



# Analysis of Issues on Human Resource Development in Astronomical Observatories

Khadijah Ismail <sup>1</sup>, Mohd Hafiz Safiai <sup>2</sup>, and Ezad Azraai Jamsari <sup>3\*</sup>

<sup>1</sup> Department of Islamic History and Civilization, Academy of Islamic Studies, University of Malaya, Kuala Lumpur, MALAYSIA.

<sup>2</sup> Research Centre for Sharia, Faculty of Islamic Studies & Institute of Islam Hadhari, Universiti Kebangsaan Malaysia, Selangor, MALAYSIA.

<sup>3</sup> Research Centre for Arabic Language and Islamic Civilization, Faculty of Islamic Studies, Universiti Kebangsaan Malaysia, Selangor, MALAYSIA.

\*Corresponding Author (Tel: +616-2123343. Email: [eajsti@gmail.com](mailto:eajsti@gmail.com), [ezad@ukm.edu.my](mailto:ezad@ukm.edu.my)).

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## Abstract

This article discusses the problems faced in human resource development at astronomical observatories in Malaysia. The development of Islamic astronomy programs and subjects at Malaysian universities has produced graduates with theoretical and practical knowledge of astronomy. However, these graduates are still unable to apply the skills learned in the appropriate place. Therefore, this research aims at identifying issues related to human resource development in Malaysian astronomical observatories. This is a qualitative study using a document analysis approach, interviews, and observations. The findings show that there are several human resource development issues in the observatories. The issues are related to the human resource recruitment system, workload, training and expertise, discipline, and worker commitment. This research is expected to benefit the government and the administration of observatories in Malaysia, indirectly enhancing human resource development at the observatories.

**Disciplinary:** HRM, Islamic Astronomy, History, Islamic Studies.

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## 1. Introduction

In the history of the Islamic civilization, the development of the observatory institution was in line with the achievement and rapid development of knowledge in astronomy. The early

construction of observatories was concentrated in the eastern part of the Islamic empire, namely the cities of Baghdad and Damascus, in addition to some constructed in the western part, namely Andalusia (Sayili, 1960; Ibrahim et al., 2012).

This development of the observatory institution was continued by the West which emulated some of the characteristics of the Islamic civilization era and subsequently augmented or replaced them with more sophisticated instruments such as the telescope and other auxiliary equipment (Safiai et al., 2014; Ibrahim et al., 2013). With improved efforts and capacity, research orientation and findings of the observatory institution increasingly developed and greatly helped humans to understand the phenomena and occurrences of nature. Modern research in astronomy also covers various aspects of scientific research such as calendar systems, studies of the sun and moon, dark matter, and atmosphere (Ilyas, 2003).

## 2. Literature Review

Historically, most of the state observatories in Malaysia are generally placed under the management of the respective State Mufti Departments, because the scope of duty and main observation at the observatories are related to affairs of Islamic law, namely moonsighting to determine the start of Ramadan (fasting) month, celebrations of Eid al-Fitr in the month of Shawal and Eid al-Adha in the month of Zulhijjah. However, the National Observatory in Langkawi is regulated by Malaysia Space Agency (MYSA) at the Ministry of Science, Technology, and Innovation (MOSTI).

The development of programs and subjects in Islamic astronomy at Malaysian universities has produced graduates with theoretical and practical knowledge of astronomy or *falak*. According to Ismail (2008), however, a market study of graduates in the Islamic astronomy program of Universiti Malaya showed that graduates are unable to apply the skills they learned in the appropriate place, specifically in observatories nation-wide and *falak* sections in State Mufti Departments in the entire country because the recruitment system is generally through the Public Services Commission or, in some states, the positions are within the jurisdiction of the State Government Secretariat and State Religious Council which only appoint graduates born in the respective states. The majority of respondents stated that graduates of this program are suitable for employment in organizations of *falak* background, in management of observatories, and Shariah administration. Thus, this problem has an impact to some extent and is very disadvantageous to the human resource needs of observatories and *Falak* Unit of State Mufti Departments in the entire country.

The legacy of observatory's role in research activity and Islamic astronomy education since the time of the Islamic civilization requires to be continued by observatories in today's Islamic world. An observatory is a place for astronomy research activity and this role should be optimally vitalized instead of making the observatory as a mere tourist place or attraction (Nordin, 2010). Failure to maximize its use will make the development of a constructed observatory a considerable waste of funds. An observatory that is run by many skilled workers and quality scientists,

instruments that can record astronomical data accurately, and organized management are characteristics of a good observatory. Unfortunately, however, observatories in the entire country face funding problems relating to instruments, scientists, and skilled workers (Awang, 2011).

Shortage of skilled and efficient workers, not having specific training in managing an observatory, weak organization, and inadequate maintenance of instruments require further study of the observatory involved (Zainuddin, 2013). Besides, there are sophisticated observatories with problems of having only one person who knows how to operate the observatory telescope, not user-friendly telescope, besides limiting the use of telescopes for only the founder of the observatory or one-man show, without preparing a second echelon, and appropriate training for officers at the observatory are some of the problems faced in the observatories (Ahmad, 2014). Another issue arising which may be perceived at the Langkawi National Observatory is the workload and dumping of tasks on a worker. For example, a research officer at the Langkawi National Observatory is required to understand and perform night observation, do analysis, telescope maintenance, and daily routine at the observatory such as attending to visitors in the daytime. According to Asillam (2013), the staffing system under the Civil Service Commission and State Government Secretariat is believed to cause some difficulty for the recruitment of additional workers.

Further, according to Awang (2011), the Sultan Zainal Abidin University (UNISZA) Observatory experiences a shortage of skilled manpower and technical problems involving telescope damage. In addition, there are complaints of technical damage at the observatory each time visitors from schools wish to visit a certain observatory (Ahmad, 2013). Research on human resource development at the observatory is extremely essential for researchers to examine the deficiencies and actual problems experienced at observatories in Malaysia. Are the problems caused by funds shortage, human resource mismanagement, or shortage of expert staff who can supervise an observatory? All questions need to be studied and scrutinized. Hence, research on the actual issues of human resource development at the observatories in Malaysia is very important to answer the questions arising.

### 3. Methodology

This article focuses on a discussion covering the issues of human resource development at observatories in Malaysia. The discussion shows a leakage factor of human resource management in the recruitment of workers at the observatories. This is qualitative research using a case study design. The approaches used are interview and observation.

This qualitative study was conducted using instruments of document analysis. Data were obtained from authoritative sources such as journal articles, seminar papers, conference proceedings, colloquia, books, government and non-governmental reports of information related to human resources. In addition, data and information were also sourced from relevant agencies such as the National Space Agency (Malaysia) and Mufti's Department from each state. The development of human resource sources was referenced to understand the issue of this field. The data obtained were examined and analyzed using a thematic approach.

In addition, many informants were selected to obtain information, at once analyzing obtained data to conclude this research. To strengthen the value of this research, interviews were made at few places, such as National Planetarium, observatories, and astronomy complex. This is to ensure the data obtained in the research are genuine to be used in the analysis process.

## 4. Result Analysis

Based on interviews with observatory managers and staff as well as observation at observatories in Malaysia, the researcher has categorized issues of human resource development using software, Atlas.ti. This software facilitates analysis and arranges interview content into the required sub-topics. Using this software, human resource development issues are identified into four, namely, human resource recruitment system, workload, training and expertise, and worker discipline and commitment. The following issues are presented as generally relevant to observatories in the whole of Malaysia.

### 4.1 Issues of Human Resource Recruitment and Staffing

As mentioned, human resource management at observatories in Malaysia is bound to one of the three organizations, namely, MOSTI under the Civil Service Department, State Mufti Department under the State Government Secretariat, and universities. Hence, the worker recruitment systems in some of the observatories face difficulty in recruiting more workers. Some observatories have sophisticated instruments but have not recruited sufficient workers to accommodate the workload because they are bound to particular quotas set by the Public Services Department and State Government Secretariat which have their own mission and human resource guidelines. Observatory coordinators and managers interviewed are of the opinion that the system of worker recruitment should be re-evaluated because some policies of the government and Public Services Department limit worker appointment (Asillam, 2013).

Another problem arising concerns the understanding of the vision and mission of the observatory between the manager and the experts in the process of construction and input after construction leading to conflicting opinions on the number of workers necessary for the observatory. The reason for this is that an observatory has a very sophisticated and big telescope, so without skilled workers and incentives that should be given to them by the authorized party involved for operating the observatory; the observatory will certainly be unable to play its proper role. A big telescope has the capacity to enable good research activity. However, if the authorized party for an observatory has the mission and objective limited to only providing education to the public, then no funds will be provided for recruiting researchers and sufficient workers for the observatory (Hamzah, 2014).

In worker recruitment at State observatories under the patronage of the State Mufti Departments, the prerequisite for working at the *Falak* Unit and observatory is a qualification in religious studies as workers and a science degree as officers. As workers do not have any basic knowledge of *falak*, specific training in this field is provided when they begin their job. The training

provided due to lack of knowledge or expertise is time wasted because there are already available suitable graduates with knowledge in *falak* who should be channelled directly to the observatory. This is the result of recruiting unsuitable workers (Ismail et al., 2014).

The process of worker recruitment also involves a considerable amount of funding for salaries and allowances, hence, being bound to the Federal government and State government sectors at times causes difficulty to recruit more staff because there is no special provision for funding of human resource required such as recruiting researchers. A considerable amount of funds has been invested in building observatories, but there is still insufficient provision specifically for human resources to run the observatory after its construction. This requires due attention from the authorities overseeing the observatories. This matter contradicts principles of human resource development theory from the Islamic as well as Western perspectives, that require an organization and its head to take seriously proper planning of training needs and human resource in running an organization, such as the human resource development theory of Imam Hasan al-Banna, namely, team-building is essential prior to drive the organization towards achieving its mission and vision (al-Banna, 2001).

In addition, some observatory managers are of the opinion that job entry through the Public Services Commission is not ideal for recruiting observatory staff. The reason given is that observatory workers need to have a special interest and passion for the world of astronomy, especially because of their role for observation work in the middle of the night, and to have the skill to manage instruments. Further, workers face the problem of being transferred or posting to a different workplace as the government system is based on vacancy and grade. For example, there was a *Falak* officer at the Penang State Mufti Department who continued his studies for a Master's degree in *Falak*. Ironically, upon his promotion, he was transferred to some places else for another post not related to *falak* because the new grade is not available at the previous *Falak* Unit. This is clearly a loss of skilled human resources who have gone through extensive training while he was a *falak* officer. This case clearly contradicts the human resource development principle in both Islamic and Western theories, which embraces the concept of transfer training after undergoing a training process through the transfer of knowledge and training acquired, in the form of action within the organization and its surroundings (Hamzah, 2014).

There is also a case of an observatory with a suspended status to this day due to overlapping powers between a State Religious Council and a State College after it was upgraded in status to an Autonomous University (Zainal, 2013). The suspended status of the observatory caused difficulty to obtain a considerable amount of funding for maintenance. The fund provided by the university is sufficient only for minor maintenance and funding for workers is the university's responsibility. This shows that problems in the human resource environment, which are emphasized in human resource development theory from both Islamic and Western perspectives, affect human resource development at observatories (Azmi, 2013).

In addition, the result of the researcher's observation shows that most observatories were established without human resource planning and development. A considerable amount was invested to build an observatory and *baitul hilal* complex, without implementing financial provision for human resources and its development as well as a proper staffing system. Hence, attention from the observatory founder for this important matter is required in order to ensure that suitable human resource is utilized at an observatory in accordance with the principles of human resource development theory.

## 4.2 Issues of Workload

Another problem arising which can be observed at the Langkawi National Observatory is the problem of workload and dumping of tasks on a worker. For example, a researcher at Langkawi National Observatory is required to understand and perform night observations, do analysis, telescope maintenance, and also daily routine at the observatory such as attending to visitors in the daytime. The staffing system under the Public Services Department causes difficulty to recruit more workers. Even though the training is given to observatory staff and workers, the training does not meet its output objective because of the workload and dumping of tasks to the same person. This impacts the operation and quality improvement of workers at the observatory. In addition, the stress of task dumping experienced by the person also causes difficulty to complete a given task within a set timeframe. This contradicts human resource development principles which emphasize human welfare and the emotional well-being of workers in their work. Inappropriate workload may also demotivate a worker (Asillam, 2013).

Due to a stated constraint in a circular, observatory workers are obliged to work at irregular times when required. Hence, those who do research activities stay up all night but also have to come to work in the daytime. In addition, an observatory manager who works as a religious law enforcer in the morning is entrusted with managing the observatory because of his experience during its construction. This overlapping of responsibilities causes a person to lack proper focus on the observatory. Other than observation work, workers also need to do administrative work such as attending to visitors and managing correspondence. Drivers and administrative assistants also have to help in doing telescope maintenance and technical work involving visits and maintenance of instruments (Abdul Rashid, 2013).

## 4.3 Issues of Training and Expertise

Training for observatory workers is very essential as they manage the observatory in terms of instrument maintenance, research, and educating society. From interview and observation, it is found that training is divided into training for administration and for research. The problem in training, specifically in instrument maintenance in some observatories, is that instruments get damaged and cannot be fixed, thus adding to financial burdens. Due to this problem, training to be systematically and carefully implemented. Each worker starts with zero knowledge about the

observatory's system and instruments and will usually self-study from an equipment manual or website (Ibrahim et al., 2017).

Very few observatories are willing to train workers overseas to gain expertise while some workers view the training given as inadequate for astronomical research and telescope system. Thus, workers experience difficulty in operating instruments in the beginning but after some time, the problem is overcome through learning by experience. Observatories throughout the country, specifically those under the State Mufti Departments still lack experts and training in operating instruments. Most of the workers interviewed send telescopes for external maintenance. Further, not all observatory workers have mastered using instruments related to astrophysics research such as spectroscope, CCD camera, and others. This also causes the orientation of observatories in the whole country, specifically under the State Mufti Departments, to be mostly focused on educating society on astronomy or *falak* (Ibrahim et al., 2015).

In addition, the issue of training and expertise arises when a position at the observatory under the State Mufti Department and Department for Islamic Development of Malaysia (JAKIM) provides only for a scheme with an Islamic background, when today, graduates in *falak* already exist. This makes training a waste in addition to the trained worker getting transferred to a non-*falak* section because there is no problem of vacancies there. In human resource development theory, the problem is that training transfer is lost to the observatory to vitalize research culture at the observatory with various research activities which may be implemented, as an already trained worker has gained a wider view of astronomy while learning at university or college.

#### 4.4 Issues of Discipline and Commitment at Work

Discipline in an observatory worker is very important in research and managing instruments. There are workers who are neglectful in taking care of instruments leading to damage. Discipline and interest are essential as the worker needs to be willing and alert at night to do observation activity. Although only a minority of workers lack discipline and do not have a high commitment as observatory workers, this attitude has a significant impact on the observatory as a whole. Figure 1 summarizes involved issues on human resource development in astronomical observatories.



**Figure 1:** Issues on Human Resource Development in Astronomical Observatories.

In the Islamic perspective of human resource development, among the matters arising, is apathy in using instruments leading to damage and lack of care when doing a task. Lack of focus in working because of inappropriate workload besides assigned tasks also has an impact on worker discipline and commitment at an observatory (Ahmad, 2014).

## 5. Conclusion

As a whole, the issue of human resource recruitment is caused by the lack of will and effort on the part of the authorities to add more human resources at observatories due to insufficient funds and lack of willingness to develop an observatory as a place of research. In addition, the constraint of the human resource recruitment system at observatories in the entire Malaysia which uses the system of the Public Services Commission and of employment by State Mufti Department which limits appointments to only persons born in the respective states becomes the cause for trained human resource to be ineligible to work at state observatories. This has an effect and is related to the second issue, namely the issue of workload. An insufficient number of workers at an observatory causes a worker to do multiple tasks, including the observatory manager himself as well as the clerk having to do technical tasks such as operating a telescope and managing visitors.

Hence, among the proposals put forward are that the staffing and job entry systems include interviews and the mentor-mentee system as the entry system under the Public Services Commission and staffing system under the State governments are not so practical as there are still many graduates qualified in *falak* who do not get the opportunity to practice the skills learnt because they cannot penetrate these systems. In addition, work as an observatory researcher and worker needs continuous training which requires revamping of the selection method for observatory positions. It is hoped that this early study will be beneficial to observatory implementers and managers nation-wide to give their due attention to the importance of human resource development at their observatories.

## 6. Availability of Data, and Material

Data can be made available by contacting the corresponding author.

## 7. Acknowledgment

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## 8. References

- Abdul Rashid, A.T. (2013). *Sejarah Balai Cerap di Malaysia (History of the Observatory in Malaysia)*. Interview, February 10.
- Ahmad, N. (2014). *Sejarah Balai Cerap di Malaysia (The History of Observatories in Malaysia)*. Interview, April 1.
- Ahmad, S. (2013). *Seminar Astronomi Islam (Islamic Astronomy Seminar)*. Academy of Islamic Studies, University of Malaya, Petaling Jaya, April 25.



- Ahmad, S. (2014). *Sejarah Balai Cerap di Malaysia (The History of Observatories in Malaysia)*. Interview, February 19.
- al-Banna, H. (2001). *Majmu'at al-Rasa'il*. Cairo: Dar al-Kalimah li al-Nashr wa al-Tawzi'.
- Asillam, F. (2013). *Sejarah Balai Cerap di Malaysia (The History of Observatories in Malaysia)*. Interview, May 20.
- Awang, A. (2011). *Balai Cerap KUSZA di Bukit Merang, Setiu, Terengganu: Kajian Khusus tentang Peranan dan Aktiviti (KUSZA Observatory at Bukit Merang, Setiu, Terengganu: Special Study on Role and Activity)*. Final project, Department of History and Islamic Civilization, Academy of Islamic Studies, University of Malaya, 91.
- Azmi, S.H. (2013). *Sejarah Balai Cerap di Malaysia (The History of Observatories in Malaysia)*. Interview, February 10.
- Hamzah, A.Z. (2014). *Sejarah Balai Cerap di Malaysia (The History of Observatories in Malaysia)*. Interview, February 11.
- Ibrahim, I.A., Ahmad, M.R. & Safiai, M.H. (2013). Astrofiqh Observatories in Malaysia: A Continuation of Islamic Astronomy from West Asia. *International Journal of West Asian Studies*, 5(2), 35-50.
- 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 Science*, 6(3), 316-320.
- Ibrahim, I.A., Safiai, M.H. & Jamsari, E.A. (2015). Functions of Astrofiqh Observatories in Malaysia in Solving Astrofiqh Issues. *Mediterranean Journal of Social Science*, 6(1,SI), 112-119.
- Ibrahim, I.A., Safiai, M.H., Jamsari, E.A., Ahmad, M.Y., Nor, A.H.M., Nasir B.M. & Hehsan, A. (2017). Observatories in Malaysia, Descendants of Islamic Civilization Superiority. *International Journal of Civil Engineering & Technology*, 8(12), 782-795.
- Ilyas, M. (2003). *Astronomi Islam dan Perkembangan Sains: Kegemilangan Masa Lalu Cabaran Masa (Islamic Astronomy and Scientific Development: Past Glory and Future Challenges)*. Kuala Lumpur: Dewan Bahasa dan Pustaka.
- Ismail, K. (2008). *Dokumentasi Kajian Pasaran Graduan Syariah dan Astronomi Islam di Jabatan Fiqh dan Usul (Documentation for Market Study of Shariah and Islamic Astronomy Graduates at Department of Fiqh and Usul)*. Report, Academy of Islamic Studies, University of Malaya.
- Ismail, K., Asillam, F. & Mat Zin, A.A. (2014). Human Resource Development Issues in the Field of Islamic Astronomy: Analysis of the Langkawi National Observatory, Malaysia. *International Journal of Social Sciences and Humanity*, 4(6), 463-467.
- Nordin, R. (2010). *Pembentukan Takwim Hijri berdasarkan Hilal dan Kepentingannya terhadap Permasalahan Fiqh di Malaysia (Formation of the Hijri Calendar and its Importance for Jurisprudential Issues in Malaysia)*. PhD Thesis, Department of Fiqh and Usul, Academy of Islamic Studies, University of Malaya, 357.
- Safiai, M.H., Jamsari, E.A. & Ibrahim, I.A. (2014). Malaysian Observatories and Those of the Islamic Civilization Era. *Mediterranean Journal of Social Science*, 5(29), 40-48.
- Sayili, A. (1960). *The Observatory in Islam and Its Place in the General History of the Observatory*. Ankara: Turkish Historical Society.

Zainal, B. (2013). *Sejarah Balai Cerap di Malaysia (The History of Observatories in Malaysia)*. Interview, February 10.

Zainuddin, M.Z. (2013). *Sejarah Balai Cerap di Malaysia (The History of Observatory in Malaysia)*. Interview, March 27.

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**Khadijah Ismail** (Ismail, K.) is an independent researcher on the history of astronomy. Her previous designation was a Fellow and an Assistant Lecturer at the Academy of Islamic Studies, University of Malaya. Her main research interest is on Islamic Astronomy (Falak); Criteria of Moon Visibility in Islamic Calendar and History of Astronomy, particularly in History of Observatory in Malaysia; and Medieval Islamic History and Civilization.



**Dr. Mohd Hafiz Safiai** (Safiai, M.H.) is a Senior Lecturer at the Research Centre for Sharia, Faculty of Islamic Studies and an Associate Fellow at Institute of Islam Hadhari, Universiti Kebangsaan Malaysia. His research interests are in Fiqh in the Modern World; Islam & Science, Technology, Engineering and Mathematics (iSTEM); and Astrofiqh & Cosmofiqh (Islamic Astronomy). He has been involved in several researches especially in Islamic astronomy such as on observatories and astrolabes.



**Dr. Ezad Azraai Jamsari** (Jamsari, E.A.) is a Senior Lecturer at the Research Centre for Arabic Language and Islamic Civilization (ArabIC), Faculty of Islamic Studies, Universiti Kebangsaan Malaysia. His research interests are in Islamic Military History; Islamic Political History in al-Andalus (The Nasrids) and The Maghreb (The Marinids); Medieval Islamic History and Civilization (al-Andalus & The Ottomans); Islamic and Arabic Educational History; and Islamic Civilization.

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