

The Role of Al- Khawarizmi Astronomy Complex in Malaysian Astronomical Tourism

Mohd Razlan Ahmad^{1,2}, Mohd Paidi Norman^{1,2}, Nur Nafhatun
Md Shariff^{1,2}, Nor Nazmi Razali³, Mohd Takiyuddin Ibrahim^{2,4}

¹Academy of Contemporary Islamic Studies (ACIS), Universiti Teknologi MARA (UiTM),
40450 Shah Alam, Selangor, Malaysia, ²Islamic Astronomy & Solar Astrophysics (IASA),
Universiti Teknologi MARA (UiTM), 40450 Shah Alam, Selangor, Malaysia, ³Falak Syarie Unit,
Melaka Mufti Department, Malaysia, ⁴Academy of Contemporary Islamic Studies (ACIS),
Universiti Teknologi MARA (UiTM), Selangor Branch, Dengkil Campus, 43800 Dengkil,
Selangor, Malaysia

To Link this Article: <http://dx.doi.org/10.6007/IJAROSS/v12-i10/14816> DOI:10.6007/IJAROSS/v12-i10/14816

Published Date: 16 October 2022

Abstract

The observatory is one of the important elements in the field of astronomy. It is seen to have played an important role in increasing knowledge, and awareness of the importance of learning astronomy or space science through research and educational activities. In addition, it is also seen to have the potential to be one of the tourist attractions due to its location and attractiveness. Thus, the objective of this paper is to identify the role of an observatory has the potential to be developed as one of the centers of astronomical tourism activities and thus can provide economic returns to the country. This study focuses on the Falak Al-Khawarizmi Complex, Melaka because it is seen as one of the astronomical tourism centers in Malaysia. This study uses a qualitative methodology that is analysis and observation of various documents such as the number of visitors to examine the extent of the role it plays in astronomical tourism. The results of this study indicate that the observatory meets the elements of astronomical tourism based on its role in offering astronomy-based activities.

Keywords: Astronomical tourism, Al-Khawarizmi, Observatory, Astronomy, Education

Introduction

Astronomical tourism is a new opportunity for the tourism industry in Malaysia. Astronomical tourism needs to be explored more widely to provide substantial returns to the country. According to Samaneh (2012), astronomical tourism is a new branch in the tourism industry comes under the ecotourism industry which is nature -based tourism. Under astronomical tourism, the public's attention can be attracted by the location of watching beautiful sunrise and sunset scenery, and eclipses and celestial phenomena. According to Percy (1998), astronomy is a practical application and implications of its philosophy. It is an application of everyday events involving the accuracy of time, seasons, navigation, astronomical and

climatic phenomena, as well as for long-term issues such as climate change and biological evolution. He also adds that astronomy education does not necessarily take place only in any classroom, but it must also take place outside such as observatories and astronomical museums.

An observatory has been defined as a building equipped with certain equipment to enable scientists and astronomers to make observations and predictions on astronomical phenomena, the position or condition of stars and so on. The word observatory is a combination of two words, namely observatory and observation. The word 'hall' means a building, house (for the public) or a building specially built for a purpose, while the word 'observe' means to observe, perception is the act or process of observing a phenomenon, and receiving something in the heart with the senses such as seeing and hearing (Dewan Bahasa & Pustaka [DBP], 2005).

The observatory is an institution that undertakes the study of space observations by linking theories about space objects and phenomena of the universe as a whole. The glory of Islamic civilization that has existed since the eighth century has been said to be the beginning of the progress of the construction of observatories that have changed from time to time together with the help of observation equipment to conduct astronomical studies (Arny & Schneider, 2010).

Ahmad (2003) reports that astronomy in West Asia began to grow because of the good support of the Islamic rulers at that time such as building observatories and appointing Islamic scholars for the purpose of conducting research activities based on astronomy for general use and worship. The contribution of observatory to the community is very impactful especially in the Islamic world such in Malaysia. Ibrahim et al (2013) agree that the development of observatories in Malaysia is a continuation of the glory of Islamic astronomy in the past because it was also influenced by elements from West Asia such as the use of the names of Islamic astronomer figures, namely Al-Khawarizmi (Al-Khawarizmi Astronomy Complex, Melaka) and Al-Biruni (Al-Biruni Observatory, Sabah).

In Malaysia, the observatory is an astronomical observation complex administered by the government and serves as a centre for research, astronomy education, world time and calendar for Muslim worship as well as community-friendly through activities carried out (Ahmad, 2015). Ibrahim and Nordin (2005) add that an observatory should also function as a centre to spread the message of Islam through the field of astronomical science. In addition, it also plays a role in solving current Astro-Fiqh problems such as early determination of Islamic months, astronomical research centers, space science education centers and tourist destinations (Ibrahim et al., 2015). It also needs to take part in the astronomical tourism industry through astronomical educational activities conducted at its premise.

The establishment and construction of observatories in Malaysia is a very appropriate effort to provide opportunities for the community to deepen and advance their knowledge of astronomy. It is also a continuation of the glory of Islam in the field of astronomy in West Asia in the past. The involvement of the Ulama' at an early stage in the activity of observing the crescent moon for the determination of the beginning of the month of Islamic Hijri calendar has been an effort to develop astronomical knowledge to the community. This continuous

observation activity is an astronomical method that was once popularized by Islamic scholars by making the observatory as a place for the study of their astronomical knowledge (Ibrahim et al., 2013). Thus, several observatories have been built to realize the purpose of their establishment as well as contribute towards the advancement of astronomical tourism.

Statement of Problem

Astronomical tourism is also one of the night-time activities that complement traditional tourism activities. Fixed or portable observatories can be easily provided with the availability of quality telescopes. Jiwaji (2016) opines that astronomical tour guides can be trained on an ongoing basis and night sky viewing activities can be conducted monthly as conducted in Tanzania. Thus, the observatory can play an important role in developing the astronomical tourism industry through educational activities.

The role that the observatory has played is very important for the advancement of astronomy. This is because the observatory is a specialized place and complete with basic equipment facilities for astronomers to explore small parts of the universe such as studying radiation from celestial objects to form theories about the celestial bodies (Othman, 1993; Zainuddin, 2002).

The observatory too has played a very important role in the study and expansion of the knowledge of astronomy in the society and the country. There are several elements that make the observatory a focal location of the astronomical tourism sector, namely its strategic position, logistic facilities, and amenities. The position of the observatory in our country which is in a tourist hotspot is one of the factors that the observatory has the potential as an astronomical tourism location.

Tapada et al (2021) report that the growing demand for viewing the night sky is due to the continuous efforts by a combination of astronomers, academics, ecologists and certain groups to maintain a starry dark night sky. This effort has led to the preparation of dark night sky reserve locations to see the light of the stars around the world. Locations are generally associated with natural areas that have low air and pollution values that are far from light pollution sources.

In this regard, it seems that the study of observatories in Malaysia has been done in various aspects such as their roles, specifications, activities, facilities, and contributions of observatories to the field of astronomy. Since the beginning of the glory of Islamic civilization, the observatory has played an important role in the development of astronomy such as the study of the movement of the sun and moon, the position of the stars and its relationship with the Muslim worship activities performed by Islamic astronomers at the Shammasiyah Observatory, Qasiyun Observatory, Observatory Banu Musa and others (Mujani et al., 2012; Ismail, 2015).

An observatory has also played a very important role in solving problems related to Astro-Fiqh issues such as the appearance of the crescent moon for the early determination of the Hijri month (Ibrahim et al., 2015; Safiai and Ibrahim, 2015). In addition, a study on the specifications of observatories in Malaysia was conducted so that the observatories have

specific and distinctive features based on Malaysian identity apart from meeting the requirements of Shariah (Ahmad, 2015).

In addition, an observatory has the potential to be developed in the field of astronomical tourism because it is able to provide economic returns as what has been done in Japan, the United States and European countries (Syed Mohamad et al., 2016). This also proves that the observatory has great potential in the field of astronomical tourism with all the facilities and roles that can be carried out there. Safiai et al. (2020) strongly believe that various astronomy-based elements can be developed as locations of tourist attractions such as observatory, archeoastronomy, mosques and dark night sky areas.

Priyatikanto et al (2019) argue that the preservation of the starry dark sky is an important step that needs to be taken in a modern context. It is also unstoppable by the complex development of human civilization in preserving ecosystems. Light pollution needs to be reduced and managed wisely for the systematic mapping of the night sky in terms of its brightness, while light pollution seems to be the starting point as an obstacle to the progress of astronomical tourism.

It is therefore the objective of this paper to identify the role of Al- Khawarizmi Astronomy Complex in Malaysian Astronomical Tourism. This study hopes to find out if astronomical education activities conducted at an observatory can be one of the major contributions to astronomy tourism in our country. This is because astronomical education activities have always received encouraging responses among the community in increasing their knowledge in the field of astronomy.

Methodology

This study employed the library method which is a qualitative approach by reviewing previous research documents related to observatory. In addition, information related to the observatories studied was also obtained from interviews with staff officers at the Melaka State Mufti Department who manage the Al-Khawarizmi Observatory. Studies on the background of the Al-Khawarizmi Astronomy Complex as well as the role played by the management of the observatory, especially astronomy education activities which have attracted different walks of society to visit the observatory.

The Al-Khawarizmi Astronomy Complex was chosen as the recreation and research location because it has been listed as a tourist location and one of the economic centers for astro-tourism in Melaka (Kerajaan Negeri Melaka [KNM], n.d). The astronomical complex was officially opened in 2007 by Dato 'Seri Abdullah bin Haji Badawi, the fifth Prime Minister of Malaysia. The construction of the complex began in 2002 and went through three phases of construction. This complex is the official crescent observation site for the state of Melaka. The location of the complex is very strategic and suitable for the development of an observatory because it is located on the beach with a height of 38 meters above sea level facing the Straits of Melaka in Kampung Balik Batu, Tanjung Bidara, Alor Gajah, which is about 25 km from the Historic City of Melaka (Safiai and Ibrahim, 2012; Ibrahim et al., 2012; Ahmad, 2015).

Findings

The results of the study have found that the Al-Khawarizmi Astronomy Complex has played an excellent role as a tourist attraction in the field of astronomy. The astronomical complex consists of two main parts, namely the training complex (Figure 1) which consists of an auditorium, a seminar room, a multi -purpose hall, a living room, a musolla, an office and a robotic observatory, while another section consists of an exhibition gallery, a lecture room, an office, a planetarium, an observation deck and Al-Khawarizmi Observatory (Figure 2). The Al-Khawarizmi Observatory area has been managed by the Melaka State Mufti Department.



Figure 1: Al-Khawarizmi Astronomical Complex
Source: Melaka Mufti Department

Figure 2: Al- Khawarizmi Observatory

Source: Melaka Mufti Department

One of the main roles carried out by the Al-Khawarizmi Observatory is astronomical education activities. Through such activities, this astronomical complex is always an attraction to both local and foreign visitors because it has complete equipment and facilities. Technological equipment such as sophisticated telescopes must be one of the main attractions for visitors and researchers in obtaining observatory services as well as study tours for school students. This encouraging response shows a positive development because astronomical knowledge can be expanded through tourism activities to various levels of society in line with the actions of the Melaka state government which has turned the Al-Khawarizmi Astronomical Complex into as one of the state's tourist locations.

In addition, the astronomical complex has been an attraction due to the organization of various astronomy-based activity packages offered to visitors such as academic visits at astronomical galleries, night sky observations, planetarium screenings, courses, workshop, and seminars. The study found that fees charged to clients or visitors are reasonable as shown in Table 1. The collected fees can certainly be used as an income generation for the management.

Table 1

Current payment rates to visitors to the Al-Khawarizmi Astronomical Complex

Type	Adult (13 years old and above)	Child (12 years old and below)
Entrance / Visit	RM1.00	RM1.00
Planetarium Presentation	RM2.00	RM1.00
3D Show	RM3.00	RM2.00
Night Sky Observations	RM3.00	RM3.00

Source: Al-Khawarizmi Astronomy Complex, Melaka Mufti Department

Al-Khawarizmi Astronomy Complex has always been an important location to be visited by people who are interested in astronomy. Table 2 shows the number of visitors that has been recorded in getting services and using facilities available there. According to Mohamad et al. (2016), the presence of visitors to the Al-Khawarizmi Astronomy Complex has contributed to the tourism industry especially hospitality one.

Table 2

Number of visitors to Al-Khawarizmi Observatory from 2010-2019

Year	Number of Visitors*
2010	8,802
2011	10,933
2012	13,199
2013	10,777
2014	10,053
2015	6195
2016	5257
2017	4675
2018	5546
2019	6129

Source: Al-Khawarizmi Astronomy Complex, Melaka Mufti Department

*This number of visitors refers to visitors present at the Al-Khawarizmi Observatory only, not including visitors to the complex in general.

Conclusion

In conclusion, this study found that the Al-Khawarizmi Astronomy Complex has an important role in the field of astronomical tourism through educational activities based on astronomy or space science. Based on the results of the study, the number of visitors to the Al-Khawarizmi Astronomy Complex plays an important role in ensuring its function as an astronomy-based tourism centre. Although the number of visitors has somewhat declined starting in 2015 due to renovation, the response has still been encouraging to visit the astronomical complex as an astro-tourism destination.

In addition, the move by the Melaka state government to introduce the Al-Khawarizmi Astronomy Complex as one of the tourist attractions is a very wise decision. Strong encouragement and support from the state government is needed to ensure that the observatory will become one of the main attractions in the state for visitors to come and gain knowledge about astronomy. To ensure that the Al-Khawarizmi Astronomy Complex remains relevant, we recommend that it organize various forms of astronomy activities on an ongoing basis every year. Furthermore, support from schools, institutions of higher learning and the community is important to ensure that the Al-Khawarizmi Astronomy Complex continues to function properly and have an impact on it.

Appreciation

This research study was funded by ACIS Internal Research Grant (600-TNCPI 5/3/DDF (ACIS) (005/2020), Universiti Teknologi MARA.

Corresponding Author

Mohd Razlan Ahmad, Academy of Contemporary Islamic Studies (ACIS), Universiti Teknologi MARA (UiTM), 40450 Shah Alam, Selangor, Malaysia.

Email: mrzlan@uitm.edu.my

References

- Ahmad, M. R. (2015). *Pembinaan balai cerap astrofiqh berasaskan spesifikasi mekanikal dan pematuhan syarie di Malaysia*. Master thesis. Universiti Kebangsaan Malaysia.
- Ahmad, Z. (2003). *Influence of Islam on World Civilization*. New Delhi: Adam Publishers & Distributors.
- Arny, T. T., & Schneider, S. E. (2010). *Explorations: Introduction to Astronomy* (6 ed.). New York: McGraw-Hill Science Engineering.
- Dewan Bahasa Pustaka. (2005). *Kamus Dewan (Edisi 4)*. Kuala Lumpur: Dewan Bahasa dan Pustaka.
- Ibrahim, I. A., Safiai, M. H., & Jamsari, E. A. (2015). Functions of astrofiqh observatories in Malaysia in solving astrofiqh issues. *Mediterranean Journal of Social Sciences*, 6(1 S1), 112-119.
- Ibrahim, I. A., & Nordin, R. (2005). Peranan Balai Cerap Al-Khawarizmi sebagai medium dakwah berasaskan sains di Malaysia. *Kertas Kerja Seminar Internasional Dakwah Serumpun Malaysia-Indonesia, IAIN Imam Bonjol, Padang, Indonesia, 23-26 Ogos*.
- Ibrahim, I. A., Ahmad, M. R., & Safiai, M. H. (2013). Balai Cerap Astrofiqh di Malaysia: Kesinambungan Ilmu Falak Syarie Dari Asia Barat. *International Journal of West Asian Studies*, 5(2), 35-50. doi:10.5895/ijwas
- Ibrahim, I. A., Ahmad, M. R., Safiai, M. H., & Mujani, W. K. (2012). Islamic Astronomy and the Establishment of Al-Khawarizmi Complex in Malaysia. *Advances in Natural and Applied Sciences*, 6(3): 316-320. ISSN 1995-0772
- Ismail, K. (2015). *Sejarah balai cerap di Malaysia: Kajian isu-isu pembangunan sumber manusia*. PhD thesis, University of Malaya.
- Jiwaji, N. T. (2016). Astro-Tourism as a high potential alternative tourist attraction in Tanzania. *African Journals Online*, 23(1). eISSN: 0856-6739
- Kerajaan Negeri Melaka. (n.d). *Info pelancongan: Tempat-tempat menarik*. Retrieved from <http://www.melaka.gov.my/ms/pelancongan/info-pelancongan/tempat-tempat-menarik>
- Mujani, W. K., Ibrahim, I. A., & Safiai, M. H. (2012). Observatories in Islamic history. *Advances in Natural and Applied Sciences*, 6(8): 1370-1373. ISSN 1995-0772.
- Othman, M. (1993). Kepentingan balai cerap dalam penyelidikan astronomi. *Kertas Kerja Seminar Ilmu Falak Peringkat Kebangsaan 1993. Anjuran bersama Kolej Agama Sultan Zainal Abidin (KUSZA), Bahagian Hal Ehwal Islam, Jabatan Perdana Menteri dan Persatuan Falak Syarie Malaysia*. Kolej Ugama Sultan Zainal Abidin.
- Percy, J. (1998). Astronomy Education: An international perspective. *International Astronomical Union Colloquium*, 162 (pp. 2-6). Cambridge University Press. doi:10.1017/S025292110011468X
- Safiai, M. H., & Ibrahim, I. A. (2015). Astrofiqh observatories in servicing Islam. *The Proceeding of the 6th International Symposium on Islam, Civilization and Science (ISICAS 2015)*. UKM Bangi: Institut Islam Hadhari (HADHARI).
- Samaneh, S. N. (2012). Astronomical Tourism (Astro-Tourism) in Cebu, Philippines: Essential Features in Selected Destinations and Its Complementing Visitor Attractions. *International Conference on Trade, Tourism and Management (ICTTM'2012)*. December 21-22, Bangkok (Thailand).
- Mohamad, S. S., Ibrahim, I. A., Safiai, M. H., Noor, M. A., & Zikri, Y. R. M. (2016). Balai cerap astrofiqh dan prospek pulangan ekonomi di Malaysia. In Ibrahim, I.A & Safiai, M.H (Ed.),

Prosiding Persidangan Antarabangsa Falak di Dunia Islam. Kajang: Persatuan Falak Syar'i Malaysia. ISBN 978-967-1387-80-1

Tapada, A., Marques, C. S., Marques, C. P., & Costa, C. (2021). Astrotourism: A literature review and framework for future research. *Enlightening Tourism. A Pathmaking Journal*, 11(2), 291-331.

Zainuddin, M. Z. (2002). Institusi Balai Cerap: Peranannya dalam pendidikan, penyelidikan dan pelancongan. *Kertas Kerja Seminar Penghayatan Ilmu Falak. Anjuran Kerajaan Negeri Melaka & Jabatan Mufti Negeri Melaka dengan kerjasama Persatuan Falak Syarie Malaysia*. Air Keroh d'Village Resort, 7-8 April.