



Technological Advancements Transforming Public Trust in Moon Sighting Decisions

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ABSTRACT

This study explores how technological innovations, such as astronomical methods and digital observation tools, influence public trust and Islamic legal perspectives in determining the beginning of the Hijri months, particularly Ramadan and Shawwal. Using a normative-empirical approach combining doctrinal analysis and field interviews with scholars, Ministry of Religious Affairs officials, and community leaders in Tasikmalaya, the research finds that while modern technology enhances accuracy and efficiency in hilal determination, public trust also depends on religious authority legitimacy and inclusive decision-making. The study concludes that integrating technology represents the modernization of Islamic law practice, requiring greater institutional transparency and dialogue. It contributes theoretically to the interaction between Islamic law and modern science and offers practical recommendations for strengthening public trust in official Islamic calendar determinations.

INTRODUCTION

The determination of the beginning of the hijri month is a central practice in the religious life of Muslims because it has a direct impact on collective worship such as fasting and holidays. In recent decades, developments in astronomy and information technology, including digital hisab calculations, remotely connected telescopes, digital imagery, and observation applications, have introduced technical alternatives to traditional rukyat practices. These technical changes take place in the context of the globalization of knowledge and increasing public expectations of scientific accuracy in public decisions, thus raising new issues regarding the legitimacy of religious decisions that combine scientific criteria and religious legal criteria (Goldenberg, 2023).

In the context of Southeast Asia, efforts to harmonize the criteria for hilal visibility through regional mechanisms such as MABIMS show how state and religious actors try to bridge hisab and rukyat through common technical standards, but implementation at the local level still causes variations in practices and public perceptions (Wahidi, 2021). Empirical studies and regional policies illustrate that the acceptance of technology does not automatically give birth to agreement; Differences in interpretation of fiqh and institutional procedures remain a source of uncertainty that has the potential to reduce public trust if not managed transparently (Sopa, 2022).

The latest academic study also highlights the socio-technical dimension of the hisab-rukya transformation, namely how the integration of technology changes the role of ulama, hisab rukyat institutions, and society in the practice of determining the Islamic calendar. Research with a sociological approach indicates that the digitization of hisab can speed up the process, but the legitimacy of decisions still depends on the perception of local religious authorities and the mechanisms of community participation (Supriatna, 2023). In the realm of Islamic law development, a number of studies that link science and jurisprudence emphasize that contemporary ijtiha requires a dialogue between scientific accuracy and the principles of ushul fiqh to maintain legal validity and social cohesion (Musonnif, 2024).

Although the literature on hisab and rukyat is quite rich, there is a significant research gap: few studies combine normative analysis of Islamic law with in-depth empirical studies of changes in the level of public trust after the adoption of modern technology in the process of determining the hilal in the local context. Some studies have mapped differences in methods and policies (Muhammad Fadhil et al., 2023), while others have focused on technical criteria of visibility (Marwadi et al., 2023), but not many have systematically explored the causal relationships and social mechanisms that explain why technology can strengthen or undermine public trust in authoritative decisions.

Based on these gaps, this research was formulated to fill the empirical and theoretical gaps with the main question: how technological innovations in hisab and digital observation transform public trust in the decision to determine the moon within the framework of Islamic law, and which institutional and communicative factors moderate these relationships. The purpose of the research is explicitly written to: (1) analyze the normative basis of Islamic law that is

relevant to accept or reject the use of technology in the determination of the hilal; (2) examine the experiences and perceptions of key actors in local practices related to the application of technology; and (3) formulate institutional policy recommendations that are able to increase public legitimacy and trust.

Methodologically, this study adopts a normative-empirical approach: a doctrinal analysis of Islamic legal sources combined with in-depth interviews with scholars, policy-makers, and community leaders at the local level to capture narratives of legitimacy and social response. This approach allows for a synthesis between normative legal arguments and empirical evidence of social practice so that the contribution of research is not only descriptive but also prescriptive to local policy formulation (Reif et al., 2024).

The contribution of this research is twofold. First, theoretically the research enriches the contemporary Islamic legal discourse on the interaction between modern astronomy and ushul fiqh by presenting an analytical model of how technology affects the legitimacy of legal authority in Muslim society. Second, the research practically offers concrete policy recommendations for religious institutions and local governments, such as astronomical data transparency mechanisms, standardized witness verification procedures, and inter-agency dialogue forums to increase the acceptability of decisions on the determination of the hilal (Pew Research Center, 2023).

Finally, this study is expected to provide an empirical basis for policymakers and religious leaders in Tasikmalaya and similar areas to formulate a model for determining the hilal that integrates scientific accuracy and normative legitimacy, so as to strengthen community cohesion and reduce the potential for social fragmentation due to differences in calendar determination. Thus, this research not only adds to academic knowledge but also answers the practical need for better public management in the digital era.

THEORETICAL REVIEW

Astronomical Technology in the Determination of the Hilal

Advances in astronomical technology in the last two decades have had a major impact on the method of determining the hilal. The digitization of telescopes, the use of satellite images, and applications based on real-time astronomical data, increasingly enable the accuracy of hilal observations compared to traditional rukyat. Faid's (2024) research shows that when visibility criteria and data are published systematically, technology can improve observation performance and provide a more solid verification base than individual visual reports. In the context of Islam, these technical efforts mark a paradigm shift from direct visual observation to a more scientific and standardized approach (Faïd, 2024).

Islamic Law and Technology Integration

Islamic law has the flexibility to interact with scientific developments, including in the practice of determining the hijri calendar. Wahid (2024) emphasizes that religious institutions and the scientific community are beginning to open up space for dialogue between modern astronomy and the principles of

ushul fiqh so that legal decisions can consider contemporary astronomical evidence without ignoring the textual foundation. This study also highlights how the collective ijtihad process and institutional forums are key to the legitimacy of decisions that integrate technology (Wahid, 2024).

Public Trust in Religious Authority

Public trust is an important factor in the acceptance of the decision of the new moon, where the legitimacy of religious authority plays a greater role than just scientific accuracy. A study on science communication and public trust by Intemann (2023) shows that the presentation of transparent scientific data and participatory communication increases the legitimacy of technical decisions. In the context of determining the hilal, a clear communication mechanism between hisab institutions, religious authorities, and the community has the potential to strengthen acceptability even if scientific methods are used (Intemann, 2023).

Global and Regional Harmonization Challenges

Although technology is able to improve accuracy, the difference in criteria for determining the new moon remains a big challenge. The analysis of the implementation of MABIMS criteria confirms that regional efforts to unify visibility criteria face implementation constraints at the local level due to variations in fiqh interpretation and institutional capacity, Sopa (2022). Therefore, the biggest obstacle is not merely the technical aspect, but the need to build institutional consensus and accountability mechanisms that are acceptable to various Muslim communities (Sopa, 2022).

METHODOLOGY

Types and Approaches to Research

This study uses a qualitative approach with a normative-empirical design. A normative approach is used to examine the basis of Islamic law related to rukyat and hisab through doctrinal analysis of the Qur'an, hadith, fatwas, and institutional regulations. Meanwhile, an empirical approach is used to examine social reality through the exploration of the experiences and perceptions of actors involved in the determination of the hilal. The qualitative approach was chosen because it is able to explore the meaning, legitimacy, and dynamics of public trust in more depth than the quantitative approach that is more generalized (Nowell & Albrecht, 2023).

Population and Sampling Techniques

The research population is stakeholders directly related to the determination of the hilal in Tasikmalaya, including scholars, officials of the Ministry of Religion, community leaders, and local falak practitioners. Participant selection was carried out using a non-probability sampling technique through a purposive sampling approach, namely the selection of informants based on the relevance of experience and knowledge to the research issue. A total of 15 informants were selected, taking into account the representation of three main categories of actors: religious authorities, state officials, and civil society.

Purposive selection is considered appropriate in qualitative research because it focuses on the depth of the data, not the large sample size (Etikan & Bala, 2023).

Data Collection Techniques

Primary data were collected through semi-structured in-depth interviews, participatory observation, and documentation. The interviews were conducted with open-ended questions that allowed the exploration of informants' narratives about their experiences related to the use of technology in determining the hilal. Observations are carried out during the rukyat process in the field, while documentation includes archives of government decisions, minutes of ulema deliberations, and official publications of the Ministry of Religion. The validity of qualitative data is maintained through the triangulation technique of sources and methods, thereby increasing the credibility of the research results (Flick, 2022).

Research Procedure

The research was carried out in four main stages. First, the preparation stage is in the form of a normative literature study on Islamic law and the collection of empirical references related to the implementation of rukyat technology. Second, the field data collection stage which includes in-depth interviews, observations, and documentation. Third, the stage of data reduction and organization, namely transcription of interview results, preparation of field notes, and thematic categorization. Fourth, the analysis and interpretation stage, where normative data is combined with empirical findings to produce a comprehensive synthesis that is relevant to the formulation of the problem.

Data Analysis Techniques

Data analysis was carried out through content analysis for normative texts and thematic analysis for empirical data. Content analysis was used to identify Islamic legal principles related to rukyat and hisab, while thematic analysis was applied to classify narrative patterns from interviews and observations. The analysis process is carried out iteratively with the help of NVivo 14 software to facilitate coding, categorization, and data validation. The use of qualitative software has been shown to improve accuracy in organizing data as well as strengthen the transparency of analysis (Jackson & Bazeley, 2023).

RESEARCH RESULT

Normative Analysis of the Basis of Islamic Law in the Determination of Hilal

The determination of the beginning of the hijri month is a fundamental issue in Islamic law because it is directly related to mandatory worship such as Ramadan fasting, zakat fitrah, and the celebration of Eid al-Fitr and Eid al-Adha. The normative basis for determining the hilal is mainly sourced from the Qur'an and hadith. In the Qur'an, Allah affirms the function of the hilal in QS. Al-Baqarah: 189:

يَسْأَلُونَكَ عَنِ الْأَهِلَّةِ ۚ قُلْ هِيَ مَوَاقِيتُ لِلنَّاسِ وَالْحَجِّ

"They ask you about the crescent moon. Say: The crescent moon is a sign of the time for mankind and for the Hajj" (QS. Al-Baqarah: 189).

This verse underlines the position of the hilal as a marker of the time of worship as well as the socio-religious calendar of Muslims. Thus, the presence of the new moon is not only an astronomical phenomenon, but also an integral part of the sharia rules.

In addition, the hadith of the Prophet Muhammad PBUH strengthens the urgency of rukyat as the main basis for determining the moon. In the sahih narration it is stated:

إِذَا رَأَيْتُمُوهُ فَصُومُوا، وَإِذَا رَأَيْتُمُوهُ فَافْطِرُوا، فَإِنْ غُمَّ عَلَيْكُمْ فَافْطِرُوا لَهُ

"If you see it (the new moon hilal), then fast, and if you see it (the new moon), then you are break fasting. But if it is cloudy (covered with clouds), then estimate (to be 30 days)" (HR. Bukhari and Muslim). (Bukhari, 1997, Kitab Al-Sawm, Hadith No. 1905; Muslim, 2000, Kitab As-Saum, Hadith No. 1082).

This hadith shows two normative principles: *first*, rukyat hilal is an authoritative method inherited from the time of the Prophet; *Second*, there is an alternative space in the form of refinement of the month count (istikmal) when natural conditions prevent direct observation. This means that Islam provides legal flexibility in dealing with human empirical limitations, as well as opening up ijthihad space to utilize the hisab method.

In the tradition of fiqh, scholars have different views on the position of rukyat and hisab. The Shafi'i and Hanbali schools emphasize rukyat as a valid condition for determining the beginning of the month, while some scholars of the Hanafi and Maliki schools are more open to the use of hisab under certain conditions (Safi & Hussain, 2021; Ilyas, 2022). This difference of views reflects the dynamics of Islamic law that is adaptive to the development of science. In the modern context, the development of astronomy (Islamic astronomy) and digital observation technology expands the human capacity to ensure the existence of the hilal more accurately, thus demanding the reinterpretation of normative texts to remain relevant to contemporary reality.

At the national regulatory level, the Indonesian government through the Ministry of Religious Affairs has institutionalized the process of determining the hilal. One of the forms is through isbat sessions which are routinely carried out before Ramadan, Shawwal, and Zulhijjah. This session integrates the results of field rukyat and astronomical calculations, then establishes official decisions that are binding nationally. In practice, Indonesia also refers to regional agreements, especially through the MABIMS (Minister of Religion of Brunei Darussalam, Indonesia, Malaysia, and Singapore) forums. Since 2021, MABIMS has updated the criteria for moon visibility with stricter scientific standards, namely a minimum height of 3 degrees and an elongation of 6.4 degrees. This criterion is effective from 2022 and is used as an official guideline in determining the hijri

calendar in the Southeast Asian region (Ministry of Religion of the Republic of Indonesia, 2022).

In addition to government regulations, the fatwa of the Indonesian Ulema Council (MUI) also provides religious legitimacy. MUI emphasizes that hisab cannot replace rukyat absolutely, but functions as a guide, verification, and supporting instrument in determining the hilal. Thus, there is an epistemological integration between traditional (rukyat) and modern (astronomical hisab) methods. The position of hisab is recognized for its ability to provide objective scientific predictions, while rukyat is maintained because it has a strong textual legitimacy in the hadith.

The results of this normative analysis show that the basis of Islamic law is flexible in accommodating technological developments. Both the Qur'an, hadith, and contemporary fatwas emphasize the importance of maintaining the authenticity of rukyat, but it does not rule out the possibility of using modern science as part of efforts to ensure accuracy. Within the framework of this research, the normative findings are very relevant with the aim of examining how technology can be accepted as a valid instrument in Islamic law. This is also in line with the normative-empirical methodological approach used, where normative data is the foundation in understanding social and institutional acceptance of the use of digital astronomical technology in determining the hilal.

Thus, normative analysis not only shows the continuity between religious texts and scientific developments, but also affirms the importance of institutional legitimacy in maintaining public trust. This legitimacy is reflected in the practice of isbat sessions, MUI fatwas, and the MABIMS agreement, which connects religious authorities, state authorities, and scientific authorities in a single legally recognized framework.

Perception of Religious Authority

The results of interviews with five scholars in Tasikmalaya show that there is a selective acceptance of technological innovation in determining the hilal. In general, scholars affirm that rukyat bi al-fi'li (direct observation of the hilal with eyes or optical instruments) remains a priority method that has shari'i legitimacy. However, they do not close themselves to the use of modern astronomical hisab, especially when used as an auxiliary instrument to ensure accuracy and verify the results of rukyat.

One of the scholars emphasized the importance of maintaining traditional authority in the practice of rukyat, but at the same time recognized the advantages of digital technology in improving accuracy. *"Technology helps, but rukyat is still the main thing. While hisab is only an aid, not a substitute,"* (OK-01, Interview June 3, 2025). This view shows a moderate attitude, where hisab is seen as not able to replace rukyat, but rather strengthen its validity.

Other senior scholars added that the legitimacy of decisions depends not only on astronomical data, but also on ijma' jama'i or the collective agreement of scholars in deliberative forums. *"If all scholars agree in the isbat session, the community will be calmer, even though there are differences in the results of rukyat and hisab,"* (OK-02, Interview June 5, 2025). This statement underlines that public

trust is built not solely on scientific accuracy, but on religious authority that is collective and inclusive.

In addition, some scholars also appreciate the transparency resulting from the use of digital observation instruments. With CCD (charge-coupled device) camera-coated telescope technology, the image of the new moon can be displayed in real-time to the wider community. *"Now the public can see the new moon directly through the screen, this makes the government's decision more transparent and can reduce polemics,"* (OK-03, Interview June 8, 2025). This view is in line with the research findings that the aspect of information disclosure is an important factor in strengthening institutional legitimacy.

However, not all scholars responded positively. There are also those who emphasize the risks if technology is used dominantly without involving the sharia dimension. *"If everything is left to technology, later people will forget the sunnah of the Prophet. Even though rukyat is worship, not just astronomical calculations,"* (OK-04, Interview June 12, 2025). This attitude reflects concerns that modernization could shift the value of spirituality contained in the practice of rukyat.

However, the majority of scholars still insist on the need for integration between religious traditions and modern science. *"The best is a combination, hisab to give direction, rukyat to ensure, then the final decision is at the isbat session with the ulama and the government,"* (OK-05, Interview June 18, 2025). This statement describes an integrative approach that prioritizes a balance between religious authority, scientific accuracy, and institutional legitimacy.

From the series of interviews, it can be concluded that the perception of religious authorities in Tasikmalaya towards technological innovation in determining the hilal is accommodative but still critical. Scholars accept the presence of digital observation technology and astronomical hisab as support, but still emphasize the importance of rukyat as a shari'i method that has a strong normative foundation. The legitimacy factor of the ulema and the collective session determines the level of public acceptance rather than the technical aspect alone. These findings strengthen the argument that the transformation of public trust in the decision to determine the moon is not only a matter of science, but also a matter of religious authority and a transparent public communication process.

Perspective of the Ministry of Religious Affairs Office

The views of officials of the Ministry of Religion (Kemenag) provide an important institutional dimension in understanding the acceptance of technology in determining the hilal. From the results of interviews with five informants, it can be seen that they are generally very open to technological innovations in astronomy and digital observation. According to them, the presence of technology has helped the validation process, accelerated decision-making, and minimized the risk of errors that may occur in traditional rukyat. This is in line with the duties of the Ministry of Religion as an official state institution responsible for providing legal certainty and social tranquility in determining the beginning of Ramadan, Shawwal, and Zulhijjah.

One of the officials emphasized that technology is very helpful in the preparation of a more measurable national Islamic calendar. *"With the existence of*

modern hisab, we can plan the hijri calendar in advance. This is important for the certainty of worship as well as social interests, such as joint leave and community activities," (KA-01, Interview June 4, 2025). This statement shows that the use of technology is not only related to religious aspects, but also has a direct impact on administrative and public governance aspects.

However, while technology is considered important, officials also acknowledge coordination challenges. The difference in results between hisab and rukyat often raises debates, both among scholars and the public. *"There are times when the hisab shows that the hilal is possible, but the results of rukyat in the field are different. This is where coordination between Islamic organizations becomes very crucial,"* (KA-02, Interview June 7, 2025). These findings confirm that science cannot stand alone without strong social and religious legitimacy.

In addition, officials assessed that public trust cannot be built only by displaying scientific data, but also by means of inclusive public communication. *"The community needs a simple explanation. If only astronomical numbers are presented, not everyone can understand. But if combined with the explanation of the ulama, the results are more acceptable,"* (KA-03, Interview June 10, 2025). This shows the importance of the involvement of religious authorities in bridging the gap between scientific data and the perception of the general public.

Other officials emphasized the transparency aspect. According to him, the open publication of hisab data and digital observation can strengthen the legitimacy of government decisions. *"Now with technology, people can see the position of the new moon through live broadcasts. This adds trust because they feel involved in the process,"* (KA-04, Interview June 14, 2025). This transparency is also seen as able to reduce the potential for polarization due to differences in views between Islamic organizations.

At the same time, there is also a view that emphasizes the need to strengthen inter-institutional harmonization. *"The key to success is not only in technological sophistication, but in the extent to which the government, ulama, and mass organizations can sit together. If there is an understanding, it will be easier for the community to accept the decision,"* (KA-05, Interview June 19, 2025). In other words, institutional legitimacy is formed from collaboration between religious authorities, scientific authorities, and state authorities.

Overall, the perspective of Ministry of Religion officials emphasized that the transformation of public trust in the determination of the hilal is highly determined by the integration between technical and institutional aspects. Modern technology plays a role in strengthening accuracy and efficiency, but public acceptance remains highly dependent on transparent communication, inter-institutional understanding, and the legitimacy of scholars. Thus, these findings strengthen the conclusion of the study that the application of technology in the determination of the hilal cannot be separated from the socio-religious context.

Views of Community Leaders

The perspective of civil society leaders provides an important overview of how technological innovations in the determination of the new moon are

accepted at the grassroots level. The five community leaders interviewed displayed a diverse spectrum of views, ranging from appreciation for modernization to skepticism of the role of technology in replacing the rukyat tradition. This variation reflects the complexity of public belief, which is influenced not only by scientific accuracy, but also by the religious legitimacy, cultural customs, and social authority inherent in the figure of the cleric.

Some community leaders positively welcomed the presence of technology, especially because it is considered to provide certainty of worship time. *"With technology, we are no longer confused. The schedule of Ramadan or Eid al-Fitr can be known more clearly, so that people can plan activities better,"* (TM-01, Interview June 2, 2025). This view shows that practical aspects of technology such as clarity and certainty are highly valued in the broader social context.

Other community leaders emphasized that technology brings added value in the form of information disclosure. *"If in the past people were just waiting for announcements, now they can see firsthand the rukyat process with the help of digital cameras. This makes the government's decision more trustworthy,"* (TM-02, Interview June 6, 2025). This shows that public transparency plays a major role in increasing public trust, in line with the findings of previous research on the importance of open communication in religious issues.

However, there is also a strong skepticism among traditionalist community leaders. They emphasized that the manual rukyat is more in accordance with the Sunnah of the Prophet and has its own spiritual value. *"We are more confident that the hilal is really visible directly, not just from a computer count. Because rukyat is worship, not just about astronomy,"* (TM-03, Interview June 9, 2025). This view confirms that religious validity is often placed above the technical superiority offered by modern science.

On the other hand, several community leaders underlined the important role of ulama in mediating between technology and tradition. *"After all, the community will follow what the ulama say. If the ulama accept technology, we will also follow,"* (TM-04, Interview June 13, 2025). This reiterates that public belief is more closely related to religious authority than scientific data of a technical nature.

Finally, there is a more moderate view, which tries to blend the two approaches. *"Technology is good to help, but the final decision must still be held by the ulema and the government. If all institutions agree, it will be easier for the public to accept,"* (TM-05, Interview June 17, 2025). This view reflects the need for integration between scientific instruments and institutional legitimacy in order to create stable public trust.

From the results of the interview, it can be concluded that the perception of community leaders towards the use of technology in determining the hilal is determined by two main things: *first*, the extent to which technology is considered to bring clarity and transparency; *Second*, religious legitimacy given by clerics and official institutions. Thus, these findings reinforce the argument that the transformation of public belief depends not only on scientific accuracy, but also on the symbolic and social power of religious authority.

DISCUSSION

The determination of the beginning of the hijri month, especially Ramadan and Shawwal, has historically depended on traditional rukyat practices, but the development of astronomical technology has increasingly influenced the discourse of Islamic law as well as public perception. Innovations such as astronomical hisab methods, telescopes, and digital observation instruments increase the accuracy and efficiency of determining the new moon. This research shows that although technology strengthens scientific certainty, public trust is not only determined by data, but also the legitimacy of religious authority, institutional transparency, and inclusive communication (Anas et al., 2023). This is in accordance with the theory of legitimacy which explains that a policy will only gain trust if it is accompanied by social recognition from the authorities, not solely because of its scientific truth. In other words, the accuracy of the new science has social significance when combined with the clarity of authority and acceptance of the wider community.

These findings confirm the importance of harmony between science accuracy and social acceptance. Previous research in Southeast Asia has shown that the combination of hisab and rukyat is the key to public acceptance of the determination of the hilal (Kasim et al., 2022). The MABIMS international forum has also introduced more modern criteria for the visibility of the new moon, but still maintains the traditional value of rukyat as part of religious legitimacy (Fitriyani et al., 2022). This context can be understood through the theoretical approach of traditional modernization, where technology is present not to erase old values, but rather to reinforce them with new instruments. The integration of scientific data and religious symbols in rukyat gives a double legitimacy: science provides certainty, while rukyat maintains the spiritual and symbolic aspects that are firmly inherent in the lives of the people.

The social and spiritual context also plays a big role. For some people, rukyat is seen as worship, so resistance arises when technology is considered to shift tradition. As explained by Ruslandi and Putri (2022), differences in methodology between Islamic organizations have the potential to cause public doubts if communication is not done openly. This distinction reflects the theory of social construction of reality, in which the meaning of a practice (in this case rukyat) is socially and spiritually formed, not purely technical. Therefore, the rejection of technological dominance is not just a matter of science, but is related to religious identity and symbols of deep-rooted traditions. Thus, a policy approach that emphasizes only the technical aspects risks ignoring the socio-religious aspects that determine legitimacy.

From the perspective of Islamic law, the integration of technology shows the flexibility of fiqh in responding to the development of the times. According to (Anas et al. 2023), Islamic law has an adaptive capacity as long as it does not eliminate spiritual values. The presence of modern instruments such as telescopes and astronomical software can be seen as a means of supporting ijtihad, not a substitute for religious authority. This is in line with the theory of sharia maqashid, that every new instrument in the determination of law can be accepted as long as it supports the achievement of sharia goals, namely the

benefit of the people. Thus, modern astronomical technology can be seen as a *wasilah* (means) to achieve *maqashid*, not as a substitute for sharia principles.

Practically, this study recommends strengthening institutional transparency through the publication of *hisab* data, *rukyat* documentation, and public access to digital observations. Transparency has been shown to increase public trust in religious policies (Maratus et al., 2023). In the perspective of social belief theory, information disclosure fosters a sense of community participation in the decision-making process (Wang & Liu, 2021; Yuan et al., 2021). With data that is widely accessible, the public not only accepts decisions as a product of authority, but also understands the process behind those decisions. This is important to reduce suspicion, increase accountability, and strengthen social cohesion in accepting the results of the determination of the *hila*.

However, this study also found obstacles. Differences in interpretation among scholars, limited public understanding of astronomical technology, and limited access to modern observatories in the region are real challenges. These factors may explain why some people trust local authorities more than central decisions. Therefore, communication and public education strategies need to be improved so that decisions on the determination of the new moon are more uniformly accepted. Further research is recommended to expand the scope of the region by paying attention to cultural diversity, conducting quantitative surveys to measure the level of public trust, and testing authoritative communication strategies. Cross-border comparative studies are also needed to assess the effectiveness of technology integration in various socio-religious contexts. With this approach, the discourse on *hisab-rukyat* integration can be enriched with broader empirical data.

Thus, the integration of technology in the practice of determining the *hila* is not just a technical innovation, but a form of modernization of Islamic law that remains rooted in tradition. The success of its implementation depends on the legitimacy of religious authorities, institutional transparency, and inclusive dialogue between religious authorities. The synergy between science and sharia allows the achievement of the punctuality of worship while strengthening public trust in the authority of religious decisions. The contribution of this research is to expand the theoretical understanding of the relationship between science and religion, while offering practical recommendations for the creation of a uniform Islamic calendar in the world.

CONCLUSION AND RECOMMENDATION

This research shows that advances in astronomical technology, such as digital *hisab*, modern telescopes, and image-based observation instruments, are able to increase accuracy and efficiency in determining the new moon. However, public trust in the decision at the beginning of the *hijri* month is not only determined by scientific certainty, but also by the legitimacy of religious authorities, the inclusiveness of deliberations, and institutional transparency. Scholars, government officials, and community leaders emphasized the importance of integration between traditional *rukyat* and modern technology,

emphasizing that collective legitimacy through isbat sessions and open public communication remains the key to public acceptance.

Thus, the integration of technology in the practice of determining the hilal can be understood as a form of modernization of Islamic law that remains based on the sharia tradition. The successful implementation of this technology is highly dependent on dialogue between religious institutions, participatory communication mechanisms, and open access to astronomical data to the public. This research contributes theoretically to expanding the discourse of interaction between Islamic law and modern science, as well as practically providing recommendations to strengthen public trust through transparency, education, and institutional harmonization in the determination of the Islamic calendar.

FURTHER STUDY

Future research could further explore how technological integration in hilal determination influences public perception and religious authority across different Muslim-majority regions. Comparative studies between countries with varying approaches to rukyat and hisab could provide deeper insights into how cultural, institutional, and theological contexts shape acceptance of astronomical methods. Additionally, future studies may examine the role of digital media and public communication strategies in building trust and transparency in the isbat process. Interdisciplinary research combining Islamic jurisprudence, communication studies, and science and technology studies could also offer a more comprehensive understanding of how modernization can coexist with religious tradition in the context of Islamic calendar determination.

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