

# ADAPTIVE REUSE OF OLD COLONIAL BUILDING, MUAR AS GALLERY & RESOURCE CENTRE DESIGN: A COMPARATIVE STUDY ON ISLAMIC ARCHITECTURE INFLUENCE TOWARDS KUALA LUMPUR COLONIAL BUILDINGS

\*<sup>1</sup>Nur Amalina binti Hanapi, <sup>2</sup>Leng Pau Chung

<sup>1</sup> Department of Architecture,  
Faculty of Civil Engineering and Built Environment,  
Universiti Tun Hussein Onn Malaysia,  
86400 Parit Raja, Batu Pahat, Johor, Malaysia

<sup>2</sup> Department of Architecture,  
Faculty of Built Environment & Surveying,  
Universiti Teknologi Malaysia,  
81310 Johor Bahru, Malaysia.

\*Correspondence e-mail: amalina91@graduate.utm.my, amalina@uthm.edu.my

---

## ABSTRACT

While several studies have noted on the effectiveness of reusing historical colonial buildings as sustainable mechanism, there is still an absence of Islamic influence study on the performance-based framework to rank optimal usage element in historical building as resource centre and gallery. This research focusses on the elements of Islamic influence in old colonial building to be imparted as part of the framework study for an adaptive reuse library and gallery. The methodology comprises of case studies on identifying current Islamic layout influence demarcation of the old colonial building and at the same time evaluating possible elements for adaptive reuse library and gallery towards achieving resilient building. With the invited collaboration of library design study from Muar, Johor parliament for community library, an initiative proposal study of adaptive reuse old colonial which was previously an office building in Jalan Othman been made aligned with an approach to local authority, Majlis Perbandaran Muar with the council vision of low carbon city for the town. Several case studies of colonial building will be selected to explore the Islamic principles, garden element and design development to balance their framework screening for the vacant colonial office building. The findings are anticipated to establish useful validated framework in balancing the list of priorities and interests of Islamic design principles for designing future adaptive reuse library and gallery in Muar. Hence, this research provides a significant contribution to the development of design framework will then enabling the decision makers to achieve a logical result and support the visualization impact of different priority of Islamic principal elements and criteria on colonial buildings.

**Keywords:** *Adaptive reuse, Design, Islamic, Culture, Development*

---

## INTRODUCTION

In relation to the current need for a gallery and library in Muar due to its previous state which has been declared structurally unfit as per Diagram 1, the designated project study is retrofit project intertwining its other function with the royal gallery of Johor. The fieldwork carried out is to design the anchor tenant programme of gallery and resource center with the requirements needed to serve its function to the community. Being proposed in one of the historical sites, the comparisons study carried out should be able to gauge the Islamic influence in restructuring adaptive reuse design function and how the conservation notion implies to the current colonial skyline of Muar. Located in the CBD area and Uptown Maharani, the site is viable in capturing higher end-users target (Hanapi et al., 2022). Muar being reconstituted as a lively new city has been recently developed in many ways as compared to 10 to 20 years ago. The numbers of youth's involvements in the city activities have been increased due to the improvement in infrastructures and programme conducted in the region.



*Figure 1: Interior and exterior of Old Muar Library, Kampung Baharu.*

## RESEARCH BACKGROUND

Gallery and library currently serve as dynamic gathering area for community and businesses despite being notable hallmark public organization. Community is drawn to library for various intentions and these reasons have developed into this public building as important centres for meeting, debating and imaging. Whilst gallery is a place where the history of a particular culture is being showcased to ensure contained information is being preserved to the people living in a particular period. In line with the current draft study for Muar development, researchers are encouraged to rethink the new library movement for Muar which is well suggested to be stitched together with royal gallery as the anchor tenant for the dedicated site. Muar being one of Malaysian's earliest cities, adorned with significant number of colonial buildings situated in the central business district (CBD). The site chosen as in Diagram 2, scrutiny to the idea having both functions in which would be able to multiple the visitors or the end-users contributing to the socioeconomic improvement in Muar (Hanapi et al., 2022).



Figure 2: Proposal for the new royal gallery and library in Jalan Othman, Muar.

Based on the radius and neighborhood context assessment in Diagram 3, the chosen site for the project study located in Jalan Othman which has been gazette as royal gallery may advocate the potential proposition and analysis for the adaptive reuse of both gallery and library. Adorned with fragment of extended porch style as colonnade in Diagram 4, the chosen site which is called Muar Old Colonial Building served its previous function as office building for Telekom Malaysia.

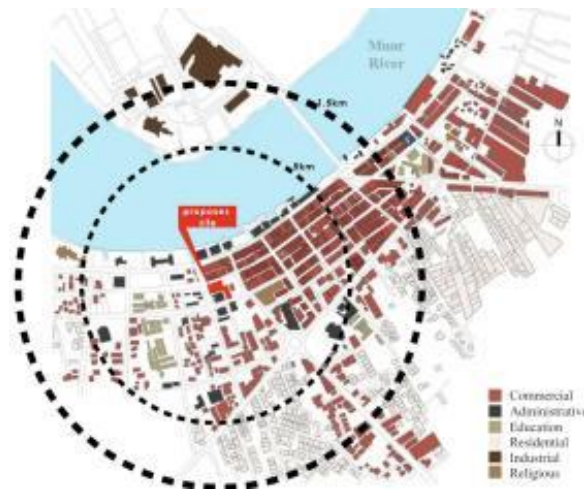


Figure 3: Radius and neighborhood context assessment of Old Colonial Building, Muar.



Figure 4: The extended colonnade and portico ornamentation to the Old Colonial Building, Muar.

## ISSUES AND PROBLEM STATEMENT

The research is being carried out to investigate comparative studies on religious influence on old colonial adaptive reuse building. Architecture is a process that implies people belief system which will most likely being carved to their buildings. Motifs and symbols are parts of inspiration to create ambience, inspiration and spirit to the building. Even though Malaysia has come long way since its colonial period, the country does have an exceptional number of colonial buildings that remained until today regardless of function or typology being switched throughout the decade (Ahmad, 1993). Religious influence does play a significant role in affecting colonial building face-lifting. Since Islam is the highest number of followers in the country building design and facade treatment do play a significant role in delivering its divine notion (Ahmed & Talib, 2013). Hence, list of colonial architecture buildings is being selected in the buildings to understand the Islamic repercussion to the surrounding context of the city.

## METHODOLOGY

Methodology implies to accomplish this research comprises site observation, architectural drawing study and interview with the local authorities involved with Muar Old Colonial Building preservation. Based on the visual survey done on the site, related data through visual evidence are gathered for the analysis process. Upholding the research qualitative state, five case studies were selected as per Diagram 5 and further discussed with key parameter established which sit adjacent to each other to better analyze its impact to the overall city development. The selection of the case study of this research is in accordance to controlled parameters of colonial buildings that served the same function as a gallery and library (Haliza et al., 2014).



Figure 5: a) Kuala Lumpur Library, b) Kuala Lumpur City Gallery, c) National Textile Museum, d) Kuala Lumpur City Gallery, e) National Textile Museum.

### National Textile Museum

Being gazetted as historical building in 1983, National Textile Museum exhibits the early displays, advancement, locality textile procedures and the position they have had in the rich statutory in assorted Malaysian heritage. Situated in the old colonial precinct along the Merdeka Square, which is the core of Kuala Lumpur, its location will be a stop center for the tourist to attain on Malaysian culture in detail. Curated by AB Hubback through the influence of Mughal design, the building completed as Federated Malay States Railways headquarter in 1905. Later in 1917 the building function was first being replaced as Selangor Public Works Department and continue to be converted to various socioeconomic and other governmental operation as premises such as high court, craft centre and bank prior to gallery showcasing fabrics publicly in 2010(Misirlisoy, 2016).



*Figure 6: National Textile Museum from Jalan Raja*

### Kuala Lumpur City Gallery & Library

Throughout the time of British provincial organization, the gallery building was first established housing for Malay States Federation for administration before supplanted as Government Printing Office in Taiping. A. C. Norman, who was the architect in-charge of planning the new office to house huge print machines adorned with exposed brick style, neo-Renaissance facade standards and enormous semi-round windows enhanced with cornerstones. Whilst the inside had an underlying scaffolding arrangement of cast iron sections and supports (Haliza et al., 2014). The building was later adapted as Metropolitan Postal Security Office in 1961 before Kuala Lumpur City Hall purchased the structure, remodeled and well outfitted it in 1977 as a public recourse centre. In the early 90s, the reference centre developed rapidly as primary library in Malaya to developed rapidly in online system usage and was retitled as Kuala Lumpur Library in early 2000 with annex building next to it (Ahmad, 1993).



*Figure 7: Kuala Lumpur City Gallery from Leboh Pasar Besar*



*Figure 8: The new annex of the Kuala Lumpur Library which was built in 2004 leaving the old one as mere gallery function.*

### Kuala Lumpur Railway Station

Built in 1910 this building was the headquarters for Malay railways station before it is being taken off by Kuala Lumpur Sentral in early 2000. The building was well known for its beauty detailing which blends fractions of East and West architectural elements. Situated in Sultan Hishamuddin Road which also compounds National Mosque, Railway Administration Hub and Dayabumi Complex, these group of buildings are very much close in detailing composition. Located just before the meeting point of two prominent rivers which are Klang and Gombak River, the building was then equipped three-storey annex addition platforms with massive concrete columns supporting the latticework housing the passengers waiting areas (MisriIsoy, 2016).



*Figure 9: Kuala Lumpur Railway Station from Jalan Sultan Hishamuddin*

### Jamek Mosque

Located on the exact confluence of Klang and Gombak River the mosque was the first sizable religious building for Islamic communities in Malaya during the early Islamic influence. The building's foundation was set by Selangor Sultan in 1908 and was officially opened by him for public usage a year later. Being partially covered by British Colonial authorities and Malay localities, the mosques represent Kuala Lumpur leading Muslim religious building until establishment of National Mosque in 1965. The building which was initially assembled as an open terrace structure has been continuously developed to be shaded for worshippers. However, being hit by an unexpected downpour in 1993, one of the constructed domes later ruptured. Constituted of two prominent minarets built on bricks, the

overall mosque gives the illusion of white and pinkish facade with the tallest white dome of approximately 21m housing the main prayer hall underneath (Khazae et al., 2015).



Figure 10: Jamek Mosque from Gombak River view

### DBKL City Theatre

Located at the intersection of Raja and Tun Perak Road in CBD area in Kuala Lumpur and across Merdeka Square, the historical theatre building was named after Dewan Bandaraya Kuala Lumpur (DBKL), a city hall theatre completed its construction in 1904. The Moorish façade theatre, which was designed as musical performance stages by Arthur Hubback who was also responsible for designing other colonial structures throughout the Klang Valley, was later listed as a historic building under the Antiquities Act. DBKL City Theatre is a historical theatre hall located across the Merdeka Square in Kuala Lumpur, Malaysia, at the junction of Jalan Tun Perak and Jalan Raja. Construction began in 1896 and was finished in 1904. The theatre formerly occupied the historic Old City Hall of Kuala Lumpur. The theatre which house production stages such as plays, and musicals was also gazette as a heritage building under the Antiquities Act for its Moorish façade preservation. In 1992, the city hall architects and builders quickly rebuilt the building after one catastrophic fire incident completely damaged the building enclosure (Ahmad, 1993).



Figure 11: DBKL City Theatre from Jalan Raja

## RESEARCH FINDINGS

The screening process of the case studies conducted as the basic underlying Islamic principles of colonial Architecture were table based on the parameters of the chosen colonial building. Below is the table indicating the matrix relationship existed for the selected colonials' buildings in Kuala Lumpur CBD area with Muar Old Colonial Building.

| Colonial building                              | Muar Old Colonial, Jalan Othman | DBKL Theatre | City | Jamek Mosque | Kuala Lumpur Railway station | Kuala Lumpur City Gallery & Library (without annex) | National Textile Museum |
|--|---------------------------------|--------------|------|--------------|------------------------------|---|-------------------------|
| The use of arabesque                           |                                 | /            |      | /            | /                            | /   | /                       |
| The role of light                              |                                 |              |      |              | /                            |   | /                       |
| The use of colour                              | /                               | /            |      | /            | /                            | /   | /                       |
| Dome   | -                               | /            |      | /            | /                            | -   | /                       |
| Garden   | -                               | /            |      | /            | /                            |   |                         |
| Its influence in shaping the urban environment |                                 | /            |      | /            | /                            | /   | /                       |
| Adaptive reuse                                 | /                               | /            |      | /            | -                            | /   | /                       |

Table 1: Parameters of studies for the colonial buildings listed

### The Use of Arabesque

This ornamentation subsisting surface decorations based on rhythmic linear patterns of scrolling and interlacing foliage or tendrils frequently paired alongside additional feature. These long-standing customs of organic spiral adornment inside the societies early Islamic era, give rise to the establishment of this ornamentations. During the era, widely used vegetation tiles motifs in mihrab of Damascus Mosque were created by Byzantine painters in typical manner. Acanthus, which emphasizes foliage patterns, as well as the grapevine, which emphasizes knotted tendrils equally, are indeed the floras that are typically employed in idealized design. Over the years, the form evolved and became sleeker and more artistic (Khazaee et al., 2015).



Figure 12: Arabesque element in exterior columns of National Textile Museum



Throughout early Egyptian artwork and some various historical Middle Eastern cultures throughout all its prehistoric period to contemporary Islamic geometric pattern, there has been a prescriptive consistency with growth within beautiful foliar motifs. It remained undoubtedly a difficulty distinguishing aspect of such Islamic style, despite its precedence, as several quatrefoil figures fade at such a frame line without terminating, allowing them to be seen as continuously extending just beyond of what area it really fills (Ibrahim & Poy, 2013). Most of the examples utilized for these connections are the longitudinal quatrefoil motif aspect that is introduced across the property's hallway, that serves as the primary communal space. Its presence of both the motifs indicates the significance of the place portrayed, in which the majority of these are embellished to the cladding promenade as indicated in Table 2(Riggs & Chamberlain, 2018).

| Colonial building    | Muar Old Colonial, Jalan Othman  | DBKL City Theatre  | Jamek Mosque   | Kuala Lumpur Railway station  | Kuala Lumpur City Gallery & Library(without annex)                                   | National Textile Museum  |
|----------------------|--|--|--|---|--|--|
| The use of arabesque |  |  |  |  |  |  |

Table 2: Linear patterns of the arabesque shown in each of the case studies

### The Role of Light

Architecture and artwork have constantly used lighting in some manner. A piece of design's intent and significance might change depending on how much illumination it receives when it is shown. Like how the Gothic style was expressed, unique and creative architectural solutions being developed to enable such "new light" or luminosity nouveau to enter Gothic dwellings, enabling that divine look to occur. Barriers separating churches were removed by the construction team using ribbing vaulted supported by flying buttresses. It became capable of placing stained-glass windows there after the exterior been reopened (Khazaei et al., 2015). Stained window is crucial element in Gothic architecture where it replaces walls to concurrently provide colorful way to tell Christian story. There is a different need for natural and artificial light. Both carries both functioned at different point of time such as galleries natural lighting is not highly advisable as of protect the materials like book, artifacts or model being deteriorate by the extra exposure of sunlight(Mısırlısoy, 2016). Usage of light also depends on the necessity of having artificial lighting Or the natural lighting to lit or give illuminance to certain spaces. As per Diagram 13 and 14, any difference of the space planning activity that divides the existence of semi-public, public or private spaces do bring out the hierarchy in degree of illuminance as per outlined in Table 3.



*Figure 13: a) Artificial lighting for the interior of the DBKL City Theatre, b) The natural lighting lit up parts of the common area in DBKL City Theatre*



*Figure 14: a) The insertion of natural light in the common area in the National Textile Museum as guidance and wayfinding for the visitor*

| Colonial building                                    | Muar Old Colonial, Jalan Othman | DBKL City Theatre | Jamek Mosque | Kuala Lumpur Railway station | Kuala Lumpur City Gallery & Library (without annex) | National Textile Museum |
|--|---------------------------------|-------------------|--------------|------------------------------|---|-------------------------|
| High intensity artificial lighting                   | Yes (for exhibition area)       | Yes (for staging) |              |                              | Yes (for exhibition area)                           |                         |
| High intensity natural lighting                      |                                 |                   |              | Yes                          |   | Yes (for workshop)      |
| Optimum amount of both natural & artificial lighting |                                 |                   | Yes          |                              |   |                         |

Table 3: Hierarchy in degree of illuminance for spaces

### The Use of Colour

Our surrounding is made up entirely of colour, both in the natural enclosure and in the built environment created by man. This development of humans has indeed involved colour. The brain interprets the surroundings as well as its colours, processing and making both objective and subjective decisions about things like psychological influence, interaction, data, and repercussions on the mind. Consequently, purposes of colour palette in an architecture setting are not limited to mere ornamentation (Doulos et al., 2019). Hue can be perceived as a physiological phenomenon, and like all sensory phenomena, it also has metaphorical, association, result of experiences, and emotive implications.

These elements of colour mechanics include neuropsychiatric elements, somatic impacts, optical functionality, and color combinations behavioral impact since the mind and body are indeed organisms. These are design goals that must be followed in order to safeguard people's wellbeing in their artificial environment. The aim of the colour selector or artist is to understand that optical stimulus is received, processed, and elicited reactions work in tandem with the hormone cycle to provide the optimum outcomes for human wellbeing. In a variety of settings, including workplaces, industry and manufacturing centers, education services, facilities for the elderly, detention facilities, and so on this has the greatest priority considering many function and activity regions inside everyone. The detailed colour chosen for the national textile museum for example implicated the degree of versatility being introduced. On the exterior as per Diagram 17, it does explain on the colonial representation of the building. However, on the interior part of the building most of them were flushed in white paint to show the contrast of the activity like textile painting conducted inside so that the degree of visibility of the painter can be truly appreciated.



Figure 15: The contrast element shown in colour between interior and exterior treatment in National Textile Museum.

| Colonial building       | Muar Old Colonial, Jalan Othman | DBKL City Theatre | Jamek Mosque | Kuala Lumpur Railway station | Kuala Lumpur City Gallery & Library (without annex) | National Textile Museum |
|-------------------------|---------------------------------|-------------------|--------------|------------------------------|---|-------------------------|
| Colour for the exterior | Greyish                         | Terracotta        | Terracotta   | White                        | Terracotta  | Terracotta              |

Table 4: Colour treatment preference analysis

### The Garden

This garden style is typically a decorative piece of property with stream and shade-related features. Its greatest recognizable architectural style is a quadrilateral Charbagh arrangement with four corner courtyards separated by paths or moving water. Islamic garden, in contrast to English which are frequently made for strolling, are meant for repose, introspection, and meditation. The utilization of irrigation and aromatic herbs was utilized in this garden concept to provide a sensory perception, which was the key focus. These grounds were traditionally utilized to offer relief from a hot and dry environment before Islam had spread to other regions. They included a wide range of shapes and functions that are no longer used. The holy scripture, the Quran, makes numerous allusions to meadows and claims that they are compared to the existence in heaven that followers are guaranteed on earth. Such non-religious connections with Islamic gardening include riches, authority, territories, enjoyment, hunts, relaxation, affection, and space and time in addition to the widely held idyllic reflection of gardens. Such additional linkages add further significance in the form of calm thinking and contemplation and are connected to a sense of scholarship. (Ahmed & Talib, 2013)

In a large area that stretches western to eastern countries, many classical Islamic Garden are remained. These green spaces offer a range of features that help to stimulate the consciousness and various sensations, enhancing a visitor's enjoyment there. Such tools include the utilization of fragrant vegetation and water modification (Rozali, 2013). In this research study, the most obvious representation of the Islamic Garden can be seen in Jamek Mosque which practices the principles of symmetrical garden concept for each of the entrance to the mosque as per Diagram 18. Their best recognizable architecture is a hexagonal Charbagh arrangement with four gardens separated

by paths or moving waterways. Whilst, in Table 5 indicated the garden existence in each of the case studies except for Muar Old Colonial Building and Kuala Lumpur Railway Station will only give the allowance of bared courtyard existence (Almhafdy et al., 2013).



Figure 18: The symmetrical garden concept and perspective introduced in very compound of the Jamek Mosque

| Colonial building                                   | Garden layout |
|---|---------------|
| Muar Old Colonial, Jalan Othman                     |               |
| DBKL City Theatre                                   |               |
| Jamek Mosque  |               |
| Kuala Lumpur Railway station                        |               |
| Kuala Lumpur City Gallery & Library (without annex) |               |
| National Textile Museum                             |               |

Table 5: Allowance of garden and courtyard

### Dome Insertion

Dome is normally equipped with the minaret design which type of tower typically built into or adjacent to mosques design. Over thousands of years, the dome symbolism has grown. The beginnings are uncertain, yet domes were used as tombs in early civilizations all throughout the planet, and they were also associated with the heavens symbolically. Each of these customs might have their origins in the vaulted house, that served as graves and was connected to the skies. Heavenly symbolism was embraced by Middle Eastern tyrants to stress his heavenly validity. Subsequent nations have carried on this tradition up to the current today as a generic representation of administrative sovereignty for the Mughal and Moorish architecture influence (Khazaee et al., 2015). The concept of the dome structure represents the concept of sovereignty to the empowerment of the ear of architecture and act as the landmark to the surrounding context due to its position or hierarchy which is sit on top placement. However, it is no clear explanation to certain given colours role to the dome design as per displayed in the Diagram 18.



*Figure 18: Dome with minarets as the main elements of the Islamic colonial influence to the DBKL City Theater and Kuala Lumpur Railway Station*

| Colonial building | Muar Old Colonial, Jalan Othman   | DBKL City Theatre   | Jamek Mosque  | Kuala Lumpur Railway station   | Kuala Lumpur City Gallery & Library (with annex)                                    | National Textile Museum   |
|-------------------|---|---|---|--|---|---|
| Dome design       |  |  |  |  |  |  |
| Dome colour       |   | Black(copper)   | White   | White  | Black   | White   |

Table 6: Analysis of dome structure for the case studies

### URBAN SPRAWL IMPACT TO THE NEARBY CONTEXT AND ENVIRONMENT

The development of a new spatial language. Mosque, tomb, castle, and fort are indeed the main Islamic architecture styles for big or prominent facilities. The language of Islamic design is formed from all these four categories and applied to additional structures including bath houses, ponds, and household design (Khazaee et al., 2015). Open places for communities may significantly enhance the possibilities and pleasure of urban places has led municipality to place more emphasis on developing and disseminating newer, elevated version in order to create and maintain attractive city marketing images. Therefore, public areas in all shapes and sizes have undergone a revival and are now essential components of all urban redevelopment plans. This has enhanced the standard of open spaces and brought in a lot of end-users. By luring more private sectors in the construction, more improvement projects have revived historical spaces and created brand-new ones that are intended to bring in funding through the tourist economy (Carmona, 2019; Madanipour, 2019). Both the development of the Kuala Lumpur and Muar CBD area likewise are fall along river waterfront. This shows that the influence of the architecture of colonial buildings also creates a colonial skyline movement of a city. In fact, both cities shared the same situation in where most all the governmental buildings lie at the water frontage as per Diagram 19.



Figure 19: Kuala Lumpur CBD development along confluence of Gombak (Red) and Klang River (Yellow).



Figure 20: Analysis study on the land use of in Muar CBD area near the Old Colonial Building in where the red zoning is colonial governmental building situated to the water frontage in Muar.

## CONCLUSION

Due to closure of the previous Muar Library, it was found that there was a higher demand of comprehensive resource centers which urged progressive identification on strategical place for Muar community. Based on this these identified old colonial building, in order to avoid urban shrinkage of Muar in future, recommendations ought to be suggested as just proactive approach and backup mechanism in encouraging adherence to preservation of historical buildings (Esther et al., 2020). Thus, in line with local parliament collaboration of suggesting



new library design research idea and avoiding shrinkage triggers, new library location in one of the vacant colonial buildings in the CBD area was selected as the possible site as part of upgrading underutilized buildings as an idea to merge its function as gallery and library or resource center. Urban renewal strategy has recently gained a lot of popularity for creating sustainable historical towns and low carbon city. Demarcation of the existing old colonial building layout and the structural strength are among the great challenges that arise in contemplating adaptive reuse concept. Few case studies must be addressed, and Islamic influence do imply to the A good framework and guideline for Muar adaptive reuse library and gallery interventions. The current modern technology such as augmented reality system had already made it necessary to have technological gadgets anywhere including their applications in libraries and galleries interactive learning process. Hence, dwell in this progressive modern environment, few recommendations made by designers and architectural students which urged should concentrate on brand-new, excellent, versatile, and innovative resources center and galleries that are adorned with innovative and aspirational systems together with the notion of conserving the historical building elements as part of the retrofit project(Noriza et al., 2013). Below are among the characteristics highlighted for the Muar Old Colonial Building based on the research done.

## REFERENCES

- Ahmad, A. G. (1993). Conservation of British Colonial Buildings Built Between 1800 and 1930 in Malaysia. October 1–23. <http://etheses.whiterose.ac.uk/14730/1/252500.pdf>
- Ahmed, L., & Talib, A. (2013). Adaptive Reuse in the Traditional Neighbourhood of the Old City Sana' a -Yemen. *Procedia - Social and Behavioral Sciences*, 105, 811–822. <https://doi.org/10.1016/j.sbspro.2013.11.084>
- Aigwi, I. E., Egbelakin, T., Ingham, J., Phipps, R., Rotimi, J., & Filippova, O. (2019). A performance-based framework to prioritise underutilised historical buildings for adaptive reuse interventions in New Zealand. *Sustainable Cities and Society*, 48(April), 101547. <https://doi.org/10.1016/j.scs.2019.101547>
- Almhafdy, A., Ibrahim, N., Ahmad, S. S., & Yahya, J. (2013). Analysis of the Courtyard Functions and its Design Variants in the Malaysian Hospitals. *Procedia - Social and Behavioral Sciences*, 105, 171–182. <https://doi.org/10.1016/j.sbspro.2013.11.018>
- Doulos, L. T., Sioutis, I., Kontaxis, P., Zissis, G., & Faidas, K. (2019). A decision support system for assessment of street lighting tenders based on energy performance indicators and environmental criteria: Overview, methodology and case study. *Sustainable Cities and Society*, 51(August), 101759. <https://doi.org/10.1016/j.scs.2019.101759>
- Esther, I., Ingham, J., Phipps, R., & Filippova, O. (2020). Identifying parameters for a performance-based framework: Towards prioritising underutilised historical buildings for adaptive reuse in New Zealand. *Cities*, 102(March 2019), 102756. <https://doi.org/10.1016/j.cities.2020.102756>
- Haliza, D., Jamal, D., Hassan, Z., & Ramli, Z. (2014). Adaptive Reuse of Several Historical Buildings in Kuala Lumpur as Museums. 7th International Seminar on Ecology, Human Habitat and Environment Change in the Malay World, August 19–20.

- 
- Huda, N., Razali, M., & Talib, A. (2013). Aspects of Privacy in Muslim Malay Traditional Dwelling Interiors in Melaka. *Procedia - Social and Behavioral Sciences*, 105, 644–654. <https://doi.org/10.1016/j.sbspro.2013.11.067>
- Ibrahim, I., & Poy, K. (2013). Living Sanctuaries: An approach to wetlands conservation from the p. *Procedia - Social and Behavioral Sciences*, 105, 476–483. <https://doi.org/10.1016/j.sbspro.2013.11.050>
- Khazae, M., Yaacob, N., Awad, Z. A. M., & Md Ali, Z. (2015). Mughal or Moorish architecture: The origins of Malaysian mosques during colonial periods. *Pertanika Journal of Social Science and Humanities*, 23(3), 639–654.
- Mısırlısoy, D. (2016). Adaptive reuse strategies for heritage buildings: A holistic approach. 26, 91–98. <https://doi.org/10.1016/j.scs.2016.05.017>
- Noriza, R., Ariffin, R., & Khairi, R. (2013). Perceptions of Urban Walking Environments. *Procedia - Social and Behavioral Sciences*, 105, 589–597. <https://doi.org/10.1016/j.sbspro.2013.11.062>
- Prof, A., Tajuddin, M., & Rasdi, M. (n.d.). Mosque Architecture in Malaysia: Classification of Styles and Possible Influence. 1–37.
- Riggs, W., & Chamberlain, F. (2018). The TOD and smart growth implications of the LA adaptive reuse ordinance. *Sustainable Cities and Society*, 38(May 2017), 594–606. <https://doi.org/10.1016/j.scs.2018.01.007>
- Rozali, E. A. (2013). The Islamic Education' s Development Among the Malay' s Society in the E arly of 20th Century and the Contribution of Kaum Muda. Mdhss.