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SARAWAK DESIGN INCUBATION CENTRE: SPURRING SARAWAK TIMBER ECONOMIC GROWTH THROUGH INNOVATION AND EMPOWERMENT

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ABSTRACT

The study explores the application of Sarawakian imprints in contemporary architecture, focusing on timber products that reflect this heritage. The decline of Sarawak's timber industry necessitates strategies to strengthen local utilisation. Therefore, the implementation of a design incubation centre is essential to support timber craft talents and preserve Sarawakian timber heritage. The proposed Sarawak Design Incubation Centre aims to serve as a venue for developing design potential and showcasing contemporary timber construction. The design incorporates a main building, academic building, and workshop, interconnected by a plaza featuring a living gallery. This approach not only facilitates education in timber design but also fosters innovation and entrepreneurship within the industry. Through the unique design approach, this paper illustrates the significance of creating a dedicated space to revitalise the timber economy and promote cultural heritage, ensuring that the legacy of Sarawak's traditional craftsmanship is preserved for future generations.

Keywords: Sarawakian imprints, Timber building, Vernacular architecture
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INTRODUCTION

Timber is a type of wood used as a structural material in construction, as well as for carpentry and other engineering purposes (Bazmi & Dogne, 2016). In Malaysia, timber is one of the natural resources that has been utilised the longest in the construction industry. It is an especially valuable building material due to its various features, such as low heat conductivity, relatively high strength, low bulk density, and, most importantly, the availability of raw materials, especially in Sarawak (Batrisyia et al., 2024).

Sarawak, Malaysia's largest state, has 70 per cent of its territory covered in forest. The forests are vast and home to a diverse range of tree species. The history of Sarawak's timber industry and forest regulation policy can be divided into three phases, corresponding to the form of political control, economic globalisation, and the rate of timber exploitation. These phases are (1) the Brooke era and the Borneo Company's timber monopoly, (2) the colonial period and the post-war entry of other foreign timber concessionaires, and (3) the post-independence period and the integration of forestry into national development strategies. Over the last seventy years, ownership of the forest estate has shifted from monopoly to oligopoly and back to (state) monopolistic control (Kaur, 1998).

Sarawak's forestry and forest industry play an important role in the state's socio-economic growth. Forestry has been a major contributor to Sarawak's economy. As a naturally renewable resource, the state's forests will continue to generate income and foreign exchange earnings for the people in the coming years. Sarawak's forest-based industries stimulate economic activity by offering additional income and job opportunities through downstream processing and the production of value-added products for domestic and global markets (Ismail & Hassan Zaki, 2010). The contribution of the timber industries has varied over time as a result of forest policies, the growth of timber trade and wood-based industries, and the licensing systems in place in the state. Sarawak's incumbent premier, Tan Sri Datuk Patinggi Abang Haji Abdul Rahman Zohari bin Tun Abang Haji Openg, also known as Abang Johari, stated that the Sarawak government is aware of the state's depleting natural forest resources. As a result, the government has taken necessary steps to enable the state's timber industry to use design for economic growth, which led to the introduction of the Pool of Young Designers (POYOD) programme (Pim, 2019).

The Pool of Young Designers (POYOD) is a large-scale, ambitious creative programme that explores this rich oeuvre. To ensure the successful implementation of the Timber Industry Transformation Plan, various perspectives and potentials need to be considered, one of which is the development of creative skills resources. This new pool of talent emphasises the importance of the domestic environment, ecosystem, individual taste, manufacturing skills, and local beauty in developing the new furniture industry in Sarawak. At the same time, the POYOD programme encourages the use of local resources, emphasising affordability and underscoring Sarawak's unique appreciation of truthfulness in natural materials. The collaboration with local industries and international partners illustrates a greater potential for experimentation with new market opportunities (Sarawak Timber Industry Development Corporation, 2019).

Sarawak is endowed with an abundance of tropical woods, with more than 70% of its 124,450 square kilometres remaining forested. These forests provide a natural habitat for tens of thousands of plant and animal species. Timber is one of the natural resources that is contributing to Sarawak's economic growth (Ismail & Hassan Zaki, 2010). Therefore, timber has long been associated with Sarawak. Evidence of this can be seen in traditional Sarawakian products, which were made from timber—ranging from ornamentations and buildings to parts of the traditional attire of some ethnic groups, all sourced from forest resources. As a result, timber itself reflects Sarawakian imprints. However, in modern times, the use of timber has been replaced by other materials, especially in building construction (Batrisyia et al., 2024).

The purpose of this study is to explore the issues surrounding the use of timber as a building material. Since building materials in Sarawak today have been replaced by alternatives, there must be underlying issues causing these changes. This study also aims to investigate how timber can be utilized as a building material in both vernacular and modern architecture in Sarawak.

DESIGN ISSUES

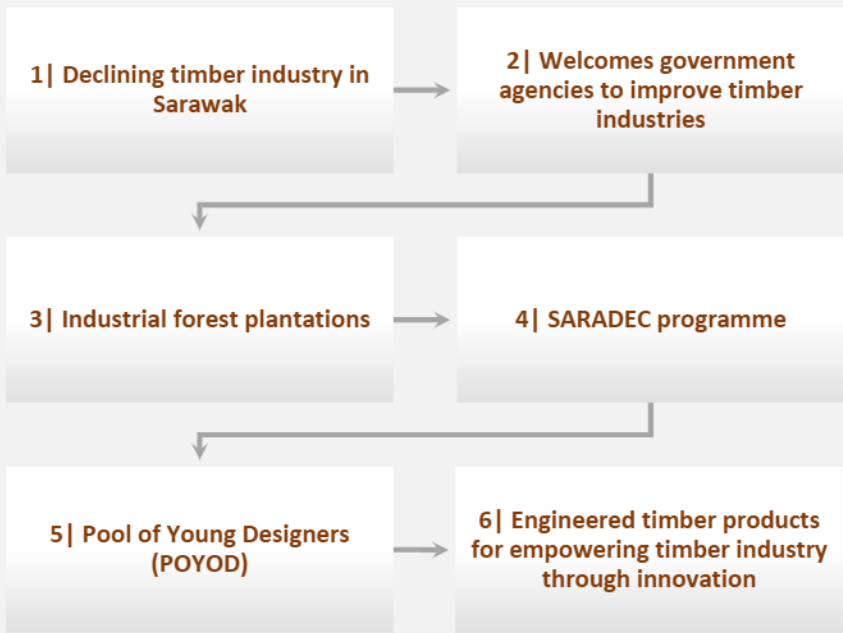


Figure 1: Flow of design issues

The decline of Sarawak's timber industry prompted the government to involve agencies in developing industrial forest plantations as a long-term strategy for sourcing raw materials. Despite the availability of timber, local utilisation is essential for industry growth. To address this, the Sarawak Timber Industry Development Corporation (STIDC) is establishing the Sarawak Design Centre (SARADEC) to promote design-driven economic growth and nurture young furniture design talents in Sarawak.

Additionally, STIDC initiated the Pool of Young Designers (POYOD) with Indonesia's Institute Teknologi Bandung (ITB) to cultivate designers for the timber sector. Strengthening partnerships with educational institutions and industry stakeholders is key to creating the Sarawak Design Incubation Centre.

PROBLEM STATEMENT

There is a need for the implementation of strategies that strengthen the local timber industry through the development of a design incubation centre, which will support timber craft talents and serve as a living manifesto of Sarawakian timber heritage through the architectural use of timber as a building material.

Table 1: Formulation of design approach to address the issue.

ISSUES	CAUSES	EFFECTS	APPROACH
The timber industries in Sarawak declining	Less income by exporting raw timber. Quality of new timber declining.	Timber industries which once were known as the major contributor to Sarawak's economy were declining	Proposing new timber products that can be produced by using new timber technology
Fresh graduates have less opportunity to develop potential talents in promoting Sarawak design identity	Less knowledge in starting business in design industry. No platform to promote Sarawak design identity	Young designers forget the arts and culture of Sarawak.	Proposing a platform that can train the stakeholder, graduates and entrepreneur to develop potential talents in design and to spur timber industry in Sarawak.



Figure 2: 4W and 1H framework for Sarawak Design Incubation Centre

METHODOLOGY

The research for the Sarawak Design Incubation Centre is structured around two types of data: primary and secondary. The primary data is collected through expert interviews and observations, while the secondary data is gathered from articles, research journals, and newspapers to ensure accurate results. This combined approach supports the aim of designing the Sarawak Design Incubation Centre as an institutional building that reflects the identity of Sarawak.

TIMBER AS A BUILDING MATERIAL

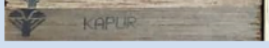
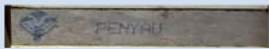
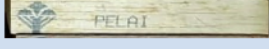
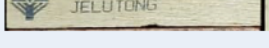
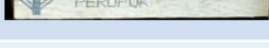
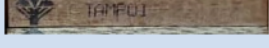
Timber has been utilised for a variety of reasons since ancient times. Whether in Egyptian, Mesopotamian, or Harappan civilizations, the uses for timber were established early on. Even today, it remains one of the most important construction materials. There is a common misconception regarding timber; many people believe that any type of wood qualifies as timber (Malaysian Timber Council, 2024). However, wood encompasses all types, including burning wood, structural wood, and furniture wood, while timber specifically refers to wood suitable for construction purposes as a structural material. Thus, it can be concluded that timber includes all kinds of wood, whereas wood does not encompass all sorts of timber. To distinguish timber from wood or trees, various features must be considered. For instance, the diameter of tree trunks should not be less than 600 mm in girth. It should also be mechanically workable and possess low heat conductivity (Bazmi & Dogne, 2016). It is well known that wood has many uses, making it a primary building material (Hj. Abdul Hamid, 1986). Timber has been one of the most important building materials in the construction industry from the past to the present. The construction of wooden houses was widespread before the introduction of other building materials such as bricks, cement, and steel. However, as construction technology has advanced, the prevalence of wooden houses has decreased (Hamzah, 2000).

TYPES OF TIMBER IN SARAWAK

Sarawak is located between the first and fifth northern parallels and the 109th and 115th eastern longitude parallels. The climate is warm, with temperatures ranging from 66 to 100 degrees Fahrenheit and an average shade temperature of 72 to 92 degrees Fahrenheit at sea level. The capital, Kuching, experiences an average annual rainfall of 160 inches, with a range of 120 to 220 inches. From November through March, a pronounced monsoon occurs, causing monthly rainfall to commonly range between 18 and 20 inches (Mead, 1925). The differing locations in terms of latitude and longitude between Sarawak and Peninsular Malaysia result in distinct forest resources.

Sarawak’s forests are evergreen and can be loosely categorised as littoral and inland forests. The former can be further divided into dry forests and mangrove wetlands. In particular, the deltas of the Rejang and Sarawak rivers are heavily forested with mangroves (Mead, 1925).

Table 2: List of selected famous timber species in Sarawak.

Species Number	Family	Botanical Name	Local Name	Example
1	Dipterocarpaceae	Anisoptera	Mersawa	
2	Dipterocarpaceae	Dipterocarpus	Keruing	
3	Dipterocarpaceae	Dryobalanops	Kapur	
4	Dipterocarpaceae	Shorea pluricostata	Selangan Batu	
5	Dipterocarpaceae	Shorea	Alan	
6	Dipterocarpaceae	Shorea Carapae	Meranti Merah	
7	Dipterocarpaceae	Upuna borneensis	Penyau	
8	Anacardiaceae	Parishia	Upi	
9	Apocynaceae	Alstonia	Pelai	
10	Apocynaceae	Dyera	Jelutong	
11	Burseraceae	Canarium apertum	Seladah	
12	Celastraceae	Kokoona reflexa	Bajan	
13	Celastraceae	Lophopetalum	Perupok	
14	Ebenaceae	Diospyros pseudomalabaria	Kayu Malam	
15	Euphorbiaceae	Baccaurea polyreura	Tampoi	
16	Euphorbiaceae	Elaterospermum tapos	Perah	
17	Fagaceae	Lithocarpus cantleyanus	Empenit	

CASE AND PRECEDENT STUDIES

Sarawak, Malaysia’s largest state, is home to 27 ethnic groups. Each of the 45 dialect groups has its own set of stories, beliefs, traditions, and cultures. Different tribes, such as the Kayan, Kenyah, Lun Bawang, and Kelabit, comprise the Orang Ulu, or ‘people from upriver.’ Each ethnic group has its own style of architecture. The only similarity in this regard is the material used, which is timber. This illustrates the significance of timber in shaping the built environment of Sarawak from ancient times. Similarly, adopting timber in its newer forms, such as composite timber products, glulam, cross-laminated timber, and structural composite lumber, in the construction industry of Sarawak will open up new avenues for promoting and patronising the timber industry to ensure a sustainable built environment.

Table 3: Sarawak vernacular architecture analysis.



RUMAH BARUK



RUMAH PANJANG



RUMAH MELANAU



RUMAH MELAYU



Table 4: Sarawak vernacular architecture synthesis.

	RUMAH BARUK	RUMAH PANJANG	RUMAH MELANAU	RUMAH MELAYU
EXTERIOR PERSPECTIVE				
FLOOR PLAN				
WALL				
ROOF				
FLOOR				
WINDOW				
DOOR				
SYNTHESIS				
MATERIALS		BUILDING ELEMENTS		LAYOUT
 Glulam - Heavy constructions: structures, pillars, floors, and walls Composite bamboo - Light constructions: Flooring, roofing designing, scaffolding and furniture		 Roof Exposed structure Door & Window Carve Sarawakian patterns as finishes showing the identity		 RUMAH MELANAU RUMAH MELAYU
Since it took so many years for a tree to grow to commercial sizes, new techniques should be more encouraged in Sarawak such as glulam and composite bamboo.		 Wall Carve timber openings as ventilations and natural lighting		 RUMAH BARUK RUMAH PANJANG
				Every layout can be applied in Sarawak Design Incubation Centre by implementing every layout with the nearest and the most suitable functions.

SITE LOCATION

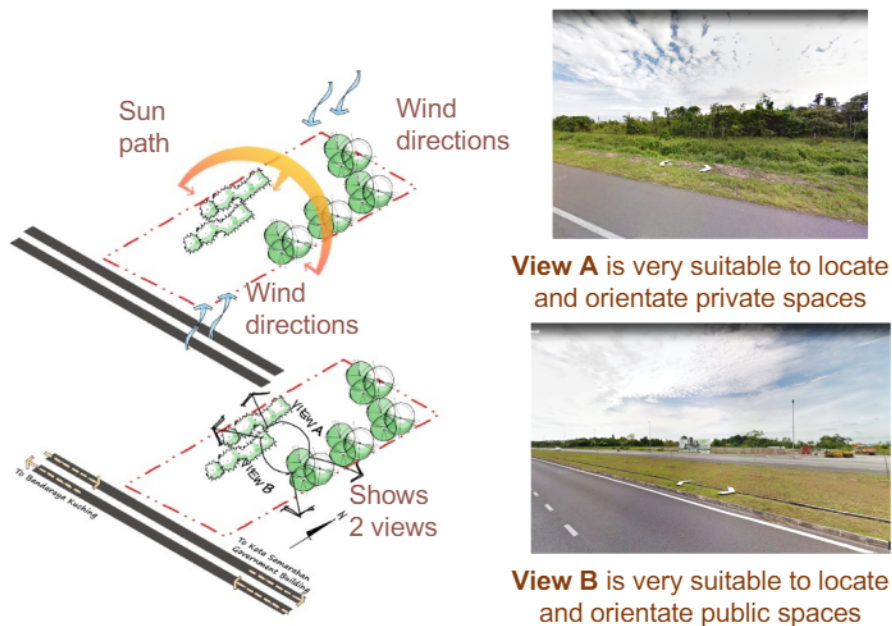
The capital, Kota Samarahan, is located about 30 km from Kuching. The town is an educational hub and is officially known as the Town of Knowledge. There are two full-fledged universities: Universiti Malaysia Sarawak (UNIMAS) and Mara University of Technology (UITM), as well as a teachers’ training centre, an industrial training centre, and the Sarawak Tropical Research Institute.

Kota Samarahan boasts booming commercial centres with malls such as The Summer Mall and AIMA Mall, featuring numerous restaurants and fast-food outlets catering to the increasing population. The selection of the site in Kota Samarahan will enable the proposed design incubation centre to be closely affiliated with surrounding institutional settings and act as a catalyst for the further growth of the town while maintaining the Sarawakian identity.



Figure 3: Site selection.

SITE ANALYSIS AND SYNTHESIS



View A is very suitable to locate and orientate private spaces

View B is very suitable to locate and orientate public spaces

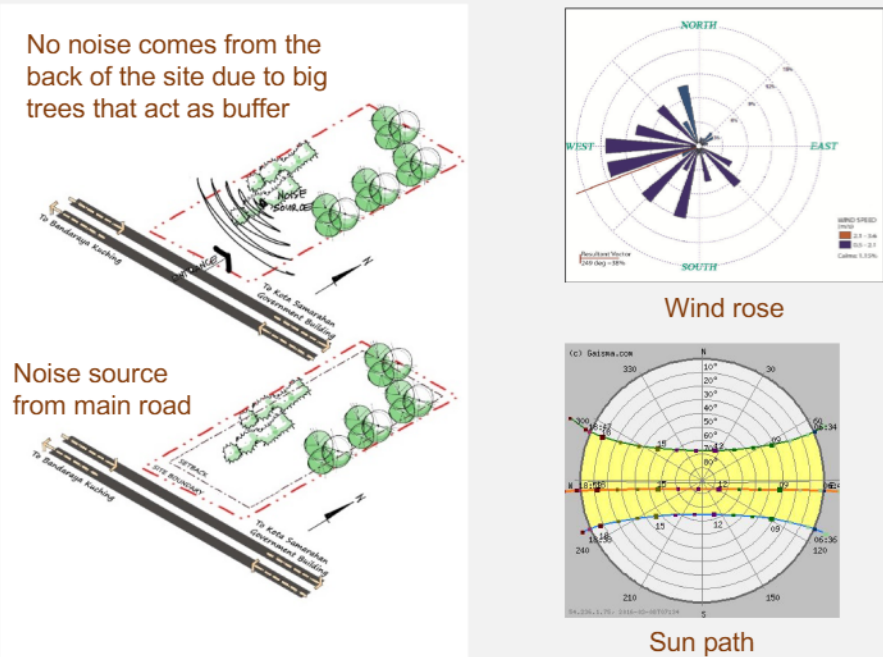


Figure 4: Site analysis and synthesis

DESIGN BRIEF

The proposed Sarawak Design Incubation Centre is envisioned as a venue and platform to develop potential talents in design. The building itself is intended to be a living showcase of contemporary timber construction, contributing to the revitalisation of the traditional timber industry in Sarawak.



Figure 5: Design brief

BUILDING PROGRAMME

Table 5: Proposed Schedule of Accommodation

	PROGRAMME	SPACES
Retail	Local products sales by local entrepreneur. (arts & crafts, timber products). Including online marketing	Retail shop
Teaching & learning	Talent & career development, seminar programme and sharing session	Classroom, Library, Resource room, Design clinic, Design studio
Workshop	Design programme, training and produce timber & craft products	Timber w, Craft w, Model making w
Display	Indoor exhibition: product display, introduce Sarawak design internationally Outdoor exhibition: Display types of timber trees and display outdoor timber products (hardscape)	Timber gallery, Exhibition room, Garden gallery
F&B	Eatery / cafeteria	Cafeteria, Refreshment area

DESIGN CONCEPT

Design development is part of the process that requires all decisions to be evaluated for their practicality and execution. It is the point at which decisions are made, and concepts are solidified into actions. Schematic design is focused on getting ideas on paper that represent the goals outlined during programming and fit within the constraints defined through site planning. While schematic design addresses broad goals and larger concepts, design development refines these ideas into realistic and tangible options.

SARAWAKIAN IMPRINTS

“ What is the Sarawakian Imprints? ”

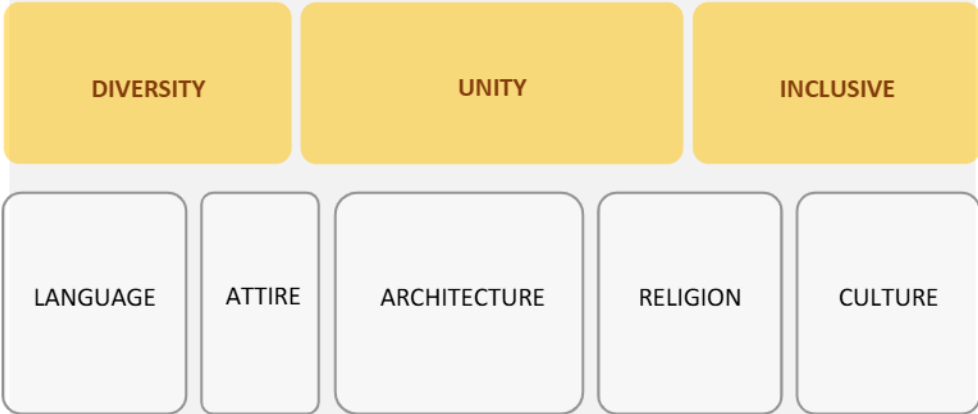


Figure 6: Design concept

CAMPUS PLANNING PRINCIPLE

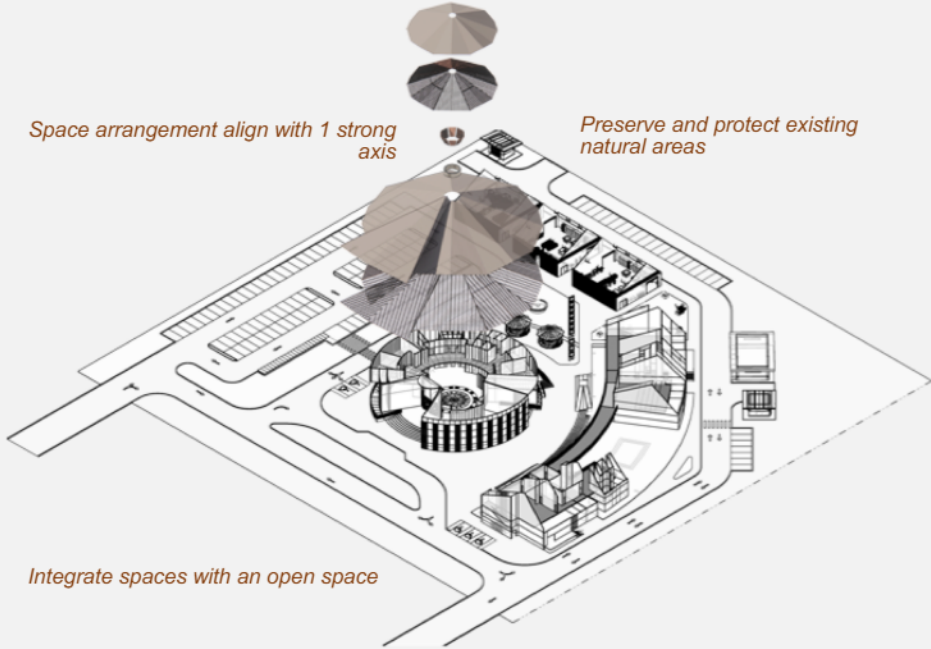


Figure 7: Campus planning principles

Campus planning involves designing and organising the physical layout of educational institutions to create functional, aesthetically pleasing, and sustainable environments. Several key principles guide effective campus planning:

- 1. Space arrangement align with one strong axis
- 2. Integrate spaces with an open space
- 3. Preserve and protect existing natural areas.

By adhering to these principles, Sarawak Design Incubation Centre can create environments that support learning, collaboration, and sustainability while enhancing the overall campus experience.

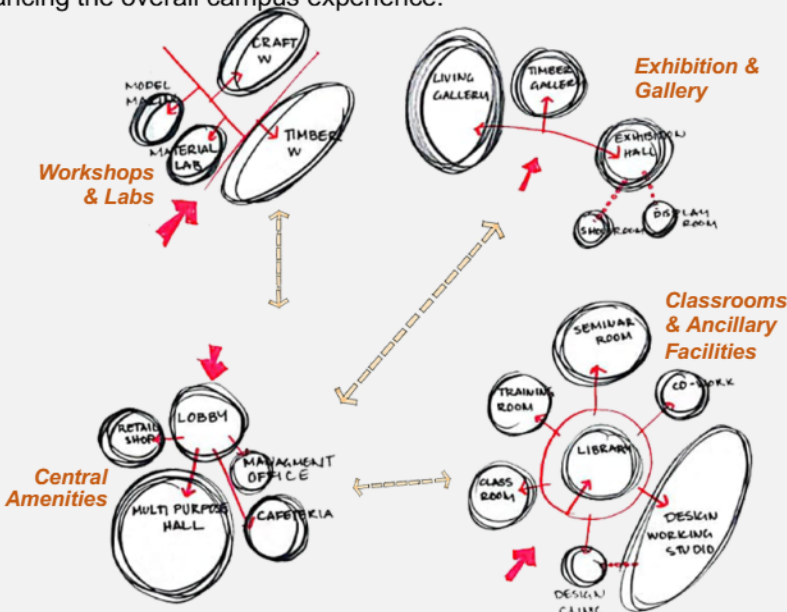


Figure 8: Bubble diagram showing the initial spatial arrangement

SITE PLAN

The Sarawak Design Incubation Centre is located in Kota Samarahan, which is about 30 km from Kuching. The town serves as an education hub and is officially known as the Town of Knowledge. It is home to two full-fledged universities, the University Malaysia Sarawak (UNIMAS) and Mara University of Technology (UITM), as well as a teachers' training centre, an industrial training centre, and the Sarawak Tropical Research Institute. Kota Samarahan boasts booming commercial centres, including malls such as The Summer Mall and AIMA Mall, along with numerous restaurants and fast-food outlets catering to the increasing population.



Figure 9: Site plan of Sarawak Design Incubation Centre

SPACE PLANNING

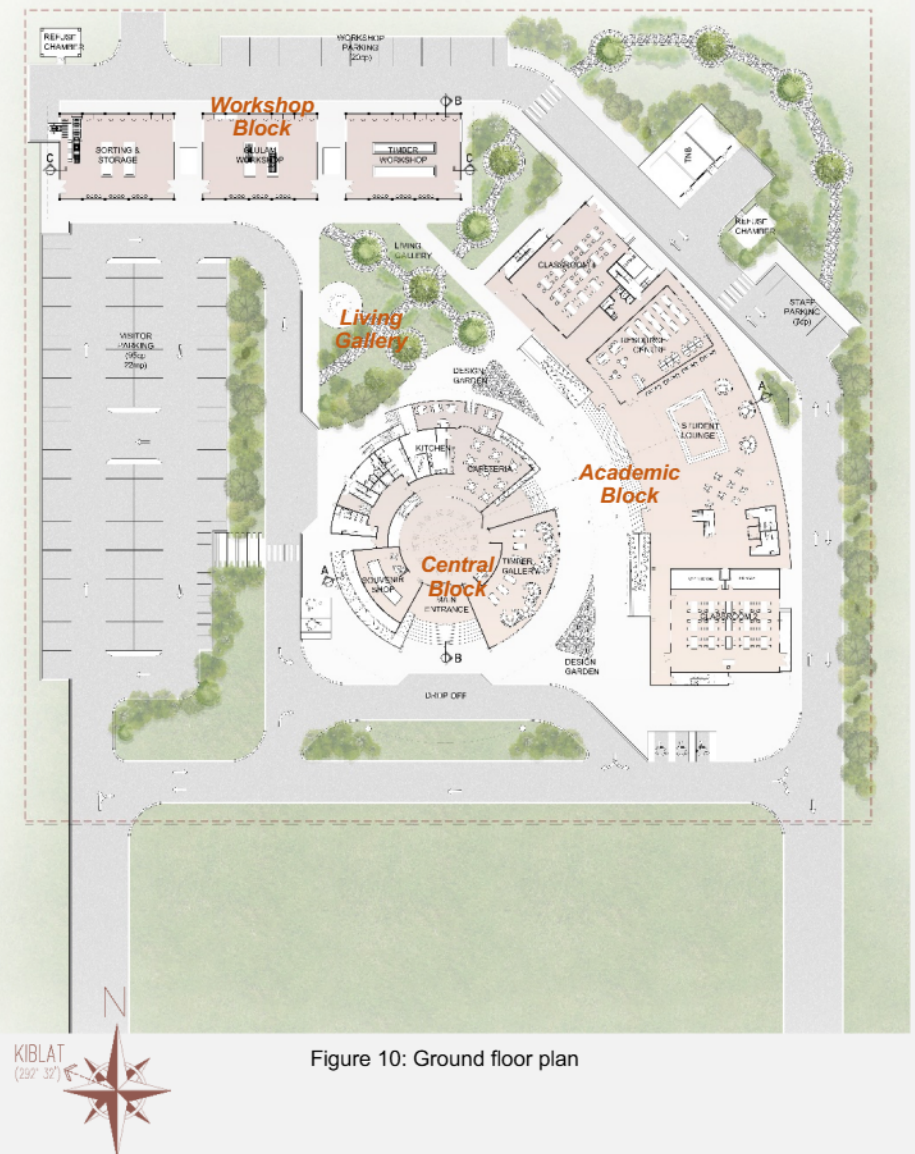


Figure 10: Ground floor plan

The centre is divided into three blocks: the main building, the academic building, and the workshop. These three buildings are connected by a plaza that integrates a living gallery and a design garden. The ground level of the main building is primarily for public use, featuring an indoor timber gallery, a souvenir shop, and a cafeteria. These spaces are connected by an open hall that can be used for temporary exhibitions.

The academic building is easily accessible from the main building via a covered walkway. This building primarily serves students, with the main space on the ground floor being the student lounge, which separates the west and east wings, each containing classrooms.

The workshop building, however, is only one story due to the heavy load of the machines and tools. This building is divided into three sections based on their functions.

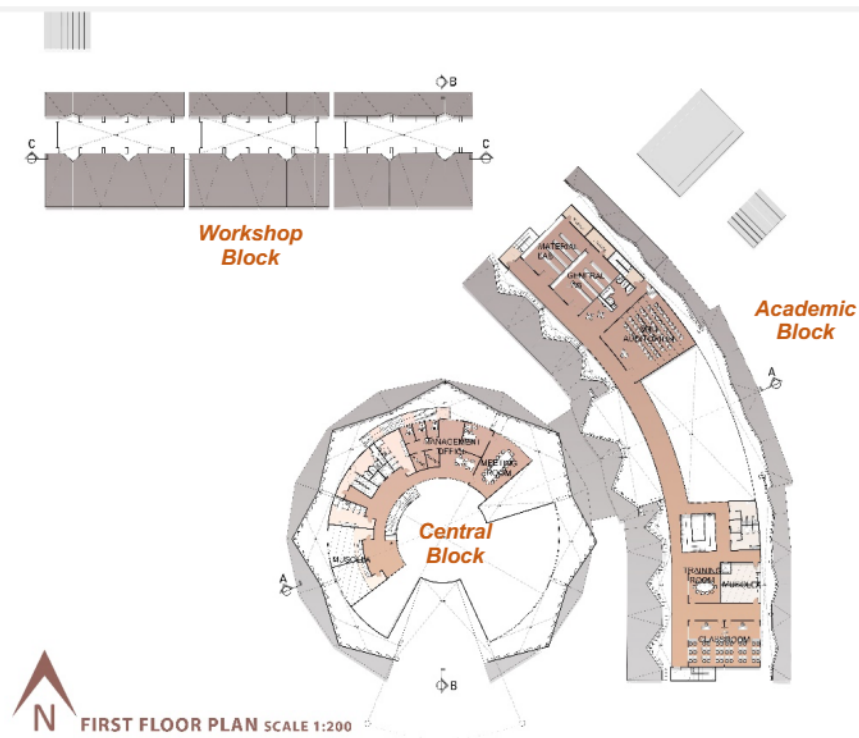


Figure 11: First floor plan

The management offices are located on the first floor of the main building along with public amenities. As for the academic building, there are more classrooms, mini auditorium and laboratory mainly to conduct studies on timber materials.

LIVING GALLERY



Figure 12: Recreational areas around the living gallery

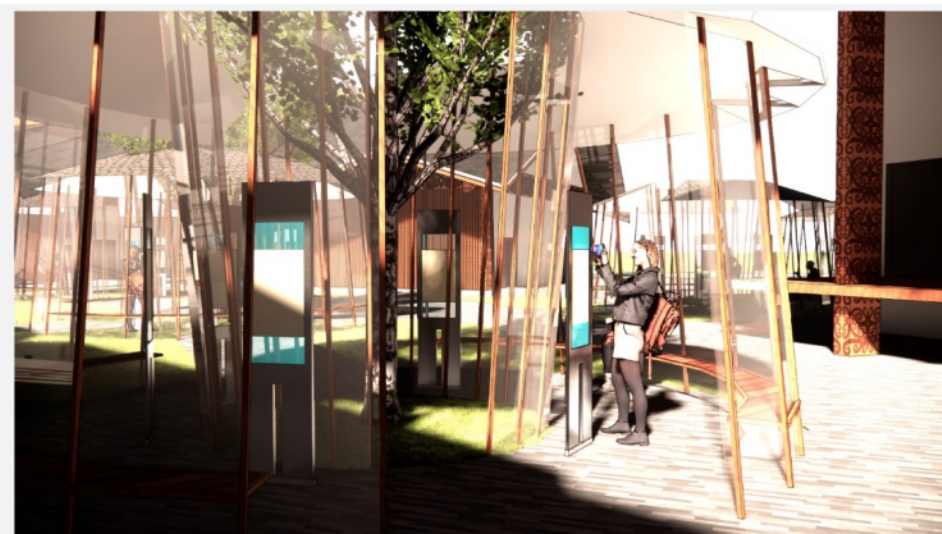


Figure 13: Living gallery for nurturing endangered timber species

Exterior visualisations



Figure 14: Central block with permanent and temporary gallery spaces



Figure 15: Academic block consisting of classrooms



Figure 16: Workshop building for heavy machineries and hand-on training



Figure 17: Timber gallery showcasing different species of timber from around the world



Figure 18: Workshop for heavy machineries



Figure 19: Open hall for exhibition, seminar and live performance



Figure 20: Main entrance showcasing the intricacy of Sarawakian timber ornamentation

CONCLUSION

In conclusion, this paper aims to illustrate the design approach of the Sarawak Design Incubation Centre as an institutional building that represents the identity of Sarawak. The design incorporates the use of timber products that reflect Sarawakian imprints. This paper presents a significant opportunity to foster innovation, collaboration, and economic growth within Sarawak. Through a comprehensive exploration of the transition from vernacular to contemporary Sarawak architecture and the provision of facilities for education in Sarawak timber, this paper outlines the importance of creating a dedicated space to support these issues.

The Sarawak Design Incubation Centre is to be established to foster creativity, innovation, and entrepreneurship in various industries, including timber and forestry in Sarawak. The centre will provide resources, mentorship, and support for individuals and businesses working on innovative projects and designs.

To complete this study, several methodologies were selected to ensure the aim and objectives of the design paper are met. Literature reviews, case studies, and expert interviews were used to analyse the spatial requirements needed to create this incubation centre.

The ideas for the design centre were translated into a centralised organisation of architectural buildings that reflect the culture of the place and consist of an exciting indoor timber gallery, an outdoor living gallery, an open hall that can be used to organise small events, and other academic facilities for exploration.

Designing the Sarawak Design Incubation Centre will reconnect and recreate talent in producing Sarawak timber products to improve the Sarawak timber economy and reintroduce the cultural treasures that have long been forgotten. It is hoped that the proposed Sarawak Design Incubation Centre will achieve its aims and objectives to address issues and create more awareness about preserving the rainforest.

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