



**DESIGN CONSIDERATIONS IN SHAPING THE IDENTITY OF  
ARCHITECTURAL COMPONENTS TOWARDS FORESTRY  
RESEARCH AND EDUCATION**

**By**

**NOR SYURIATY BINTI JAAFAR**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra  
Malaysia, in Fulfilment of the Requirements for the Degree of  
Master of Science**

**April 2022**

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in  
fulfilment of the requirement for the degree of Master of Science

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**Chair : Mohd Kher Bin Hussein, PhD**  
**Faculty : Design and Architecture**

The development of Research and Education Forests (REF) in Malaysia is a complement to the ongoing efforts on the importance of conserving the natural forests which are a treasure of natural heritage for the country, as well as the world. REF functions as a natural forest-based learning, research and development that requires the facilities in accordance to the sensitivity of the forest ecosystem. Therefore, architectural components that are in harmony with natural forest environment is needed not only to create sustainable REF development, but as a source of inspiration of the local identity. A strong identity is a need to establish citizen's self-esteem and without it all, development efforts are seen as having no purpose, so that it would not be a catalyst for the country's progression. Studies related to identity formation with regard to architectural design in the REF have not yet been specifically explained. Hence, this study aims to investigate the relationship between the architectural design aspects and the harmonization with natural forest environment to determine design considerations in shaping the identity of architectural components within the REF. The mixed method approach was used in the research methodology and results were validated through triangulation which involved the reviewed data from selected literature and case studies. The literature review covers the constructs of Research and Education Forest (REF), design harmonization and architectural identity. Subsequently, the case study was selected at Sultan Idris Shah Forest Education Centre (SISFEC), consisting site observation and survey questionnaire. The survey was based on the user's perception to the design harmonization with the natural forest environment and the place identity. Data on the design harmonization were analysed using SPSS 21, where the Pearson Correlation revealed that all selected design aspects are correlated positively to the harmonization of the architectural components with natural forest environment. Later, the Regression Analysis verified the proposed model statistically and proved that harmonize design aspects had significantly increased the design harmonization with forest environment for the formation of

architectural identity. Furthermore, Thematic Analysis on the place attachment showed that place identity is influenced by the uniqueness of nature, activities related to the forest environment and cultural uniqueness. Results of triangulation emphasized that the four (4) main design considerations in shaping architectural identity which must be taken into account by all stakeholders, namely spatial organization, the appearance of forms, the essence & ability of material and the style of design. The findings of this study would be able to assist designers in creating a sustainable REF with architectural identity that could help manifest the global obligation in preserving the world natural heritage, as well as showcasing its distinguished national cultural heritage.

Keywords: Architectural Identity, Design Harmonization, Natural Forest Environment



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia  
sebagai memenuhi keperluan untuk ijazah Master Sains

**PERTIMBANGAN REKABENTUK DALAM MEMBENTUK  
IDENTITI KOMPONEN SENIBINA KE ARAH PENYELIDIKAN DAN  
PENDIDIKAN PERHUTANAN**

Oleh

**NOR SYURIATY BINTI JAAFAR**

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**Fakulti : Rekabentuk dan Senibina**

Pembangunan Hutan Penyelidikan dan Pendidikan (HPP) di Malaysia adalah pelengkap kepada usaha yang berterusan terhadap kepentingan memulihara hutan semulajadi yang menjadi khazanah warisan semulajadi negara serta dunia. Fungsi kawasan ini adalah untuk pembelajaran, pengkajian dan pembangunan berteraskan hutan semulajadi yang memerlukan fasiliti yang sesuai dengan sensitiviti ekosistem di hutan tersebut. Oleh itu, sebuah pembangunan komponen seni bina yang harmoni dengan persekitaran alam semulajadi hutan amat diperlukan bukan sahaja untuk mewujudkan pembangunan HPP yang lestari, malah sebagai tonggak kepada identiti setempat. Sebuah identiti yang kuat adalah perlu bagi mewujudkan jati diri rakyat kerana tanpanya semua usaha pembangunan dilihat tidak mempunyai arah tuju yang dapat menjadi pemangkin kepada kemakmuran negara. Kajian berkaitan pembentukan identiti yang merujuk kepada rekabentuk seni bina di HPP masih belum dirungkaikan secara spesifik. Oleh itu, kajian ini bertujuan untuk mengkaji perkaitan antara aspek reka bentuk seni bina dan pengharmonian dengan persekitaran hutan semula jadi untuk menentukan faktor dalam membentuk identiti komponen seni bina di HPP. Pendekatan kaedah campuran digunakan di dalam metodologi kajian dan keputusannya disahkan melalui triangulasi. Ia melibatkan data semakan daripada literatur terpilih dan kajian kes. Kajian literatur merangkumi konstruk karakter Hutan Pelajaran dan Penyelidikan (HPP), keharmonian reka bentuk dan identiti seni bina. Kajian tapak di SISFEC melibatkan pemerhatian tapak dan tinjauan kaji selidik. Kaji selidik ini berkenaan persepsi pengguna mengenai keharmonian reka bentuk dengan persekitaran hutan semulajadi dan identiti setempat. Data mengenai pengharmonian reka bentuk dianalisa dengan menggunakan SPSS 21, Korelasi Pearson menunjukkan bahawa semua aspek reka bentuk yang dipilih mempunyai kaitan positif dengan keharmonian komponen seni bina terhadap persekitaran hutan semulajadi. Analisis Regresi telah mengesahkan model yang dicadangkan secara statistik dan membuktikan bahawa aspek reka bentuk harmoni

mempunyai kesan yang ketara dalam meningkatkan pengharmonian rekabentuk dengan persekitaran hutan bagi pembentukan identiti senibina. Selain itu, Analisis Tematik pada “place attachment” menunjukkan bahawa identiti setempat dipengaruhi oleh keunikan alam semulajadi, aktiviti yang berkaitan dengan persekitaran hutan dan keunikan budaya. Hasil triangulasi menekankan bahawa empat (4) pertimbangan reka bentuk utama dalam pembentukan identiti senibina yang perlu diambil kira oleh semua pihak yang berkepentingan, iaitu organisasi spatial, penampilan rekabentuk, intipati & keupayaan bahan dan stail rekabentuk. Penemuan kajian ini akan dapat membantu para pereka dalam mewujudkan HPP yang lestari dan beridentiti. Identiti seni bina HPP adalah manifestasi tanggungjawab global dalam memelihara warisan semula jadi dunia serta mempamerkan keunggulan warisan budaya negara.

Kata Kunci: Identiti Seni bina, Pengharmonian Rekabentuk, Persekitaran Hutan Semulajadi

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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## TABLE OF CONTENTS

	<b>Page</b>
<b>ABSTRACT</b>	i
<b>ABSTRAK</b>	iii
<b>ACKNOWLEDGEMENTS</b>	v
<b>APPROVAL</b>	vi
<b>DECLARATION</b>	viii
<b>LIST OF TABLES</b>	xiii
<b>LIST OF FIGURES</b>	xiv
<b>LIST OF ABBREVIATIONS</b>	xv
<b>CHAPTER</b>	
<b>1 INTRODUCTION</b>	<b>1</b>
1.1 Background of the Study	1
1.2 Problem Statement	2
1.2.1 Less Emphasis on REF by the State Authority	2
1.2.2 Conflict between the Designs of Architectural Component with the Sensitivity of Forest Ecosystem	3
1.2.3 Lack of Understanding in Specific Design Process in the Context of Natural Forests Environment	3
1.3 Research Gap	4
1.4 Aim of the Study	4
1.5 Hypothesis	4
1.6 Research Questions	5
1.7 Research Objectives	5
1.8 Scope of the Study	5
1.9 Limitation of the Study	6
1.10 Thesis Structure	6
<b>2 LITERATURE REVIEW</b>	<b>8</b>
2.1 Introduction	8
2.2 Scenario of Research and Education Forest (REF) in Malaysia	8
2.3 Function and Physical Characteristic of Research and Education Forest (REF)	11
2.4 The Design Approach related to Architectural Components of Research and Education Forest (REF)	12
2.5 Design Aspects applied to the Architectural Component Related to the Research and Education Forest (REF)	15
2.6 The Necessity of Architectural Identity in Research and Education Forest (REF)	17
2.7 Summary	18

<b>3</b>	<b>METHODOLOGY</b>	<b>19</b>
3.1	Introduction	19
3.2	Research Design	19
3.3	Case Study Approach	20
3.3.1	Sultan Idris Shah Forest Education Centre (SISFEC)	21
3.3.2	Justification on the Selection of Case Study	22
3.3.3	Site Observation on the Architectural Components	22
3.4	Questionnaire Survey Approach	25
3.5	Method of Analysis	27
3.6	Triangulation Technique	27
3.7	Summary	28
<b>4</b>	<b>RESULTS AND DISCUSSION</b>	<b>29</b>
4.1	Introduction	29
4.2	The Reliability of Variables	29
4.3	Demographics Background	30
4.3.1	Gender, Nationality and Age	31
4.3.2	Level of Education and Duration of Visit	32
4.4	The Relationship between Design Aspects and Design Harmonization with Natural Forest Environment	32
4.4.1	The Relationship between Spatial Organization and Design Harmonization with Natural Forest Environment	34
4.4.2	The Relationship between Appearance of Form and Design Harmonization with Natural Forest Environment	35
4.4.3	The Relationship between Essence & Ability of Material and Design Harmonization with Natural Forest Environment	36
4.4.4	The Relationship between Style of Design and Design Harmonization with natural Forest Environment	37
4.5	The Affecting Factor in Interpreting the Formation of Architectural Components' Identity for REF	37
4.6	The Contributing Factors to the formation of Architectural Identity	40
4.6.1	Place Attachment towards the Architectural Identity of SISFEC	44
4.6.2	The Importance of Place Attachment for SISFEC	45
4.7	Result Interpretation	47
4.8	Summary	52

<b>5</b>	<b>DESIGN CONSIDERATIONS OF ARCHITECTURAL IDENTITY FOR RESEARCH AND EDUCATION FOREST (REF)</b>	<b>53</b>
5.1	Introduction	53
	5.1.1 Significance of the Study	53
5.2	Design Considerations	54
	5.2.1 Spatial Organization	55
	5.2.2 The Appearance of Forms	58
	5.2.3 The Essence & Ability of Material	59
	5.2.4 The Style of Design	60
5.3	Design Approach for the Formation of Architectural Identity at REF	61
5.4	Future Research	62
5.5	Conclusion	62
	<b>REFERENCES</b>	<b>63</b>
	<b>APPENDICES</b>	<b>69</b>
	<b>BIODATA OF STUDENT ACHIEVEMENTS</b>	<b>72</b>
	<b>LIST OF PUBLICATION</b>	<b>73</b>
		<b>74</b>

## LIST OF TABLES

<b>Table</b>		<b>Page</b>
2.2	Type of Research and Education Forest in Malaysia	10
3.1	Observation's Checklist on Architectural Components	23
3.2	Likert Scale of Harmonize Level	26
4.1	Reliability Statistics, (Part B-Harmonization of Design Aspects)	30
4.2	Reliability Statistics, (Part C-Identity)	30
4.3	Frequency Table	31
4.4	Relationship between Design Aspects with the Design Harmonization	33
4.5	Summary of Correlation Analysis between IV and DV	33
4.6	Model Summary of Multiple Regression Analysis between IV and DV	38
4.7	Summary of Multiple Regressions Analysis	39
4.8	List of Remembrance Items	41
4.9	Thematic Analysis on Remembrance Items	42
4.10	The User's Place Attachment of SISFEC	43
4.11	Thematic Place Attachment of SISFEC	43
4.12	Observation's Checklist on Design Aspect	46
4.13	Summary of Findings on Architectural Components, Design Harmonization and Architectural Identity	51

## LIST OF FIGURES

Figure		Page
1.1	Flow of Thesis Structure	7
2.1	Selection of Design Aspects for REF	16
3.1	Flow of Research Methodology Framework	20
3.2	Location of Study Area	21
3.3	Spatial Organization	23
3.4	Form of Architectural Components	24
3.5	Material of Architectural Components	24
3.6	Style of Architectural Components	24
3.7	Triangulation Technique	28
4.1	The Application of Spatial Organization in Respecting the Forest Composition and Natural Terrain in SISFEC	48
4.2	The Application of Form in Respecting the Layer of Trees in SISFEC	48
4.3	The Application of Material in Respecting the Natural Landform in SISFEC	49
4.4	The Application of Style in Respecting the Forest Environment in SISFEC	50
5.1	Spatial Organization in REF	55
5.2	Spatial Organization - Site Contextuality of REF	57
5.3	The Sense of Place of REF	58
5.4	Appearance of Form of REF	59
5.5	Essence & Ability of Material of REF	60
5.6	Relationship between Harmonize Design Approach and Architectural Identity	61

## LIST OF ABBREVIATIONS

RO	Research Objective
HPP	Hutan Penyelidikan dan Pelajaran
REF	Research and Education Forest
SISFEC	Sultan Idris Shah Forest Education Centre
IV	Independent Variables
DV	Dependent Variable
KSAS	Kawasan Sensitif Alam Sekitar
SPSS	Statistical Package for the Social Sciences



# CHAPTER 1

## INTRODUCTION

### 1.1 Background of the Study

Design consideration are subjects that may affect the approach, planning, designing, requirements, operation as well as management since it should be part of the overall implementation process. Moreover, design consideration can assist with the proper implementation via precise steps to avoid design failure or ineffectiveness. These considerations are intended as a foundation for a design guideline and as a planning tool for designers and stakeholders to be taken into account from the inception design stage. Hence, this study focuses into the design consideration on the formation of identity in architectural components at the Research and Education Forest (REF) in Malaysia where the Sultan Idris Shah Forest Education Centre (SISFEC) at Air Hitam Forest Reserve, Selangor was chosen as the case study for this research.

Architectural components are references made to buildings and also landscape elements such as shelter, walkway, seating, lighting, signage and etc. These components were developed in REF with the function to meet the needs for education, research and development activities. The design of architectural components that involve sensitive forest ecosystem requires a specific study on the forest characteristics, the design aspects as well as the determination of appropriate design approach. In addition, the understanding of site context becomes a necessity when involving natural forest areas such as REF. Here, the appearance of architectural components have contributed in defining the sense of place which signified the cultural value of the nation.

REF is listed as one of the forest categories under the National Forestry Policy 1978 (Revised 1992) with the purpose of research, education and the preservation of biological diversity. Malaysia is fortunate to still have extensive natural forests with preserved ecosystems despite rapid development, compared to other developed countries. Thus, the determination on design aspects that corresponds with the natural ecosystem of the forest is essential for its sustainability. The only way to ensure the sustainability in REF for the formation of architectural identity is the application of a harmonize design approach on the design aspects. Hence, harmonize design approach is the heart of sustainability in REF. As a natural forest-based learning, REF has its own class and potential to elevate the country's image on a global level with the architectural identity of its national spirit. Hence, with a strong architectural identity in REF it will not only enhance a sense of nationhood, but it will definitely sustain the sensitivity of the forest ecosystem. Ultimately, the emphasis on architectural identity is vital for the overall image of REF.

## 1.2 Problem Statement

The problem statement that lead to the implementation of this study is as follows:

“There is lack of identity in architectural components at REF in reflecting the preservation of natural heritage as well as celebrating the cultural heritage of Malaysia.”

Azizi (2003) highlighted that development is mostly caught in the homogenizing forces of the mass media and are repeating the mediocrity of international fashion where it could be observed that some of the architectural design in forest areas are quite similar with urban parks, for instance, the building, shelter, pedestrian walkways, benches and etc. To date, there is no specific guideline on the architectural identity for the natural forests, especially in REF. Besides that, the lack of understanding and awareness on the natural and cultural resources which are related to REF significantly contributes to the lack of direction in the identity of architectural components. Although there are acts, policies and guidelines related to the natural forests, for example the existing guidelines issued by the PLANMalaysia which focuses on the provision of general planning and forestry activities, these, however; do not lead to the formation of architecture with an identity. Since REF requires suitable architectural components that fit into the forest characteristic, problems arise due to the following factors:

### 1.2.1 Less Emphasis on REF by the State Authority

Public perception on the function of ‘Jabatan Perhutanan Semenanjung Malaysia’ is more on the production of timber since it is part of the local commodity in certain states. As REF has been categorized as one of the four forest categories in the National Forestry Policy 1978 (Revised 1992), the public is more aware of the other three categories, namely Production Forest, Protection Forest and Amenity Forest. Additionally, based on the observation at the official website of Jabatan Perhutanan Semenanjung Malaysia (2019) of each state in Peninsular Malaysia in 2022, REF is emphasised less by states across Malaysia compared to other types of forests (Table 2.1, Page 10). This may be due to socio-economic factors where the community demands more on the recreational purposes, lack of awareness on the importance of educational forest etc. However, from a positive point of view, most of the parties involved realised the great potential of REF as one of the platforms in guiding, controlling, including an effective way in conserving and preserving natural forests. It is shown on the initiative of the parties involved in planning or upgrading the facilities of REF for several states in Malaysia.

### **1.2.2 Conflict between the Designs of Architectural Component with the Sensitivity of Forest Ecosystem**

REF is currently one of the permanent reserved forest that has been classified as Environmental Sensitive Area (ESA) in the Garis Panduan Perancangan Pemuliharaan dan Pembangunan Kawasan Sensitif Alam Sekitar (KSAS) Hutan Simpanan Kekal (PLAN Malaysia, 2017). The designing of architectural components require suitable design approaches that respond effectively toward the sensitivity of the forest ecosystem and the implementation process should be managed in a sustainable manner. There is a pressure in fulfilling the demand for facilities to support activities in the REF for the stakeholders and designers in providing the architectural components in natural forest areas, without disturbing the ecosystem. This is in line with Mohd Kher & Syuriaty (2021) whom highlighted this conflict had contributed to inharmonious designs which led to the significant failure of identity as well as meaning in securing the sense of place which was not adequately examined in the process. If this situation continues, it could raise to unsafe guarding, unsustainability and degradation of the surrounding natural resources of the site. Futhermore, Syuriaty, et al., (2020) stressed that harmonization of man-made elements with existing forest environment is crucial and there is a need for further improvement to be taken to increase the harmonize level.

### **1.2.3 Lack of Understanding in Specific Design Process in the Context of Natural Forests Environment**

Specific design process in the context of natural forest environment especially for REF in Malaysia is still unveiled and caused to lack of understanding among designers and stakeholder. This is in line with an argument by Bosh & Thomas (2004) where generally most of the architectural components in natural forest areas are noticed as less prominent in terms of design, compared to urban areas. This is due to lack of specific characteristic on design aspects to the appearance of architectural components and usually the construction of architectural components that apply an 'in situ' approach. Indeed, it is very unfortunate that architectural components in the forest are built on an ad hoc basis with the absence of a 'code of design' in creating a well-built environment of landscape and architectural quality (Noorizan, 1995). Furthermore, this issue contributes to neglect in the context of the natural forest environment and resulting ecosystem imbalance.

### **1.3 Research Gap**

From the above research problem, the author has identified the research gaps as less emphasis given on REF by the State Authority, conflict between the designs of architectural components with the sensitivity of forest ecosystem, lack of understanding in specific design process in the context of natural forests environment and lack of clarity on the direction in the identity of architectural components in the natural forests area. Therefore, there is a research gap for a study focusing on the design consideration that shapes the architectural identity through the harmonization of design elements in architectural components with natural forest environment at REF.

### **1.4 Aim of the Study**

This study aims to investigate the association between the design aspect of architectural components and harmonization with natural forest environment in shaping the architectural identity for REF. To achieve the aim, harmonization of architectural components is a vital attribute in this study. Harmonization is a common process in many practices with the purpose to produce the best achievement of overall strategic implementation. For example, in cross-cultural survey, harmonization is a generic term for procedures used predominantly in official statistics that aim at achieving, or at least improving, the comparability of different surveys and measures collected (Ann Arbor, 2016). Meanwhile, the National Institute for Environmental Studies Japan (2021) has conducted research and program on Harmonization with Nature on the measures for conservation of biodiversity and the sustainable use of ecosystem services, which are essential for establishing a society in harmony with nature. The purpose is to mainstream biodiversity and promote transformative change, such as behavioral change, and to improve natural capital by synergizing the conservation and sustainable use of biodiversity. Therefore, this study focuses on the harmonization of design elements with natural forest environment at REF which can be a platform for identity formation on the architectural component.

### **1.5 Hypothesis**

The hypothesis of this study is as follows:

“There is a positive relationship between design aspects of architectural component and design harmonization with natural forest environment for the formation of architectural identity”

Therefore, predictions are made through constructed hypotheses and will be tested after determining the significant correlation between the factors that affect the formation of architectural identity.

## **1.6 Research Questions**

The research problem is presented as a question of this study. Therefore, based on the problem statement, three research questions were developed as below:

- 1) What is the relationship between design aspects of architectural components and design harmonization with natural forest environment to the formation of the architectural identity?
- 2) What are the factors that contribute to the formation of architectural components' identity based on the REF's characteristic?
- 3) What are the design considerations in shaping the identity of architectural components of REF in Malaysia?

## **1.7 Research Objectives (RO)**

- RO1 To examine the relationship between design aspect of architectural components and design harmonization with natural forest environment to the formation of architectural identity in the REF.
- RO2 To evaluate the contributing factors to the formation of architectural identity in the REF.
- RO3 To determine the design consideration in shaping the identity of architectural components of REF in Malaysia.

## **1.8 Scope of the Study**

This study covers the architectural aspect of REF in Malaysia. This is to emphasize that the identity contributes a significant part in encouraging the public's responsiveness towards the forest as a natural heritage of the nation and upholding the Malaysian cultural value. Hence, the need for a formation identity on the architectural components with forest characteristic is necessary.

Syuriaty, et al., (2020) highlighted that harmonious design in the Forestry Education Centre can be created by studying the application of form, color, materials and style of all buildings and structures to an architectural design theme. Meanwhile, Ismail Said (2000) emphasized on the spatial organization that would cause minimal modification to the water flow, soil structure, plant and wildlife communities of the forest as the main design consideration for natural forest areas. Therefore, based on the fundamental of design characteristics, appropriate design approach and understanding of place attachment of REF, this study focuses only on four main design aspects in architectural components namely spatial organization, form, material and style in the determination of design considerations that shape the identity.

## **1.9 Limitation of the Study**

This study is limited to the appearance of architectural design components at REF in Malaysia only. It does not cover other aspects related to the interior design or indoor space of the building, civil and structural design, mechanical and electrical engineering aspects. The data collection, data analysis and data gathering and assessment that were presented are only accurate for the selected REF in Malaysia and does not involved REF in other locations. This study also concentrate on the formation of identity only, and not on the usability.

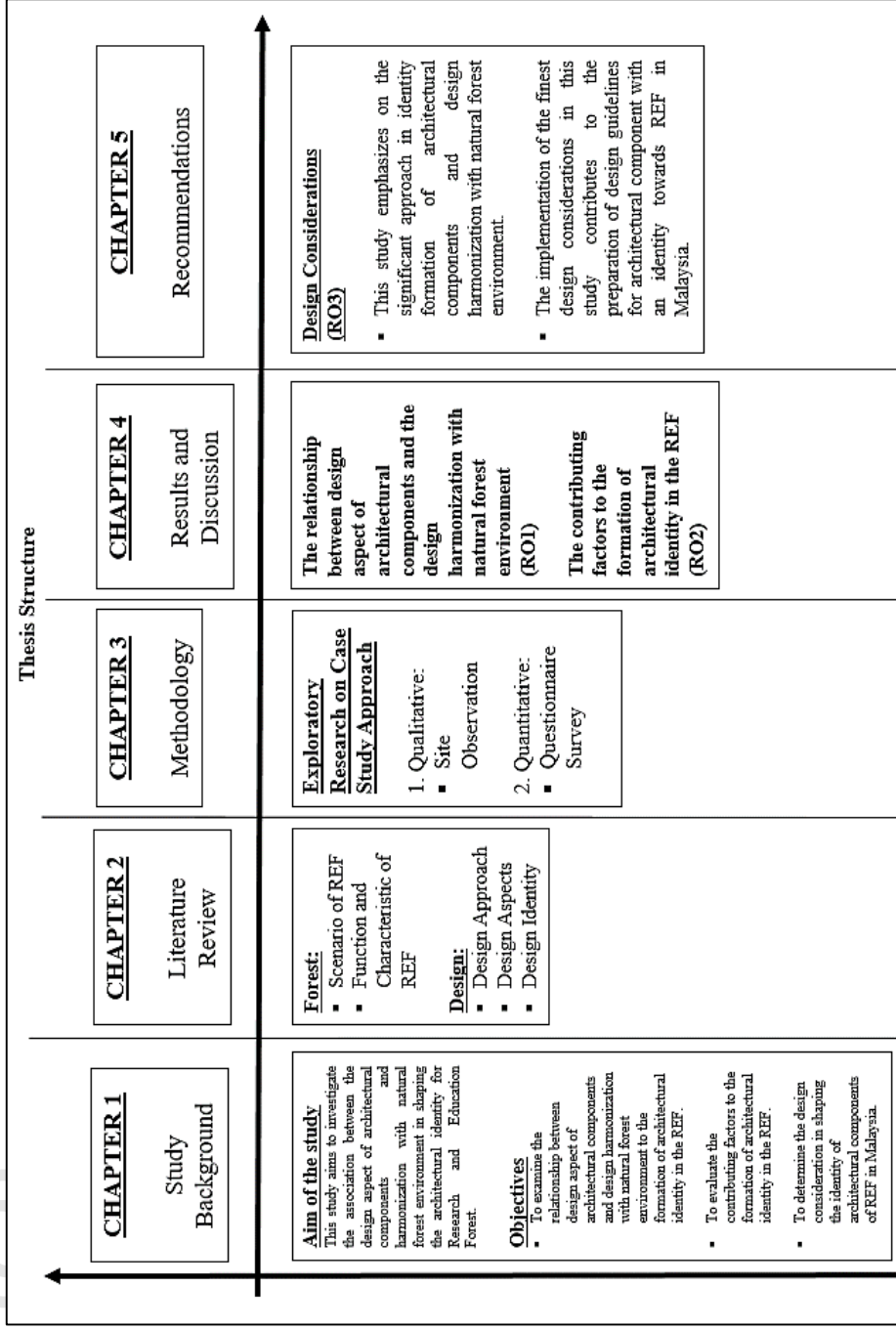
## **1.10 Thesis Structure**

The thesis structure describes the content of the research report in general. To achieve this purpose as well as further description with respect to research activities, this report is organized in five chapters.

The first chapter is a background and introduction to the research and briefly describes the contents of the research report. The description covers an initial understanding of architectural components and REF as well as the importance and justification in constructing design considerations to shape the identity of architectural components in REF. This chapter further explains the research problems, the research gap, aim of the study, hypothesis along with the three objectives of the study determined through the research questions, followed by scope of the study and the limitations of the study.

Afterward, the literature review is discussed in Chapter Two. For this purpose, the literature review is divided into two parts, namely on REF in Malaysia, and secondly on architectural design approach, design aspect and on architectural identity related to REF. The third chapter is a research methodology that uses a mixed method that is divided into two parts, namely qualitative and quantitative, which leads to the types of data collection. The study approach, samples and respondents of the research are also stated.

The fourth chapter describes the types of analysis used and explains the results of the study. In addition, hypotheses were also constructed and tested to further strengthen the results of the conducted analysis. Then, the discussion was made on the findings of the study and basically, it is to respond to the research objectives (RO) of the study that have been set at the beginning of the study. Triangulation techniques were performed for the evaluation of the summary of each discussion. The fifth chapter is the last chapter in the study. It discusses the conclusions obtained from the research that has been conducted with a set of design considerations. The flow of thesis structure is shown on Figure 1.1.



**Figure 1.1: Flow of Thesis Structure**  
(Source: Author, 2021)

## REFERENCES

- Abowardah, E. S. (2016). Design Process & Strategic Thinking in Architecture. In Proceedings of 2016 International Conference on Architecture & Civil Engineering, 1–13.
- Ahmad, S. S. (2015). Research and Its Importance. *The Ophthalmology - Open Journal*, 1(1).1–2.
- Al-Alwan, Hoda & Hakki, Yasamine. (2017). Architectural Harmony with Nature : Sustainable Design Towards Human Health and Well-being.
- Al-Shuaibi, Abdulghani. (2014). The Importance of Education.
- Altman, I., & Low, S. M. (1992). Place attachment. Springer.
- Ann Arbor, (2016). *Guidelines for Best Practice in Cross-Cultural Surveys*. MI: Survey Research Center, Institute for Social Research, University of Michigan.
- Anselm, A. J. (2006). Developing designs in balance with nature. *Eco-Architecture : Harmonisation between Architecture and Nature*.
- Azmi, B., Rosli, M. F., Effendi, M. S. M., & Shuaib, N. A. (2014). Sejarah dan apresiasi senilukis dan senireka. Universiti Malaysia Perlis.
- Azrin, M. K. (2011). Sistem Pendidikan di Malaysia : Dasar , Cabaran , dan Pelaksanaan ke Arah Perpaduan Nasional. *Sosiohumanika*, 4(1), 33–48.
- Baper, S. Y., & Hassan, A. S. (2010). The influence of modernity on Kurdish architectural identity. *American Journal of Engineering and Applied Sciences*, 3(1), 552-559.
- Bawole, P. (2011). Harmony with Nature for Sustainable Built Environment. “Man Made and Natural Environment”. Department of Architecture : University, Yogyakarta.
- Behzad Far, M. (2008). City identity (a look at identity of Tehran). Tehran's Cultural Center, Nashre Shahr Institute Publishing, Second Edition.
- Bell, S. (2008). Design for outdoor recreation. Taylor & Francis.
- Berita Harian, (2021). Retrieved January 27, 2022, from <https://www.bharian.com.my/>
- Bosch, K. V. D., Cecil & Thomas, R. (2004). Urban Forestry.
- Caldwell, J. C. (1996). Demography and Social Science. *Population Studies*, 50(3), 305–333.



- Ching, F. D. K. (2007). *Form, Space and Order. e-conversion - Proposal for a Cluster of Excellence*, Wiley & Sons.
- Chua, Y. P. (2006). *Kaedah dan Statistik Penyelidikan*. Kuala Lumpur: McGraw Hill.
- Cooper, N. S. (2000). How natural is a nature reserve? : An ideological study of British nature conservation landscapes. *Biodiversity and Conservation*, 9(8), 1131–1152.
- Dasar Perhutanan Malaysia, 2021. Kementerian Tenaga dan Sumber Asli, Malaysia.
- Denis Taylor. (1966). *The Importance of Research in Developing Countries*, 33–36.
- Dewidar, K. (2017). *Architecture and Nature*. The British University in Egypt.
- Drost, E., A. (2011). Validity and reliability in social science research. *Education Research and Perspectives*, 38 (1), 105-124.
- Eden, A. H., & Kazman, R. (2003). *Architecture, design, implementation. Proceedings - International Conference on Software Engineering*, 149–159.
- Eskelson, T. C. (2020). How and Why Formal Education Originated in the Emergence of Civilization. *Journal of Education and Learning*, 9(2), 29–47.
- Evans, P., & Thomas, M. (2013). *Exploring the elements of design (3<sup>rd</sup> Edition.)*. Delmar, NY: Cengage Learning.
- Forest Research Institute Malaysia. (2014). Retrieved January 26, 2022, from <https://www.frim.gov.my/>
- Fu, K. K., Yang, M. C., & Wood, K. L. (2015). *Design Principles: The Foundation of Design*. In *Proceedings of the ASME 2015*, 1–10.
- Gatto, J. A., Porter, A. W., & Selleck, J. (2011). *Exploring visual design: The elements and principles, (4<sup>th</sup> Edition.)*. Worcester, MA: Davis Publications.
- Ghotbi, A. A. (2008). The concept of identity and modern Iranian architecture. *Aeiine Khial Journal*, 10.
- Gödek, Yasemin. (2004). The Development of Science Education in Developing Countries. *Journal of Kirsehir Education Faculty*. 5.
- Hammer, Carol. (2011). The Importance of Participant Demographics. *American journal of speech-language pathology / American Speech-Language-Hearing Association*.
- Hasmori, A. A., Sarju, H., Norihan, I. S., Hamzah, R., & Saud, M. S. (2011). Pendidikan dan Kurikulum. *Journal of Edupres*, 1, 350–356.

- Heale, Roberta & Forbes, Dorothy. (2013). Understanding triangulation in research. Evidence-based nursing.
- Henderson, N. (1992). Wilderness and the Nature Conservation Ideal : Britain, Canada and the United States Contrasted, *Ambio*, 21(6). 394–399.
- Hull, B. R., Lam, M., & Vigo, G. (1994). “Place identity: Symbols of self in the urban fabric”. *Landscape and Urban Planning*, 28. 109-120.
- Hussein, M. K. B. , & Jaafar, N. S. B. (2021). Understanding the Importance of Harmonized Landscape Design for Forest Education Centers in Malaysia. In (Ed.), *Light Pollution, Urbanization and Ecology*. IntechOpen.
- Hussein, Mohd Kher & Mohd Yusof, Mohd Johari & Jaafar, Nor. (2020). An Observational Study on Forest Landscape Conservation in Malaysia via the Establishment of Forestry Educational Centres. *Journal of Construction in Developing Countries*. 25. 153-173.
- Ira, M. (2012). “Menggali Makna Arsitektur Vernakular: Ranah, Unsur dan Aspek-aspek Vernakularitas. *Journal of Architecture*, 1(2). 68-82.
- Ismail, Said., & Ali Rahman, M. A. (2000). Site Planning and Architectural Design Considerations of Resorts in Mangrove Forests. In *Proceedings CASLE 2000, Expanding Relevance & Enhancing Possibilities in a Knowledge-based Economy*, 1–12. Kuala Lumpur, Malaysia.
- Jabatan Perhutanan Negeri Johor, (2019). Retrieved January 27, 2022, from <https://forestry.johor.gov.my/>
- Jabatan Perhutanan Semenanjung Malaysia. (2019). Retrieved January 27, 2022, from <https://www.forestry.gov.my/en/>
- Jaglan, A. (2018). Role of Elements and Principles of Design in Architectural Design. *International Journal of Architectural Design and Management*, 1(1).
- Kaplan, B., & Duchon, D. (1988). Combining qualitative and quantitative methods in information systems research : a case study. *MIS quarterly*, 571-586.
- Kaya, V. H., & Elster, D. (2019). Environmental STEM Pedagogical Content Knowledge (E+STEM-PCK) : Teacher’s Professional Development as Environmental STEM Literate Individuals in the Light of Experts’ Opinions. *Science Education International*, 30(1), 11–20.
- Kim, J., & Park, K. (2018). The design characteristics of nature-inspired buildings. *Civil Engineering and Architecture*, 6(2), 88–107.

- Kimberlin, C.L., & Winterstein, A.G. (2008). Validity and reliability of measurement instruments used in research. *American journal of health-system pharmacy : AJHP : official journal of the American Society of Health-System Pharmacists*, 65(23), 2276-84 .
- Kosman, K. A., & Ibrahim, N. L. N. (2007). Identity Seni Bina Malaysia : Masalah dan Penyelesaiannya. *SARI : Jurnal Alam dan Tamadun Melayu*, 25. 270-290.
- Marshall, C. & Rossman, G. B. (1989). *Designing qualitative research*. Newbury Park, CA : Sage.
- National Forestry Act 1984. Amended 2006. Government of Malaysia.
- National Forestry Policy 1978. Revised 1992. Government of Malaysia.
- National Institute for Environmental Studies (2021). *NIES Annual Report*. Japan.
- Niles, D., & Tachimoto, N. (2018). Science and the experience of nature. *Nature Sustainability*, 1(10), 540–543.
- Noor Azizi, A. (2003). *Landscape architecture in Malaysia-in search of identity. Alam Cipta. Fakulti Rekabentuk dan Senibina. Universiti Putra Malaysia.*
- Nooraddin, H. (2012). *Architectural Identity in an Era of Change. Developing Country Studies*, 2(10), 81–96.
- Noorizan, Mohamed. (1995). *Conservation in Malaysia: landscape, tourism and culture. Unpublished PhD. Thesis. University of York, UK.*
- Norazida, I., & Hasnah, A. (2013). *Kepentingan Penyelidikan dan Pembangunan (R&D) dalam Pertumbuhan Wilayah Di Malaysia. Prosiding Perkem VIII*, 2, 796–805.
- Oliver, P. (1997). *Encyclopedia of vernacular Architecture of The World*. 3. Cambridge: Cambridge University Press.
- Pallant, J. (2005). *SPSS Survival Guide : A Step by Step Guide to Data Analysis Using SPSS for Windows*. 3rd Edition, Open University Press, New York.
- [Pallant, J. \(2010\). \*SPSS Survival Manual : a step by step guide to data analysis using SPSS, 4<sup>th</sup> Edition\*.](#)
- Park, K. (2017). *The Design Characteristics of Nature Inspired Architecture. Seoul World Architects Congress.*
- Perry, D. E., & Wolf, A. L. (1992). Foundations for the study of software engineering. *Software Engineering Notes*, 17(4), 40-52.

- Peter, A., & Olukayode, O. F. (2017). Architectural Design Harmonising With The Surrounding Features. *International Journal of Research -Granthaalayah*, 5(11), 102–108.
- Petterson, R. (2010). *Information Design–Principles and Guidelines*. 29(2), 167–182.
- PLAN Malaysia. (2017). *Pemuliharaan Dan Pembangunan Kawasan Sensitif Alam Sekitar (KSAS)*.
- Proshansky, H. M., Fabian, A. K., & Kaminoff, R. (1995). Place identity : Physical world socialisation of the self, giving places meaning. *Readings in Environmental Psychology*, 87-113.
- Rancangan Pengurusan dan Pembangunan Hutan Simpan Ayer Hitam. (2016-2025). *Fakulti Perhutanan, Universiti Putra Malaysia*.
- Rasdi, M. T. H. M. (2005). *Malaysian architecture: Crisis within*. Utusan Publications.
- Roscoe, J. T. (1975). *Fundamental research statistics for the behavioral sciences (Second Edition)*. New York : Holt Rinehart and Winston.
- Sekaran, U. & Bougie, R. (2016). *Research Methods for Business : A Skill-Building Approach*. 7th Edition, Wiley & Sons, West Sussex.
- Sekaran, U., & Bougie, R. (2010). *Research Methods for Business : A skill Building Approach*. 5th Edition, Chichester: John Willey & Sons Ltd.
- Shamai, S. (1991). Sense of place: An empirical measurement. *Geoforum*, 22(3), 347-358.
- Shebek, N., Timokhin, V., Tretiak, Y., Kolmakov, I., & Olkhovets, O. (2020). Sustainable development and harmonization of the architectural environment of cities. In *E3S Web of Conferences*, 166, 1–9.
- Singh, G. & Singh, J. (2012). *Building Planning, Design and Scheduling*. Published by N.C. Jain Standard Publishers Distributors. Nai Sarak, Delhi.
- Syahida Shahidan, N., & Md Khalid, R. (2019). Forest Research Institute Malaysia (FRIM) as Heritage Forest: Existing Legal Protection and its Effectiveness. *International Journal of Asian Social Science*, 9(12), 702–708.
- Syuriaty, J. N., Mohd Kher, H., & Mohd Johari, Y. (2020). Harmonization of Man-Made Landscape Elements in Forestry Educational Centres with Existing Forest Environment. *Department of Landscape Architecture , Faculty of Design and Architecture, Alam Cipta*, 13(2), 33–46.
- Tajudin, M. R. M., & Alice, S. I. (2002). *Teori Senibina Frank Lloyd Wright*. Prentice Hall, Malaysia.

- Tomita, K. (2015). Principles and Elements of Visual Design: A Review of the Literature on Visual Design of Instructional Materials. *Educational Studies*, 57(4), 167–174.
- Ujang, N. (2010). Place attachment and continuity of urban place identity. *Asian Journal of Environment-Behavior Studies*, 11, 41-74.
- Ujang, N. (2014). Place meaning and significance of the traditional shopping district in the city centre of Kuala Lumpur, Malaysia. *Archnet-IJAR*, 8(1), 66–77.
- Vale, L., J. (1992). *Architecture, power, and national identity*. New Haven, Yale University Press.
- Van, N. T., Said, H., Awang, Z., & Khan, A. (2016). Student perspective on learning and development outcomes of academic advising at universiti teknologi Malaysia. *Man in India*, 96(1–2), 675–688.
- Williamson, G. R. (2005). Illustrating triangulation in mixed-methods nursing research. *Nurse Researcher*, 12(4), 7-18.
- Yin, R., K. (2014). *Case study research design and methods 5th Edition*. Journal: *CJPE*, 30(1), 1-5. University of Ottawa.
- Zeisel, J. (2016). *Observing Environmental Behavior. Inquiry by design: tools for environment-behavior research*.