



DESIGN IDEALS

Volume 7 | Issue 1 | 2025

PREFACE

Assalamu'alaikum wrt. wbt.

Dear worthy readers.

Wholehearted welcome and thanks to all for taking the time to read and review our first issue of the year 2025, the Design Ideals Journal (DIJ). In the previous issue 2 of Volume 6, 2024, the publication presented eight (8) papers pertaining to the built environments. As for this issue, eight (8) articles from our faculty and students that focus on the fields of Architecture, Planning, Landscape Architecture, Quantity Surveying, Building Technology Engineering, and Applied Arts and Design are presented for your construing. As pledged, it is our commitment to constantly creating a journal unambiguously dedicated to a well-thought of KAED community. As such, the principal aim of the Design Ideals Journalist to provide a platform for the students, lecturers and practitioners to extend their practical trust for nurturing the readers, be it general, students or professionals alike.

The journal offers an opportunity for researchers, research students and practitioners to share their views on either theoretical or empirical research findings and readers, especially academics and students to indulge and value its contents. We welcome the research reports and academic papers, short practice notes, design reviews and abstracts from portfolios and design theses on any aspects within the areas related to the built environment. With the production of this issue, we accomplish to publish the first of two issues as our pledge for a biannual production. InshaaAllah, apart from regular issues, we hope an additional issue in the form of a Special Issue will be obtainable to the readers in the impending. As usual, we humbly anticipate getting inspiring feedback from readers.

Lastly, I would like to thank the entire publication team, KAED and IIUM in general who had supported and give their commitment in completing the publication for this issue. To all the readers, I wish all a joyful reading and indefatigable support in our publication efforts. Thankyou.

Editor-in-Chief

EDITORIAL

Assalamu'alaikumwarahmatullahiwabarakatuh

As in the previous issue 2 of Volume 6, 2024, the publication presented eight (8) papers addressing numerous subjects, challenges and solutions in the form of design concepts pertaining to the built environments. In this first issue of Volume 7, 2025, the publication presented eight (8) papers dedicated to case studies comprising academicians, final year studio projects and the design thesis of the students guided and supervised by the lecturers.

The first paper, Organ Donation Centre in Cyberjaya, Selangor by Wan Nur Amalya Wan Zamharir, Srazali Aripin and Aliyah Nur Zafirah Sanusi. The paper aims to propose an Organ Donation Assistance Centre that focuses on providing comprehensive support throughout the organ transplant process, considering the physical environment healing and offering educational programmes to increase awareness and eradicate misconceptions. The Organ Donation Centre seeks to promote cooperation among medical professionals, organ donors, organ recipients and the wider community by acting as a light of hope, healing and compassion through a multidisciplinary design approach. Studies and researches throughout the literature review, precedent studies and case studies and in-depth interview have guided the design process to come out with the final design.

The second paper entitled Bridging Urban Mobility: A Comparative Analysis of Transportation Systems In South Korea and Malaysia by Muhammad Afiq Hilmi Abd Aziz, Alif Nazmi Khairil Anuar, Nur Sabrina Huda Zulbahari and M Zainora Asmawi. This paper aims to analyse the approaches to urban mobility in cities in Malaysia and South Korea, focusing on key strategies, challenges and outcomes of selected projects. The findings of this paper are beneficial for policymakers, urban planners and other stakeholders involved in urban development initiatives, aiming to create more sustainable, inclusive and livable cities in South Korea, Malaysia and similar contexts worldwide.

As for the third paper by Nik Asiff Akhtar Muhammad Ariff, Fatin Nabilah Rosli, Muhammad Hakim Zainudin and M Zainora Asmawi entitled Enlightening Strategies For Tourism Development In A Global Metropolis: The Seoul Experience. The study explores how tourism contributes to Korea's national economy and consequently, promotes sustainable tourism development in the nation. This study relies on secondary data, primarily official documents for data collection. Seoul has effectively utilised tourism to boost its global reputation and economic growth, with strategic urban planning efforts such as city branding, cultural tourism and innovative design playing a significant role in enhancing its international tourism competitiveness. Seoul's comprehensive approach to tourism and urban planning is instrumental in driving its economic success and international standing.

The fourth paper by Tuan Muhammad Nubli Tuan Sariff, Asiah Abdul Rahim, Muhammad Azmeer Muhammad and Zuraini Denan entitled Eco Vocational Academy As Sustainable Educational System For Orang Asli In Hulu Langat, Selangor. This research explores sustainable education approaches for the Orang Asli, with three key objectives; firstly to identify strategies that attract Orang Asli to education; secondly to determine suitable curriculum components for this community and lastly to develop a sustainable education framework that supports their long-term potential. The study highlights the value of aligning educational systems with local culture and ecology to promote inclusive, equitable development offering actionable insights for educators and policymakers addressing indigenous education globally

EDITORIAL

The fifth paper entitled Bridging Tradition and Modernity: Brick Architectural and Critical Regionalism In Contemporary Village Residence In Bangladesh by Nayeem Asif, Zeenat Begam Yusof and Aida Kesuma Azmin. This paper aims to illustrate the application of brick as a sustainable and contextual material and its use in different architectural elements to achieve climate-responsive architecture in a single-family residence. Adopting a qualitative approach, the paper presents a brief literature review on the chronological development of critical regionalism through brick architecture. Additionally, architectural drawings of the case study residence are analysed to demonstrate the application of critical regionalism in contemporary architecture in rural Bangladesh. This approach supports the advancement of the architecture industry in contemporary times.

The sixth paper by Arif Salihin Muhammad Aminuddin, Raja Intan Suhaylah Raja Abdul Rahman and Julaila Abdul Rahman entitled Explorex: An Innovative Outdoor Chair For Enhanced Comfort, Safety and Portability. This research aim to develop a camp chair for outdoor seekers, named 'Explorex'. It is for those who intends to use the gear in multiple occasion related to outdoor activities such as camping, travelling, hiking and relaxing at the beach. Explorex is developed through a comprehensive process involving background research, ideation, mock-up creation and model development. These chairs are designed to be portable, durable and easy to set up, making them essential for outdoor enthusiasts.

The seventh paper entitled Urban Social High Rise Residential Building: Vertical Community Amenities by Noorfarhana Alia, Zuraini Denan and Abdul Razak Sopian. The aim of this paper is to re-envision the urban social high-rise residential building by integrating the vertical community amenities to improve the well-being of the occupants. The objective of the study is to propose a space configuration for enhancing social need; to improve the design and planning aspect of the high-rise residential space in order to enhance social sustainability and interaction and to integrate the community amenities in the urban social high-rise residential building of Malaysia. The study used qualitative method by utilising literature study and case study approach in understanding the subject matter and extracting information from case and precedent studies.

The eight paper entitled Woodcarving Catalyst Hub: Proposing An Architectural Design Project For The Revitalisation Of The Malay Woodcraft Heritage by Zainal Abidin Mat Salleh and Fadzidah Abdullah. The paper discussed woodcarving stands as one of Malaysia's oldest and most intricate traditional art forms, renowned for its elaborate motifs and deep-rooted cultural significance. However, modernisation and waning interest among younger generations threaten the survival of this heritage. In response, this research has the initiatives to explore architectural design potential of a place, for the revitalisation of Malay woodcarving, by establishing a Woodcarving Catalyst Hub in Kuala Terengganu, Malaysia. By merging preservation with innovation, the Woodcarving Catalyst Hub aspires to sustain the relevance of this art form, ensuring its transmission to future generations while positioning Kuala Terengganu as a dynamic centre for Malay cultural heritage.

Prof. Dato' Sri Ar. Dr. Asiah Abdul Rahim
Editor-in-Chief
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01

ORGAN DONATION CENTRE IN CYBERJAYA, SELANGOR

Wan Nur Amalya Wan Zamharir, *Srazali Aripin and Aliyah Nur Zafirah Sanusi
Department of Architecture, Kulliyyah of Architecture and Environmental Design,
IIUM

ABSTRACT

This study aims to propose an Organ Donation Assistance Centre that focuses on providing comprehensive support throughout the organ transplant process, considering the physical environment healing, and offering educational programmes to increase awareness and eradicate misconceptions. By establishing such a centre, we can effectively increase the transplant rate, promote a healthy lifestyle, and ultimately save more lives. The project is to provide a comprehensive environment that encourages awareness, education, and coordination of organ donation procedures, with an emphasis on developing a purpose-built facility suited to the particular requirements of organ donation. The design concept highlights the integration of sustainable design principles and human-centred approaches to create a transformative space for individuals and families affected by organ donation. The Organ Donation Centre seeks to promote cooperation among medical professionals, organ donors, organ recipients, and the wider community by acting as a light of hope, healing, and compassion through a multidisciplinary design approach. Studies and researches throughout the literature review, precedent studies and case studies, and in-depth interview have guided the design process to come out with the final design. The Organ Donation Centre consists of three main components which are, the public amenities, organ recipient facilities, clinical spaces, and organ donor accommodations. Confidentiality is the main concept to keep the secrecy of organ donor and organ recipients' identities hence the zonings for organ donors and organ recipients are separated including their flow from registry to the operation theatre and towards recovery. The layout of operation theatre designated for organ transplant living donation was focused on as special studies.

Keywords: Organ donation, Organ transplant, Organ living donation, Organ transplant centre

*Corresponding author: srazali@iium.edu.my

1.0 INTRODUCTION

Organ donation is the process of surgically removing an organ or tissue from one person (the organ donor) and transplant it into another person (the recipient). Transplantation is necessary because the recipient's organ has failed or has been damaged by disease or injury. In Malaysia, the Health Ministry Dr. Zaliha told the rate for organ transplant is among the lowest compared to other countries. Malaysia's rate is at 0.7 per million people in 2022 (Bernama, 2023). IRODaT 2023 recorded the top countries in the rank show a huge difference from Malaysia such as Spain at 46.3 per million people (p.m.p.), United States at 44.5 p.m.p. in and Belgium at 29.4 p.m.p. in 2022 (Ashamuddin & Rahim, 2024).

In 1975, Hospital Kuala Lumpur (HKL) carried out the first-ever living kidney donation in Malaysia. Even though the first organ transplant was performed more than 45 years ago, the number of patients in Malaysia who need transplant surgery due to end-stage organ failure still outweighs the country's organ and tissue donation and transplantation rates. Giving is a kind deed that has the power to transform countless lives.

The key study of the paper is based on several issues. Firstly, demand for organs are expected to increase as the factors contributing to organ failure are worrying. The rate for adult obesity is increasing and Malaysia already rank in top 1 in Asia for adult obesity and at top 2 in ASEAN for children obesity. In addition, kidney failure and liver failure related to Hepatitis B and Hepatitis C endemic in Malaysia are also increasing.

A few studies in Malaysia suggest that cultural and religious factors are the main barriers to organ donation, while others argue that the public's mistrust of the medical system is another reason why people are reluctant to donate Makmor et al (2014). According to Husin et al. (2018), knowledge about permissibility of organ donation is the first step to raise awareness because this shape the willingness of Muslims to support organ donation.

The mental state to accept the news of the organ failing, cooperate with the pain and physical limitations, and lifestyle changes to be dependent on dialysis and medications to treat the physical symptoms is challenging. In addition, these patients also facing anxiety thinking of someone has to die for them to receive an organ is quite common among patients. Li et. al. (2012) stressed on how crucial it is to give these individuals awaiting organ transplants extra psychosocial care. A study by Baharuddin and Nawawi (2024), suggested that the integration of a therapeutic garden within the hospital environment would assist in patient well-being as it would provide connection to greeneries and outdoors.

Organ transplant surgery in Malaysia is held in a number of specialised hospitals mainly in Kuala Lumpur and Selangor due to availability of the specialists. As for organ donation, the organs of deceased donors are harvested at the Organ Procurement Units which are the state hospitals of every state in Malaysia and deliver the organs to the recipients at the specialised hospitals. The transportation for the organs donated are managed by the National Transplant Resource Centre organisation, either by helicopter or airplanes, and ambulance. However, according to Naghavi et. al. (2020), logistic difficulties are one of the main factors for an organ transplant to be declined. This is because the most important measure in transplant is the timeframe for the organ to be kept preserved in a static cold storage before the transplant surgery.

1.1 RESEARCH FRAMEWORK

issue	questions	objectives	solution	architectural solution
lack of organ donation awareness, misconception and fear	how to educate public about organ donation?	to create programme that integrate public education of organ donation	positive socialization	provide spaces for exhibition, informative talk, interactive gallery for organ donation campaign
organ recipients facing anxiety and stress waiting for organ	what is the proper environment for the waiting organ recipients?	to define the environment principles that calm organ recipients	stress-free environment	provide care and space according to healing architecture to offer tranquility
no organ donation centre in Malaysia	how to design comprehensive organ donation centre?	to design a comprehensive organ donation centre	comprehensive organ donation centre	well-designed comprehensive organ donation centre

Figure 1: Research framework

1.2 AIM

The aim of this study is to propose the creation of an organ donation assistance centre that focuses on providing comprehensive support throughout the organ transplant process, considering the physical environment healing, and offering educational programmes to increase awareness and eradicate misconceptions. By establishing such a centre, we can effectively increase the transplant rate, promote a healthy lifestyle, and ultimately save more lives.

1.3 RESEARCH OBJECTIVES

1. To implement architectural solution that cater to the requirements of organ transplant procedures, organ donors and organ recipients.
2. To integrate healing environment into the centre as to offer tranquility as therapeutic experiences for both organ donors and organ recipients.
3. To promote healthy lifestyle and raise public awareness of organ donation through architecture.

1.4 RESEARCH QUESTIONS

1. How to design a comprehensive organ donation centre?
2. What is the preferred environment for the waiting organ recipients and the organ donors?
3. How to educate public on organ donation through architecture?

1.5 RESEARCH STATEMENT

The establishment of an organ donation centre that offers comprehensive assistance to donors and recipients, including education on the organ transplant process and continuous support from pledging to recovery, while monitoring the organs and patient’s health with a physical environment that influence on the healing process, we can enhance the effectiveness and success of organ donation, ultimately save more lives and improve the overall transplantation outcomes.

1.6 RESEARCH LIMITATIONS AND SCOPE

Characteristics of an organ donation centre that includes potential building programs, zoning, functions, spaces, target users and architectural style and identity. Requirements for a transplant centre as tertiary healthcare that includes health department required, spaces of treatments and its suitable dimension, public amenities, facilities and services. The idea application of sustainable approaches, human-centric design and healing environment in the transplant centre. Due to lack of similar typology of transplant centre, the precedent studies and case studies for this project are chosen among the specialised hospital. The planning and design considerations are analysed from the studies including the flow of the transplant process.

1.7 SIGNIFICANCE OF THE STUDIES

This research will assist decision-makers in developing any measures based on findings to disseminate ideas for an organ donation centre that are based on the constructed theoretical framework. It stresses the importance of human-centric design and healing environment as an approach of awareness for organ donation. Due to the sensitivity of the subject matter, the importance of architectural design is highlighted as an indirect strategy to help promoting organ donation in Malaysia while showing appreciation to the donors.

1.8 RESEARCH METHODOLOGY

In order to accomplish the research goal, this research methodology combines qualitative and quantitative data collection techniques. This guarantees the synchronisation of the data obtained. Information were gathered from primary as well as secondary sources. As part of the literature review, research journals, publications, and news articles were gathered as part of the data collection procedure. The components of the study, including the research questions, aims, and technique, are correlated. A more thorough description of the research approach is provided in diagram below.

questions	objectives	thesis methodology	architectural solution
how to educate public about organ donation?	to create programme that integrate public education of organ donation	literature review	provide spaces for exhibition, informative talk, interactive gallery for organ donation campaign
what is the proper environment for the waiting organ recipients?	to define the environment principles that calm organ recipients	case study literature review	provide care and space according to healing architecture to offer tranquility
how to design comprehensive organ donation centre?	to design a comprehensive organ donation centre	case study in-depth interview literature review	well-designed comprehensive organ donation centre

Figure 2: The research methodology approach

2.0 SITE

2.1 SITE INTRODUCTION

Situated in Malaysia's Multimedia Super Corridor, Cyberjaya is a city centred around a science park. It is situated in Selangor Sepang District. Putrajaya, the government seat of Malaysia, is next to Cyberjaya and was established alongside it. The goal of this metropolis is to become Malaysia's Silicon Valley. Cyberjaya was officially opened on May 17, 1997, with Prime Minister Mahathir bin Mohamad leading the ceremony. The city is home to numerous data centres and major corporations. The Hulu Langat (Kajang) district was in charge of Cyberjaya, Putrajaya, and Dengkil. There formerly stood an estate called Prang Besar (Great War) on the location of Cyberjaya. With an approximate land area of 7,000 acres, the city forms the core of the Multimedia Super Corridor (MSC), which is currently referred to as MSC Malaysia. Plantations of oil palm predominated largely on the undeveloped territory that would eventually become Cyberjaya. Since then, a lot of construction has taken place there, including the construction of a community club, a boutique hotel, a number of commercial buildings, offices for MSC Status firms, universities, and the local council's headquarters. Its purpose was to build a future city.

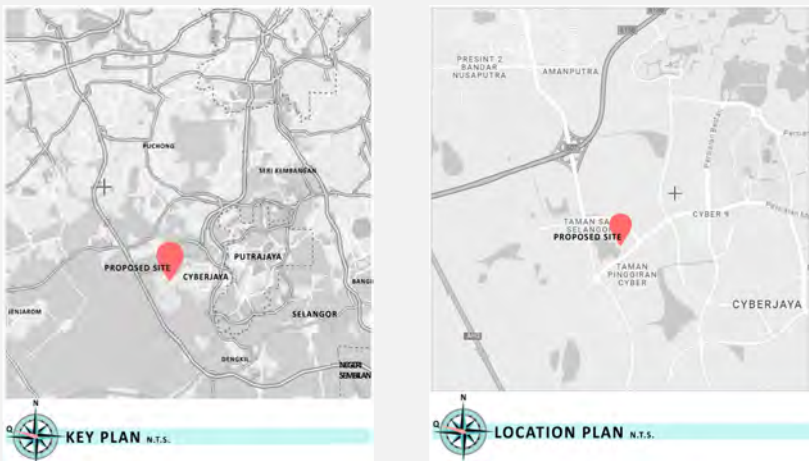


Figure 3: Key and location plan

The proposed site located at the state of Selangor, Malaysia. Situated at Southwest of Cyberjaya city, 30km from Kuala Lumpur and 33km from Kuala Lumpur International Airport (KLIA). The location chose based on several criteria as shown in Figure 4.

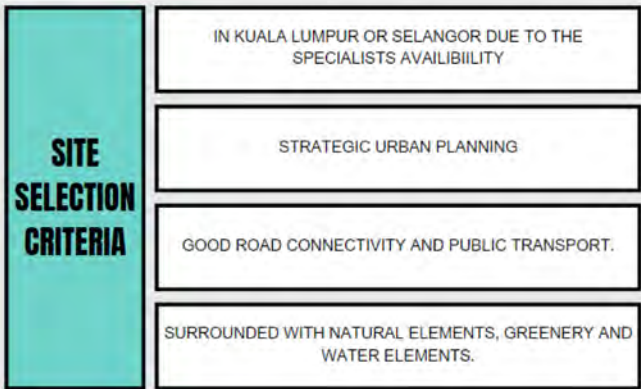


Figure 4: Criteria for a site selection

2.2 SITE INFO

Cyberjaya is a district subdivision in Sepang, Selangor. The population reaches 100,000 people where majority are knowledge workers and students. Other than that, huge percentage of the population are Malays, followed by Chinese, Indians and others.

The proposed site is located at 2°55'06"N 101°37'44"E in Cyberjaya, Selangor. The area of the proposed site is located 33 km from Kuala Lumpur and 30 km from Kuala Lumpur International Airport (KLIA). Located approximate 500 metres from Cyberjaya Hospital and by a small pond, this proposed site has good view of natural elements of greeneries and water elements.

Land Area: 6.76 acre
Land use: Multi-development
Plot Ratio: Floa1:4
District: BPK 1.4 Selangor Cyber Valley

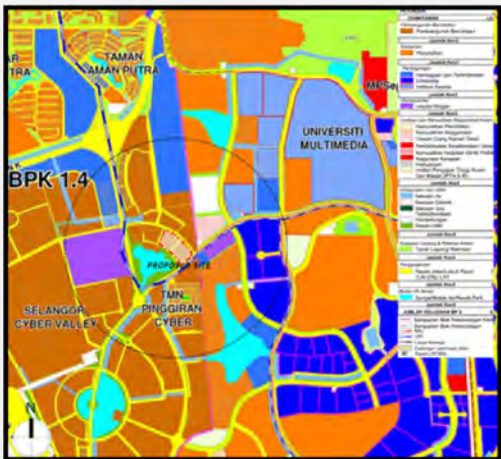


Figure 5: The land use and zoning in Cyberjaya, Selangor. (Source: RTK BP 1.4, 2021)

The zoning for the proposed site is multi-development zone, however based on the RTK BP 1.4 (2021), other typology such as healthcare can be built on the site. The site are surrounded with residential area, commercial zone and institutional zone within 1 kilometre radius. Thus, it is suitable for the transplant centre to be located there due to the well-developed city, and near to the local community.

2.3 SITE ANALYSIS

The proposed site location in Cyberjaya presents as a strategic setting for the centre, offering panoramic views as the site consists of natural green element and water element at the south side of the site. Its strategic placement in well-developing city coupled with easy accessibility, high visibility, pleasant climate conditions and natural ventilation, enhances its value. The site's accessibility by various mode of transportations eases the journey for both organ donors and organ recipients to come to the site. The connectivity to the proposed site is an important consideration due to the urgency of organ transplant procedures and ease the users travel experience. The criteria of the proposed site meets the initial goals of the project which is healing environment, so the natural water element and green area is vital to ensure the sense of belonging in the site.



Figure 6: West view of the proposed site.



Figure 7: East view of the proposed site.

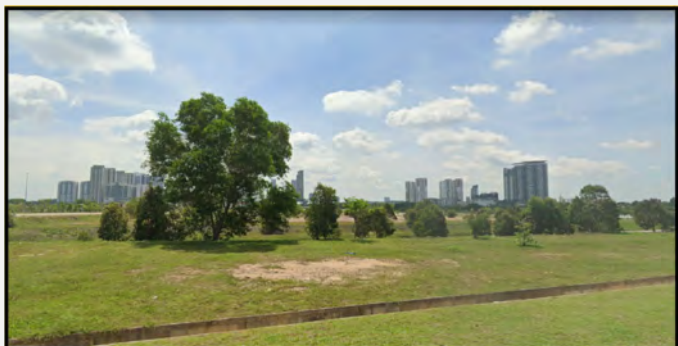


Figure 8: West view of the proposed site.



Figure 9: South view of the proposed site.
(Source: Tideschart.com)

2.4 SITE SYNTHESIS

The proposed site is considered to have a strategic placement considering the accessibility from the city centre of Kuala Lumpur and the KLIA. According to site microanalysis studies, the building orientation adheres to the sun direction where the longer penetrations of the building are facing the North side and the South side. Other than that, the public, private and semi-private zoning are determined together with internal circulation of the site. Most openings are facing the best view which is towards the South where the small pond located. Other than that, thick greeneries are to be integrated into the design especially at the East side of the site buffering the traffic noise form the main road, Persiaran Multimedia. Moreover, a welcoming elevation and façade facing towards the main road creating an inviting vista.

2.5 DESIGN BRIEF

The Organ Donation Centre design thesis aims to address the critical need for dedicated spaces and a therapeutic environment to bolster the Gift of Life Programme in Malaysia. With a focus on raising awareness about organ donation, particularly living organ donation, the project endeavors to facilitate education, coordination, and support for Malaysians considering organ donation. The target client for this project is the National Transplant Resource Centre (NTRC), operating under the Ministry of Health, Malaysia.

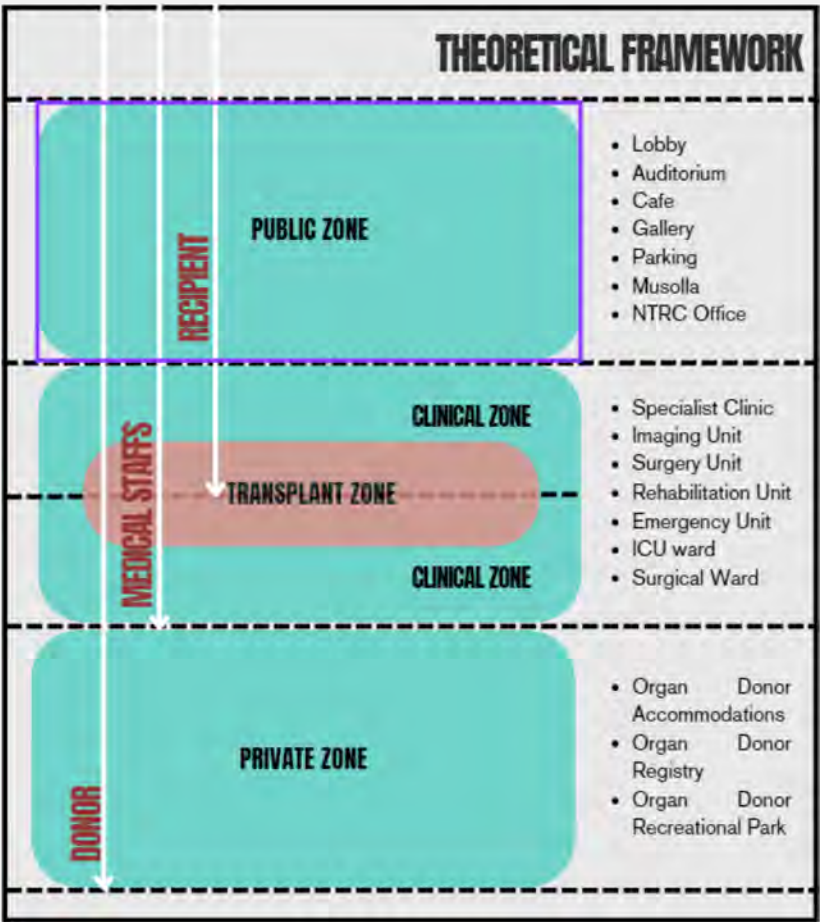


Figure 10: Theoretical framework.

2.6 USERS AND PROGRAMME FRAMEWORK

Confidentiality in living organ donation refers to the practice of protecting the privacy and anonymity of both the organ donor and the organ recipient, ensuring that their identities remain undisclosed to each other. This approach is implemented to respect the wishes and preferences of individuals involved in the donation process and to mitigate potential ethical, social, and psychological concerns that may arise from direct contact between donors and recipients. Here is the programme flow for both organ donor and organ recipient in the organ donation centre from registration until recovery.

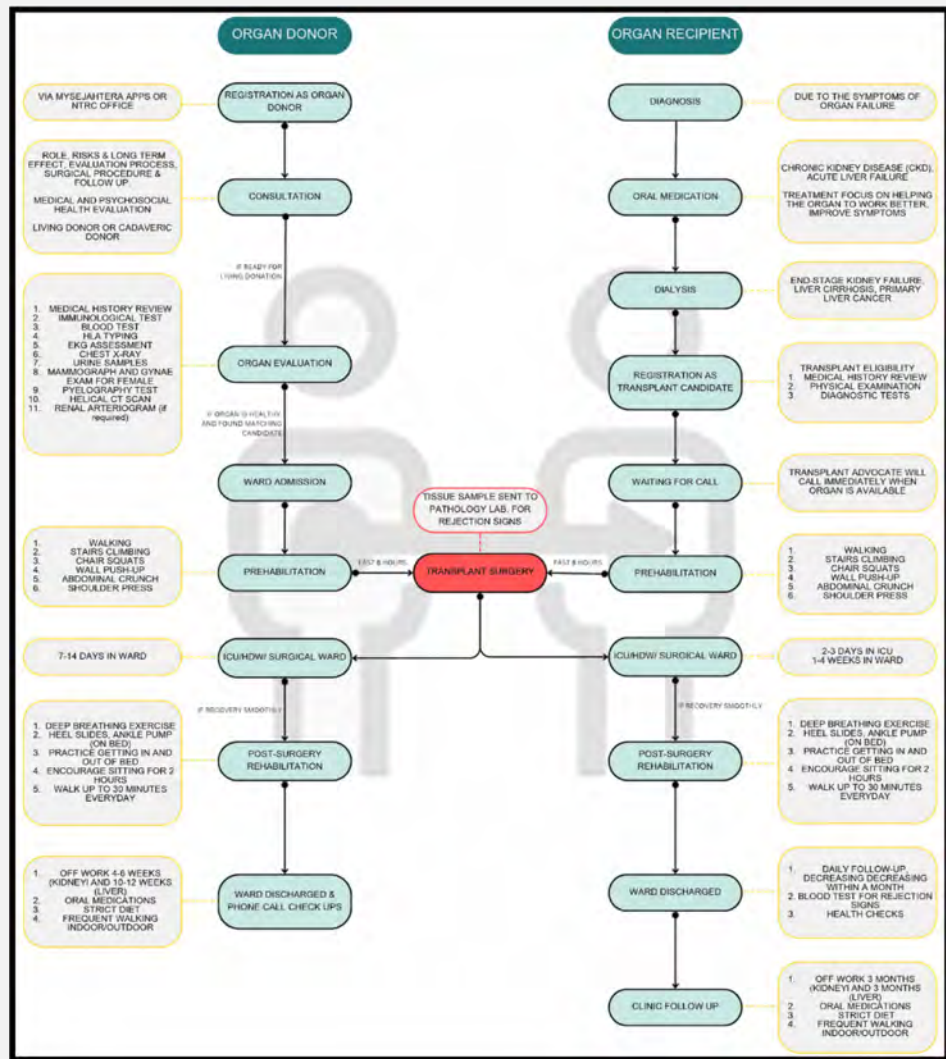


Figure 11: Programmed framework

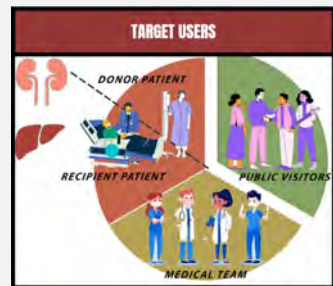


Figure 12: Target Users

2.7 DESIGN CONCEPT

2.7.1 THE HIDDEN DEED

The initial concept design for the architectural thesis focuses on establishing a clear separation between donor patients and recipient patients within the proposed facility, in accordance with ethical guidelines outlined by the Malaysian Medical Council (2006). By prioritising privacy, confidentiality, and respect for individual autonomy, the design aims to create supportive and healing environments for individuals involved in the organ donation and transplantation process while upholding ethical standards and principles.



Figure 13: The interconnectedness between organisms and ecosystems.

2.7.2 ISLAMIC VALUE

From an Islamic standpoint, organ donation is a complicated matter that needs to be carefully considered in light of numerous moral, legal, and religious precepts. Although Islamic teachings do not have a single, definitive position on organ donation, numerous academics and religious authorities have offered counsel and interpretations based on the fundamental principles of Islam.

Charity and Compassion (Sadaqah):

Islamic beliefs promote deeds of generosity, kindness, and sympathy for other people. Donating an organ can be seen as a charitable gesture that uplifts society and satisfies the need to assist the underprivileged. The Prophet Muhammad (peace be upon him) said, "The best of people are those that bring most benefit to the rest of mankind" (Hadith), emphasising the value of easing suffering and aiding others.

Intention and Assent:

In Islam, the purpose (niyyah) of a deed is very important. Both the donor and the recipient of an organ must really intend to save life and practise compassion for organ donation to be accepted.

Islamic jurisprudence holds that organ donation should only take place with the voluntary and informed consent of the donor or their family. Consent is fundamental to Islamic ethics.

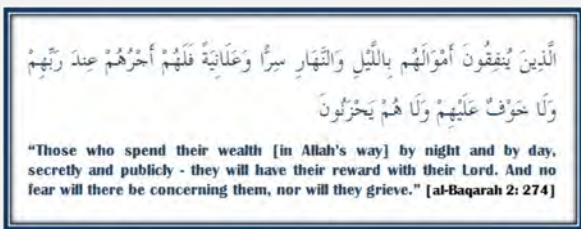


Figure 14: Surah Al-Baqarah, Verse 274.
(Source: Al-Quran)

3.0 SITE PLAN

Building is orientated based on the site synthesis, where the longer side of the building are facing North and South. Every block is arranged on its zonings. The zoning for recipient areas and donor areas are determined, with clinical block connecting both donors and recipient. Services zoning to be hidden at the back of the building.



Figure 15: Site Plan

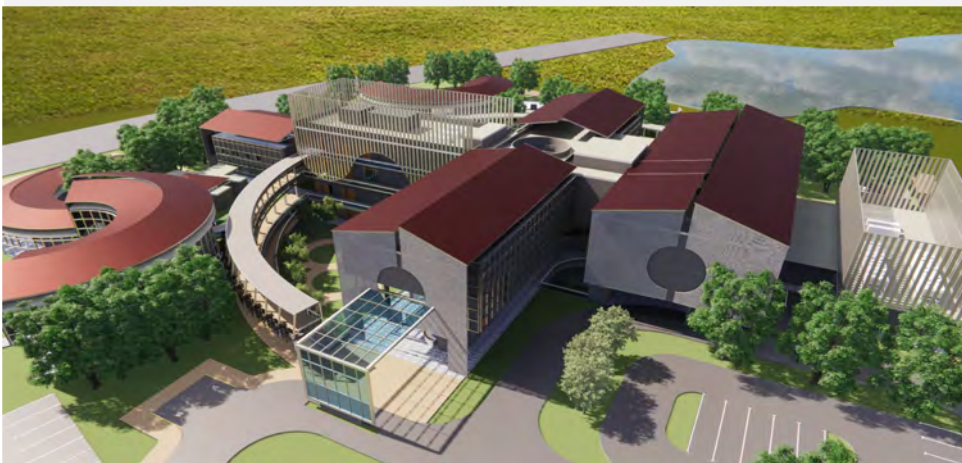


Figure 16: Perspective

3.1 LOWER GROUND FLOOR PLAN

The lower ground level has three main spaces. Firstly, the rehabilitation unit consists of indoor rehab gym and outdoor rehab park for both organ donors and organ recipients. This unit separates both organ donor and organ recipients to not meet each other due to confidentiality matter. Other than that, is the imaging unit, facilitating x-ray rooms and CT scan room. This unit only separate organ donor and organ recipients at the waiting area and reception, then enter the rooms by appointment. Lastly, services bay for water pump room, sprinkler tank and hose reel tank are located on this floor. This lower ground level designed with a lot of openings for natural ventilation.

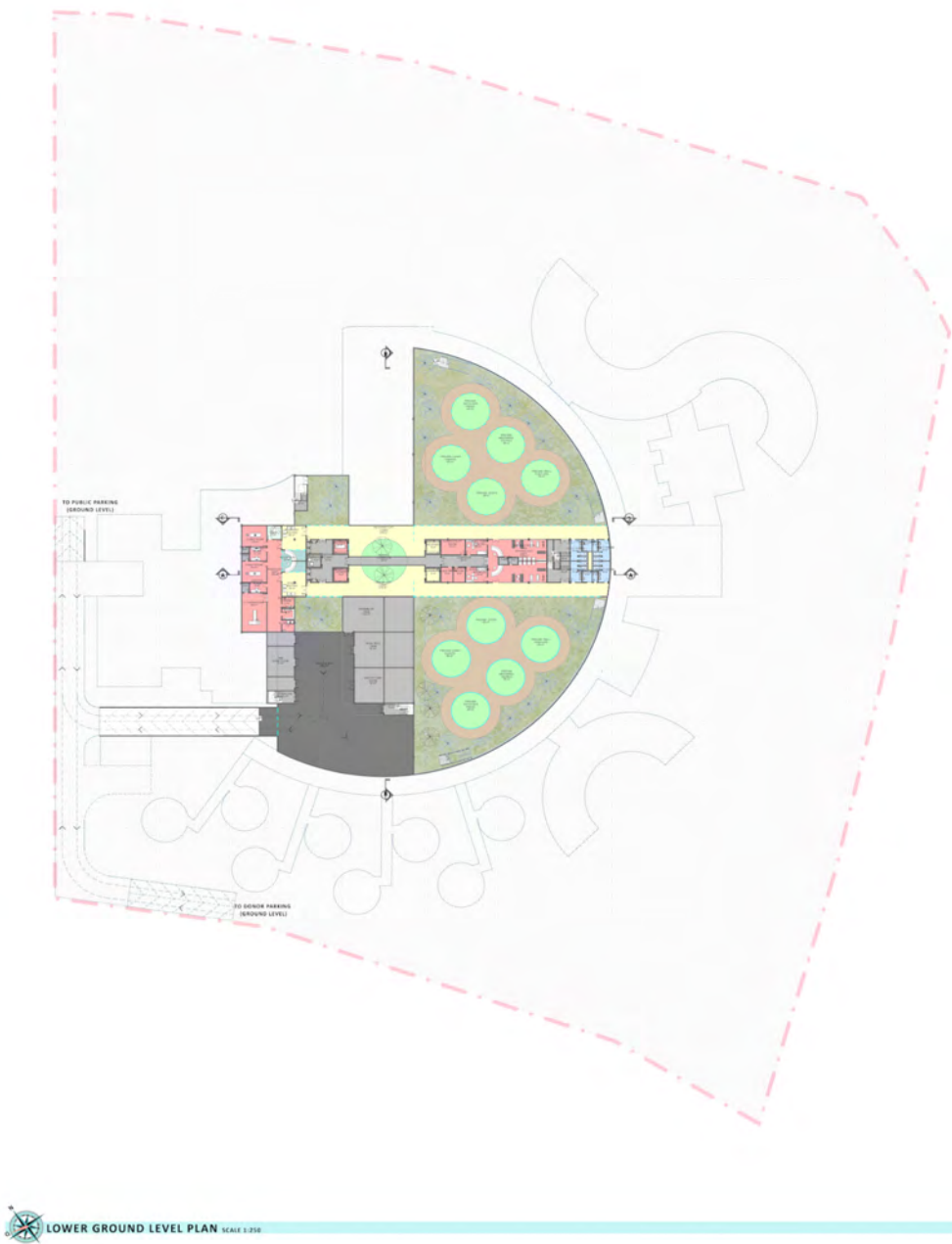


Figure 17: Ground Floor Plan

3.2 GROUND FLOOR PLAN

On the ground floor of the centre, there are two drop offs which are the main drop off and the emergency drop off for emergency cases. As the main drop off connected to main lobby with a receptionist. There are three main components, the public amenities building facilitates café, auditorium, *musolla* and gallery to the public. The clinical building serves dialysis unit for organ recipients in waiting and the centre is where the pharmacy and admission located. Another component is the organ donor accommodations with a clubhouse that facilitates indoor gym, library, café, remote cum office and more for organ donor as incentives for pledging as organ donor. Only organ donor can enter this area, Moreover, loading bay and services located at the back of the building which is the West side of the plan.



Figure 18: Ground floor plan

3.3 FIRST FLOOR PLAN

Clinical spaces are located on the first floor. The main one is the organ transplant operation theatre, consists of four operation rooms which, and separated the zoning and flow of organ donor patient and organ recipient patient. Adjacent to that unit, is the ICU and HDW wards. The north wing is organ recipients ICU & HDW wards, while organ donor's one is at the south wing. The specialist clinic for doctor's consultation appointments is at the centre, provided two separate entrance for organ donor and organ recipient. The east wing is where the National Transplant Resource Centre (NTRC) office.

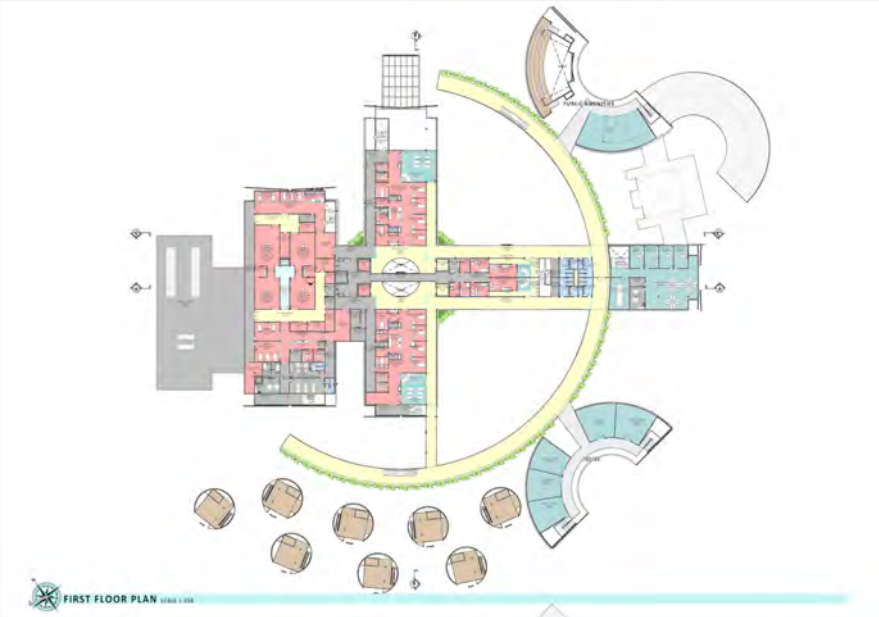


Figure 19: First floor plan

3.1 SECOND FLOOR PLAN

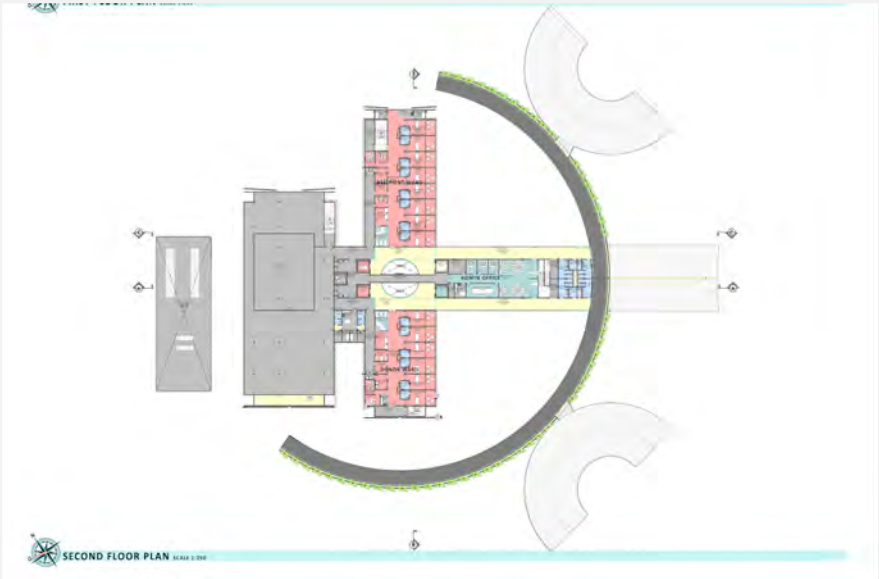


Figure 20: Second floor plan

On the second floor, the administration office is located at the centre. The North wing is where the organ recipient surgical wards and the South wing is the surgical wards for organ donors, post-transplant to be admitted here for several days.

3.2 ELEVATIONS

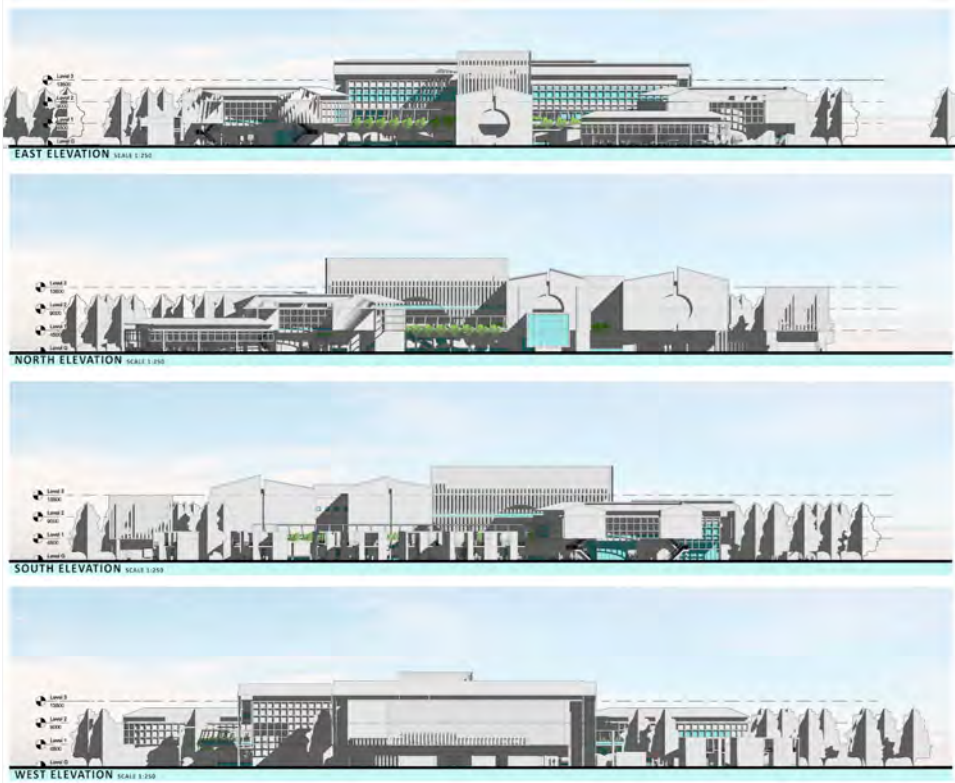


Figure 21: East, North, South, and West building elevation

3.3 SECTIONS

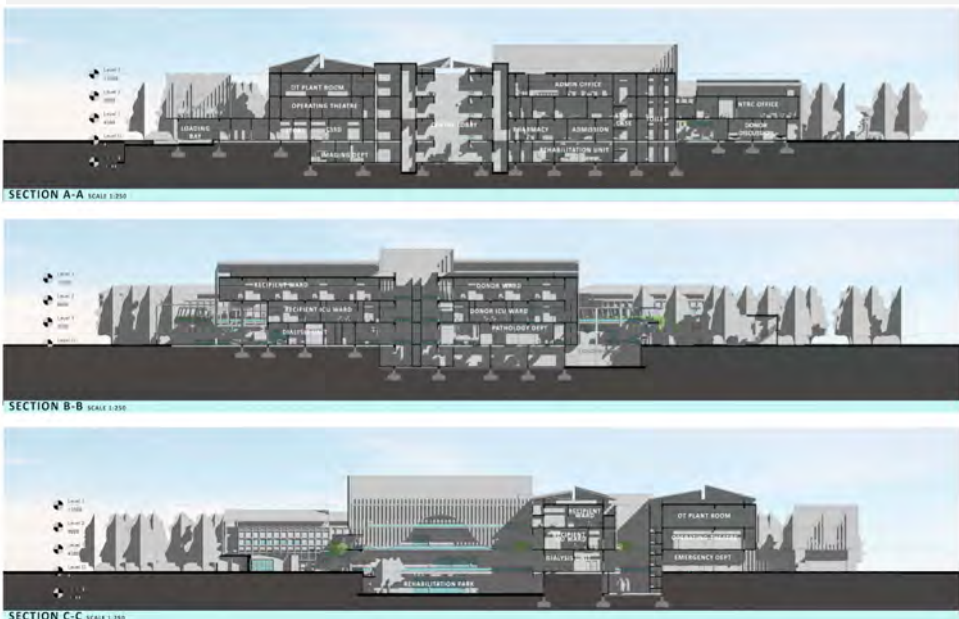


Figure 22: Section A-A, B-B and C-C of the building

3.4 PERSPECTIVES



Figure 23: Perspective view of the front building elevation

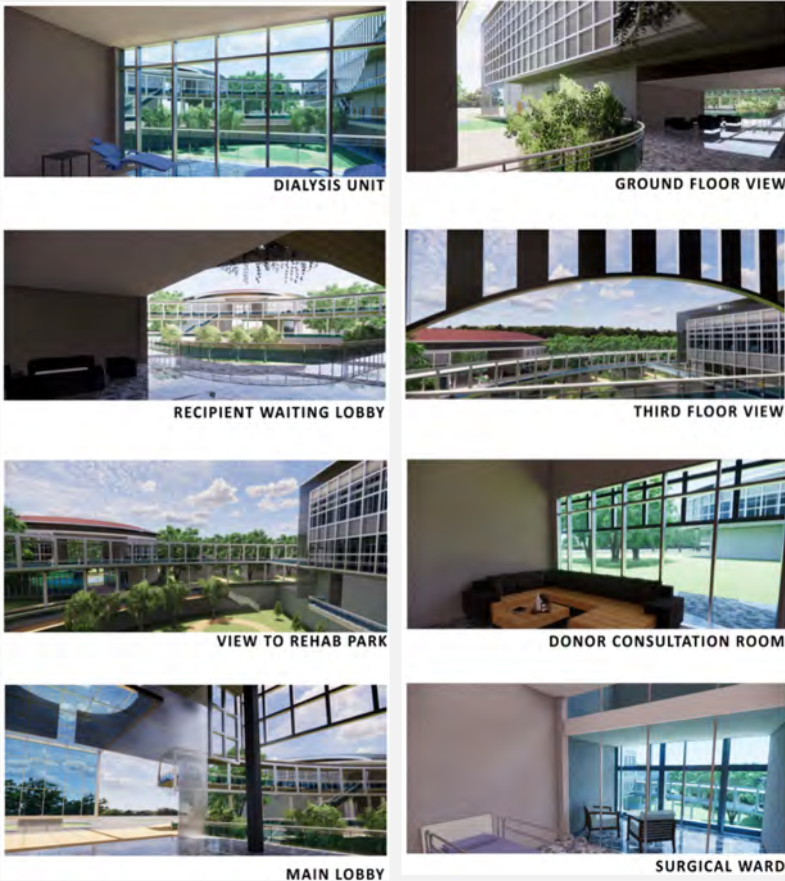


Figure 24: Compilation of Interior perspectives

4.0 SPECIAL STUDY

4.1 OPERATION THEATRE FOR ORGAN LIVING-DONOR TRANSPLANT

An organ transplant centre is a medical facility that specialised in organ transplantation procedures. It performs procedures, provides aftercare, and evaluates both donors and recipients. These facilities make it possible for patients with end-stage organ failure to get life-saving transplant procedures, which greatly enhances their quality of life. It is impossible to overestimate the significance of research and analysis in creating a special operating room for organ transplants involving living donors and recipients while maintaining the idea of secrecy.

It is imperative to construct an operation room specifically intended for organ transplants involving living donors and recipients while keeping anonymity in mind. Throughout the transplantation procedure, it protects the patients' autonomy, dignity, and privacy. Healthcare facilities uphold legal duties, ethical standards, and patient trust by enforcing stringent confidentiality regulations and physical separations. Patient well-being is promoted, and the overall healthcare experience is improved by providing a secure and encouraging atmosphere where confidential medical information is kept private. Respecting confidentiality also upholds the integrity of the organ transplantation process within the medical community, fosters professionalism, and fortifies the bonds between patients and providers.

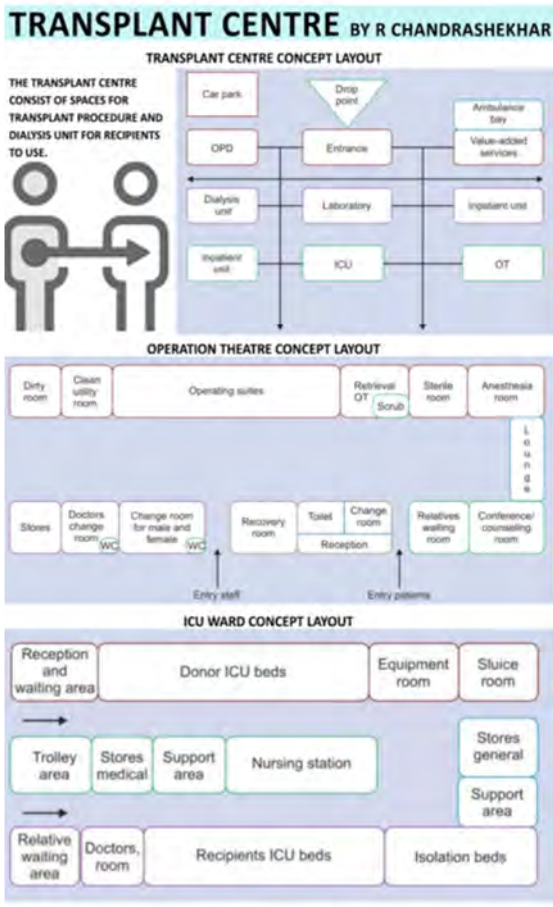


Figure 25 shows on spaces and flow concept of organ transplant ventre, focusing on operation theatre. (Source: Thimmappa et al., 2021)

4.2 CONNECTED OPERATING ROOMS

It is essential for efficient communication, well-coordinated care, and quick access to medical resources for organ transplants involving living donors and recipients to have adjacent or connected operating rooms. Being close together makes it easier for surgical teams to consult in real time, which guarantees smooth coordination throughout complicated surgeries. Patient outcomes are improved when shared resources, including imaging centres and support personnel, are easily accessible. This also cuts down on delays and increases efficiency. Furthermore, being close by makes it possible to react quickly to unanticipated problems, guaranteeing timely treatments and lowering risks. All things considered, adjoining or linking operating rooms foster collaboration, improve patient safety, and enable a unified approach to organ transplantation, which in turn raises the standard of care given to both donors and recipients.

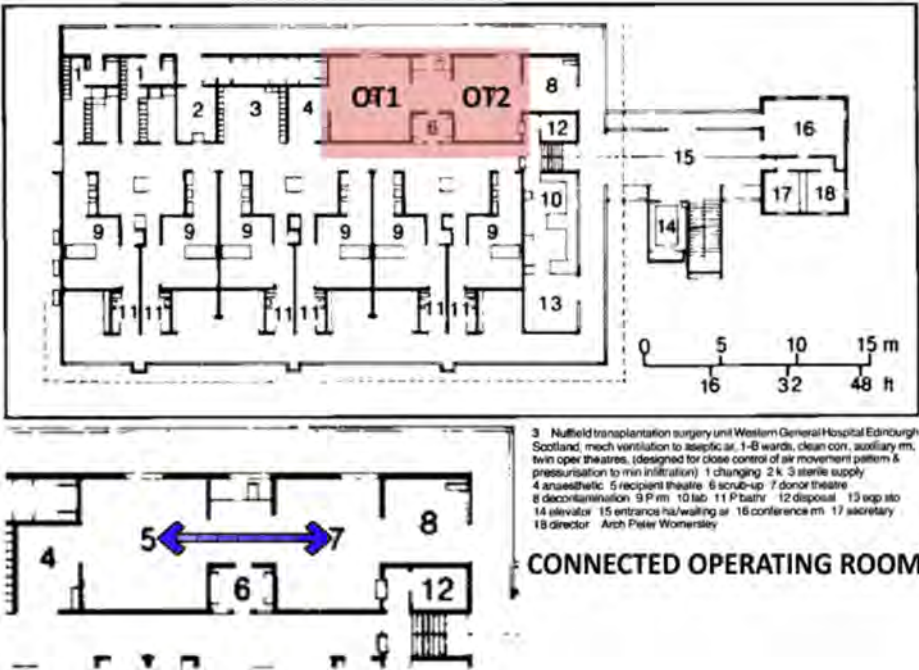


Figure 26: Organ transplant operating rooms connection. (Source: Neufert, 1980)

Typical operating theatre layout, which the operating rooms are not connected.

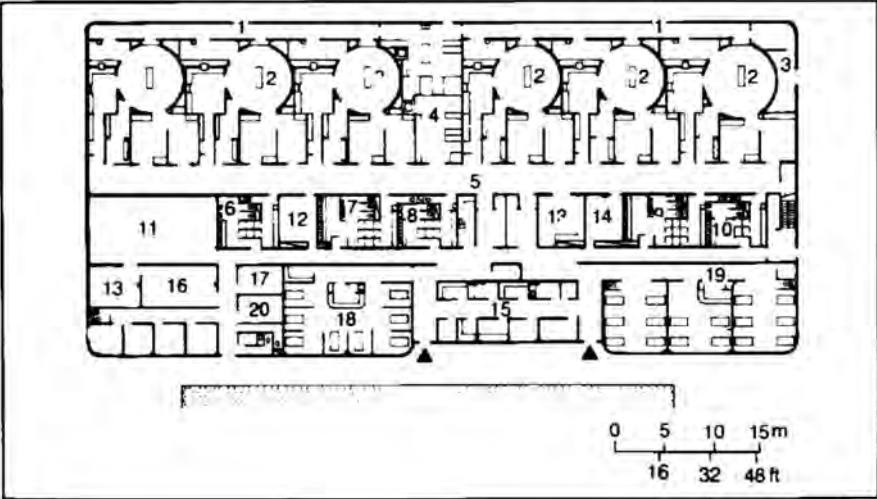


Figure 27: Organ transplant operating rooms not connected. (Source: Neufert,1980)

4.3 TYPICAL OPERATION THEATRE LAYOUT

4.3.1 CENTRALISED STERILE CORRIDOR

The operating theatre suite's central sterile hallway is situated in this arrangement. The sterile hallway is surrounded by surgery rooms, making it simple to go from the sterile area to any operating room. Ancillary facilities like scrub rooms, equipment storage areas, and post-anesthesia care units (PACUs) are usually connected to the corridor. This design maximises the use of available space and streamlines workflow because it allows medical personnel to travel between operating rooms without having to leave the sterile area. Furthermore, materials and equipment can be collected in one area of the sterile corridor for easy access during surgery. All things considered, this arrangement works great for bigger operating rooms that do several surgeries at once.

4.3.2 LINEAR STERILE CORRIDOR

The operating rooms are positioned in this configuration in a straight line down a sterile hallway. The operating rooms are surrounded by a sterile corridor that gives access to each one separately. The arrangement facilitates a more systematic movement of patients, personnel, and apparatus within the operating room. Additionally, it makes it easier to zone various portions of the suite effectively, creating places specifically for pre-operative planning, cleaning, and post-operative recuperation. Smaller operating rooms or institutions with constrained space typically choose this arrangement since it makes the best use of the available space while upholding sterility and productivity. Furthermore, the operating theatre suite's linear layout makes it simple to expand or alter as needed.

4.4 THE USERS FLOW IN THE OPERATION THEATRE FOR ORGAN LIVING-DONOR TRANSPLANT



Figure 28: The operation theatre in the organ donation centre.

Organ transplantation is a very private and delicate procedure that frequently involves living donors and recipients who might want to keep their identities private. In addition to protecting patient privacy and individual autonomy, designing a dedicated operating room that maintains rigorous segregation between donors and recipients may also allay ethical worries about direct donor-recipient interaction.



Figure 29 shows separation patient flow layout of organ donor and organ recipient.

To reduce the risk of postoperative problems and graft rejection, organ transplant procedures require strict adherence to sterile standards and infection control measures. Creating a special operating room guarantees that the surroundings are well-maintained, which lowers the risk of surgical site infections and guarantees the best possible results for donors and recipients.

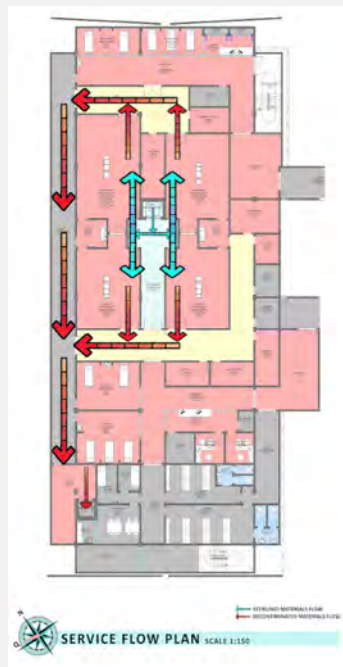


Figure 30 shows sterile equipment flow and decontaminated equipment flow layout.

Due to organ transplant surgeries require specialised care, staff members need a dedicated operating theatre. It offers a sterile atmosphere that is optimised for control, reducing the chance of infection and guaranteeing the security of patients and medical staff. Dedicated facilities also improve patient outcomes by streamlining workflow, increasing efficiency, and enabling staff members to get familiar with the special procedures and tools required for an organ transplant to be effective.

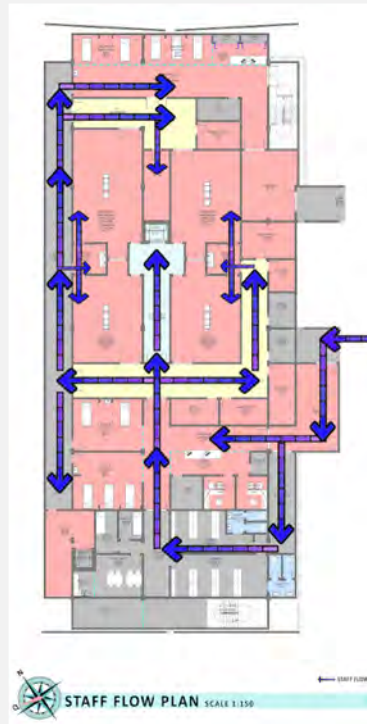


Figure 31 shows the organ transplant team flow layout.

CONCLUSION

To sum up, the architectural design thesis project that centred on building an organ donation centre marks a key turning point in addressing the pressing demand for establishments specifically designed to support organ donation and transplantation. With careful planning, careful investigation, and a dedication to moral values, the suggested Organ Donation Centre realises the goal of offering a comprehensive and encouraging setting for people and their families impacted by organ donation. The design idea places a high priority on the dignity and well-being of both donors and receivers by including the concepts of patient-centered care, confidentiality, and sustainability. The Organ Donation Centre is a communal symbol of compassion, healing, and hope because of the specialised locations, and interdisciplinary teamwork. The Organ Donation Centre also acts as a mobilising force for education, awareness-building, and cooperation amongst medical experts, donors, recipients, and the general public. The Organ Donation Centre has the capacity to inspire positive change, promote organ donation and transplantation as a culture, and save lives through its inventive design and transformative potential. In conclusion, the Organ Donation Centre's architectural design thesis project offers a comprehensive strategy for tackling the many opportunities and difficulties associated with organ donation and transplantation. The planned Organ Donation Centre reflects the values of compassion, and decency by fusing architectural innovation with ethical considerations and patient-centered care.

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02

BRIDGING URBAN MOBILITY: A COMPARATIVE ANALYSIS OF TRANSPORTATION SYSTEMS IN SOUTH KOREA AND MALAYSIA

Muhammad Afiq Hilmi Abd Aziz, Alif Nazmi Khairil Anuar, Nur Sabrina Huda Zulbahari and *M Zainora Asmawi
Department of Urban and Regional Planning, Kulliyyah of Architecture and Environmental Design,
IIUM

ABSTRACT

Urban planning and development in many countries now place a strong emphasis on urban mobility. This comparative study aims to analyse the approaches to urban mobility in cities in Malaysia and South Korea, focusing on key strategies, challenges, and outcomes of selected projects. The study involved a comprehensive review of the literature and a qualitative analysis of case studies from both locations. By comparing the experiences of Malaysia and South Korea, the study seeks to identify similarities and differences in urban transportation methods. The findings of this paper are beneficial for policymakers, urban planners, and other stakeholders involved in urban development initiatives, aiming to create more sustainable, inclusive, and livable cities in South Korea, Malaysia, and similar contexts worldwide.

Keywords: Urban mobility, transportation system, South Korea, Malaysia.

*Corresponding author: zainora@iium.edu.my

INTRODUCTION

As cities grow to accommodate increasing populations, efficient urban mobility, the ability for people and goods to move freely, becomes essential (Debra Lam & Peterhead, 2012). This study compares urban mobility in Seoul, South Korea, known for its extensive public transportation network including subways and BRT, and Malaysia's transportation system. Seoul's emphasis on pedestrian and cycling infrastructure has reduced reliance on cars (Yoonjong Choi, 2014), while Malaysia, despite investments in LRT and commuter rail, still struggles with private vehicle usage. By examining the strengths and weaknesses of both systems, this study aims to identify factors contributing to successful urban mobility, analyse the impact of infrastructure, public transport options, and car dependency, and explore potential knowledge transfer between the two countries. This comparative analysis offers valuable insights for policymakers and urban planners, enabling them to develop effective strategies to enhance urban mobility and create more livable, sustainable cities.

OBJECTIVES

The objectives of this study are:

- 1) To identify key factors that contribute to successful urban mobility in South Korea and Malaysia towards creating efficient movement of transportation system;
- 2) To analyse the impacts on the infrastructure development, public transportation options, and car dependency on urban mobility outcomes in South Korea and Malaysia; and
- 3) To explore the potential for knowledge transfer and best practice sharing between South Korea's advanced public transport system and Malaysia's developing network.

LITERATURE REVIEW

Developed nations place a high priority on efficient urban mobility systems as a cornerstone of a thriving society. Public transportation is key, offering benefits such as reduced traffic congestion (Rivera, Amorim, Reis, 2021; Litman, 2003) and cleaner air (Zhang, et al., 2024, Gössling et al., 2019) compared to car-centric approaches, while also emphasising the social advantages of ensuring universal access to opportunities through affordable and accessible public transport. Various options like subways and buses create a user-friendly network, further improved by seamless integration between them. Additionally, micromobility options like bicycles and e-scooters are becoming popular for short trips, promoting a multimodal system. Technological advancements such as Intelligent Transportation Systems and vehicles (Zhang, et al., 2024; Schwanen et al., 2018) and others can offer promise for the future of transportation. However, challenges persist, such as the need for continual investment in aging infrastructure and the ongoing quest for equitable access for all citizens. By prioritising public transportation, micromobility, and embracing technological progress, developed nations can continue to cultivate sustainable, fair, and efficient urban mobility systems for their residents.

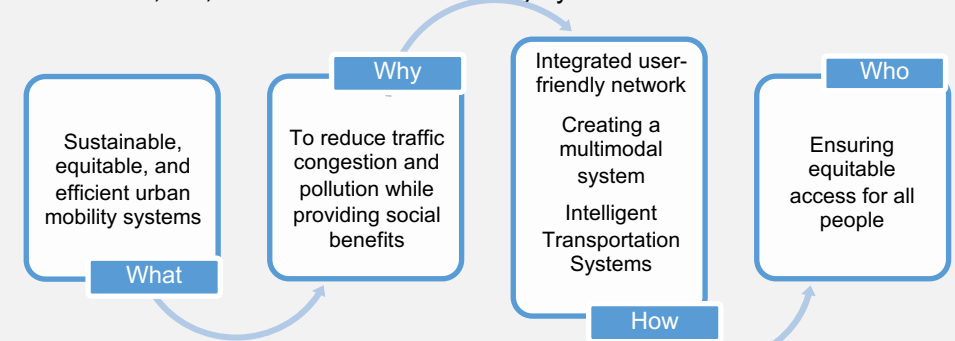


Figure 1: Conceptual Framework of Urban Mobility

ELEMENTS OF URBAN MOBILITY

Urban mobility encompasses the ability of people and goods to move freely within a city. Several key elements contribute to its success.

Firstly, **infrastructure** including a well-developed public transportation network like Seoul's extensive subways and BRT corridors, alongside dedicated lanes for pedestrians and micromobility options like bicycles increasingly seen in Malaysia

Secondly, the transportation modes themselves are important, with a focus on public transport, **micromobility**, and even private vehicle use needing to be considered within a cohesive strategy such as electric vehicles, non-motorists transport, and cycling

Thirdly, **accessibility and integration** in which, ensuring infrastructure is usable by everyone, regardless of ability, and offering affordable and well-integrated options.

Fourthly, **technology** through Intelligent Transportation Systems and the potential of autonomous vehicles offering a glimpse into the future that considering smart transportation facilities such as navigator, information board, and ticketing system.

Fifthly, effective **policy and planning** that promoting mixed-use development and prioritization of public transport, micromobility, and walking/cycling over car dependence.

Finally, a focus on **sustainability and equity** in reducing reliance on cars, minimises emissions, while ensuring everyone has access to affordable and efficient transportation options fosters social inclusion.

By considering these elements as suggested by many scholars like Miskolczi et al. (2021), cities like Seoul and Malaysia can continue to develop efficient and livable urban mobility systems with smooth movement of people and goods without damaging environmental aspects.

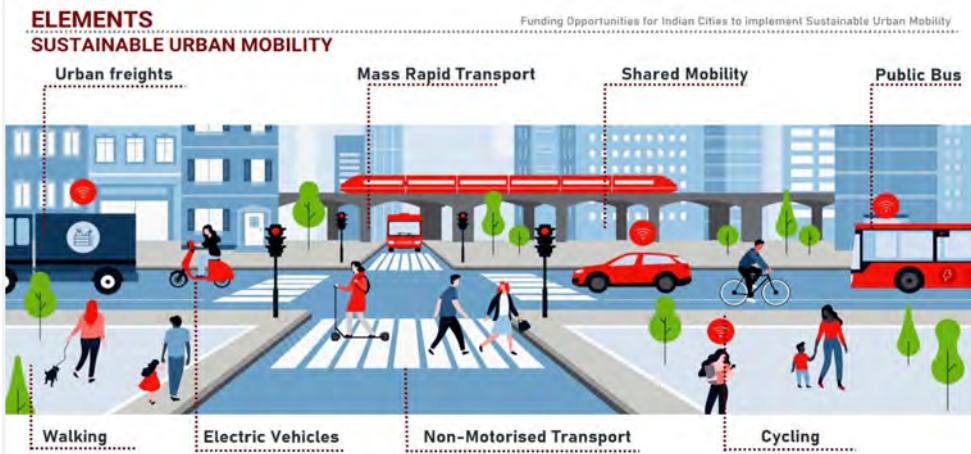


Figure 2: Elements Sustainable Urban Mobility (Rohith T, 2022.)

Examining urban mobility elements in Malaysia and South Korea highlights the diverse approaches Asian nations are taking to address this growing challenge. While Malaysia faces congestion due to car dependence and limited public transport options, the government's focus on improving infrastructure and promoting ride-sharing offers offering ways for a more balanced system.

Conversely, South Korea exemplifies a more established model, with extensive public transport networks in major cities. However, their focus on integrating technology and micromobility infrastructure demonstrates a proactive approach to tackle remaining issues like rush-hour congestion and air quality. Overall, these contrasting urban mobility elements illuminate the ongoing efforts towards sustainable and efficient urban mobility solutions in both countries for future advancements.

CHARACTERISTICS OF URBAN MOBILITY

The characteristics of urban mobility may vary based on the specific destination and base approach.



Figure 3: Characteristics of Urban Mobility (Gao, Y., & Zhu, J, 2022.)

THE IMPORTANCE OF AUTHENTIC TRAVEL EXPERIENCE IN URBAN MOBILITY

Urban mobility is not just about getting from one location to another. It is about immersing people in the local rhythm of a city. Below are the reasons authentic travel experiences are intertwined with a city's mobility.

Understanding the Local Pace

- Using the same modes of transport as locals allows to experience the city's true rhythm. Whether it's the fast-paced efficiency of a subway system or the leisurely pace of a bicycle commute in order to connect with the city's flow.

Connecting with the Culture

- Local transportation systems are often representing a city's culture. Public markets might be bustling hubs within subway stations, or street vendors might line cycling paths. These encounters offer a richer cultural immersion than self-tourist transportation options.

Discovering Hidden Gems

- Navigating a city on foot or by bike allows people to explore narrow alleys and hidden squares that people would not find on a map. This encourages spontaneity and lets people stumble upon unique areas as cars often restrict people to main roads, missing the city's hidden charm.

Meaningful Connection

- Authentic travel experiences enable visitors to form meaningful bonds with local communities. Interacting with locals in the bus, taking part in waiting activities, and participating in community-based mobility initiatives foster genuine connections.

Boosting Independence

- Exploring a city using local transportation fosters a sense of self-reliance when people learn to navigate unfamiliar environments, communicate with locals, and make decisions independently, all of which contribute to overall sense of self-sufficiency.

Sharpening Adaptability

- Delays, changes in plans, or unexpected detours are common when relying on public transport. Learning to adapt to these situations on the fly improves people flexibility and resilience, valuable skills that translate into all aspects of life.

FACTORS INFLUENCING THE DEVELOPMENT OF URBAN MOBILITY AND TRANSPORTATION SYSTEMS

Urban mobility and transportation systems are essential components of modern cities, playing a critical role in facilitating the movement of people and goods. Their existence and development are shaped by a complex interplay of economic, social, and environmental factors. Economic factors ensure the financial viability and affordability of transportation systems, while social factors emphasize community engagement, inclusivity, and quality of life. Environmental considerations focus on sustainability and resilience in the face of climate change. Understanding these factors is crucial for developing effective and authentic transportation solutions that meet the diverse needs of urban populations and promote sustainable urban growth.



Economic Aspect

1. Economic Growth and Development

Urban mobility and transportation systems are essential for supporting economic growth and development. Efficient transportation infrastructure facilitates the movement of goods and people, enabling businesses to operate smoothly and connect with markets. It enhances access to employment, education, and services, which are critical for economic productivity. Well-developed transportation networks can attract investments, boost property values, and stimulate local economies, thereby fostering overall economic development (Rodrigue et al., 2016).

2. Cost-Benefits Considerations

The development of urban transportation systems often hinges on detailed cost-benefit analyses. Planners and policymakers evaluate the potential economic benefits, such as reduced travel times, lower vehicle operating costs, and increased productivity, against the costs of construction, maintenance, and operation. Projects that demonstrate significant economic benefits relative to their costs are more likely to be pursued. This economic rationale ensures that transportation investments contribute positively to the urban economy and provide value for money (Litman, 2021).

3. Funding and Financing

Securing adequate funding and financing is a fundamental factor for the existence and expansion of urban transportation systems. Various sources of funding, including government budgets, public-private partnerships, and international financial institutions, are often utilised. Innovative financing mechanisms, such as land value capture and congestion pricing, can also play a crucial role in generating the necessary resources. Effective financial planning and management ensure the sustainability and scalability of transportation projects (Suzuki et al., 2015).



Social Aspect

1. Population Growth and Urbanisation

Community engagement plays a pivotal role in ensuring that urban mobility projects are authentic and meet the true needs of the residents. It ensures that the development is aligned with the needs, preferences, and aspirations of the local population. Community engagement also helps to identify unique local needs and preferences, making the transportation solutions more relevant and effective (Arnstein, 1969).

2. Quality of Life

The existence of robust urban mobility systems significantly enhances the quality of life for city dwellers. Efficient transportation reduces commute times, decreases traffic congestion, and improves air quality, contributing to a healthier and more livable urban environment. Access to diverse transportation options, such as public transit, biking, and walking, promotes social equity by ensuring that all residents, regardless of income, have mobility choices. Enhancing the quality of life through better transportation is a major driver for the development of these systems (Banister, 2008).

3. Social Inclusion and Equity

Transportation systems play a vital role in promoting social inclusion and equity. By providing affordable and accessible mobility options, urban transportation can bridge social divides and ensure that all segments of the population can participate fully in economic and social activities. Inclusive transportation planning addresses the needs of vulnerable groups, including the elderly, disabled, and low-income residents, ensuring that no one is left behind. This focus on social equity is a key factor in the development of urban mobility systems (Lucas, 2012).



Environmental Aspect

1. Sustainability Goals

The push for sustainable urban development is a significant factor driving the existence and evolution of urban transportation systems. Cities aim to reduce their carbon footprint and mitigate climate change impacts through sustainable transportation initiatives. This includes promoting public transit, cycling, walking, and the adoption of electric and low-emission vehicles. Sustainable transportation reduces greenhouse gas emissions, lowers energy consumption, and minimises environmental degradation, aligning with broader environmental goals (Banister, 2008).

2. Enhancing Accessibility and Connectivity

Efficient transportation networks, including buses, trams, subways, and bike-sharing systems, facilitate seamless movement across different urban areas, making it easier for people to reach their destinations. This connectivity reduces travel times and increases the accessibility of various city parts, from residential neighbourhoods to commercial and cultural districts. Gehl (2011) stated that high connectivity enables more spontaneous and flexible travel, allowing people to explore more of the city and access a wider range of services and amenities.

3. Improving Comfort and Convenience

Comfort and convenience are critical components of positive travel experiences. Modern urban mobility systems are designed to provide comfortable, safe, and convenient travel options. Features such as air-conditioned vehicles, real-time information systems, well-maintained infrastructure, and user-friendly ticketing systems contribute to a pleasant travel experience. Additionally, the integration of different modes of transport, such as park-and-ride facilities and multi-modal transit hubs, enhances convenience by making it easier to switch between transportation modes (Banister, 2008). This convenience encourages more people to use public transportation, reducing the reliance on private cars and contributing to a more sustainable urban environment.



4. Promoting Sustainability and Environmental Stewardship

Urban mobility systems that prioritise sustainability can significantly enhance travel experiences by contributing to cleaner, healthier urban environments. The promotion of public transportation, cycling, and walking over private car use reduces traffic congestion, lowers pollution levels, and decreases greenhouse gas emissions. Green transportation initiatives, such as electric buses and bike-sharing programmes, further support environmental sustainability. Travelers benefit from improved air quality and less noise pollution, which enhances the overall experience of moving through the city (Banister, 2008). Additionally, sustainable urban mobility initiatives reflect a city's commitment to environmental stewardship, which can foster a sense of pride and well-being among residents.

5. Fostering Social Interaction and Community Engagement

Public transportation systems, such as buses, trams, and subways, provide shared spaces where people from diverse backgrounds can interact. This daily interaction can build a sense of community and social cohesion, as people share common experiences and spaces. Moreover, well-designed public spaces around transit hubs and pedestrian-friendly streetscapes encourage people to spend time outdoors, engaging with their surroundings and with each other. This social aspect of urban mobility contributes to a richer, more vibrant urban life (Gehl, 2011).

6. Supporting Economic Activities

Efficient urban mobility systems are vital for supporting economic activities by ensuring that businesses, workers, and consumers can easily access different parts of the city. Reliable transportation enables businesses to attract a broader customer base and access a larger pool of employees. It also allows workers to commute efficiently, reducing time lost in traffic and increasing productivity. For consumers, easy access to commercial areas enhances their shopping and leisure experiences. The economic vitality supported by efficient urban mobility creates a dynamic, thriving urban environment that attracts both residents and visitors (Rodrigue et al., 2016).

7. Enhancing Cultural and Recreational Experiences

Urban mobility systems significantly enhance cultural and recreational experiences by providing easy access to cultural institutions, parks, entertainment venues, and tourist attractions. Efficient transportation networks allow residents and visitors to explore the cultural richness of a city without the stress of navigating traffic or finding parking. This accessibility makes it easier to attend cultural events, visit museums, enjoy urban parks, and participate in recreational activities. By facilitating these experiences, urban mobility systems contribute to the cultural vibrancy and attractiveness of the city (Florida, 2014).



METHODOLOGY

This study utilised a qualitative research approach in the metropolitan cities of Seoul, South Korea, and Kuala Lumpur. The analysis and findings were based on case studies, preliminary studies, observations, and site context studies. Ground-truthing was conducted to gain a deeper understanding of the actual implementation of urban mobility development in both countries. Analysis and synthesis were employed in the design process to create suitable solutions aligned with the study's objectives.

The case studies chosen for analysis included major transportation developments like Seoul's public bus transportation and subway system due to their suitability. Observations were conducted in these areas to document the key features that have effectively influenced urban mobility in Seoul. Meanwhile, the same transportation modes, public bus transportation, and subway system in Kuala Lumpur were studied on the ground and also based on secondary data.



Figure 4: Data Collection Methodology

RESEARCH FINDINGS

Seoul, the capital city of South Korea, boasts one of the world's most advanced and efficient urban mobility and transportation systems. This system is characterised by its comprehensive coverage, integration of various modes of transport, advanced technology use, and strong emphasis on sustainability. Here, the paper delves into the various aspects and types of transportation that make up Seoul's urban mobility framework, exploring the factors contributing to its success.

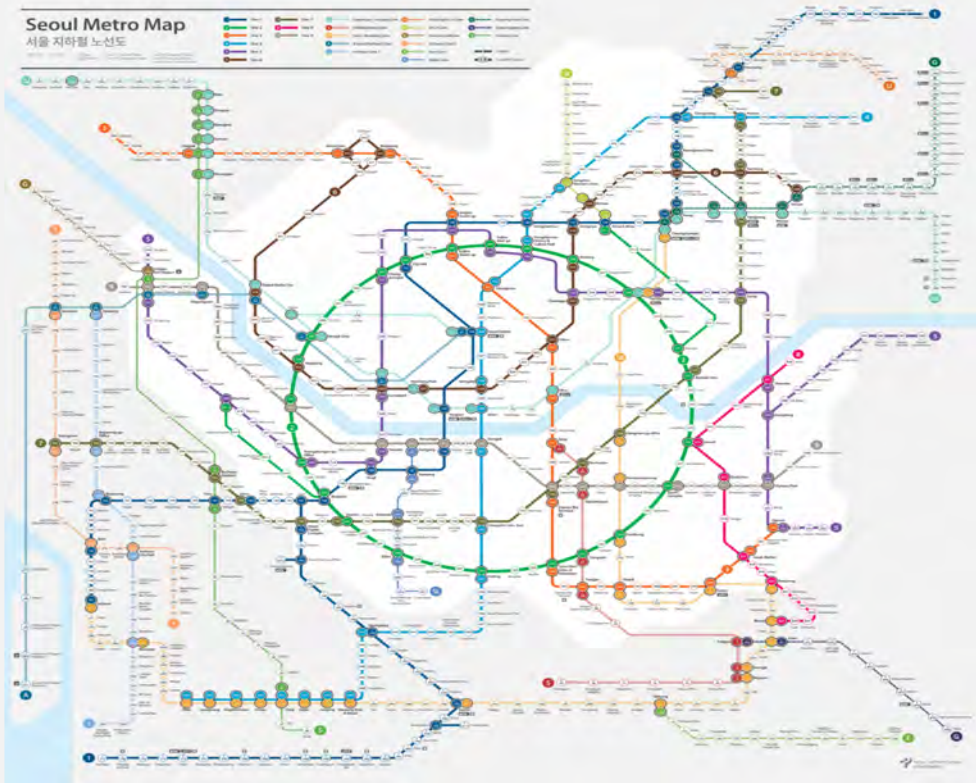


Figure 5: Seoul Metro Map (Seoul Metro, 2023).

Subway System

Seoul's subway system is the backbone of its urban transportation, renowned for its efficiency, cleanliness, and extensive reach. The Seoul Metropolitan Subway comprises 23 lines, covering a total length of approximately 940 kilometers, and serving over 300 stations. This extensive network connects virtually every part of the city and its suburbs, making it the preferred mode of travel for millions of commuters daily. The subway system is also known for its punctuality and frequent service, with trains arriving every few minutes during peak hours (Seoul Metro, 2023).

The subway stations are equipped with modern amenities such as Wi-Fi, air conditioning, and multilingual signage, catering to both local commuters and international visitors. The system also prioritises accessibility, with elevators, escalators, and tactile paving for the visually impaired present at most stations.



Figure 6: Subway station



Figure 7: Seoul Bus Types (Seoul Metropolitan Government, 2023).

Bus System

Complementing the subway is Seoul's extensive bus network, which includes four types of buses: blue (trunk), green (branch), yellow (circular), and red (express). The bus system is designed to ensure that areas not directly served by the subway are still well-connected. The blue buses operate on major arterial roads, linking different districts, while green buses provide feeder services to subway stations. Yellow buses circulate within specific districts, and red buses offer rapid transit between Seoul and its surrounding areas (Seoul Metropolitan Government, 2023).

Table 1: Seoul Bus Types (Seoul Metropolitan Government, 2023).

Bus Colour	Description
Blue	Operated partly by private bus companies and partly by the city government. It runs for longer distance and has access to median bus lanes connecting suburban areas to downtown Seoul.
Green	Operated by private bus companies. It runs for shorter distance connecting major subway stations or bus terminals outside downtown Seoul.
Yellow	Circle parts of Seoul and stop at stations near business areas, tourist areas, and shopping areas, as well as providing connections to trunk/branch buses, subway stations, and major railway stations.
Red	Designed especially for passengers commuting between downtown Seoul and the metropolitan area.

Many bus stops in Seoul are equipped with digital displays providing real-time bus arrival information. These displays also show the bus routes and estimated travel times. The real-time information displays improve the efficiency of the bus network by reducing wait times and uncertainty for passengers. Some bus stops in Seoul feature interactive art installations. For example, the bus stop near the Ewha Womans University includes a wall of "wish locks" where students and visitors can hang padlocks with their wishes or messages. This not only beautifies the bus stop but also creates a unique and engaging experience for those waiting for their bus.

Integrated Fare System

Seoul's transportation system benefits significantly from its integrated fare system, which allows seamless transfers between subways, buses, and other modes of transport. The T-money card, a rechargeable smart card, can be used to pay for rides across all public transportation modes, including taxis. This integration simplifies the commuting process and encourages the use of multiple transportation types for a single journey, thus enhancing overall mobility efficiency (Seoul Metropolitan Government, 2023).



Figure 8: T-money

Seoul thrives on T-money, a rechargeable card that unlocks cashless travel. Tap users T-money card on buses, subways, and even taxis for effortless payments. Beyond transport, T-money is accepted at many convenience stores, vending machines, and even some cafes and restaurants, making it a versatile spending tool. Top-up stations are plentiful, and transfer discounts between buses and subways add to the savings.



Figure 9: Real-time bus arrival and departure information system

Real-Time Information Systems

Seoul has leveraged technology to provide real-time information to commuters, enhancing the convenience and reliability of its transportation network. Digital displays at bus stops and subway stations show real-time arrival and departure information, while mobile apps offer route planning, real-time tracking, and service updates. These technological innovations help commuters make informed decisions and reduce waiting times, improving the overall travel experience (Kang, 2019).

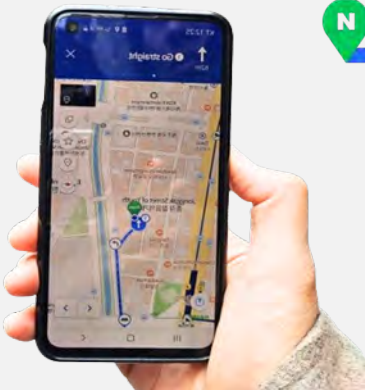


Figure 10: Naver map (Seoul Metropolitan Government, 2023)



Naver Map

Naver Map is a popular Korean app, lets people explore Seoul with ease. Search locations, buses, or subways, and get real-time navigation for driving, walking, cycling, and even public transport (including arrival times). Plan trips with buses, subways, and taxis. English language support is available. Naver Map features and real-time navigation make it a must-have for navigating Seoul.



Figure 11: Seoul EV Charging Stations

Electric and Green Vehicles

Seoul is also at the forefront of adopting electric and green vehicles to reduce its carbon footprint. The city has introduced electric buses and taxis, supported by an extensive network of charging stations. Incentives and subsidies are provided to encourage the adoption of electric vehicles (EVs) among residents and businesses. These initiatives align with Seoul's commitment to reducing greenhouse gas emissions and promoting sustainable urban development (Kang, 2019).

Micro Mobility Transportation (E-Bike and E-Scooter)

Seoul, known for its advanced and integrated transportation system, has embraced micro-mobility solutions, particularly e-bikes and e-scooters, as part of its strategy to enhance urban mobility. These micro-mobility options provide flexible, efficient, and eco-friendly transportation alternatives that complement the city's extensive public transportation network.

Seoul's government has actively promoted the use of e-bikes as a sustainable transportation mode to reduce traffic congestion and pollution. The Seoul Bike (Ddareungi) programme, launched in 2015, includes a fleet of e-bikes, making them accessible to residents and visitors alike. These bikes can be rented from docking stations located throughout the city, providing a convenient last-mile solution and encouraging more people to use bicycles for short trips (Seoul Metropolitan Government, 2023).



Figure 12: E-Bike



Figure 13: E-Scooter

E-scooters have quickly gained popularity in Seoul as a convenient and flexible mode of transportation. They are particularly favored for short trips and are seen as a viable solution for bridging the gap between public transportation stops and final destinations. Several private companies operate e-scooter sharing services in Seoul, offering a large fleet of scooters that can be rented via mobile apps (Seoul Metropolitan Government, 2023).

URBAN MOBILITY IN MALAYSIA AND KOREA

This section shows examples of urban mobility in Malaysia and South Korea based on several key elements.

MALAYSIA’S URBAN MOBILITY

Getting around Malaysian cities can be a challenge. Traffic congestion is common due to a high number of cars and limited public transport options. While buses exist, they often struggle with efficiency. The rapid growth of cities further strains the system. The government is looking to improve public transport and encourage ride-sharing, but for now, many Malaysians spend a lot of time stuck in traffic.

SOUTH KOREA’S URBAN MOBILITY

South Korea demonstrates balanced urban mobility with strong public transport in major cities reducing traffic congestion. However, high car use in suburbs leads to rush hour jams and air quality issues. Korean cities are addressing this with smart traffic management and promoting cycling infrastructure for a more sustainable future.

Table 2: Comparison of Element of Urban Mobility in Malaysia and South Korea.

MALAYSIA	SOUTH KOREA
1. Infrastructure	
While car-centric, Malaysia's existing road network offers a base for improvement. In Kuala Lumpur, for instance, expanding the LRT system and adding dedicated lanes to this network could significantly boost public transport efficiency. Micromobility initiatives like bike-sharing programmes in specific areas show promise for a more sustainable future.	South Korean cities shine in public transport infrastructure. Take Seoul, for example. Its subway network is vast, with frequent trains and easy transfers to buses. Stations are modern and user-friendly, with digital displays guiding passengers. Moreover, Seoul embraces technology with AI traffic management and bike lane investments, making getting around efficient and sustainable.



Figure 14: RapidKL and BRT in Kuala Lumpur



Figure 15: RapidKL and BRT in Kuala Lumpur

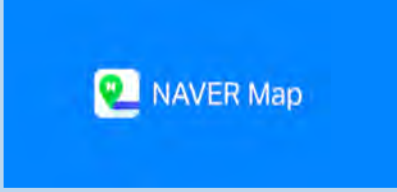


Figure 16: Subway and bus service system in Seoul



Figure 17: Subway and bus service system in Seoul

MALAYSIA	SOUTH KOREA
2. Micromobility	
Malaysia's micromobility is taking a step through planning base. Pilot programmes such as bike-sharing in Kuala Lumpur let residents experience cycling for short trips. A growing number of cycling enthusiasts and some dedicated bike lanes in places like Petaling Jaya show an increased interest. E-scooters might join the mix in the future. With more development and clear rules, micromobility could become a bigger part of getting around Malaysian cities.	South Korea is moving forwards in micromobility. Seoul, for instance, boasts a vast bike-sharing programme with convenient pick-up and drop-off points. Dedicated bike lanes separated from traffic make cycling safer and more attractive. E-scooters are also a popular option, with designated areas for riding. These micromobility options integrate seamlessly with public transport, allowing for easy connections between subways, buses, bikes, and e-scooters.
	
Figure 18: Petaling Jaya bicycle lane	Figure 19: Seoul bicycle lane
3. Accessibility and Integration	
Kuala Lumpur's newer buses offer features like wheelchair areas and audio announcements, improving accessibility. KL Sentral's integrated rail transportation center, offering global connectivity and seamlessly linking all urban and suburban areas. Trials of combined ticketing systems are underway, and some areas see improved sidewalks for safer walking. These steps, though limited, show a positive move towards a more user-friendly and integrated network.	All stations in Seoul, for example, boast features like elevators and ramps, making them easy to navigate for everyone. Seoul central station is the starting point of all railway routes in South Korea, featuring the line that connecting Seoul with other main hubs like Busan. It also features lines of the subway and connects to the Incheon airport. Plus, Seoul integrates public transport with pedestrian walkways and cycling lanes, creating a user-friendly and accessible network for all.
	
Figure 20: KL Sentral	Figure 21: Seoul Station

MALAYSIA	SOUTH KOREA
4. Technology	
Malaysia is dipping into using technology for better urban mobility. For instance, Kuala Lumpur is developing mobile apps, namely Moovit with real-time information on bus schedules, delays, and connections to other public transport options. Trials of integrated ticketing systems with mobile payment options are also underway. Data analysis on traffic flow is another positive step. Ride-hailing apps like Grab are prevalent in Malaysia and offer an alternative to car ownership.	South Korea leverages technology for a smarter urban mobility system. Take Busan city, for example. It uses AI to analyse traffic flow in real-time, optimising traffic lights and reducing congestion. Extensive digital displays and mobile apps keep passengers informed about schedules and delays. Plus, the T-money card with contactless fare payment allows for faster boarding and a smoother journey.
	
Figure 22: Moovit Apps (Seoul Metro, 2023).	Figure 23: Naver Map Apps (Seoul Metro, 2023).
5. Policy and Planning	
The government recognises the need for change and is investing in public transport expansion, like the LRT system in Kuala Lumpur. Pilot programmes for bike-sharing and designated bike lanes show a policy shift towards micromobility. Some areas are even incorporating wider sidewalks for pedestrians. National Transport Policy (2019-2030) outline strategies for a more sustainable system, including improved public transport and non-motorised options.	In Seoul, Seoul Transport Vision 2030 was developed to cater primarily to the growing car population. New developments are built near subway stations, allowing residents easy access to daily needs without a car. Government investment expands the subway network, making public transport the faster and more attractive option. Additionally, the city promotes cycling with dedicated lanes and prioritises pedestrian infrastructure like wider sidewalks, making walking safer.
	
Figure 24: National Transport Policy	Figure 25: Seoul Transport Vision

URBAN MOBILITY PROJECT

In order to produce effective and sustainable urban settings, urban mobility initiatives in Malaysia and Korea have concentrated on expanding public transport systems, lowering traffic congestion, and integrating smart technology. The following section will give examples of urban mobility initiatives in Malaysia and South Korea.

URBAN MOBILITY CASE STUDY IN MALAYSIA

An extensive case study on Malaysian urban mobility can draw attention to particular programmes and projects that have been put in place to solve transport issues, enhance public transit, and encourage sustainable urban growth. Table 3 depicts some example of urban mobility projects in Malaysia.

Table 3: List of Urban Mobility projects in Malaysia.

URBAN MOBILITY PROJECT	PROJECT OVERVIEW	KEY FEATURES	IMPACT
Mass Rapid Transit (MRT) System	MRT Kajang Line: Operational since 2017, the SBK line spans 51 kilometres with 31 stations, connecting Sungai Buloh in the northwest to Kajang in the southeast of Kuala Lumpur. MRT Putrajaya Line: Currently completed, this line will further expand the MRT network, enhancing connectivity across the city and easing traffic congestion.	Seamless Integration: The MRT lines are integrated with other public transport systems, including the Light Rail Transit (LRT), monorail, and bus services, facilitating easy transfers and reducing travel times. Modern Infrastructure: Stations are equipped with modern amenities, including air-conditioned waiting areas, digital information displays, and facilities for the disabled.	Increased Ridership: The MRT system has significantly increased public transport usage, reducing the number of private vehicles on the roads. Economic Development: Improved connectivity has spurred economic activities along the MRT corridors, boosting property values and commercial development.
Light Rail Transit (LRT) Expansion	LRT Kelana Jaya Line Extension: Extended to Putra Heights, the Kelana Jaya Line now spans 46.4 kilometers with 37 stations. LRT Ampang and Sri Petaling Lines Extension: These lines have been extended to provide better coverage and connectivity in the Klang Valley.	Interconnectivity: LRT lines are integrated with MRT, monorail, and bus systems, offering a comprehensive public transport network. Convenience: Stations are equipped with park-and-ride facilities, enabling commuters to conveniently switch from private vehicles to public transport.	Reduced Traffic Congestion: The LRT extensions have alleviated traffic congestion in densely populated areas by providing efficient and reliable public transport options. Enhanced Accessibility: Improved access to public transport has benefited residents, especially those in suburban areas, by reducing travel times and increasing mobility options.
RapidKL Bus System	Bus Rapid Transit (BRT) Sunway Line: A dedicated elevated bus line serving the Sunway area, providing a reliable and efficient public transport option for commuters. RapidKL Bus Network: An extensive bus network covering Kuala Lumpur and the surrounding Klang Valley, connecting various residential, commercial, and industrial areas.	Dedicated Lanes: The BRT Sunway Line operates on dedicated lanes, ensuring timely and efficient service free from regular traffic congestion. Service Integration: Buses are integrated with other RapidKL services, including MRT, LRT, and monorail, allowing seamless transfers.	Improved Public Transport Access: The RapidKL bus network has improved access to public transport, especially in areas not served by rail systems. Reduced Travel Times: Dedicated BRT lanes and improved bus services have reduced travel times for commuters, enhancing the overall efficiency of the public transport system.
Green Mobility Initiatives	Electric Vehicle (EV) Promotion: Malaysia has introduced incentives for the adoption of electric and hybrid vehicles, including tax exemptions and subsidies. Public Bicycle-Sharing Programmes: Initiatives like the Kuala Lumpur City Hall (DBKL) bicycle-sharing programme provide eco-friendly transport options for short-distance travel within the city.	Charging Infrastructure: Expansion of EV charging stations across major urban areas to support the growing number of electric vehicles. Bicycle-Friendly Infrastructure: Development of dedicated bicycle lanes and parking facilities to encourage cycling as a sustainable mode of transport.	Reduced Carbon Footprint: Increased use of electric vehicles and bicycles has contributed to reducing the carbon footprint of urban transportation. Health and Wellness: Promotion of cycling has positive health benefits for residents and contributes to a healthier urban environment.

Kuala Lumpur and other Malaysian cities are tackling the challenges of urban mobility with a multi-pronged approach. At the core of this strategy is the idea of offering a diverse range of transportation choices. This might include expanding and improving existing options like buses and trains. Additionally, infrastructure advancements could involve building dedicated bus lanes, creating safe and separated cycling paths, and improving pedestrian walkways. These improvements would make these alternative modes of transport more attractive, safer and efficient. Encouraging cycling and walking through infrastructure development and public awareness campaigns can significantly reduce reliance on cars and further contribute to a greener urban environment. By combining these elements, Malaysian cities are working towards a more efficient, user-friendly, and environmentally responsible urban mobility system.



Figure 26: MRT Putrajaya line



Figure 27: RapidKL bus

URBAN MOBILITY CASE STUDY IN SOUTH KOREA

A case study on South Korea's urban mobility may showcase the nation's cutting edge transit system, smart city programmes, and environmentally friendly mobility options. Numerous initiatives have been put in place in South Korea, especially in places like Seoul, with the goal of enhancing urban mobility, lowering traffic, and encouraging ecologically friendly transportation.

Table 4: List of Urban Mobility projects in South Korea

URBAN MOBILITY PROJECT	PROJECT OVERVIEW	KEY FEATURES	IMPACT
Smart Traffic Management System	Seoul TOPIS (Transport Operation and Information Service): A state-of-the-art traffic management system that integrates various modes of transport and provides real-time traffic information.	Real-Time Data Collection: Uses over 1,200 traffic cameras and sensors to monitor traffic flow and conditions in real-time. Integrated Control Center: Manages traffic lights, provides real-time updates to drivers, and controls public transportation systems. Public Information: Disseminates traffic information through various platforms, including mobile apps, websites, and electronic billboards.	Reduced Congestion: Improved traffic flow through adaptive traffic signal control and real-time updates. Enhanced Safety: Quick response to traffic incidents and efficient management of emergency situations.
Seoul Subway System	Seoul Metropolitan Subway: One of the most extensive and efficient subway systems globally, serving the Seoul Capital Area with over 23 lines and more than 700 kilometers of track.	High Connectivity: Links Seoul with surrounding cities and towns, integrating seamlessly with buses and other transport modes. Advanced Facilities: Equipped with amenities such as Wi-Fi, air conditioning, digital information displays, and barrier-free access for the disabled. Integrated Ticketing System: T-money card allows for easy transfer between subway, bus, and other public transport.	High Ridership: Daily ridership exceeding 7 million passengers, significantly reducing reliance on private vehicles. Economic Development: Enhanced connectivity boosts commercial activities and property values along the subway routes.
Public Bicycle-Sharing Programme	Ddareungi (Seoul Bike): A public bicycle-sharing programme launched in 2015 to promote eco-friendly and healthy transport options.	Wide Coverage: Over 2,000 stations and 20,000 bicycles available throughout Seoul. User-Friendly: Accessible through a mobile app that allows users to locate, rent, and return bicycles easily. Affordable: Low rental fees make it an economical option for short trips.	Increased Bicycle Usage: Encourages residents and tourists to use bicycles for short-distance travel, reducing traffic congestion and pollution. Health Benefits: Promotes physical activity and a healthier lifestyle among residents.
Electric Vehicle (EV) Initiatives	Promotion of EVs: Government incentives and infrastructure development to support the adoption of electric vehicles.	Subsidies and Tax Benefits: Financial incentives for purchasing EVs, including subsidies and tax reductions. Charging Infrastructure: Rapid expansion of EV charging stations across Seoul and other cities. EV Car-Sharing Programmes: Initiatives like SOCAR and Green Car offer EVs for short-term rental, promoting shared mobility solutions.	Reduced Emissions: Increased EV adoption contributes to lowering greenhouse gas emissions and improving air quality. Enhanced Urban Mobility: EV car-sharing programmes provide flexible and sustainable transport options for urban residents.
Smart City Initiatives: Songdo International Business District	Songdo IBD: A purpose-built smart city near Incheon, designed to integrate cutting-edge technologies for urban living and mobility.	Ubiquitous Connectivity: Extensive use of IoT (Internet of Things) devices for seamless communication between various city services. Automated Transport Systems: Features such as autonomous electric buses and smart traffic management. Green Spaces and Walkability: Emphasis on pedestrian-friendly design with ample green spaces and bike lanes.	Model for Future Cities: Songdo serves as a prototype for future smart cities, showcasing the potential of integrated technologies in urban development. Sustainable Living: Focus on green and sustainable solutions reduces environmental impact and enhances the quality of life for residents.

CONCLUSION

South Korea is leading the charge in reimagining urban mobility. Smart traffic management with AI-powered "smart intersections" reduces congestion. Extensive and well-maintained subway networks provide support, while government investment ensures their continued growth. South Korea promotes cycling with dedicated lanes and bike-sharing programmes. Additionally, they are a major player in the EV market, with government incentives and charging stations encouraging cleaner transportation. Finally, detailed planned smart cities like Songdo (International Business District) integrate technology, sustainable options, and public transport connectivity to create livable and efficient urban environments. Through these comprehensive strategies, South Korea is setting a global example for a future where urban mobility is synonymous with efficiency, sustainability, and a high quality of life. Urban mobility initiatives in Malaysia and South Korea show notable advancements in the promotion of sustainable mobility solutions, the integration of smart technology, and the improvement of transportation infrastructure. Both nations have implemented all-encompassing strategies to tackle the problems associated with urban mobility, which have improved the quality of life for citizens, decreased traffic, and improved public transportation networks. Urban mobility difficulties may be efficiently addressed by focusing on sustainability, using technology innovation, and strategically planning, as exemplified by South Korea and Malaysia. These nations may improve their urban environments and make them more livable, efficient, and sustainable for coming generations by investing in and developing cutting-edge transportation technologies.

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03

ENLIGHTENING STRATEGIES FOR TOURISM DEVELOPMENT IN A GLOBAL METROPOLIS: THE SEOUL EXPERIENCE

Nik Asiff Akhtar Muhammad Ariff, Fatin Nabilah Rosli, Muhammad Hakim Zainudin and *M Zainora Asmawi
Department of Urban and Regional Planning, Kuliyah of Architecture and Environmental Design, IIUM

ABSTRACT

Tourism has been a key driver of economic development globally, with Seoul standing out as a successful example of a popular tourist destination, particularly in the Southeast Asian region. The study explores how tourism contributes to Korea's national economy and consequently, promotes sustainable tourism development in the nation. This study relies on secondary data, primarily official documents, for data collection. It employed a qualitative research method to collect data on selected towns in Seoul, using a descriptive explanatory approach. Seoul has effectively utilised tourism to boost its global reputation and economic growth, with strategic urban planning efforts such as city branding, cultural tourism, and innovative design playing a significant role in enhancing its international tourism competitiveness. By integrating cultural tourism with urban design strategies, Seoul showcases its rich history and culture to attract visitors worldwide and foster sustainable economic development. The city's blend of modernity and tradition serves as a blueprint for other urban areas looking to enhance their global standing through tourism-focused urban development. Seoul's comprehensive approach to tourism and urban planning is instrumental in driving its economic success and international standing.

Keywords: Tourism, Economic Development, Cultural Heritage, Urban Planning, Sustainable Growth

*Corresponding author: zainora@iiu.edu.my

INTRODUCTION

Seoul has steadily become a model for cities aiming to boost their global status and economic prosperity. The city's tourism growth has played a crucial role in driving economic development, generating foreign exchange earnings, creating jobs, and investing in infrastructure since the 1960s. These benefits are important for developing regions, fostering sustainable growth and balanced development. Seoul, South Korea, exemplifies this trend through its comprehensive approach to tourism, integrating advanced technologies, cultural heritage, and strategic urban planning.

Seoul's evolution into a major tourist destination reflects a global trend where cities use their unique cultural and historical assets to attract international visitors and promote sustainable urban development. This process enhances the city's global reputation and economic competitiveness. Seoul employs strategic initiatives like city branding, cultural tourism, and innovative urban design to strengthen its global image. City branding involves creating a distinct urban identity through public design and cultural events, enhancing the city's appeal. By combining cultural tourism with urban design policies, Seoul highlights tourism's role in economic development and international competitiveness. Leveraging its rich historical and cultural resources, Seoul attracts international visitors, driving urban renewal and international recognition to support sustainable growth and economic development goals. Seoul sets a standard for other cities looking to enhance their global position and economic prospects through tourism-driven development by blending modernity and tradition. In this context, thus, the study explores how tourism contributes to Korea's national economy and consequently, promotes sustainable tourism development in the nation.

LITERATURE REVIEW

Tourism is described by the United Nations World Tourism Organisation (UNWTO) as the activities of individuals traveling to and staying in places outside their usual environment for up to one consecutive year for leisure, business, and other purposes (UNWTO, 2019). Tourism development strategies, as outlined by Dwyer and Forsyth (2020), involve intentional and systematic efforts aimed at improving and expanding the tourism industry of a specific area. These strategies involve a combination of marketing, infrastructure development, policy creation, and community involvement intended to attract and retain tourists. According to Hall (2017), a global city is a large, economically important city that functions as a major center for international business, culture, and tourism, known for its diverse population and extensive infrastructure. These cities typically demonstrate significant economic impact, advanced transportation systems, and a high level of cultural exchange and innovation.

Sustainability, technology, and cultural authenticity have emerged as crucial components of global tourism strategies in recent years. Effective tourism strategies necessitate thorough planning that encompasses environmental factors, community involvement, and technological advancements, as noted by Dwyer et al. (2019). Mobile applications and augmented reality have enhanced visitor interaction and contentment (Gretzel et al., 2015). Edgell and Swanson (2018) further emphasised the significance of policy structures that promote sustainable tourism growth, asserting that cooperation between the public and private sectors is vital for creating infrastructure and services that enhance the experiences of tourists and local communities.

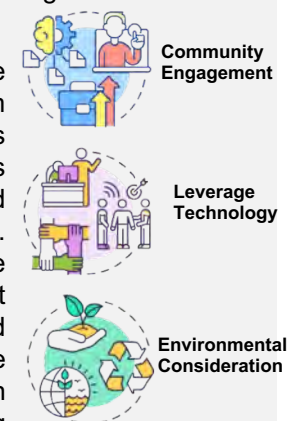


Figure 1: Important aspects of Tourism Strategies



Figure 2: Myeongdong Street is one of Seoul's main shopping and tourism districts.
(Source: Traveloka.com)

The tourism industry in Seoul has undergone significant evolution in recent decades. Initially driven by the Korean Wave (Hallyu), which attracted international visitors interested in Korean pop culture like K-pop, dramas, and fashion (Kim, Agrusa, Chon, & Cho, 2014), the establishment of key cultural landmarks and shopping areas like Myeongdong and Gangnam further enhanced Seoul's appeal. In a more recent development, Seo and Kim (2020) noted that Seoul has shifted its focus towards creating a sustainable and inclusive tourism environment. The city's policies now prioritise the preservation of cultural heritage, the development of eco-friendly tourism facilities, and the promotion of lesser-known local attractions to spread tourist traffic more evenly throughout the city.



Figure 3: River of Life is one of rejuvenation of historical area project in Kuala Lumpur
(Source: Thesun.My)

A content analysis of Seoul tourism development reveals distinct strategies employed by that city to enhance its tourism sectors. Seoul has effectively capitalised on its technological advancements and cultural exports. Choi, Lee, and Jamal (2017) addressed that Seoul's integration of smart tourism initiatives, such as free city-wide Wi-Fi, interactive digital kiosks, and mobile applications, has positioned it as a leader in blending technology with tourism. These technological innovations not only enhance the visitor experience but also provide valuable data for managing tourist flows and preferences. Moreover, Seoul's global cultural influence through Hallyu (Korean Wave) has been a significant driver in attracting international tourists eager to experience the pop culture, fashion, and cuisine that they admire from Korean media (Kim et al., 2014).

SUSTAINABLE TOURISM PRACTICES

Sustainability continues to be a key focus of modern tourism strategies, with cities around the world working to strike a balance between tourism growth, environmental conservation, and community well-being. Gössling et al. (2019) stated that the importance of sustainable tourism practices in addressing the environmental impacts of rising tourist numbers in major global cities. Cities like Seoul are urged to implement green policies, promote eco-friendly transportation, and ensure the sustainable management of tourist sites to ensure long-term sustainability (Gössling et al., 2019).

In 2019, Lee discussed sustainable tourism initiatives in Seoul, which focus on creating green spaces, implementing sustainable urban planning, and offering eco-friendly accommodations. The city has developed urban parks like Han River Park and green belts to provide recreational areas for residents and visitors, promoting ecological health. Seoul also promotes public transportation and cycling to reduce the environmental impact of tourism.



Figure 4: Recreational Spaces along the Han River
(Source: visitkorea.or.kr)

Additionally, Seoul has taken steps to protect its cultural heritage sites, ensuring that tourism growth does not harm its historical and cultural treasures. Initiatives promoting local crafts and traditional markets support the cultural economy and offer genuine experiences for tourists. According to Lee (2019), these initiatives significantly improve residents' quality of life and appeal to environmentally conscious travelers who appreciate sustainability and authenticity.



Figure 5: Gyeongbokgung Palace
(Source: visitkorea.or.kr)



Figure 6: Hangang Park
(Source: visitkorea.or.kr)



Figure 7: Bukchon Hanok Village
(Source: visitkorea.or.kr)

METHODOLOGY

This study utilised a qualitative research method in specific towns in Seoul, employing a descriptive explanatory approach. The case study method was adopted to collect information from academic journals, industry documents, and government publications to analyse tourist strategies in Seoul and other major cities globally. Key government documents were obtained from the Korea Tourism Organisation (KTO) and Seoul Tourism Organisation (STO), providing reliable data on tourism development in Seoul, Korea. Data was gathered from primary and secondary sources, with a particular focus on Seoul as a global popular tourist destination.

The selection criteria for the study areas in Seoul included factors such as:

- i. attractiveness;
- ii. reliable accessibility;
- iii. good infrastructure; and
- iv. sufficient tourist services.

The study areas chosen for analysis included Myeong-dong, Dongdaemun, Seoul 7017, and Yeouido Hangang Park due to their suitability. Observations were conducted on these areas to document the key features that have effectively influenced tourism policies and strategies, leading to an increase in tourists from various countries visiting Seoul. Site analysis was carried out on-site, and photographs were taken.

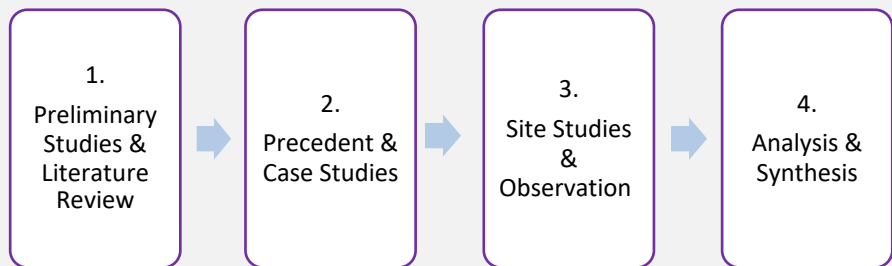


Figure 8: Data Collection Methodology

By consolidating the research findings, a range of practical steps will be proposed to boost tourism in Seoul. These strategies will tackle existing challenges and leverage Seoul's distinctive assets by integrating key elements such as cultural identity, visitor experiences, accessibility, partnerships, and customisation. This comprehensive approach will enable a thorough grasp of Seoul's tourism landscape, facilitating the development of effective strategies for sustained growth and prosperity. Nonetheless, the study is constrained by data limitations that hinder access to the most up-to-date information on tourism trends in Seoul.

RESEARCH FINDINGS AND ANALYSIS

SEOUL TOURISM COLLABORATIVE STRATEGY

Seoul, a vibrant city with a mix of historical and modern attractions, aims to maintain its position as a top destination (MasterCard, 2023). This approach focuses on leveraging Seoul's unique combination of tradition and innovation, fostering strong partnerships, creating engaging content for a worldwide audience, embracing technology-driven advancements, and promoting sustainable tourism practices. Through these initiatives, Seoul can enhance its global tourism competitiveness, attracting a diverse range of visitors and offering an exceptional experience for all. The Seoul Metropolitan Government is currently actively working to attract more international tourists by collaborating with foreign travel agencies to develop customised tourism offerings tailored to younger travelers.



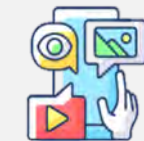
Figure 9: Seoul's Tourism Website in a Global Stage
(Source: <https://www.visitseoul.net/index>)

SEOUL TOURISM COLLABORATIVE ACTIONS



Building a Network of Collaboration in a Global Stage

The official Seoul tourism website outlines their mission is to make Seoul a world-class tourist destination by providing excellent service and information to visitors from all over the world.



Content Marketing for Seoul Global Image Appeal

UNWTO publishes reports on tourism trends and best practices. Their reports often highlight the importance of digital marketing strategies for destinations.



Harnessing Technology for Smart Promotion

"Ahn et al. (2022) examine the impact of mobile apps on tourist experiences in Seoul, highlighting the potential for technology to enhance visitor engagement."

Building a Network of Collaboration in Global Stage

Partnering with international tourism agencies expands Seoul's reach, promoting the city as a top destination in their marketing efforts. This collaboration enhances Seoul's visibility and attracts a diverse tourist base. By sharing knowledge with global tourism organisations, Seoul gains insights into successful strategies, fostering innovation in its tourism policies.

A key element of this strategy is to establish strong partnerships. By collaborating with local businesses, such as hotels, restaurants, and cultural institutions, attractive tourist packages and discount programmes are created. These initiatives aim to encourage travel to Seoul and enhance the overall visitor experience. Additionally, it is important to empower residents to act as ‘cultural ambassadors.’ For instance, in 2023, the 11-member K-pop group THE BOYZ represented Korean culture internationally as the promotional ambassador for the Korean Culture and Information Service (KOCIS).

KOCIS, a branch of the Ministry of Culture, Sports, and Tourism, officially appointed THE BOYZ to this role at the KOCIS Center in Seoul's Jung-Gu District. Following in the footsteps of CRAVITY, THE BOYZ kicked off their activities by promoting Talk Talk Korea, a global competition focused on Korea-related content. They also engaged in initiatives that promote Korean culture and Hallyu content worldwide.



Figure 10: The Boyz K-Pop Group as a Cultural Ambassador of Korean Culture and Information Service (KOCIS). (Source: korea.net)

Content Marketing for Seoul Global Image Appeal

In today's digital era, content marketing is essential for attracting tourists, as emphasised by Skift (2023) in their article "Content Marketing for Travel & Tourism: Strategies for Success". Creating a comprehensive global marketing campaign tailored to various tourist interests is crucial (UNWTO, 2023). This campaign can be shared through social media platforms (Skift, 2023), travel websites (UNWTO, 2023), and international publications (Skift, 2023). The official Seoul tourism website ("Visit Seoul") and YouTube channel ("Visit Seoul TV") act as central hubs for showcasing Seoul's offerings (Seoul Metropolitan Government, 2024). These platforms can highlight Seoul's unique strengths through various content formats such as travel videos (Skift, 2023), cultural guides (UNWTO, 2023), blog posts (Skift, 2023), and virtual tours (UNWTO, 2023).

Moreover, capitalising on the global popularity of the Korean Wave ("Hallyu") through K-pop, K-dramas, and Korean food culture presents a distinct opportunity (Forbes, 2024). Promoting filming locations, celebrity-frequented restaurants, and K-pop dance classes taps into this trend, attracting fans and establishing a youthful, trendy image for Seoul (Forbes, 2024). Therefore, it is evident that enhancing Seoul Tourism on a global scale is crucial. Korean content has gained significant value and importance as Korean pop culture has become a worldwide phenomenon.

In 2018, the K-pop group BTS made history by becoming the first Korean act to reach the top of the Billboard 200 chart. In the years that followed, BTS continued to set records in various music and social media platforms such as Spotify, YouTube, Twitter, TikTok, and Instagram. In 2020, the Korean film "Parasite," produced and distributed by CJ ENM, made history by winning the prestigious Best Picture award at the Academy Awards, marking the first time a foreign language film achieved this honor. The following year, the Korean original series "Squid Game" became a global phenomenon as the most-watched series on Netflix, making it the first non-English series to dominate the global charts. A 2023 report by Skift, a travel industry research firm, emphasised the significant impact of social media marketing in reaching a worldwide audience and influencing travel choices. As a result, Seoul has been recognised as one of the top 5 cities in the Asia-Pacific region for tourism competitiveness.



Figure 11: Expat social media influencers to promote domestic tourism appeal

Table 1: Seoul ranked fifth in tourism competitiveness among Asia-Pacific cities (Source: korea.net // gowithguide.com)

Ranking	1	2	3	4	5
City	Tokyo	Sydney	Singapore	Beijing	Seoul
Score	4.67	4.51	4.47	4.01	3.98

Harnessing Technology for Smart Promotion

The Seoul Metropolitan Government and private companies are working together to create mobile apps that are easy for users to navigate. These apps include interactive maps, multilingual audio guides, personalised itinerary suggestions, and real-time updates on public transportation. A study conducted by Kim and Wang in 2023 explored the impact of these mobile apps on tourists in Seoul. The study revealed that the apps significantly improve visitor engagement and navigation. Additionally, augmented reality (AR) technology allows tourists to see digital information overlaid on the real world, such as historical landmarks or hidden gems. For example, a tourist could point their phone at Gyeongbokgung Palace and see a 3D recreation of its past glory, creating a stronger connection to Seoul's history.



Figure 12: Technology used of Seoul for Global Tourism Strategy Source: <https://www.mdpi.com/>

CULTURAL AND HERITAGE PRESERVATION STRATEGY

Seoul's tourism strategy is centred on preserving and promoting its cultural heritage. The city has implemented various initiatives to ensure that historical and cultural assets are maintained and integrated into the urban tourism experience. Traditional practices such as wearing Hanbok in heritage locations like Gyeongbokgung Palace, Bukchon Hanok Village, and other historical sites are part of these preservation efforts. This not only attracts tourists but also fosters a deeper appreciation of Korean culture (Peck & Kwak, 2020).

The Cultural Heritage Administration of Korea has introduced a new conservation system that focuses on a "list-caution" policy, which records and manages cultural assets through comprehensive surveys rather than just protecting designated cultural assets. This shift aims to involve local communities and the private sector in the preservation process, promoting value preservation and creation (Peck & Kwak, 2020). This approach underscores the importance of community participation in heritage conservation and the promotion of cultural tourism.



Figure 13: Gyeongbokgung Palace
(Source: korea.net)

CULTURAL AND HERITAGE PRESERVATION ACTION



Cultural Heritage Care Project:

Initiated in 2010, this project involves periodic monitoring and minor repairs to minimise damage and reduce maintenance costs (Peck & Kwak, 2020).



Comprehensive Maintenance Plans:

These plans ensure efficient preservation, management, and utilisation of cultural assets through thorough research and analysis (Peck & Kwak, 2020).



Museum and Exhibition Establishments:

Historical sites are transformed into museums and exhibition spaces, such as the National Palace Museum, to educate the public and promote cultural heritage (Peck & Kwak, 2020).



Cultural Heritage Education Programs:

These programmes provide systematic and professional experiences through on-site visits and experiential learning, operated by local governments and cultural commentators (Peck & Kwak, 2020).



Utilisation as Public Parks:

Some historical sites serve as public parks, providing natural resting places while preserving the cultural environment (Peck & Kwak, 2020).

CULTURAL AND HERITAGE IMPACT OF TOURISM

Seoul's tourism strategy has had a significant impact on its cultural landscape, focusing on heritage preservation, promoting traditional arts and crafts, and influencing local lifestyles and customs. These efforts have not only increased the city's attractiveness as a tourist destination but also cultivated a greater understanding and appreciation of Korean culture among both residents and tourists. Here are some of the main initiatives and their effects:

Promotion of Traditional Arts and Crafts

Cultural Events and Exhibitions: Seoul promotes traditional arts and crafts through high-profile cultural events like the Seoul Design Olympiad and the World Design Capital designation in 2010. These events showcase the city's rich artistic traditions by blending traditional Korean crafts with contemporary design innovations. This approach attracts a global audience and fosters international cultural exchange (Yu, 2012).

Educational Programs

Cultural heritage education programmes provide hands-on activities and workshops that allow participants to learn and experience traditional arts and crafts up close. These programmes are designed to preserve traditional skills and knowledge, promoting a greater understanding and appreciation of Korean culture among both locals and tourists (Peck & Kwak, 2020).

Influence on Local Lifestyle and Customs

Cultural Heritage Protection Programs: Programs such as the "Protector of Cultural Heritage" engage citizens in the protection and maintenance of cultural sites. This community involvement fosters a sense of ownership and pride in cultural preservation, positively influencing local lifestyles and customs (Peck & Kwak, 2020).

Promotion of Cultural Experiences

The city provides cultural experiences like traditional tea ceremonies, calligraphy classes, and Hanbok-wearing at historical sites such as Gyeongbokgung Palace and Bukchon Hanok Village. These activities facilitate people immerse themselves in Korean culture, fostering cultural understanding and appreciation (Yu, 2012).

Development of Media Content

Seoul has developed comprehensive digital archives of its cultural heritage, providing online access to historical documents, photographs, and artifacts. These archives are valuable resources for researchers, educators, and the public, promoting wider access to cultural information and facilitating academic and cultural exchanges (Peck & Kwak, 2020).

Technological Integration in Cultural Heritage Sites

Seoul has created smart tourism apps with virtual tours, interactive maps, and cultural site details to enhance the visitor experience. These apps provide convenient information for exploring the city and its heritage (Peck & Kwak, 2020).

SMART TOURISM STRATEGY

Seoul's tourism strategy focuses on using smart tourism technologies to improve its destination image. Hwang, Park, and Hunter (2015) used constructivist methodologies to study how residents view Seoul's image. They used the Q method to categorise residents' subjective views based on common tourism promotional photographs. The study identified three clusters of subjectivities, showing that symbolic monuments like Seoul Tower and Namsan are crucial representations of Seoul. This approach emphasises the need to align marketing strategies with residents' perceptions to create a compelling destination image (Hwang et al., 2015).

Smart tourism technologies have transformed how destination images are perceived. User-generated content (UGC) and social media have shifted tourism marketing towards a participatory model where residents and tourists collaborate to shape the destination image. This interactive environment allows for a more authentic and diverse representation of Seoul, enhancing its appeal to a global audience (Hwang et al., 2015).



Figure 14: My Soul Seoul Digital Campaign
(Source: korea.net)

SMART TOURISM ACTIONS

Seoul's dedication to smart tourism is crucial for improving visitors' experience and encouraging sustainable urban development. The incorporation of cutting-edge technologies like mobile apps, IoT, and AR/VR has revolutionised how tourists engage with the city. The main benefits of smart tourism in Seoul include:



Enhancing Visitor Experience

Interactive Guides such as Mobile apps and digital kiosks provide real-time information, interactive maps, and virtual tours, helping visitors navigate the city more efficiently.

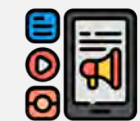


Efficiency and Convenience

Smart Infrastructure: Seoul utilises smart infrastructure such as free Wi-Fi zones, smart card payments for public transport, and IoT-enabled facilities to streamline the visitor experience.



Seamless Transportation: Integrated transport systems with real-time updates on buses, subways, and taxis ensure tourists can move around the city with ease.



Cultural Immersion:

Digital Storytelling: Interactive platforms and apps provide rich historical and cultural narratives, enhancing the understanding and appreciation of Seoul's traditions and heritage.

IMPLEMENTATION OF SMART CITY INITIATIVES

Seoul has adopted the smart city concept by incorporating a range of technological solutions to enhance urban living and tourism. This involves the implementation of IoT devices and sensors across the city to oversee and regulate various aspects such as traffic flow and energy usage. These efforts contribute to establishing a more effective and sustainable urban setting, which is a significant draw for tourists looking for destinations that are both technologically advanced and environmentally conscious. The smart city projects in Seoul aim to elevate the overall standard of living, making the city more appealing to both locals and tourists (Dameri, 2017).

Traffic Management:

Smart Traffic Lights: IoT sensors and AI algorithms are utilised to dynamically control traffic lights, decreasing congestion and enhancing traffic flow.

Real-Time Traffic Information: Mobile apps and digital displays offer real-time traffic updates, assisting drivers and pedestrians in navigating the city more effectively.

Integrated Transportation Systems:

T-Money Card: A convenient smart card that enables easy payment for transportation services such as buses, subways, and taxis. It streamlines travel for visitors and eliminates the necessity of carrying cash.

Real-Time Transit Information: Mobile applications and digital screens offer up-to-the-minute details on public transportation timetables, routes, and any disruptions, aiding tourists in planning their trips more efficiently.

Public Safety:

Smart Surveillance: CCTV cameras with AI technology are used to monitor public spaces for safety and security. They can identify unusual activities and notify authorities immediately.

Emergency Alerts: Tourists receive real-time alerts and emergency information through mobile apps and digital platforms to ensure their safety.

Mobile Applications:

Visit Seoul App: The authorised travel app offers comprehensive details on sights, lodging, dining, shopping, and activities. It offers personalised schedules, AR guides, and language translation tools.

Seoul Pass: A mobile pass that provides tourists with discounts and complimentary access to a variety of attractions, improving convenience and saving money.

Tourist Services:

Interactive Tourist Information: Smart kiosks and mobile apps offer tourists comprehensive information about attractions, events, and services in various languages.

Digital Guides and AR: Augmented reality (AR) applications enhance the visitor experience at cultural and historical sites by providing interactive guides and virtual tours..

Real-Time Data and Analytics:

Tourist Behavior Analysis: Seoul adopts big data analytics to gain insights into tourist behavior, preferences, and movement patterns, which in turn aids in enhancing tourism services and refining marketing strategies.

URBAN AESTHETIC ENHANCEMENT

Urban aesthetic enhancement is crucial in shaping the identity and appeal of global cities as tourist destinations. Research indicates that tourists are increasingly attracted to destinations that offer a unique aesthetic experience, with a focus on walkable areas and green spaces. In Seoul, South Korea, initiatives aimed at revitalising public spaces, integrating cultural heritage, and promoting sustainable urban design are key components of the city's tourism strategy. This introduction delves into Seoul's approach to urban aesthetic enhancement in the context of tourism development, highlighting key actions, implementation strategies, and academic viewpoints.

Seoul's urban aesthetic enhancement efforts prioritise the preservation of cultural heritage alongside modernity and sustainability principles. Kim and Lee (2018) emphasise that urban green spaces and public art installations not only enhance the city's visual appeal but also contribute to environmental sustainability and community well-being. Research by Park et al. (2022) shows that the Cheonggyecheon Stream restoration project in Seoul resulted in a significant increase in tourism foot traffic in the surrounding area. Collaborative planning involving stakeholders from the public and private sectors is crucial for fostering inclusive and culturally sensitive urban designs (Park & Kim, 2019). As Seoul continues to develop as a global city, understanding the diverse impacts of urban aesthetic enhancement on tourism, cultural identity, and urban sustainability is vital for guiding future development endeavors.



Figure 15: Dongdaemun Design Plaza which is a major urban development landmark in Seoul
(Source: <https://english.seoul.go.kr/dongdaemun-design-plaza>)

URBAN AESTHETIC ENHANCEMENT ACTIONS

1. Revitalisation of Public Spaces and Landmarks

Seoul is implementing strategic revitalisation projects to improve the visual appeal and cultural significance of public spaces and landmarks. These initiatives are boosting Seoul's reputation as a tourist destination, with foreign tourist spending in the city hitting a record high of \$18.2 billion in 2019 (Korea Tourism Organisation, 2020). One example is the restoration of Gyeongbokgung Palace, where historical buildings and gardens are being meticulously reconstructed to showcase traditional Korean architecture and landscaping techniques (Kim & Choi, 2019). Another notable project is the Dongdaemun Design Plaza (DDP), designed by Zaha Hadid Architects, which combines contemporary design with historical elements to attract visitors with its innovative aesthetic and cultural exhibitions (Choi & Kim, 2017).

2. Public Art Installations and Cultural Districts

Seoul incorporates public art installations into urban planning to enhance public spaces with artistic expressions and cultural narratives. The Seoul Street Art Project transforms urban walls into platforms for murals and graffiti, drawing both tourists and residents, with approximately 10 million visitors coming to see the evolving street art scene each year (Seoul Metropolitan Government, 2023). A recent survey by the Korea Tourism Organisation (KTO) revealed that 78.4% of international tourists cited Seoul's unique cultural experiences, including art and traditional crafts, as a key factor in choosing Seoul as a destination (KTO, 2023).

Cultural districts like Insadong showcase galleries, street performances, and interactive installations that celebrate traditional Korean arts and crafts, offering immersive cultural experiences for visitors (Jung & Kwon, 2018). These districts are a major draw for tourists, with over 40% of respondents in the survey expressing a preference for visiting cultural districts while in Seoul (KTO, 2023). This focus on public art and cultural integration in public spaces not only caters to tourist interests but also enriches Seoul's dynamic cultural landscape, attracting a significant number of visitors to the city.



Figure 16 & 17: Insadong is known for the food stalls and variety of food and public art
(Source: <https://www.koreatodo.com/insadong>)

3. Landscape Architecture and Green Urbanism

Seoul prioritises green urbanism principles by integrating sustainable landscape architecture into its urban planning. The Seoulo 7017 Skygarden, previously an elevated highway, has been converted into a verdant pedestrian pathway featuring more than 24,000 plants, providing sweeping vistas of the cityscape (Kim & Lee, 2018).

This project not only improves the visual appeal but also supports biodiversity, mitigates the urban heat island effect, and offers recreational opportunities. Research indicates that cities with ample green spaces attract more tourists. According to a survey conducted by the Seoul Tourism Organisation (STO) in 2022, 85.3% of international tourists preferred visiting cities with parks and green spaces during their trips. The Seoulo 7017 Skygarden exemplifies Seoul's dedication to green urban planning, enhancing the city's appeal as a tourist destination.



Figure 18: Seoulo 7017 - The Skygarden for Seoul
(Source: <https://www.mvrdv.com/seoul/o-7017-skygarden>)

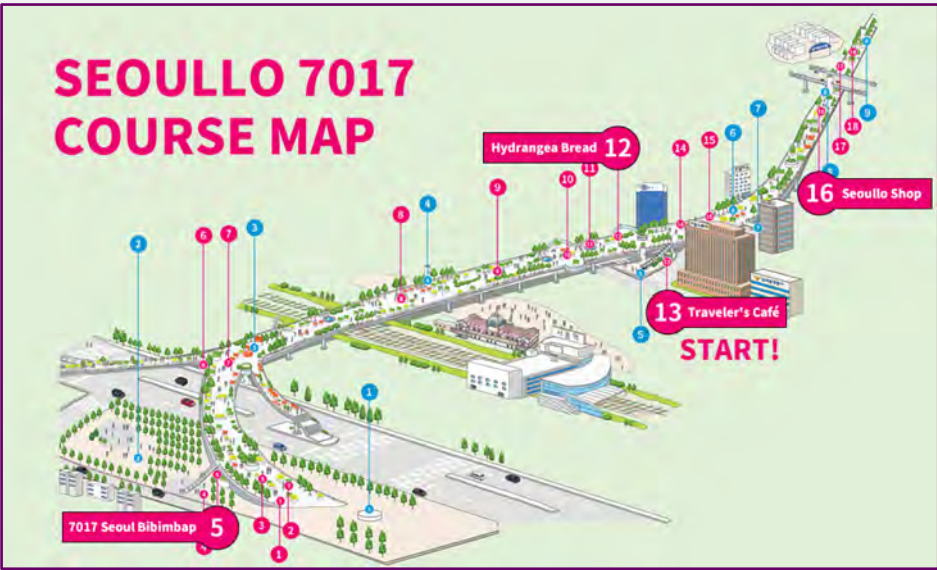


Figure 19: Seoul 7017 Course Map
(Source: <https://www.mvrdv.com/seoullo-7017-skygarden>)

IMPLEMENTATION OF URBAN AESTHETIC ENHANCEMENT ACTIONS

Implementing Seoul's Urban Aesthetic Enhancement strategy involves turning visionary ideas into real urban improvements that boost the city's cultural vibrancy, visual attractiveness, and environmental sustainability. This process includes a comprehensive approach that combines collaborative design frameworks, policy support mechanisms, and acknowledgment of outstanding projects. By utilising these strategies, Seoul not only safeguards its cultural legacy but also stimulates economic development by increasing tourism attractiveness and enhancing residents' quality of life. The implementation of Urban Aesthetic Enhancement includes two approaches as follows :

1. Collaborative Design and Planning

Seoul adopts collaborative design and planning methods to ensure that urban aesthetic improvements align with community values, cultural heritage, and environmental factors. This collaborative approach involves architects, urban designers, landscape architects, and community stakeholders collaborating to plan and implement projects. An example of this is the revitalisation of Cheonggyecheon Stream, which involved extensive public consultations and interdisciplinary cooperation to turn a neglected waterway into a vibrant urban park that rejuvenates the nearby neighborhoods (Park & Kim, 2019).



Figure 20: Cheonggyecheon Stream before and after
(Source: <https://www.thenatureofcities.com/>)

2. Policy Support and Regulatory Frameworks

Policy support is essential for guiding and facilitating urban aesthetic enhancement projects in Seoul. Research indicates that more than 70% of international tourists visiting South Korea prioritise the beauty and aesthetics of a destination (KTO, 2023). Additionally, a study conducted by the Korea Development Institute (KDI) in 2022 revealed that investments in urban aesthetics, such as public art and green spaces, can result in a 15% increase in tourism revenue (KDI, 2022). The Seoul Metropolitan Government has implemented strategic policies that emphasise design excellence, cultural preservation, and sustainable development. Initiatives like the Design Seoul program offer incentives for creative urban design and cultural activities, encouraging developers and designers to incorporate aesthetic improvements into their projects (Choi & Park, 2020). Furthermore, regulatory frameworks ensure adherence to environmental standards, heritage preservation laws, and accessibility requirements, promoting inclusive and environmentally conscious urban development.

URBAN TRANQUILITY STRATEGY

Seoul's Urban Tranquility Strategy aims to transform the South Korean capital into a peaceful, pedestrian-friendly city, enhancing its appeal as a top global tourist destination. The South Korean tourism industry has seen significant growth, with a record 17.5 million visitors in 2019 (KTO, 2019). However, concerns about traffic congestion and air pollution affect tourists in Seoul (Tan, 2020). The Urban Tranquility Strategy addresses these issues by focusing on reducing traffic and improving air quality. A key aspect of the plan is the enhancement of public spaces. The strategy includes creating more green areas, pedestrian zones, and lively recreational areas for residents and tourists to relax and explore at a leisurely pace. Studies show that cities with walkable areas and green spaces are more appealing to tourists, especially those interested in cultural experiences (Jun & Shin, 2019). By promoting these peaceful environments in the city, the strategy aims to encourage deeper cultural immersion and a greater appreciation for Seoul's historical heritage.

URBAN TRANQUILITY ACTION

1. Creating Car-Free Zones

Transforming key urban areas into car-free zones to reduce congestion and enhance pedestrian safety and comfort. A 2023 survey by the Seoul Metropolitan Government revealed that 68% of tourists visiting Seoul found pedestrian-only areas like Insadong to be particularly enjoyable, highlighting the value of these zones for cultural exploration and a more relaxed sightseeing experience (Seoul Metropolitan Government, 2023). For example, Insadong has been designated as a pedestrian-friendly district, lined with traditional shops and tea houses, providing an inviting environment for cultural exploration (Jung & Kwon, 2018).

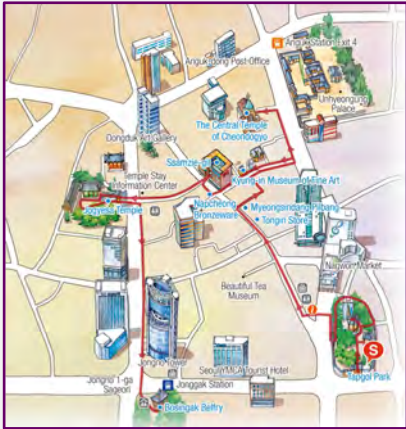


Figure 21: Insadong Street that was classified as car-free zone
(Source: <https://english.seoul.go.kr/>)

2. Enhancing Public Spaces

Seoul's dedication to improving public spaces goes beyond Seoullo 7017 Skygarden and includes projects like Yeouido Hangang Park. This park, located by the Han River, offers landscaped gardens, walking paths, and recreational facilities that attract tourists and locals seeking relaxation and beautiful views (Choi and Park, 2020). A report from the STO in 2023 revealed that 82.7% of international tourists considered convenient and accessible public transportation a key factor in choosing to visit Seoul (STO, 2023). The development of well-connected public spaces like Yeouido Hangang Park, integrated with Seoul's extensive public transport system, enhances the visitor experience. These initiatives not only enhance urban landscapes but also help create a vibrant and welcoming cityscape in Seoul.



Figure 22: Yeouido Hangang Park Illustration
(Source: <https://greatruns.com/seoul-yeouido-hangang-park/>)

3. Preserving Historical Heritage

Preserving and incorporating historical sites into the urban landscape provides cultural and educational value for tourists. Bukchon Hanok Village, known for its well-maintained traditional Korean houses (hanoks), allows visitors to delve into Seoul's rich historical legacy (Lee and Park, 2021). According to the KTO, (2023), 87.2% of international tourists are keen on exploring historical and cultural sites during their travels. By safeguarding and blending historical sites such as Bukchon Hanok Village and Gyeongbokgung Palace, the largest of Seoul's Five Grand Palaces, Seoul caters to this significant tourist interest and enhances the city's cultural allure (Cultural Heritage Administration of Korea, 2024).



Figure 23: Gyeongbokgung Palace
(Source: Korea.Net)

IMPLEMENTATION OF URBAN TRANQUILITY STRATEGY

1. Monitoring and Evaluation

Ongoing evaluation of pedestrian-friendly initiatives is essential for maximising visitor satisfaction and minimising environmental impact. Regular assessments of projects like the Seoullo 7017 Skygarden help ensure they are in line with objectives and improve the cityscape (Kim & Lee, 2020). According to a report from the Seoul Tourism Organisation in 2023, 92% of international tourists consider pedestrian-friendly infrastructure and walkable areas to be significant factors in their enjoyment of Seoul (STO, 2023). By actively monitoring and assessing these initiatives, Seoul can guarantee they meet the preferences of tourists and enhance the overall visitor experience.

2. Visitor-Centric Design Philosophy

Creating urban spaces that prioritise the comfort and exploration of visitors. Places like Bukchon Hanok Village are designed to encourage the discovery of hidden cultural gems through narrow alleys, enhancing the overall visitor experience (Kim & Lee, 2020). According to a 2023 survey conducted by the KTO, 84.1% of international tourists consider walkability, clear signage, and convenient access to public transportation as crucial elements for a positive tourism experience in Seoul (KTO, 2023). This approach to design, centered around the needs of visitors, resonates with tourist preferences and promotes a spirit of adventure and exploration throughout the city.

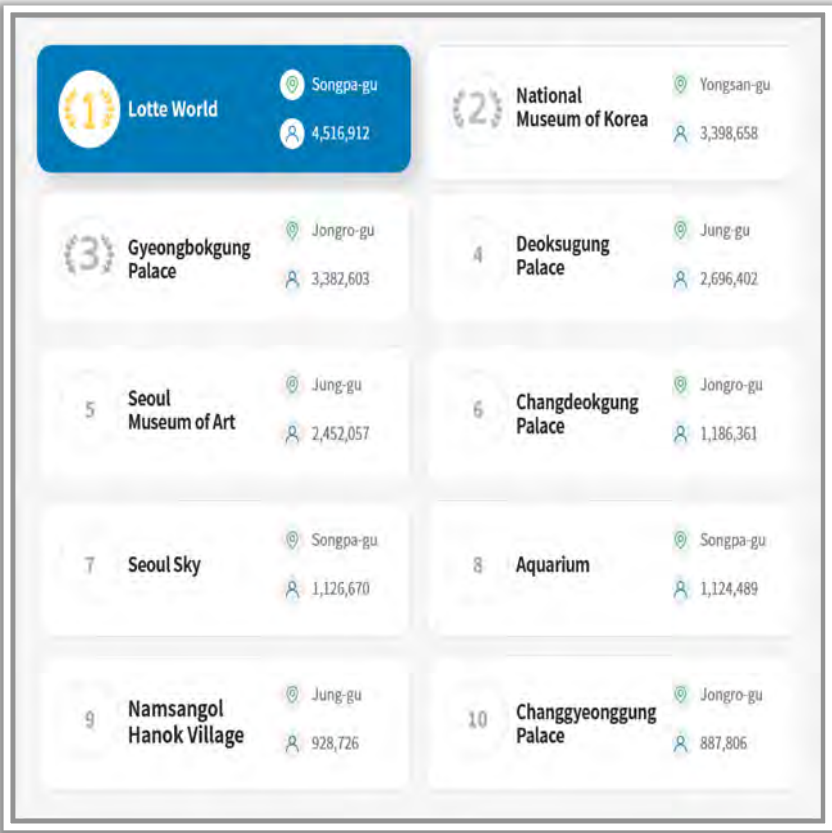


Figure 24: Top 10 ranking Korea Domestic Tourism Places
(Source: Tourism Knowledge & Information System)

POLICY RECOMMENDATIONS

Strengthening Public-Private Partnerships: To sustain and enhance its tourism initiatives, Seoul should continue to foster strong partnerships between public and private entities. This collaboration can lead to more innovative and inclusive tourism projects.

Diversifying Tourism Offerings: Expanding the range of tourism products beyond traditional cultural sites can attract a broader audience. This includes promoting niche markets such as eco-tourism and medical tourism.

Enhancing Digital Marketing: Leveraging digital platforms and social media can significantly boost Seoul's tourism marketing efforts. Engaging with potential tourists through interactive and immersive digital content can enhance the city's global reach.

Promoting Sustainable Tourism: Integrating sustainable practices into tourism development can ensure the long-term viability of Seoul's tourism sector. This includes preserving cultural heritage, promoting eco-friendly initiatives, and encouraging responsible tourism practices.

CONCLUSION

This comparative study of smart tourism initiatives in Seoul and Kuala Lumpur showcases how both cities have applied innovative technologies to improve the visitor experience, each with their own distinct approaches. Seoul's approach is deeply integrated into its smart city framework, utilising IoT, AI, and big data to create an efficient and sustainable urban environment. Key features such as free Wi-Fi, real-time data analytics, augmented reality, and virtual reality offer personalised and immersive services, attracting tech-savvy and environmentally conscious tourists. Kuala Lumpur, while also embracing smart tourism, focuses on digital platforms to enhance accessibility and convenience. Mobile apps, digital payments, and smart transportation solutions improve tourist satisfaction through practical applications. The city's focus on cultural tourism and digital storytelling helps preserve and promote its rich heritage. Both cities showcase the potential of smart tourism to revolutionise urban tourism, striking a balance between technological innovation and cultural preservation. This analysis emphasises the importance of tailoring smart tourism strategies to fit local contexts, ensuring that technological advancements complement the unique cultural and historical aspects of each city.

In summary, Seoul demonstrates how smart tourism can enhance the tourism sector. Through ongoing adjustments to their approaches, these cities can remain competitive and offer memorable experiences for tourists. Further studies should track the impacts of these efforts to assist other cities in their quest to become smart tourist destinations.

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04

ECO VOCATIONAL ACADEMY AS SUSTAINABLE EDUCATIONAL SYSTEM FOR ORANG ASLI IN HULU LANGAT, SELANGOR

Tuan Muhammad Nubli Tuan Sariff, *Asiah Abdul Rahim, Muhammad Azmeer Muhammad and Zuraini Denan
Department of Architecture, Kulliyyah of Architecture and Environmental Design, IIUM

ABSTRACT

Education is essential for success in a globalised world, yet marginalised communities such as Malaysia's Orang Asli face significant barriers due to culturally irrelevant curricula, inadequate facilities, and systemic misalignment with their traditional values. This research explores sustainable education approaches for the Orang Asli, with three key objectives: (1) to identify strategies that attract Orang Asli to education, (2) to determine suitable curriculum components for this community, and (3) to develop a sustainable education framework that supports their long-term potential. Employing interviews, field observations, and literature reviews, the study underscores the importance of culturally responsive and environmentally sustainable educational models. The findings reveal that familiar environments, locally adapted curricula such as the Kurikulum Asli dan Penan, and the use of indigenous materials enhance engagement and learning outcomes. The study highlights the value of aligning educational systems with local culture and ecology to promote inclusive, equitable development offering actionable insights for educators and policymakers addressing indigenous education globally.

Keywords: *Orang Asli education, Sustainable education, Indigenous learning, Culturally relevant curriculum, Educational equity, Inclusive education.*

*Corresponding author: arasiah@iium.edu.my

1.0 INTRODUCTION

Education is a foundational pillar of national development, equipping individuals with essential knowledge and skills to contribute to economic growth and social progress (Mustapha & Abdullah, 2019). In Malaysia, despite policies aimed at promoting accessibility and inclusivity (Ministry of Education Malaysia, 2022), the Orang Asli community continues to encounter significant educational disparities. Systemic barriers such as inadequate school infrastructure, limited access due to geographic isolation, and economic hardship hinder their academic participation (Sharif et al., 2021; Hassan et al., 2023). Mainstream education models often overlook the Orang Asli's distinct cultural background, resulting in disengagement and high dropout rates (Sawalludin, Jia Min, & Mohd Ishar, 2020). Additionally, the national curriculum is frequently misaligned with the community's values and learning preferences, which emphasise experiential and skill-based knowledge (Zainal, 2021).

A shortage of indigenous educators and culturally aware teaching practices further contributes to a sense of exclusion within the schooling system (Ismail & Yunus, 2022). Bridging these gaps requires a more adaptable and context-sensitive educational framework that incorporates vocational training, localised curricula, and community-driven models. This study addresses these concerns by proposing a sustainable, culturally grounded education system tailored to the needs of Orang Asli communities, focusing on equity, inclusivity, and long-term capacity building



Figure 1: Orang Asli students in class
(Source: Leaderonomics)

Research Problem

High dropout rates among Orang Asli students, as shown in Figure 2, especially during transitions to secondary school, remain critical. Jabatan Kemajuan Orang Asli (JAKOA), (2012–2018) reports over 50,000 dropouts annually, limiting future opportunities. A 2014 Ideas report notes 40,000 Malaysian students, many Orang Asli, left school in 2012. Dropout rates peak from Standard 6 to Form 1 and Forms 3 to 4. Despite better secondary enrollment, compulsory education remains limited to primary school, disproportionately affecting Orang Asli. Addressing systemic, socioeconomic, and cultural barriers is crucial for equitable education and national development.

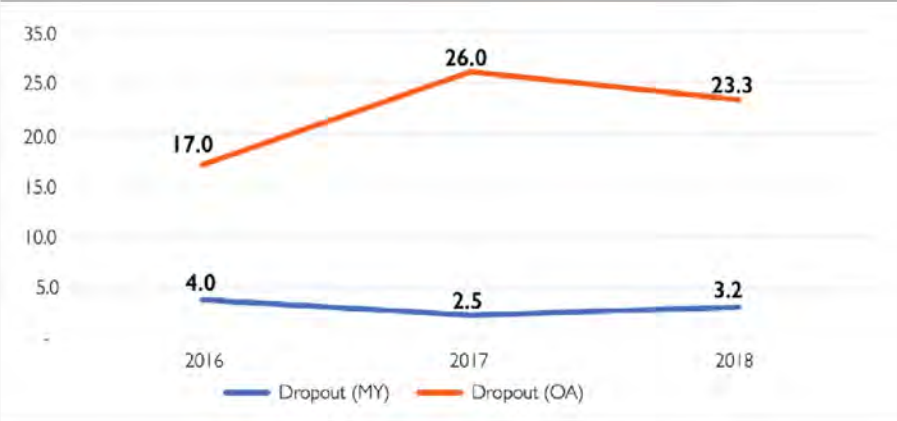


Figure 2: Dropout rates between Orang Asli and general races (source: Ministry of Education, 2019)

Research Issues

From the Figure 3 chart, Orang Asli dropout rates after Year 6 improved from 2008 to 2016 but rose to 26% in 2017 before slightly improving to 23% in 2018, still well above the national average. From 2016 to 2018, Malaysia’s overall dropout rate stayed below 4%, while Orang Asli rates remained above 17%, highlighting persistent educational disparities. These figures emphasise the need for targeted interventions to address systemic challenges.

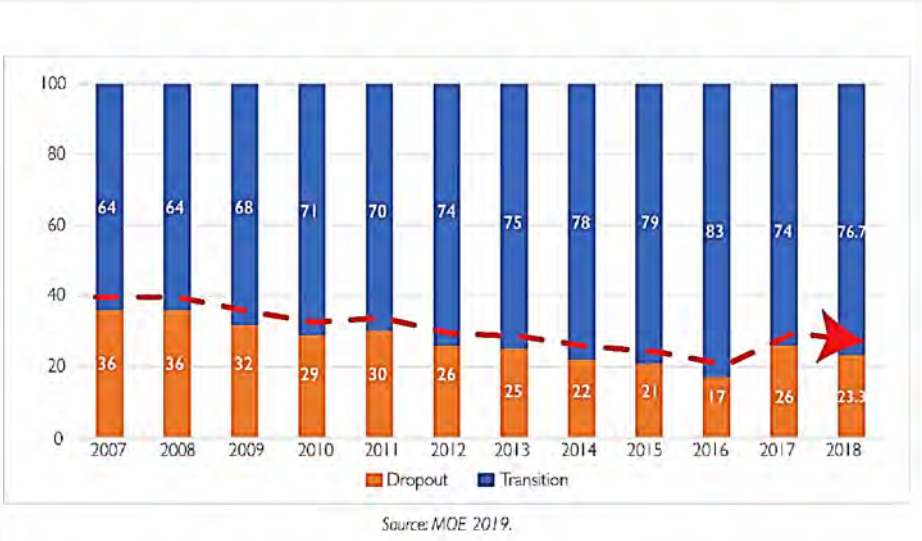


Figure 3: Declining bar chart of Orang Asli in continuing study (source: Ministry of Education, 2019)

Research Causes

Orang Asli children encounter multiple barriers to education, leading to high dropout rates and low achievement. Figure 4 shows poverty restricts access to resources, while remote locations make school attendance difficult. Language and cultural gaps hinder learning, as the national curriculum lacks adaptation to their needs. Additionally, a shortage of culturally aware teachers limits academic support. These challenges result in lower enrollment, higher dropouts, and reduced access to quality education, ultimately restricting their long-term opportunities.

Year	Total Head of Household (HoH)	Poverty					
		Poor		Hard Core Poor		Total	
		%	HoH	%	HoH	%	HoH
2000	25,337	39.80	10,085	43.60	11,046	83.40	21,131
2001	26,198	39.80	10,428	41.03	10,749	80.83	21,177
2002	28,476	41.20	11,732	37.88	10,788	79.08	22,520
2003	29,873	41.63	12,435	35.26	10,532	76.88	22,967
2007	27,841	18.00	5,011	32.00	8,909	50.00	13,920
2008	27,841	17.75	4,942	32.34	9,004	50.09	13,946
2009	27,841	33.53	9,335	15.47	4,307	49.00	13,642
2010	36,658	11.19	4,102	19.97	7,321	31.16	11,243

Figure 4: Poverty table of Orang Asli by total head of House (source: Ministry of Education, 2019)

Research Effects

Orang Asli children experience significant educational disparities, with lower enrollment, higher dropout rates, and reduced secondary school completion, as shown in Figure 5 below. Despite efforts to improve inclusivity, systemic inequalities persist as policies fail to address their unique challenges. Geographical isolation, socio-economic disadvantages, and limited culturally responsive education further widen the gap. These issues emphasise the need to implement targeted interventions to ensure equitable learning opportunities.

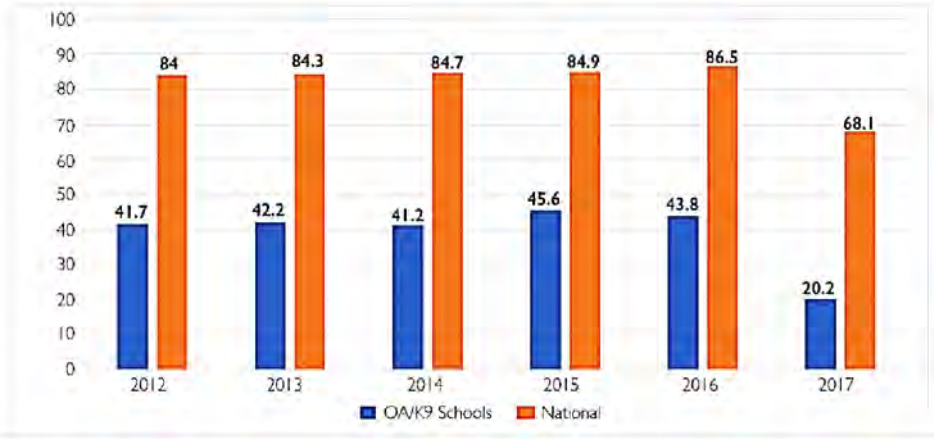


Figure 5: Declining bar chart of Orang Asli’s UPSR passing rate per year (source: Ministry of Education, 2019)

2.0 LITERATURE REVIEW

Efforts to enhance Orang Asli education are outlined under the Pelan Pembangunan Pendidikan Malaysia (PPPM) 2013–2025 (see Figure 6), which promotes culturally responsive and inclusive learning. One key initiative, the Kurikulum Asli dan Penan (KAP), integrates indigenous knowledge, local language, and traditional practices into the curriculum, enhancing relevance and engagement for Orang Asli learners (Ahmad & Rahim, 2020; Ministry of Education Malaysia, 2022). Kelas Berkeperluan Khas offers adaptive, smaller-sized classes for students with learning or linguistic gaps, supporting smoother integration into the formal education system (Ismail & Yunus, 2022). The Sekolah Model Khas Komprehensif initiative strengthens rural educational infrastructure by combining classrooms, dormitories, and teacher development under one roof, ensuring that underserved students, especially from remote Orang Asli villages, have better learning environments (Sharif, Ahmad, & Yunus, 2021). Furthermore, Information and Communication Technology (ICT) integration enables Orang Asli students to access digital tools and localised content, bridging geographic and resource-based educational gaps (UNESCO, 2019; Hassan, Zainal, & Ismail, 2023). Complementing these efforts, the Twelfth Malaysia Plan (RMKe-12) (see Figure 7) prioritises Technical and Vocational Education and Training (TVET) to equip Orang Asli youth with practical, employment-ready skills. A dedicated trainee teacher programme also encourages Orang Asli individuals to support classroom instruction while developing teaching capacity within their communities (Ministry of Human Resources, 2023). Together, these initiatives present a holistic strategy that aligns formal education with cultural identity, equity, and long-term empowerment.

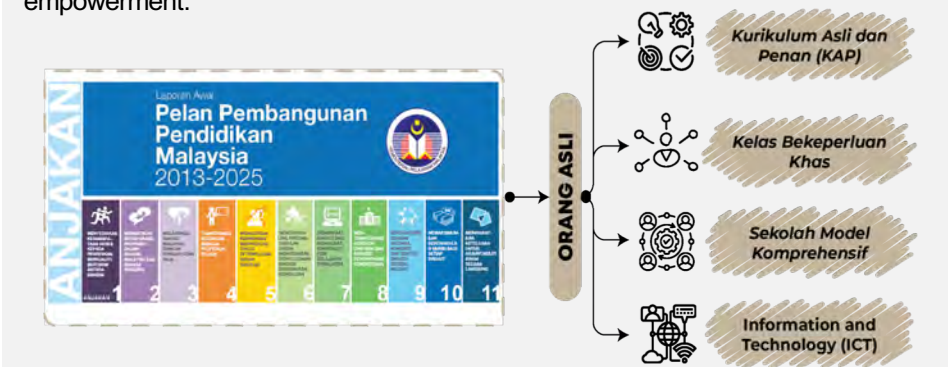


Figure 6: Effort made for Orang Asli under the PPPM (2013-2025)
(Source: Ministry of Education, September 6, 2013)



Figure 7: The declining bar chart of Orang Asli in continuing study
(Source: Ministry of Education, 2019)

Research Aim

This paper examines the quality of education for Orang Asli in Malaysia, aligning with SDG 4 (Quality Education) and SDG 11 (Sustainable Cities and Communities), as illustrated in Figure 8. It explores disparities in access, enrollment, and learning outcomes, highlighting challenges like poverty, geographical barriers, and cultural misalignment within the national curriculum. By assessing existing policies and programmes, the study aims to propose sustainable, community-centered solutions to enhance educational equity, empowering Orang Asli children and supporting their long-term socio-economic development.

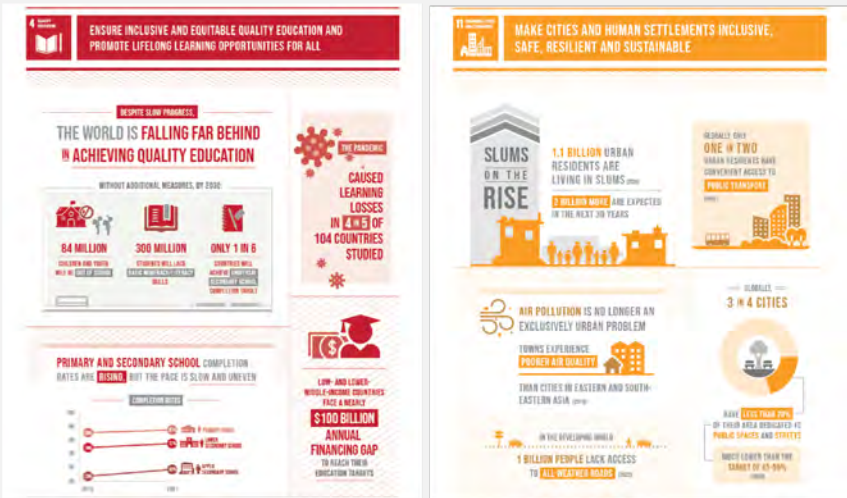


Figure 8: The SDG NO 4 AND 11
(Source: Sustainable Development Goals Report, 2023)

Research Questions

Figure 9 shows the need to understand what attracts Orang Asli to education is key to closing the gap and ensuring long-term participation. A suitable curriculum must respect their culture while providing relevant skills. Leveraging their potential in sustainable education preserves heritage while promoting self-sufficiency and economic opportunities. These factors guide the design of a TVET school that enhances accessibility and engagement. This project aims to establish an educational framework integrating tradition, sustainability, and practical vocational training.

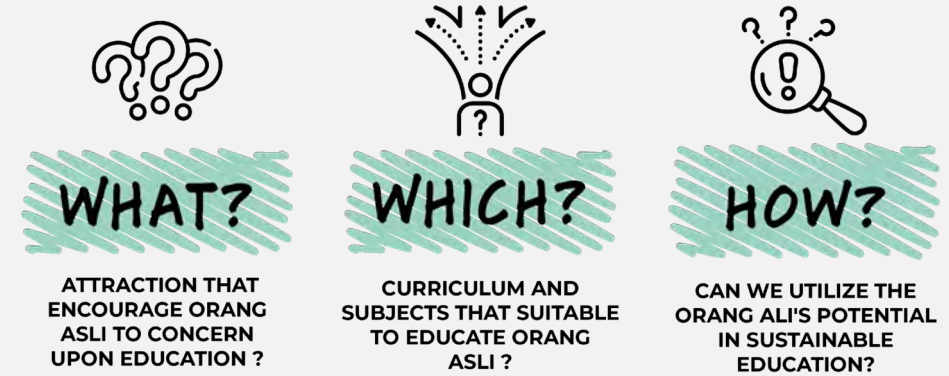


Figure 9: Questions Diagram

Research Objective

This research is structured around three primary objectives: (1) to identify effective strategies that can encourage Orang Asli youth to pursue education, (2) to examine curriculum elements that combine practical skills with indigenous knowledge, and (3) to develop a sustainable educational model that cultivates the potential of Orang Asli communities and supports long-term development. These objectives align with Malaysia’s Sustainable Development Goals (SDG 4 and SDG 11), emphasising quality education and inclusive community growth, as portrays in Figure 10.

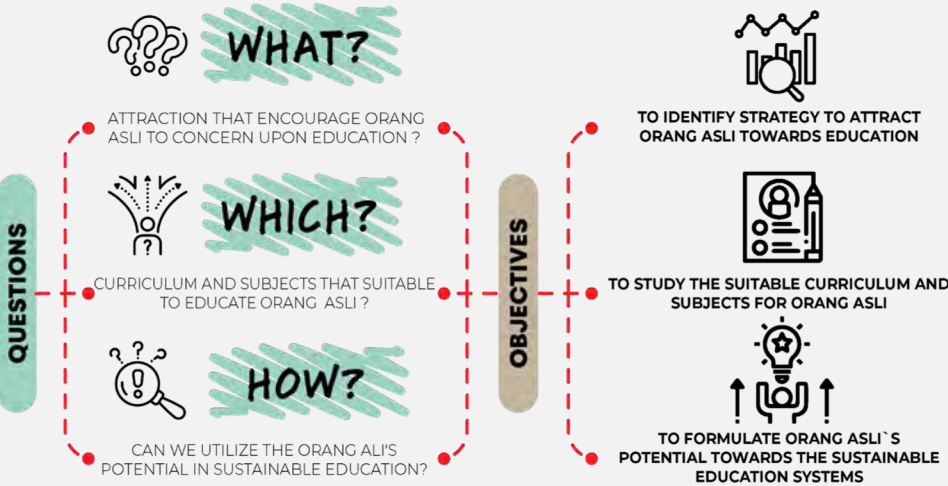


Figure 10: Relationship of Questions and Project Objectives

Research Framework

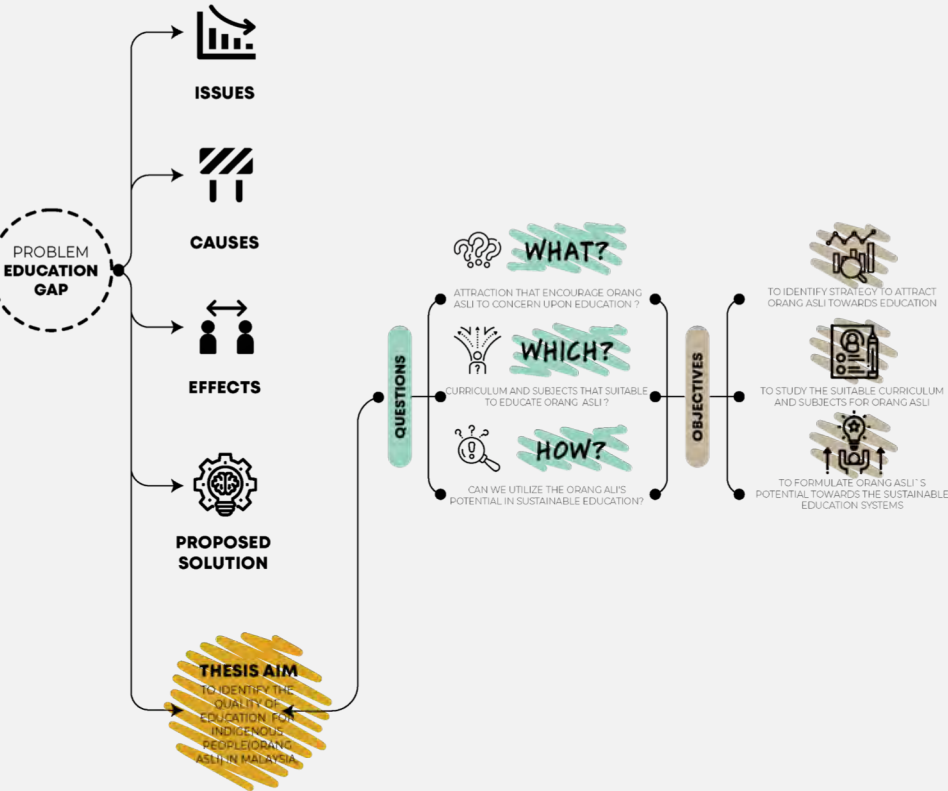


Figure 11: The Project Framework Diagram

3.0 RESEARCH METHODOLOGY

This research adopts a mixed-methods approach, combining qualitative and quantitative strategies to comprehensively explore the educational needs and preferences of the Orang Asli community in Hulu Langat. The qualitative component consists of semi-structured interviews and field observations, while the quantitative component involves the analysis of demographic and educational data (Figure 12).

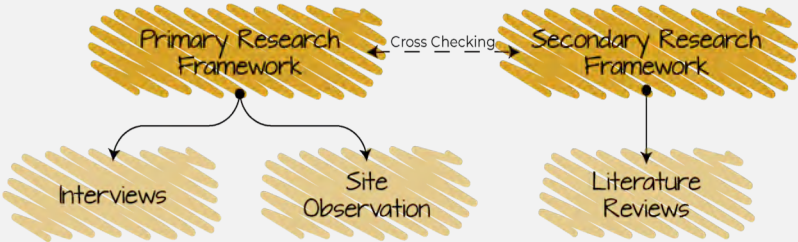


Figure 12: Research Methodologies applied in this research

Data Collection

An extensive literature review was conducted to contextualise the study within the existing academic discourse. Sources included peer-reviewed articles, government publications, and relevant case studies on indigenous education, sustainable design, and vocational training. This review informed the development of the research framework and interview protocol. Semi-structured interviews were carried out with key stakeholders, including Orang Asli students, community leaders (Tok Batin), and educators from JAKOA. A total of 15 interviews, each lasting approximately 45 minutes, provided valuable insights into the community’s educational challenges, aspirations, and experiences (Figure 13).



Figure 13: Respondents during the field visit

Field Observations Site visits to eight Orang Asli villages in Hulu Langat were conducted to observe existing educational facilities, infrastructure, and environmental conditions. Observations focused on factors such as accessibility, building materials, and spatial organisation, providing contextual data to inform the design proposal as portrayed in Figure 14.



Figure 14: Orang Asli Village in Hulu Langat

4.0 DATA ANALYSIS

Qualitative data from the interviews were transcribed and analysed thematically to identify recurring patterns related to educational challenges and preferences. Quantitative data—such as demographic indicators and academic performance—were assessed using descriptive statistical methods to provide a foundational understanding of the current educational landscape (Figure 15).

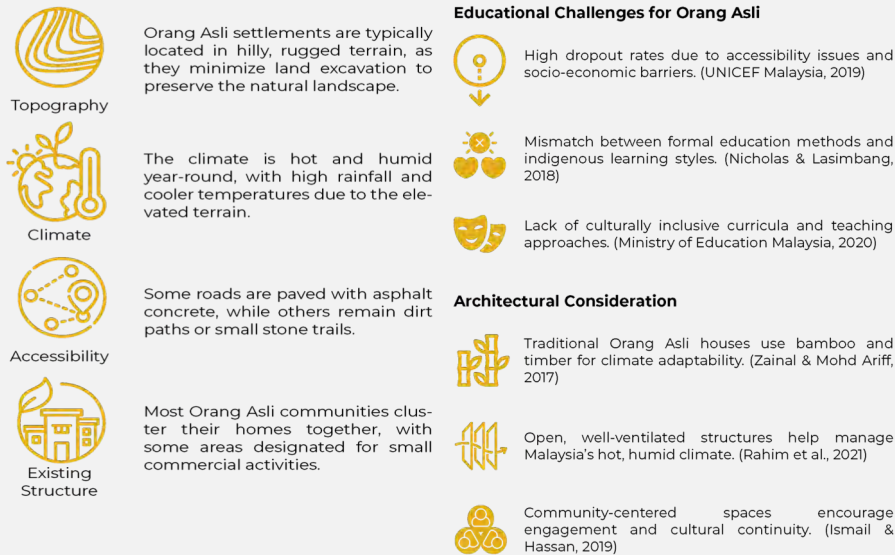


Figure 15: Thematic data analysis

Limitation

This study is limited to the Orang Asli communities in Hulu Langat, which may not represent the broader indigenous population in Malaysia. Logistical constraints and limited access restricted the sample size and geographic coverage. Future research should consider longitudinal data and a more diverse sampling strategy to enhance the study's generalizability.

Findings

- The findings highlight critical challenges faced by Orang Asli in education, including systemic barriers, a strong preference for practical and culturally relevant learning, and the strategic selection of Kampung Pangsun as a suitable intervention site.
- Socio-Educational Barriers:** Dropout rates among Orang Asli remain disproportionately high due to poverty, limited school accessibility, and an education system that lacks cultural relevance (MOE, 2019). Interviewees expressed feelings of alienation in mainstream schools, citing language, teaching methods, and unfamiliar environments as significant deterrents.
 - Community Aspirations and Educational Preferences:** Respondents highlighted a strong preference for skill-based education aligned with traditional occupations such as agriculture, carpentry, and ecotourism. Community leaders and educators advocated for culturally responsive institutions situated within or near Orang Asli villages.
 - Site Suitability:** Kampung Pangsun was identified as a strategic intervention site due to its high dropout rates, population density, and absence of secondary education facilities within a 14-kilometer radius. The area offers accessible terrain, natural landscapes, and existing infrastructure, including JAKOA Kindergarten and Mutiara Integrated School

Results

As illustrated in Figure 16, the primary barriers for Orang Asli students include physical distance to schools, misaligned curriculum, and inadequate infrastructure. Interviews confirmed a preference for vocational, hands-on learning models. Field observations further revealed terrain-informed construction and insufficient educational facilities, validating the necessity of a localized TVET institution that integrates indigenous knowledge and sustainable architecture.

Category	Interview Findings	Site Observations	Literature Review
Education Barriers	Distance to school, cultural disconnect	Remote, limited transport	Socio-economic gaps, policy issues
Preferred Learning	Hands-on skills, vocational training	Practical space needed	Indigenous education models
Architectural Needs	Natural materials, open spaces	Vernacular houses, climate-adaptive design	Sustainable, Community-driven design

Figure 16: Research Methodologies applied in this research

5.0 SITE SELECTION

The site was selected based on Orang Asli population density, dropout rates, and areas with the greatest educational need. This strategic approach ensures the TVET school maximises accessibility and impact, addressing key challenges and supporting long-term educational development, as shown in Figure 17 below. Pahang, Perak, and Selangor have the highest density of Orang Asli in Malaysia, which covers 76.71% of the overall population of 215,215 people.

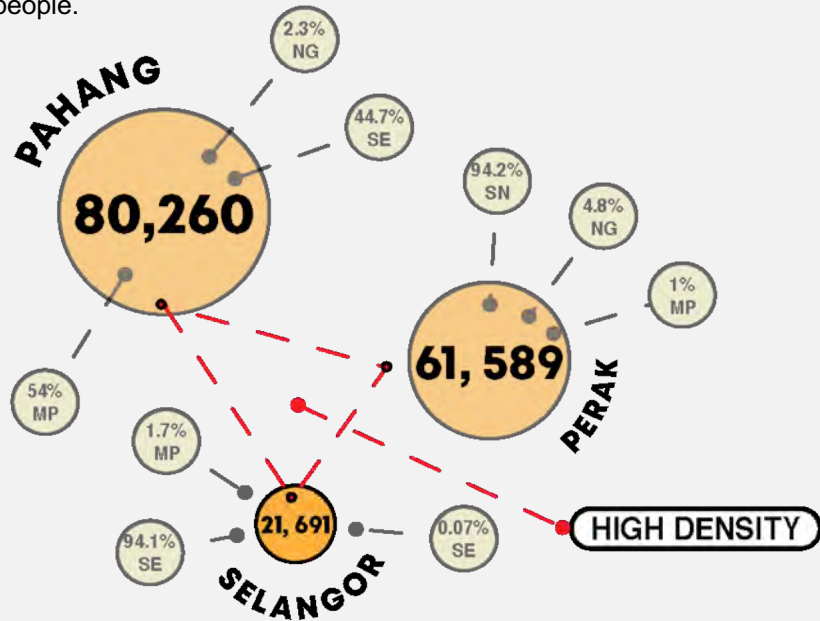


Figure 17: Orang Asli Population 2024 (Source: Author)

5.0 SITE SELECTION

In Figure 18, comparing Selangor, Pahang, and Perak, Pahang has the highest population density, followed by Perak, with Selangor having the lowest. Despite its lower density, Selangor's dropout rate of 27% is the highest, making it the most crucial district for targeted educational support and development initiatives to address this issue.

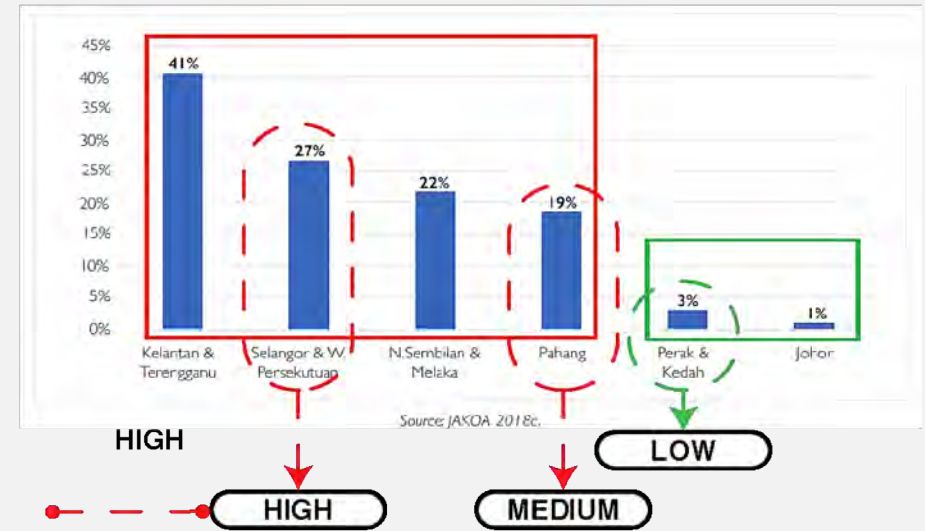


Figure 18: Chart shows Orang Asli Highest dropouts in Malaysia (Source: Jabatan Kemajuan Orang Asli (JAKOA), 2018)

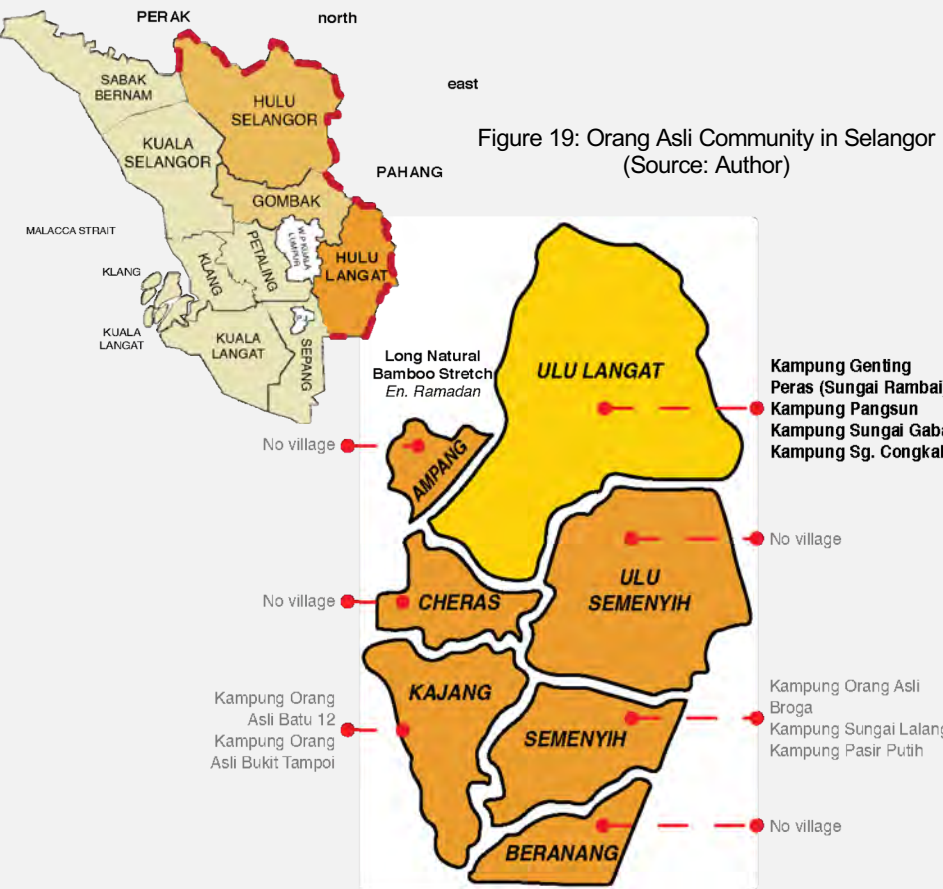


Figure 20: Orang Asli settlement in Hulu Langat (Source: Author)

Ulu Langat, Selangor, was chosen for its high Orang Asli population and lack of nearby schools, contributing to high dropout rates. The TVET programme aims to improve education access and reduce dropouts through local vocational training, as illustrated in Figure 19. Several Orang Asli villages are in Hulu Langat, primarily in Ulu Langat, with none in Cheras, Beranang, or Ulu Semenyih, as shown in Figure 20. Kuala Pangsun has the highest number of total Households that located 14km to the nearest secondary schools, as highlighted in Figure 21.

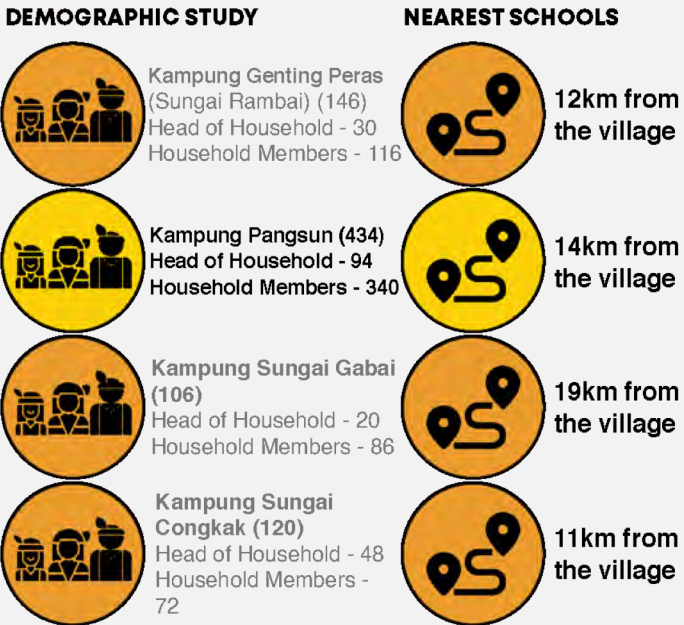
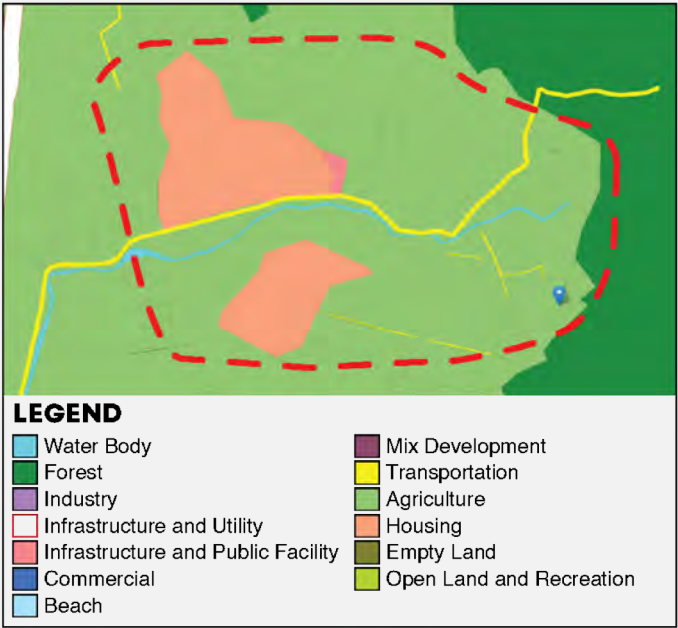


Figure 21: The villages' filtration by the school proximity

Kampung Pangsun is an Orang Asli village that is mainly covered with agricultural areas and housing near the river, as in the figure below.



5.0 SITE SELECTION

The site is surrounded by dense forests, reflecting the Orang Asli’s deep connection to nature, with the scenic Sungai Hulu Langat flowing nearby. It also hosts two key institutions: Mutiara Integrated Secondary School and JAKOA Kindergarten, making it a strategic location for education while preserving the natural landscape, as shown in Figure 23.



Figure 23a: Master plan on detail of the site

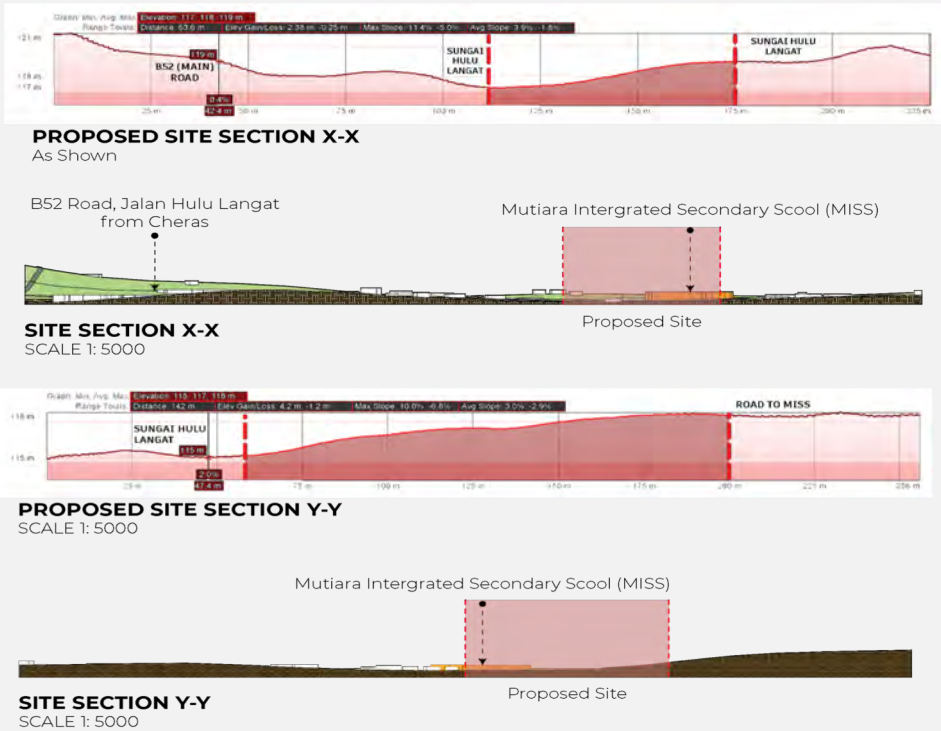


Figure 23b & 23c: The cross-section of the site

6.0 DESIGN BRIEF FORMULATION

The design brief was developed through a comprehensive framework that identifies core educational issues, their causes and effects, and aligns these with targeted research questions. This process informed the creation of programmatic elements, space planning strategies, and zoning requirements (Figure 24).

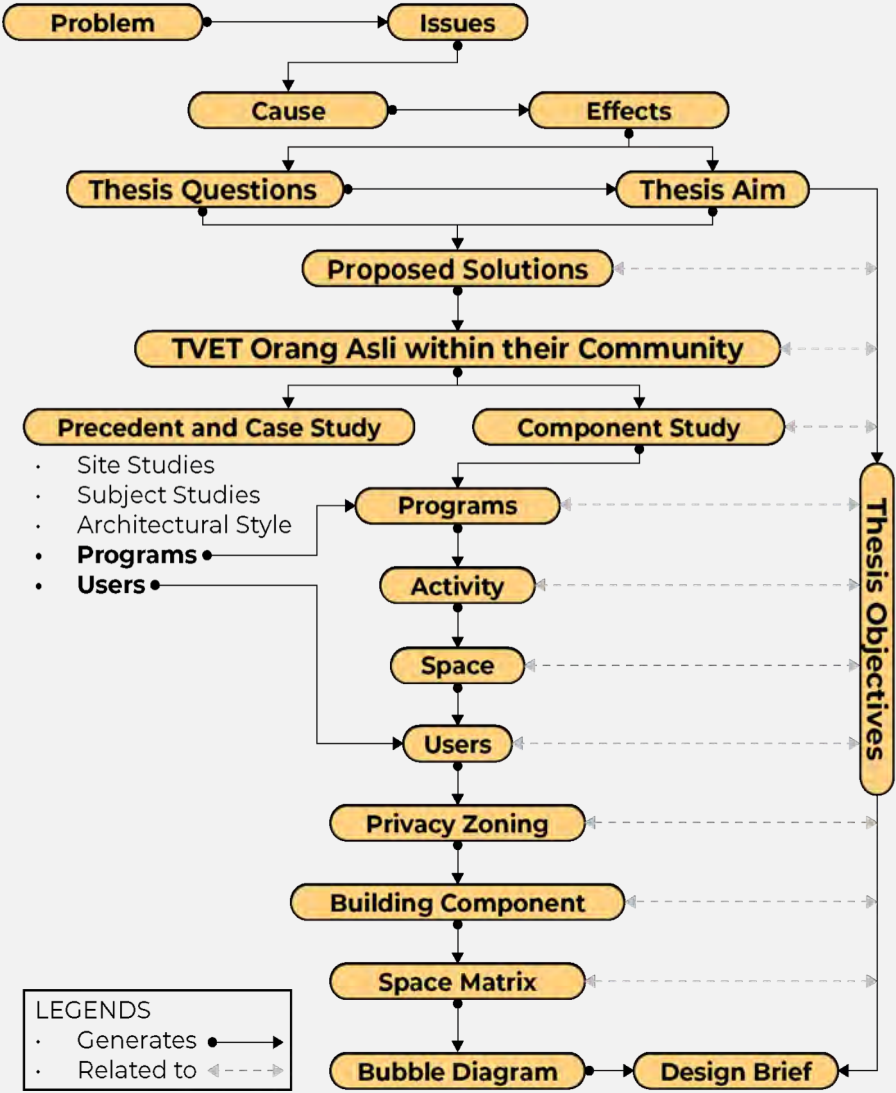


Figure 24: Design brief formulation (Source: Author)

ECO VOCATIONAL ACADEMY: A SUSTAINABLE EDUCATION SYSTEM FOR ORANG ASLI, IN HULU LANGAT

Introduction

The Eco Vocational Academy is a design thesis project aimed at creating a sustainable education system for the Orang Asli community in Hulu Langat. This institution seeks to provide a tailored Technical and Vocational Education and Training (TVET) programme that aligns with the cultural values, skills, and aspirations of the Orang Asli while promoting environmental sustainability.

Project Objectives (The project focuses on three key objectives):

- Identifying effective strategies to attract Orang Asli youth to education.
- Developing a suitable curriculum that integrates practical skills and indigenous knowledge.
- Formulating a sustainable education system that nurtures the Orang Asli's potential and long-term community development.

Target Users

The academy will serve multiple user groups, including Orang Asli students, teachers, operational staff, and tourists who seek to learn about indigenous culture and sustainable practices.

Site Context and Analysis

The site, strategically located near Orang Asli villages in Hulu Langat, boasts breathtaking natural landscapes surrounding it. The location fosters a strong connection between the academy and the local community, allowing for immersive, hands-on learning experiences. However, the area is prone to occasional flooding, which requires strategic mitigation measures.

Programme

The academy will offer a specialised TVET curriculum designed for Orang Asli students, focusing on skills that enhance their livelihood while preserving their cultural heritage. The programme will integrate traditional craftsmanship, ecotourism, agriculture, and modern technical skills.

Architectural Approach

The design adopts a modern vernacular style rooted in Orang Asli traditions, utilising locally sourced bamboo, timber, and concrete. This approach harmonises contemporary functionality with cultural expression, promoting environmental stewardship and community identity.

Philosophy

Guided by the Malay proverb “Meluntur buluh biarlah dari rebungnya,” the project emphasises early, culturally relevant education as a means of long-term empowerment

Environmental Strategy

The proposal incorporates passive design strategies, such as natural ventilation, daylighting, and rainwater harvesting. These methods reduce energy dependency while aligning with the community's ecological values.

Expected Outcome

- A comprehensive master plan tailored for the Orang Asli's educational and environmental needs.
- A scalable prototype of a sustainable TVET academy adaptable to other indigenous settings.
- A model integrating architecture, education, and community development in harmony.

7.0 DESIGN CONCEPT

Introduction

Concept: Dynamic Resilience The Eco Vocational Academy is shaped by the principle of “*meluntur buluh biarlah dari rebungnya*,” reflecting early-stage education for lasting impact. It integrates three core sub-themes:

- Resilient Skills: Practical, vocational learning embedded with cultural identity.
- Indigenous Synergy: A built form that respects Hulu Langat's ecological and community fabric.
- Sustainable Craftsmanship: Materials and methods that combine tradition with contemporary efficiency.

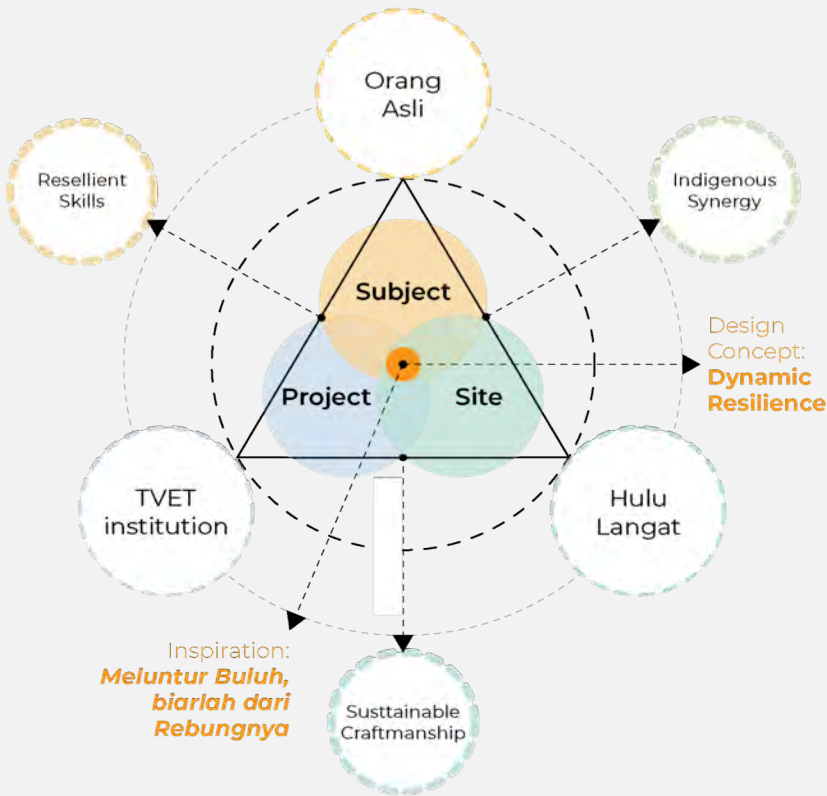


Figure 25: Design concept
(Source: Author)

Design Development

The design development of the Eco Vocational Academy follows a strategic approach, integrating resilient skills, indigenous synergy, and sustainable craftsmanship. Initial strategies focus on cultural preservation, adaptive learning spaces, and eco-conscious materials. These evolve into design solutions emphasising spatial flexibility, vernacular architecture, and sustainability, shaping a resilient and culturally integrated educational environment.

Design Strategies

The proposal includes elevated structures to mitigate flood risks and features open-plan spaces for adaptive learning. Ecotourism nodes such as galleries and cultural parks further foster community involvement

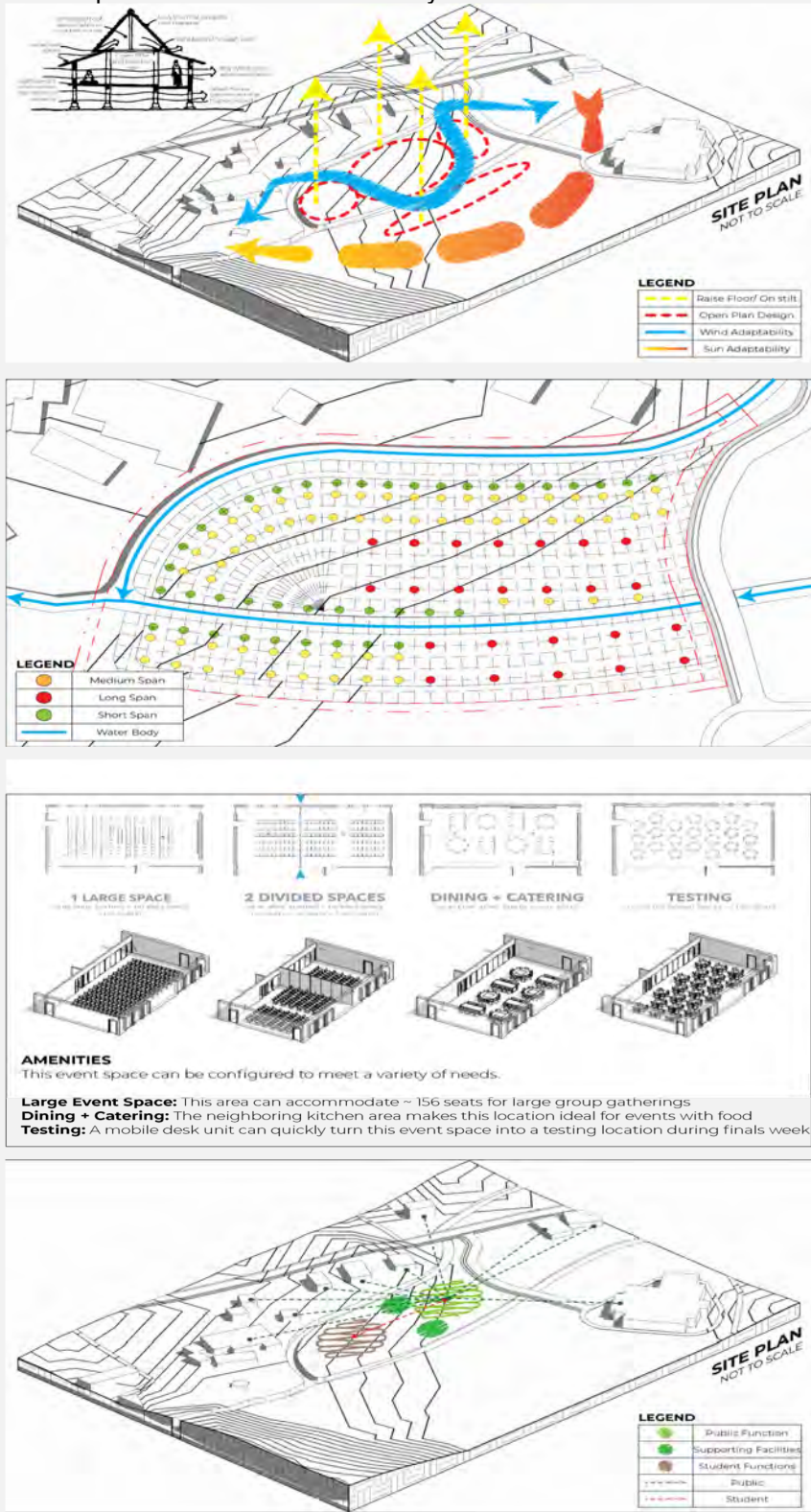


Figure 26 shows the design strategies

Design Solution

Technical features construction leverages modular units, passive cooling systems, and sustainable services, as in Figure 27 below.

- Treated bamboo and sustainably sourced timber framing promote ecological integration and structural longevity.
- Elevated modular design with uniform height and span enhances adaptability to terrain and flood resilience.
- Strategic building orientation and operable openings optimise natural ventilation and passive cooling through effective air scooping.
- Integrated solar energy systems and rainwater harvesting infrastructure support off-grid functionality and environmental self-sufficiency

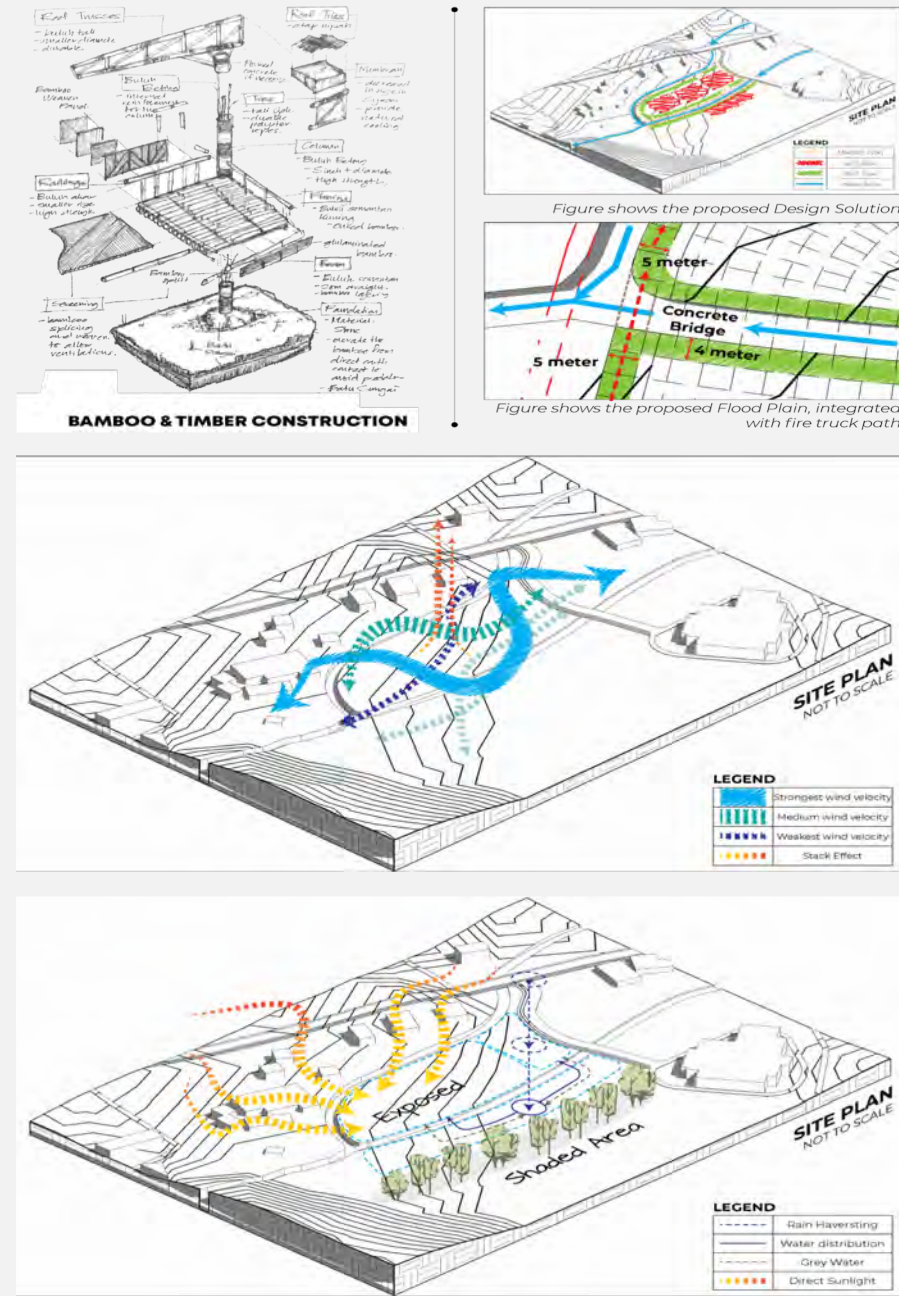


Figure 27 shows proposed technical features construction

8.0 FINAL DESIGN SCHEME

Building upon prior research, the design advanced through a systematic process of material testing, environmental analysis, and iterative spatial planning. Passive design strategies and context-responsive structural solutions were integrated to ensure both feasibility and functional performance. This phase culminated in the development of technical drawings and 3D visualisations, presenting a comprehensive architectural proposal aligned with the project's sustainability objectives and overall design vision, as illustrated in the figures shown below.



Figure 28: The final scheme

Elevation



Figure 29a: The Front Elevation



Figure 29b: The Right Elevation



Figure 29c: The Left Elevation



Figure 29d: The Rear Elevation

Sections



Figure 29e: The Section X-X



Figure 29e: The Section Y-Y



Figure 30: The workshop and accommodation perspective



Figure 31: The classroom and ICT exterior perspective



Figure 32: The cultural park perspective

9.0 CONCLUSION

This study proposes the Eco Vocational Academy as a context-driven solution to the educational disparities faced by the Orang Asli community in Hulu Langat. By integrating vocational training, indigenous knowledge, and sustainable architectural practices, the design addresses systemic and cultural barriers that hinder access to inclusive education. Findings confirm that localised, culturally aligned institutions can significantly improve engagement and reduce dropout rates among indigenous students. The design leverages passive systems, vernacular materials, and modular structures to enhance climate responsiveness and environmental integration while reinforcing cultural identity. Community participation, particularly from Tok Batin, educators, and students, shaped the proposal to ensure the academy reflects real needs and aspirations. The curriculum's focus on agriculture, ecotourism, and construction promotes both educational relevance and economic resilience. As a replicable model, the Eco Vocational Academy illustrates how spatial design can support socio-educational transformation. Future studies should evaluate long-term educational outcomes and spatial performance while building strategic collaborations to scale and adapt the framework for broader indigenous application.

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05

BRIDGING TRADITION AND MODERNITY: BRICK ARCHITECTURE AND CRITICAL REGIONALISM IN CONTEMPORARY VILLAGE RESIDENCE IN BANGLADESH

*Nayeem Asif, Zeenat Begam Yusof and Aida Kesuma Azmin
Department of Architecture, Kulliyah of Architecture and Environmental Design, IIUM

ABSTRACT

Traditional brick has been the most preferred construction material in the Bengal region since 300 BC. During the renaissance of modern architecture in Bangladesh, which began in the early 1950s, brick architecture was revived through large-scale national projects as well as smaller private projects. This trend has continued and evolved into various experimental approaches integrating brick with other contemporary materials. This paper aims to illustrate the application of brick as a sustainable and contextual material and its use in different architectural elements to achieve climate-responsive architecture in a single-family residence. Moreover, it explores how contemporary brick architecture can blend seamlessly into the rural context of Bangladesh without disrupting the existing rich rural fabric and lifestyle. Adopting a qualitative approach, the paper presents a brief literature review on the chronological development of critical regionalism through brick architecture. Additionally, architectural drawings of the case study residence are analysed to demonstrate the application of critical regionalism in contemporary architecture in rural Bangladesh. The findings show that incorporating conventional materials that can be locally sourced provides flexibility in terms of available expertise while enabling architecture to blend into the existing socio-cultural context. This approach supports the advancement of the architecture industry in contemporary times.

Keywords: Brick architecture, Critical regionalism, Climate-sensitive architecture, Bangladesh.

*Corresponding author: nayeem@iium.edu.my

INTRODUCTION

This study explores the use of conventional construction materials such as brick and associated architectural elements—such as brick *jaali*, vertical louvres, tilted louvres, integrated rainwater harvesting for plant maintenance, and strategically placed openings to enhance natural ventilation—in order to achieve sustainable, contextual architecture through the approach of critical regionalism in the rural region of southern Bangladesh. Critical regionalism, which emerged in the late 20th century, is an architectural theory that emphasises local culture and architectural identity while balancing global trends. It was developed as a response to the place-lessness and lack of identity in the International Style (Frampton, 1993; Lefaivre & Tzonis, 2003). The approach gained prominence through the works of architects such as Kenneth Frampton, Alvar Aalto, Tadao Ando, and many others. In the Indian subcontinent, architects such as Balkrishna Doshi and Charles Correa in India, Minnette de Silva, Geoffrey Bawa in Sri Lanka, and Mazharul Islam, Bashirul Haque, and Saiful Haque in Bangladesh adopted this approach in the mid-1900s. Since then, the architecture of this region has been primarily influenced by this philosophy, carried forward by later generations of architects.

In today's world, the dynamics of the architecture industry have witnessed a recent shift toward reconnecting with the origins of place, appreciating local building culture and traditions.

This paper aims to provide insight into this topic, specifically examining the architectural development of Bangladesh through history by analysing the design of a rural residence as shown in Figure 1..



Figure 1: An amalgamation of contemporary architecture within the traditional vernacular context of rural Bangladesh.

LITERATURE REVIEW

Brief chronology of brick architecture in the Bengal region

The geological location of Bangladesh within the Bengal Delta has ensured an abundance of clay as a construction material since the first millennium BCE. The Bengal region, encompassing modern-day Bangladesh and West Bengal, saw ancient brick and terracotta architecture (Figure 2) reach its pinnacle between the 8th and 12th centuries during the Pala Empire, continuing through the Bengal Sultanate period (14th to early 16th centuries) (Hasan, 2014; Sharmeen, 2021).

Unlike other regions of the Indian subcontinent, Bengal lacks substantial stone resources suitable for building. Consequently, clay-based products like brick, terracotta, and tiles become the primary building materials, often mimicking the vernacular style of timber detailing and thatched roof shapes (Hasan, 2014). During the Bengal Sultanate period, numerous mosques were erected featuring intricate brick detailing (Figure 3) and a fusion of Indo-Persian Islamic elements such as domes, vaults, and pointed arches (Hasan, 2011).



Figure 2: Ruins of the central Buddhist stupa (800 AD), a UNESCO World Heritage Site (Source: https://en.wikipedia.org/wiki/Architecture_of_Bengal/)

The colonial era (1757–1947) also witnessed extensive use of brick for government buildings of various scales in Bengal. In addition to brick as the primary construction material, spatial layouts became more responsive to the climate for both public and domestic buildings (Afzal, 2018). Features included long verandas protecting inner habitable spaces from direct sunlight, allowing airflow while shielding from monsoon rains; inner courtyards for privacy and ventilation; thick masonry walls acting as thermal barriers; and linear organisation of rooms facilitating cross ventilation (Ahmed & Khan, 2024).

The pre-independence period (1947–1971) marked the early arrival of modernism in the region through the works of local and international architects. Notably, modernist architects like Louis I. Kahn and Paul Rudolph adopted brick as their primary construction material for various projects across Bangladesh (Figure 4). This adoption included climate-responsive spatial layouts and architectural elements, sowing the seeds of critical regionalism alongside pioneering local architects (Asiatic Society of Bangladesh, 2021; Morshed, 2017; Scotto, 2018).



Figure 3: Darasbari Masjid (1479), remnant of Bengal sultanate architecture with intricate brick work. (Source: https://en.wikipedia.org/wiki/Bengal_Sultanate)

Throughout the history of Bangladesh and the Bengal region, brick architecture has evolved with technological advancements, yet the appeal of traditional burnt clay brick remains constant (Rumana & Bin Ahmed, 2013). This enduring appeal is evident in the works of various contemporary architects. A comprehensive discussion of prominent local architects will be presented as case studies in the next section to provide better insight into the application of brick in contemporary architecture of Bangladesh.



Figure 4: National Assembly Building MP Hostel complex (1963-1982), Louis I Kahn, modern interpretation of brick architecture in early 60s. (Source: Cemal Emden)

CASE STUDY 1: ARCHITECT MAZHARUL ISLAM'S RESIDENCE

Overview

Architect Muzharul Islam's residence (as shown in Figure 5) in Dhanmondi is a testament to his modernist approach, deeply influenced by Le Corbusier's philosophy. Inspired by Corbusier's *Villa Shodhan*, the house features a parasol roof, an architectural element that provides shade and protection while defining the overall structure. Constructed primarily with brick and reinforced concrete, the residence embodies Islam's mastery in climate-responsive design, structural clarity, and proportion.



Figure 5: Exterior view (3D) of Architect Mazharul Islam's residence
(Source: Wahiduzzaman Ratul & Shihan Karar)

Site Context

Despite its urban setting, the residence is surrounded by ample open spaces, including a south-facing lawn, gardens, and a small water feature, reflecting the traditional Bengali rural courtyard (*uthan*). These outdoor spaces foster a connection with nature while enhancing thermal comfort.

Orientation

The house is meticulously oriented to optimise climate responsiveness:

- West Side: Solid brick walls shield the interiors from harsh sunlight and heat.
- South Side: Open and permeable, allowing natural ventilation and daylight, with shaded outdoor spaces mitigating heat gain.

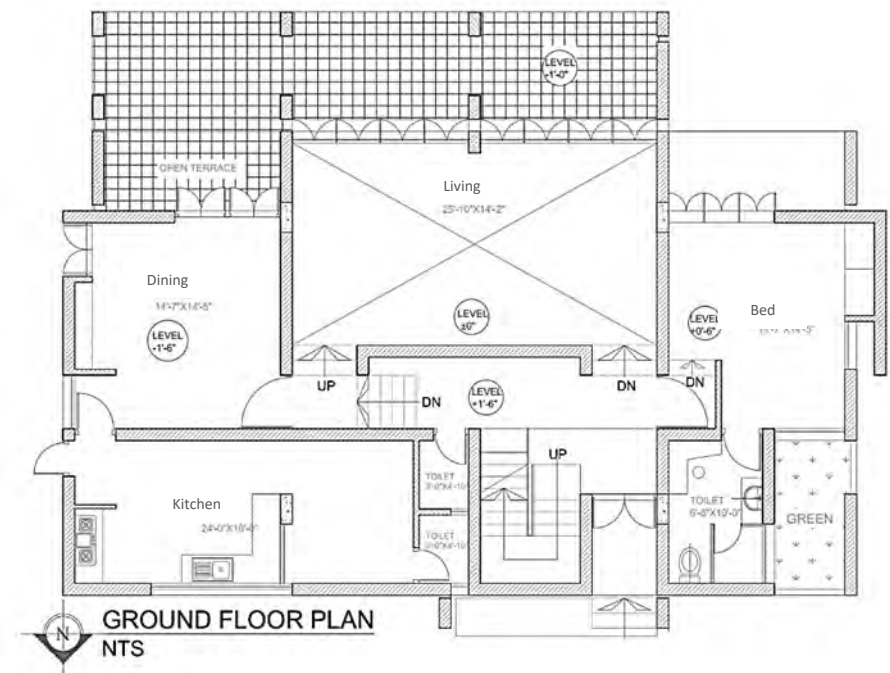


Figure 6: Ground floor plan of Architect Mazharul Islam's residence
(Source: Wahiduzzaman Ratul & Shihan Karar)

Layout

The house follows an open-plan concept, with flexible spatial interconnections between levels (Figure 6). There are few level variations within the floor to define spaces without the interruption of walls. The void in the living space links the upper floors with the ground as well as enhancing natural ventilation within the house.

- Ground Floor:
 - Entry through a lobby, leading to a double-height living area, fostering social interaction and visual connectivity.
 - Spaces for guest accommodations, dining, and kitchen are seamlessly integrated.
 - Level variations and a step-down design emphasise transitions between spaces.
 - The south-facing lawn extends the living experience outdoors while reinforcing traditional courtyard typology.
- First Floor:
 - A central lobby connects all bedrooms, ensuring privacy while maintaining openness.
 - A study room and verandas provide shaded outdoor spaces, protecting from monsoon rains and summer heat.
 - The upper level houses a library, visually linked to the lobby through the double-height void.

Architectural Elements

- **Parasol Roof:** Inspired by Corbusier's *Parasol House*, the floating slab on RCC columns provides climatic protection while defining the architectural language.
- **Verandas and Openings:** Designed to extend indoor spaces outdoors, ensuring cross-ventilation and thermal comfort.
- **Staircase and Vertical Voids:** Create a multi-layered spatial experience, enhancing both visual and physical connectivity.

This residence is an exemplary model of modernist tropical architecture, integrating regional elements, climatic responsiveness, and contemporary spatial planning.

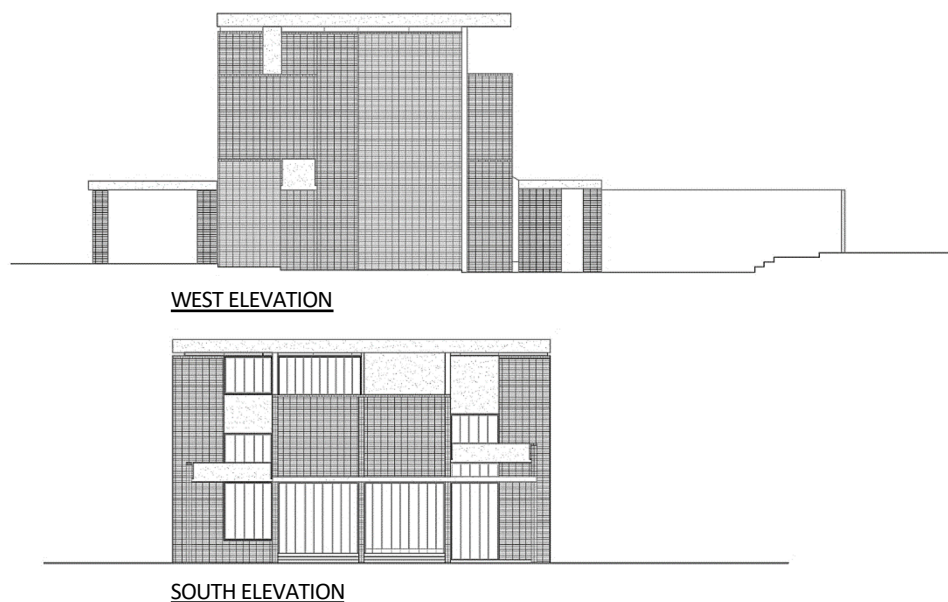


Figure 7: West elevation with minimal openings to reduce heat gain versus south elevation with ample openings for maximising natural ventilation.
(Source: Wahiduzzaman Ratul & Shihan Karar)

Climatic considerations

As seen from the layout and elevations, this residence is designed in response to the solar orientation and wind direction. Additionally, internal spatial layout illustrates the open planning for maximising natural ventilation and daylighting. To protect the users from the west sun, the design provided layers of ancillary spaces such as veranda, staircase and toilets. While, the southern side has large terrace and ample openings to bring in the prevailing wind from south-east. Kitchen, dining and the master bedroom is located on the east side to capture the desired early morning sun. As north light is the best option for reading, the study room is placed on north side.

This thoughtful climatic approach reflects the principles of critical regionalism in early modern Bangladeshi architecture, where modernist ideals were adapted to local climate and cultural contexts to create responsive and sustainable built environment.

CASE STUDY 2: BHATSHALA COMPLEX

Overview

Bhatshala Complex, located in the rural landscape of Brahmanbaria, Bangladesh, is a two-storey private residence designed by Architect Bashirul Haq. Built in 1989, the house follows a climate-responsive approach, integrating traditional architectural elements with passive design strategies to ensure comfort and sustainability (Figure 8). Its L-shaped configuration embraces a central courtyard, fostering a spatial relationship between built and open areas.



Figure 8: Bhatshala Complex showing beautiful exposed brick work on exterior façade.
(Source: Bashirul Haque Architect)

Site Context

The house is situated in a rural setting characterised by low-lying lands with small hills and red soil. The design respects its context by employing locally available materials such as sunbaked bricks and wood, allowing it to blend seamlessly with its surroundings. The spatial organisation follows a traditional homestead layout, where the courtyard serves as the heart of the residence, supporting both social and climatic functions (Figure 9).

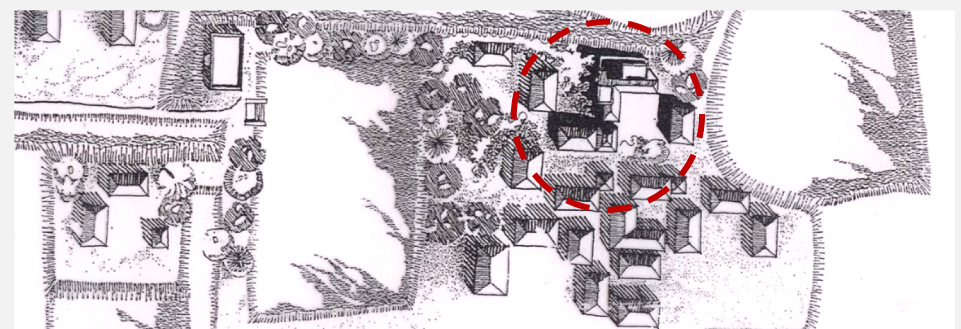


Figure 9: Bhatshala Complex within its rural context surrounded by open lands and vernacular village houses.
(Source: Bashirul Haque Architect)

Orientation

Oriented to optimise climate responsiveness, the house strategically places openings and shaded outdoor spaces to regulate indoor temperatures. The west and north facades are partially enclosed to protect against excessive heat gain, while the southern and eastern sides feature open corridors and terraces to maximise cross-ventilation and daylighting. This arrangement ensures thermal comfort by allowing prevailing winds to pass through, cooling the interiors during summer while also providing warmth during winter.

Layout

The layout consists of functional spaces distributed across two floors (Figure 10). On the ground floor, a corridor connects primary living areas, including bedrooms, a semi-covered terrace, and common spaces. The first floor, lighter in structure, integrates shaded spaces with wooden louvered windows and doors, maintaining airflow while ensuring privacy. The corridor acts as a transitional space, influencing internal temperature regulation by serving as a thermal buffer between rooms.

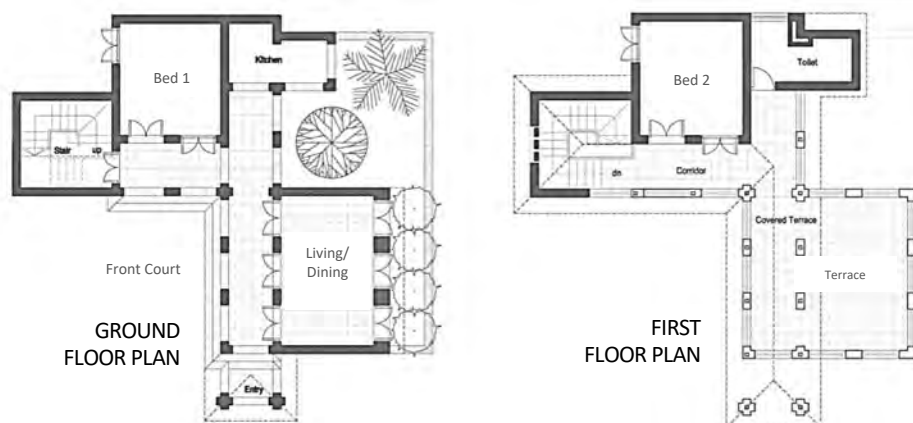


Figure 10: Ground floor plan and first floor plan of Bhatshala Complex
(Source: Bengal Institute)

Architectural elements

Architectural elements such as brick arches, exposed brickwork, and wooden details contribute to the house's vernacular identity. The use of Flemish bond brickwork, arched brick columns supporting the RCC roof, and wooden structural elements highlight the fusion of tradition with modern building techniques.

The inclusion of an extended veranda and corridor enhances connectivity between indoor and outdoor spaces, reinforcing the house's openness while offering protection from monsoon rains and summer heat (Figure 11).

The provision of front court instead of a courtyard illustrates the conventional practice of rural homesteads in Bangladesh. Conventionally front yard is used for daily household chores like drying crops, raising chicken and outdoor informal meeting place.

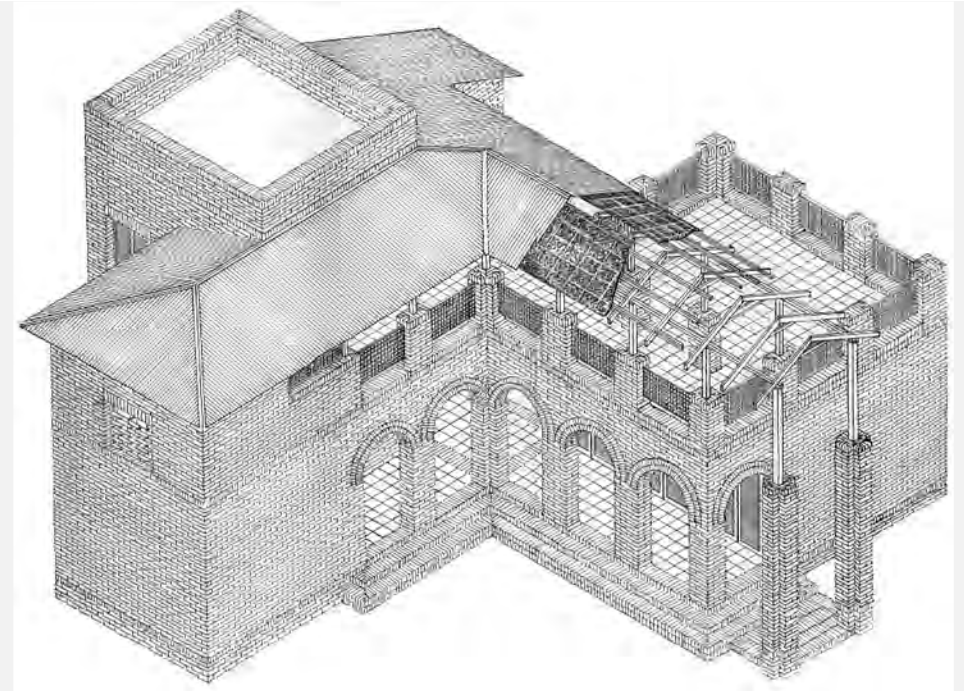


Figure 11: Axonometric view of Bhatshala Complex
(Source: Archnet)

Climatic considerations

The design of the Bhatshala Complex demonstrates a deep understanding of climatic considerations. The interplay between shaded outdoor spaces, ventilated corridors, and strategic material choices ensures that the residence remains thermally comfortable throughout the year. By incorporating regional construction methods and passive cooling techniques, the house stands as a significant example of climate-responsive vernacular architecture in the rural regions of Bangladesh.



Figure 12: Layered façade to protect the house from heat gain during summer.
(Source: Bashirul Haque Architect)

SYNTHESIS OF THE CASE STUDIES

This section presents the findings from the two case studies and synthesise the elements of critical regionalist brick architecture in the context of Bangladesh.

Contextual Considerations

In the rural context of Bangladesh, the placement of a house within a site is crucial, as it is influenced by several factors. These include the location of existing ponds, the connected front yard shared with neighbouring houses—often belonging to close relatives—the positioning of the animal shed to minimise odour, the presence of existing fruit trees, as well as considerations of access and privacy (Das et al., 2021). Once the ideal location for the house is determined, its spatial layout is then guided by its orientation.

Orientation and climatic consideration

Table 1 shows the basic design responses according to the orientation of the building.

Table 1: Building orientation and design considerations.

Direction	Climatic Considerations	Design Response
North	Receives soft north light, ideal for study and living areas.	Large openings, placement of living spaces to capture light.
South	Main source of prevailing wind; receives low-altitude sun in winter.	Openings for ventilation, bedrooms placed here, horizontal louvres to reduce heat gain and channel wind.
East	Receives early morning sunlight and prevailing wind.	Kitchen and some bedrooms placed here, vertical louvres for shading.
West	High heat gain from afternoon sun.	Minimal openings, veranda as buffer, vertical louvres, double or hollow brick walls to reduce heat.
North-East	Strong seasonal storm winds.	Trees and vegetation as wind barriers.
South-East	Most desirable side—receives year-long prevailing wind and winter sun.	Optimal placement for main living spaces.

Among the six seasons in Bangladesh, summer is characterised by extreme heat, a lack of rain, and seasonal storms. The monsoon season typically brings prolonged rainfall and seasonal floods. Winter is generally mild, except for cold waves from the northeastern side, which can lower the temperature to 5°C.

Throughout the year, the most crucial factors for human comfort in residential architecture include ample natural ventilation and adequate daylight while ensuring protection from thermal gain on the west side. Both case studies serve as good examples of these considerations.

Architectural elements

Table 2 lists down the climate responsive architectural elements for both case studies.

Table 2: Climate responsive architectural elements

Architectural Element	Climate-Responsive Function
Parasol & Pitch Roof	The parasol roof provides shade and reduces heat gain, while the pitch roof aids rainwater drainage and natural ventilation.
Exposed Brickwork	Enhances durability, regulates indoor temperature, and improves breathability with Flemish bond brickwork.
Semi-Open Corridors	Promote cross-ventilation, natural light, and seamless spatial connectivity.
Front Court	Acts as a thermal buffer, improves airflow, and integrates natural elements into the living environment.
Louvres, Openings & Verandas	Facilitate ventilation, minimise heat gain, and enhance indoor-outdoor interaction.
Brick Arches & Columns	Provide structural stability, increase airflow, and enhance thermal regulation.
Vertical Voids & Staircase	Improve air circulation, reduce heat buildup, and enhance spatial layering.
Extended Roof Overhangs	Protect against rain and direct sunlight, ensuring cooler interiors.
Wooden Structural Elements	Add warmth, flexibility, and improve insulation against temperature fluctuations.

Internal Layout

For both case studies, the open-plan layout enhances ventilation and daylight, reducing reliance on artificial cooling and lighting. The double-height spaces and voids facilitate airflow, preventing heat buildup in the tropical climate. While corridors and verandas are primarily for connectivity among the living spaces, they also act as thermal buffers, ensuring comfort through passive cooling. Shaded terraces and wooden louvers regulate indoor temperatures while allowing airflow. Courtyards and south-facing spaces integrate traditional layouts with climate-responsive design.

Both projects exemplify the early critical regionalism approach among the modernist architects of Bangladesh in their materiality, contextuality, cultural sensitiveness and climate responsive design.

METHODOLOGY

This study adopts a qualitative approach to explore the evolution, adaptation, and application of critical regionalism in brick residential architecture in Bangladesh. The historical background of brick architecture in the Bengal region is examined through a literature review. Two case studies were selected to analyse the early adoption of critical regionalism in the context of modern residential architecture in Bangladesh. The synthesis of these case studies identifies key climatic considerations and architectural elements for designing climate-responsive residential buildings using brick masonry as the primary construction material.

The derived elements from the case studies are applied to a contemporary residential project, illustrating architectural strategies for designing a two-story family residence in the rural context of Bangladesh (Narail district of the Khulna division). The total built-up area for the house is 220 sqm. The findings reveal how the application of climate-responsive brick architecture, guided by the principles of critical regionalism, informs building placement, orientation, façade articulation, spatial organisation, and the integration of elements such as louvres, pergolas, rainwater spouts, and built-in planter boxes (Figure 13).

This methodological framework enables a contextual understanding of how traditional materials and regional strategies can be meaningfully reinterpreted in present-day architectural practice.

FINDINGS AND DISCUSSION

Macro Climate and Seasonal Variation

The project is situated in the rural context of southwestern Bangladesh, in the Narail district of the Khulna division. This region is characterised by agricultural flatlands, crisscrossed with canals and rivers. There are six seasons, including summer, monsoon, and winter. During summer, temperatures can rise to 34°C around April. Seasonal cyclones also occur, primarily due to low atmospheric pressure in the Bay of Bengal.

The monsoon season (June–October) brings continuous rainfall for several days, often causing seasonal floods. In winter, temperatures drop to around 13°C, with occasional cold waves from the northern region lowering the temperature to as low as 5°C (Diebel et al., 2025).

The prevailing wind across most of Bangladesh comes from the southeast. The west side of buildings receives low-altitude afternoon sunlight, which can significantly increase indoor temperatures if not properly screened. The east receives morning sunlight, which is desirable, especially during cold winter mornings. The north side receives the least daylight, requiring sufficient openings for adequate daylighting and ventilation. However, during seasonal summer cyclones, strong winds of up to 260 km/h strike the coastal areas, primarily from a north-easterly direction (Diebel et al., 2025).

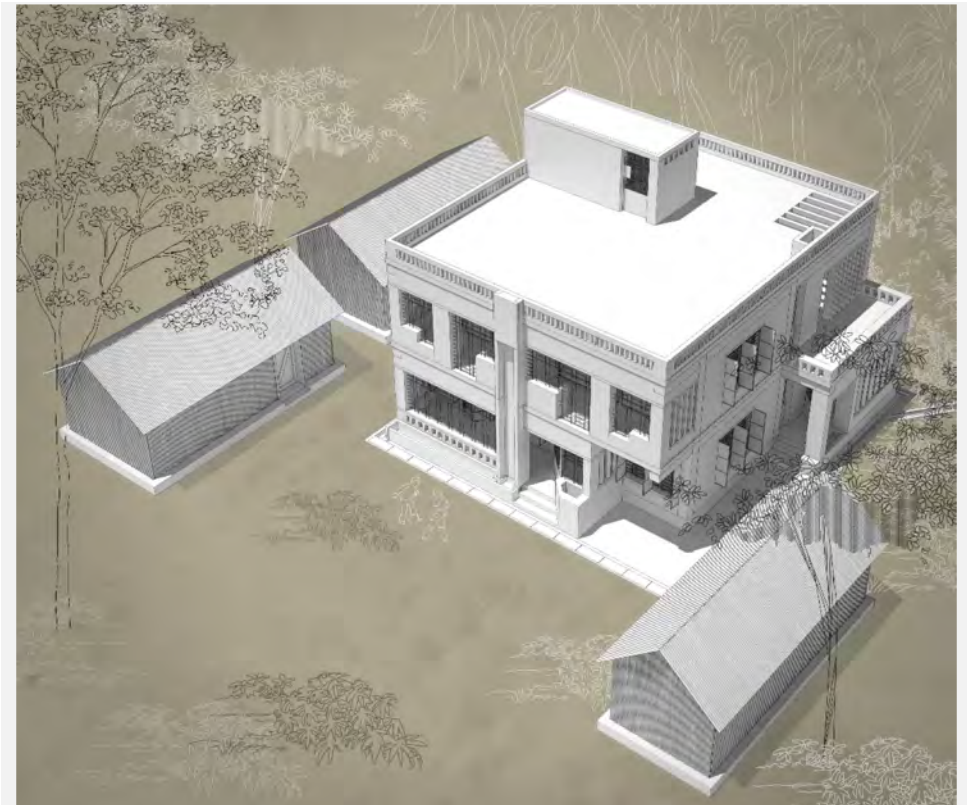


Figure 13: The proposed project within the surrounding rural settings.

Site Context

- Water Bodies and Drainage

In rural Bangladesh, domestic water bodies such as ponds, ditches, and canals are significant landscape elements traditionally used for bathing, washing, fish farming, and rainwater retention. As village areas lack central drainage systems, these water bodies play a crucial role in flood protection. The project site features a pond on the north-eastern side, with rainwater drainage from the residence linked to it.

- Front Yard

The front yard is an integral part of rural homesteads, frequently used throughout the day for animal rearing, drying seasonal crops, welcoming guests, and circulation (Rahman, 2019). This contrasts sharply with urban dwellings, where courtyards are preferred for maintaining privacy instead of a front yard. For this project, the existing front yard has been retained, with an additional side access from the kitchen to enhance accessibility and functionality.

- Vegetation

The northern side of the site has a row of existing palm trees with tall trunks that act as an effective wind barrier against seasonal cyclones while allowing filtered light to pass through. Around the front yard, existing fruit trees have been preserved. Additional plantations have been integrated into the building façade for both climatic and aesthetic benefits.

For example, the western side features *bougainvillea*, a vine creeper that provides shade from the afternoon sun while offering vibrant purple blooms. The eastern side includes a two-layer terrace: the first level is covered with a pergola for seating, while the second is open to the sky with potted flowering plants. The front façade also has planter boxes connected to the rainwater drainage system for easy maintenance.

Internal Layout and spatial organisation

The design is organised into two primary zones: a living area (bedrooms and living spaces) and a service area (kitchen and toilets), with vertical circulation placed in the central shared space to connect both floors efficiently. This layout ensures functional clarity while supporting airflow and spatial connectivity, aligning with principles of climate-responsive design (Figure 15).

Passive cooling strategies and visual connections were explored to enhance indoor comfort, though these aspects were primarily conveyed through drawings. Initially excluded, front verandas were later incorporated at the client's request—an addition that proved beneficial. They contributed to climatic protection, enhanced security in the rural context, and enriched the building's spatial and visual character. Their inclusion also enabled greater flexibility in elevational articulation, reflecting a regional sensitivity embedded in the design.



Figure 14: The west façade showing slit openings and vine creeper as a protection from the low altitude afternoon sun.



Figure 15: Ground floor plan (left) and first floor plan (right) showing the internal layout of the two-story residence.



Figure 16: Sectional perspective and photographs showing the double height space connecting the ground floor with the first floor visually for enhanced daylighting, visual connectivity and natural ventilation.

Climate Responsiveness Through Sectional Design

The section design integrates climate-responsive strategies rooted in critical regionalism, balancing innovation with contextual sensitivity. A central double-height space is utilised to generate a stack effect, enhancing natural ventilation (Figure 16).

Solar heat absorbed by the stair core roof promotes the upward movement of warm air, which exits through ventilated brick *jali* screens. This process draws in cooler air from the south and southeast-facing windows and verandas, particularly effective due to dense vegetation on the east side that moderates ambient temperatures even during peak summer when the temperature can reach up to 34°C.

Additionally, the spatial arrangement of the semi-private zone—comprising dining and family living areas—supports both visual and physical cross-connections, allowing abundant daylight to penetrate the interior and minimising reliance on artificial lighting until late in the day. Planter boxes are strategically positioned to offer green views from multiple vantage points, contributing to year-round thermal comfort and sensory well-being.

The three images above illustrate the naturally lit double-height space that vertically connects the dining area on the ground floor with the family living space on the upper level. Captured during mid-day, all images demonstrate effective daylight penetration without the use of artificial lighting. The first image (A) highlights the dining area illuminated by northern light and filtered rays entering through narrow slit openings on the west façade.

The second image (B) focuses on the west façade, where sunlight is diffused through vine creepers, offering consistent, softened daylight to both the dining and stair areas.

The third image (C) presents the upper-level family living space, which benefits from a visual and spatial connection to the double-height volume and two eastern terraces. The first terrace is semi-enclosed, featuring glass doors and vertical brick louvers that mitigate harsh morning sunlight, while the second, open terrace is designed for pot planting, contributing to visual comfort and climatic moderation.

These semi-private spaces surrounding the double-height zone enable spatial fluidity while safeguarding the privacy of more intimate functions such as bedrooms which are connected to the common space and have their own verandas for relaxation.



Figure 17: (A) Vertical brick louvre on west façade; (B) Tilted vertical brick louvre on east façade allowing the winter morning sun; (C) Vertical brick louvre on the upper floor veranda providing privacy from the neighbouring houses while allowing ventilation.

Architectural Elements

• Vertical Brick Louvres and Tilted Brick Louvres

The west façade incorporates vertical brick louvres to reduce heat gain from the afternoon sun. On the east façade, however, the design encourages morning sunlight, particularly during the cold winter season. Since the sun's path tilts towards the south by approximately 47.3° from the vertical during winter, the east-facing vertical louvres are tilted at 45° to optimise exposure to morning sunlight (Figure 17).

• Slit Openings

Although the total window width on the east and west façades is the same, their design differs in response to climatic needs. The west façade features narrow slit openings acting as vertical louvres to minimise solar heat gain. In contrast, the south-facing façade includes wide openings to allow prevailing southeast winds to enter the residence and flow through openings on the other façades, facilitating effective cross ventilation (Figure 18-19).



Figure 18: (Left) Slit openings on the west façade from the exterior; (Right) The afternoon sun has been filtered through the slits to protect the bedroom from heat gain.

• Pergola, Veranda, and Open Terrace

The residence includes five verandas. Three are attached to bedrooms to enhance views while maintaining privacy and offering rain protection, allowing windows to remain open for ventilation. These verandas also serve as extended living spaces, suitable for seating or drying clothes. Another veranda, located adjacent to the kitchen, supports local practices such as washing dishes and other chores typically performed outdoors (Figure 20). It also serves as a transitional zone providing access to the back of the house, pond, and front yard—without passing through the living room—thus maintaining privacy. The final veranda, or open terrace, is attached to the first-floor family living area. This space accommodates seating, relaxation, and informal gatherings. A semi-open zone with a pergola overhead connects the terrace to the interior, enhancing natural lighting and spatial aesthetics.



Figure 19: Cropped view of the veranda through the sliding glass door of the upper floor bedroom.

- Double-Height Space

As discussed in the sectional analysis, the double-height space acts as a central hub for vertical and horizontal circulation. It enhances natural ventilation through the stack effect and supports daylight penetration to adjacent spaces.



Figure 20: The kitchen veranda (ground floor) with tilted louvers and access door towards the front yard and the open terrace (upper floor) with a 270° view towards the pond and front yard.

- Planter Boxes, Rainwater Spout, and Drainage

The residence features a flat roof, reflecting the regional modernist tradition. Two drainage systems manage rainwater runoff. One includes a rainwater spout, designed as an aesthetic element of the front elevation. Water is discharged into a planter box at ground level; overflow is directed to a drain that leads to a retention pond at the rear (Figure 21-23).

The second system is located on the east side, where a rainwater downpipe runs through the toilet core, directing water to the same retention pond via underground drainage.

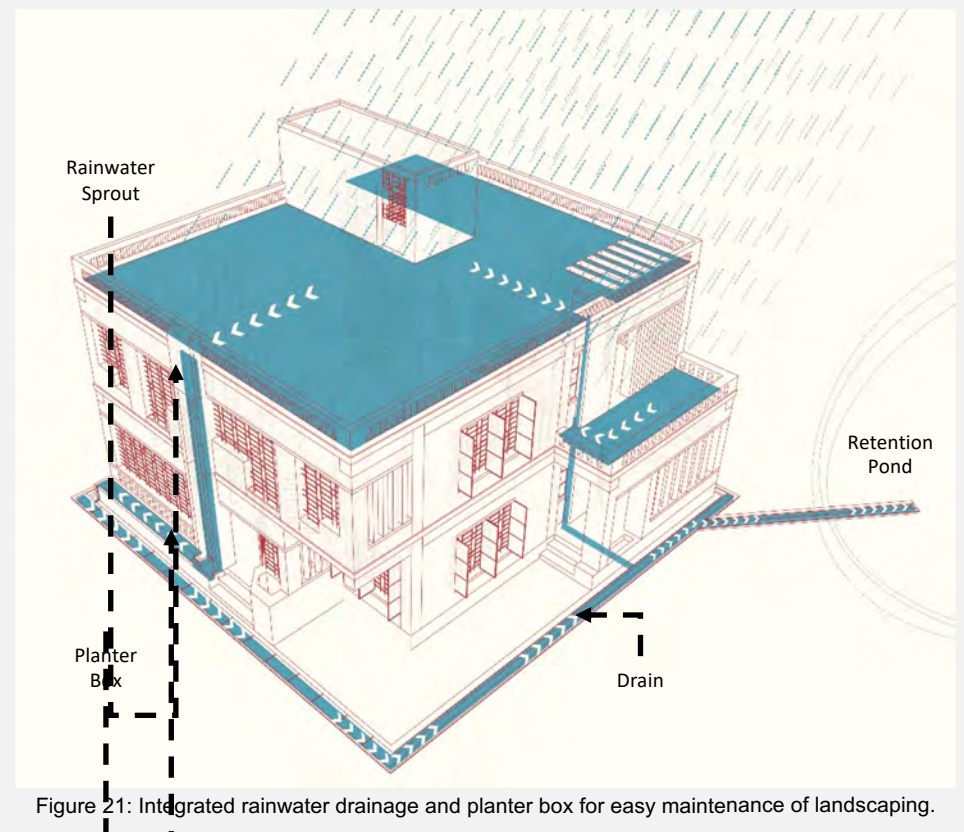


Figure 21: Integrated rainwater drainage and planter box for easy maintenance of landscaping.



Figure 22: Integrated rainwater spout on the front façade of the building. The water coming down nourishes the bougainvillea plant on the ground floor planter box.



Figure 23: Planting and vegetation (A) at the entrance, (B) on the west façade and (C) north side of the building, enhancing aesthetics and privacy, filtering sun light to reduce thermal gain and blending the house into the context.

Table 3: Summary of the design considerations from the critical regionalism perspective

Contextual Parameters	Architectural Considerations	Design Responses
Macro Climate	- Hot summers (~34°C), heavy monsoon (June–Oct), cold winters (~13°C, sometimes down to 5°C) - Prevailing southeast wind - Cyclones up to 260 km/h	- Orientation and facade treatments address seasonal sun and wind patterns - Double-height space enhances ventilation and daylighting - Dense east-side vegetation cools microclimate
Site Context	- Rural site with nearby pond, no central drainage - Vegetation (palm trees, fruit trees) - Cultural uses of front yard	- Rainwater channelled to pond for drainage and retention - Existing trees preserved for wind protection and shade - Front yard and kitchen-side access retained for traditional rural use
Building Orientation	- West receives harsh afternoon sun - East gets soft morning sun - Southeast wind is desirable	- Bedrooms placed on south side for warmth - Services placed on east side for shading - Wide openings on south and southeast enhance cross ventilation
Internal Layout	- Needs airflow and daylight across all zones - Climatic comfort and functional clarity	- Zoning into living and service areas - Central double-height space connects floors and promotes stack ventilation - Verandas added later to improve comfort, privacy, and aesthetics
Architectural Elements: <i>Openings</i>	- Need for morning sun (east), protection from afternoon sun (west), and ventilation from southeast	- West: narrow slit windows as shading - East: larger, well-positioned windows for morning light - South: wide openings for wind and light - North: openings to increase daylight where it is least available
Architectural Elements: <i>Vertical Louvres and Pergola</i>	- Sun tilts ~47.3° south in winter - Protection from afternoon sun - Desire for natural light, shade, and aesthetics	- West: vertical brick louvres for shading - East: 45° tilted louvres for winter morning sun - Pergola over semi-open space enhances daylighting and adds aesthetic quality
Architectural Elements: <i>Planter Box, Rainwater Spout</i>	- Need to manage rainwater during heavy monsoons - Desire to integrate nature and greenery into living environment	- Two drainage systems: spout to planter box and underground pipe to pond - Planter boxes used in front facade for aesthetics and cooling - Vegetation integrated into terraces and facade for thermal and visual comfort

CONCLUSION AND RECOMMENDATIONS

This study highlights the potential of traditional brick as a sustainable and contextually relevant material in the architectural landscape of rural Bangladesh. By examining a single-family residence through the lens of critical regionalism, the paper demonstrates how brick, rooted in centuries of vernacular wisdom, can continue to play a vital role in contemporary climate-responsive design as summarised in Table 3. The integration of passive cooling techniques, context-sensitive planning, and thoughtful architectural elements reflects a deep sensitivity to climate, culture, and local lifestyle.

Moving forward, architects and designers are encouraged to draw inspiration from vernacular traditions and reinterpret them within modern architectural frameworks. Sensitivity to the specific climate, culture, and context of a site should guide key design decisions such as building orientation, spatial layout, and material selection.

The thoughtful integration of natural features—such as vegetation, water bodies, and open spaces—can enhance the environmental performance and livability of a project. Prioritising the use of locally available materials and skilled labour not only supports the local economy but also ensures construction methods remain rooted in the region's cultural and technical heritage.

The recommendations outlined in this paper advocate for a grounded and sustainable architectural practice, where traditional knowledge and modern innovation coalesce. This approach offers a resilient path forward for architecture in Bangladesh, one that respects its rich heritage while addressing contemporary needs. Further exploration on this topic may look into the use of brick in other typologies with larger scale, as well as the amalgamation of brick with other modern construction materials to carve out the path of the future of architecture in the context of Bangladesh.

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06

EXPLOREX: AN INNOVATIVE OUTDOOR CHAIR FOR ENHANCED COMFORT, SAFETY, AND PORTABILITY

Arif Salihin Muhammad Aminuddin, *Raja Intan Suhaylah Raja Abdul Rahman and Julaila Abdul Rahman
Department of Applied Arts and Design, Kulliyah of Architecture and Environmental Design, IIUM

ABSTRACT

For someone who love to explore the world with friends, having adventure journey with family and peers, equipped with useful gear will be a great aided tools for users to have some relaxation during camping. An often overlooked or forgotten piece of camping gear is a camp chair. It might not seem as important as a tent, sleeping bag, or sleeping pad, but having a camp chair can add to overall experience of sleeping outdoors. Hence, this project aim to develop a camp chair for outdoor seekers, named 'Explorex'. It is for those who intends to use the gear in multiple occasion related to outdoor activities such as camping, travelling, hiking and relaxing at the beach. It is designed through environmental preservation with nature concept to create nature-based sitting chair. Sustainability considerations were integrated throughout the design process, ensuring that the final product aligns with the United Nations Sustainable Development Goals (SDGs). Specifically, the project addressed SDG 9 (Industry, Innovation and Infrastructure) by promoting innovative yet feasible design solutions, SDG 11 (Sustainable Cities and Communities) by supporting environmentally responsible outdoor practices, and SDG 12 (Responsible Consumption and Production) by emphasising material efficiency, recyclability, and low-impact manufacturing. Explorex is developed through a comprehensive process involving background research, ideation, mock-up creation, and model development. These chairs are designed to be portable, durable, and easy to set up, making them essential for outdoor enthusiasts. They offer comfort and convenience across various settings e.g. for camping, festivals, or beach outings. Often overlooked, camp chairs enhance the outdoor experience by providing reliable seating, and Explorex fully embodies these versatile, user-centered qualities.

Keywords: *Camp chair, outdoor enthusiast, camping, adventure, Explorex*

*Corresponding author: rajasuhaylah@iium.edu.my

PROJECT INTRODUCTION

This project aims to create an outdoor camping chair under the concept of 'Stay Wanderer', designed to seamlessly blend with nature and inspire the user's desire for exploration. The concept encourages users to keep exploring the world and discover its unknown corners by wandering through natural environments. This philosophy is also reflected in the chair's design, which emphasises versatility, allowing users to utilise it in a variety of outdoor settings.

The design draws inspiration from two key themes: vintage and classic, embodying the spirit of early 20th-century adventurers. Named 'Explorex' — a fusion of the words 'explore' and 'revive' — the chair targets those who seek the thrill of discovery while appreciating the timeless charm of vintage aesthetics. Influenced by the colours of nature and historic expeditions, Explorex features rich, warm tones such as rustic red, burnt orange, green, and white. These hues evoke the feel of old-world maps and aged leather, while weathered finishes lend the chair an authentic, antique appearance.

From a practical standpoint, Explorex is designed for convenience and functionality. It folds easily for transport and storage, includes straps for effortless carrying, features a padded headrest for added comfort, and has foldable legs that convert it into a low chair. This low seating position lowers the centre of gravity, enhancing stability even on rough or uneven terrain.

PROJECT ISSUES

1. Many outdoor chairs sacrifice long-term comfort by prioritising compactness and lightweight features, often lacking essential ergonomic elements such as lumbar support and cushioning. (Fig.1)
2. Many chairs lack stability on uneven terrain, making them unsafe and difficult to use on slippery slopes or rocky ground.
3. Not many chairs are durable enough to withstand harsh outdoor conditions, and they often are not easy to set up or fold for convenient transport and storage. (Fig.2)

Thus, these issues need to be addressed to improve comfort, safety, durability, and usability in outdoor chair designs.



Figure 1: Rocky and uneven landscape



Figure 2: User choice of camp chair for outdoor setting

AIM AND OBJECTIVES

Consequently, this project aims to propose the development of an outdoor camping chair through environmental preservation and nature-based concept with the following objectives:

1. Study existing camp chair line-ups to identify design opportunities.
2. Analyse user behaviour to inform safety, comfort, and usability features.
3. Develop and design a camp chair model that meets identified needs and standards.

RESEARCH METHODS

The study employed a multi-stage approach to inform the development of the Explorex chair. First, a literature review was conducted to examine existing camping chair designs, ergonomic principles, and sustainability guidelines. This was followed by a market analysis to identify current trends, product strengths, and gaps within the camping chair segment. In parallel, observational studies were carried out to understand user behaviour, comfort preferences, and typical usage patterns in outdoor settings. Insights from these stages guided the design development, where ideation sketches and mock-up prototypes were created, tested, and refined to enhance usability, portability, and ergonomic comfort.

LITERATURE REVIEW

CAMP CHAIR DESIGN AND MARKET TRENDS

The outdoor gear market has seen continuous growth, with increased consumer demand for products that are lightweight, foldable, and durable (Outdoor Industry Report, 2021). Many current designs incorporate aluminum or carbon-fibre frames with weather-resistant fabrics, aiming for minimal weight and maximum portability (Brown, 2019). Ergonomic considerations such as lumbar support, seat height, and backrest angles have also become essential in enhancing prolonged sitting comfort in outdoor settings (Chen & Wu, 2022).

USER INTERACTION AND BEHAVIOR

Studies show that outdoor product usability is deeply influenced by the context of use, such as terrain type, weather, portability needs, and assembly time (Nguyen & Hassan, 2021). Users prefer designs that are intuitive, easy to carry, and adaptable to multiple settings like beaches, campsites, or festival grounds. Moreover, emotional attachment to gear that evokes a connection with nature or minimalist living is becoming a trend among younger outdoor enthusiasts (Kaur, 2020).

NATURE-INSPIRED AND BIOPHILIC DESIGN APPROACHES

Nature-based design—commonly referred to as biophilic design—emphasises aesthetics and functions that connect users with the natural world (Kellert, 2016). In the context of furniture, such elements can include organic shapes, earth-toned colours, and the use of natural or sustainable materials. Integrating such principles into the camp chair's form can elevate the user's sensory and psychological experience during outdoor activities (Tan & Ramli, 2018).

MECHANISM

Product	Name	Measurement	Material	Feature	Type
	Strongback low gravity chair	• 20"(Seat W) x 23.5"(D) x 24"(H) • 136kg (weight cap)	• Heavy-duty polyester 600D tear and wear-resistant fabric • Black powder-coated durable steel frame	• Installed beverage holder • Upgrade cup holder straps and pocket • Lumbar padding to align spine position • Designed to reduce back pain • Backpack – dual shoulder straps	• Low chair • camping, travel, picnics and beach trips
	Big Agnes Big Six Armchair	• 40 x 24 x 26 in- Size • 136kg (weight cap) • 2.6 kg (item)	• Polyester	• backpacking Armchair with two built in cup holders • Extra height and width for ultimate comfort • Light weight and compact size	• Classic camp chair • Perfect for camping, picnics, and outdoor events.
	Nemo stargaze auto reclining chair	• 136kg (weight cap) • 100cm(H) x 98 cm w x 64 cm D • 67 cm (H) x 17 cm (w) –Backpack	• Oxford cloth & aluminum bracket	• Adjustable headrest • Low leg (low center of gravity for stability) • Mesh cup holder (no-spill cupholder) • Reclining system (rocking mechanism) • Sized stash pocket for phone or book • Backpack -1 shoulder straps and snag straps	• Suspended chair • Camping, Backpacker

SHAPE AND SIZE

Product	Name	Measurement	Material	Feature
	XGEAR Leisure Folding Camping Chair (Asteri)	• 56cm(D) x 59cm(W) x 106cm(H) (Size) • 6.08 Kg (item) • 136 Kg (weight cap)	• Alloy steel (frame) • 600D Oxford fabric (cushion)	• Padded hard armrest and headrest. • adjustable lumbar cushion – find comfortable position, adjust body position and want comfort • High back provide better support and comfort • Portable carry bag • Cupholder on armrest
	OZTENT MAWSON CHAIR BLACK & GREEN	• 150 kg (load cap.) • 53 x 66 x 90cm	• 600D Polyester	• solid collapsible table • portable cooler holding up to 16 cans • Adjustable lumbar support system and ample padding • Tough adjustable table with cup holder
	DUNE 4WD NOMAD II DELUXE XL CHAIR BLACK & GREY	• 120 kg (load cap.) • 56 x 46 x 48/109 cm	• Material: 600D PVC & Neoprene • Frame: Powder Coated Steel • Carry Bag: 600D PVC	• Cup & wine glass holder, built into the armrest • Fully padded seat and back • 8 position reclining function • Square frame for excellent stability • Fold away side table and cooler included

STYLE AND INSPIRATION

Product	Name	Measurement	Material	Feature
	The Spanish chair	• Height: 67 cm • Width : 82,5 cm • Depth: 60cm • Seat height :33cm • Weight:10,7kg	• Lounge chair of solid wood and saddle leather • seat and back made in vegetable tanned saddle leather with metal buckles.	• Solid oak or walnut • Highest calibre saddle leather creates a strong presence in a chair that will only become more beautiful with age. • Designer : Borge Mogensen • Design Year : 1958
	Danish Mid Century Folding Deck Chair	• 28.75"W x 21"D x 30.5"H • Seat height :17.0 in	• Teak • Colour : Black • Item type : Vintage, antique	• Style : Danish modern • Designer : Hans Wegner • Period :1950s • Have cupholder on both armrest • foldable
	Rookie Campaign chair	• Height: 33-35 inches (83-89cm) • Width: 22-24 inches (56-61 cm) • Depth (22-24 inches (56-61cm) • Seat height: 16-18 inches (41-46 cm) from the ground	• Leather (3.5-4.0mm) double butt belt leather • Color – black, brown, tan cognac • Copper rivets	• Designer (Christopher Schwarz) • Lightweight and ease of assembly • Portability - can be foldable • Simple construction : wooden as frame and canvas or leather as seat and backrest • Timeless Design : The chair's classic utilitarian design used as inspiration for modern furniture

Figure 3: Line-up study

LINE UP STUDY

Figure 3 reviews current camping chairs, highlighting features like cup holders, storage pockets, and lumbar support. Foldable and stable designs are common, with an ideal size of 35" H, 20" W, 22" D. These insights shape the Explorex chair—ergonomic, eco-friendly, and inspired by nature and minimalist outdoor style—designed for comfort and convenience on the go.

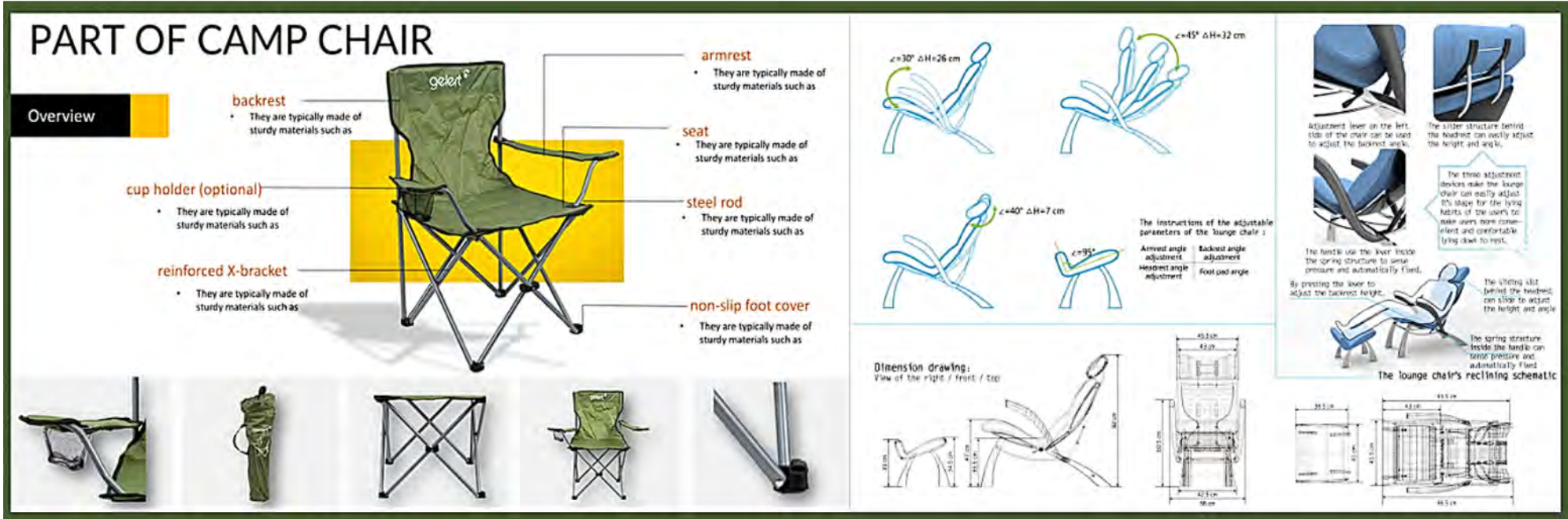


Figure 4 Study for Part of Camp Chair for Ergonomic Study

For optimal comfort and safety, the camping chair design must incorporate essential ergonomic elements. Features such as armrests and a cup holder enhance usability and convenience during extended outdoor use. The Explorex chair addresses key user needs through ergonomic posture support, ensuring back and lumbar comfort with flexible canvas that adapts to the body. Its low centre of gravity and stable leg design enhance balance on uneven terrain. Lightweight and foldable, Explorex is easy to carry and store, making it an ideal companion for any outdoor adventure. The chair must also adhere to standard ergonomic dimensions to ensure proper posture and support:

- Seat height from ground: 15–18 inches (38–46 cm)
- Seat width: 18–24 inches (46–61 cm)
- Seat depth (front to back): 16–20 inches (41–51 cm)
- Backrest height (from seat to top): 18–24 inches (46–61 cm)
- Overall chair height (ground to top of backrest): 30–40 inches (76–102 cm)

In addition, the chair should be able to support a standard weight capacity of 250–300 pounds (113–136 kg) to accommodate a wide range of users safely. (Refer to Figure 4)

Based on observations from online videos, outdoor chair users prioritise comfort, especially during long periods of sitting. Ergonomic support and relaxed seating positions are highly valued. Portability is another key factor—users prefer lightweight chairs that are easy to carry and transport, often with features like shoulder straps or compact folding designs. Quick setup is essential, with a clear preference for chairs that require minimal effort to assemble and disassemble, ideally without the need for tools. Durability is also critical, as the chairs must withstand outdoor elements such as sun, rain, and dirt, along with rough handling. Foldable designs are especially favoured for their convenience in storage and space-saving during travel. (Figure 5)

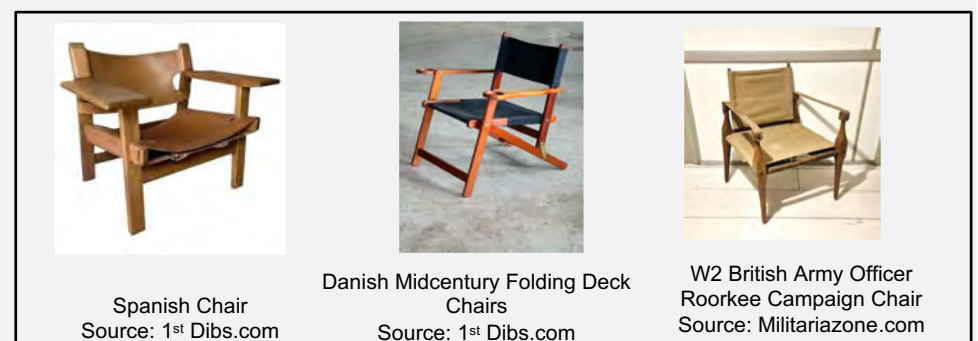


Figure 6 Design Inspiration

The W2 Roorkee Campaign Chair, Spanish Chair, and Danish Midcentury Folding Deck Chairs inspire the Explorex chair through their blend of form, function, and heritage. The Roorkee chair offers portability and minimalist construction ideal for outdoor use. The Spanish Chair contributes robust materials and wide armrests for comfort and utility. Danish folding chairs add lightness, clean lines, and efficient storage. Together, these elements shape a design that is **versatile, practical, and timeless**, suited for modern explorers. (Fig.6)



Figure 5 User Behaviour Study



Figure 7: Ideation Sketches

The inspiration for this project draws heavily from the era of 19th and early 20th-century exploration, when travel gear was built for durability, adaptability, and timeless style. Historical expedition furniture—such as the Roorkee Chair used by British officers—inspired the structural simplicity and portability. These campaign-style pieces were designed for easy setup, transport, and resilience in rugged terrain, aligning with modern needs for compact and durable outdoor furniture.

Additionally, the aesthetic direction influenced by the warm, weathered tones of antique maps, leather satchels, and natural landscapes—seen in the choice of rustic red, burnt orange, forest green, and off-white. These colours evoke nostalgia and a deep connection to nature. From the Spanish Chair, the project borrows the idea of broad leather elements that age beautifully over time, while the Danish folding chairs inspire clean lines and efficient folding mechanisms for compactness and modern appeal. The sketches reflect a synthesis of these references—covering not just form and structure, but also folding techniques, ergonomic features, and material exploration. Altogether, these inspirations shape a chair designed not just for sitting, but for storytelling—a piece that encourages users to wander, rest, and continue their journey (Figure 6).

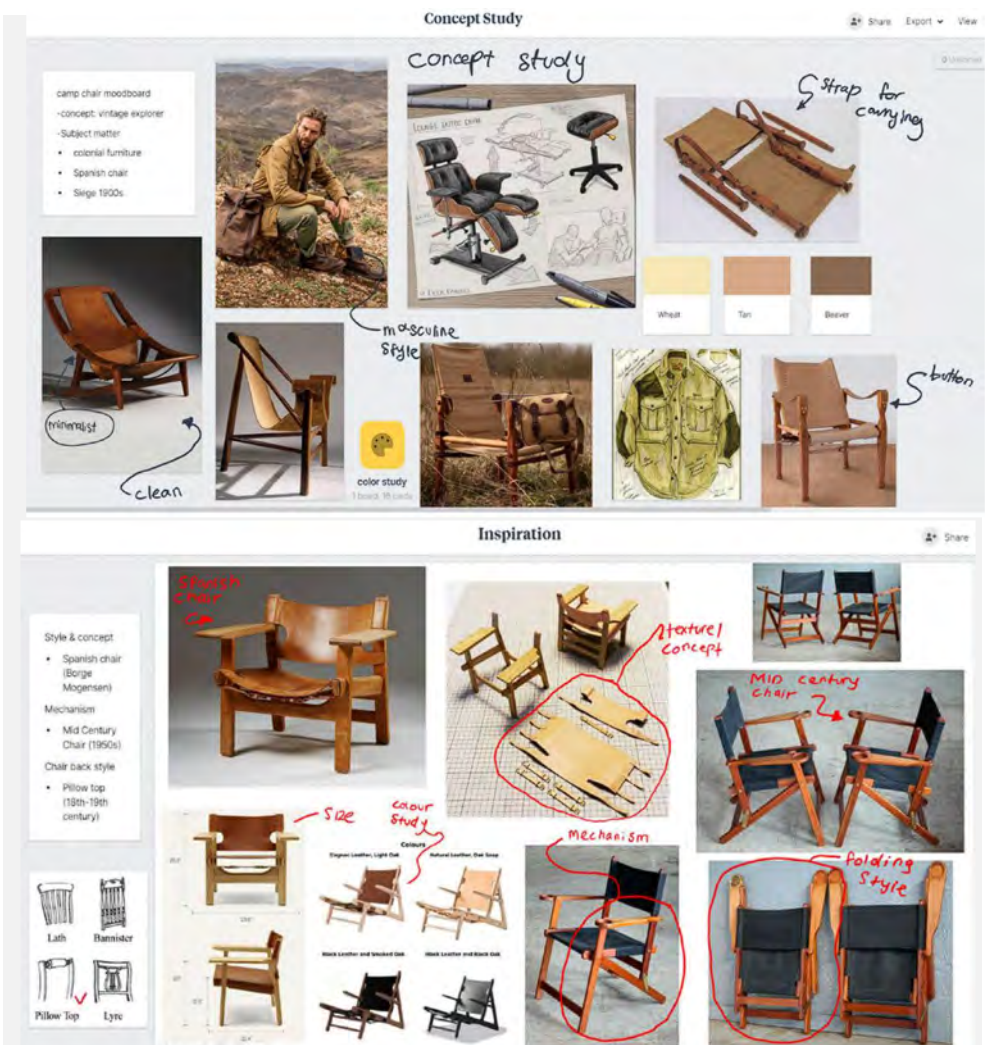


Figure 8: Ideation Sketches

Sustainability Considerations in Design.

Sustainability was integrated throughout the design process to ensure that the camping chair supports both environmental responsibility and ethical manufacturing practices. This approach aligns with several United Nations Sustainable Development Goals (SDGs):

SDG 9 (Industry, Innovation and Infrastructure) was addressed by developing a chair that uses efficient folding mechanisms, allowing for easy production, repair, and replacement.

SDG 11 (Sustainable Cities and Communities) was considered is addressed by designing an outdoor-friendly chair with minimal environmental impact, using non-slip, low-pressure feet to prevent soil erosion and non-toxic, weather-resistant finishes to reduce contamination.

SDG 12 (Responsible Consumption and Production) is reflected through the use of recyclable and reusable materials such as mesh and canvas. Mesh offers breathability and comfort, especially when made from recycled or bio-based synthetics, while canvas—traditionally cotton or linen—is durable, biodegradable, and reduces waste through long-term use.

From an Islamic perspective, sustainability is guided by *khilāfah* (stewardship), *wasatiyyah* (moderation), and *mīzān* (balance). The camping chair reflects these values by minimising waste, using durable materials, and promoting long-term usability, aligning both with global sustainability goals and ethical responsibilities.



Figure 7: Proposed colour design

INNOVATIVE DESIGN ELEMENT



Figure 9: Innovative design element

DESIGN STATEMENT

The Explorex chair is created to solve common problems found in outdoor seating such as lack of comfort, poor stability, and limited durability. It addresses long-term comfort by using an ergonomic design with canvas cut-outs that flex and support the user's posture, helping reduce strain during extended use. The chair is designed with a low-ground adjustable leg system for better balance on uneven or rocky surfaces, making it safer for outdoor environments. Made from strong yet lightweight materials, Explorex is built to withstand tough outdoor conditions while remaining easy to fold and carry. Additional features like a Velcro-attached cooler bag and compact folding frame make it both functional and convenient for transport. With colour options like beige, red, olive green, and yellow-orange paired with a sleek black frame, Explorex offers comfort, safety, durability, and style such as meeting the real needs of outdoor users.

CONCLUSION

The Explorex chair presents a well-rounded design solution that elevates outdoor experiences by emphasising comfort, ergonomic support, and portability. Tailored for travelers, campers, and outdoor enthusiasts, it addresses key practical needs such as posture support, stability on uneven terrain, and convenient transport. Innovative features—including a foldable frame, flexible canvas cut-outs, and modular accessories—enhance usability across diverse environments.

Rooted in sustainability, the design aligns with Sustainable Development Goals (SDGs) 9, 11, and 12 by promoting responsible material selection, efficient production, and environmentally conscious design. By combining functionality with aesthetic value, Explorex not only fills critical gaps in current outdoor chair offerings but also redefines what it means to sit comfortably and responsibly in nature.

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07

URBAN SOCIAL HIGH RISE RESIDENTIAL BUILDING: VERTICAL COMMUNITY AMENITIES

Noorfarhana Alia, *Zuraini Denan and Abdul Razak Sopian
Department of Architecture, Kuliyah of Architecture and Environmental Design, IIUM

ABSTRACT

The aim of this design is to re-envision the urban social high-rise residential building by integrating the vertical community amenities to improve the well-being of the occupants. This study is done to suggest solutions for the social issues that arise in low and middle-income housing. This study used a qualitative method utilising a literature study and case study approach in understanding the subject matter and extracting information from case and precedent studies. This study suggested that the provision of communal amenities such as the sky court and sky podium can improve residents' physical and mental well-being. It can enhance the quality of life of the community, encourage social interaction, reduce feelings of isolation, which are common in high-rise living and help foster a sense of belonging and community spirit among diverse residents. Lastly, this study suggested that the integration of vertical community amenities may help reduce social stigma attached to low and middle-cost housing and increase the economic value.

Keywords: Vertical Community Amenities, Urban, Social High Rise Residential

*Corresponding author: dzuraini@iium.edu.my

INTRODUCTION

High-rise homes have always been part of modern Malaysia's urban landscape, where they form part of a solution to the problems of housing the urban poor such as Program Perumahan Rakyat (PPR). The factors that influence the community's well-being and quality of life are its living conditions. However, throughout the years, the high-rise homes, especially the low- and middle-income housing, are seen as 'poor housing for the poor' with unsuitable living conditions. The small budget of housing with which they are built often means that each flat is small and cramped, with poor quality ventilation and daylighting. Even after a decade, social issues persist in public housing, such as incidents of loitering, drug abuse, theft, obscenity, smoking, gambling, vandalism, running away from home, and drinking alcohol, which haunt the teenagers living in the area. Furthermore, excessive crowding in high-density living results in social withdrawal, which is detrimental to social interaction. If residents are unaware of who their neighbours are, high-rise living becomes ripe for crime. The urban social high-rise residential building aims to re-envision the urban social high-rise residential building by integrating the vertical community amenities to improve the well-being of the occupants.

ISSUES

Kuala Lumpur's high-rise residential housing has a number of social problems that affect residents' quality of life and community well-being. Denser households, cramped living conditions which are low housing standards due to the design of the house, insufficient and lacking social spaces to generate social integration and typical layouts of architecture such as narrow corridors

are frequently the causes of these issues. Three generations of a family were living together in a cramped environment at a PPR home (Mustafa, 2023).

Besides, many high-rise buildings prioritise efficiency and privacy over common areas in their architectural design, which discourages people from interacting socially. This seclusion could lead to mental health issues, including depression and anxiety (Lee, N. I. et al, 2024). Lack of shared spaces, such as community gardens and plazas, often prevents residents from forming strong social bonds. The unavailability of youth-friendly facilities will expose them to conditions that make the community vulnerable to social problems such as running away from home, smoking, vandalism, which can lead to mental health issues and others. Teenagers leave the house to relieve stress and consume prohibited substances, hang out at underutilised areas, or stay away from home for fun and freedom due to low motivation and may feel that they cannot control their surroundings and their future, which would lead them to delinquency and drug abuse as a negative coping mechanism.

The involvement of teenagers in social problems such as loitering, drug abuse, theft, obscenity, smoking, gambling, vandalism, and drinking alcohol leads to unhealthy living conditions in the community which affect the community's well-being and quality of life. Consequently, the teenagers may have trouble concentrating at school and may not finish the homework due to the unhealthy environment. This may lead to children and youth failing in their education, not being able to secure a good job and falling into the same cycle of poverty.

The community especially teenagers may fall into the same cycle of poverty because they do not have the opportunity to change their current life, well-being and socioeconomic. Last but not least, the government needs to spend a lot of money to provide a budget to solve the social issue of the nation that comes from the low and middle cost housing.

RESEARCH AIM

To re-envision the urban social high-rise residential building by integrating the vertical community amenities to improve the well-being of the occupants.

RESEARCH OBJECTIVES

1. To propose a space configuration for enhancing social need.
2. To improve the design and planning aspect of the high-rise residential space in order to enhance social sustainability and interaction.
3. To integrate the community amenities in the urban social high-rise residential building of Malaysia.

RESEARCH QUESTIONS

1. What is the space configuration to enhance the social need ?
2. How to improve the design and planning aspect of the high-rise residential space in order to enhance social sustainability and interaction?
3. How to integrate the community amenities in the urban social high rise residential building of Malaysia?

LITERATURE STUDY

Sick Building's Syndrome

More than 90% of people's time is spent performing activities in buildings. To ensure a healthier lifestyle, an inclusive building environment is very important to maintain building occupants' well-being. In this context, one of the most important factors influencing occupants' physical and mental well-being as well as their productivity, comfort, and overall sense of well-being is the quality of their indoor environment. The typical low-cost apartment floor plan, features extremely packed and compact housing units connected by linear corridors throughout the structure. Low-cost housing has always been associated with low quality materials in building when in comparison to other types of housing (Hanafi, 1999). Karim (2012) supported the stance and mentioned that the causes of low-quality housing are low quality of materials used, provision of amenities and surrounding environments and also the building layout.

Overcrowding

A typical Malaysian household usually consists of five members: an adult male, an adult female and three children, according to the Millenium Development Goal. This gives rise to occupation of between two and six people per room/space (Sikod, 2001). This syndrome leads to space-related problems with comfort and privacy for households with more than four people. According to Pevalin, Taylor, and Todd (2008), the most commonly cited indicator of housing quality among urban poor people is overcrowding, which is defined as having more than two people per room.

Spaces for children's activity in PPR

Children were only allowed to play within their homes or in visual supervision proximity by their parents (Hillman, M. et al. 1990). When allowed to play, children were restricted to surrounding places, therefore they frequently used the circulation space as a social and play area (Aziz, A.A. et al. 2012). Children living in low-cost housing were more likely to utilise the corridors as a play area where surveillance was enabled by adults living nearby (Hanapi, N.L. et al. 2016). Overcrowding also forced children to efficiently utilise the surrounding accessibility by using outdoor neighborhood environments as a medium for social interaction, exploration, and development. Many children mentioned places in designated play areas and parks as play areas, whereas neighbourhood open spaces such as streets, courtyards, rest spaces, and parking lots were the least mentioned (Min, B. et al. 2006)

Insufficient and lack of community amenities in low-cost housing

According to (Isnin et al., 2012) the residents' housing satisfaction showed that residents are not happy with the building services facilities in their area of residence. They pointed out that in addition to housing facilities, common facilities such as educational and health facilities, public transport markets, community halls, mailing systems, parking lots and playgrounds are necessary to support daily life. Lack of community facilities such as playgrounds, halls and fields became an issue in low-cost housing. Lack of playgrounds will compromise children's opportunity to play and release stress. Apart from that, the children will be exposed to danger when playing outside and occasionally can lead to vandalism and unhealthy activity. Besides, it compromises occupants' ability to do recreational activity and release stress after work. Car parking QS COLLOQUIUM SERIES XII Section 5: Design and Human Factor 107 provision for low-cost housing is apparently inadequate, which has led to related problems such as illegal roadside parking, traffic obstruction and the like (Kuala Lumpur Structure Plan 2020).

Community Amenities as Social Space

In order to promote engagement, well-being, and a feeling of community among inhabitants, community facilities that serve as social areas are essential. These common spaces, such parks, community centres, and leisure centers, offer venues for people to interact, take part in events, and create strong communities. The community amenities can foster the social connections that can enhance the neighbourhood satisfaction and trust among residents. Access to such amenities is linked to increased social interactions and reduced feelings of isolation (Daniel et al. (2019). A successful social space in a vertical neighbourhood may enable residents to interact in meaningful ways, fostering a sense of community (Huang, 2006). The provision of vertical housing guidelines should prioritise social issues first, rather than achieving a number of housing units.

RESEARCH METHODOLOGY

The study methods adopted for this study involved a qualitative analysis that comprises four key activities: literature review, case study, precedent study, site observations, interviews and questionnaires. Secondary data collection is being collected from readily available data such as journals and newspapers. The main purpose of this method is to obtain data and results from the previous researchers about the topic and issues. The keywords used for the study are vertical community amenities, urban, social high-rise residential building. The discussion is mainly about definition, design strategies, appropriate communal amenities, application in architecture and activities related to spatial arrangement of each component. Through case and precedent studies, the data will be gathered and analysed. The results were synthesised based on design, building programme, circulation, planning and space. The result of the data will be implemented for the future design. In addition, the site observation, random interviews and questionnaires were done to get the primary data collection. The data collected are analysed and the result can be used as guidelines for design. A site observation of current amenities at one of the low-cost apartments was done which is at PPR Kerinchi, Kuala Lumpur. During the site process, pictures of the current communal amenities, other spaces, and environments that may lead to social problems were taken. The community were asked about their current living conditions and the social issues that arise in the community. Then, the community were invited to suggest suitable communal amenities that can support their lifestyle and foster interactions in the future.



Figure 1: The provision of surau for the community which is located at the ground floor



Figure 2: Community clinic was located at the ground floor of the apartment's units



Figure 3: The corridors of the residential building were used to hang clothes and store the community's personal belongings. The design of the current residential building provides lack of natural ventilation and daylighting. It is overcrowded with a high density and lack of communal amenities.



Figure 4: The community garden at the entrance of the apartment.



Figure 5: The wedding reception was held at the ground floor of the apartment's units.



Figure 6: The provision of sport amenities at the ground floor which give community the opportunities to do sport activities

SITE LOCATION

The proposed site is located along Jalan Sentul and is surrounded by public transportation, educational institutions, medical institutions, and recreational parks. This site is diverse in people with different backgrounds. The site location is self-sustaining as there is no need for the community to venture out of town to meet the most common needs of residents. The area is connected to public transport, infrastructure and, daily need activities such as convenience stores, healthcare, educational institutions, and recreational activities. The majority of places visited are within a median distance or a short distance away from the development. Besides, the site is easy to reach by public transportation which is about 650m to LRT Sentul. The site which is located beside the Gombak river and in the centre of Kuala Lumpur could provide a view of the city.



Figure 7: The location plan of the proposed site and the neighbourhood context.

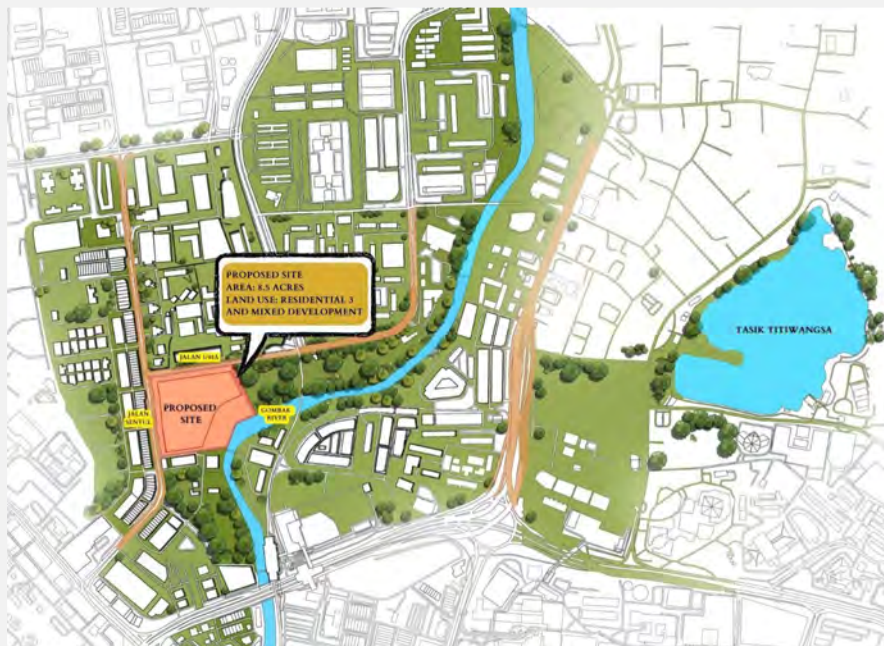


Figure 8: The location plan of the proposed site.

SITE ANALYSIS



Figure 9: View of the current proposed site.

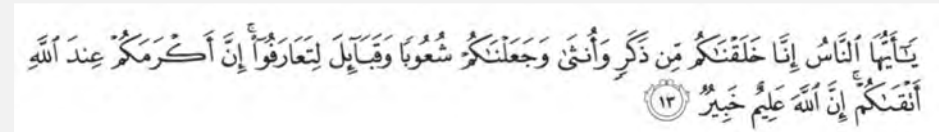


Figure 10: View towards the proposed site from the shop lots.



Figure 11: View of Jalan Sentul and the shop lots from the proposed site.

DESIGN INSPIRATION



O mankind, indeed We have created you from male and female and made you peoples and tribes that you may know one another. Indeed, the most noble of you in the sight of Allah is the most righteous of you. Indeed, Allah is Knowing and Acquainted.

Surah Al-Hujurat Verse 13 (49:13)

Wahai umat manusia! Sesungguhnya Kami telah menciptakan kamu dari lelaki dan perempuan, dan Kami telah menjadikan kamu berbagai bangsa dan bersuku puak, supaya kamu berkenal-kenalan (dan beramah mesra antara satu dengan yang lain). Sesungguhnya semulia-mulia kamu di sisi Allah ialah orang yang lebih taqwanya di antara kamu, (bukan yang lebih keturunan atau bangsanya). Sesungguhnya Allah Maha Mengetahui, lagi Maha Mendalam PengetahuanNya (akan keadaan dan amalan kamu).

Surah Al-Hujurat Ayat 13 (49:13)

DESIGN BRIEF

Based on the study, the proposed design is affordable housing, as KLSP2040 stated that Kuala Lumpur will ensure all city residents have equal access to affordable housing, quality social facilities, infrastructure, and a safe, clean, and green environment. The target user for the research is the B40 community as it can help the urban poor community to have a conducive living environment. The average household size is four to five persons and the households in the PPRs are mostly families. Most of the household earn less than the poverty line and the community does have semi-skilled or low-skilled jobs in terms of occupation. The client of this study is Dewan Bandaraya Kuala Lumpur. The proposed design for this study will include all the aspects from the small community to the big community which are the home community, level community, block community, and the building community.

KLSP2040: Kuala Lumpur will ensure all city resident's have equal access to affordable housing, quality social facilities, and infrastructure, a safe, clean and green environment

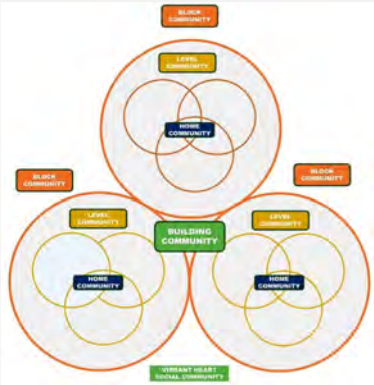


Figure 12: The diagram shows the aspect of the proposed design from the small community to the big community.

DESIGN CONCEPT

The design concept for the proposed design is Vertical Kampung. Every dwelling unit belongs to a “Sky Village” that shares the “Tropical Community Space” which is a skycourt to develop the community’s well-being and livability of the city. The skycourt will act as an “ANJUNG” where people can do small gatherings and has more spaces especially during Eid celebration for open houses and birthday celebration. Therefore, every unit will come with a garden with the integration of the skycourt in the design. Furthermore, the owner of the unit has the flexibility to rent the bedroom on the lower floor as it can act like a split unit. One of the entrances will go into the living and dining area which acts as a “SERAMBI” before entering the kitchen area. The “SELANG” area can be used as a private space for women during special occasions. In addition, the community plaza and the community garden will act as a gathering place and the space can develop the “Kampung Spirit” among the community as it can foster social interaction. Lovers of plants, retirement and other community can have the opportunity to pursue gardening during their free times while knowing their neighbours.

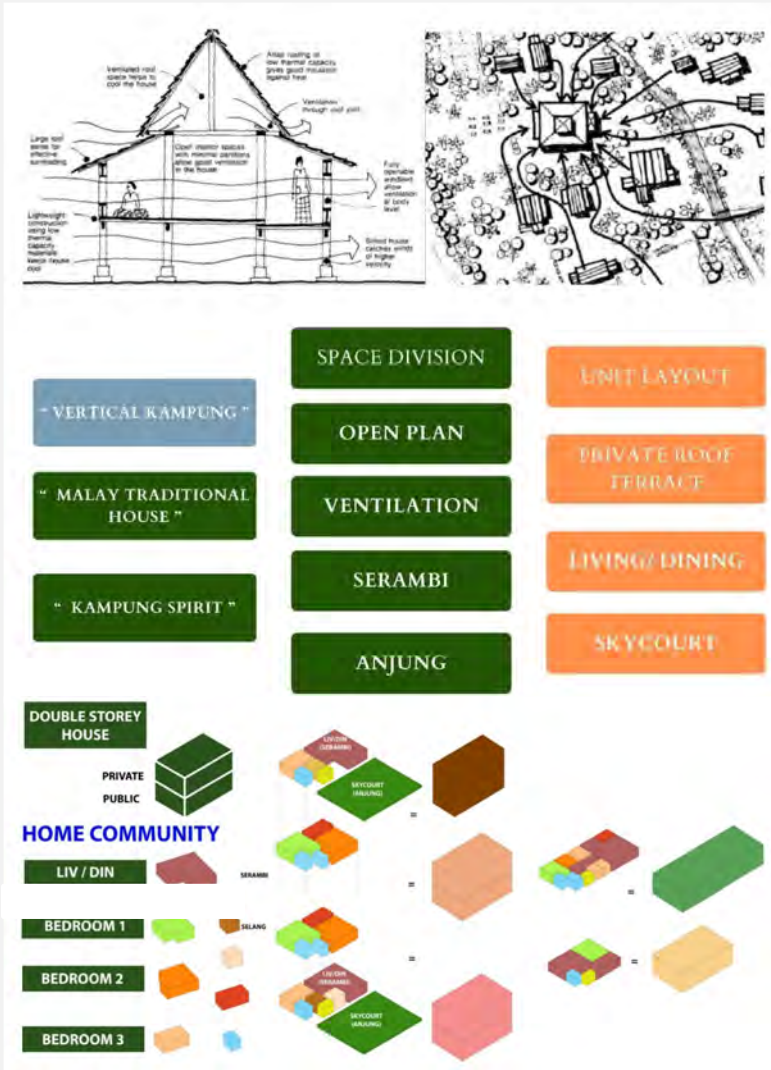


Figure 13: The diagram shows the design concept of the “Sky Village” which inspired from the Malay traditional house.

DESIGN STRATEGIES

The elements that support social interaction are public access, programmes, hybridisation, and the periscopes. It is the condition where the ground floor is opened to give a different open space in the city, which might be utilised for any number of open capacities. Transparency permits one to enter the building without any boundaries, physical and mental, where people choose to be in public rather than their private lobby (Hitzler, N. 2016). Thus, the design strategy is to create an open ground floor and open roof such as the community plaza and the rooftop skypark. The open ground floor will allow the paths of various users to overlap. Sky Village has integrated the element of hybridisation through dispersed programmes such as the skycourt being connected vertically while the sky bridge, rooftop skypark, and sky podium are connected horizontally. In addition, public spaces such as rooftop skyparks are connected like periscope atriums as they can operate vertically and horizontally offering views to spaces that would otherwise be hidden. A periscope elevates the public eye to the increasingly privatised skyline, giving a privileged view to the public.

Elements that support social interaction	Strategies	Sky Village
Public access	- Open ground floor - Open roof	- Void decks - Community plaza - Sky Bridges - Rooftop Skypark
Program	Communal activities	Commercial: small shops Education: Kindergarten Open space: Private sky terrace, skycourt, sky bridges, children playground and court
Hybridization	Dispersed programs	Dispersed centrally with focal points in courtyard of community plaza Vertical : Private Community Terrace, Skycourt Horizontal : Sky bridge, Rooftop skypark, Sky podium
	Shared circulation	Horizontally in the ground floor between public areas : Pathways Horizontally in upper level between open spaces to units : Skycourts Vertically between open spaces to groups: Cores
Periscopes	Periscopes atriums	- Periscope from above: Rooftop skypark - Periscope via communal space: Communal amenities, sky bridges - Periscope via open space: Community plaza and big courtyard in ground floor

Figure 14: The diagrams shows the elements that support social interaction and design strategies for the community amenities of the Sky Village.

SITE PLAN



Figure 15: Site plan of the vertical community amenities in urban social high rise residential building which is the “ Sky Village”.

The Sky Village is an urban social high-rise residential building that integrates the vertical community amenities that are located in Sentul, Kuala Lumpur. The site is located beside the Gombak River and in the centre of Kuala Lumpur which could provide a view of the city. The road that can be accessed to the Sky Village is Jalan 1/48a which is two-way lane from the LRT Sentul. The Sky Village is orientated to the southwest and northeast directions to utilise the natural ventilation to the units, triple volume of the skycourts, and other community amenities. The building is oriented to integrate the passive design strategy by providing natural ventilation and a large opening of breathing space for the residential and community amenities.

SPACE PLANNING



Figure 16: The perspective view of the “Sky Village“

The Sky Village is designed to re-envision the urban social high-rise residential building by integrating vertical community amenities to improve the well-being of the occupants. The design of the building will include all the aspects from the small community to the big community which are the home community, level community, block community, and the building community. Firstly, space planning was emphasised in the home community. The basic module of the units at the Sky Village comprises two-double storey apartments that occupy four floors, one placed on top of the other such that access to both apartment units is on the courtyard level. Sky Village is designed with **“one unit going up and one unit going down”**. Tenants who are living in the bottom floor unit have the convenience of entering the house through the main front door which is on the lower floor of the double-storey apartment and also the courtyard (skycourt) level. On the other hand, if the tenant is taking the top floor unit, the tenant will have direct access to their own home through the upper floor of the double-storey apartments. Consequently, stacking the two double-storey apartments on top of each other can produce a triple-volume sky court. The sky court can function as a social, public communal space in the sky, allowing the benefit of greater light, view, and ventilation thus enhancing the internal environment (Pomeroy, 2014). Skycourt can reduce the area of circulation by the omission of corridor space and give the opportunity to have bigger space on the courtyard level. Therefore, on the level of community, the sky court can function as a gathering place and foster social interaction among the level community. The community can have more space during special occasions such as Eid celebrations or celebrations of birthdays. Besides, the Sky Village has a long-format apartment where every space from living, dining, and bedrooms is accompanied by a grand view which is the Kuala Lumpur city skyline. The units also come with folding doors to offer flexibility and freedom to the homeowners. The service wall is isolated to the outside of the unit, all mechanical elements servicing the unit are accessible through a hidden service wall. The private roof terrace will function as a corridor and also the terrace for the small social space of the home community.



Figure 17: Ground floor plan of the vertical community amenities in an urban social high-rise residential building.

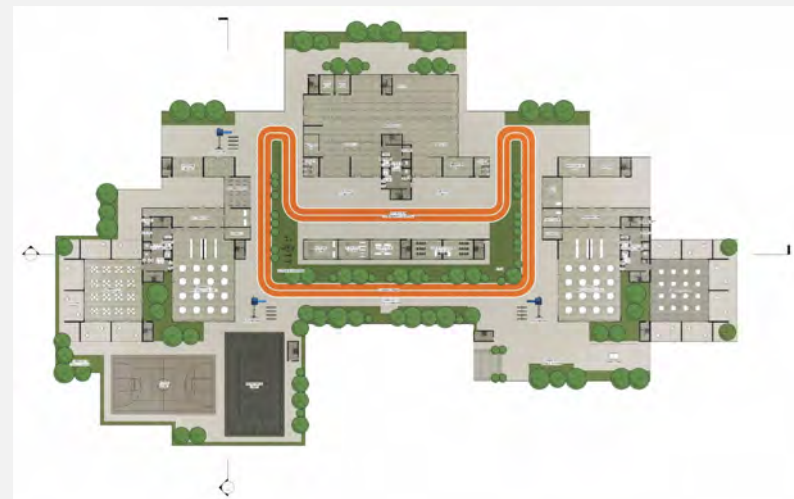


Figure 18: The fifth floor plan (Sky Podium) of the vertical community amenities in an urban social high-rise residential building.

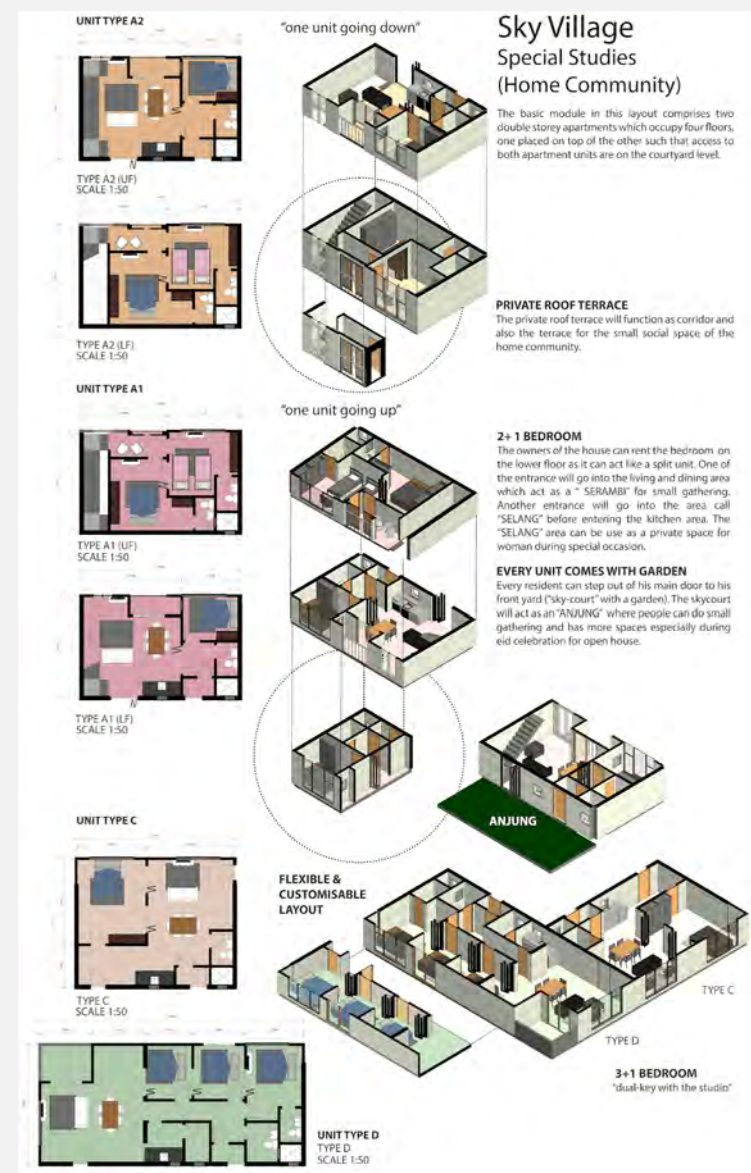


Figure 19: The special study of the home community at the Sky Village.

At level and block community, a cluster of six stories is set up. After that, the cluster is twisted for every six stories. Thus, each Sky Village has 12 stories based on the arrangement of the cluster. Each Sky Village has integrated the invisible space to generate programmes and provide shared spaces for the community which is the “Sky Bridge Corridor Garden”. The sky bridge corridor garden will be integrated into each of the stacked villages. Each of the stacked villages will highlight the cluster of individuals that come together as a community such as startup, sports and healthy, arts and crafts, and the garden and edible village cluster to foster the “**Kampung Spirit**” and generate social interaction as the community bump into each other at the sky bridge corridor garden and other spaces of community amenities. Lovers of plants, retirements, and other community planters can have the opportunity to pursue gardening during their free time at the garden and edible village cluster. In addition, the arts and crafts village cluster has provided space for the community creative area. The community can explore creative ideas by doing arts and crafts such as batik and wood crafts and get the vibe of living in the setting of a village. The arts and crafts like batik can be sold at the art and craft shop which is located at the sky podium. This exploration can give the community work experiences and profits. Furthermore, the sport and healthy village cluster can get the opportunity to explore the triple-volume of communal amenities such as the badminton court which is located at the 18th level. The triple volume space of community amenities can also function as a multipurpose room for special occasions such as the celebration of birthdays or weddings with a grand view of Kuala Lumpur’s city skyline.



Figure 20: The floor plan of level six and seven which integrated the architectural space of skycourt.

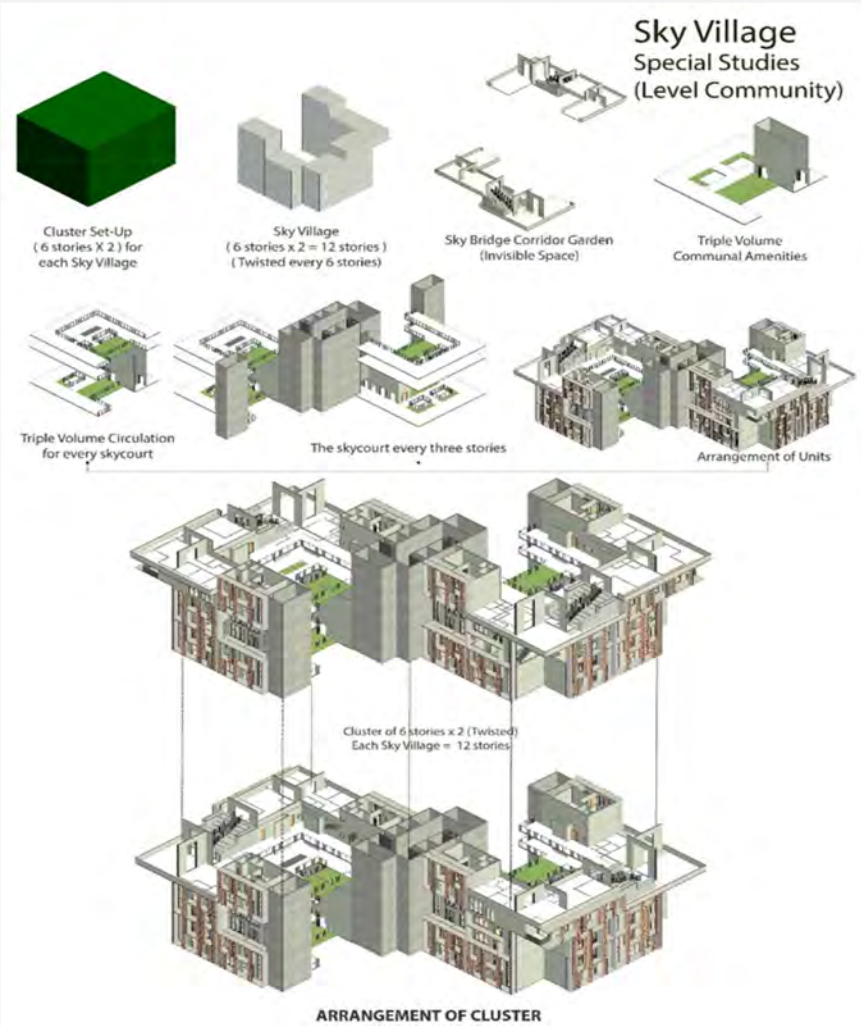


Figure 21: The diagram shows the cluster set-up of the Sky Village.



Figure 22: The floor plan of 18th level which is the sport and healthy village cluster. The triple volume of the sport amenities has been implemented in the building.

Sky Village also has integrated the community plaza, sky podium, rooftop skypark, sky bridge and community edible garden, and other appropriate community amenities for the whole building community. The community plaza can act as a central gathering area for residents to socialise, relax, or hold events. It is equipped with seating areas, playgrounds, gardens, and retail spaces such as cafes or convenience stores. The community edible gardens will function as a communal area where a number of people can grow and care for plants, fruits, vegetables, herbs, and flowers. These community edible garden can encourage local food production, sustainability, and social engagement. The community edible gardens can provide a gathering place for neighbours to socialise, collaborate, and strengthen community bonds. Furthermore, the sky podium which is located at Level 5 will function as a common area for the community and has a green, social, and recreational spaces. It is designed as a social hub to encourage interaction among residents or tenants in a communal setting. Last but not least, the sky bridge has connected the three towers of the Sky Village horizontally. It is designed as an elevated and open-air walkway that connects the three separate towers which is located above ground level. The sky bridge can function as a place for small gatherings and social spaces with the provision of seating areas and gardens. Lastly, the design of the building always reflects people's perspectives of the building for the first time. The façade of the Sky Village was inspired by the architectural design of a traditional Malay house which uses wood panels.



Figure 23: The façade of the Sky Village was inspired by the architectural design of traditional Malay house which is by using the wood louvers panel.

PERSPECTIVE VIEW



Figure 24: The exterior perspective view of the skycourt at the Sky Village.



Figure 25: The community can have more space during special occasion such as eid celebration or birthday's party for small gathering and social interaction at the skycourt.



Figure 26: The sky bridge corridor garden (invisible space), which acts as a community's playing and study area.



Figure 27: The food bazaar can be open at the community plaza which the community can sell or buy a diverse mix of traditional Malay food. The public can also access to this area to buy their favorite local foods.



Figure 28: The community edible garden will function as a communal area where a number of people can grow and care for plants, fruits, vegetables, herbs, and flowers. The plants can be used or sell at the community plaza or community edible garden.



Figure 29: The sky podium which is located at Level 5 will functions as a common area for the community and has a green, social, and recreational spaces such as basketball courts.

CONCLUSION

In conclusion, the study of the vertical communal amenities in urban social high rise residential building can provide significant positive impacts. The provision of communal amenities such as the skycourts, sky podium, rooftop sky park, community plaza, community gardens and others can improve residents' physical and mental well-being. It will improve the quality of life of the community. The study can give more understanding of the appropriate community amenities space that can help foster a sense of belonging and community spirit among diverse residents. It can encourage the social interaction, reducing feelings of isolation which is common in high-rise living. Affordable housing projects with amenities may help reduce social stigma attached to low- and middle-income housing and increase the economic value. This study will help policymakers to understand the needs of residents and integrate appropriate amenities into urban housing policies.

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08

WOODCARVING CATALYST HUB: PROPOSING AN ARCHITECTURAL DESIGN PROJECT FOR THE REVITALISATION OF THE MALAY WOODCRAFT HERITAGE

Zainal Abidin Mat Salleh and *Fadzidah Abdullah

Department of Architecture, Kulliyyah of Architecture and Environmental Design, IIUM

ABSTRACT

Woodcarving stands as one of Malaysia's oldest and most intricate traditional art forms, renowned for its elaborate motifs and deep-rooted cultural significance. Known as Malay woodcarving, this craft is characterised by meticulous floral, geometric, and calligraphic patterns. The Malay woodcarving is historically tied to the Malay archipelago, encompassing the present-day Malaysia, Indonesia and Thailand. Beyond its aesthetic appeal, woodcarving holds spiritual and cultural symbolism, with motifs often conveying specific meanings tied to the Malay identity. Traditionally adorning mosques, palaces, homes, and furniture, these carvings blend artistic expression with functional design, serving both practical and symbolic roles. However, modernisation and waning interest among younger generations threaten the survival of this heritage. In response, this research has the initiatives to explore architectural design potential of a place, for the revitalisation of Malay woodcarving, by establishing a Woodcarving Catalyst Hub in Kuala Terengganu, Malaysia. Designed as a collaborative space, the architectural design project aims to revitalise the craft by providing places for artisans, enthusiasts, and researchers to foster innovation, enhance skill preservation, and promote cultural exchange. Equipped with modern tools and workshops, the proposed architectural design offers training programmes to pass down traditional woodcarving techniques while encouraging contemporary adaptations. Additionally, the hub strengthens cultural tourism by showcasing local craftsmanship to global audiences and supports economic opportunities for artisans. Through partnerships with educational institutions and cultural organisations, the hub is hoped to drive research and development to align traditional practices with modern demands. By merging preservation with innovation, the Woodcarving Catalyst Hub aspires to sustain the relevance of this art form, ensuring its transmission to future generations while positioning Kuala Terengganu as a dynamic centre for Malay cultural heritage.

Keywords: Woodcarving, Malay Traditional Art, Heritage Craftsmanship, Heritage Catalyst, Cultural Heritage.

*Corresponding author: fadzidah@iium.edu.my

INTRODUCTION

Malay woodcarving, a cornerstone of Malaysia's cultural heritage, faces an existential threat. Globalisation and dwindling intergenerational interest have eroded the practice of this centuries-old craft, once central to architectural, spiritual, and communal identity. In response, this design research has the initiatives to design a place for revitalisation of Malay woodcarving, by establishing a Woodcarving Catalyst Hub in Kuala Terengganu, Malaysia. The establishment of the Woodcarving Catalyst Hub has the objectives to empower artisans through skill-sharing, attract younger generations via adaptive training programmes, and reposition woodcarving as a dynamic, economically viable practice.

The Woodcarving Catalyst Hub is proposed as an architectural solution to the crisis: a purpose-built space in Kuala Terengganu designed to revive and sustain Malay woodcraft through innovation, education, and community engagement. Combining workshops, exhibition areas, and collaborative zones, the hub integrates traditional craftsmanship with modern design principles. Merging preservation with innovation, the Woodcarving Catalyst Hub aspires to sustain the relevance of this art form. The project could ensure the transmission of the Malay heritage craft to future generations while positioning Kuala Terengganu as a dynamic centre for Malay cultural heritage.

DESIGN ISSUES

The Woodcarving Catalyst Hub responds to a critical juncture in Malaysia's cultural landscape, where the survival of Malay woodcarving, a craft steeped in heritage, is threatened by interconnected challenges of livelihood, education, and preservation. In term of livelihood, high demand for authentic woodcarving products clashes with a shrinking workforce. Artisans struggle to meet market needs due to labour shortages and time-intensive production processes, stifling economic growth in this craft sector. The hub addresses this by integrating streamlined workshop layouts and shared fabrication technologies, enabling artisans to scale production without compromising quality. Collaborative spaces will foster partnerships between craftsmen and designers, while a marketplace connects their work to local and global buyers, transforming woodcarving into a sustainable livelihood.

A lack of skilled labour stems from dwindling intergenerational knowledge transfer and limited training infrastructure. The hub combats this educational issue through apprenticeship programmes led by master carvers, paired with modern vocational training in design, entrepreneurship, and digital tools. The provision of flexible studios and open workshops will invite youth and visitors to hands-on engagement, demystifying the craft and nurturing a new generation of artisans.

As traditional woodcarving risks obsolescence, the hub acts as a living archive. Exhibition galleries and interactive installations will celebrate the craft's history, symbolism, and regional variations. By collaborating with the Ministry of Tourism, the project amplifies woodcarving role in cultural tourism, positioning Kuala Terengganu as a heritage destination. The Ministry's involvement ensures policy support, funding, and nationwide promotion, embedding woodcarving into Malaysia's cultural identity.

ARCHITECTURAL DESIGN VISION

The Woodcarving Catalyst Hub will have spatial design that merges traditional Malay architectural elements—such as ventilated façades inspired by floral motifs—with adaptive, modular spaces. Production zones, training studios, and public areas are woven into a cohesive ecosystem, fostering dialogue between artisans, learners, and tourists. Green technologies and locally sourced materials underscore a commitment to sustainability, mirroring the craft's harmony with nature.

Based on thorough design research, the hub is formulated to have these three (3) main spatial categorisations:

1. Livelihood cluster - to provide proper working spaces for wood carving production with new technology.
1. Education cluster- to provide authorised learning spaces for the training of youngsters, to learn and earn from wood carving industry.
1. Preservation Cluster - to propose architectural solution that promotes the woodcarving art revitalisation and assist in developing awareness towards preservation of cultural heritage.

Ultimately, the Woodcarving Catalyst Hub is more than a building—it is a catalyst for cultural continuity. By addressing systemic gaps in livelihood, education, and heritage stewardship, this architectural intervention reignites pride in Malay woodcraft, ensuring its relevance in a modern, globalised world. By bridging heritage and contemporary needs, this architectural project seeks not only to preserve a fading art form but to reimagine its role in Malaysia's cultural and creative future.

BACKGROUND RESEARCH

Malay Traditional Wood Carving

Malay traditional wood carving is an art form deeply rooted in Malay culture and heritage. It is not only aesthetically pleasing but also serves functional purposes, such as in the design of traditional Malay houses for filtering daylight (Denan et al., 2015). The craftsmanship and symbolism in Malay wood carvings reflect the cultural and belief values of the Malay people, and these art forms are considered essential to be preserved (Yusof et al., 2021). The motifs and designs of Malay wood carvings are influenced by Islamic principles and are associated with specific periods and the skills of the craftsmen (Yusof et al., 2022). Furthermore, the wood carvings in traditional Malay architecture, such as at the Istana Lama Seri Menanti (*Seri Menanti Old Palace*), exemplify the architectural influences and expertise of Malay carvers (Abidin et al., 2017).

The wood carvings in traditional Malay architecture are crucial in deciphering Malaysia's architectural identity, contributing to the sustainability and preservation of architectural heritage (Azmin et al., 2021). The architectural uniqueness of Malay buildings, including specific façade geometries on walls, roofs, and motifs, can be effectively captured through the fusion of photogrammetry and laser scanning, showcasing the importance of wood carving in preserving architectural heritage (Ahmad et al., 2025).

Additionally, the visual composition of Malay wood carvings in vernacular houses of Peninsular Malaysia serves both functional and aesthetic purposes, defining the character of regional architecture (Said, et al., 2008). The use of first-class timber, such as Belian, in the building structures of Malay traditional dwellings further emphasises the importance of wood carving in ensuring the structural integrity and longevity of the architecture (Zain & Putro, 2021). Figure 1 shows an intricate carved wood panel with the motive of 'Bunga Mas'.



Figure 1: A Carved wood panel with main flower with the motive of 'Bunga Mas, designed by Mohd Zamri Jusoh

Type of Wood Used for Wood Carving

The types of wood used for Malay traditional wood carving are diverse and carefully selected to ensure the quality and suitability for the intended purpose. The selection of wood for traditional Malay wood carving is influenced by various factors, including the durability properties, cultural significance, and sustainability. Native wood species such as *Belian*, *Cengal*, and *Merbau* are commonly used in Malay traditional wood carving due to their durability, resistance to decay, and suitability for intricate carving. These woods are known for their strength and are often used in the construction of traditional Malay houses, reflecting the cultural value placed on the durability and longevity of the wood. Figure 2 shows an intricate carved wood panel with the motive of *Bunga Kerawang* (cutwork flower).



Figure 2: A Carved wood panel with 'Bunga Kerawang' motive, designed by Mohd Fadlullah bin Awang

The Usage of Wood Carving on Building

The incorporation of wood carving in traditional Malay building construction is also associated with environmental considerations. For instance, wood carving is ingeniously used as a form of daylight filtering device, addressing issues such as glare and heat from sunlight, thereby contributing to the sustainable and passive thermal design of the buildings (Azmin et al., 2021). Most of the times, wood carving panels also have openings to allow cross ventilation, to ensure dwellers of the buildings to have optimum comfort level. These consideration are aligned with the principles of sustainability and ecological responsiveness, to minimise the buildings' impact on the surrounding environment. Figure 3 shows images of a Grave-marker, a hilt of *Tajung kris* (and a top-window ventilation panel, made with wood carving.



Figure 3: A Grave-marker, a hilt of Tajung Kris and a top-window ventilation panel (Source: <https://core.ac.uk/download/pdf/11777532.pdf>)

SITE SELECTION

Site Location

The chosen site for the proposed Woodcraft Catalyst Hub is located at Kuala Terengganu, Terengganu, Malaysia. Kuala Terengganu is a city strategically located on the eastern coast of Peninsular Malaysia, facing the South China Sea. As the capital of Terengganu state, it serves as a gateway to the rich cultural and natural attractions of the region. The city is well-connected by road, with the East Coast Expressway linking it to major cities like Kuala Lumpur. Sultan Mahmud Airport, located just 15km from the city centre, provides regular domestic flights and occasional international flights, making it accessible to travellers and tourists. The site's coastal position not only offers scenic beaches and waterfront views but also positions it as a central point for tourists and the local people to explore the surrounding traditional Malay villages, islands, and natural parks. This geographical setting enhances the site's appeal as a heritage tourism destination, blending urban amenities with cultural and natural experiences.

At the macro level, the site is located at Kampung Tiong in Kuala Terengganu, Terengganu. It is strategically situated in the main commercial zone of Kuala Terengganu and surrounded by heritage precincts. The site has a size of 5 acres, with the plot ratio of 1: 6. Figure 4 shows an aerial view of the site.



Figure 4: Aerial view of the site.

Site Heritage Value

Kuala Terengganu is an area of historical interest which has been established as an eminent spot for heritage tourism. With its rich cultural heritage, historical landmarks and natural beauty, the city provides a realistic cultural immersion for heritage tourism. Therefore, the scenario offers great opportunities for the Terengganu's authority to promote wood carving industry and to generate the state's economic endeavors.

Currently, there are as many as 500 wood carving entrepreneurs throughout Malaysia. The state of Terengganu also has the highest number of wood carvers, compared to other states of Malaysia, such as Kedah, Kelantan, and Pahang.

Site Neighbourhood Context

The neighbourhood context of Kuala Terengganu has both heritage and culture that are intricately intertwined, reflecting a blend of traditional Malay identity and multicultural historical significance. Building landmarks such as the iconic Crystal Mosque and the historic Istana Maziah showcase the fusion of Islamic and Malay architectural styles. Meanwhile, *Kampung Cina* (Chinatown) boasts well-preserved traditional wooden houses, temples, and vibrant street art, highlighting the historical multiculturalism of the city.

In Kuala Terengganu city centre, especially at the area of *Pasar Payang* (Payang Market), residents actively engage in cultural practices, such as producing traditional batik clothes and woodcarving craft. The market bustles with activity, offering a variety of local crafts, textiles, and delicacies that provide a sensory immersion into Terengganu's cultural heritage. Additionally, *Pulau Warisan* (Heritage Island) serves as a cultural hub, hosting events and exhibitions that further promote and preserve the region's rich heritage, making Kuala Terengganu's neighbourhoods as a vibrant centre, where history and tradition thrive. Figure 5 and 6 show the bird eye views of the site and its neighbourhood context.



Figure 5: The site and its neighbourhood context, looking from the east side.



Figure 6: The site and its neighbourhood context, looking from the north side.

DESIGN IDEATION

The design brief for woodcraft catalyst hub in Kuala Terengganu. seeks to establish a dynamic centre for the preservation, innovation, and promotion of traditional Malay woodcarving. This state-of-the-art facility will serve as a nexus for master craftsmen, artisans, researchers, and enthusiasts to collaborate, innovate, and educate. The design must prioritise functionality and accessibility, providing dedicated spaces for workshops, training programmes, and exhibitions that showcase the intricate techniques and cultural significance of Malay woodcarving. Incorporating sustainable practices and utilising local materials accentuate the hub's commitment to environmental stewardship and community engagement. Furthermore, the hub should be amalgamated with modern technologies such as digital archives and interactive displays to enhance visitor experiences and facilitate global outreach. By fostering creativity, preserving heritage, and nurturing talent, the Woodcraft Catalyst Hub will not only safeguard Malaysia's cultural legacy but also position Kuala Terengganu as a premier destination for heritage tourism and artistic innovation.

Design Concept

Bunga Bakawali (Bakawali Flower) is chosen as the design concept of this project because it represents creativity, resilience, and growth. Traditionally, Bunga Bakawali has been used as one of the traditional Malay wood carving motif in Terengganu, as the flower symbolises the identity of Terengganu wood carving. The flower implies that architecture could be built close to nature, with stunning aesthetic value and well functioning facilities.

The *Bunga Bakawali* concept is aligned with architectural principles of dynamism, radial organisation, and hierarchy. Devising these vibrant design principles would govern the design exploration into having organic shapes and forms in the building's design. This so-called biomimicry design would express the sense of growth and enthusiasm in the building design. Architecturally, the concept of *Bunga Bakawali* incorporates earth colours for the building, which will generate the sense of calming for the dwellers. Based on Architectural Perspective, *Bunga Bakawali* could be elucidated as the followings:

Symbolism and Cultural Identity: - In Malay tradition, *Bunga Bakawali* represents grace, tenacity, and the transient aspect of existence. A sense of cultural identity and pride can be evoked by incorporating this motif into the hub's architecture, honouring Malaysia's rich tradition of woodcarving and craftsmanship. A visually metaphorical narration that appeals to visitors can be created by incorporating the flower's symbolism into architectural features, such as façades, entrances, or interior spaces. Figure 7 shows illustration of *Bunga Bakawali*.



Figure 7: An illustration of Bunga Bakawali (Author)

Aesthetic Integration: - *Bunga Bakawali* has the ability to affect the hub's overall aesthetic as a design motif. Building facades, interior finishes, and landscaping elements can all benefit from the use of architectural forms and patterns that are inspired by the flower's delicate petals, graceful curves, and twisting vines. In addition to improving the hub's aesthetic appeal, this integration creates a unified design language that captures the organic beauty of the natural world. Figure 8 shows the intricate design of Bunga Bakawali, used for building finishes.



Figure 8: An intricate design of building finishes.
(Source: <https://www.threads.com/@zarirhabdullah/post/DDWckptvXU4>)

Functional Interpretation: - Beyond aesthetics, the hub's design's functional elements can be influenced by the *Bunga Bakawali* concept. For example, the structure and growth patterns of the flower can stimulate creative thinking in the areas of sustainability, circulation, and spatial planning. To emulate the adaptable characteristics of the flower, features like natural lighting schemes, ventilation systems, and green infrastructure can be incorporated, encouraging a peaceful coexistence of the built environment and the natural world. Figure 9 shows woodcarving element is used for the railing of staircase.



Figure 9: An intricate design of a woodcarving element, which is used for the railing of staircase
(Source: https://www.instagram.com/p/C1DsK5OSVNI/?img_index=1)

DESIGN DEVELOPMENT

Islamic values

For any Muslim's architectural design, the inception of Islamic values are essential to ensure architects and designers to comply with shariah compliance design. Islamic values concerning wood carving emphasises on the responsibility of human as the stewards of the earth. Ethical conduct must be observed in utilising natural resources, guided by Quranic principles and Hadith. Quranic verses such as Surah Al-Baqarah (Al Quran 2:164) highlights the creation's signs and the importance of using resources wisely, while Surah Al-A'raf (Al Quran 7:31) cautions humankind against excessiveness in consumption. Prophet Muhammad (peace be upon him) emphasised the virtue of planting trees and benefiting others, illustrating the concept of Sadaqah (charitable act) through environmental stewardship (Sahih Muslim, 1559). These Islamic teachings encourage woodcarvers to source materials sustainably, minimise waste, and uphold integrity in craftsmanship, reflecting a reverence for nature and responsible use of its blessings in accordance with Islamic values.

Design Exploration

Only after divine guidance is sourced, the designer could explore the creation of architectural design enthusiastically, whilst observing factors of constraints. Figures 10 to 17 show images of design explorations and development, manifolded in challenging integration between design constraints, sovereignty and forms.

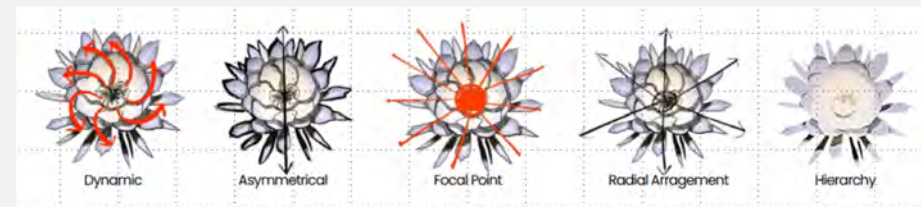


Figure 10: Exploration of architectural forms, based on the concept of Bunga Bakawali



Figure 11: Exploration of architectural forms using 2 dimensional sketches.



Figure 12: Parts of Exploration on Site Zoning.



Figure 15: Form Transformation during Design Process, shown in 3-Dimensional forms.

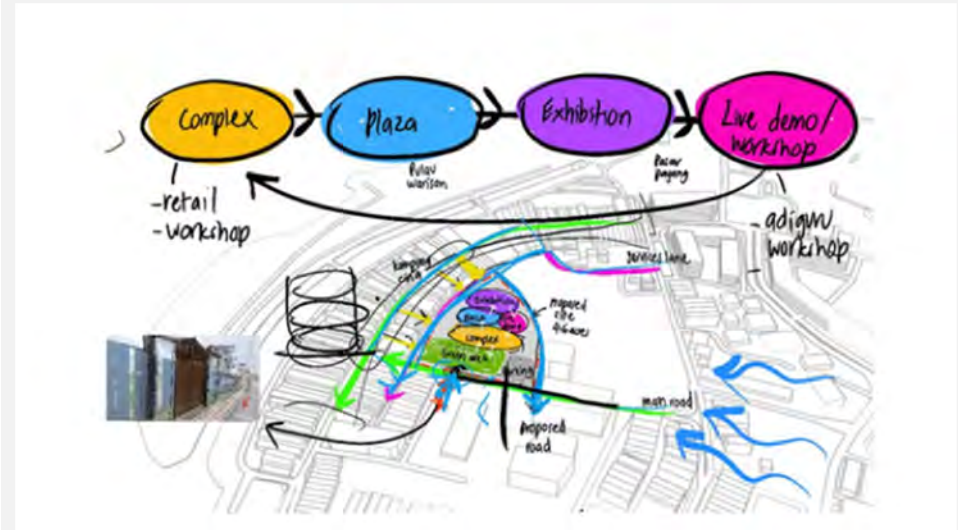


Figure 13: Feasibility Analysis of the Neighbourhood's Context.

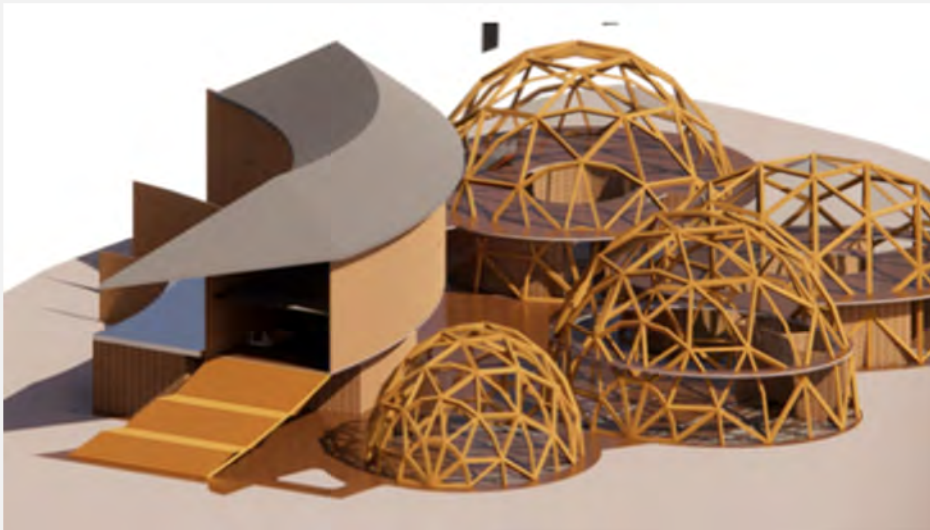


Figure 16: Structural Exploration of the Design Scheme

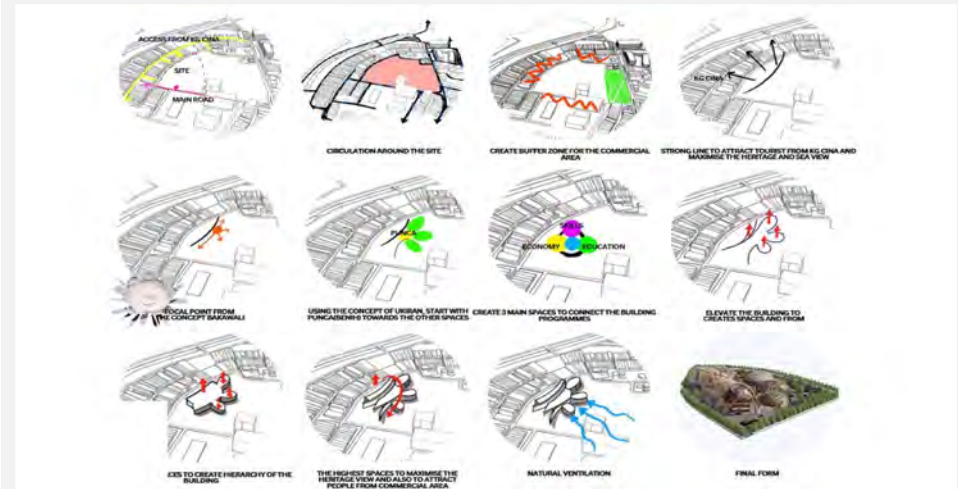


Figure 14: Process of Problem Solving to integrate Design Constraints, Sovereignty and forms.



Figure 17: Final Design Scheme, shown in 3-dimensional Drawing

FINAL DESIGN SCHEME



Figure 18: Final Design Scheme, shown in 3-dimensional Physical Model



Figure 19: The ground floor plan

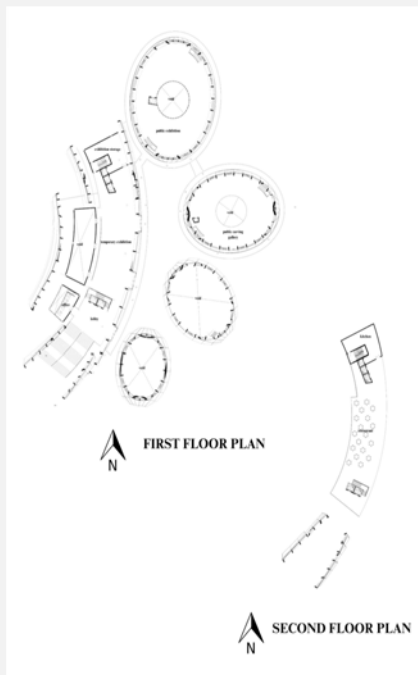


Figure 20: the first-floor plan and second floor plan

Thorough research and intensive design exploration have eventually produced final design scheme that worth to be exhibit to the authority of Terengganu State, and to the general public. Figures 18 to 26 show images of the final design scheme of the Woodcarving Hub.

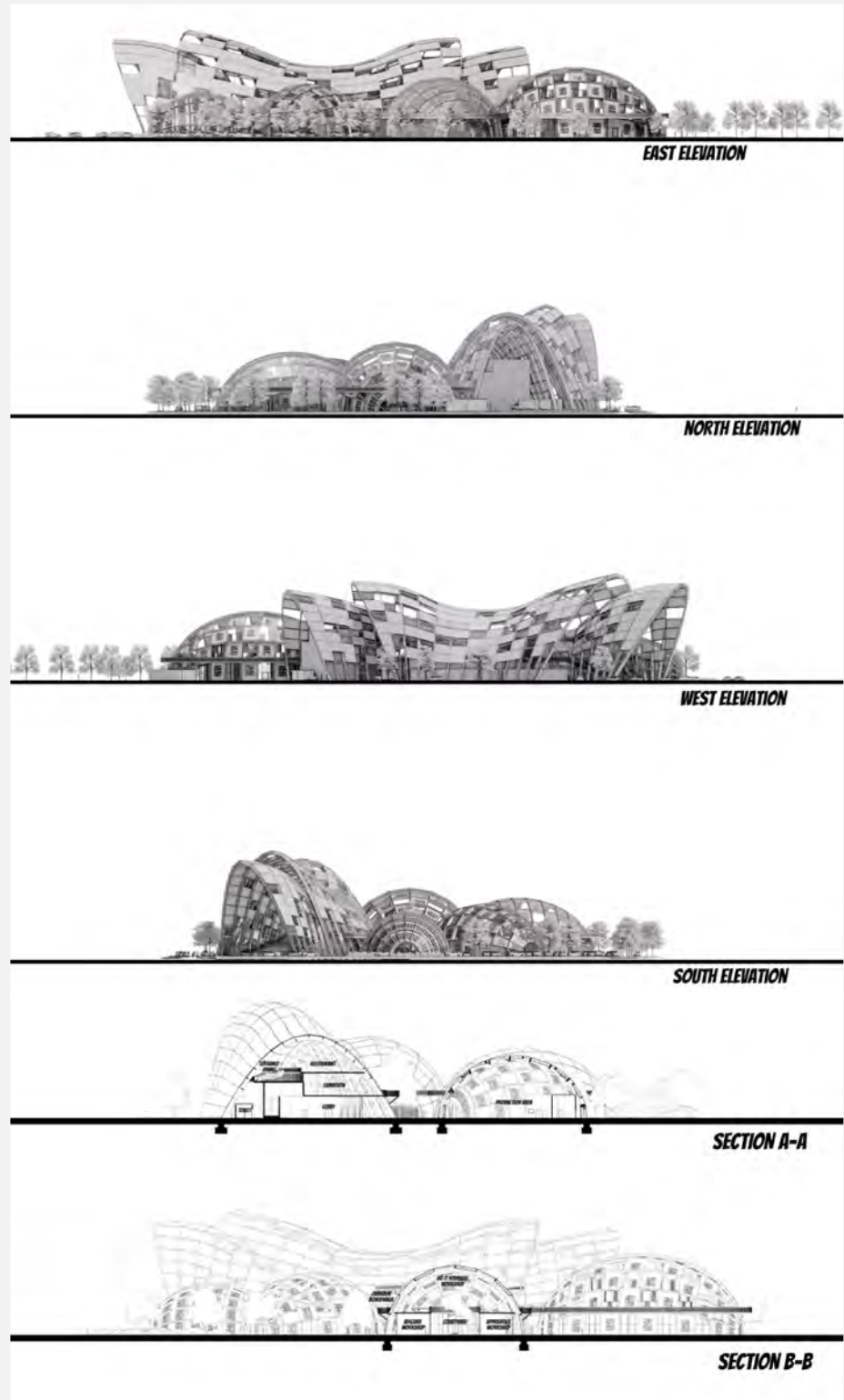


Figure 21: shown the elevations and sections of Woodcraft Catalyst Hub



Figure 22: A view of the outdoor Amphitheatre of the Woodcarving Catalyst Hub.



Figure 23: A view of the open plaza in between the three capsules and the main building.



Figure 24: A view of the main entrance of the Woodcarving Catalyst Hub



Figure 25: An interior view of a classroom for education section



Figure 26: An interior view of a workshop for Woodcarving production

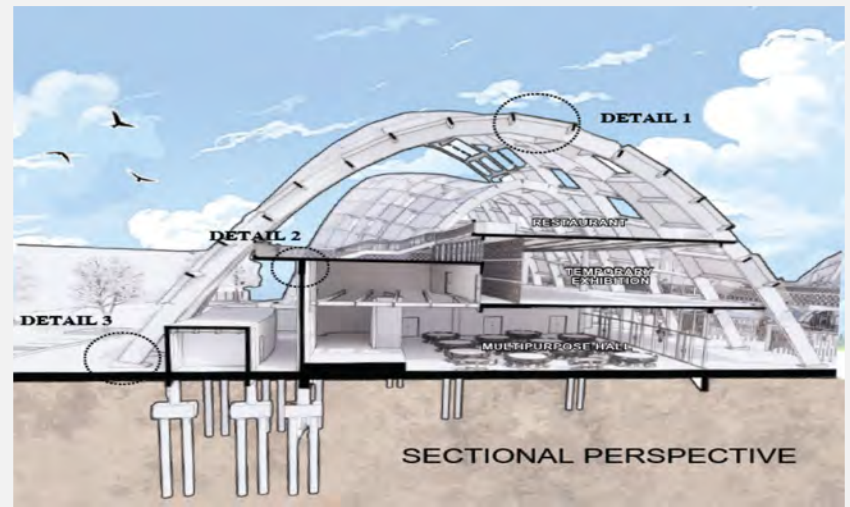


Figure 27: An illustration of the structural system of the main building

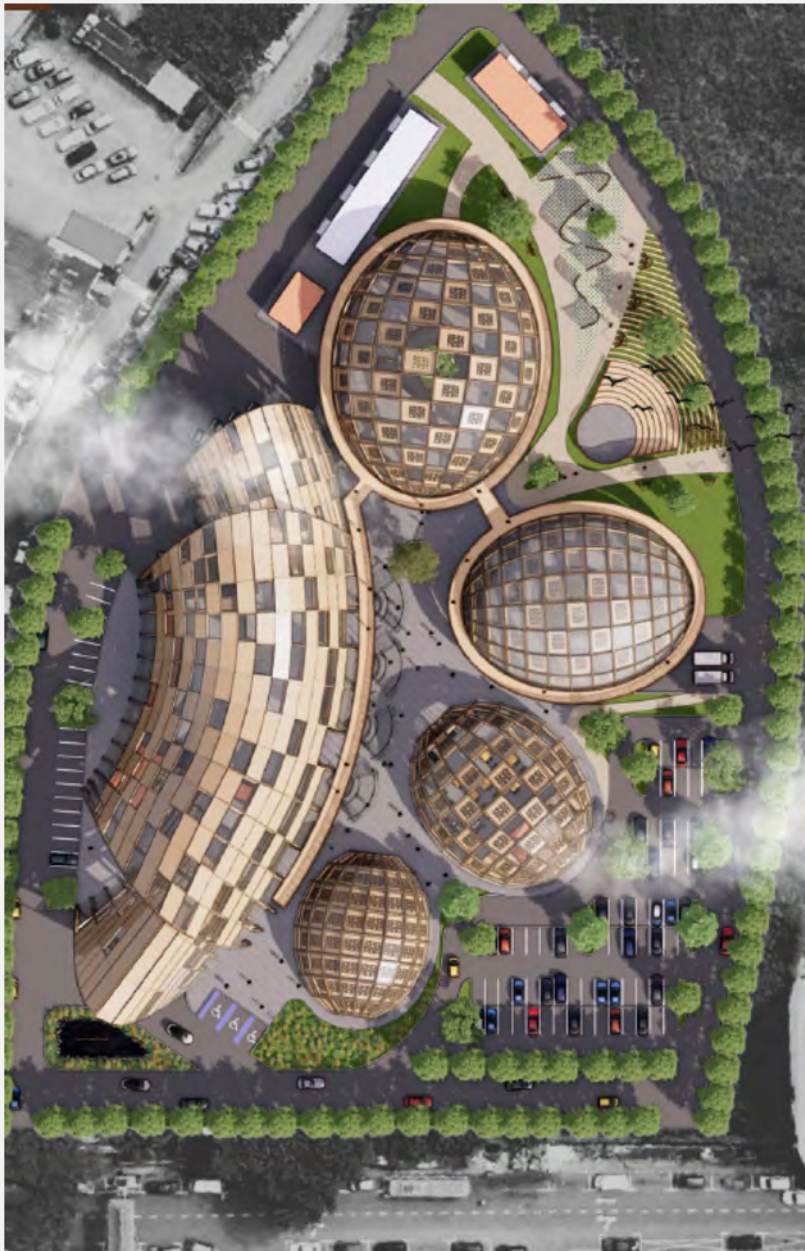


Figure 28: An aerial view of the whole complex of the Woodcarving Catalyst Hub

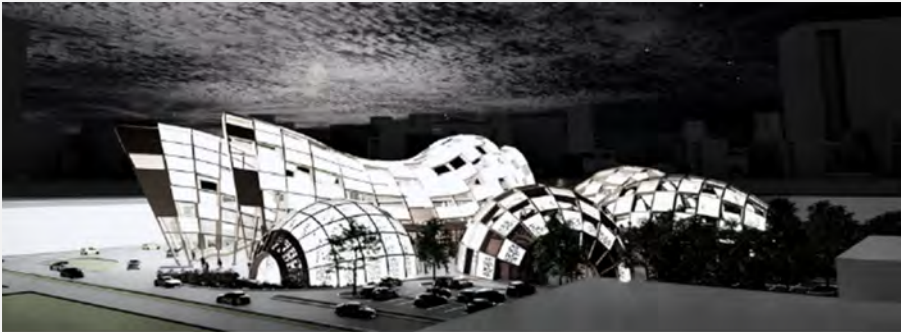


Figure 29: An illustration of the complex at night



Figure 30: An illustration of the main entrance of the complex at night



Figure 31: A bird eye view of the open plaza in between buildings

CONCLUSION

The proposed design of the Woodcraft Catalyst Hub in Kuala Terengganu represents a pivotal initiative, aimed at preserving and revitalising the traditional art of woodcraft. This architectural design endeavour has explored the multifaceted dimensions of designing a facility that responds to the crucial need to sustain cultural heritage, while promoting sustainable practices and modern innovation. Through a detailed analysis of sustainable building materials, advanced construction techniques, and the integration of renewable energy systems, this project not only honors the traditional craftsmanship of woodcarving but also sets a precedent for environmentally responsible design. The use of locally sourced and recycled wood products, coupled with modular construction methods, ensures that the hub embodies the principles of sustainability and resource efficiency.

Moreover, the incorporation of interactive displays, educational workshops, and collaborative spaces within the hub, fosters an environment of learning and cultural exchange. By engaging the community and providing a platform for artisans to showcase their work, the Woodcraft Catalyst Hub serves as a vibrant cultural centre that bridges the gap between tradition and modernity. The strategic location of the hub in Kuala Terengganu, a region rich in woodcarving history, further enhances its significance. The Woodcarving Catalyst Hub acts as an inspiration for preserving woodcraft traditions and stimulates local economic growth by attracting tourists and promoting local craftsmanship. Indeed, the Woodcraft Catalyst Hub is more than just a building; it is a symbol of cultural resilience and innovation. It stands as a testament to the enduring legacy of woodcarving and the potential of sustainable design to create spaces that honor the past while embracing the future. This project underscores the importance of such initiatives in ensuring that traditional arts continue to thrive in a rapidly changing world, providing inspiration for similar projects globally.

ACKNOWLEDGEMENT

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