of the moon) is viewed not merely as a scientific method but as a religious practice holding historical and emotional significance. Therefore, the implementation of the Unified Hijri Calendar (KHGT) must not disregard traditions that have evolved within the community. Ongoing efforts are needed to raise awareness regarding the astronomical basis, fiqh (Islamic jurisprudence) arguments, and the broader public interest served by the KHGT. The public needs to understand that a global calendar is not an attempt to erase differences between schools of thought (madhhabs), but rather an effort to establish uniformity in timekeeping a matter with far-reaching implications. Educational initiatives should employ accessible language and involve religious leaders, academics, and educational institutions. A communicative approach can help gradually reduce public resistance. Social acceptance is a key factor determining the long-term viability of the KHGT's implementation (Arwin Juli Rakhmadi, 2014).

Despite these challenges, the KHGT holds significant promise for modern Muslim life. Advances in astronomy and information technology enable the creation of calendars that are both accurate and predictable over the long term. Data on the positions of the Moon and Sun can be calculated with high precision, and the results can be rapidly disseminated via various digital media. This creates an opportunity for Muslims to utilize a calendar well in advance of the months dedicated to worship. Such certainty is highly beneficial for educational institutions, government bodies, the business world, the tourism sector, and the general public. National holidays, religious pilgrimages, academic schedules, and social agendas can all be planned more effectively. In the context of globalization, a unified calendar can also facilitate international

coordination and strengthen social ties among Muslims worldwide. The KHGT can serve as a vital tool for fostering a shared sense of time amidst increasing human mobility. Thus, the Hijri calendar serves not only to determine the timing of acts of worship but also as a timekeeping system that supports the social and administrative life of the community.

The prospects for the Unified Hijri Calendar (KHGT) are further bolstered when viewed in the context of the need for Muslim unity. Discrepancies in the observance of Ramadan, Eid al-Fitr, and Eid al-Adha often symbolize fragmentation within the Muslim community on a global scale. While such differences rest on scientific and jurisprudential grounds, they can impact social relations and public perceptions regarding unity. A global calendar can serve as a means to foster a shared identity and reinforce the awareness that Muslims constitute a community bound by common teachings and synchronized times of worship. Calendar uniformity can also enhance solidarity in the performance of acts of worship and socio-religious activities. From the perspective of maqāṣid al-sharī‘ah (the higher objectives of Islamic law), this initiative aligns with the goals of promoting public welfare, averting hardship, and strengthening Islamic brotherhood (ukhuwah Islamiyah). However, unity must not be forged by forcibly suppressing diversity of thought; differences of opinion must continue to be respected provided they are grounded in scientific and religious principles. Consequently, the KHGT should be developed as a platform that remains open to dialogue and evaluation. Its success hinges largely on the community's ability to prioritize unity as a shared objective.

The prospects for implementing the KHGT are also evident in the growing scope for collaboration between religious scholars (ulama) and scientists. Historically, the divergence between jurisprudential and astronomical approaches has often led to unproductive debates, despite the fact that these two approaches serve complementary functions. Astronomy provides objective data on lunar movements and the potential visibility of the new crescent moon (hilal), while jurisprudence determines how that information is applied in legal rulings. Collaboration among experts in Islamic astronomy (falak), astronomers, religious scholars, and government bodies can yield calendar criteria that are more robust and broadly acceptable to the public. Scientific forums, international conferences, and joint research initiatives must be continuously fostered to address the technical and normative aspects of the KHGT. Furthermore, there must be an openness to evaluation based on actual sighting data (rukyat) and scientific advancements. The global calendar should not be viewed as an immutable final product, but rather as a system capable of refinement in response to evolving needs and new discoveries. A collaborative approach will strengthen the legitimacy of the KHGT at both national and international levels. Thus, the prospects for KHGT depend heavily on the integration of science, fiqh (Islamic jurisprudence), public policy, and public participation.

Based on the foregoing, it can be concluded that the implementation of the Unified Islamic Calendar (KHGT) faces multidimensional challenges, encompassing differences in methodology, religious authority, the concept of maṭla‘ (moon-sighting location), astronomical criteria, the International Date Line, societal traditions, and interstate political interests. These challenges cannot be resolved through technical approaches alone; they require fiqh (Islamic jurisprudence) dialogue, institutional cooperation, public education, and international consensus. Conversely, the KHGT holds great promise, supported by advancements in astronomy and information technology, the need for global coordination, and the spirit of Muslim unity. This calendar can provide certainty regarding the timing of acts of worship, reduce discrepancies, facilitate social planning, and strengthen the identity of the Ummah (Muslim community) as a global entity. Its implementation must proceed gradually and transparently, grounded in the principle of public interest (maslahah). The consensus-building process must involve various stakeholders to ensure the KHGT possesses scientific, jurisprudential, social, and political

legitimacy. With such an approach, the KHGT has the potential to become a calendrical system that is not only astronomically accurate but also relevant to the needs of the Muslim community in the modern era.

Conclusion

Based on study findings, the Unified Global Hijri Calendar (KHGT) is a proposal to unify the Islamic calendar system, grounded in astronomy and highly relevant from the perspective of maqāṣid al-sharī'ah (the objectives of Islamic law). Astronomically, the KHGT enables the creation of a predictive calendar based on calculations of ijtimā' (conjunction), the positions of the Moon and Sun, and criteria for crescent visibility, thereby providing certainty regarding the timing of acts of worship and social activities for the Muslim community. From the perspective of maqāṣid al-sharī'ah, the KHGT embodies the value of public interest (maṣlaḥah) by upholding ḥifẓ al-dīn (preservation of religion), ensuring certainty and order in the observance of worship, minimizing potential conflicts arising from date discrepancies, and strengthening Muslim brotherhood and unity. Nevertheless, its implementation faces challenges regarding differing ḥisāb (calculation) and ru'yah (sighting) methods, the concept of maṭla' (moon-sighting zones), calendar-setting authority, astronomical criteria, the Hijri date line, and socio-cultural acceptance. Therefore, the KHGT requires development through the integration of fiqh (Islamic jurisprudence), 'ilm al-falak (traditional Islamic astronomy), modern astronomy, public policy, and the community's social needs, accompanied by inclusive dialogue and consensus. Through this approach, the KHGT has the potential to become a global Islamic calendar system that is not only astronomically accurate and predictable but also capable of fostering public welfare, certainty in worship timing, social order, and Muslim unity in the global era.

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